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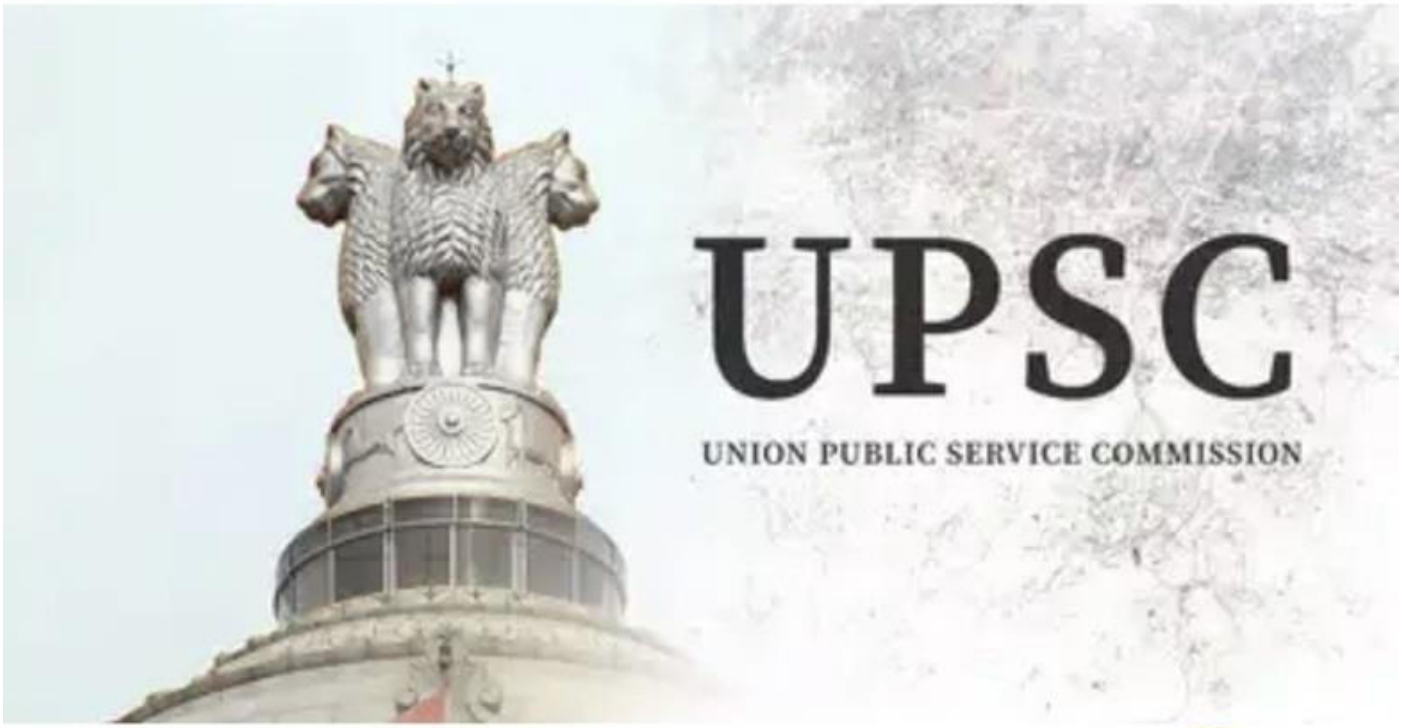
News Analysis



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JANUARY 2025
G.S PAPER II

1. INDIAN POLITY

1.1 Issues Surrounding Governor's Address

There have been a series of issues in Opposition-ruled States with respect to the address by the Governor to the State legislature at the commencement of first session of the year.

What about the Governor's customary address?

- **About the Governor –** He/She is the ***constitutional, nominal head*** of an Indian state, acting as the chief executive in whom state powers are vested, similar to the President at the center.
- **Appointed by –** The President for a 5-year term, they act on the advice of the Council of Ministers, yet hold discretionary powers, including reporting for President's rule (Article 356) and appointing the Chief Minister.
- **Customary Address** – It is a ***formal speech*** delivered by the Governor at the beginning of certain legislative sessions.
- Similarly, the President delivers such an address in Parliament.
- **Drafting of the Speech** – These speeches are prepared by the *government in office*, not by the Governors or the President themselves.
- The Head of State merely reads out the text drafted by the Council of Ministers.
- **Nature of the Address** – The Governor's address is *not a personal statement*, but a constitutional duty that reflects the policies and priorities of the elected government.
- **Constitutional Implications** – Skipping, altering, or refusing to deliver the prepared speech is considered unconstitutional. Such actions undermine democratic accountability and can lead to political instability.

What are the historical background?

- **Government of India Act, 1935** – Section 63 of the act provided that the Governor may in his discretion address the Provincial legislature.
- Starting from April 1937, when provincial autonomy started under the act, the Governor's speech was prepared in consultation with the Council of Ministers in Provinces that laid down the legislative agenda.
- **The Constituent Assembly Debate** – While adopting the article dealing with Governors' address to State legislature, it was understood that it would reflect the policy of elected Council of Ministers and not the Governor's personal views.

What are Constitutional provisions?

- **Article 175** – The Governor may address the house(s) of the State legislature, but this is ***not a mandatory address*** and may be rarely used by a ruling government.
- **Article 176** – The Governor shall address the house(s) of the State legislature
  - at the commencement of the first session after each general election to the Legislative Assembly and
  - at the commencement of the first session of each year.
- This is a ***mandatory address*** to be prepared by the Council of Ministers and delivered by the Governor.
- **Content –** It outlining the government's achievements in the previous year and its roadmap for the policies in the ensuing year.
- This address is also provided whenever a new assembly is constituted to enable a newly sworn in Council of Ministers to outline their policies to the elected representatives and through them to the citizens at large.
- **Motion of Thanks** – Article 176 further directs that the rules of procedure of the house(s) shall have provisions for allotment of time for discussion of matters referred in such address.
- The 'Motion of thanks on Governor's address' where the ruling and opposition legislators' debate on the policy matters announced in the address before voting on the same.

What are the Judicial precedents?

- **Shamsher Singh vs State of Punjab (1974)** – The SC had held that the Governor is only a constitutional head who *acts on the advice of Council of Ministers.*
- **Nabam Rebia vs Deputy Speaker (2016)** – The SC reiterated that the address under Article 175 or 176 is to be performed by the Governor on the *aid and advice of Council of Ministers*.

What is the current issue?

- **Tamil Nadu –** The Governor had skipped portions of the address in 2022–23 and since 2024 has refused to deliver the mandatory speech as required under Article 176, even walking out of the Assembly.
- **Kerala –** The Governor skipped a few portions of the policy address prepared by the State's cabinet.
- **Karnataka –** The Governor did not read out the address prepared by the Council of Ministers but instead delivered a two-line speech before leaving the joint session of Legislature.
- **Violation under Article 159** – It is pertinent to note that the Governors take ***oath of office*** under Article 159 that requires them to 'preserve, protect and defend the Constitution and the law.'
- Such actions go against the constitutional principles and law as settled by the highest court of the country.

What are the political & federal concerns?

- **Role of the Governor** – The Governors act as nominal head of the State executive just like the President for the Union executive.
- Further, the Governor acts as an appointee of the Centre which may be required for maintaining the unity and integrity of the nation in critical times.
- **Federalism concerns** – Federalism is a basic feature of our Constitution and the Governor's office should not undermine the powers of popularly elected governments at the States.
- The conflicts often arise when Governors act beyond their constitutional role.
- **Politicisation of the Governor's post** – It has fueled calls for reform, with some leaders even suggesting abolition of the office, but considering the *quasi-federal constitutional scheme,* such demands for abolition are likely to remain only on paper.

What lies ahead?

- **Recommendations by various commissions** – According to the recommendations of the ***Sarkaria & Punchhi Commissions***, the appointment of Governors should be preceded by consultation with the Chief Ministers of the respective States.
- **Impact –** This may not solve all disputes between Governors and elected governments, but it can serve as a useful step to reduce friction on key legislative matters and prevent clashes over customary practices like the annual address.

1.2 Corruption Charges and Prior Sanction

Recently, A two-judge Bench of the Supreme Court has delivered a split verdict on the constitutional validity of Section 17A of the Prevention of Corruption Act, 1988 (PCA, 1988).

What is the PCA, 1988?

- **Santhanam committee** – The Central government had constituted a committee on prevention of corruption under the chairmanship of K. Santhanam in 1962, submitted its report in 1964.
- **Key Recommendations** – Strengthening laws against bribery and criminal misconduct, establishing vigilance bodies in government departments and greater accountability of public servants.
- **PCA, 1988 –** A ***comprehensive act*** was enacted to consolidate the law relating to prevention of corruption in the form of PCA, 1988.
- It provides for punishment with respect to offences committed by public servants while performing public duties.
- **Public servant –** Includes any government or local authority employee, any Judge, any person who holds an office by virtue of which he is required to perform a public duty etc.
- **Public duty –** It means a duty in the discharge of which the government, the public or the community at large has an interest.

- **Type of Offence –** The type of offences punishable under the PCA, 1988 include bribery, undue advantage without consideration, criminal misconduct, disproportionate assets, and abuse of position etc.

What is Section 17A?

- **Section 19 of the PCA, 1988** – Prior sanction needed *before prosecution in court*.
- It requires prior sanction from the appropriate government before prosecution of a public servant in a court of law.
- In other words, No public servant can be prosecuted in court without prior sanction from the appropriate government.
- **Concerns –** However, it was felt that there needs to be a distinction in dealing between intentional corruption and decisions taken in good-faith that could potentially go wrong.
- Officers become reluctant to take bold and timely decisions because of fear of wrongful prosecution.
- **Section 17A –** Prior approval needed *before investigation itself*.
- In order to address this issue, the Parliament inserted Section 17A through an amendment of the PCA in the year 2018.
- **Requirement –** This section requires prior approval from the appropriate government is needed for initiating an inquiry or investigation into alleged offences.
- **Scope –** It applies when allegations relate to any recommendation made or decision taken by a public servant in discharge of official duties.

What were the earlier rulings?

- **Vineet Narain versus Union of India (1998) –** The SC struck down an executive order, referred to as 'Single Directive', issued to the CBI, to get prior sanction of the designated authority before initiating investigation against certain categories of public servants.
- **Delhi Special Police Establishment (Amendment) Act (DSPE), 2003** – It governs the functioning of the CBI, added Section 6A to this act.
    - **Section 6A** – It required prior approval of the Central government to initiate any investigation against officers at the rank of Joint Secretary or above.
- **Dr. Subramanian Swamy vs Director, CBI, 2014** – The SCt struck down Section 6A as violative of Article 14 of the Constitution that guarantees equality before law.
- The court said no special protection for senior officials; corruption must be investigated equally.

What is the current split verdict?

- **Case Context –** The Public Interest Litigation (PIL) filed by the Centre for Public Interest Litigation (CPIL) against the Union of India.
- **Issue –** The Constitutional validity of Section 17A, PCA 1988 (prior approval before investigation of public servants).
- Two-judge division Bench of the Supreme Court has given the split verdict and referred the matter to the higher bench.
- **Justice K. V. Viswanathan's view** – He ruled that Section 17A is valid, but with safeguards.
- Held that the requirement of obtaining prior approval before initiating investigation was necessary in order to protect honest officers from vexatious and frivolous complaints.
- **Reasoning –** Protection against frivolous complaints is essential to safeguard honest officers, as without it the bureaucracy may adopt a cautious 'play-it-safe' approach.
- **Condition –** Section 17A is valid only if approval for investigation comes from an independent agency, not the government.
- Section 17A should work together with the Lokpal and Lokayuktas Act, 2013.
- The approval for investigation must come from the appropriate government, but only on the basis of a binding opinion given by the Lokpal for Central government employees and the Lokayuktas for State government employees.
- **Justice B. V. Nagarathna's view –** She held that Section 17A was unconstitutional and tantamount to 'Old wine in new bottle' that was struck down in earlier cases by the court.

- **Reason –** She held that Article 14 requires intelligible differentia and rational nexus to the legislative object, and that Section 17A fails on both counts.
- She held that adequate protection for honest officers in the form of prior sanction from the government before prosecution by a court is already available under Section 19 of the PCA.

What lies ahead?

- **Swift Disposal of Corruption Cases –** There must be swift disposal of cases and handing over punishments for guilty public servants that would act as a deterrent against corruption.
- **Penalty for False/Malicious Complaints** – Imposing penalties on false and malicious complaints would serve as a strong deterrent against habitual and vexatious allegations.

1.3 The Debate on Age of Consent

Recently, the Supreme Court, in State of Uttar Pradesh vs Anurudh & Anr., noted that the POCSO Act (2012) is increasingly misused in cases of consensual adolescent relationships where one partner is a minor.

What is the evolution and current law on age of consent in India?

- **Age of consent –** It refers to the ***legally defined age*** at which an individual can consent to sexual activity.
- **Age of Consent Act, 1891** – It raised the age of consent for sexual intercourse for all girls, married or unmarried, *from 10 to 12 years* in all jurisdictions.

> *The **age of consent** is distinct from the **'minimum age of marriage'**, which under the Prohibition of Child Marriage Act, 2006, is 18 for females and 21 for males.*

- **Criminal Law (Amendment), 2013** – Section 375 of IPC defines 'rape' and, prior to 2012, fixed the age of consent at 16 years, after that it ***aligned with 18 years under POCSO***.
- **Mandatory Reporting** – Section 19 of the POCSO Act mandates that anyone who aware/suspecting an offence must report it to local police or Special Juvenile Police Unit.
- **Bharatiya Nyaya Sanhita (BNS), 2023** – Section 63 defines rape to include sexual acts with or without consent if the woman is under 18.
- **Current position –** In India, the ***age of consent is 18 years***, as established by the gender-neutral POCSO Act.
- Anyone below this age is classified as a "child", making their consent to sexual acts legally irrelevant.
- Consequently, sexual acts with minors are treated as "statutory rape", based on the legal presumption that children lack the capacity to give valid consent.

What is the parliamentary stance about the issue?

- **Consistent rejection** – The Parliament has ***consistently rejected*** proposals to lower the age of consent.
- **Justice Verma Committee, 2013** – It had recommended keeping age of consent at 16 under IPC Section 375, but Parliament chose to raise it to 18 in 2013, aligning with POCSO.
- **240th Standing Committee Report, 2011** – It rejected recognising minor consent in the POCSO Bill, stating that willingness or maturity was legally irrelevant.
- **167th Standing Committee Report, 2012** – It supported raising the age to 18 and opposed any 'close-in-age' exemption.
- **283rd Law Commission's Report, 2023** – It warned that reducing the age of consent would render POCSO a "paper law", undermining efforts to combat child marriage, prostitution, and trafficking.

What are the judicial views on age of consent?

- **State versus Hitesh (2025)** – The Delhi HC held that adolescent love deserves respect if it is consensual and free from coercion, highlighting the rights of young people in relationships.
- **Ashik Ramjaii Ansari versus State of Maharashtra (2023)** – The Bombay HC held that sexual autonomy includes both the right to choose consensual activity and the right to be protected from sexual aggression, recognising both is essential to uphold human dignity.
- **The SC's view on August 20, 2024** – It reaffirmed POCSO's strict stance on minor consent but used Article 142 (extraordinary jurisdiction) to avoid sentencing, stressing the ruling was case-specific and not precedent.

- **Mohd. Rafayat Ali versus State of Delhi, 2025** – The Delhi HC, asserted that "consent is legally immaterial" under POCSO if the victim is under 18.

What are the arguments in favour of changing the age of consent to 16?

- **Surge in POCSO cases –** In recent years, the debate on age of consent has intensified, due to a surge in POCSO cases involving adolescents aged 16-18, where the girl often testify the relationship was consensual.
- **Advocates views –** They argue that the current law fails to recognise adolescent sexuality, infringing on the autonomy of 16-18-year-olds capable of giving mature consent.
- They stress POCSO was meant to protect children from abuse, not criminalise consensual romantic relationships among older adolescents.
- **Ground realities of 'adolescent sexual behaviour'**
    - **NFHS-4 (2015-16)** – It shows that 11% of girls had their first sexual experience before age 15, and 39% before 18.
    - **Enfold study (2016-2020)** – It analysed 7,064 POCSO judgments across Assam, Maharashtra, and West Bengal & found 24.3% involved romantic relationships, 82% of victims refused to testify against the accused.
    - **Enfold-Project 39A study** - It examined 264 cases under Section 6 (aggravated penetrative sexual assault) of POCSO, found 25.4% involved in consensual relationships.
- **Call for Nuanced Legal Approach** – Many experts advocate recognising consent for adolescents over 16, with safeguards against coercion, exploitation, or abuse of authority.
- **Shift in Focus –** Move from blanket criminalisation to open dialogue on sex education, relationships, and consent.
- **Global Practices** – In many Western democracies, the ***consent age is 16***, with safeguards against coercion and abuse.
- Countries like the ***U.K., Canada, and several EU nations*** use 'close-in-age' exemptions or the 'Romeo-Juliet clause' to avoid criminalising consensual teenage relationships.

What are the arguments against changing the age of consent?

- **Risk of Weakening Deterrence** – Many believe that lowering the age of consent may reduce the law's deterrent power, allowing trafficking and abuse under the cover of "consent."
- **Bright-Line Rule** – The law treats everyone under 18 as unable to consent, creating a clear zone of protection under POCSO and BNS.
- **Judicial Discretion vs Legal Exceptions** – Opponents agree courts may use discretion in rare consensual adolescent cases, but caution against making such exceptions part of the law.
- **Risk of exploitation** – Abuse often comes from trusted figures like family members, neighbours, teachers, or caregivers.
- A 2007 study by the Ministry of Women and Child Development found that over 50% of abusers were known to the child.
- **Limits of Child Consent –** Children often lack emotional independence to resist or report abuse, making any claim of consent meaningless.
- **Risks of Diluting the Law** – Weakening the law could legitimise coercion, suppress disclosures, and undermine constitutional and statutory child protection commitments.
- **Concern of premature sexual activity –** Lowering the age may push younger children into sexual activity before they are emotionally mature enough to understand its consequences.
- **Ground realities** – Data from studies shows that many cases stem from consensual romance weaponised by parents which clog courts, erodes trust and fail to address root issues like poor sex education or cultural taboos around dating.
- **Real Challenge** – It involves not merely analysing whether the age of consent should remain 18 or fall back to 16, but how the law can be recalibrated to distinguish genuine adolescent relationships from exploitative ones.
- The blanket reduction risks diluting child protection, yet the current blanket rule unjustly criminalises consensual adolescent intimacy.

What is the way forward?

- **Role of Parliament & SC** – Reducing age of consent lies within Parliament's jurisdiction.
- The SC must clarify the interpretational divide between the statutory framework and HC rulings, ensuring consistency for investigating agencies and lower courts.
- **Beyond Legal Framework** – Laws alone cannot address the complex realities of adolescent life.
- **Need a holistic approach** – True change requires sex education, autonomy, health services, fair law enforcement, and a supportive society for adolescents.
- **Close-in-Age Exemptions** – Instead of a blanket reduction, introduce 'close-in-age' exemptions for 16-18 years, within a 3-4 years gap, coupled with mandatory judicial reviews to detect coercion or abuse.
- **Strengthening Support Systems** – Expand school programs on healthy relationships, consent, and emotional resilience, which promote awareness to help adolescents navigate love safely.
- **Balanced Outcome** – Respects adolescent autonomy without weakening child protection and reduces misuse of law while fostering a more empathetic and supportive society.

1.4 The Phaltan Case and Dignity of the Victim

The suicide of a young doctor in Phaltan, Satara district, Maharashtra, highlights significant gaps between legal reforms and societal attitudes toward gender-based violence.

What are the key issues highlighted?

- **Failure of administrative systems –** The first crime is her pleas for help were reportedly ignored by administrative systems, highlighting institutional failure.
- **Secondary victimisation by society –** The second crime is the public character assassination that follows when a victim's family begin their quest for justice.
- It was evident in the comments made by the Chairperson of the Maharashtra State Commission for Women, about the victim's private communications and relationships.
- This amounted to character assassination, shifting blame onto the victim and perpetuating patriarchal attitudes.

What are key legal provisions available?

- **Criminal Law (Amendment) Act, 2013 –** Also known as Nirbhaya Act, which specifically designed to dismantle the very foundation of character assassination in rape trials, often used in the public sphere.
- **Section 50 of Bharatiya Sakshya Adhiniyam (BSA), 2023** (Section 53A IEA, 1872) – It legally implies that a woman's personal life, her friendships, messages or habits cannot be used by the defence to argue that she "deserved it" or that her consent should be presumed.
- **Section 48 of BSA, 2023** (Sec 146 of IEA, 1872) – It prohibit questions being put to a victim during cross-examination regarding her "general immoral character or previous sexual experience.
- **Section 72 of Bharatiya Nyaya Sanhita (BNS), 2023** (Section 228A IPC) – It prohibits disclosure of a sexual assault victim's identity.

What are the important SC Judgements that shield the dignity of victims/survivors of sexual violence?

- **Irrelevance of prior sexual history** – In the State Of Punjab vs Gurmit Singh & Ors. (1996), the Court stated that the victim's testimony should not be doubted simply because she is a woman and the.
- It warned against dismissing a victim's evidence based on a perception of "loose morals", stating that every woman, regardless of her character, has the right to refuse sexual intercourse.
- **Insult to injury –** The Court has repeatedly observed, under wider scope, that subjecting a victim to intense scrutiny, searching for minor discrepancies, and casting aspersions on her character only add "insult to injury" — a clear condemnation of the very essence of victim-blaming.
- **Ban on identity disclosure –** In 2018 and 2019, the Court has mandated that no person shall print or publish the name or any matter that may make known the identity of a sexual assault victim.
    - **Scope of Ban –** This blanket ban extends even to a deceased person unless a competent authority determines otherwise.
    - **Purpose –** To prevent public shaming and character assassination that often follow disclosure.

What are the violations in the Phaltan case?

- **Media Scrutiny –** The victim's dying declaration was subjected to media exposure, violating confidentiality and interfered with the Commission's investigation.
- **Legal Implications –** Such disclosure raises questions about the investigation's progression into abetment to suicide or murder.
- **Prima Facie Evidence –** The dying declaration itself points to abetment to suicide.
- **Impact on Victim's Family**
    - **Restricted Access** – Lawyers for the complainant were denied access to the investigation report.
    - **Secondary Trauma** – The victim's relatives suffered further distress as her personal information was circulated in the media, compounding their grief.
- **Character Assassination in Public Sphere** – The Phaltan case shows how institutional commentary can inadvertently result in character assassination, a practice strictly prohibited in judicial proceedings.
- **Extra-Judicial Victim Shaming** – Public functionaries used details of the victim's personal communication.
- They create a public opinion, ***a "social verdict",*** that tries the victim's character, effectively achieving the 'second crime' that the 2013 Amendment was designed to eradicate from judicial procedure.
- **Legal vs. Moral Breach –** This act, while not technically a violation of the ban on identity disclosure (as the victim's name was widely known), is a ***breach of the spirit of the judicial directions***: to treat the victim with fairness, respect and dignity.
- **Institutional Failure –** It is an *institutional act of de facto character assassination,* undermining the constitutional and legal safeguards designed to protect victims.

What lies ahead?

- **Training & Sensitisation** – The police, prosecutors, and judges must be trained and sensitised to understand and respond empathetically.
- To focus on the trauma that victims endure, especially in sensitive cases that concern sexual assault and domestic violence.
- **End victim blaming –** As a society, need to stop being tolerant of societal attitudes that question a victim's character.
- There is also a need to transform the investigation culture making it truly victim-friendly.
- **Resource boost –** The new criminal law lays an emphasis on forensic and digital evidence, but there is a lack of infrastructure.
- It is time to expand laboratories, invest in advanced forensic facilities, have dedicated women's desks, and ensure accessible legal aid.
- This will make safeguards such as audio-visual statements and clear victim communication the standard tools of justice.

1.5 Child Trafficking in India

Child trafficking is a grave issue in India, in K.P. Kiran Kumar v. State, the Supreme Court issued strict guidelines to curb such crimes, declaring that trafficking violates children's fundamental right to life under the Constitution.

What is child trafficking?

- **Definition –** "It is defined as the recruitment, transportation, transfer, harbouring or receipt of a child for the purpose of exploitation" ***under the Palermo Protocol*** (UN Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children), 2000.
- **Section 143 of the Bhartiya Nyaya Sanhita (BNS), 2023** – Anyone who recruits, transports, harbours, transfers, or receives a person for exploitation—using threats, force, coercion, abduction, fraud, deception, abuse of power, or inducement (including payments or benefits) commits the offence of trafficking.
- **Scope of 'Exploitation'** – Physical and sexual exploitation, slavery or servitude and forced removal of organs.

India signed the Palermo Protocol in 2002 and ratified it in May 2011.

What about the Supreme Court's view in K. P. Kiran Kumar versus State?

- **Background –** In 2010, a minor girl was rescued from a rented house in Peenya, Bangalore, during a police raid organized with the help of NGO workers.
- **K. P. Kiran Kumar versus State, 2025** – The SC upheld the conviction of the accused for child trafficking and sexual exploitation under the Immoral Traffic (Prevention) Act (ITPA).
- **SC's Observations**
    - **Credibility of minor victims** – The Courts must handle minor victims' testimony with sensitivity, considering their vulnerabilities.
    - **Organized crime networks** – The court noted that trafficking operates in complex, layered structures, making precise narration difficult.
    - **Constitutional values** – The Court stressed that trafficking and exploitation violates children's dignity, bodily integrity, and constitutional protection.
    - **Evidence handling** – Delayed protest or lack of precision in testimony does not reduce credibility due to trauma.

What is the present status of child trafficking in India?

- **National Crime Records Bureau** – In 2022, around 3,098 children below 18 years were rescued, while between April 2024 and March 2025, over 53,000 children were rescued across India from child labour, trafficking, and kidnapping.
- **Regional trend** – Data from 2018–2022 shows a consistent pattern of children being trafficked for prostitution, labor, and begging, with ***West Bengal, Assam, and Bihar*** among the states reporting higher numbers.
- **Low conviction rate** – The conviction rate for such offences between 2018 and 2022 was ***only 4.8%.***
- **POCSO Courts** – India registered 80,320 new POCSO cases in 2025, disposed of 87,754 cases, achieving a 109% disposal rate — the first time more cases were resolved than filed.

What are the constitutional and legal provision against child trafficking?

- **Articles 23 and 24** – It gives protection from human trafficking, begging, forced labour and employment in hazardous industries.
- **Article 39 (e) & (f)** – Safeguards against exploitation, moral and material abandonment; ensures healthy development of children.
- **Sections 98 & 99 (BNS, 2023)** – It specifically address the selling and buying of minors.
- **Immoral Traffic (Prevention) Act, 1956** – It focuses on prevention of trafficking for sexual exploitation.
- **Juvenile Justice Act, 2015** – It provides care, protection, and rehabilitation for victims of child trafficking.
- **Criminal Law Amendment Act, 2013** – It intends to check such activities by providing a more comprehensive definition of trafficking by including sexual exploitation, slavery, servitude, forced labour, and organ removal.
- It will cover trafficking irrespective of consent.
- **POCSO Act, 2012** – The Act is gender-neutral and defines offences like sexual assault, harassment, and child pornography, prescribing strict punishments including life imprisonment and, in extreme cases, the death penalty.
- **Fast-track courts –** In order to provide rapid trials, about 400 fast track courts set up exclusively for implementing the POCSO Act, each targeting disposal of around 165 cases per year.

What has been the judicial approach?

- **Vishal Jeet versus Union of India, 1990** – The Court held that trafficking and child prostitution are serious socio-economic problems, requiring a preventive and humane approach.
- **M. C. Mehta versus State of Tamil Nadu, 1996** – The Court issued guidelines with a view to prohibiting employment of children in hazardous industries.
- **Bachpan Bachao Andolan versus Union of India, 2011** – The SC issued directions to address widespread exploitation and trafficking of children.

What are the government's measure to tackle child trafficking?

- **Anti-Human Trafficking Units (AHTUs)** – The specialized police units across districts to investigate trafficking cases.
- **National Child Protection Services (CPS)** – It provides shelter, education, and rehabilitation for rescued children.
- **UJJAWALA Scheme** – Focused on prevention, rescue, rehabilitation, reintegration, and repatriation of trafficked women and children.
- **Integrated Child Protection Scheme (ICPS)** – It strengthens institutional care, foster care, and adoption mechanisms.
- **Rescue & rehabilitation** – District Magistrates/Sub-Divisional Magistrates empowered to order rescues, provide interim medical aid, shelter, counselling, and evict trafficking dens.
- **Operation AAHT** (Against Human Trafficking) – 1,048 persons rescued in 2023; 257 traffickers apprehended.
- **Operation Nanhe Farishtey** – 3,973 girl children rescued in 2023.

What are the vulnerabilities and emerging risks?

- **Socio-economic vulnerabilities** – The courts and authorities must consider the special risks faced by children from marginalized communities.
- **Failure of protection** – Society is still unable to protect children and adolescents from being criminals or being victims of crimes.
- **Push factors** – Factors such as poverty, unemployment, migration, disasters and breakdown of the family system push children into vulnerability which strengthens the trafficking chain.
- **Modern risks** – In recent years, the spread of social media and online platforms has contributed to such offences, especially in terms of recruitment in the name of jobs or opportunities for "modelling".

What lies ahead?

- **Protection of rights** – The government must ensure that the social, economic and political rights of children are well protected with the help of institutions built for the purpose.
- **Strict action on traffickers** – It must come down heavily on traffickers and ensure that the conviction rate improves considerably so that a deterrence may be created.
- **Union–State coordination** – Moreover, a strong Union-State relationship is also required because law and order and police are State subjects.

1.6 Malayalam Language Bill, 2025

The passage of the Malayalam Language Bill, 2025 by the Kerala Legislative Assembly has reopened debates on linguistic policy, minority rights and Centre–State relations in India.

What is the Malayalam Language Bill, 2025?

- **Recognition of state language** – The Malayalam Language Bill, 2025 seeks to formally declare Malayalam as the sole official language of the State of Kerala.
- **Wider use of malayalam** – It mandates the use of Malayalam across a wide spectrum of domains, including:
    - Government administration
    - Education
    - Judiciary
    - Public communication
    - Commerce and business
    - Digital and information technology platforms
- At present, Kerala recognises both Malayalam and English as official languages.
- The Bill proposes a decisive shift towards Malayalam, while stating that all provisions will operate subject to the Constitution of India.

What are the key provisions of the bill?

- **Education –** Malayalam will be the compulsory first language in all government and aided schools in Kerala up to Class 10.
- Provisions exist for linguistic minority students to continue studying their mother tongue where such options are available, in line with the National Education Curriculum.
- **Judiciary and legislature –** All Bills and Ordinances will be introduced in Malayalam.
- Judgments and court proceedings will be translated into Malayalam in a phased manner.
- Important Central and State Acts published in English will be translated into Malayalam.
- **Administration and governance –** Malayalam will be used for official correspondence and public communication.
- Linguistic minorities will be allowed to use their mother tongues for correspondence with the Secretariat, Heads of Departments and local government offices in designated areas.
- **Digital and technological domain –** The Information Technology Department will develop open-source software and digital tools to facilitate the effective use of Malayalam in IT and e-governance.
- **Institutional framework –** The existing Personnel and Administrative Reforms (Official Language) Department will be renamed as the Malayalam Language Development Department.
- A Malayalam Language Development Directorate will be established to oversee policy implementation.

Why was the bill introduced?

- **Extensive effort** – The Bill is rooted in Kerala's long-standing effort to strengthen Malayalam as the principal language of governance.
- **2015 Bill** – The State had passed the Malayalam Language (Dissemination and Enrichment) Bill with similar objectives.
- However, that Bill was reserved for the President's consideration and assent was withheld.
- The earlier Bill faced objections on multiple grounds:
    - Conflict with the Official Language Act, 1963
    - Concerns over the protection of linguistic minorities
    - Alleged violation of the Three Language Formula under the National Education Curriculum
    - Inconsistencies with provisions of the Right of Children to Free and Compulsory Education Act, 2009
- **2025 Bill** – It was introduced after removing or modifying the contentious provisions, with the State government claiming that constitutional safeguards and minority protections have been adequately addressed.

What has triggered the opposition outside kerala?

- **Karnataka's opposition** – The strongest opposition has emerged from the Karnataka government, which has termed the Bill "unconstitutional" and contrary to the interests of Kannada-speaking linguistic minorities in Kerala, especially in the border district of Kasaragod.
- Key concerns raised:
    - The provision making Malayalam the compulsory first language in all schools, which Karnataka argues undermines the rights of Kannada-speaking students who currently study Kannada as their first language.
    - Fears that the implementation of the Bill in Kasaragod could weaken the Kannada language and cultural identity in the region.
- A delegation from the Karnataka Border Area Development Authority submitted a memorandum to the Kerala Governor, urging him to withhold assent to the Bill.
- **Kerala government's defence –** The Kerala government has rejected the charge that the Bill infringes minority rights.
- Kerala government has emphasised that the Bill contains explicit safeguards for linguistic minorities, including speakers of Tamil, Kannada, Tulu and Konkani.
- According to the State:

- Linguistic minorities will be permitted to use their own languages for official correspondence with government authorities in relevant areas.
- Students whose mother tongue is not Malayalam can continue education in their preferred languages where such options exist, in accordance with national education policy.
- Students from other States and foreign countries will be exempted from writing Malayalam language examinations in Classes 9, 10 and higher secondary levels.
- The government argues that the Bill balances the promotion of Malayalam with constitutional guarantees under Articles 29 and 30, which protect the cultural and educational rights of minorities.
- **Constitutional and federal dimensions –** Language is a sensitive subject in India's federal structure.
- While States have the power to adopt official languages for their administration, such measures must comply with:
    - Fundamental rights
    - Minority protections
    - Central laws such as the Official Language Act
- The controversy highlights the tension between linguistic assertion by States and the need to accommodate diversity in border regions. The Governor's decision on assent may therefore have broader implications for language policy and Centre–State relations.

What lies ahead?

- The Malayalam Language Bill, 2025 represents Kerala's attempt to assert its linguistic identity and strengthen the role of Malayalam in governance, education and technology.
- At the same time, opposition from Karnataka underscores the challenges of implementing language policy in a multilingual and federal polity.
- The final outcome will depend on constitutional scrutiny and political accommodation, making the Bill an important case study for understanding language, federalism and minority rights in India.

2. GOVERNMENT POLICIES AND INTERVENTIONS

2.1 Kerala's Right to Disconnect Bill

Recently, Kerala has introduced the Right to Disconnect Bill, 2025, aiming to protect private-sector employees from being forced to answer work calls, emails, or messages after office hours.

What is the Right to Disconnect Bill of Kerala?

- **About the Bill** – The Kerala Government's proposed Right to Disconnect Bill, 2025 seeks to protect private sector employees from excessive work-related digital communication beyond official working hours.
- **Important provisions** – The bill grants employees the right to disengage from calls, emails, messages, and virtual meetings after work hours, without fear of disciplinary action.
- **Significance** – If enacted, Kerala would become the first Indian state to legislate such a right.
- **International examples** – Countries such as France, Spain, Italy, Germany, and Belgium have introduced similar measures.
- Evidence from France's experiments with shorter workweeks indicates improvements in mental health, productivity, and job satisfaction, suggesting that regulated working hours can benefit both workers and employers.
- **Indian context** – In India, where long workdays and constant digital availability are often normalized, the Right to Disconnect could serve as an important corrective, particularly for women navigating paid work alongside unpaid care responsibilities.
- **Similar policy** – Karnataka's paid menstrual leave legislation are among the most progressive state-level initiatives aimed at addressing the everyday pressures faced by workers, particularly women.
- **Other measures** – Alongside such reforms, the expansion of digital technologies, remote work, and flexible employment arrangements has created new opportunities for women's participation in the workforce.

- **Continuing concerns** – However, despite these changes, women continue to shoulder a disproportionate share of unpaid domestic and care work and this raises a crucial policy question.

What are the impacts of various reforms?

- **Impact of new Labour Codes** – Parallel to state-level reforms, the four new labour codes introduced by the Ministry of Labour and Employment *aim to improve women's participation in the workforce*.
- These reforms permit women to work at night across sectors (with consent and safety measures) and promise equal access to higher-paying jobs.
- Such measures are significant in a country with one of the lowest Female Labour Force Participation Rates (FLFPR) globally.
- Since 2004–05, India's FLFPR declined steadily, reflecting deep-rooted structural and social constraints.
- **Education and the U-Shaped Hypothesis –** Economists often explain trends in women's workforce participation using the U-shaped relationship between education and employment.
- Women with very low education levels tend to work out of economic necessity, while those with higher education access better-paying jobs and professional opportunities.
- Women with intermediate education, however, are more likely to withdraw from the workforce due to social norms, marriage, or caregiving responsibilities.
- Additionally, India's pattern of economic growth has been skewed towards sectors that traditionally employ fewer women, limiting job opportunities outside agriculture.
- Recent data shows a modest rise in FLFPR, largely driven by self-employment among rural women, particularly in agriculture—highlighting the lack of quality non-farm jobs for women.
- **Effect of digitalisation** – Between 2015 and 2022, India witnessed a sharp increase in internet access and digital penetration, coinciding with a gradual rise in FLFPR.
- Several studies point to a positive relationship between digitalisation and women's employment, particularly for salaried and self-employed women.
- Digital technologies enhance women's access to job information, increase autonomy, and enable flexible work arrangements such as work-from-home (WFH).
- **Limitations** – However, these benefits are not evenly distributed.
- Women who lack digital literacy, autonomy, or household support often fail to benefit fully from ICT-led opportunities.
- **Gig Economy** – The gig economy, often promoted as flexible and empowering, has attracted increasing numbers of women across the Global South.
- For women with lower education levels, gig work can provide income opportunities while allowing them to manage domestic responsibilities.
- **Digital entrepreneurship and e-commerce** – They have opened new avenues.
- India has approximately 7,000 women-led start-ups, accounting for around 7.5 per cent of all start-ups, and women make up nearly 14 per cent of entrepreneurs.
- Digital platforms allow women to access markets, build networks, and bypass traditional barriers such as mobility constraints.
- However, most women entrepreneurs remain concentrated in micro-enterprises within the informal sector, facing limited access to credit, technology, and social security.

What are the important issues women facing?

- **The "Double Burden" of Labour** – The Covid-19 pandemic normalised remote work, especially in the formal sector.
- While the work from home (WFH) increased women's labour force participation, it also blurred the boundary between paid work and domestic labour.
- Historically, Indian women have worked from home as unpaid family labour or as home-based piece-rate workers in industries such as garments and bidi rolling.

- Contemporary corporate WFH arrangements, however, largely involve middle-class women who are expected to perform professional duties alongside domestic work—often without a corresponding redistribution of household responsibilities.
- Studies consistently show that WFH women experience a "double burden", juggling paid employment and unpaid care work, particularly childcare.
- Flexible jobs may increase women's participation, but they do not automatically reduce unpaid labour.
- **Corporate Work Culture and Burnout** – India's corporate sector reports some of the highest burnout levels globally.
- Long workdays, constant digital surveillance, and expectations of round-the-clock availability have intensified since the pandemic.
- Employees working with multinational firms often operate across time zones, leading to disrupted sleep cycles and poor work–life balance.
- For women, these pressures are compounded by entrenched gender norms assigning primary responsibility for household and care work to them.

What lies ahead?

- **Need for Structural Support** – Economist Claudia Goldin highlights that when women combine paid work with caregiving under WFH arrangements, frequent interruptions reduce productive work time.
- The care economy and the market economy are deeply interlinked, and women's participation in paid employment reshapes household care dynamics.
- In this context, the Right to Disconnect Bill can be a meaningful intervention for formal sector workers.
- However, its effectiveness depends on complementary structural policies, including:
    - Affordable and accessible childcare and crèches
    - Paid parental leave for both parents
    - Social security for informal and gig workers
- Without such support, flexible work arrangements risk reinforcing, rather than reducing, gendered inequalities.
- Flexible work arrangements and digital technologies have expanded opportunities for women, but they are not a panacea.
- In the absence of structural care support and equitable household labour distribution, flexibility often translates into intensified workloads for women.
- Progressive legislation like the Right to Disconnect must therefore be embedded within a broader framework of gender-sensitive labour and social policies to genuinely ease women's work burdens.

2.2 India's Skilling Outcomes – Challenges and Opportunities

India has made significant strides in building one of the largest skilling ecosystems globally over the past decade and despite the implementation of various initiatives such as the Pradhan Mantri Kaushal Vikas Yojana (PMKVY), skilling has not yet become a mainstream pathway for the youth.

What is the current skilling landscape of India?

- **Scheme** – India's flagship skilling initiative, PMKVY, has aimed to train and certify around 1.40 crore candidates between 2015 and 2025.
- However, as per the *Periodic Labour Force Survey (PLFS),* wage gains from vocational training remain modest and inconsistent, particularly among workers in the informal sector, where the majority of India's workforce is absorbed.
- **Formally trained workforce** – Despite a decade of investments, only about 4.1% of India's workforce has received formal vocational training.
- **Other countries** – This contrasts sharply with countries like Austria, Finland, and the Netherlands, where vocational education programs cover about 44% to 70% of upper-secondary learners.
- Despite the massive scale of the skilling ecosystem, vocational training is not seen as a first-choice pathway for most young Indians.

What are the challenges in the skilling ecosystem?

- **The Disconnect between Skilling and Aspirations –** The low Gross Enrolment Ratio (GER) in vocational education is a reflection of *deep-seated societal perceptions.*
- In India, traditional education, especially undergraduate and postgraduate degrees remains the preferred route, with vocational training viewed as a last resort for those who fail to secure a place in formal education.
- The absence of guaranteed wage premiums or job security in sectors relying heavily on informal labor further discourages young people from pursuing vocational education.
- **Low Industry Participation –** Industry is the largest beneficiary of skilled labor.
- However, the participation of employers in public skilling programs remains limited.
- Most employers prefer hiring through internal training systems, referrals, or private training platforms, instead of relying on publicly-certified vocational qualifications.
- The *National Apprenticeship Promotion Scheme (NAPS)* has made some headway, yet its impact is still uneven, particularly among large companies.
- The primary issue is that industry is neither incentivized nor obligated to contribute to curriculum development, certification standards, or the assessment process.
- The absence of meaningful industry participation in shaping training content and certification standards leaves a gap between the skills being taught and those needed in the real-world job market.
- As a result, employers often remain skeptical about the credibility and relevance of certifications offered by public skilling programs.
- **Fragmentation of Responsibility –** Sector Skill Councils (SSCs) were established with the goal of being industry-facing bodies that would define skills standards, assess job readiness, and ensure that vocational training aligns with industry needs.
- Unfortunately, SSCs have failed to meet these expectations.
- Today, the responsibility for training, assessment, certification, and placement is fragmented across multiple agencies.
- This lack of accountability and coordination has led to erosion of trust in the skilling ecosystem.
- Employers often find SSC credentials lacking in value, as they do not reliably correlate with job readiness or the skills required by industry.
- In contrast, certifications from private players like AWS, Microsoft, or Google hold significant credibility, partly due to the robust standards, fair assessments, and industry recognition they offer.
- SSCs must be held accountable not only for setting standards but also for ensuring that their certifications lead to real employment outcomes.
- If they are unable to bridge the gap between skill development and employability, they will remain ineffective in transforming India's labor market.
- **Lack of Integration –** One of the key limitations of the current skilling ecosystem is its disjointed relationship with formal education.
- Vocational training is often seen as an alternative to traditional academic education, but it is not sufficiently integrated with mainstream higher education systems.
- Without a seamless integration, skilling will always remain a peripheral option, rather than a central pillar of a well-rounded education.
- The National Education Policy (NEP) 2020 proposes an integrated approach where vocational training is embedded within general education, ensuring that skills development accompanies academic progression.
- This would allow students to earn both academic qualifications and industry-relevant skills, thus providing them with more opportunities for employment and upward mobility.

What can be done?

- **Industry as a Co-Owner of the Skilling Ecosystem –** The first step towards meaningful reform is to ensure that industry plays a central role in skilling.
- This means incentivizing businesses to actively participate in curriculum design, certification processes, and assessments.

- Industry-driven certifications that are aligned with real-world job requirements will help bridge the gap between training outcomes and labor-market needs.
- Incentivizing industries to invest in skilling through tax breaks or funding partnerships can create a symbiotic relationship between the public sector and private companies.
- Additionally, scaling initiatives like NAPS and PM-SETU, which focus on modernizing ITIs and encouraging apprenticeships, could further deepen industry involvement.
- **Accountability of Sector Skill Councils –** To address the fragmentation and lack of trust in the skilling ecosystem, Sector Skill Councils must be held accountable for employability outcomes.
- SSCs should be incentivized or required to ensure that their certifications lead to real job placements.
- Reforms should include making SSCs responsible for continuously updating the curriculum in consultation with industry and ensuring that assessments are fair, transparent, and reflective of the skills needed by employers.
- **Integration of Skilling with Formal Education –** The integration of skilling into the formal education system is essential to make vocational training an attractive option for the youth.
- Skilling should not be seen as an alternative to traditional academic education but as a complement to it.
- By embedding vocational training within higher education, India can ensure that every graduate possesses both academic qualifications and employable skills, thus boosting employability and economic productivity.

What lies ahead?

- India's skilling challenges are not due to a lack of intent or funding but stem from the absence of accountability, coordination, and meaningful industry participation.
- To drive sustained economic growth, skilling must be treated not just as a welfare intervention, but as a crucial component of national economic empowerment.
- By addressing the structural flaws in the skilling ecosystem, India can turn its demographic advantage into a powerful engine of growth, improving job quality and dignity of labor for millions of young people.

3. HEALTH

3.1 Malaria Elimination Efforts in India

India has reduced malaria cases by nearly 80% between 2015 and 2023 and is on track to meet its 2030 elimination target, though challenges like migration, urban transmission, and drug resistance remain.

What was India's malaria elimination journey?

- **Target –** India set an ambitious target to ***eliminate malaria (zero indigenous cases) by 2030*** under National Framework for Malaria Elimination in India (2016-2030).
- **Interim milestone** – Interrupting indigenous transmission across the entire country, including all high-transmission States and Union Territories (UT), including high-burden regions by 2027.
- **Current Status**
  - In 2023, 34 States/UTs achieved an annual parasite incidence of less than one except in two States, Tripura (5.69) and Mizoram (14.23).
  - By the end of 2025, 160 districts in 23 States/UTs had reported zero indigenous cases between 2022 and 2024, marking steady progress toward India's 2027 interim target.
- **Key drivers of the progress** – The Ministry of Health and Family Welfare (MOHFW) credits robust surveillance systems and sustained interventions (testing, treatment, vector control).
- **Core measures include**
  - Strengthen surveillance systems and diagnostic capacity.
  - Intensify control efforts in high-burden districts.
  - Monitor drug resistance and insecticide resistance.
  - Ensure compliance with 14-day radical treatment for Plasmodium vivax.

To know about Malaria disease, click here

How is prevalence of the disease measured?

- **WHO Certification –** According to the WHO, a country is granted a certification of malaria elimination when
  - The chain of local transmission of all human malaria parasites has been interrupted nationwide for at least three consecutive years, and
  - A fully functional surveillance and response system is in place to prevent re-establishment of indigenous transmission.
- This ensures imported cases don't spark new outbreaks.
- Surveillance includes mandatory reporting, rapid diagnostics, and vector monitoring.
- **Global Status** – As of mid-2025, *47 countries or territories* have been officially certified malaria-free by the WHO.
- **Recently certified countries** – Georgia (2025), Egypt (2024), Cabo Verde (2024), and Suriname (2025).
- **Other examples include**
  - **Europe** - Entire region certified malaria-free.
  - **Asia-Pacific** - Countries like Sri Lanka (2016) and China (2021).
  - **Africa** - Algeria (2019) and Morocco (2010).
  - **Americas** - Paraguay (2018) and El Salvador (2021).

How does the World Malaria Report 2025 assess India's progress?

- **India Exits WHO High Burden Group** – India made significant progress in reducing malaria incidence and mortality in its high-endemic States, officially exiting the WHO ***"High Burden to High Impact" Group***, in 2024.
- **Case reduction** – Malaria cases reduced by *around 80%* from 2015 to 2023 in the country.
- **Regional share –** In 2024, India accounted for 73.3% of the 2.7 million estimated malaria cases in the WHO South-East Asia Region.
- Over the past two decades, the region has achieved major reductions in malaria cases and deaths, according to WHO South-East Asia region.
- **On track for WHO GTS target** – India is on track to meet the WHO Global Technical Strategy (GTS) goal of cutting malaria cases by 75% by 2025, compared to 2015 levels, having already reduced them by over 70% in 2024.

What findings are shown in the Tamil Nadu case study?

- **Steady decline** – As per the State's Directorate of Public Health and Preventive Medicine show a ***steady decline in malaria cases***, from 5,587 in 2015 to 321 in 2025.
- **District classification** (since 2023) -
  - **Category O** (Prevention of re-establishment) - 33 of 38 districts with zero indigenous cases.
  - **Category I** (Elimination phase) - 5 districts, including Chennai, where API is less than 1 per 1,000 population at risk.
- **Annual Parasite Incidence (API)** – API is the number of confirmed new malaria cases registered in a specific year, expressed per 1,000 individuals under surveillance, for a given country, territory, or geographic area.
- **Measures taken by TN**
  - **Detection & Diagnosis** - Intensive malaria testing in government hospitals and primary health centres.
  - **Larval Control** - Regular measures to reduce mosquito breeding.
  - **Migrant Worker Surveillance** – Intensive surveillance is being taken up among workers coming from malaria-prone neighbouring States.

How is India working to eliminate malaria?

- **2 national plans** - to guide and accelerate malaria elimination —
- **National Framework for Malaria Elimination in India (2016-2030)** – Outlines the vision, goals, and targets for a phased malaria elimination by 2030, and

- **National Strategic Plan (NSP) for Malaria Elimination (2023-2027)** – Builds upon earlier frameworks and focuses on -
    - Transforming malaria surveillance as a core intervention for malaria elimination,
    - Ensuring universal access to diagnosis, treatment by enhancing and optimising case management by "testing, treating and tracking" and
    - Ensuring universal access to prevention by enhancing and optimising vector control.

What are the challenges?

- **Migration & Cross-Border Importation** – Movement of people from malaria-endemic neighbouring States risks reintroducing malaria into low-transmission areas.
- **Urban Transmission** – Cities face unique risks due to rapid urbanisation, expanding infrastructure, and widespread apartment complexes where water storage can become breeding grounds.
- **Hard-to-Reach Populations** – The special focus is needed in urban, forest, tribal, project/border areas, and among migrant workers.
- **Persistent transmission** – The Plasmodium vivax transmission accounts for nearly two-thirds of regional cases, continues to complicate elimination efforts.
- **Localised transmission** – In India and Nepal, population movement and cross-border importation drive localised outbreaks, highlighting the need for targeted subnational and regional coordination.
- **Antimalarial Drug Resistance** – WHO reports partial resistance to artemisinin in eight African countries, with partner drugs also showing reduced effectiveness, raising concerns for future malaria treatments.

What lies ahead?

- **Data Accuracy** – Reliable and precise data is essential at this stage to guide malaria elimination efforts.
- **Surveillance** – Private practitioners must be included in strict public health surveillance, with mandatory reporting of even suspected malaria cases.
- **Fighting Urban Malaria Together** – Addressing Urban Malaria needs both government initiatives and household-level action, as clean stored water often becomes the source of mosquito breeding.

3.2 Menstrual Hygiene – A Fundamental Right

In a historic judgment, the Supreme Court of India has ruled that access to menstrual hygiene is not just a health issue but a constitutional right, fundamental to ensuring gender equality and the right to education.

What is menstrual hygiene Management?

- **MHM** – Menstrual Hygiene Management (MHM) is the practice of using clean, absorbent materials to manage menstrual blood flow, with the ability to change them in privacy as often as needed.
- It includes access to clean water, soap for washing, and safe, private disposal methods.
- Proper MHM reduces infections, stigma, and school/work dropout.
- **Menstrual Hygiene as a Constitutional Right –** The Supreme Court's ruling is grounded in the *principle of substantive equality*, a concept that acknowledges that equal treatment does not always lead to fair or just outcomes, especially for marginalized groups.
- Article 14 of the Indian Constitution guarantees equality before the law, but the court observed that simply treating everyone the same can perpetuate existing inequalities.
- **Absence of hygiene facilities** – The absence of adequate menstrual hygiene facilities disproportionately affects girl children, preventing them from attending school and thus entrenching gendered disadvantage.
- The court emphasized that menstruation should not be a barrier to a girl's education.
- As the bench stated, "*A period should end a sentence – not a girl's education.*"
- **Inequality** – In its judgment, the court asserted that menstruating girls who are denied access to sanitary products or proper toilets are not on an equal footing with their male counterparts.
- **Inaccessibility** – The inaccessibility of Menstrual Hygiene Management (MHM) measures transforms a biological reality into a structural exclusion, reinforcing gender inequality in educational settings.

- **Scope of Article 21** – The court further held that menstrual health falls under the right to life and personal liberty guaranteed by *Article 21* of the Constitution.
- The right to life, as interpreted by the court, *includes the right to live with dignity.*

> *For **menstruating girls**, the lack of proper MHM measures subjects them to stigma, humiliation, and the violation of their bodily autonomy.*
> *Forcing a student to drop out or miss school due to lack of menstrual hygiene facilities, the court observed, violates her right to privacy and dignity.*

- **Interpreting the Right to Education Act –** The judgment also reinterprets the Right of Children to Free and Compulsory Education Act, 2009 (RTE Act), with a focus on menstrual health.
    - **Section 3** – Under this Section, the right to "free education" is not limited to waiving tuition fees, but extends to the removal of any barriers—financial or infrastructural—that hinder a child's ability to complete their education.
- The court reasoned that when the absence of sanitary napkins or menstrual hygiene facilities leads to absenteeism or dropouts, it turns the right to education into a conditional one.
    - **Section 19** - The court highlighted that this section of the RTE Act mandates that schools adhere to specific norms and standards, which include maintaining separate toilets for boys and girls.
- However, the court emphasized that this requirement is not just about infrastructure; it is a substantive right that ensures equal educational opportunities for both boys and girls.
- Without proper access to sanitary products or hygienic toilets, girls are more likely to miss school, exacerbating gender-based educational disparities.
- Therefore, the lack of menstrual hygiene facilities in schools amounts to a "stark constitutional failure," according to the court.

What are the directions to the state?

- **Provision of Free Sanitary Napkins –** The court ordered that all schools, whether government-run or privately managed, must provide sanitary napkins free of charge to girl students.
- These sanitary napkins should be eco-friendly and oxo-biodegradable to ensure environmental sustainability.
- The preferred method of distribution is through vending machines located within toilet premises or through a designated authority within the school.
- **Hygienic Disposal Mechanisms –** Schools are required to establish safe, hygienic, and environmentally compliant systems for disposing of sanitary napkins.
- The court emphasized the need for covered waste bins that are cleaned regularly, ensuring that waste disposal does not become another barrier to menstrual hygiene.
- **Functional and Accessible Toilets –** The judgment directed that all schools, both urban and rural, must have functional, gender-segregated toilets with water connectivity.
- Toilets must be designed to ensure privacy and be accessible to children with disabilities.
- The facilities must also include functional hand-washing stations with soap and water available at all times, ensuring that menstruating students can maintain their hygiene.
- **Menstrual Hygiene Management Corners –** Schools are to set up dedicated "Menstrual Hygiene Management corners," equipped with essential items such as spare innerwear, spare uniforms, and disposable bags.
- These corners will ensure that menstruating students have access to the necessary resources to manage their periods without having to leave school due to leakage or staining.
- **Destigmatizing Menstruation –** One of the most important aspects of the court's ruling is the emphasis on destigmatizing menstruation.
- The court observed that a "hostile and stigmatized environment" in schools can render the infrastructure useless.
- To address this, the court directed that boys be educated about menstruation and its biological realities.

- This would ensure that menstruating girls are not subjected to harassment, which could discourage them from attending school.
- **Teacher Training and Gender-Responsive Curricula –** The court mandated that the National Council of Educational Research and Training (NCERT) and State Council of Educational Research and Training (SCERT) incorporate gender-responsive curricula, focusing on puberty and menstruation.
- Additionally, teachers, both male and female, must undergo training to provide the necessary support to menstruating students.
- **Inspection and Feedback Mechanism –** The court directed District Education Officers (DEOs) to conduct regular inspections of schools, preferably once a year, to assess compliance with the new guidelines.
- The DEOs are also required to obtain anonymous feedback from students through surveys, allowing them to evaluate the reality of the menstrual hygiene facilities in schools.

What are the impacts on gender equality?

- **Education** – The Supreme Court's judgment highlights the critical role of menstrual hygiene in promoting gender equality in education.
- **Dignity** – The court has not only provided a solution to a practical problem but has also reaffirmed the importance of dignity and autonomy for menstruating students.
- **Inclusiveness** – By ensuring that menstrual hygiene is recognized as a fundamental right, the court has paved the way for a more inclusive and equitable educational environment for all children, regardless of gender.
- **Breaking the stereotypes** –The court's directive on educating boys about menstruation is particularly significant in challenging deep-rooted social taboos and stereotypes.
- It signals a move toward creating a more supportive, respectful environment for menstruating girls, free from discrimination and shame.

What lies ahead?

- The Supreme Court's landmark verdict recognizing menstrual hygiene as a fundamental right represents a significant step toward eliminating barriers that prevent girls from accessing education.
- It underscores the importance of equal opportunities in education, regardless of gender, and reinforces the constitutional mandate of dignity and equality.
- With clear directives to the government and educational institutions, this judgment has the potential to transform the educational landscape for girls across the country, ensuring that menstruation no longer becomes a reason for their exclusion or dropout from school.

4. GOVERNANCE

4.1 Property Registration and Title in India – The unending challenge

Recently, The Supreme Court of India, in its judgment in Samiullah vs State of Bihar, described the process of buying and selling property as "traumatic" for many Indians.

What was the issue before the Supreme Court in the Samiullah case?

- **Background** – The Samiullah case arose from amendments introduced to the Bihar Registration Rules in 2019.
- **Bihar's registration rules amendment** – These amendments empowered registering authorities to refuse registration of property transfer documents, such as sale deeds or gift deeds, if the seller failed to provide proof of mutation.
- Such proof included documents like Jamabandi or holding allotment records.
- The intent of the State was to ensure that only persons with legitimate ownership could transfer property.
- **Issues with the amended rules** - The amendments effectively made proof of mutation a mandatory precondition for registration, thereby altering the nature and scope of the registration process under the Registration Act, 1908.

Why did the Supreme Court strike down the Bihar Registration Rules?

- **Issue of subordinate legislation** – The court held that the rules exceeded the powers granted to the Inspector General of Registration under the Registration Act.
- Subordinate legislation cannot override or expand the scope of the parent statute.
- **Freedom of property curtailed** – By requiring proof of mutation, the rules indirectly demanded proof of title.
- This contradicted the fundamental objective of the Registration Act, which is limited to registering documents and not adjudicating ownership.
- Such a requirement curtailed the freedom to transfer property and adversely affected the constitutionally protected right to property under Article 300A.
- **Practical impossibilities** – The court took judicial notice of the ground realities in Bihar.
- With the Bihar Mutation Act and the Bihar Special Survey and Settlement Act still far from completion, obtaining mutation records was practically impossible for many landholders.
- Enforcing such a requirement would therefore exclude genuine transactions and deepen administrative hardship.

How did the court clarify the distinction between registration and title?

- **Registration vs Title** – The Supreme Court reaffirmed that registration of a document and establishment of title are legally distinct processes.
    - **Registration** – It serves as public notice of a transaction and creates only a rebuttable presumption of ownership.
    - It does not confer or confirm title conclusively.
    - **Questions of title and ownership** – It fall within the exclusive domain of civil courts, which possess adjudicatory powers to examine evidence, hear parties, and determine competing claims.
- **Administrative overreach** – Registering officers, by contrast, perform a ministerial function.
- Their enquiry is confined to verifying the identity of the parties, the description of the property, and compliance with statutory formalities.
- The court clarified that references to surveys or maps during registration are meant solely to identify the property and not to establish ownership.

How does this judgment align with earlier Supreme Court rulings?

- **K. Gopi vs Sub-Registrar (2024)** – In that case, the court struck down a rule framed by the State of Tamil Nadu that allowed Sub-Registrars to refuse registration if the seller failed to produce the original title deed.
- The court held that Sub-Registrars lack the authority to decide questions of title and cannot be transformed into quasi-judicial authorities.
- Both judgments reinforce the long-established principle that the Registration Act concerns itself only with documents, not ownership.
- **Forthcoming Registration Bill, 2025** – It seeks to replace the Registration Act of 1908, and it also upholds this distinction by limiting the powers of registering authorities.

Why has buying and selling property become 'traumatic' in India?

- **Complex issues** – India's land governance framework is shaped by a complex mix of colonial-era laws, fragmented administration, and an overburdened judiciary.
- **Lack of coordination** — Registration, survey and settlement, and revenue administration, operate independently, each governed by distinct statutes and bureaucratic hierarchies.
- The lack of coordination among these institutions results in inconsistent and outdated records.
- **Presumptive titling system** – It is followed in India where ownership is inferred from documents such as sale deeds, revenue receipts, mutation entries, and proof of possession.
- Since none of these provide conclusive title, ownership can always be challenged in court.
- This places an onerous burden on buyers to conduct extensive due diligence and exposes them to prolonged litigation.

- **Historical factors** – Over centuries, the Indian subcontinent was governed by diverse rulers who implemented different revenue systems.
- Colonial policies, varying practices in princely states, post-independence land reforms, and land ceiling laws have created region-specific legal complexities.
- These layered inconsistencies continue to affect present-day land records.

What reforms are needed in land administration?

- **Integration of land records** – Meaningful reform requires large-scale administrative restructuring aimed at integration and synchronisation of land records.
- The primary objective should be to reduce disputes, prevent fraud, and enhance certainty in property transactions.
- **Initiatives of Governments** – Both the Union and State governments have undertaken initiatives to digitise land records.
- **Karnataka** – The Bhoomi and KAVERI platforms represent a notable example, where records of rights are linked with registration systems, enabling automatic updating of ownership upon registration.
- Similar efforts are underway in other States, particularly for agricultural land, though progress remains uneven.
- However, digitisation alone is insufficient without verification, updating of legacy records, and institutional coordination among departments.

What role can technology, including blockchain, play in reform?

- **Supreme court's recommendation** – The Supreme Court itself, in Samiullah, suggested exploring blockchain technology to create secure, transparent, and tamper-proof land records.
- **Blockchain in land records** – Applied to land records, blockchain could create a single digital block for each parcel of land containing its entire transaction history, title details, survey maps, inheritance records, and registered documents.

> ***Blockchain*** *is a decentralised digital ledger in which data is stored in interconnected blocks that are immutable and verifiable by all participants. Once recorded, information cannot be altered without consensus, making fraud and manipulation extremely difficult.*

- Each subsequent transaction would add a new block, ensuring chronological transparency and traceability.
- **Andhra Pradesh's pilot blockchain project** – It reportedly reduced land disputes significantly and improved transaction efficiency.
- However, the success of such technologies depends on the accuracy of initial data entry and alignment with existing legal and administrative frameworks.

What lies ahead?

- The Supreme Court's decision in Samiullah vs State of Bihar is a timely reminder of the structural flaws in India's land governance system.
- While it reinforces a settled legal principle separating registration from title, it also highlights the urgent need for comprehensive administrative and technological reform.
- Ensuring secure property rights is essential not only for individual citizens but also for economic growth, investment, and social stability.
- A transparent, integrated, and reliable land administration system is the cornerstone of that goal.
- Understanding the historical and institutional complexities is the first step toward building a future-ready framework that truly secures the right to property for all.

5. INTERNATIONAL RELATIONS

5.1 US Takeover of Venezuela's Oil Sector – Impact on India

Recently, Donald trump announced that the US will take over the oil sectors of the Venezuela.

What is the recent conflict between US and Venezuela?

- **Capture of Venezuelan tankers** – The U.S. Coast Guard tried to intercept the *Bella 1,* a stateless tanker under U.S. sanctions, for past Iranian oil shipments.
- The Coast Guard also stopped and detained the *Centuries,* a Panamanian-flagged vessel carrying Venezuelan oil for a China-based trader.
- **Military actions** – The U.S. military said a strike in the eastern Pacific targeted a boat that had been transporting drugs along known trafficking routes.
- Over several days, the U.S. military intensified operations in the Caribbean, sending multiple C-17 transport flights from bases across the country and Japan to Puerto Rico.
- In the first known U.S. operation inside Venezuela, the C.I.A. carried out a drone strike on a port facility sometime during the fourth week of December.
- **Capture of Venezuelan president** – The US army has arrested and deported the Venezuelan president Venezuela's President Nicolás Maduro.
- **Announcement from US** – Soon after Maduro's capture, US President Donald Trump said Washington would take control of Caracas's oil sector.
- He also said that American companies would pump in billions of dollars to revive the struggling Venezuelan oil industry and fix its broken oil infrastructure.

What is the status of Venezuelan oil sector?

- **Oil reserves** – Venezuela has the largest oil reserves globally, estimated at over 300 billion barrels or a fifth of the proven oil reserves all over the world.
- **Oil production** – Venezuela produces around 1 million barrels per day (bpd) of crude, while global output is over 100 million bpd.
- It accounts for less than 1% of global oil production.
- The world's largest oil exporter, Saudi Arabia, is second to Venezuela in terms of proven oil reserves.
- **Reason for low production** – The relatively insignificant oil production by Venezuela, despite massive potential, is a result of a combination of factors that include:
    - US sanctions on the country's oil and gas sector constraining its energy exports,
    - Severe economic crisis in Venezuela
    - A debilitating lack of investment in the country's oil and gas infrastructure.

How these changes have an impact on India?

- **Minimal impact** – As for India, the country appears to be well-shielded from any direct impact in the near term, as Indian refiners do not import Venezuelan crude.
- **Flow of oil to the market** – If the US and Venezuela's new leadership can negotiate an easing or suspension of sanctions, it could open the doors for Venezuelan oil to flow more freely in the international market, including to India.

> ***India**, is the world's third-largest consumer of crude oil and depends on imports to meet over 88% of its oil needs.*

- **Recovery of dividends** – It could also pave the way for ONGC Videsh, to recover over $500 million worth of stuck dividends from its shareholding in two Venezuelan oil and gas projects.
- **Investment opportunities** – It could also create opportunities for more Indian investment in Venezuela's oil and gas sector.

***ONGC Videsh** is the overseas investment arm of the state-owned Oil and Natural Gas Corporation (ONGC).*

- **Chevron model** – ONGC wants to operate projects in Venezuela under the so-called *"Chevron model",* which allows foreign oil companies to operate in the country after receiving specific approvals from the US.
    - The model is referred to as the Chevron model in the oil industry because the US major Chevron was the first to operate in sanctions-hit Venezuela through this route.
- **Past transactions** – India, specifically private sector refining giant Reliance Industries (RIL) was a regular buyer of Venezuelan crude prior to the imposition of US sanctions on Caracas in 2019.

What impact it could have on US and global market?

- **Inflowing of US companies** – Trump now wants the American oil majors to get into the game so that more Venezuelan oil can be pumped into the global market including the US and to the benefit of American corporations.
- **Expert's opinion** – According to experts, if Trump's intentions for Venezuela's oil industry turn into a concrete plan that is implemented, Venezuela could emerge as a significantly larger oil supplier than it is now.
- **Increased investment** – It could also open up the country's oil sector for more investments, not just from American companies, but from other countries' corporations, as well.
- **Increased oil supply** – More oil supply in the international market should translate into downward pressure on oil prices in the long run.

What lies ahead?

- Given Washington's sanctions on the Latin American country's oil and gas sector, companies cannot use American banking channels, services, and US dollars for these projects, unless they have a specific license from the Office of Foreign Assets Control (OFAC) of the US Department of the Treasury.
- The specific license for this type of operation usually gives foreign companies major control over finances, operations, production, and marketing of oil from Venezuelan projects, despite Venezuela's state-owned oil major Petróleos de Venezuela, SA (PDVSA) being the majority shareholder.
- ONGC Videsh holds 40% stake in the San Cristobal project and 11% in Carabobo 1.

5.2 Exit of the United States from International Organisations

Recently, U.S. President Donald Trump signed an executive order suspending U.S. support for 66 international organisations, agencies, and commissions, most of them linked to the United Nations system.

What is the background of the issue?

- **Approach of the U.S** – The Trump administration has adopted an **"America First"** approach that prioritises national sovereignty and transactional engagement over multilateralism.
- **Reason for the exit** – According to the U.S. State Department, these organisations were found to be:
    - Redundant or mismanaged
    - Wasteful and poorly run
    - Captured by interests contrary to U.S. priorities
    - A threat to U.S. sovereignty, freedoms, and economic prosperity
- Many targeted institutions focus on climate change, labour standards, population health, and diversity-related initiatives, which the administration has labelled as "woke" agendas.

What are the major international organisations affected?

- **United Nations–related withdrawals –** The U.S. has either exited or suspended support from several UN bodies, including:
    - World Health Organization (WHO)
    - UN Relief and Works Agency for Palestine Refugees (UNRWA)
    - UN Human Rights Council
    - UN Educational, Scientific and Cultural Organization (UNESCO)
    - UN Population Fund (UNFPA)
- This represents a sharp break from earlier bipartisan U.S. support for UN institutions.
- **UN Framework Convention on Climate Change (UNFCCC) –** The UNFCCC is the foundational treaty underlying the *Paris Climate Agreement.*
- President Trump, who has repeatedly dismissed climate change as a hoax, had earlier withdrawn from the Paris Agreement as well.
- **Implications:**
    - Undermines global climate governance
    - Weakens collective action to curb greenhouse gas emissions
    - Provides other nations with justification to delay commitments

- Experts argue that meaningful progress on climate change is difficult without cooperation from the U.S., one of the world's largest emitters and economies.
- **Exit from other multilateral platforms –** Other organisations from which the U.S. is departing include:
    - International Solar Alliance (India–France initiative)
    - Carbon Free Energy Compact
    - United Nations University
    - International Tropical Timber Organization
    - International Cotton Advisory Committee
    - International Federation of Arts Councils and Culture Agencies
    - International Lead and Zinc Study Group
    - Pan-American Institute for Geography and History
- Additional reviews of U.S. participation in international bodies are ongoing.

What are the impacts on global governance?

- **Weakening of multilateral institutions –** The U.S. has shifted to an *à-la-carte approach*, selectively funding only those agencies aligned with its strategic interests.
- This has:
    - Forced the UN to implement staffing and programme cuts
    - Reduced the effectiveness of global coordination mechanisms
    - Increased financial stress on humanitarian and development agencies
- **Impact on global development and humanitarian work –** Cuts in *USAID funding* have led to the closure of several NGO and UN-linked projects worldwide.
- Suspension of funding to *UNFPA* threatens access to sexual and reproductive health services in developing countries.
- **Strategic reorientation –** Despite the exits, U.S. officials maintain that they seek to expand American influence in select global standard-setting bodies where competition with China is intense, such as:
    - International Telecommunications Union (ITU)
    - International Maritime Organization (IMO)
    - International Labour Organization (ILO)
- This reflects a selective multilateralism aimed at geopolitical competition rather than global cooperation.
- **Geopolitical and strategic implications –** The withdrawals coincide with assertive U.S. actions, including threats against adversaries and unconventional foreign policy postures.
- Allies are unsettled by the erosion of predictable U.S. leadership.
- China and other powers may gain greater influence in vacated multilateral spaces.

What lies ahead?

- The U.S. exit from numerous international organisations under the Trump administration represents a fundamental shift in global governance, from cooperative multilateralism to transactional and interest-based engagement.
- While intended to safeguard sovereignty and reduce costs, the move risks:
    - Weakening global institutions
    - Undermining collective responses to transnational challenges like climate change, health, and humanitarian crises
    - Creating leadership vacuums that may be filled by rival powers
- For countries like India, this evolving landscape presents both challenges and opportunities to strengthen leadership in multilateral platforms and advocate for a more inclusive and balanced global order.

5.3 Pax Silica – Importance for India

Despite the North-South divide, semiconductors and AI are shifting global power, making Rare Earth Elements (REEs) supply chains crucial, in response, the U.S.-led Pax Silica Summit (2025) seeks to secure these technologies and build resilient systems for peace and prosperity.

What is Pax Silica Summit?

- **Pax Silica Summit** – It was ***convened by the U.S.***, held in Washington D.C on December 12, 2025.
- **Purpose –** To secure the supply chain of critical minerals and build advanced manufacturing and logistics capabilities critical to new frontier technologies such as semiconductors and AI.
- **Meaning –** 'Pax' in Latin means 'peace' and 'Silica' is a key compound used in chip manufacturing — taken together they suggest that the supply chain for new technologies should promote peace and prosperity.
- **Pax Silica Declaration** – This initiative seeks to reduce coercive dependencies, secure global tech/AI supply chains, and build trusted digital infrastructure.
- **Major participants** – Its membership is evolving – with U.S., Japan, Australia, The Netherlands, South Korea, Singapore, Israel, United Kingdom, Qatar and the United Arab Emirates (India was not invited to the inaugural meeting).
- **Other participants as observers** – Canada, the European Union, the Organisation for Economic Co-operation and Development (OECD), and Taiwan.

***India is not a member** of Pax Silica initiative.*

To know more about Rare earth elements (REEs), click here

How has China's dominance in REEs & its influence in global supply chains and geopolitics?

- **China's Dominance in REEs –** There are concerns that China has emerged as a principal supplier of REEs and acquired the capability to shape the global flow of these resources.
- **Lack of Inclusivity** – Beijing has also not demonstrated a willingness to create REE supply chains that are sensitive to the development needs of emerging economies such as India.
- **Resource Weaponisation –** In recent years, China has restricted the flow of critical resources to achieve its desired political and economic ends.
    - **Example (2025)** – In response to U.S. tariffs, China suspended REE exports to U.S. & others.

Why is it matters for India?

- **Supply Chain Vulnerability** – India experienced disruptions to the import of rare-earth magnets from China, negatively impacting the country's automobile and electronics industries.
- **China's condition –** India regained access to rare-earth magnets only after its companies accepted China's strict licensing rules, requiring assurances that imports would not be used for defence or dual-use applications.
- **Lessons from the Pandemic** – The pandemic demonstrated the limitations of supply chains that are heavily reliant on a single country.
- **India's existing initiatives** – India already participates in the Supply Chain Resilience Initiative (2021) and the Quad Critical Minerals Initiative (2025).

What are the major strengths India would bring to Pax Silica?

- **Strong Collaboration History** – Indian and American firms have a history of healthy collaboration in the technology domain and healthy track record of joint ventures and R&D collaborations.
- **Digital Infrastructure & AI Market** – India has a strong digital infrastructure, and its AI market is growing rapidly, with many enterprises adopting AI solutions.
- **Policy Initiatives –** India's AI and semiconductor ecosystems are well behind those of Pax Silica countries however, it has launched AI and Semiconductor Missions with substantial financial allocations in recent years.
- **Private & Foreign Investments** – Indian private firms like the Tatas and U.S. chip manufacturers such as Micron have invested in semiconductors, while India is also witnessing a steady rise in newly funded AI startups.
- **Collaboration** – India is collaborating with Japan, Singapore, and Israel to strengthen supply chains and set up fabrication plants.
- **Human Capital Advantage** – India is sending a large number of educated young people to pursue advanced degrees in the U.S.

- If U.S. visa rules remain, many engineers will return to India, providing India with a large, highly trained human resource pool to power AI and semiconductor industries.

What are the challenges India must navigate?

- **Status as a Developing Country** – The member countries of the Pax Silica are U.S. allies and high-income countries.
- If India decides to join the Pax Silica, it will be the first developing country to do so, creates an expectation gap with high-income member states.
- **Strategic Autonomy** – India will also be the *first non-ally (but a strategic partner) of the U.S. to join* this initiative, India must ensure that its strategic autonomy is not diluted through its participation in the Pax Silica.
- **Nascent Ecosystems** – As a developing country, India has relatively young semiconductor and AI ecosystems compared with those of other Pax Silica countries, with the risk of being overshadowed by advanced economies.
- **Policy Divergence –** India will seek to protect its semiconductor and AI ecosystems by granting domestic firms preferential treatment through subsidies, government procurement, and calibrated import regulations.
- There will be a potential friction with U.S. trade preferences and unclear responses from other Pax Silica members.

What lies ahead?

- **China's Current Position** – At the moment, China is a leading player in the REE supply chain and has already instituted export control regulations to preserve its dominant position.
- **Pax Silica's Potential Role –** Over time, two REE supply chains will dominate the global economy, namely that of China's and Pax Silica's.
- **India's Likely Orientation** – China's dominance and restrictive REE policies may push India towards Pax Silica, but strained U.S. ties mean India will tread cautiously, seeking clarity before deeper engagement.

5.4 Justice mission 2025 of China – Military Drills around Taiwan

China's People's Liberation Army (PLA) conducted large-scale military exercises around Taiwan on December 29–30, 2025, codenamed "Justice Mission-2025."

What is the Justice mission 2025 of China?

- **Justice mission 2025** – These drills mark the second major exercise of the year and represent one of the most intense displays of military pressure on Taiwan to date.
- Officially framed as measures to safeguard China's sovereignty and national unity, the drills were also intended to warn against Taiwanese separatism and foreign interference.
- **Nature and Scope of "Justice Mission-2025"** – The Justice Mission-2025 exercise was notable for its scale, proximity, and operational objectives.
- According to China's Ministry of National Defence (MND), the drills focused on:
    - Comprehensive combat readiness
    - Blockade of key ports and territories
    - Achieving sea and air superiority
    - Three-dimensional deterrence involving land, sea, and air forces
- **Air Superiority and Tactical Signalling** – On the first day, the PLA conducted 130 air sorties, of which 90 crossed the Taiwan Strait's centreline—a tacit boundary that China has increasingly sought to normalise crossing.
- These sorties demonstrated China's intent to erode Taiwan's air defence comfort zone and assert military dominance in the strait.
- **Missile and Rocket Deterrence** – The second day focused on long-range rocket firing, with 10 rockets landing in Taiwan's contiguous zone, the closest such strikes have ever occurred.
- This move signals China's ability to conduct precision strikes and maritime denial operations, stopping short of direct territorial violation but pushing psychological and strategic limits.
- China's Ministry of Foreign Affairs described the mission as a deterrent against "separatist forces," reinforcing Beijing's long-standing claim that Taiwan is a breakaway province.

What is the Historical pattern of military drills around Taiwan?

- **Pelosi Visit and Strategic Shock, 2022**– Following U.S. Speaker Nancy Pelosi's visit to Taiwan, China conducted unprecedented drills involving:
    - Aircraft carrier groups
    - Nuclear submarines
    - Launch of 11 missiles into waters surrounding Taiwan
- This marked a turning point, with China using military exercises as strategic punishment for perceived political provocations.
- **Responses to Diplomatic Engagements, 2023**
    - **April 2023** – Drills followed Taiwanese President Tsai Ing-wen's meeting with U.S. Speaker Kevin McCarthy.
    - **August 2023** – Smaller exercises were conducted after Vice President William Lai Ching-te's diplomatic tour of the Americas.
- **Electoral Outcomes and Sustained Pressure, 2024–25** – After William Lai Ching-te of the Democratic Progressive Party (DPP) won Taiwan's presidential election, China conducted large-scale exercises in the East China Sea, signalling displeasure with pro-independence leadership.
- In April 2025, the "Strait Thunder–2025A" drill emphasised advancing, deterrence, closure, destruction, and paralysis—terms indicative of full-spectrum conflict planning.
- Justice Mission-2025 thus fits into a continuum of coercive diplomacy rather than being an isolated event.
- **Role of U.S.–**Taiwan Military Cooperation – A key trigger for Justice Mission-2025 appears to be the proposed $11-billion U.S. arms sale to Taiwan, announced under the Trump administration.
- The package—awaiting Congressional approval—includes:
    - Self-propelled howitzers
    - Advanced rocket launch systems
    - Missile platforms
- From China's perspective, such arms sales violate the One-China principle and embolden Taiwan's defence posture.
- The drills thus serve as a counter-signal, warning both Taipei and Washington against altering the military balance in the Taiwan Strait.

What is the Taiwan's Response?

- **Official Reaction** – Taiwan's Mainland Affairs Council condemned the drills as "provocative and coercive military actions."
- Taiwan has continued to monitor PLA movements and maintain defensive readiness without direct escalation.
- **Military Modernisation** – Taiwan has proposed a multi-layered air defence system, known as the 'T-Dome,' aimed at countering missile and aerial threats.
- However, progress has been slow and uneven.
- **Internal Political Challenges** – Taiwan's defence preparedness is hampered by domestic political divisions:
    - The DPP, which supports stronger defence and safeguards sovereignty, controls the Executive Yuan.
    - The Legislative Yuan is dominated by the opposition Kuomintang (KMT) and Taiwan People's Party (TPP).
- This split has led to legislative gridlock, with defence-related bills frequently stalled, limiting Taiwan's ability to rapidly upgrade its military infrastructure.

What are the responses of external actors?

- **United States** – The U.S. has publicly underplayed the drills, consistent with its approach of avoiding rhetorical escalation while continuing material support to Taiwan.
- However, the arms sale deal underscores Washington's commitment under the Taiwan Relations Act.

- **European Union** – The EU Commission expressed concern, noting that such military activities increase cross-strait tensions and threaten regional and international stability.
- **Japan** – Tensions were further heightened by comments from Japan's newly elected Prime Minister, Sanae Takaichi, who stated that a Chinese attack on Taiwan would constitute a "survival-threatening situation" for Japan.
- China condemned the remarks as interference in its internal affairs and demanded a retraction.
- Japan's position reflects growing recognition that Taiwan's security is closely linked to Japan's own maritime and strategic interests, particularly in the East China Sea.

What are the strategic objectives behind the drills?

- **Deterrence** – Signalling high costs for Taiwanese independence moves.
- **Normalisation** – Making frequent centreline crossings and near-zone strikes routine.
- **Testing Responses** – Gauging Taiwan's military readiness and external reactions.
- **Domestic Messaging** – Reinforcing nationalist credentials of the Chinese leadership.
- **Countering Foreign Influence** – Warning the U.S. and allies against deeper involvement.
- **Regional and Global Implications**
    - Increased militarisation of the Taiwan Strait
    - Risk of miscalculation or accidental escalation
    - Greater alignment among U.S. allies such as Japan
    - Challenges to freedom of navigation in a critical global trade route
    - For the Indo-Pacific, Taiwan remains a flashpoint where great-power competition intersects with regional security.

What lies ahead?

- China's Justice Mission-2025 military drills are not merely routine exercises but a strategic demonstration of coercive capability and intent.
- They reflect Beijing's determination to deter Taiwanese independence, counter foreign involvement, and reshape the status quo without triggering open conflict.
- At the same time, Taiwan's constrained political environment, increasing U.S. military support, and Japan's sharper rhetoric point to a more polarised and volatile regional order.
- Managing this tension without escalation will remain one of the most critical challenges for Indo-Pacific stability in the years ahead.

5.5 Commonwealth Speakers' Conference – Strengthening Parliamentary Dialogue

Recently, India hosted the 28th Conference of Speakers and Presiding Officers of the Commonwealth (CSPOC) in New Delhi from 14–16 January 2026, reaffirming its leadership in parliamentary diplomacy and democratic governance.

What is CSPOC?

- **CSPOC** – The Conference of Speakers and Presiding Officers of the Commonwealth (CSPOC) is an independent parliamentary forum of the Commonwealth of Nations.
- It brings together Presiding Officers from 53 sovereign national parliaments and 14 semi-autonomous legislatures, representing a wide diversity of constitutional traditions and parliamentary systems.
- **Membership** – CSPOC has no formal affiliation with either the Commonwealth Parliamentary Association (CPA) or the Commonwealth Secretariat.
- Its membership overlaps with these institutions and its deliberations complement the broader Commonwealth parliamentary ecosystem.
- **Individuality** – Its independence allows it to function as a neutral, non-political platform focused exclusively on parliamentary leadership and institutional values.
- **Conference period** – CSPOC is held biennially, with a Standing Committee meeting convened in the intervening year to finalise agendas, review rules, and ensure institutional continuity.

What is the historical origins and legal framework?

- **Establishment** – CSPOC was established in 1969 on the initiative of Lucien Lamoureux, then Speaker of the House of Commons of Canada.
- **Background** – The initiative emerged from a recognised need for a non-partisan, Speaker-led forum dedicated to parliamentary procedure, neutrality, and institutional autonomy — an area not adequately covered by existing political or executive-focused Commonwealth platforms.
- **Need** – The Conference was designed to strengthen the constitutional role of Presiding Officers as impartial guardians of parliamentary democracy, ensuring orderly conduct of business, protection of minority voices, and respect for legislative norms.
- **Standing rules and membership framework –** CSPOC operates under a set of Standing Rules, periodically reviewed and amended, which constitute its internal legal framework.
- **Key provisions**:
    - Membership restricted to Speakers and Presiding Officers of national parliaments of independent Commonwealth states
    - In case of dissolution, the last serving Presiding Officer continues representation until a successor is elected
    - Deputy Speakers may participate as substitutes with full rights, except eligibility for Standing Committee membership
    - Clearly defined procedures for agenda-setting, conduct of proceedings, quorum, voting, and tenure
- These rules ensure both institutional stability and adaptability to emerging parliamentary challenges.
- **Aims and functions –** CSPOC operates with a focused and constitutionally sensitive mandate.
- **Core aims**
    - To uphold impartiality and fairness on the part of Presiding Officers
    - To promote knowledge and understanding of parliamentary democracy across diverse constitutional systems
    - To strengthen legislative institutions through structured exchange of experiences and best practices
- **Functional role –** Although CSPOC resolutions are non-binding, they exert strong normative influence on parliamentary conduct, ethics, and administration across the Commonwealth.
- **Contemporary relevance –** CSPOC has evolved to address modern concerns such as digital transformation, artificial intelligence, public engagement, member wellbeing, and safeguarding institutional credibility.

What is the institutional structure and governance?

- **Standing Committee –** The Standing Committee is the principal governing body during intersessional periods. Its responsibilities include:
    - Selecting venues and dates for future Conferences
    - Proposing agenda themes
    - Reviewing Standing Rules
    - Overseeing administrative and logistical arrangements
- **Composition**
    - Chaired by the Presiding Officer of the next host Parliament
    - Includes regional representatives to ensure geographic balance
    - Comprises 15 members, with a quorum of five
- **Secretariat support –** Since inception, Canada has provided secretariat services, ensuring institutional continuity and administrative stability.
- **India's role in cspoc –** India has played a consistent and substantive role in CSPOC, reflecting its long-standing parliamentary traditions.
- India has hosted CSPOC four times — *1970–71, 1986, 2010, and 2026* — underscoring its sustained engagement.
- The 29th CSPOC is scheduled to be held in London in 2028.

What is the significance of India as host of the 28th CSPOC?

- **Chairmanship** – The 28th CSPOC was held in New Delhi under the chairmanship of Lok Sabha Speaker.
- **Agenda priorities of the 28th cspoc –** The agenda reflected contemporary challenges to democratic institutions and parliamentary functioning, including:
    - The role of Artificial Intelligence and digital tools in legislatures
    - The impact of social media on parliamentary discourse and authority
    - Enhancing public understanding of Parliament and safeguarding democratic institutions
    - Security, health, and wellbeing of Members of Parliament and parliamentary staff
- **India's role in the standing committee –** In preparation for the Conference, India chaired the CSPOC Standing Committee meeting in Guernsey in January 2025.
- This allowed India to shape the agenda and institutional direction of the 2026 Conference, reaffirming its leadership role.
- **Thrust of India's interventions –** India emphasised that while AI and social media have improved efficiency, transparency, and inclusivity, they also pose challenges such as misinformation, cybercrime, and social polarisation.
- Legislatures, India argued, must collectively promote ethical AI, transparent digital governance, and accountable social media frameworks.
- **Highlights by India:**
    - Repeal of obsolete laws and enactment of welfare-oriented legislation
    - The role of Parliamentary Standing Committees as "mini-Parliaments" in budgetary and legislative scrutiny
    - Progress towards Viksit Bharat and Atmanirbhar Bharat
- India also underscored women's leadership, noting that:
    - India has a woman President and a woman Chief Minister of Delhi
    - Around 1.5 million women representatives form nearly 50% of elected leaders in local bodies, an achievement unmatched globally
- **India, cspoc, and the global south –** India highlighted its democratic and institutional capacity to deliver domestically and globally.
- It noted its role as:
    - The largest producer of vaccines, supplying medicines to over 150 countries
    - Second-largest producer of steel and rice
    - Home to the third-largest aviation market, fourth-largest railway network, and third-largest metro system

What lies ahead?

- CSPOC remains a vital non-political forum for strengthening parliamentary democracy by enabling Presiding Officers to uphold impartiality, procedural fairness, and institutional integrity.
- India's hosting of the 28th CSPOC highlights its parliamentary heritage and commitment to democratic values, with a forward-looking focus on technology, public engagement, and institutional resilience — essential pillars for democratic governance in the 21st century.

5.6 Exit of the U.S. from the International Solar Alliance (ISA)

On January 7, the U.S. government announced its decision to withdraw from 66 international organisations, including major climate platforms. Among them was the International Solar Alliance (ISA)—an India-headquartered body jointly led by India and France.

What is the International Solar Alliance (ISA)?

- **ISA** – The ***ISA was established in 2015*** with the objective of making solar energy affordable, accessible, and scalable, particularly for developing countries located in the tropical region.
- **Mandate and Work of the ISA –** While the ISA does not directly build solar power plants, it plays a critical facilitative role by:

- Helping countries ***access low-cost finance***
- ***Reducing investment risks*** for private players
- Supporting ***policy frameworks, training, and capacity building***
- Accelerating the ***deployment of solar technologies***

- **Membership and Reach –** The ISA has ***over 120 member countries.***
- Active across ***Africa, Asia, and Small Island Developing States.***
- Acts as a key platform for ***South-South cooperation.***
- **Role of the United States in the ISA –** The U.S. joined the ISA **relatively late, in 2021.**
- Over three years, it contributed about ***$2.1 million.***
- This accounted for roughly 1% of the Alliance's total funding.

What is the impact of U.S. Exit on the ISA?

- **Financial impact** – From a financial perspective, the impact is limited.
- The U.S. contribution was not critical to ISA's budget
- **Operations** – Indian officials have confirmed that day-to-day operations and ongoing programmes will continue.
- Training and capacity-building initiatives remain unaffected
- **Confidence impacts** – Confidence matters in global economics.
- The U.S. exit sends a broader signal that could affect:
  - Investor sentiment
  - International cooperation in climate finance
- **Implications for India's Solar Industry –** The exit has no direct negative impact on India's solar sector.
- India does not rely on the U.S. for solar panels or key components
- Domestic manufacturing capacity has expanded significantly:
  - **Solar module manufacturing:** ~144 GW (late 2025)
  - **Solar cell manufacturing:** ~25 GW and rapidly growing
- Indian firms are investing across the entire solar supply chain
- **Role of China and Imports –** China dominates global solar manufacturing with ~70% of global cell production capacity
- India imported about $1.7 billion worth of photovoltaic (PV) modules from China in FY25, as per MNRE data
- This underscores that the U.S. exit does not increase project costs or electricity tariffs in India.
- For Indian consumers, nothing changes**.**
- **Effects on investments –** Investments are unlikely to slowdown because:
  - Solar projects are driven by strong domestic demand.
  - Backed by long-term power purchase agreements with state utilities and central agencies.
  - Investment decisions depend on policy stability, power demand, and growth prospects, not U.S. participation in ISA.
  - Funding mainly comes from Indian banks, global investors, and development finance institutions.
- **Employment Impact –** Solar jobs in India are concentrated in manufacturing, installation, and operations.
- India's growing domestic manufacturing base protects employment.
- **Potential advantage:**
  - As the U.S. slows renewable approvals domestically but still needs clean energy equipment.
  - With supply tensions with China and Mexico, Indian firms could:
    - Export solar equipment.

- Set up manufacturing units aligned with U.S. standards.

- Much depends on the outcome of a bilateral trade agreement between India and the U.S.

Where is the real economic risk?

- **Impacts outside India –** Africa and poorer developing countries, where ISA is deeply engaged.
- These regions rely on:
  - Cheap international finance
  - Multilateral cooperation
- **Other impacts** – A U.S. retreat from climate engagement may:
  - Make lenders more cautious
  - Slow project approvals
  - Delay decision-making
- This could affect Indian companies looking to expand abroad.

What are the implications for India's climate diplomacy?

- **Key pillar** – ISA is a key pillar of India's climate leadership in the Global South.
- It helps India:
  - Build diplomatic influence
  - Open new markets
  - Support Indian firms overseas
- **Superiority to India** – While the U.S. exit removes a powerful partner and some technical expertise:
  - Leadership of the ISA remains with India
  - India now bears greater responsibility in sustaining momentum

What lies ahead?

- Solar power in India remains affordable, projects are secure, and jobs are protected.
- The bigger challenge is a fragmented global climate order, where cooperation and finance become harder to mobilise.
- Compared to the past, India is better prepared—economically, industrially, and diplomatically—to handle this shift.

5.7 India –EU Free Trade Agreement — "Mother of All Deals"

Recently, India and the European Union announced the successful conclusion of a long-pending Free Trade Agreement (FTA) — often described by leaders as the "mother of all deals."

What Is the India-EU Free Trade Agreement (FTA)?

- **Background** – The deal comes after nearly two decades of negotiations beginning in 2007, with stops and starts over market access issues, regulatory differences, and strategic sensitivities.
- It is part of a wider strategic and cooperative agenda that brings the two partners closer together on economic, regulatory, and security issues.
- At the heart of the new agreements is a Free Trade Agreement that aims to dramatically reduce trade barriers between India and the EU.
- **Scope and Coverage** – The FTA covers goods, services, investment, movement of professionals, regulatory cooperation, and sustainable development provisions.
- It is set to impact a market of nearly 2 billion people, accounting for roughly one-third of global trade and about one-quarter of global economic output.
- **Tariff Reductions** – The most significant element of the FTA is tariff liberalisation on goods:
- Tariffs will be eliminated or reduced on approximately *96–99%* of traded goods by value.

- **Duty free access** – Many labour-intensive Indian exports, such as textiles, leather, footwear, tea, spices, sports goods, toys, and gems and jewellery will receive immediate duty-free access to EU markets.

- For other products, tariff elimination will be phased over several years, offering predictability while protecting sensitive sectors as the transition occurs.

What are the sensitive sectors and safeguards?

- **Protected sectors** – While the agreement reduces tariffs on most products, **certain categories remain protected**, or face gradual quota-based opening.
  - **Agriculture –** Core products like dairy, cereals, and some poultry are kept out or subject to protective measures.
  - **Automobiles –** India will reduce taxes on European cars from very high levels to lower tariffs in stages; there are quota systems to balance competitive pressures.
  - **Wine and spirits –** Duties will be cut substantially over time, boosting EU exports while retaining some safeguards for local industries.
- **Services and Mobility –** The agreement also includes a comprehensive services chapter that provides:
- Commitments on market access in 140+ service sub-sectors, including IT, finance, engineering, and education.
- A mobility framework to allow skilled professionals, business visitors, and certain service providers smoother cross-border access.

What are the economic and strategic impacts?

- **Economic Growth and Exports –** EU exports to India could double by 2032, driven by lower tariffs on machinery, chemicals, pharmaceuticals, and automotive goods.
- Indian exports will benefit from duty-free access in several high-value sectors, estimated to open access worth *~Rs.6.4 trillion (about $75 billion)* across a range of products.
- Sectors such as textiles, leather, gems and jewellery, engineering goods, and marine products are set for significant market expansion.
  - **For example**, the gems and jewellery sector alone is expected to double its exports to the EU in coming years due to zero-duty market access.
- **Industrial and Supply Chain Benefits –** Reduced production costs for Indian manufacturers by lowering the cost of imported machinery, components, and industrial inputs.
- It will help Indian companies integrate deeper into Europe-centred global value chains, particularly in technology, engineering, and advanced manufacturing.
- It would spur foreign direct investment (FDI) into India as EU firms seek to utilise India as a strategic production and export hub.
- **Strategic Diversification –** The deal comes against a backdrop of global trade uncertainty, where rising protectionism especially in the United States.
- It has encouraged both India and the EU to diversify partners and reduce dependency on single markets.
  - The FTA reinforces India's role as a *China-plus-one trade partner* for European companies.
  - It strengthens the EU's engagement in the Indo-Pacific, balancing geopolitical interests with economic integration.

What are the regulatory and security agreements?

- **Regulatory Cooperation –** India and the EU have signed a cooperation agreement on financial market oversight, especially concerning clearing houses.
- This resolves regulatory disputes and opens avenues for cross-border financial integration.
- **Sustainable Development and Climate Action –** The FTA has a dedicated trade and sustainable development chapter aimed at:
  - Supporting environmental protections, labour rights, and climate action collaborations.
  - Building joint platforms and funding mechanisms (including EU support for India's climate and clean energy goals).
- **Strategic Security Partnership –** Parallel to economic cooperation, India and the EU have discussed security and defence collaboration, focusing on:

- Counter-terrorism and maritime security in the *Indo-Pacific.*
- Joint initiatives in *cybersecurity* and technology co-development.

- This strategic overlay adds depth to the economic deal, showing that the partnership aims for long-term geopolitical alignment.

What are the challenges?

- **Ratification Process –** The FTA must still be approved by EU member states and the European Parliament, and by India's government and legislature — a process that can take months.
- **Sensitive Sectors –** Some sectors remain outside full liberalisation to protect domestic producers, requiring careful implementation and monitoring.
- **Regulatory Alignment –** Harmonising standards, environmental rules, and digital regulations will require continued negotiation and cooperation.

What lies ahead?

- The India-EU FTA and the accompanying cooperation frameworks represent one of the most significant trade and strategic partnerships of the 21st century:
- It is a milestone in India's global economic integration, offering expanded opportunities for exporters, industry clusters, and workers.
- It enhances the EU's access to one of the fastest-growing large markets.
- It strengthens both partners' geopolitical positions amid global trade realignments.
- While implementation will take time and careful adjustment, the new agreements mark a major step forward in India-EU relations — economically, strategically, and geopolitically.

5.8 India-Arab League Relations

Delhi will host the 2nd India-Arab Foreign Ministers' Meeting on January 30–31, 2026, bringing together all 22 Arab League members in a major diplomatic outreach amid regional conflicts and global shifts.

What is the Arab league?

- **Arab League** – It is a regional intergovernmental organisation comprising 22 member states in the Middle East and North Africa.
- It is officially known as the ***League of Arab States*** (LAS).
- **Established in** – Cairo, Egypt on 22 March 1945
- **Goal** – To foster political, economic, and cultural cooperation while safeguarding the sovereignty of its members.
- **Headquarters** – Cairo, Egypt.
- **Structure** – Governed by the Council, where each member has one vote, decisions are *binding only on those states that vote for them*.

- **7 founding members** – Egypt, Iraq, Jordan, Lebanon, Saudi Arabia, Syria, and Yemen.
- **Other Members** – Algeria, Bahrain, Comoros, Djibouti, Egypt, Iraq, Jordan, Kuwait, Lebanon, Libya, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Somalia, Sudan, Syria, Tunisia, UAE, and Yemen.
  - **Syria's Return** – After a 12-year suspension due to the civil war, Syria was readmitted on 7 May 2023.
- **Observers** – Several nations hold observer status, including India, Brazil, Eritrea, Venezuela, Armenia, Chad, and Greece.

What about India- Arab League engagement?

- **Historical roots** – India's relations with Arab League countries go back centuries through trade and cultural exchanges.
- **Formalisation of Ties** – The engagement with the LAS was formalised in March 2002 through an MoU, which institutionalising the process of dialogue.

- **Aim –** To strengthen friendship and cooperation between India and the Arab States, with provisions for annual meetings between India's External Affairs Minister and the Arab League's Secretary General.

- **Arab-India Cooperation Forum (AICF)** – Established in December 2008, with the first meeting in January 2016 at Manama, Bahrain.
- **Permanent Representation** – In December 2010, India's Ambassador to Egypt was designated as Permanent Representative to the Arab League.
- **Economic Engagement Platforms** – India-LAS Partnership and Investment Summit, a biennial flagship economic event, focus on trade, investment, and infrastructure cooperation.
- **New Initiative (2026)** – During the current ministerial visit, the *India–Arab Countries Chambers of Commerce, Industry and Agriculture* will be inaugurated to boost collaboration in business, agriculture, and industry.

What are the Key pillars of engagement?

- **Role in Multilateral Forums** – India has also strongly rallied for the region in various multilateral forums such as BRICS and SCO and positions itself as a bridge between regions in global platforms.
- **Convergence of strategic vision** – India's long-term vision aligns closely with those of Arab nations, Saudi Vision 2030, UAE Centennial 2071, Kuwait Vision 2035, and Oman Vision 2040 — alongside India's Viksit Bharat 2047.
- Notably, India is recognized as one of the eight strategic partners in Saudi Vision 2030.
- **Trade and investments**
- **Bilateral trade** – With most of India's external trade flowing through the Suez Canal, the Red Sea, and the Gulf of Aden, its economic engagement with the Arab League has become vital — bilateral trade now exceeds $240 billion.
- **CEPA –** India has signed the Comprehensive Economic Partnership Agreement (CEPA) with the UAE and Oman; UAE trade alone is $115B, aiming for $200B by 2030.
- **Investment** – The cumulative FDI in India from the region has crossed $2.5 billion.
- Major commitments made by UAE ($75 billion), Saudi Arabia ($100 billion) and Qatar ($10 billion), mostly in the fast-growing infrastructure sector.
- **Connectivity** – The India-Middle East-Europe Economic Corridor was launched at the G20 Leaders' Summit in New Delhi in 2023, to ensure speed, efficiency and collective prosperity.
- **Digital & Financial Cooperation**
- The **RuPay card** was launched in the UAE in August 2019; rupee is being accepted as legal currency at Dubai airports since 2023.
- India and the UAE have operationalised the ***rupee-dirham settlement*** *system.*
- **UPI –** India's Unified Payments Interface (UPI) is already accepted for financial transactions in Bahrain, Saudi Arabia, Qatar, and the UAE and is likely to grow further in the LAS countries soon.
- **Energy Security**
- **Energy Dependence** – The region caters to about 60% of India's crude oil imports, 70% of natural gas, and more than 50% of fertilizers and related products.
- **Top crude oil exporters** – Iraq, Saudi Arabia, and the UAE.
- **Strategic Oil Reserves** – The UAE has signed an agreement with India to store strategic oil reserves in the country, operationalised with an initial investment of $400 million.
- **LNG deals** – India signed a $78 billion Liquified Natural Gas deal with Qatar in 2024 for another 20 years, in 2023, Indian Oil signed LNG contract with ADNOC (Abu Dhabi National Oil Company) for a period of 14 years.
- **Security & Defence Cooperation**
- **Defence partnership** – India has signed defence cooperation agreements with several Arab League countries including Oman, UAE, Saudi Arabia, Egypt, and Qatar.
- **Maritime Security Initiatives** – India's SAGAR (Security and Growth for All in the Region) framework promotes joint collaboration in the Indian Ocean Region, particularly against sea piracy and maritime security threats.

- **Strategic partnerships** – India's strategic ties with the Arab region began with Oman in 2008 and later expanded to the UAE (2015), Saudi Arabia (2019), Egypt (2023), and Qatar (2025), showing rapid growth in strategic convergence.
- **Strategic Advantage** – India's agreement with Oman over the *Duqm port* offers a critical advantage to the Indian Navy in its operations in the region, also allow India to watch on the activity of China's Navy activities.
- **Regional Security Concerns** – The threat of war in Iran and the future of the Gaza peace process are common areas of security concerns in the region.
- **Counter-Terrorism Cooperation** – Most of the LAS countries are in total sync in India's fight against cross-border terror and have condemned the Uri, Pathankot, Pulwama, and Pahalgam terror attacks in India.
- **Defence Production & Exports** – LAS countries are showing strong interest in joint defence production and Indian exports like the Tejas fighter jet, BrahMos and Aakash missiles, and artillery guns.
- **Emerging Frontiers of Cooperation** – Cyber, space and drone are future areas of cooperation.

What lies ahead?

- As India grows into a major economic, political, and military power, the Arab League region forms a critical part of its global matrix.
- For LAS countries too, India is a strong and reliable partner.
- The countries of the two regions may be separated by the Arabian Sea but are joined by history, destiny, trust, and growing brotherhood.
- The meeting of the foreign ministers of LAS in Delhi offers the perfect opportunity to forge closer ties and seek new avenues of engagement.

5.9 End of globalization – Is India prepared?

Earlier this month, President Trump said India cut Russian oil imports to please him and warned of more tariffs if displeased, this shows trade is now about power, not cooperation—countries with surpluses are seen as strong, and those with deficits as weak.

What is Globalisation?

- **Globalisation** – It refers to the growing interconnectedness of economies, cultures, and populations across borders, driven by trade, investment, technology, and movement of people.
- **Political context** – It is defined as how governments ran markets and societies, and how they engaged with each other and with networked global institutions that they had established.
- **Origins** – While trade and cultural exchange have existed for centuries, the modern wave of globalisation accelerated after the Cold War in the 1990s.
- **Key drivers** – Technological advances, economic liberalization, free trade agreements, political cooperation, multilateral institutions, social and cultural exchange through media and migration
- **Globalisation's Relevance Today –** Globalisation is being questioned as nations shift toward protectionism and mercantilism, but it still shapes everyday life through products, services, and digital networks.
- It came to be associated with liberalism, democracy, and global cooperation. That system is now over.

What are the past and present status of globalization in the world?

- **Early Globalisation: Built on Force**
  - Wealth accumulation in the industrialised north was on the backs of domestic resource exploitation and overseas resource extraction.
  - Trade was unequal and coercive, not genuinely free.
- **Mid-20th Century: A New Order Emerges**
  - As the rest of the world found its voice and war had ravaged the industrialised countries, it was time for a new order.
  - Sovereignty spread faster than democracy.
  - Global institutions like UN, Bretton Woods bodies, were birthed to offer a normative framework to manage international affairs.
  - Even unilateral actions were justified in terms of democracy, stability, or humanitarianism.

- The legitimacy of the system depended on restraint, which is now been abandoned openly.

- **Assumptions of the Global System** – This global system rested on several political assumptions
  - open markets,
  - free movement of capital but not people,
  - cross-border enforcement of contracts,
  - negotiations over management of shared resources.
- **Outcomes –** For a while, these assumptions seemed to hold as many countries experienced economic growth and declines in poverty.

What are the unintended consequences?

- **Economic Imbalances –** Returns to capital far outstripped increases in wages.
- As the integration of global markets and supply chains deepened, economic pressures intensified.
- Manufacturing declined in some regions and surged in others & Migration from poor to rich countries increased.
- It was a matter of time before populist politics would take shape to respond to these imbalances.
- **Rise of China –** The geopolitical foundations of the post-colonial era were shaken by the rise of China.
- China entered global markets, gained wealth and power without following multilateral rules.
- China benefited enormously from access to global markets, supply chains, and technology, while keeping state control over capital, labour, and information.
- China's trade surplus reflects the relentless pursuit of a model of excess capacity and external demand, which has stunted the industrial ambitions of poorer countries, including India.
- Over time, China accumulated enough power to emerge as an alternative model for both economic growth and consolidation of domestic political power.
- **Changing Perceptions of Globalisation** – Major economies began to see global cooperation as an opportunity cost or distraction, as populist politics turned societies inward-looking.
- Their response is essentially an assertion of sovereignty at the expense of liberal values, such as the politicisation of migration and the promotion of industrial policy to buy self-sufficiency.
- **Result** – This is why globalisation, as practised, is now dead.

What are the impact on developing countries due to this change in globalization?

- **Loss of support –** The crutch of global cooperation has already been taken away from the developing world.
- **Aid with condition –** International aid is now conditional on the national interests of donor countries.
- **Multilateral institutions failing –** The ability of developing countries to negotiate jointly on matters such as climate change or illicit financial flows is weakening rapidly.
- **Domestic pressures –** Domestically, restless youth now demand much more of their governments.
- **Role of Political elites –** Need to recognise this moment and act decisively, even if they initially do so to further their self-interest to address these challenges.

What is India's role going to be in this emerging global order?

- **India's Paradox** – India is simultaneously too large to ignore and too poor to matter.
- Over the last 15 years, we have squandered the opportunity to convert our demographic advantage into productive capacity.
- **Social Structure –** The social pyramid has become more sharply stratified, with an overwhelmingly poor and powerless base supporting a narrow elite apex.
- Inequality undermines social cohesion and long-term growth.
- **Potential Domains of Strength –** Digital public infrastructure being the most prominent, but also with potential in renewable energy, the services sector, and democratic decentralisation.
- **Barriers to Realisation** – Current political economy limits possibilities, limited economic growth has not expanded the base, lack of sustained public investment in health and education, and weak state capacity undermines competitiveness.

- **Consequence in a Mercantilist World** – In a mercantilist world order, low state capacity will only result in long-term irrelevance, India risks being sidelined despite its size and aspirations.

What lies ahead?

- Without stronger state capability, greater social cohesion, and a social contract committed to sharing growth more evenly.
- India risks remaining a country that lays claim to being a Vishwaguru without the institutional foundations and economic means to achieve it.
- Rhetoric alone will not be enough.

G.S PAPER III

6. ECONOMY

6.1 Design Linked Incentive (DLI) Scheme

The Design Linked Incentive (DLI) Scheme is a key instrument in advancing India's semi-conductor ambitions and to develop a strong fabless capability.

What is the DLI scheme?

- **Design Linked Incentive (DLI) Scheme** – It is a key instrument in advancing India's ambition to develop a strong fabless capability.
- It supports semiconductor design across the full lifecycle—from design and development to deployment—covering
- Integrated Circuits (ICs), chipsets, Systems-on-Chip (SoCs), systems and IP cores.
- **Aim** – By promoting indigenous semiconductor content and intellectual property in electronic products, reduce import dependence.
    - Strengthen supply chain resilience, and enhance domestic value addition.
- **Implementation** – By the Ministry of Electronics and Information Technology (MeitY).
- **Eligibility** – The following are eligible for financial incentives for deploying semiconductor designs.
    - **MSMEs** — Defined according to the Ministry of Micro, Small and Medium Enterprises notification, 1 June 2020.
    - **Startups** — Defined as per the Department for Promotion of Industry and Internal Trade (DPIIT) notification, 19 February 2019.
    - **Domestic companies** — Defined as those which are owned by resident Indian citizens, as per the Foreign Direct Investment (FDI) Policy Circular, 2017 or extant norms.

What support is provided under the scheme?

- **Financial incentives**
- **Product Design Linked Incentive –** Reimbursement of up to 50% of eligible expenditure and is capped at ₹15 crore per application.
- The support is available to entities involved in semiconductor design for –
    - Integrated Circuits (ICs) Chipsets Systems on Chips (SoCs) Systems
    - IP Cores Semiconductor-linked designs.
- **Deployment Linked Incentive** – Incentives of **6% to 4%** of net sales turnover are provided for five years.
    - The incentive is capped at ₹30 crore per application.
    - The minimum cumulative net sales required over Years 1–5 is 1 crore for startups/ ₹ MSMEs and 5 crore for other domestic companies.
- The design must be successfully deployed in electronic products.
- **Design infrastructure support**

- C-DAC has established the ChipIN Centre under the DLI Scheme to facilitate the design infrastructure support to approved companies.
- **National EDA (Electronic Design Automation) Tool Grid** — Remote access to the centralized facility of advance EDA tools for chip design activities will be provided to start-ups and MSMEs.
- **IP Core repository** — Flexible access to the repository of IP Cores for SoC design activities.
- **MPW Prototyping support** —Fiscal support for fabricating the design in MPW manner at semiconductor foundries.
- **Post-silicon validation support** — Fiscal support for testing and validation of the fabricated ASIC and silicon bring-up activities.

What are the programme highlights & key achievements of DLI?

- **ChipIN Centre** – It has democratized access to advanced EDA tools for chip design for about 1 lakh engineers and students across 400 organizations nationwide.
    - It is the world's largest user base of a centralized chip design facility.
- This includes around 305 academic institutions *under the Chips to Start-up (C2S) Programme* and 95 startups under the DLI Scheme
    - This reducing entry barriers for early-stage innovators.
- **India's shared EDA Grid** — A national platform offering high-end chip design software has recorded 54,03,005 hours of cumulative usage by 95 supported start-ups as of 2nd January 2026.
- **Strengthening skill base –** over 1,000 specialised engineers have been trained or engaged through DLI-supported projects, strengthening India's design talent base.

What are key institutional frameworks for semiconductor design?

- **Ministry of Electronics and Information Technology (MeitY) —** MeitY leads national semiconductor initiatives, provides policy direction, and anchors schemes.
- It also coordinates institutional and industry partnerships to strengthen India's chip design and manufacturing ecosystem
- **Semicon India Programme (SIM)** – With an outlay of ₹76,000 crore, this supports investments in semiconductor and display manufacturing as well as the design ecosystem.
- It ensures end-to-end backing for design, fabrication and productisation.
- **Chips to Startup (C2S) Programme** – It is an umbrella capacity building programme initiated at academic organizations.
- It has spread across the country to generate 85 thousand number of industry-ready manpower at B.Tech, M.Tech, and PhD levels specialized in semiconductor chip design.
- **Microprocessor Development Programme** – initiated at C-DAC, development and fabrication of open-source architecture-based family of microprocessors
    - viz. VEGA12, SHAKTI13 and AJIT microprocessors as a step towards self-reliance.

What are the companies that stands out as leading examples?

- **Vervesemi Microelectronics** – With a strong portfolio of 110+ semiconductor IPs, 25 integrated circuit (IC) product variants,
- 10 granted patents, and 5 trade secrets is developing motor-control chips for a wide range of applications.
- **InCore Semiconductors** – It is focused on the design and development of indigenous RISC-V microprocessor IPs and SoC design automation tools.
- These initiatives with the ultimate goal of building India's most powerful embedded processor, Dolomite, targeted at entry-level smartphones and edge-AI applications.
- **Netrasemi –** It is focused on designing AI-capable SoCs for CCTV secure surveillance, smart sensors, robotics and drones, and mobility applications.
- The company has successfully taped out India's first indigenously designed AI SoC in an advanced 12 nm process node, integrating in-house AI/ML accelerators, vision processing, and video engines.
- **AAGYAVISION** – It is designing advanced radar-on-chip that operate reliably in all weather conditions,

- And driving advancements in safety, security, smart infrastructure, edge computing, and
- Emerging 6G sensor networks as well as critical application like drone detection.

What lies ahead?

- The DLI Scheme is critical to anchoring India in the most strategic and value-intensive segment of the global semiconductor value chain—chip design.
- The scheme also enables high-value growth by translating deep-tech innovation into globally competitive products, fostering startups and building skilled workforce.
- These outcomes are already evident, positioning Indian companies as credible global suppliers while strengthening domestic supply chains and reinforcing India's self-reliant semiconductor ecosystem.

Quick facts

Fabless Chip Design

- **Fabless semiconductor companies** hold the highest strategic value because they design the chips that drive product intelligence, efficiency, and security.
- While fabs manufacture silicon and EMS firms assemble devices, more than half of a semiconductor's value comes from design and IP, not physical production.
- Fabless semiconductor design models *generate high value addition with relatively modest capital expenditure*,
    - Whereas design and IP contribute disproportionately to product economic value.

6.2 The New Logic of the Chinese Economy – Insights and Opportunities for India

As the global economic landscape faces numerous challenges, China's economic resilience remains a focal point of global attention.

What are the key drivers of china's economic growth?

- **Domestic Consumption –** In 2025, final consumption expenditure contributed *52%* to China's economic growth.
- This shift towards domestic demand reflects *China's increasing focus on consumer spending* as a key driver of economic expansion.
- Contrary to some perceptions, China is not lacking in consumption.
- In fact, the country ranks among the world's top nations in terms of basic consumption.
    - **For instance**, the average Chinese person owns 1.28 mobile phones, the average daily protein intake is 124.6 grams (higher than the U.S. and Japan), and the average annual vegetable consumption is 109.8 kilograms, the highest globally.
- These figures underline the depth of domestic demand and debunk the idea that China's consumption is insufficient.
- **Exports –** China's export sector continues to demonstrate significant resilience, contributing 32.7% to the country's overall economic growth.
- Despite an unfavorable international trade environment, "Made in China," particularly high-tech products, remain highly competitive in global markets.

*In 2025, **China's GDP** exceeded 140 trillion yuan (approximately $20 trillion), marking a year-on-year growth of 5%. Contributing about 30% to global economic growth, China's economy continues to showcase robust strength despite external pressures.*

- The strength of China's industrial chain and its ongoing investment in innovation have played a key role in this success.
- High-tech product exports, in particular, *grew by 13.2% in 2025*, with stable growth in exports to key markets like ASEAN and the European Union.
- This demonstrates China's ability to adapt to changing market dynamics and continue expanding its global footprint.

- **Investment –** While investment, or gross capital formation, still contributed *15.3% to China's growth*, the country is clearly undergoing a transition.
- This shift involves moving away from an over-reliance on investment and exports to a more sustainable growth model where domestic consumption plays a leading role, supported by innovation and exports.
- This transition is evident in the advancements made in cutting-edge technologies like AI, quantum computing, and brain-computer interfaces, as well as in the rapid growth of green industries, including renewable electricity and clean energy.
- These emerging sectors are reshaping China's economic landscape, signaling a focus on future growth drivers.
- **China's Export Strategy –** One common misconception about China's exports is the idea of "overcapacity."
- China is not exporting surplus goods but high-quality production capacity and advanced technological solutions that are in demand globally.
- The capacity utilization rate of China's industries stood at *74.4%* in 2025, comparable to the U.S. and EU averages.
- This figure indicates that China's industrial output is in line with global demand, and there is no significant surplus production.
- China's export success is rooted in long-term, high-intensity research and development (R&D), fierce domestic competition, and a comprehensive industrial system.
- Unlike claims of dumping or state subsidies, the global competitiveness of Chinese products is driven by innovation and efficiency.
- Developing countries, in particular, benefit from China's technological exports, using Chinese equipment and solutions to bolster their infrastructure, transition to cleaner energy, and industrialize their economies.
- As economist Jeffrey Sachs aptly pointed out, the Western criticism of Chinese manufacturing is often rooted in "jealousy" rather than economic realities.

What are the prospects of China-India trade?

- **Mitigating the trade deficit –** China-India trade reached a historic high of $155.6 billion in 2025, reflecting the strong economic complementarity between the two nations.
- India imports a significant amount of raw materials and components from China, which are crucial for its own economic development.
- This trade relationship underscores the potential for greater cooperation between the two countries.
- **India's Growing Exports to China –** India's exports to China also showed positive momentum in 2025, reaching $19.7 billion, a year-on-year increase of 9.7%.
- This growth rate was particularly strong in the latter months of 2025, with exports surging by *90% and 67%* in the final two months, respectively.
- This indicates a growing diversification of Indian exports to China and a deeper integration into the Chinese market.
- China, for its part, does not pursue trade surpluses intentionally. The country's trade policy is not based on exploiting imbalances but rather on creating mutual benefits.
- As part of its commitment to global economic integration, China has kept its tariff levels relatively low, at just 7.3% on average, which is below global norms.
- Additionally, China has continuously reduced the negative list for foreign investments, providing greater access for Indian companies. It is also expanding visa-free policies, making it easier for foreign businesses, including Indian enterprises, to engage with the Chinese market.
- **Expanding Domestic Demand –** One of the most important aspects of China's current economic strategy is its focus on expanding domestic demand.
- The Chinese government has identified this as a top priority for 2026, recognizing the huge potential in catering to its 1.4 billion population, which includes over 400 million middle-income individuals.
- This vast consumer base presents significant opportunities for high-quality Indian products, particularly in sectors such as pharmaceuticals, food, and technology.
- **The Role of Indian Enterprises –** India can benefit from these opportunities by taking proactive steps to tap into the expanding Chinese market.

- Indian enterprises are encouraged to participate in events like the China International Import Expo, which provides a platform for showcasing premium Indian products to a vast Chinese audience.
- By increasing the visibility of Indian products in China, Indian businesses can shift the focus from trade deficits to mutually beneficial trade surpluses.
- India's long-standing trade imbalance with China can be mitigated by increasing the export of value-added goods, rather than just raw materials.
- Indian products, especially in sectors such as IT services, pharmaceuticals, organic food, and handicrafts, are well-positioned to cater to the growing demand for high-quality products in China.
- By focusing on innovation and quality, Indian enterprises can make inroads into China's vast consumer market, helping to balance the trade deficit over time.

What lies ahead?

- The new logic of the Chinese economy highlights the country's resilience and transformation towards a consumption-driven, innovative growth model.
- For India, the growing opportunities in China's expanding market offer a chance to address the trade deficit while fostering deeper economic cooperation.
- By focusing on high-quality exports and leveraging platforms like the China International Import Expo, India can turn the trade imbalance into a win-win situation, benefiting both economies.
- As China continues its economic evolution, India has the opportunity to position itself as a key player in the evolving global economic order, creating shared growth and prosperity for both nations.

AGRICULTURE

6.1 Climate-Resilient Agriculture

Climate change is real, and for India to continue meeting domestic food demands, agriculture needs to cope with the increasing unpredictability of the weather, declining soil health, and growing air pollution.

What is climate-resilient agriculture?

- **CRA** – Climate-resilient agriculture (CRA) uses a range of biotechnology and complementary technologies to guide farming practices and reduce dependence on chemical inputs, while maintaining or improving productivity.
- **Tools** – These tools include biofertilizers and biopesticides, and soil-microbiome analyses.
- **Techniques** – Genome-edited crops can be developed to withstand drought, heat, salinity, or pest pressures.
- **Recent developments** – In parallel, AI-driven analytics can integrate multiple environmental and agronomic variables to generate locally tailored farming strategies.

Why does India need CRA?

- **Increasing population** – India is an agricultural nation with a rapidly growing population, which places increasing pressure on the need for higher and more reliable farm productivity.
- **Rain dependent farming** – Around 51% of India's net sown area is rainfed, and this land produces nearly 40% of the country's food, making it especially vulnerable to climate variability.
- **Limitations of conventional farming** – Conventional farming methods alone may not withstand the rising stresses of climate change.
- For instance, recent modelling suggests that by the end of the century, yields of staple crops like rice could fall by 3-22%, and in worst-case scenarios by more than 30%.
- **Potential of CRA** – Climate-resilient agriculture offers a suite of technologies that can enhance productivity while protecting environmental health.
- It can also reduce India's reliance on food imports and strengthen the country's strategic autonomy in the food sector.

Where does India stand today?

- **ICRA's project** – In 2011, the Indian Council of Agricultural Research (ICAR) launched a flagship network project 'National Innovations in Climate Resilient Agriculture'.
- **Climate resilient farming practices** – For enhancing the resilience and adaptive capacity of farmers to climate variability, location-specific climate resilient technologies such as:
    - System of rice intensification,
    - Aerobic rice,
    - Direct seeding of rice,
    - Zero till wheat sowing,
    - Cultivation of climate resilient varieties tolerant to extreme weather conditions,
    - In-situ incorporation of rice residues, etc., have been demonstrated under the project in 448 climate-resilient villages.
- **The National Mission for Sustainable Agriculture** – It has been formulated to enhance agricultural productivity, especially in rainfed areas, focusing on integrated farming, water use efficiency, soil health management, and synergising resource conservation.
- **Recent policy –** The BioE3 policy also positioned CRA as a key thematic area for the development of biotechnology-led solutions.
- India has a strong scientific capacity for CRA, supported by ICAR, DBT, IARI, and a growing private-sector biotechnology ecosystem.
- Several technologies relevant to CRA are already commercialised, especially biofertilizers, biopesticides, and microbial soil enhancers.
- **Participation of companies** – Leading companies such as Biostadt, IFFCO, GSFC, NFL, and IPL Biologicals supply bio-inputs that improve soil health and reduce chemical dependence.
- **Agritech startups** – India also has an expanding digital agriculture sector, with agritech startups offering AI-enabled advisories, precision irrigation, crop-health monitoring, and yield prediction tools.

What are other countries doing?

- **U.S –** It integrates CRA into federal policy through the USDA Climate-Smart Agriculture and Forestry (CSAF) initiative, investing billions in climate-smart practices.
- **EU –** CRA is embedded in the EU Green Deal and Farm to Fork Strategy, both aiming to reduce chemical inputs and enhance sustainability.
- **China –** The CRA strategy of China centres on climate-tolerant crop breeding, large-scale water-saving irrigation, and agricultural digitalisation.
- **Brazil** – It leads in tropical climate-resilient crop development, driven by EMBRAPA's biotechnology research.

What are the challenges faced by India?

- **Low adoption** – India faces several risks in scaling CRA, including low adoption among small and marginal farmers due to:
    - Limited access,
    - Awareness, and affordability,
    - Quality inconsistencies in biofertilizers and biopesticides that undermine trust in biological alternatives.
- **Slow reach of techniques** – The rollout of climate-resilient seeds remains slow, with the adoption of new tools such as gene editing still emerging and uneven distribution across States.
- **Digital divide** – Further, the digital divide limits the reach of precision agriculture and AI-based decision tools.
- **Ecological changes** – These challenges are compounded by ongoing soil degradation, water scarcity, and accelerating climate volatility, which may outpace current adaptation efforts.
- Fragmented policy coordination further risks slowing progress.

What lies ahead?

- The way forward requires accelerating the development and deployment of climate-tolerant and genome-edited crops, strengthening quality standards and supply chains for biofertilizers and biopesticides, and provision of digital tools and climate advisories to support adoption by small landholders.

- Financial incentives, climate insurance, and credit access are essential to support farmers during the transition.
- Above all, India needs a coherent national CRA roadmap under the BioE3 framework, aligning biotechnology, climate adaptation, and policies to deliver resilience at scale.

6.2 Farmer Suicides in India

Recently, the National Crime Records Bureau (NCRB) released a data on farmer's suicide in a new analysis of last 28 years.

What does the data reveal?

- **2 important states** – Maharashtra and Karnataka have remained the epicentres of farmer suicides in India for more than two decades.
- The suicide rates consistently about 2.5 times the national average since the mid-1990s,
    - **Maharashtra** – 4,151 farmer suicides
    - **Karnataka** – 2,423, farmer suicides
- In 2023 alone, these states recorded, these numbers making them the two worst-affected states in the country.
- **Major reason** – One of the major drivers over the years has been the *rapid spread of Bt cotton* in the early 2000s, particularly across rain-fed regions, the analysis by independent research organization Centre for Sustainable Agriculture (CSA) found.
- The study links the crisis in these states to the *failure of Bt cotton to deliver on promises of higher yields and pest resistance.*
- Instead, farmers faced sharply rising input costs and greater financial risk.
- Repeated crop failures, combined with the absence of reliable price support, pushed many small and marginal farmers into chronic debt.
- **Regional concentration of crisis** – Beyond Maharashtra and Karnataka, the data show a clear regional concentration of the crisis.
- *Southern and western India* together account for around *72.5%* of all farmer suicides recorded since 1995.
- *Andhra Pradesh and Telangana* follow closely among the worst-affected states.
- Together, they have reported more than 170,000 farmer suicides over the past 28 years.
- Telangana, which was carved out of Andhra Pradesh in 2014, has emerged as a high-crisis state in its own right.
- The cotton-growing districts that became part of Telangana already carried a heavy suicide burden, while coastal Andhra Pradesh districts historically reported lower rates.
- *Madhya Pradesh* has also consistently ranked among the top contributors to national suicide figures, underlining that the crisis is not confined to a single region.

What are the Peak years of agrarian crisis?

- **The period of crisis** – At least 394,206 farmers and agricultural labourers died by suicide in India, according to NCRB records.
- This amounts to an average of about 13,600 deaths every year.
- The analysis noted that the crisis intensified after India joined the World Trade Organization (WTO) in 1995.
- Reduced subsidies and increased agricultural imports weakened farm incomes, particularly for small producers.
- **2000 to 2009** – The most acute phase came between 2000 and 2009, when more than 154,000 suicides were recorded.
- **2002** – The year 2002 stands out as the deadliest, with 17,971 farmer suicides nationwide.
- **2023** – After years of decline, the trend reversed sharply in 2023.
- The country recorded 10,786 farmer suicides, an increase of more than 75% compared with 2022.
- The figures also reveal a significant shift within the rural economy.
- Agricultural labourers now account for a larger share of suicides than cultivators.

- Of the 10,786 deaths recorded in 2023, 6,096 were agricultural labourers, compared with 4,690 cultivators.
- **Identified causes** – Researchers linked this to a combination of droughts, collapsing crop prices, weak crop insurance, and shrinking access to institutional credit.
- The growing share of suicides among agricultural labourers points to deeper rural distress.
- **Effect on labourers** – Unlike land-owning farmers, labourers face:
    - Acute wage insecurity,
    - Seasonal unemployment,
    - Rising food prices and
    - Limited social protection,
- Making them especially vulnerable to economic shocks.
- The analysis cautioned, however, that part of the increase in 2023 may reflect delayed reporting during the Covid-19 period, rather than a sudden deterioration in a single year.

How MGNREGA came to rescue?

- **Declining of farmers' suicide** – The sharp rise in 2023 contrasts with trends seen over much of the previous decade.
- From around 2010 onwards, farmer suicides declined steadily across several states, reaching their lowest levels between 2015 and 2019.
- **Key Intervention** – One of the key interventions during this period was the *Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA),* which provided wage employment during lean agricultural seasons and drought years.
- MGNREGA helped reduce income volatility for small and marginal farmers and agricultural labourers.
- **Other measure** – Expanded crop insurance coverage and debt relief measures.
- **Visible results** – *Kerala* recorded a steep fall in farmer suicides, from 1,118 in 2005 to 105 in 2014.
- *West Bengal* reported zero farmer suicides by 2012, according to the NCRB data analysed.
- *Madhya Pradesh*, which had recorded some of the highest numbers during the peak crisis years, also saw sustained reductions during this period.
- **Shortcomings** – In states such as Maharashtra and Karnataka, suicide numbers have remained persistently high despite welfare interventions, underscoring the limits of short-term relief in the absence of broader agrarian reform.
- In these states rain-fed agriculture and market-linked commercial crops continue to dominate.

6.3 Nutrient-Based Subsidy (NBS) Scheme

Recently, the Government has approved the NBS rates for Rabi 2025-26, effective from October 1, 2025, to March 31, 2026, for Phosphatic and Potassic (P&K) fertilizers, including DAP and NPKS grades.

What is Nutrient Based Subsidy scheme (NBS)?

- **NBS** – It is a critical policy intervention that promotes the judicious use of fertilizers by supporting farmers in accessing key nutrients at affordable prices.
- **Need for the scheme** – Balanced fertilization is crucial for maintaining soil health, enhancing crop productivity and ensuring long-term agricultural sustainability.
- **Introduced on** – The Government of India introduced the Nutrient-Based Subsidy (NBS) scheme, effective from April 1, 2010.
- **Significance** – The scheme represented a significant policy shift in the fertilizer sector.
- It is designed to make fertilizers available to farmers at subsidized, affordable, and fair prices, while simultaneously encouraging their balanced and efficient use.
- Under the NBS framework, subsidies are determined based on the nutrient content of fertilizers, primarily NPKS:
    - Nitrogen (N),

- Phosphorus (P),
- Potassium (K), and
- Sulphur (S).

- It empowers farmers to make informed choices that align with the specific needs of their soil and crops.
- By promoting the use of secondary and micronutrients, the scheme also addresses issues of soil degradation and nutrient imbalance that have emerged from years of skewed fertilizer usage.
- **Outcomes and Policy Priorities** – The Nutrient-Based Subsidy (NBS) Scheme of the Ministry of Chemicals and Fertilizers aims to promote the balanced use of essential nutrients, such as nitrogen, phosphorus, potassium, and sulphur.
- It helps farmers avoid over-dependence on any single fertilizer and maintain soil health while improving productivity.
- It ensures that fertilizers are available to farmers on time and at affordable, subsidized prices, which is vital for smooth crop planning.
- The scheme also fosters healthy competition among fertilizer companies, driving improvements in quality, innovations, and efficiency in the fertilizer market.
- By supporting the introduction of new and innovative fertilizers, including advanced and micronutrient-enriched products, the NBS scheme helps modernize agricultural practices.
- Additionally, it focuses on rationalizing subsidies by aligning them with global price trends of fertilizers and raw materials, ensuring both farmer support and fiscal responsibility.
- **Fixed subsidy** – The government provides a fixed subsidy, revised annually or biannually, on Phosphatic and Potassic (P&K) fertilizers, including DAP.
- The subsidy amount is linked to the nutrient composition of each fertilizer grade.
- Until Rabi 2023–24, the NBS scheme included 25 P&K fertilizer grades such as DAP, MOP, and SSP.
- From Kharif 2024 onward, three additional fertilizer grades have been incorporated into the scheme.
    - NPK (11:30:14) fortified with Magnesium, Zinc, Boron, and Sulphur
    - Urea-SSP (5:15:0:10)
    - SSP (0:16:0:11) fortified with Magnesium, Zinc, and Boron
- With the addition of the new grades, the Government is now providing farmers with 28 types of P&K fertilizers at subsidized rates through authorized manufacturers and importers.
- In line with its farmer-centric approach, the Government continues to prioritize the affordable availability of these fertilizers at competitive prices.
- Under the NBS Scheme, the P&K fertilizer sector operates under a decontrolled regime, allowing companies to set the Maximum Retail Price (MRP) at reasonable levels, subject to government oversight.
- As a result, farmers receive the benefit of the subsidy directly when they purchase these fertilizers.
- **NBS Rates for Rabi 2025-26 –** The subsidy would be provided to fertilizer companies at the notified rates, ensuring that fertilizers are made available to farmers at affordable prices.

What are the operational management and compliance monitoring of NBS?

- **Reporting, and Monitoring** – Fertilizer companies must submit audited cost data in accordance with existing guidelines by determining the reasonableness of the Maximum Retail Price (MRP) for P&K fertilizers.
- This enables the Department of Fertilizers (DoF) to assess whether the declared MRPs are justified.
- **Regulation of Profit Margins** – As per the extant guidelines, any profit earned beyond the prescribed limit will be treated as unreasonable and recovered from the concerned company.
    - Profit margin of up to *8% for importers, 10 % for manufacturers and 12% for integrated manufacturers* over the cost of production of the final P&K product is considered reasonable.
- **Display of MRP and Subsidy Details** – Each fertilizer bag must clearly display:
    - Maximum Retail Price (MRP) and
    - Applicable subsidy per bag and per kilogram.

- Charging more than the printed MRP is an offence and is punishable under the Essential Commodities Act, 1955.
- **Monitoring of Production, Movement, and Imports** – The online, web-based Integrated Fertilizer Monitoring System (iFMS) provides continuous oversight of fertilizer distribution, movement, and imports, and the production activities of domestic manufacturing units.
- **Delivery and Transportation Responsibility** – All manufacturers, marketers, and importers of P&K fertilizers, including Single Super Phosphate (SSP) manufacturers, must ensure that fertilizers are transported up to the retail point on a Freight on Road (F.O.R.) delivery basis.
- **Digital tracking and coordination** – Based on the assessed requirement, the DoF allocates adequate quantities of fertilizers through a monthly supply plan and continuously monitors their availability across regions.

The Integrated Fertilizer Management System *is a digital platform that provides a range of online services related to fertilizer distribution and management.*

- The movement of all major subsidized fertilizers is tracked through an online, web-based Integrated Fertilizer Management System (iFMS) portal.
- Additionally, the DA&FW and DoF hold weekly video conferences with State Agriculture Officials to ensure effective coordination and resolve any emerging supply issues.
- It includes dealer registration, stock availability tracking, dealer search, and access to the Management Information System and Direct Benefit Transfer (DBT) reports.
- By enabling transparency, improving efficiency, and supporting real-time tracking throughout the fertilizer supply chain, iFMS helps ensure that farmers and stakeholders receive timely access to high-quality fertilizers.

What are the major milestone and achievements?

- **Production Growth of P&K Fertilizers** – The policy initiatives to promote domestic production and reduce reliance on imports have resulted in a sustained increase in P&K (DAP & NPKS) fertilizer output.
- The domestic production of DAP and NPKS fertilizers has increased by over 50% from 112.19 LMT in 2014 to 168.55 LMT in 2025 (up to 30 December 2025).
- **Improved Soil Health and Farm Productivity** – The implementation of NBS has demonstrated that applying Phosphatic & Potassic (P&K) fertilizers enhances farmland productivity and helps address multi-nutrient deficiencies in the soil.
- Since the scheme began, production of major crops has risen significantly.
- Foodgrain yields have increased from 1,930 kg per hectare in 2010-11 to 2,578 kg per hectare in 2024-25.
- **Financial Support under NBS** – Between 2022–23 and 2024-25, the Government of India allocated more than Rs.2.04 lakh crore in subsidies for both indigenous and imported phosphatic and potassic (P&K) fertilizers under the Nutrient-Based Subsidy (NBS) Scheme.

What lies ahead?

- The Nutrient-Based Subsidy (NBS) Scheme has emerged as a cornerstone of India's fertilizer policy, promoting balanced fertilization, soil health, and sustainable agriculture.
- Through concerted policy measures, the Government has strengthened domestic manufacturing, expanded the number of fertilizer grades from 25 to 28.
- The digitalization of monitoring through the Integrated Fertilizer Management System (iFMS) and regular coordination with States has enhanced transparency, accountability, and timely supply across regions.
- Together, these outcomes reflect the scheme's success in harmonizing productivity, sustainability, and farmer welfare.

INDUSTRIES, INFRASTRUCTURE & INVESTMENTS

6.4 SHANTI Bill – Strengthening the Energy Security

Recently, the Parliament has cleared the Sustainable Harnessing and Advancement of Nuclear Energy in India (SHANTI) Bill, despite Opposition demands for amendments and review by a Select Committee.

What is the need for the bill?

- **Achieving energy security** – The government has boosted the Nuclear Energy Mission with **Rs.20,000 crore** dedicated to Small Modular Reactors and advanced pressurised water reactors.
- **Relaxing State control** – India's nuclear power sector has remained State-controlled and unchanged since 1956.
- **Lack of private sector participation** – The private and foreign partnership has been restricted under earlier laws — the Atomic Energy Act, 1962, and the Civil Liability for Nuclear Damages Act, 2010.
- Private and Foreign companies avoided India due to its strict liability laws.

What is the SHANTI Bill?

- **SHANTI Bill** – Sustainable Harnessing and Advancement of Nuclear Energy in India (SHANTI) Bill.
- It is an overarching legislation that opens India's nuclear power sector to private and foreign participation, which was earlier entirely State-controlled and deeply regulated.
- Under the Bill, private Indian companies can seek licences to own, build, and operate nuclear power plants.
- It is also open for foreign supplier participation.
- **Private sector participation** – The SHANTI Bill allows up to *49% private participation.*
- The *government control maintaining 51%* over sensitive activities such as:
    - Nuclear fuel production,
    - Heavy water manufacturing,
    - Radioactive waste management,
    - Safety mechanisms,
    - Licensing, and
    - Strategic oversight.
- **Ends the monopoly** – The Bill ends the monopoly of Nuclear Power Corporation of India Limited (NPCIL) in plant operations.
- It allows private companies and joint ventures to build, own, and operate nuclear power plants.
    - The private sector will be involved in:
    - Fuel fabrication,
    - Equipment manufacturing,
    - Plant operations, and
    - Research and development.
- It will essentially be a public-private partnership model aimed at attracting private capital with government oversight.
- The Bill facilitates advanced nuclear technologies by enabling private participation and regulatory clarity.
- It supports the deployment of Small Modular Reactors (SMRs) and indigenous reactor designs, contributing to the clean energy transition and long-term energy security.

What is the role of AERB?

- **AERB** – The *Atomic Energy Regulatory Board (AERB),* constituted in 1983 under the Atomic Energy Act, has now been given statutory status and is *answerable to Parliament* rather than solely to the executive.
- **Responsibility** – The AERB is responsible for:
    - Ensuring nuclear safety,
    - Radiation protection,

- Emergency preparedness, and
- Quality assurance across civilian nuclear installations.

- **Authority** – It issues safety measures, licences and standards.
- It administers industrial safety provisions of the *Factories Act, 1948,* for units under the Department of Atomic Energy as per Section 23 of the *Atomic Energy Act* and conducts inspections to prevent radiation hazards.
- **Importance** – It plays a crucial role in strengthening regulatory oversight under the SHANTI Bill due to increased private sector participation.
- **Concerns** – The Bill has been criticised for concentrating power in one institution.

What safeguards are in place?

- **No explicit permit** – The Bill does not explicitly permit foreign direct investment in the nuclear power sector.
- The private companies will have to seek authorisation from the AERB.
- Authorisations are required for:
  - Setting up a plant range from production,
  - Possession,
  - Disposal of radioactive material and radiation generation equipment,
  - Establishing, operating, or withdrawing radioactive facilities.
- **Maintaining government control** – The government controls
  - The reprocessing and management of spent fuel and high-level radioactive waste;
  - Production and upgradation of heavy water;
  - Enrichment and isotopic separation of radioactive substances.
- **Liability fund** – The law also provides for the establishment of a nuclear liability fund to meet compensation needs in case of nuclear accidents.

What has changed with respect to liability?

- **Liabilities** – Compared to the earlier regime, the SHANTI Bill ensures that the liability aspect is transparent and predictable for operators.
- Liability caps are fixed as follows:
  - **Rs.3,000 crore** for large plants of *3,600 MW capacity*
  - **Rs.1,500 crore** for medium plants of *1,500-3,600 MW*
  - **Rs.100 crore** for Small Modular Reactors of *150 MW capacity*.
- **Penalties** – Penalties for legal violations in cases of severe breach are capped at Rs.1 crore.
- The Union government will bear liability beyond the operator's cap, with additional support from the proposed nuclear liability fund.
- Earlier, operators could hold suppliers liable for defective parts, faulty equipment, design inefficiency, and deliberate acts causing damage. The current Bill removes supplier accountability completely.

What is the government's viewpoint?

- **Strengthening energy security** – The Centre aims to strengthen India's energy security by diversifying the power mix, reducing dependence on fossil fuels and fuel imports, and expanding atomic energy capacity.
- Energy security is one of the main aims for boosting India's development index.
- **Guaranteed baseload** – It ensures *24x7 baseload power* as compared to solar energy and wind energy, which are subject to geographical conditions.
- **Enhancing energy sector** – It will be a boost for the energy sector, which is still heavily dependent on coal.
- It also ensures an enhancement for technology and the economy.
- **Ensuring clean energy** – Nuclear power ensures clean energy with very low carbon emissions and facilitates achieving India's net-zero targets for 2070.

- **Reviving stalled project** – The Bill may also revive the stalled civil nuclear deals with the U.S., France, and Japan, reduce dependence on Russia alone, and enhance India's image as a responsible global nuclear player.

Why does India need nuclear energy?

- **Geographic & Climatic factors** – India struggles with solar, wind, and hydro energy due to its geographical and climate variables and still majorly relies on coal for electricity generation.
- **High cost of renewable energy** – Storage and grid integration costs for renewables remain high.
- Thus, having sufficient baseload generation capacity is mandatory for an affordable and unrestricted supply.
- In order to achieve energy security for the growing economy, India has to strengthen and expand its nuclear energy sector.
- **Affordability & Reliability** – The electricity mix must have enough baseload generation capacity in order to make it affordable and reliable for consumers.
- Nuclear power plants are one of the most effective in ensuring this.

What is India's nuclear energy mission?

- **Utilization of thorium** – India has a largely indigenous nuclear power programme based on a fuel cycle that aims to utilise India's vast thorium reserves.
- **Establishes reactors** – Currently, India manages 25 nuclear reactors in seven power plants:
    - **21** pressurised heavy water reactors (PHWR) and
    - **4** light water reactors — all managed by NPCIL.
- **PHWR** – India does not have enough uranium, the Nuclear Power Corporation of India Limited has mastered the design and operation of pressurised heavy water reactors.
- **Self-sufficient** – The Bhabha Atomic Research Centre has developed technologies to reprocess spent fuel to recover valuable materials and handle nuclear waste.
- In that sense, India is independent and *self-sufficient in its nuclear power generation.*
- **FBR** – India has operationalised the fast breeder reactor (FBR) for thorium use.

Why has the Opposition strongly criticised the Bill?

- **Weakens accountability** – The Opposition argues that the Bill dilutes accountability by allowing profit-driven private participation while placing liability on the State and society.
- **Apprehensions of accidents** – There is a fear of repeating incidents like the Bhopal Gas tragedy, where accountability and remuneration were evaded by the foreign firms in spite of recourse to civil courts.
- Moreover, such recourse is unavailable according to the new Law.
- **Absence of liability** – Removing supplier liability and capping operator liability and penalties at a nominal cost, as compared to the actual volume and expanse of damages, is considered unreasonable.
- The *'polluter pays'* principle has been undermined, and this compromises public safety.
- Private firms have no liability for accident costs, public safety issues and long-term risks.
- The cap on operator liability does not change in 15 years despite inflation or long-term assessment of health, environment, livelihood cost of any serious accident.
    - **Past examples** –The cases such as Fukushima and Chernobyl point out the huge expense of liability.
    - In the case of the Fukushima disaster, the actual civil damages were 700 times more than the cap proposed by the SHANTI bill.
- **Undermining of the RTI Act of 2005** – Section 39 of the Bill seeks to override the RTI act has raised several concerns as it seeks to remove public interest review and public appeal mechanisms.
- This will make the most crucial nuclear sector-related information — *including plant details, operations, mechanisms, regulatory submissions and data on nuclear materials* — 'restricted'.
- This dilutes the transparency and questions the public accountability of the proposed system.
- **Dejection of labour safety** – Section 42 overrides occupational safety, health and working conditions for nuclear facilities.
- Nuclear workers are removed from the country's general labour safety framework.

- **Other concerns** – The Bill lacks provisions for
  - Mandatory public hearings,
  - Environmental impact assessment disclosures,
  - Community consent mechanisms,
  - Regular public reporting of safety inspections, or
  - Parliamentary scrutiny.
- **Compromising public safety** – The Bill is criticised for being pro-profit, pro-oligarch, catering to the crony capitalists while gambling with public safety.
- **International practice** – The Opposition also cited the example of France, where all nuclear reactors are under government control.

7. ENVIRONMENT

7.1 Climate Targets and India's Progress

There has been a lot of focus on the recent Aravalli judgment and its implications for mining operations across the green belt as well as the government's commitments regarding environmental standards and regulatory protection for ecologically sensitive areas.

What are India's Paris climate commitments (2015)?

- **Paris summit** – India had committed to four quantified climate targets, grounded in the principle of "*common but differentiated responsibilities".*
- It reflects how, historically, India's per capita emissions were low compared to emissions of other major countries like the U.S.

*However, currently India is the world's **3rd largest absolute emitter**.*

What are India's four quantified targets & its achievements?

- **Emissions Intensity Reduction**
  - **Target** – 33–35% reduction by 2030 (baseline 2005).
  - **Achieved** – ~36% reduction by 2020, a decade early.
- **Non-Fossil Fuel Capacity**
  - **Target** – India set renewable targets of 40% non-fossil capacity by 2030, later raised to 50%.
  - **Achieved** – By June 2025, non-fossil fuel sources made up 51% of installed capacity (495 GW), achieving the commitment early.
- **Renewable energy capacity**
  - **Target** – 175 GW of renewable energy capacity by 2022
  - Solar capacity surged from 2.8 GW (2014) to ~110.9 GW (2025).
  - Wind power increased more modestly from 21 GW to ~51.3 GW.
- **Carbon Sequestration**
  - **Target** - India pledged 2.5–3 billion tonnes by 2030,
  - **Achieved** - ~2.29 billion tonnes additional sequestration since 2005, leaving only ~0.2 billion tonnes to meet target (as per India State of Forest Report 2023).

What are the key structural factors enabling India's trajectory of emission intensity reduction?

- **Rapid expansion of non-fossil power capacity** – Solar, wind, hydro, and nuclear has lowered carbon intensity.
- By 2023, non-fossil capacity exceeded by approximately 43%, and it reached roughly 50% by mid-2025.
- **Economic shift** – India's economic composition shifted toward lower-carbon services and digital sectors, resulting in a reduction in emissions per unit of GDP.

- **Efficiency programmes** – Like Perform, Achieve and Trade (PAT), UJALA curbed demand growth in industry and households.
- National assessments record measurable electricity savings and avoided emissions in FY2020-21.
- **Government driven programs** – Such as the National Solar Mission, Solar Parks Scheme, UDAY, PM-KUSUM, and rooftop solar have successfully added 25 GW of renewable energy every year.

What are the challenges that persist?

- **Persistent absolute emission** – Although India has reduced emissions intensity, its total greenhouse gas output remains high, around 2,959 $MtCO_2e$ in 2020, and has continued at elevated levels since.
- India's GDP has grown faster than its emissions, leading to a drop in emissions intensity but no overall decline in absolute greenhouse gas output.
- **Sectoral divergence** – National averages on emissions intensity mask sectoral divergence, while the power sector's CO_2 growth slowed in 2024–25, emissions from cement, steel, and transport continued to rise.

*Comparative Insights – Analyses by **Climate Transparency & IEA** show that India's rate of intensity decline exceeds that of many G-20 peers, but coal's large share keeps absolute per-kWh emissions high.*

- **Renewable Integration Gap** – Renewables supplied only ~22% of electricity in 2024–25 due to intermittency and lack of storage, despite greater than 50% installed non-fossil capacity.
- **Missed Targets & Future Ambitions** – The 175 GW renewables target for 2022 was missed, and although a 500 GW 2030 ambition is technically possible.
- **Storage bottleneck** – The Central Electricity Authority projects 336 GWh of storage demand by 2029–30, but as of September 2025, only 500 MWh of battery storage is operational.
- **Execution bottlenecks** – Delays in grid connectivity and limited land acquisition in the power sector for projects.
- **Coal Dependence** – Despite rapid renewable growth, the backbone remains coal, with ~253 GW coal-based capacity continuing to dominate baseload supply.
- **Policy Mechanisms & Implementation Gaps** – Under the *Compensatory Afforestation Fund Act (2016)* the implementation of afforestation funds uneven across states (Delhi utilised only 23% (2019–20 to 2023–24)).
- **Green India Mission** - Regenerating 5 million hectares through regional projects in the Aravallis, Western Ghats, and Himalayas.
- **Climate change** – Satellite data shows leaf index "greening", but actual carbon assimilation and productivity are weakened by warming and water stress, particularly in the Western Ghats and Northeast India.
- **Domination of plantations** – India will likely meet its 2030 forest sink target numerically, but plantation-heavy, governance-limited mechanisms, prioritises carbon accounting over ecological restoration and biodiversity health.

What lies ahead?

- **Policy Imperatives for Net-Zero 2070 –** For India's 2070 net-zero pledge to be credible, remaining intensity gains must be translated into absolute emissions reductions through a transparent coal phase-down timetable and industrial decarbonisation roadmaps.
- **India's transition path –** That lies ahead demands storage scaling, coal phase-down, forest governance reform, and transparent data tracking — governance, not just capital, will drive success.
- **Critical Five-Year Window –** The next five years are crucial to accelerate renewables, fix storage gaps, and strengthen government coordination on grid connectivity and land acquisition.
- India has largely met its quantified commitments, but the real challenge lies in turning installed renewable capacity into sustained generation and translating intensity gains into actual moderation of absolute emissions.

7.2 Strengthening Groundwater Management for India's Water Future

India has a multi-layered strategy to manage groundwater through monitoring infrastructure, regulatory frameworks, and community-driven initiatives, schemes like Atal Bhujal Yojana, Jal Shakti Abhiyan, etc in ensuring long-term water security and achieving SDG goals.

Why groundwater management matters?

- **Groundwater** – It is a freshwater that seeps into soil and rocks, where it is stored underground before naturally emerging or being drawn for human use.
- It maintains water levels in many rivers and streams, and it strongly influences the habitats of wetlands for plants and animals.
- The underground layer that can store and transmit ground water in sufficient quantities is called as Aquifer.
- **Groundwater's status on Earth** – It comprises ***nearly 99% of Earth's liquid freshwater*** and offers substantial social, economic, and environmental benefits, including climate resilience.
- **Status in India** – The groundwater serves as the primary foundation of agricultural activity and drinking water supply, meeting nearly 62% of irrigation needs, 85% of rural consumption, and 50% of urban demand.
- **Reasons for Pressures on Groundwater Systems** – Rapid population growth, agrarian intensification, industrial expansion, and urbanisation have collectively intensified pressure on groundwater systems in the country.

What are the key pillars and priorities of Groundwater Management?

3 pillars

- **Extraction/Usage** – Pumping for domestic, irrigation and industrial purposes
- **Problems/Usage** – Decline in groundwater levels, contamination/poor ground water quality
- **Management measures** – Demand side: Reduction in ground water withdrawal & Supply side: Artificial recharge/water conservation.

4 key priorities

- As per the United Nations Educational, Scientific and Cultural Organization (UNESCO), 4 key priorities includes
- Maintaining a dynamic water cycle to support natural recharge
- Balancing ecological and human needs to ensure environmental protection
- Preserving reserve supplies to safeguard against drought
- Aligning use with quality requirements so that groundwater quality matches its purpose.

What are the government initiatives to strengthen groundwater management?

- **Model Groundwater (Regulation and Control of Development and Management) Bill** – It focus on regulation & sustainable extraction of groundwater.
- **Adoption** – So far, 21 States/UTs (including Bihar, Punjab, Haryana, Himachal Pradesh) have adopted it.
- **Jal Shakti Abhiyan: Catch the Rain (JSA: CTR)** – Launched in 2021, coinciding with World Water Day, focuses on awareness, rainwater harvesting, afforestation, strengthening the message that every drop counts.
    - **Achievement** – Includes revitalisation of borewells, geo-tagging of water bodies, 1.64 billion afforestation activities, etc were carried out.
- **Jal Sanchay Jan Bhagidari (JSJB)** – It was launched under the JSA: CTR campaign on 6 September 2024.
- **Objective –** To improve groundwater recharge through measures such as rainwater harvesting, aquifer recharge, borewell recharge, and recharge shafts.
- **Achievements –** By 22 January 2026, the total number of artificial groundwater recharge and storage works completed cumulatively under JSJB 1.0 and JSJB 2.0 stands at 39,60,333.
- **National Aquifer Mapping and Management Programme (NAQUIM)** – To support effective groundwater management in the country.
- **NAQUIM 2.0 –** Implemented by Central Ground Water Board (CGWB), provides high-granularity data density on groundwater levels and quality and delivering issue-based scientific inputs up to the Panchayat level.
    - **Targets** – Water-stressed, coastal, urban, spring-shed, industrial and mining, command, deep aquifer, auto flow, and poor-quality groundwater areas, with area-specific and user-focused outputs.
- **Master Plan for Artificial Recharge to Groundwater-2020** – To promote terrain-specific recharge techniques based on water availability and aquifer storage capacity.

- **Achievement** – The master plan targets 1.42 crore recharge structures to add 185 BCM groundwater using terrain-specific methods.

- **Atal Bhujal Yojana (Atal Jal)** – Launched on 25 December 2019, to focuses on community-led sustainable groundwater management.
  - **Implementation** – In 7 water-stressed states namely Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan, and Uttar Pradesh.
- **Mission Amrit Sarovar –** Launched on 24 April 2022, to supports the creation of Amrit Sarovars (ponds) across all districts in the country.
- **Groundwater Infrastructure for Monitoring, Restoring, and Knowledge Support** – India has a network of 43,228 groundwater level monitoring stations, comprising stations operated by the Central Ground Water Board (CGWB).
- **Jal Shakti Kendra (JSK)** – It functions as a district-level technical guidance centre, advising stakeholders on rainwater harvesting and serving as a knowledge hub for disseminating information and providing technical support on water conservation practices.
- As of 30 December 2025, a total of 712 Jal Shakti Kendras (JSKs) are operational across India.

What are the necessities for groundwater management in India?

- **Groundwater Reserves in India** – India possesses extensive groundwater reserves whose physical characteristics and availability vary widely across regions.
- **Rising pressure on groundwater systems** – Intensive and largely unregulated pumping has led to rapid declines in water tables across many parts of the country, signifying growing dependence on subsurface sources.
- **Degradation of water quality** – Contamination arising from mining, industrial effluents, and agricultural practices, combined with naturally occurring elements such as arsenic and fluoride, posing long-term environmental and public health risks.
- **Drivers of uncontrolled abstraction** – The sharp increase in groundwater extraction has been driven by the availability of affordable drilling techniques and pumping technologies, enabling even small farmers and low-income households to construct and operate private tube wells.
- **Government's Commitment** – The growing groundwater crisis has strengthened the Government's commitment to effective management, reaffirmed by India's COP 21 commitment to climate resilience and long-term growth.
- **Link to SDG –** Effective groundwater management is vital for achieving the Sustainable Development Goals, especially SDG 6, SDG 11, and SDG 12.

What lies ahead?

- **India's response** – India has embraced a comprehensive and multi-layered approach combining policy reform, scientific assessment, infrastructure creation, and community participation, led by the Ministry of Jal Shakti.
- Key initiatives taken by the government jointly reinforce recharge, monitoring, regulation, and demand side management.
- **Institutional Support** – Supported by an extensive network of groundwater monitoring stations, advanced data systems, and local knowledge centres for community engagement.
- **Transition Ahead** – These efforts mark a transition towards scientifically informed, participatory, and outcome-oriented groundwater governance, establishing a durable framework for long term sustainability, climate resilience, and the achievement of national development goals.

7.3 COP30, Climate Justice and the Future of Agriculture in India

Recently, The COP30 climate summit held in Belém, Brazil—at the heart of the Amazon—took place amid indigenous resistance, ecological fragility, and growing global inequality.

What are the contradictions of the COP30?

- **Demands of Developed countries** – Developing countries entered COP30 demanding *stronger commitments on climate finance* and adaptation, while scientific bodies reiterated the urgency of rapid decarbonisation.

- **Brazil's Reiteration** – The Brazilian presidency attempted to re-centre the discourse around justice, equity, and ecological integrity—terms that had gradually faded from climate diplomacy.
- **The Contradictions** – The final outcomes exposed persistent contradictions in multilateral climate governance:
    - Countries expressed intent to "transition away from fossil fuels" but *avoided firm commitments to an unequivocal phase-out.*
    - Adaptation finance received rhetorical support *without binding targets.*
    - A measurable global *goal on adaptation finance was deferred* despite strong lobbying from developing countries.
    - A new framework for agricultural emissions reporting was introduced as voluntary, yet implicitly signalled future obligations.
- These outcomes underscored the structural asymmetries that continue to shape global climate negotiations.

How agriculture emerging as a new climate battleground?

- **Agriculture** – Although agriculture was not a formal agenda item, it emerged as a highly contested issue at COP30.
- **Importance for India** – This is particularly significant for India, where agriculture employs nearly half of the workforce, dominated by small and marginal farmers.
- The sector is most exposed to climate risks but least protected by global finance.
- **Reasons for scrutiny on agriculture** – The scrutiny on agriculture intensified due to:
    - Methane emissions from livestock and paddy cultivation.
    - Nitrous oxide emissions from fertiliser use.
- **Issues with the Guidelines** – The Belém guidelines encouraged improved reporting of agricultural emissions and adoption of "best practices" for mitigation.
- While voluntary, *these guidelines indicate a political shift*—largely led by developed countries—towards integrating agriculture into mitigation frameworks.
- **Implications for India** – For India, the implications are profound:
    - Methane emissions are deeply embedded in mixed crop-livestock systems, and proposals to reduce cattle populations ignore their economic, social, and ecological role in smallholder livelihoods.
- Such technocratic approaches risk overburdening small farmers while leaving industrial agriculture largely unchecked.

How climate finance remain as the persistent fault line?

- **Climate finance** – It remained the most entrenched divide at COP30.
- **Demand from developing countries** – Developing countries demanded annual funding of USD 300–400 billion by 2030 to meet adaptation needs. The final agreement, however, merely "encouraged" donors to scale up efforts.
- **Key concerns**:
    - The Loss and Damage Fund received only symbolic reinforcement and remains severely underfunded.
    - Financing lacks predictability and grant-based support.
- **Affirmation of Developed countries** – They continued promoting private and blended finance as primary mechanisms.
- For Indian agriculture, this financing gap is critical.
- **Requirement of Sustainable finance** – Climate resilience requires sustained public investment in:
    - Micro-irrigation
    - Watershed restoration
    - Agro-ecological diversification
    - Soil regeneration
    - Rural extension services

- Climate forecasting systems

- These are public goods that require public expenditure and long-term concessional international finance.
- COP30's failure to establish binding commitments leaves India facing a growing adaptation deficit.

What are the strategy if India at COP30?

- **3 priorities** – India entered COP30 with three strategic priorities:
  - Securing commitments on climate finance
  - Safeguarding policy space for development
  - Ensuring flexibility in agricultural emissions reporting
- **India's success** – India achieved partial success by:
  - Incorporating references to food security and rural livelihoods in the final document.
  - Resisting binding methane reduction targets in agriculture.
  - Ensuring voluntary reporting of agricultural emissions.
- **Drawbacks for India** – However, India failed to secure meaningful breakthroughs on climate finance or binding obligations from developed countries.
  - Domestic vulnerabilities also shaped India's negotiating position.
  - The country faces a deepening agrarian crisis marked by groundwater depletion, heat stress, crop losses, livelihood insecurity, and rising farmer debt.
  - Inadequate domestic adaptation investments and uneven institutional capacity across states weaken India's ability to project a transformative agricultural vision at global forums.

How the climate justice discourse revived at Belém?

- **Important proposers** – COP30 witnessed a revival of climate justice discourse, driven by Brazil's presidency, Indigenous leaders, and the G77+China bloc.
- **Concerns in Amazon** – The Amazon became a symbol of historical exploitation and ecological injustice, highlighting unequal climate impacts:
- **Issues raised by local leaders** – Indigenous leaders highlighted:
  - Land dispossession
  - Deforestation
  - Resource extraction
- **Prospects for India** – These concerns resonate strongly with India's tribal and forest-dependent communities.
- This justice-centred discourse challenged narrow technocratic approaches and re-emphasised the historical roots of the climate crisis.

What lies ahead?

- Climate Justice must be embedded in finance, technology transfer, and regulatory frameworks—areas where COP30 made limited progress.
- COP30 at Belém exposed the limits of international climate governance and the widening divide between those responsible for emissions and those suffering their consequences.
- In India, these inequities are most visible in agriculture, where erratic monsoons disrupt livelihoods, reduce incomes, and deepen rural distress.
- The summit underscores a critical reality: climate justice in India will be shaped not only by energy transitions or industrial policies, but by the future of small and marginal farmers.
- Without shared global responsibility and a genuinely transformative domestic agricultural vision, climate justice will remain an aspiration rather than a lived reality.

8. SCIENCE & TECHNOLOGY

8.1 Biomaterials – Challenges and Opportunities

As countries look to shift to cleaner processes to manufacture consumer products, be it plastics or textiles, biomaterials will become the new frontier of materials engineering.

What are biomaterials?

- **Biomaterials –** The materials derived wholly or partly from ***biological sources***, or engineered using ***biological processes***, that are designed to replace or interact with conventional materials.
- **Applications –** They are increasingly used across sectors such as packaging, textiles, construction, and healthcare.
- **Common examples** include –
    - Bioplastics made from plant sugars or starch,
    - Bio-based fibres used in textiles, and
    - Medical biomaterials such as biodegradable sutures and tissue supports.
- **Categories** – Biomaterials can be broadly categorised into 3 types -
    - **Drop-in biomaterials** – It is *chemically identical to petroleum-based materials* and can be used in existing manufacturing systems (such as bio-PET);
    - **Drop-out biomaterials** – It is *chemically different* and require new processing or end-of-life systems (such as polylactic acid or PLA); and
    - **Novel biomaterials** – It offer *new properties* not found in conventional materials, such as self-healing materials, bioactive implants, and advanced composites.

Why does India need biomaterials?

- **Green Growth Pathway** – For India, biomaterials address multiple goals, including environmental sustainability, industrial growth, revenue generation, and supporting farmer livelihoods through a single pathway.
- **Import reduction** – Indigenous biomaterials biomanufacturing can reduce India's heavy dependence on fossil-based imports for plastics, chemicals, and materials.
- **Farm Income Diversification** – It would also enable diversified value for agricultural feedstocks and residues, offering farmers new income streams beyond food markets.
- **Global Competitiveness** – As global regulations and consumer preferences shift toward low-carbon and circular products, biomaterials position the Indian industry to remain competitive in export markets.
- **Policy Alignment** – Biomaterials also support domestic policy goals around waste reduction, such as the ban on single-use plastics and climate action goals.

Where does India stand today?

- **Strategic Growth Opportunity** – India's biomaterials sector, spanning bioplastics, biopolymers, and bio-derived materials, is rapidly emerging as a strategic industrial and sustainability opportunity.
- **Market value** – With the bioplastics market alone valued at around $500 million in 2024 and forecast to grow strongly through the decade.
- **Major PLA investment** – Balrampur Chini Mills planned Poly Lactic Acid (PLA) plants investment in Uttar Pradesh is one of the biggest investments in India.
- **Domestic innovation & startups** – Like Phool.co, converting temple flower waste into biomaterials and Praj Industries, who have their own demonstration-level bioplastics plant in progress.

What are other countries doing?

- **EU –** It has moved to a single, binding Packaging and Packaging Waste Regulation (EU) 2025/40 (PPWR) that recognises that compostable packaging has demonstrable environmental benefits for specific applications.
- **UAE –** It is positioning itself as a major manufacturing base via large-scale PLA investment.
    - **For Example,**Emirates Biotech is building a PLA plant using Sulzer technology, with two phases of 80,000 tonnes per year, the plant is expected to start in 2028, once complete, *will be the world's largest PLA facility*.
- **U.S. –** It is leading in a number of transformative technologies, securing it as a leader in biomaterials.

- A push for biomaterials comes through its federal purchasing power through the USDA's BioPreferred program.

What are the issues need to be addressed?

- **Feedstock competition –** If feedstocks also do not scale with increased demand, there could be feedstock competition with food sources.
- **Water stress & Soil degradation –** Aggressive agricultural practices could lead to water stress and soil deterioration.
- **Weak infrastructure –** Further, weak waste-management and composting infrastructure could undermine environmental benefits.
- **Fragmented policy coordination –** Lack of alignment across agriculture, environment, and industry policies may slow adoption.
- **Risk of import dependence –** Failure to act quickly could leave India dependent on imports as other countries advance faster.
- **Technology dependence –** Although India has a rich agricultural base, in some sectors, there is foreign dependence for the technologies required for the transformation of feedstocks into market-ready final products.

What lies ahead?

- **India's advantage** – India has an advantage in building a biomaterials industry, leveraging agricultural diversity and industrial potential.
- **Scaling biomanufacturing infrastructure** – Policy actions should focus on expanding fermentation and polymerisation capacity to meet industrial demand.
- **Enhancing feedstock productivity** – Emerging technologies can improve yields of sugarcane, maize, and agricultural residues for sustainable feedstock supply.
- **Invest in R&D** – Investing in research, innovation, and standards are crucial to develop both drop-in substitutes and novel biomaterials.
- **Regulatory clarity** – Clear definitions, labelling norms, and end-of-life pathways (recycling/composting) are essential to build consumer and industry confidence.
- **De-risking early investments** – Government procurement, time-bound incentives under frameworks, and support for pilot plants and shared facilities can reduce risk for investments.

8.2 Reusable Rocket Technology

Recently the reusable rocket technology has gained importance around the sustainable use of space.

What is the status of space technology?

- **Past scenario** – For nearly four decades, space exploration was dominated by government agencies, with missions driven largely by strategic, scientific, and prestige considerations.
- **Present status** – The space sector has entered a commercial phase, led by private companies that invest, innovate, and compete to reduce costs and increase launch frequency.
- Today, space is one of the fastest-growing industries in the world and is projected to exceed $1 trillion in value by 2030.
- **Transformative innovation** – At the heart of this transformation lies a single disruptive innovation: Reusable rocket technology, which is redefining sustainability and cost-effectiveness in access to space.
- **The economics of launch costs** – Traditionally, rockets were expendable, meaning each launch destroyed the launch vehicle after a single use.
- This made space access extremely expensive, with costs running into tens of thousands of dollars per kilogram of payload.
- **Low launch of costs** – The introduction of partial reusability by private players has reduced the cost of access to space by 5 to 20 times, fundamentally altering the economics of spaceflight.
- Lower launch costs have multiple downstream effects:
    - Increased launch frequency
    - Expansion of satellite constellations

- Greater accessibility for developing countries and private firms
- New commercial applications such as space tourism and in-orbit servicing

- This shift has moved the industry from a "disposable" model to a transportation model, similar to aviation.

Why spaceflight is technically challenging?

- **Physical barriers** – Launching a rocket into orbit requires overcoming two major physical barriers:
  - Gravity
  - Aerodynamic drag.
- Unlike aircraft, rockets cannot push against air or ground and must propel themselves forward by ejecting exhaust gases backward at supersonic speeds.
- The fundamental physics governing rocket motion is explained by the *Tsiolkovsky rocket equation*, which links a rocket's velocity to its mass and fuel consumption.
- This equation highlights a major limitation: *fuel itself is extremely heavy.*
- As a result, more than 90% of a rocket's mass at liftoff is typically propellant and tanks, while less than 4% is the actual payload.
- This "weight problem" is the core reason spaceflight is expensive.
- **Role of rocket staging –** To address the limitations, rockets are designed with multiple stages.
- Each stage is an independent propulsion unit that is discarded once its fuel is exhausted, allowing the rocket to shed dead weight mid-flight.
- This improves efficiency and makes orbital insertion possible.
- Traditional launch vehicles such as PSLV and LVM-3 use expendable staging, where discarded stages fall into the ocean and are never recovered.
- While effective, this approach locks in high recurring costs because each launch requires a completely new vehicle.
- **Reusability –** Reusable rockets aim to recover and reuse the most expensive components, particularly the first stage, which contains engines, avionics, and fuel tanks.
- SpaceX has pioneered this approach with its Falcon 9 rocket.
- After separation, the first stage performs a controlled descent using:
  - Engine re-ignition (retro-propulsion) to reduce speed
  - Aerodynamic drag during atmospheric re-entry
  - Precision guidance and autonomous landing on land or ocean platforms
- This innovation has dramatically reduced costs and increased launch cadence.
- SpaceX has successfully recovered Falcon 9 first stages over 520 times, with some boosters reused more than 30 times.
- **Fully Reusable Launch Vehicles –** While partial reusability is now proven, the next major leap is full reusability, where both stages of a rocket are recovered and reused.
- SpaceX's Starship represents this ambition.
- Designed as a fully reusable, heavy-lift vehicle, Starship is intended to carry crew and cargo not only to Earth orbit but also to the Moon and Mars.
- **Other global players**:
  - Blue Origin has demonstrated vertical booster recovery for its New Glenn rocket.
  - Chinese commercial space firms, such as LandSpace, are attempting recovery technologies for orbital-class rockets.
- These developments indicate that reusability is fast becoming an industry norm rather than an exception.

What are the limits to reusability?

- **Practical limitations** – Rocket stages are subjected to extreme stresses:

- Cryogenic temperatures from propellants
- Intense heat during combustion and re-entry
- High pressure, vibration, and g-forces

- Over multiple flights, these conditions cause material fatigue and microfractures, especially in engines and fuel tanks.
- **Other concerns** – Beyond a point, the cost and time required for inspection, refurbishment, and replacement of components can outweigh the savings from reuse.
- Thus, the feasible number of reuses is determined not only by engineering durability but also by refurbishment economics and acceptable risk levels.

What is the human spaceflight vs satellite missions?

- **Human space missions** – These are significantly more expensive than uncrewed satellite launches, often costing three to five times more. This is due to stringent requirements for:
  - Life support systems
  - Crew safety and redundancy
  - Escape mechanisms and reliability standards
- **Satellite missions** – They are typically one-way, with simpler hardware and software architectures.
- Reusability helps reduce costs in both cases but is especially transformative for high-frequency satellite launches.
- **India's Position in the Reusable Space Race** – India, through ISRO, has recognised the strategic importance of reusability and is actively developing relevant technologies.
- Two major approaches are being pursued:
  - **Reusable Launch Vehicle (RLV)** – A winged, shuttle-like vehicle capable of re-entering the atmosphere and landing on a runway.
  - **Stage Recovery Systems** – Using aerodynamic drag and retro-propulsion to recover spent rocket stages on land or sea platforms.
- While India has traditionally focused on cost-effective expendable launch systems, the rapidly evolving global market makes reusability a necessity rather than a choice.

What lies ahead?

- Future launch vehicles must be designed with reuse as a non-negotiable design driver.
- Advances in propellant density and engine efficiency now allow two-stage systems to perform missions that once required three or more stages.
- Key focus areas should include:
  - Optimised stage energy distribution
  - High-performance, compact engines
  - Rapid and economical refurbishment
  - Increased launch cadence.
- Reusable rocket technology represents a paradigm shift in space access, making it more affordable, sustainable, and inclusive.
- As space becomes a critical domain for economic growth, national security, and technological leadership, countries that fail to adapt risk being left behind.
- For India, timely induction of disruptive technologies and policy support for reusable systems will be crucial to remaining competitive in the emerging global space economy.

8.3 Futuristic Marine and Space Biotechnology

Recently, the sustainable marine and space technology is gaining importance due to depleting and uneven distribution of resources.

What is futuristic marine and space biotechnology?

- **Futuristic marine and space biotechnology** – It refers to advanced biological research and manufacturing that draws on two extreme, underexplored environments—the deep oceans and outer space—to create new materials, products, and life-support solutions for the future economy and exploration.
- **Marine biotechnology –** Marine biotechnology studies ocean life—microorganisms, algae, invertebrates, and fish—to develop:
    - **Bioactive compounds** (for drugs, nutraceuticals, cosmetics)
    - **Industrial enzymes** (stable under high pressure, salinity, or temperature)
    - **Biomaterials** (bioplastics, wound dressings, hydrogels)
    - **Food and feed ingredients** (seaweed proteins, omega-3s)
    - **Biostimulants** for climate-resilient agriculture
- Marine organisms are valuable because they have evolved to survive extreme conditions (high pressure, low light, low nutrients), making their biology useful for sustainable and resilient industrial applications.
- **Space biotechnology –** Space biotechnology examines how biology behaves in microgravity and high radiation on:
    - **Microbial and algal biomanufacturing** for food, oxygen, fuel, and materials.
    - **Closed-loop life-support systems** (waste recycling, air and water regeneration).
    - **Human health in space**, including astronaut microbiomes, immunity, bone loss, and muscle atrophy.
    - **Drug discovery and regenerative medicine**, where microgravity enables unique cell and protein behavior.
- This research is essential for long-duration human spaceflight, space stations, and planetary missions.

Why does India need them?

- **Strategic and economic reasons –** India has an 11,000+ km coastline and a 2 million sq. km Exclusive Economic Zone, yet underutilises its marine bioresources.
- Marine biotechnology can:
    - Reduce pressure on land, freshwater, and agriculture.
    - Create new sources of food, chemicals, energy, and materials.
    - Strengthen the blue economy and climate resilience.
- **Space ambitions –** India's human spaceflight goals require self-reliant biological systems for food, health, and life support.
- Space biotechnology helps India avoid dependence on foreign biological solutions that may not suit Indian genetic, nutritional, and health profiles.
- Together, these fields support bioeconomic growth, technological leadership, and strategic autonomy.

Where does India stand today?

- **Marine biotechnology**
    - Seaweed cultivation is still modest (~70,000 tonnes annually).
    - India imports key marine products like agar, carrageenan, and alginates.
- **Government initiatives**:
    - Blue Economy agenda
    - Deep Ocean Mission
    - BioE3 policy
- **Emerging players and institutions:**
    - Private firms: Sea6 Energy, ClimaCrew
    - Research bodies: ICAR–CMFRI
    - State-led innovation platforms

- **Space biotechnology**
- ISRO runs a microgravity biology programme studying microbes, algae, and biological systems.
    - Focus areas include:
    - Food production
    - Life-support regeneration
    - Astronaut health and microbiomes
- Private participation is currently limited due to the early stage of the sector.

What are other countries doing?

- **European Union** – Large collaborative programmes on marine bioprospecting, algae biomaterials, and bioactive compounds.
- **China** – Massive seaweed aquaculture and integration of deep-sea research with industrial bioprocessing.
- **USA & Australia** – Strong support for marine biotech innovation.
- **Space biotechnology leaders:**
    - NASA (ISS) – Microbes, stem cells, protein crystallisation, closed-loop systems
    - ESA, China (Tiangong), JAXA – Plant growth, microbiomes, and biomaterial research in space

What lies ahead?

- These are first-mover domains where early leadership brings long-term advantages.
- India needs:
    - A dedicated national roadmap for marine and space biotechnology
    - Clear timelines, milestones, and funding pathways
    - Better coordination between research institutions, startups, and industry
- The biggest risk is slow, fragmented R&D, which could cause India to miss the opportunity despite strong natural and strategic advantages.

8.4 ISRO – Achievements and Challenges

Over the past decade, ISRO has built an impressive record despite its modest size and budget, but its next major challenge lies in transforming landmark missions into a scalable industrial system.

What are the recent achievements of ISRO?

- **PSLV –** ISRO's rockets, particularly the Polar Satellite Launch Vehicle (PSLV), have consistently provided dependable access to orbit, making the launch of diverse satellite classes nearly routine.
- **Chandrayaan-3** (2023) – It has achieved a successful soft landing on the Moon (Aug 23, 2023), made India the 4th country to demonstrate lunar landing capability.
- **Aditya-L1** (2024) – India's first solar observatory mission, placed in halo orbit around L1 on Jan 6, 2024, adding a dedicated solar observatory mission to ISRO's portfolio.
- **NISAR Mission** (2025) – It is a prominent international collaboration between NASA and ISRO, launched in July 2025, an earth-observation platform for climate and hazard monitoring.
- **SpaDeX Mission** (2025) – India's first space docking experiment (Jan 2025), two small satellites (SDX01 "Chaser" and SDX02 "Target") successfully demonstrated autonomous docking technology.

What are the challenges ISRO needs to overcome?

ISRO's structural prioritisation problem

- **Parallel priorities –** ISRO has multiple priorities in parallel - the human spaceflight mission, complex science missions, satellite replenishment, and the development of Next-Generation Launch Vehicle (NGLV).
- **Private sector dependence –** At the same time private launch providers still depend heavily on ISRO facilities and infrastructure, meaning the system can't yet offload work at scale.

- **Vehicle limitation –** GSLV Mk III (Bahubali) is reliable but only medium-lift, not sufficient for heavier missions.
- **Low launch statistics (2025) –** In 2025, ISRO carried out only five launches, falling short of Chairman V. Somanath's already modest projection of eight.
- **Current bottleneck –** ISRO's low annual launch rate and extended project timelines have become increasingly evident, reflecting delays and a shift towards big-ticket programmes.
- Also, include inadequate test stands, restricted integration capacity, and weak industrial supply chains.

Governance & Legal Framework

- **Post 2020 reforms –** India has liberalised its space sector, but in reality Roles are defined but not fully operational in practice.
- **Lack of comprehensive law –** ISRO's role in India's liberalised space and spaceflight ecosystem is constrained by the absence of a comprehensive national space law.
- **Third Party Liability Gap** – The absence of clear responsibility for third-party liabilities often results in ISRO being drawn in by default as the most capable state actor.
- **Statutory Authority for ISRO** – Without statutory authority, ISRO continues to act as the fallback regulator.

Competitiveness & Industrial Depth

- **Global Trends vs India's Response** – As the world advances toward frequent launches, reusable launch vehicles, and rapid satellite production, India must respond with more than just expanded engineering ambitions.
- **Framing the NGLV –** The Indian government presents the NGLV as a high-capacity (up to 30 tonnes to LEO), partially reusable system.
- It acknowledges that economic launches and agility are now central, rather than optional, features of enterprises that operate launch vehicles.
- **Requirements for competitiveness** – For building such systems and operating them in turn requires more production depth, advanced manufacturing capabilities, higher qualification capacity, and much more capital.
- **Declining Investment trends** – In 2024, investment in India's space sector declined significantly, driven by global headwinds and the challenges of financing long horizon hardware projects.

What are the measures to overcome these challenges?

- **Ultimate Aim –** ISRO should not be forced to act as the designer and the integrator, and the bottleneck for all missions simultaneously.
- **Need for a National Space Law** – A national space law would help startups and protect ISRO by reducing the ad hoc demands on ISRO as fallback regulator/certifier.
- To ensure continuity beyond political and administrative changes.
- **Policy response –** IN-SPACe has launched a technology adoption fund aimed at helping firms bridge prototypes with scalable products and at reducing import dependence, among other funding instruments.
- **Better operational improvements** – ISRO needs
    - More integration capacity,
    - Better access to test stands, industrial supply chains for structures and avionics, and
    - A workflow that can absorb setbacks without freezing unrelated programmes or limiting their timelines.
- **Internal Management Measures –** The first step is to create an internal system that lets scientists decide which mission timelines can be delayed and why, with separate resources for R&D and operational vehicles, and more industrial capacity.
- **Institutional Roles & Legal Authority**
    - **IN-SPACe** – If it is to be the authorising body, it needs to have legal authority.
    - **NSIL** – If it is to be the commercial arm, should not face unclear liability in case of commercial mission failures.
    - **ISRO** – Focus on frontier capabilities; insulated from routine tasks (test stands, spectrum allocation).
- **Legal & Statutory Needs –** ISRO and related bodies require statutory authority to function efficiently.

- Clear legal allocations are needed for authorization, liability, insurance, dispute resolution, defined responsibilities must ensure ISRO is insulated from routine regulatory tasks, allowing it to focus on core missions.
- **Resource & Industrial Strengthening** – Separate resource allocations for R&D vs operational vehicles, stronger industrial base, and workflows resilient to anomalies.

What lies ahead?

- **ISRO's Past & Present** – ISRO's past accomplishments have earned it political capital and public trust but the next phase depends on sustained institutional performance, not just individual feats.
- **Capacity to Execute** – India's ability to deliver ambitious missions in a routine way will hinge on its execution capacity.
- **Governance & Law** – It will decide whether the government's efforts to liberalise the sector will reduce ISRO's burden or, counterintuitively, expand it.
- **Transition to Industrial System** – To compete, ISRO must evolve from individual missions into an industrial ecosystem, with engineering, regulation, manufacturing, and finance advancing together.

9. SECURITY

9.1 Social Media Monitoring by Police Forces

In recent years, the monitoring of social media by police forces across India has escalated significantly and this shift reflects the increasing role of social media in both facilitating communication and criminal activities.

What is the status of social media monitoring cells in India?

- **Growth of monitoring cells** – According to an analysis of police infrastructure data, the number of dedicated social media monitoring cells has grown substantially.
- As of January 1, 2020, there were 262 such cells across 28 states and 8 Union Territories.
- By January 1, 2024, this number had increased to 365.
- **State specific increase** – Some states have seen a particularly sharp increase:
    - **Bihar –** 52 cells
    - **Maharashtra** – 50 cells
    - **Punjab** – 48 cells
    - **West Bengal** – 38 cells
    - **Assam** – 37 cells
- The number of monitoring cells also saw a notable rise in states that experienced significant civil unrest.
    - **For instance**, in Manipur, where large-scale ethnic violence erupted in 2023, the number of monitoring cells rose from 3 on January 1, 2020, to 16 by January 1, 2024.
- **Need for monitoring cells** – Social media platforms such as Facebook, X (formerly Twitter), Instagram, and WhatsApp are increasingly becoming avenues for both crime and social unrest.
- The rise in the number of dedicated monitoring units reflects the evolving nature of threats in the digital age.

What is the impact of social media monitoring?

- **Forecasting of crimes** – Police forces across states have recognized this and established monitoring cells to pre-empt crime trends and detect possible disturbances, misinformation, and violence being planned or disseminated online.
- **Curb misinformation's** – Officials argue that this strategy helps in not only curbing cybercrimes but also monitoring hate speech, communal tension, and politically motivated violence that often manifest on social media.

What are the other developments that are taking place?

- **Expansion of Cybercrime Units –** Alongside the expansion of social media monitoring cells, the number of cybercrime police stations has also seen a rise.

- The total number of cybercrime stations increased from 376 as of January 1, 2020, to 624 as of January 1, 2024.
- This increase highlights the growing recognition of the need for specialized cyber units to tackle internet-based crimes, such as data theft, online fraud, and digital harassment.
- These developments align with global trends where law enforcement agencies are enhancing their capabilities to tackle digital crime in real-time.
- **Increasing role of drones in law enforcement –** In addition to social media monitoring, law enforcement agencies have been increasing their use of technology in crime detection and prevention.
- Drones, which provide aerial surveillance capabilities, have seen a marked rise in usage.
- As of January 2024, there were 1,147 drones available to state and Union Territory police forces, up from 1,010 drones in 2023.
- Drones are increasingly being used for crowd control, surveillance of remote areas, and tracking criminal activities in real-time.

What are the issues and challenges in social media monitoring?

- **Privacy issues –** Determining what's public vs. private, and the constitutionality of monitoring private profiles or using fake accounts, remains a complex legal area.
- **Fake Accounts & Deception –** Criminals use fake profiles, while police using them can violate platform rules and public trust, leading to legal challenges.
- **Information Overload –** The sheer volume of data makes identifying genuine threats difficult, requiring sophisticated tools.
- **Context & Misinterpretation –** Sarcasm, slang, and cultural nuances in posts are hard for automated tools (and even humans) to interpret accurately, risking false flags.
- **Tool Limitations –** Inadequate or unreliable surveillance software, often reliant on basic keyword lists, can miss threats or generate too many false positives.
- **Lack of Training & Policy –** Insufficient training for officers and a lack of comprehensive departmental policies hinder effective, lawful monitoring.
- **Resource Constraints –** Police forces often lack sufficient funding, trained personnel, and specialized labs for deep analysis.
- **Measuring Effectiveness –** Quantifying success is hard as the goal is often prevention, and cybercrimes can be covert until major damage occurs.
- **Erosion of Trust –** Secretive monitoring or perceived targeting of specific groups (like activists) can damage community relations.
- **Algorithmic & Human Bias –** Existing policing biases can seep into online monitoring, disproportionately affecting minority communities
- **Human Resource Challenges –** Despite the technological advancements and expanded infrastructure, the police force continues to face significant staffing shortages.
- The 2024 report noted that *5,92,839 police posts were vacant* across the country, against *the total sanctioned strength of 27,55,274.*
- This staffing gap remains a key challenge in ensuring that the growing demands of modern policing, especially in terms of technology, can be met effectively.
- Additionally, of the total sanctioned strength, a significant portion of police personnel belong to marginalized communities:
    - 3,30,621 personnel from *Scheduled Castes*
    - 2,31,928 personnel from *Scheduled Tribes*
    - 6,37,774 personnel from *Other Backward Classes*

What lies ahead?

- The rapid expansion of social media monitoring cells, coupled with the rise of cybercrime units and drones, represents a crucial shift in India's law enforcement strategies.
- The adoption of technology-driven policing enhances the fight against modern crimes, yet shortages in manpower and vulnerabilities in digital security continue to impede its full effectiveness

9.2 Security Camps – The Game-Changer in the Maoist Fight

Recenlty, Maoism in India has been significantly curbed and the dip in Maoist-related violence, especially over the last two years, has restricted the insurgency to few pockets in the Bastar division of Chhattisgarh.

What is Maoism?

- **Maoism** – It is a ***form of communism*** developed by Mao Tse Tung.
- **Principle** – It is a doctrine to capture State power through a combination of *armed insurgency, mass mobilization and strategic alliances.*
- **Mechanisms** – The Maoists also use *propaganda and disinformation* against State institutions as other components of their insurgency doctrine.

What is the status of Maoism in India?

- **Sharp reduction in violence –** Maoist-related incidents have dropped significantly, with government data showing a ***90% decline*** from 2010 to 2025.
- **Decline of LWE-affected districts** – The Left-Wing Extremism (LWE)-affected districts fell from *126 in 2018 to 11 in October 2025.*
- **Cadre surrenders** – Many Maoist leaders and cadres have surrendered, weakening organizational strength.
- **Current hotspots** – Only three districts - ***Bijapur, Narayanpur and Sukma***, in south Bastar — are categorised as most affected.

To know more about *Maoism in India*, click here

What are the factors responsible for expansion of Maoism?

- **Geographical remoteness –** Maoism thrived in inaccessible forested and hilly areas, away from state presence.
- **Rugged terrain –** Dense forests and difficult landscapes provided natural cover and safe havens for guerrilla warfare.
    - **Example –** The dense forests, difficult terrain, and location spanning Andhra Pradesh, Chhattisgarh, Maharashtra, Odisha, and Telangana made the Dandakaranya Region (DKR) an ideal base for the Maoists, with Bastar as their main hub.
- **Marginalised tribal inhabitants –** Tribals faced poverty, displacement, and lack of basic services, making them vulnerable to Maoist mobilization.
- **Exclusive tribal belts policy –** Official restrictions on outside intervention reinforced isolation, limiting development and governance outreach.
- **Governance deficit –** It was the most crucial factor that enabled the Maoists to expand and establish their parallel government.
- **Political & structural factors –** Land alienation, corruption, and stalled reforms deepened discontent and widened the governance vacuum.

What are the key factors contributing to the decline of Maoism?

- **Civil administration inroads –** The setback to Maoism is linked to the civil administration entering remote areas once controlled by Maoists.
- **Establishment of security camps** – The game-changing initiative of the government has been the establishment of security camps in the remote areas, regions of erstwhile Maoist domination.
- **Resistance & Acceptance** – Initial attempts to establish camps did face local resistance, however, local resistance subsided following the benefits (security, services, development) that accrued to the local population.

What are advantages of establishing security camps in affected areas?

- **Enhanced the security footprint –** Security camps increased police presence in remote areas, a boost in police to population ratio prevented the Maoists from operating with impunity.
- **Reduced reaction time –** The security forces can now respond to emergencies much faster, forcing the Maoists onto the defensive and boosting the forces' confidence and higher motivation morale.
- **Psychological advantage –** The local population witnessed the security forces gaining an upper hand, which was also a psychological setback to the Maoists.

- The local population is more assured now that the wherewithal for their welfare and development is with the government and not with the Maoists.
- **Improved Human Intelligence (HUMINT) –** The cascading effect of the advantages gained by security forces improved the HUMINT scenario for the forces in a zero-sum manner.
- **Infrastructure development** – The camps have also seen the construction of roads, and erection of mobile towers, thereby transforming the local lifestyle.
- **Civil administration support –** The governance has expanded by relying on security camps in remote areas.
- **Direct outreach –** Local people is now seeing officials (collector, tehsildar, patwari) reaching out to them.
- **Consolidated progress –** Security camps have enabled sustained development and administration, making the future promising.
- **Outcome –** Maoist influence has weakened considerably, with their capacity to recruit, acquire arms, and secure funding greatly diminished.
- Numerous cadres and leaders have surrendered or been neutralised by security forces, suggesting that the physical presence of Maoism is nearing its end.

What are the challenges in addressing Maoism?

- **Structural issues –** Sustainable resolution requires tackling deep-rooted socio-economic and governance deficits.
- **Emergence of rights-based issues –** As local communities come out of isolation, issues of land, livelihood, and tribal rights will gain prominence.
- **Shift in Maoist leaders' approach –** Several surrendered leaders, declaring their intent to continue the tribal struggle through democratic means.
- **Government's responsibility –** The state faces a complex task that demands transparent, sensitive, and mature handling to prevent resurgence.

What lies ahead?

- **Implementation of Constitutional guarantees** – The acts like the Panchayats Extension to Scheduled Areas (PESA) and Forest Rights Act (FRA) should form the basis of future policy.
- **Strengthening civil administration** – Civil administration, in most of the areas that had minimal governance, has to start from scratch.
- **Long-term planning (Vision 2047)** – Establish a dedicated task force with a roadmap till 2047 under the Viksit Bharat vision.
- **Acknowledging role of security forces** – They have worked, made sacrifices and managed the conflict well, giving a platform to the government to carry forward the mission for sustainable peace.

9.3 NATGRID

NATGRID, originally conceived after the 26/11 attacks to prevent intelligence failures, has now evolved into a mass surveillance tool that risks undermining privacy, accountability, and democratic oversight.

What is NATGRID, and how has it evolved over time?

- **National Intelligence Grid (NATGRID)** – It is a ***public–private counter-terrorism initiative*** of the central government.
- It is a secure, integrated intelligence-sharing platform between Intelligence Agencies and E-Governance organizations of India.
- It deals with integrating databases from different governments, quasi-government, as well as private organisations of Indian e-governance.
- **Goal –** To strengthen India's internal security by enabling counter-terrorism, criminal investigations, and national security coordination through real-time intelligence sharing.
- **Nodal Ministry –** Under the Ministry of Home Affairs.
- **Legal Basis –** Section 5(2) of the ***Indian Telegraph Act, 1885***, which allows interception during "public emergency" or "public safety" concerns.

- **Premise –** It is a ***middleware platform*** that would allow 11 central agencies to query databases across 21 categories (not an agency itself, but a tool for agencies to query data legally).
- These databases come from providers covering identity & assets, travel & movement, financial records, and telecom data.
- **Origins in 26/11 attacks –** NATGRID was proposed to aggregate fragmented intelligence data (travel records, financial transactions, telecom data) to prevent lapses like those seen during the Mumbai terror attacks.
- It was cleared in 2012 by executive order, not through Parliament, raising constitutional concerns.
- **Function –** It provides a 360-degree view of suspects/events by integrating fragmented data.
- It enables early warning systems and faster identification/prosecution of terror suspects.
- It gives agencies real-time access to key records (immigration, banking, telecom, travel, etc.) to strengthen law enforcement and intelligence work.
- **Significance –** Among the institutional expansions after 26/11, the ***technological crown jewel*** was the National Intelligence Grid (NATGRID).

What happened in NATGRID's 2025 expansion?

- **Expansion of scope –** The first report (after national conference of Directors General of Police in Raipur, Nov, 2025), States were asked to "scale up" NATGRID usage.
- Initially limited to 11 central agencies, now the access has ***expanded to state police units***, including officers at the Superintendent of Police level.
- **Integration with NPR** (National Population Register) – NPR contains details of 1.19 billion residents, mapping households and identities, it is politically sensitive due to NRC debates.
- By linking NPR with NATGRID shifts the paradigm from tracking discrete events as intelligence inputs to the mapping every Indian citizen, raising fears of citizenship filtering and profiling..
- **Advanced analytics** – The deployment of "***Gandiva***", an analytical engine capable of entity resolution, facial recognition, and large-scale inference.
- This moves NATGRID beyond a "search bar" into predictive surveillance, where algorithms infer intentions.
- **Recruitment drive –** New posts were announced - Director-II and Assistant Directors (Project Management, Transit Accommodation, Relationship Management, Capacity Building).
- All positions filled on deputation only, signaling a closed, internal expansion.
- **Operational surge –** NATGRID activity spiked to around 45,000 monthly data requests, showing its growing role in real-time intelligence.
- **Database integration** – It has been integrated with the Passport Seva Programme & Bureau of Immigration, while efforts are underway to connect it with the Crime and Criminal Tracking Network System (CCTNS), enabling nationwide access to police FIRs.

What are the critical concerns about NATGRID?

- **Bias in algorithms** – Algorithms don't just reveal truth; they replicate distortions in the data they process.
- If policing is already skewed by caste, religion or geography, analytics will harden those inequities and wrap them in an aura of objectivity.
- **Impact varies by social position** – For the affluent, a false positive is an administrative nuisance.
- For marginalized groups, already under suspicion, a misidentification can lead to serious ordeals or even fatal consequences.
- **Tyranny of scale –** Modern analytics is dangerous not for omniscience but for ubiquity; queries are classified by sensitivity, and officials claim every access is logged and justified.
- Tens of thousands of queries logged each month, without independent oversight risks turning safeguards into clerical rituals.
- **Life & death claim –** Supporters often argue that NATGRID is essential for national survival, is a matter of life and death. Yet, its drift from counter-terrorism into everyday policing raises doubts.
- **Intelligence failures –** It often arise not from data shortages, but from institutional weakness, perverse incentives, inadequate training, and lack of accountability (e.g., 26/11 - local police hadn't trained with firearms for over a year).

- **Privacy rights –** Our constitutional courts have grown inactive, leaving the broad privacy protections from the ***K.S. Puttaswamy (Retd.) & Anr. vs. Union of India & Ors, 2017*** judgment unused, even as the surveillance state continues to expand.
- **Legality of intelligence programmes –** It lacks any clear statutory foundation or meaningful oversight has not been squarely adjudicated, despite multiple pending cases.
- **Broad "National Security" Clause –** Section 5(2) of the Telegraph Act allows interception during "public emergency" or "public safety," but these terms are vague and open to misuse.
- **Public temper & political rhetoric** – Political discourse and cultural moulding, including mainstream cinema that treats questioning the security establishment as heresy.
- It creates silence on accountability, even after tragedies like the New Delhi bombing (Nov 10, 2025, 15 lives lost) and raises many uncomfortable question.
- **Data protection & security risks** – It integrates sensitive datasets (telecom, immigration, banking, police FIRs, etc.), but citizens don't know which private datasets are included, becomes a high-value target for hacking or insider leaks.
- **Exemption from RTI** – NATGRID is outside the scope of the Right to Information Act, reducing transparency.

What lies ahead?

- **Conditions for true prevention –** It requires professional investigation insulated from political whims, transparency about intelligence lapses, and oversight vested within the parliamentary and the judiciary.
- **Without these safeguards –** NATGRID is an architecture of suspicion, built in the name of safety and normalised through fear, but functioning in the service of digital authoritarianism.

9.4 CERT-In: India's Frontline Defender against Cyber Threats

As online fraud, phishing, ransomware, AI-driven scams, and threats to vital digital systems grow, the Government of India created CERT-In to fight cyber risks, anticipate future challenges, boost resilience, and keep India's digital progress secure, inclusive, and sustainable.

What about CERT-In?

- **Indian Computer Emergency Response Team (CERT-In)** – It is the national nodal agency responsible for ***responding to cybersecurity incidents in India.***
- **Established on** – January 19, 2004.
- **Operates under** – Ministry of Electronics and Information Technology (MeitY).
- **Legal mandate** – Section 70B of the Information Technology (IT) Act 2000.
- **Significance** – It provides the institutional depth for national cyber defence, protects India's rapidly expanding digital ecosystem and supports confidence in digital platforms and services.

How has India's digital ecosystem developed in recent years?

- **Expanding Digital Footprint** – Over the past decade, India's digital presence has grown rapidly due to internet access, smartphones, and public digital services.
- **Internet connections** – Reached 100.29 crore in 2025 (***crossed the milestone of 100 crore***), up from 25.15 crore in 2014.
- **Data usage** – Average monthly use per wireless subscriber rose 399 times—from 61.66 MB (2014) to 24.01 GB (2025), among the ***highest globally.***
- **Digital Payments Boom** – India's strong digital base has fueled rapid growth in digital payments, with the *Unified Payments Interface (UPI)* emerging as the *backbone* of the country's payment ecosystem.
- In December 2025 alone, UPI processed over 21 billion transactions valued at more than Rs.27 lakh crore.
- **Government Response** – To address these risks, the Union Budget 2025–26 allocated Rs.782 crore for cybersecurity, underscoring the government's strong focus on securing India's digital infrastructure.

What are the core functions of CERT-In for the National Cybersecurity?

- **Promoting cybersecurity awareness** among organisations and citizens,
- **Facilitating information sharing** through its automated cyber threat exchange platform,

- **Sharing near-real time information** on existing and potential cyber threats across all sectors,
- **Collaborates internationally** with partners, industry, and academia, and coordinate for mitigation measures,
- Conducts regular training programmes, drills, and exercises.
- **Operating CSKs** for cyber hygiene and a Command & Control Centre for monitoring threats.
- **Institutionalising** responsible vulnerability disclosure
- **Supporting** incident investigations and assists law enforcement with cyber forensics.
- Guides organisations in implementing Cyber Crisis Management Plans (CCMP) to boost national preparedness.

What are the key achievements of CERT-In in 2025?

- **National Cyber Incident Response & Threat Intelligence –** In 2025, it handled over 29.44 lakh cyber incidents, issued 1,530 alerts, 390 vulnerability notes, and 65 advisories, and published 29 Common Vulnerabilities and Exposures (CVEs),
- **Cybersecurity Audits** – Empaneled 231 certified security audit organisations, with most audits focused on banking, finance, power, energy, and transport sectors to strengthen cybersecurity across government, public, and private ICT systems.
- **Capacity Building** – Organised 32 technical training programmes and 95 awareness sessions, trained 20,799 officers and cybersecurity professionals from government, PSUs, and industry.
- **Cybersecurity Drills & Preparedness** – Organised 122 cybersecurity drills/exercises (including tabletop).
- Participation from 1,570 organisations across defence, paramilitary, space, atomic energy, telecom, finance, power, oil & gas, transport, IT/ITeS, and state data centres.
- **Awareness Initiatives** – CERT-In conducted 95 awareness sessions covering 91,065 participants (including *National Cybersecurity Awareness Month (NCSAM) October 2025*).
- **Reports & Guidelines (2025)** – Includes Smart City Cybersecurity Guidelines, India Ransomware Report, Digital Threat Report 2024 for BFSI, Cyber Smart Kids Guide & Senior Citizens Best Practices, etc.

What are the key institutional structures supported by CERT-In?

- **Cyber Swachhta Kendra (CSK)** – The CSK Botnet Cleaning and Malware Analysis Centre is established to enhance cyber hygiene among citizens.
- It tracks network of infected devices (computers, mobiles, IoT, routers) and provides free tools and guidance for malware removal, works with industry, academia, and ISPs to alert users.
- **Coverage** (Dec 2025) - 98% of India's digital population, engaging 1,427 organisations onboarded; 89.55 lakh tool downloads.
- **Security Assurance Framework –** To strengthen the security of government and critical sector systems.
- Under this framework certified IT security audit organisations conduct regular audits, vulnerability assessments and penetration testing are undertaken.
- **National Cyber Coordination Centre (NCCC)** – It was implemented to monitors cyberspace at metadata level to detect potential cybersecurity threats for situational awareness.
- It facilitates real-time information sharing and supports timely preventive and response actions with States and organisations.
- **Computer Security Incident Response Teams (CSIRTs)** – CERT-In oversees a network of CSIRTs operating at the sectoral and State/UT levels. Sectoral CSIRTs support domains such as finance, power, and telecom, while State CSIRTs operate under respective State and UT governments.
- **Cyber Crisis Management Plan (CCMP)** – It provides structured guidance during major cyberattacks and cyber-terrorism incidents, to supports rapid response, recovery, and continuity of essential services, particularly for critical infrastructure.
- **CSIRT-Fin (Financial Sector) –** It is the dedicated Computer Security Incident Response Team for the *Banking, Financial Services, and Insurance (BFSI) sector*, which strengthens cybersecurity through coordinated incident response, information sharing, and sector-specific guidance/support.

- **CSIRT-Power (Power Sector) –** It functions as an extended arm of CERT-In for the Power Sector, focuses on incident analysis, threat intelligence, audits, and vulnerability mitigation and works with CSK to address malware infections and enhance resilience.

How about the global recognition of India's cybersecurity leadership?

- **Growing International Standing** – India's cybersecurity efforts resonate globally due to CERT-In's scale, tech-driven approaches, and collaborative governance have positioned India as a credible and responsible stakeholder in the international cybersecurity ecosystem.
- **Global Cybersecurity Outlook, 2025** – Published by the World Economic Forum (WEF), highlighted CERT-In's AI-driven situational awareness systems for detecting malicious domains and phishing, and its real-time global threat intelligence sharing.
- **Cyber Resilience Compass Paper, 2025** – Published jointly by the WEF and the University of Oxford, CERT-In contributed to identifying seven critical domains of cyber resilience.
- **Joint AI Risk Report, 2025** – It was co-signed with France's ANSSI and other partners, advocated a risk-based approach for trusted AI systems, secure AI value chains, and address emerging AI-related cyber risks.

What lies ahead?

- Amid rising and complex cyber threats, CERT-In anchors India's cybersecurity ecosystem by identifying and mitigating risks, it has strengthened national cyber resilience.
- Its initiatives include institutional frameworks, sectoral & state CSIRTs to citizen centric awareness programmes to promote safe digital practices.
- International recognition of its AI-driven innovations highlights India's growing global leadership in cybersecurity.
- Collectively, these efforts reaffirm the Government of India's commitment to a safe, trusted, and secure digital future.

G.S PAPER IV

10. ETHICS

10.1 Acid Attacks in India – A Growing Crisis and the Struggle for Justice

Acid attacks in India continue to be a horrific form of gender-based violence that leaves victims physically and psychologically scarred.

What are Acid Attacks?

- **Definition** – An acid attack is a violent assault in which a corrosive substance, typically *sulphuric, hydrochloric, or nitric acid*, is thrown onto a person, often targeting the face.
- **Effects** – These attacks can cause devastating physical injuries, including severe burns, scarring, blindness, and permanent disfigurement.
- The victims often endure not only physical suffering but also intense psychological trauma and social stigma.
- **Motivation for such attacks** – Acid attacks are frequently motivated by personal grievances such as rejection of romantic or sexual advances, dowry disputes, suspicions of infidelity, or domestic abuse.
- While women and young girls remain the primary victims, men are not exempt from these attacks.
- **Vulnerability** – The attacks disproportionately affect those from disadvantaged backgrounds, as they may lack the resources to seek medical treatment or legal recourse.

What is status of prevalence of acid attacks in India?

- **NCRB report** – According to data from the National Crime Records Bureau (NCRB), India saw 207 reported acid attack cases in 2023, marking an increase from 202 in 2022.
- Additionally, 65 cases of acid attack attempts were recorded.
- Despite the high number of reported cases, experts believe the actual number of incidents is significantly higher, with many going unreported due to societal stigma and fear of retaliation.

- **Geographical variations** – Acid attacks are particularly prevalent in certain regions of India, including West Bengal, Uttar Pradesh, and Gujarat, where industries using acid are located.
- The geographical spread of acid attacks is linked to the easy availability of acid in areas where industries such as textiles and rubber are prevalent.
- This raises concerns about the implementation of regulations on acid sales.
- **A Comparative Perspective –** In contrast to India, neighboring Bangladesh has made remarkable progress in reducing acid attacks through stringent laws and proactive measures.
- Since the passage of a comprehensive law in 2002, which includes a complete ban on the open sale of acid, and public awareness campaigns, the number of acid attacks has drastically reduced.
- From 494 recorded attacks in 2002, Bangladesh reported only 13 attacks in 2024.

What are the legal framework and judicial challenges?

- **Laxmi vs Union of India –** The ruling resulted in amendments to the Indian Penal Code (IPC), criminalizing acid attacks and moving the crime out of general injury sections.
- **Bharatiya Nyaya Sanhita of 2023** – Acid attacks are punishable by a minimum of ten years to life imprisonment and a fine to cover the victim's medical expenses.
- The law also mandates that all hospitals provide free medical treatment to acid attack survivors, and the sale of acid must be regulated by requiring photo identification for buyers and maintaining records by sellers.
- **Weak implementation** – However, the implementation of these provisions is often weak, with cases of illegal acid sales and lenient enforcement of regulations remaining widespread.
- **Institutional delays** – Despite these legal provisions, survivors like Shaheen Malik continue to face long delays in trials, lack of judicial sensitivity, and an overreliance on out-of-court settlements.
- The case against her assailants dragged on for 16 years, and even after her personal fight for justice, she has yet to see a conviction.

What are the struggles faced by survivors?

- **Struggle for survival** – Survivors of acid attacks often find themselves in a battle not only for justice but also for survival.
- **Legal battles** – The legal process is slow, and victims frequently encounter shoddy investigations, insensitive judicial treatment, and insufficient legal support.
    - **For instance,** in 2023, the NCRB reported that of the 113 acid attack cases under investigation, only 16 resulted in convictions, and 27 were acquitted.
- **Other concerns** – The system is burdened by judicial delays, poorly handled cases, and a culture of victim-blaming that only worsens the plight of survivors.

What are the steps needed to combat acid attacks and support survivors?

- **Strengthening Acid Sale Regulations** – The sale of acid must be better regulated, and more stringent penalties should be imposed for illegal sales.
- Local authorities should be held accountable for failing to enforce these regulations, as is the case in Bangladesh, where swift action is taken against shops selling acid without proper documentation.
- **Judicial Reforms and Fast-Track Courts** – To ensure timely justice, the government must establish fast-track courts for acid attack cases and introduce harsher penalties for judicial delays.
- Judges should be sensitized to the unique challenges faced by survivors, and prosecutors must be trained to handle such cases with the seriousness they deserve.
- **Support and Rehabilitation for Survivors** –Survivors need access to prompt compensation, medical treatment, and psychological support.
- The Justice J.S. Verma Committee's recommendation for a national fund to cover lifelong medical, psychological, educational, and vocational rehabilitation for survivors must be implemented immediately.
- **Public Awareness and Education** – Public awareness campaigns are essential to changing societal attitudes toward acid attack survivors and reducing the stigma they face.
- Education about gender-based violence and the severe consequences of acid attacks must be integrated into school curricula and public discourse.

- **Legal Aid and Counseling** – Survivors should have access to free legal aid, counseling services, and shelters where they can find refuge.
- This support will empower victims to seek justice without fear of reprisal or social isolation.

What lies ahead?

- The battle against acid attacks in India is far from over. While legal reforms have made strides, the implementation of these laws remains inadequate.
- The persistence of acid attacks and the low conviction rates are a testament to the deep-rooted challenges faced by survivors and the systemic failures of the justice system.
- A comprehensive, multi-pronged approach is needed, combining stringent regulations on acid sales, judicial reforms, victim support, and public education.
- Only then can India hope to reduce the incidence of acid attacks and ensure justice for its survivors, like Shaheen Malik, who continue to fight for their rights.

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