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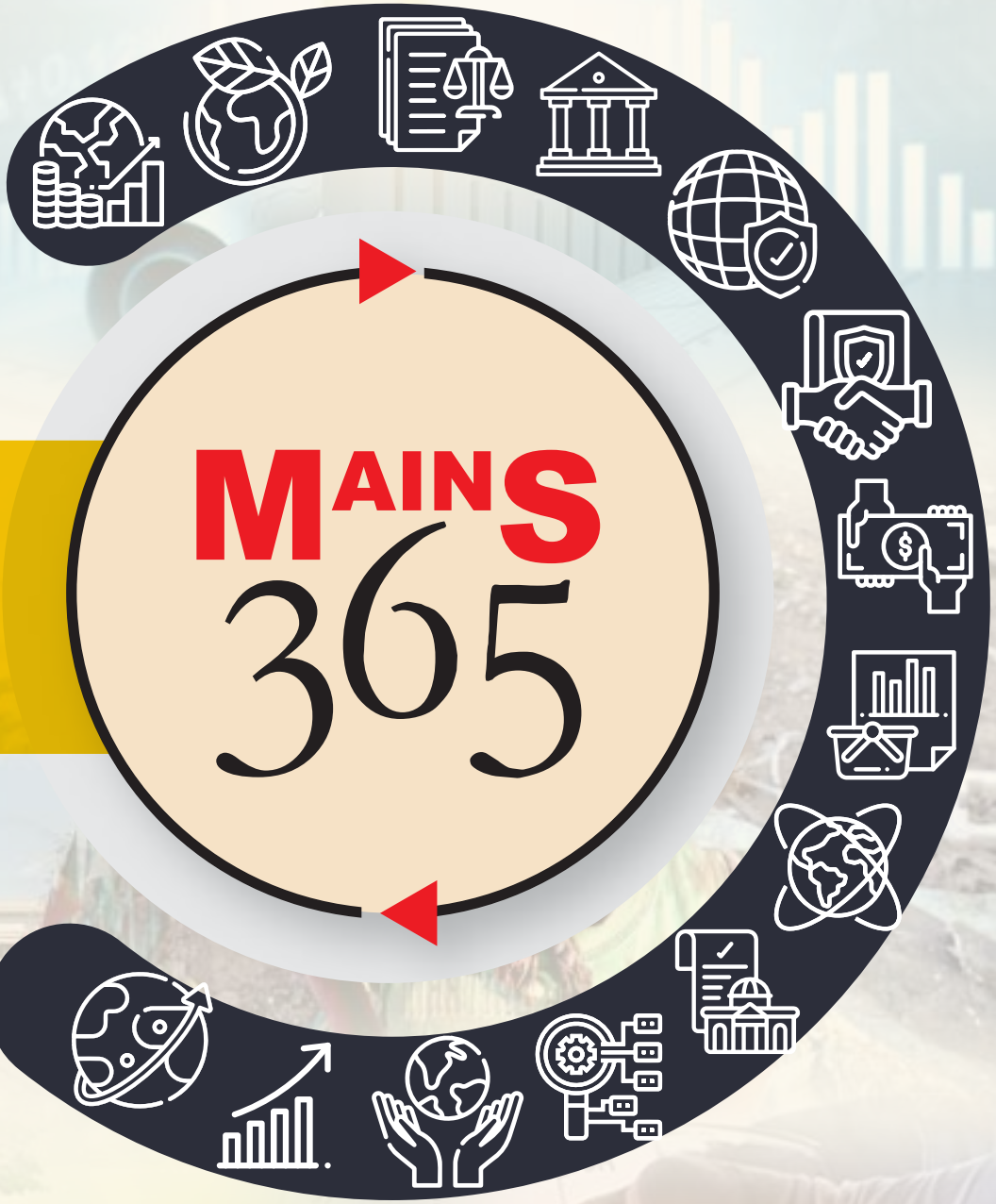

MAINS 365

UPDATED CLASSROOM STUDY MATERIAL

(June 2023 and July 2023)

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UPDATED CLASSROOM STUDY MATERIAL

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1. POLITY AND GOVERNANCE

1.1. UNIFORM CIVIL CODE

Why in the news?

Recently, the 22nd Law Commission of India (LCI) sought suggestions from various stakeholders on a Uniform Civil Code (UCC).

About Uniform Civil Code (UCC)

- A UCC provides for the formulation of **one law for the entire country, which would apply to all religious communities** in their personal matters such as marriage, divorce, inheritance, adoption, and succession.
  - Currently, Indian personal law is complex, with **each religion adhering to its specific laws**.
    - ✓ For instance, **Hindu Succession Act 1956** governs Hindus, Sikhs, Jains and Buddhists; **Muslim Personal Law** governs Muslims; and **Indian Succession Act 1925** applies to Christians, Parsis, and Jews.

Background of UCC

Pre- Independence Period	Post- Independence Period
‣ **Lex Loci Report (1840)** Emphasized the **importance of uniformity in codifying Indian law related to offenses, evidence, and contracts.** But recommended that **personal laws of Muslims and Hindus should not be codified.** ‣ **B N Rau Committee (1941)** Recommended a **codified Hindu law** which would give equal rights to women.	‣ **Special Marriage Act, 1954** Have provision for **civil marriage for people of India and all Indian nationals in foreign countries,** irrespective of religion or faith followed by either party. ‣ **Four major enactments on Hindu Law** Viz. Hindu Marriage Act 1955, Hindu Succession Act 1956, Hindu Minority and Guardianship Act 1956, Hindu Adoption and Maintenance Act 1956.

- Earlier, the Law Commission had furnished a **consultation paper on "Reform of Family Law" in 2018,** which stated that
  - A **UCC was "neither necessary nor desirable at this stage"**.
  - It recommended that **existing family laws across religions required to be amended** and **codified to tackle discrimination, inequality** in personal laws and **limit "ambiguity in interpretation"** and application.
- **Goa** is the only place in India where a form of common civil code is in practice, **the Portuguese Civil Code of 1867.**

Arguments in favour of UCC

- **Constitutional Mandate:** Article 44 under Directive Principles of state policy.
- **Promotes Secularism:** Implementing a UCC would **uphold the principles of a secular state**, where religious beliefs do not dictate civil matters.
- **National unity and integration:** UCC would **foster national unity by transcending religious and community divisions,** promoting common citizenship, and creating a more unified legal system.

Important Judicial Pronouncements related to UCC

- **Ahmed Khan v. Shah Bano Begum and others (1985):** Parliament should **outline the contours of a common civil code.**
- **Sarla Mudgal v Union of India (1995):** Reiterated the need for parliament to implement UCC.
- **Shayara Bano v Union of India (2017):** SC held that **practice of talaq-e-biddat** or instantaneous triple talaq is unconstitutional.

- **Gender Justice:** Promotes gender equality and women's rights by **eliminating discriminatory practices** in certain religious personal laws.
  - **United Nations Human Rights Committee (UNHRC)** has called on India to implement a UCC that would help India to **demonstrate its commitment to the principles of equality and non-discrimination.**
- **Simplification of Laws:** UCC will **simplify the complex laws** around marriage ceremonies, divorce, inheritance, succession etc.
  - For example, individuals seeking a divorce would follow a standardised procedure, irrespective of their religious background, ensuring faster and more efficient resolution of disputes.

- **Adapting to Modern Times**: Implementing a UCC would enable the incorporation of **modern principles and ensure that laws align with the evolving social landscape, promoting inclusivity** and individual freedoms.

Arguments against UCC

- **Against Diversity**: Imposing a UCC could **undermine the cultural and religious identities of different communities** of the country and could **violate religious freedom** (Article 25 of the Constitution).
  - Imposing a common civil code may **dilute the unique rights and protections enjoyed by minority groups and erode their cultural autonomy**.
- **Lack of Consensus**: Each community has traditions, customs, and religious laws they wish to preserve. **Implementing a UCC without the consent** and agreement of all communities could **lead to social unrest.**
- **Federal Structure:** Several experts argued that UCC could encroach upon states' legislative competence, thereby infringing on principles of cooperative federalism.
  - It is argued that **states are better positioned to assess and legislate personal laws** to suit their people's needs, given their proximity to grassroots realities.

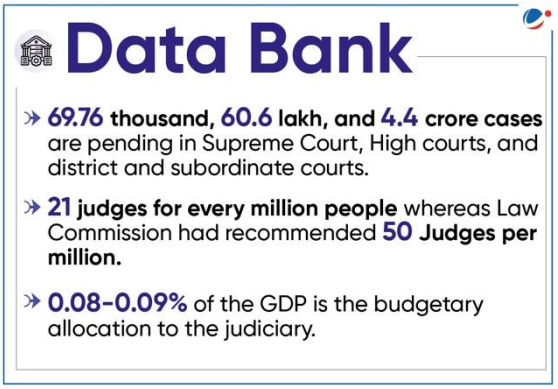
Way forward

- **Consensus**: Government must engage in a constructive dialogue with all stakeholders, including religious leaders and community representatives.
- **Strong Political Will**: Government must ensure that the **implementation of UCC is not used as a tool for political gains** and that it is undertaken in a non-partisan and inclusive manner.
- **Awareness**: The **common citizen must understand the rationale behind UCC and benefits**. This will require a concerted effort by the government, civil society, and the media to sensitise the public on this issue.
- **Eradicating discrimination:** It is essential that UCC requires a thorough review of the existing personal laws to **ensure that UCC is in line with the principles of justice, equality, and non-discrimination**.
- **Adopting a piecemeal approach**: The goal of a UCC should ideally be reached in a piecemeal manner, like the **recent amendment** on the age of marriage. This could also pave the way for internal reform and change within the religious dispensation.
  - Certain Indian laws already follow a **uniform code in most civil matters** – Indian Contract Act, Civil Procedure Code, Partnership Act, Evidence Act etc.
- **Codification of all personal laws:** By codifying laws, one can establish **universal principles that promote fairness** instead of enforcing A rigid uniform code, which may deter people from resorting to legal recourse, as marriage and divorce matters can be resolved through extrajudicial means.

1.2. JUDICIAL PENDENCY

Why in the news?

The Ministry of Law and Justice recently informed the Rajya Sabha that over 5.02 crore cases were pending in various courts.



Reasons for the pendency of cases

- **Low ratio of judges to population** and **delay in filling the vacancies** of judicial officers and judges.
- **Frequent Adjournments**: The laid down **procedure of allowing a maximum of three adjournments per case is not followed** in over 50 per cent of the matters being heard by courts, leading to rising pendency of cases.
- **Lack of infrastructure**: Court complexes **lack adequate funds, internet, lackadaisical working style of staff, and courtrooms** to occupy judges (if new appointments are made)
- **Delayed investigation**: Delay in processing both civil and criminal cases due to **non-availability of counsel, misaligned incentives, the complexity of facts involved**, nature of evidence etc. leads to rising judicial pendency.
- **Other issues**: abusing contempt of court power, improper courtroom behaviour etc.

Way forward

- **Appointment of judges**: Collegium should take adequate safeguards and transparency in selecting judges so that judges of high calibre and impeccable integrity are appointed to the higher courts.
  - An **all-India judicial services examination** can be considered to maintain high standards in the judiciary.
  - **Articles 224A and 128** of the Constitution can be invoked to appoint ad hoc Judges.
- **Promoting Alternative Dispute Resolution (ADRs)** mechanisms such as Lok Adalat, Arbitration, Mediation, Conciliation etc. for civil cases can helps to reduce the burden on courts and facilitate robust legal practice.
- **Strengthen infrastructure**: Government should provide adequate funds for developing and upgrading the judicial infrastructure, training judicial staff etc.
- **Setting a Time Limit:** A time limit should be set for hearing a case and deciding.
  - Consider and explore options for setting up fast-track courts and fixing time limits or deadlines for certain categories of cases, especially in subordinate courts.
- **Changes in criminal justice and procedural laws**
  - **Reduce the criminalization of violations** and move towards the compounding of minor offences.
  - **Reform forensics and ballistics testing** by outsourcing to accredited laboratories.
- **Grievance Redressal**: Government departments **must establish a strong internal grievance redressal mechanism and empower designated officers to decide** disputes between employees and departments.
- **Create a law-abiding society**: Introduce incentive and sanction-based models of motivation to ensure that citizens abide by the law.
  - Prohibitive penalties should be imposed to check traffic violations, civic violations including littering in public, first-time petty offenders, etc.

Initiatives taken to curb Judicial Pendency

- **Memorandum of procedure, 2016**: It has been under discussion to **bring transparency in judicial appointments** and **setting up a permanent secretariat in SC** for maintaining records of high court judges.
- **Project Sahyog** to reduce pending cases.
- **Legal Information Management and Briefing System (LIMBS)**, a web-based application for monitoring cases involving the central government of India, more effectively and transparently.
- **Mediation Bill, 2023** provides pre-litigation mediation by parties.
- **e-Courts** to improve access to justice using technology.
- **National Litigation Policy (NLP)** is under consideration to lay down guidelines for preventing, controlling and reducing litigation.
- **Administrative Mechanism for Resolution of Disputes (AMRD) to resolve** Inter-Ministerial/ Departmental disputes.
- **Fast Track Courts (FTCs)** are dedicated courts expected to ensure swift dispensation of justice.

1.3. CRIMINALIZATION OF POLITICS

Why in the news?

Association for Democratic Reforms (ADR) wrote to the Election Commission (EC) seeking action against parties that fail to publish details of criminal antecedents of candidates.

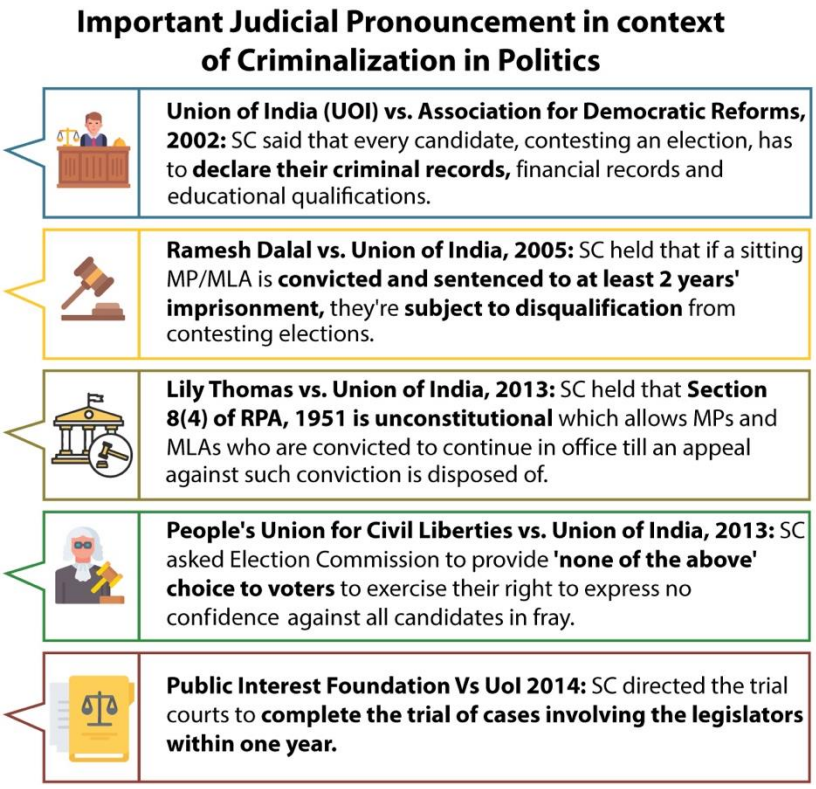
More on News

- In 2018, the Supreme Court, in the **Public Interest Foundation v. Union of India** case, **directed all political parties to publish the details of criminal antecedents of their candidates**, including **the reason** for selecting them.
- **EC issued directions to the parties**, both in 2018 and 2020, in compliance with the SC's orders, making it **mandatory for all parties to publish the details on their websites**.

Causes of Criminalization of Politics

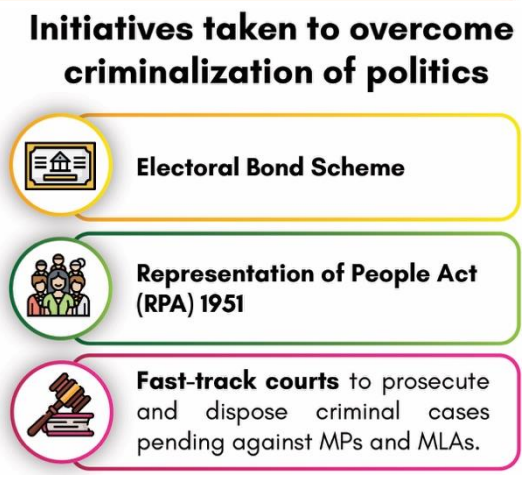
- **Winnability of candidates:** Political parties appear to be competing to field criminal candidates, as their **'winnability' is proven to be more**.
- **Delays in conviction of cases** can create loopholes that allow politicians with criminal backgrounds to hold public office.
  - **Nearly 5,000 cases are pending against politicians in Supreme Court**.

- **Legal loopholes:** Section 8 of RPA, 1951, bans convicted politicians from contesting. However, those facing trial, no matter how serious the charges, are free to contest.
- **Limited powers given to the Election Commission** to combat the menace of criminalisation. For instance, it has the power to register an association of people as a political party, but it cannot de-register a political party.
- **Money and muscle power:** Criminal elements often have access to substantial financial resources and muscle power, which they can utilise to **influence the political process**.
- **Lack of public awareness and education** among the public about the criminal backgrounds of politicians and their implications contributes to the perpetuation of criminalisation.



Consequences of criminalization

- **Lawbreakers getting elected as lawmakers** undermine the sanctity of the Parliament.
- **Loss of public faith and credibility** of the political system.
- **Negative impact on society** as it promotes a culture of crime and violence.
- **Against the principle of free and fair elections** as it limits the choice of voters to elect a suitable candidate.
- **Undermines the rule of law** as politicians with criminal backgrounds may engage in illegal activities, including corruption, and violence.



Way forward

- **Disqualification from contesting those facing serious charges:** EC has recommended that if a court of law has framed criminal charges against the accused of a **serious crime** (**punishment is not less than five years**), then it shall be **regarded as a reasonable ground for disqualification** of accused from contesting elections.
  - Also, SC had suggested that Parliament frame a law that makes it **obligatory for political parties to remove leaders charged with "heinous and grievous"** crimes like rape, murder and kidnapping.
- **State funding of elections:** It means the government extending financial assistance to political parties to contest elections in cash or kind, which will **curb the flow of unaccounted money, criminal influence, and corruption in public life**.
- **Amend RPA, 1951:** Filing a false affidavit should qualify as a 'corrupt practice' under the Act and be grounds for disqualification.
- **Establishing fast-track courts to expedite the trial of cases** involving politicians with criminal backgrounds.
- **Public awareness and educating citizens** about the importance of clean governance, the implications of voting for candidates with criminal backgrounds, etc., can empower them to make informed choices during elections.
- **Media should actively investigate and report on criminal backgrounds** and activities of politicians, creating public awareness and holding individuals accountable.

1.4. CITIZEN CHARTER

Citizen Charter at a Glance

- Citizen's Charter (CC) is a document which represents a **systematic effort to focus on the commitment of the Organisation towards its Citizens in respects of Standard of Services,** Non-discrimination and Accessibility, etc.
  - Its objective is to **empower the citizen in relation to public service delivery.** India adopted citizen's charter in 1997. It is **not legally enforceable and, therefore, is non-justiciable.**

Principles of Citizen Charter

- **Quality:** Improving the quality of services
- **Standards:** Specify what to expect and how to act if standards are not met
- **Choice:** For users wherever possible
- **Transparency:** Rules/Procedure/ Schemes/ Grievances
- **Accountability:** Individual and Organisations
- **Value:** For taxpayers money

Significance of Citizen Charter

- Tool to **achieve good governance** i.e., transparency, accountability and responsiveness of administration.
- **Provides services to the people in a time bound manner.**
- **Redressing grievances of public** and improving their lives.
- **Enshrines trust** between service provider and its users.
- **Reduce corruption.**

Initiatives taken for Citizen Charter

- **Department of Administrative Reforms and Public Grievances** (DARPG) initiated the task of coordinating, formulating and operationalising Citizen's Charters.
- In 2006, **Sevottam model was conceived by DARPG** to **improve the quality of public service delivery,** effective grievance redressal mechanism, and **successful implementation of Citizen's Charters in country.**

Steps for Sevottam model implementation

- **Define all services** and identify clients.
- **Set standards and norms** for each service.
- **Develop capability** to meet set standards.
- **Perform** to achieve standards.
- **Monitor performance** against set standards.
- **Evaluate the impact** through an independent mechanism.
- **Continuous improvement** based on environment and evaluation of results.

Challenges with Citizen Charter

- **Issues wrt design of CC:** It is **published in a difficult language, rarely updated,** and **devoid of participative mechanisms.**
- **Implementation challenges:** Not been adopted by all Ministries/Departments which overlooks local issues.
- **Lack of awareness regarding the charter,** and departments are reluctant in handing out punishments for non-compliance with it.
- **Lack in Accountability:** In most organisations, **no reporting and periodic review mechanism has been evolved** to assess its implementation.

Way Forward

- **Effort should be made to use local language** while formulating the Citizen Charter.
- **Effective monitoring and evaluation system ensures regular review** of performance on Charter and thereby make the organization participatory, responsive, and accountable.
- It is important to **include precision into standards and commitments** to **address the ambiguous vision** and mission statements.
- **Capacity building workshops should be organized** for enhancing the capacity of staff and effective implementation of charter.
- **Technology upgradation and incorporation for smooth implementation of rules** and guidelines and revision and updation of the information about Citizen's Charters.

1.4.1. GRIEVANCE REDRESSAL ASSESSMENT AND INDEX (GRAI)

Why in the news?

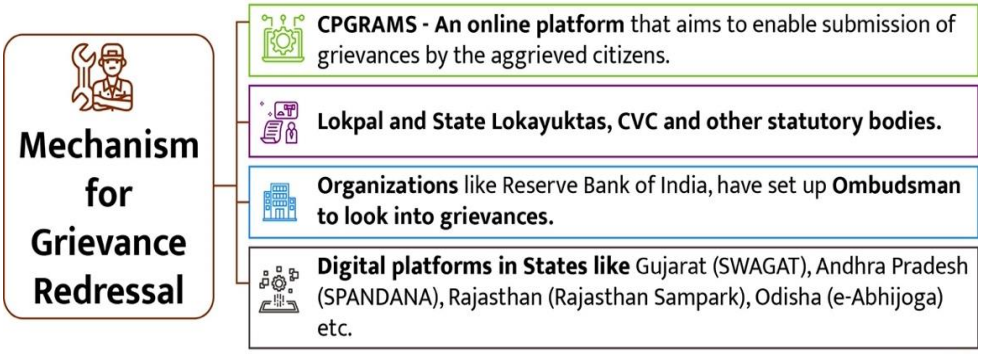
Union Minister of State for Personnel, Public Grievances and Pensions launched the Grievance Redressal Assessment & Index (GRAI) for 2022.

More about GRAI 2022

- GRAI 2022 was conceptualised and designed by **DARPG** under the Ministry of Personnel, Public Grievances & Pensions.
  - These reports **are part of the 10-step Centralised Public Grievance Redressal and Management System (CPGRAMS) reforms** that DARPG adopted to improve the quality of disposal of public grievances while reducing the time it takes to address these issues.
- **Objective of Index:** Present an **organisation-wise comparative picture** and provide **valuable insights about strengths and areas of improvement in the** Grievance Redressal Mechanism (GRM).
- **The index is based on 12 Indicators spread across four key dimensions -** Efficiency, Feedback, Domain, and Organisational commitment.
- **89 Central Ministries and Departments** were assessed and ranked based on a comprehensive index.
- **The average disposal time** of Central Ministries and Departments has **improved from 32 days in 2021 to 27 days in 2022.**

Grievance Redressal Mechanism (GRM)

- **As per the 2nd ARC Report,** GRM is one of the important mechanisms that can be used to make the **administration citizen-centric.**
- **GRM Principle:** If the promised level of service delivery is not achieved or a citizen's right is not honoured, then the citizen should be able to recourse to a mechanism to redress the grievance.



- **Benefits:** Feedback to improve service quality, transparency, and service delivery.
- **2 Nodal agencies handling public grievances: DARPG**, and **Directorate of Public Grievances**, Cabinet Secretariat.

Issues with the existing public grievance system

- **Low levels of awareness of the rights and duties of citizens**.
- **Overburdening judiciary:** Departments have an **unsatisfactory internal grievance redressal system for their personnel**, leading to minor issues being taken to court for resolution.
- **Non-Uniformity**: across organisations with respect to the framework, process, and capacity to handle grievances.
- **No statutory backup:** GRM is **not treated as mandatory** like RTI in many departments.
- **Lack of resources** and **shortage of staff**.
- **CPGRAMS is not behaving as a facilitator:** In several cases, the complainant was asked to **approach the state government. The grievance was disposed** of and not forwarded to the concerned state government.
- **Systemic Problems: Slackness in administration, low morale of services, inherent inertia**, absence of incentives, lack of proper authority and accountability.

Measures needed to strengthen GRM

- **Identification of Grievance Prone Areas**: Identify areas susceptible to corruption and/or grievance generation and conduct work audits of such areas.
- **Awareness among citizens:** Wide publicity through national, regional, and local media and through electronic media.
- **Attitudinal change in civil servants** through rewarding good work and awarding effective suggestions, and punishing deliberate negligence.
- **Recommendation of 2nd ARC**
  - **Public grievance officers** on the lines of Public Information Officers under the RTI Act. **(Statutory backup to GRM)**

- **All grievance petitions** received should be satisfactorily **disposed of by these officers within 30 days.**
- **Non-adherence** to the time limit should invite **financial penalties.**

- **Suggestions by Parliamentary Standing Committee on Personnel, Public Grievances, Law and Justice** (2021)
  - CPGRAMS should be **a facilitator** without impinging on the **nature of federalism.**
  - All Ministries are to undertake **a regular review** of grievances raised in print and electronic media.

1.5. CIVIL SERVICE REFORMS

Civil Services Reforms at a Glance

In India, present system of civil services was **created by British to promote and preserve the interests of British.** After Independence, **Sardar Vallabhai Patel insisted on continuation of Civil Services** and bureaucracy had been entrusted with key responsibility of nation-building.

Importance of Civil Services Reforms

- **Strengthening administrative capacity to perform** core government functions.
- Ensure **transparency and accountability** in decision making.
- To **implement welfare schemes** and brings **socio-economic transformation.**
- **Improve efficiency, effectiveness, professionalism, and democratic** character of a civil service.
- Promoting **better delivery of public goods and services.**

Initiatives taken to improve functioning of civil servants

- **Mission Karamyogi,** an **Integrated Government Online Training (iGOT) Platform,** to build future-ready civil service with the right attitude, skills and knowledge, aligned to vision of New India.
- **Aarambh** is first ever common foundation course for civil servants training.
- **National Training Policy to develop a professional, impartial and efficient civil servants** that is responsible to needs of citizens and ensure that they possess requisite knowledge, and skills.
- **Lateral entry** i.e. **Direct induction of domain experts at middle or senior levels** of administrative hierarchy.

Challenges with Civil Services Reforms

- **Tendency of a political executive to prefer loyalty over efficiency** in selecting civil servants to higher posts, has impacted their morale.
- **Lack of management capacity** to implement reforms.
- Performance records are mostly prepared by superiors leaving a lot of scope for **personal biases and prejudice.**
- **Absence of any systemic mechanism** to ensure an uninterrupted supply chain of motivation and strong sense of purpose.
- **Inappropriate transfer practices** due to interference of local politicians.

Way Forward

- **Surinder Nath Committee recommended** that performance appraisal should be primarily used for overall development of an officer.
- There must be a **Code of Ethics for civil servants and Model Code of Governance** as suggested by 1st ARC.
- No premature transfer should be allowed and there should be fixation of a minimum tenure for each post.
- Bring greater domain knowledge and **empower officers for more enlightened** and insightful decision-making.
- Focus on **external accountability mechanisms like citizen charters, social audits** and encourage outcome orientation among civil servants.
- Proper training should be provided right at induction level with an emphasis on **Empowered, Effective, Exploratory and Electronic Learning.**

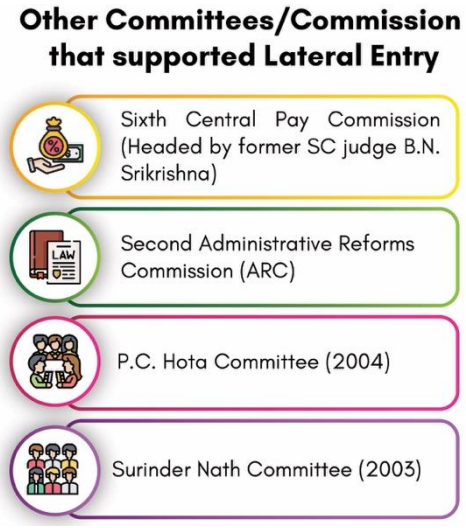
1.5.1. LATERAL ENTRY

Why in the news?

Recently, the Centre has decided to recruit various senior officers through **lateral entry mode.**

More about news

- Department of Personnel and Training (DoPT) has asked UPSC to induct senior officers in six departments at the level of **joint secretaries, directors and deputy secretaries on a contract basis**.
- This is the **fourth recruitment drive** proposed to be undertaken **since 2018,** when lateral entry was initiated. Usually, the posts of joint secretaries, directors, and deputy secretaries are held by officers of **all-India and Group A services, among others.**



About Lateral Entry

- Lateral entry, in the context of Civil Services, refers to the **induction of private sector specialists** in government departments.
  - These 'lateral entrants' become **part of the central secretariat** which in the normal course has only **career bureaucrats from All-India Services/ Central Civil Services.**
- **NITI Aayog**, in its three-year Action Agenda, and **Sectoral Group of Secretaries (SGoS) on Governance** in its report submitted in 2017, recommended the induction of personnel at **middle and senior management levels in the central government.**
- Lateral entry is also practised **by many countries** such as the UK, USA, Australia, Belgium and New Zealand.

Significance of Lateral Entry

- **Need for domain expertise and efficiency in administration**
- **Add a newer perspective:** Lateral entry will enable entry of people in the administration **who have "experienced" the government from the outside**. This can add a fresh perspective to government functioning.
- **Fosters competition** in the Government Sector.
- Potential to **disrupt any collusion between bureaucrats and politicians**, thereby **curbing corruption**.

Concerns related to Lateral Entry

- **May lead to Spoils System**: A mechanism through which **friends and supporters of the party in power** are employed and promoted in the ranks of civil service.
- **Concerns related to short tenure:** Short **three-year tenures raise concerns** about the effectiveness of bringing radical policy changes independently and hinder accountability.
- **Grassroots experience:** Experts in a specific field may **lack engagement with the common public** (**primary stakeholders** of a policy decision) at the grassroots level.
- **Absence of reservation:** Groups representing SCs, STs and OBCs have protested the fact that **there is no reservation** in these appointments.
- **Might not address existing constraints of the system such as frequent transfers, sub-optimal postings** (sometimes in positions diametrically opposed to the officer's expertise) and pressures exerted on them **from the political and social sphere**.

Road Ahead

- **Ensuring transparency** in the **recruitment process** so as to insulate lateral entrants from **any form of political or business patronage.**
- **Move towards longer tenures of lateral entrants**: It will allow them sufficient time to **settle, learn and implement their approach and blueprint** for work.
- **Deputation to the private sector:** A parliamentary panel had recommended the **deputation of IAS and IPS officers in the private sector** to bring in domain expertise and competition.

- **Weeding out Non-Performers**: A quinquennial review of the **work, conduct and integrity of every officer** should be **conducted by a high-level board** comprising retired officers as well as **Chief Secretary/Cabinet Secretary.**
    - If at the end of 15 years, three quinquennial reviews indicate a lack of **required competence**, it is better to give the officer an opportunity **to exit the system (with a proportionate pension).**

1.6. DIRECTORATE OF ENFORCEMENT

Why in the news?

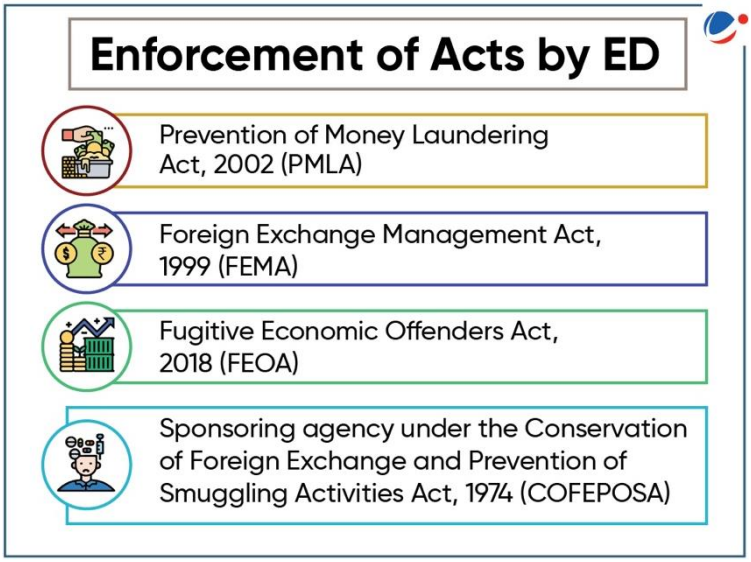
Recently, Supreme Court declared the **third extension given to the Directorate of Enforcement (ED) chief invalid**.

More on news

- **SC upheld the amendment to the Central Vigilance Commission (Amendment) Act, 2021, Delhi Special Police Establishment (Amendment) Act, 2021**, and the Fundamental (Amendment) Rules, 2021.
    - Amendments allow the **tenures of Directors of the Central Bureau of Investigation and the ED a maximum of three annual extensions**.
- However, the SC ruled that the **current ED chief's term extension was unlawful** for **violating the mandate of the Supreme Court's 2021 judgment,** wherein the court had barred further extensions.

About the Directorate of Enforcement (ED)

- ED is a **multi-disciplinary organisation** mandated to investigate **economic crimes and violations of foreign exchange laws.**
    - Works under **the Department of Revenue, Ministry of Finance**.
- **Appointment of Director of ED**
    - ED director is appointed as per **provisions of the CVC Act 2003.**
    - **Tenure should be "not less than two years,"** and any **transfer has to be sanctioned by the appointing committee chaired by CVC.**
    - The mandatory two-year appointment period is **followed by a maximum of three annual extensions** under the CVC Act of 2021.



Powers of the Directorate of Enforcement

- **Power to seize assets:** ED has the authority to **undertake "search and seizure" against any individual** based on information in the officer's possession and by establishing in writing exact "reasons to suspect".
- **Power to summon:** FEMA has empowered the ED to **hold an enquiry against any person/entity who is alleged to have committed a contravention** of the provisions of FEMA or rules and regulations made thereunder.
    - Moreover, under **ED has the same power as a civil court** regarding discovery, inspection, production of evidence, summons, examining, issuing commissions, etc.
- **Power to arrest**: ED can **investigate and make arrests for violation of** the Prevention of Money Laundering Act (PMLA) 2002 and FEMA 1999 without waiting for registration of a formal FIR by police.
- **Record Admissibility**: In 2022, the Supreme Court ruled that **statements recorded by ED officials can be admitted as evidence in court**, as they are not police officials and are **thus not subject to challenge on the grounds of being self-incriminatory**.
- **Recovery of Fines, Penalties and Arrears of Penalties**: ED can take necessary steps to recover fines, penalties, or arrears of penalties by the concerned person under the FEMA act.

Issues with the Directorate of Enforcement

- **Abysmal convictions rate:** From 2014-2022, ED's **conviction rate is as low as 0.5 per cent**.

- **Lack of transparency**: There is a **lack of clarity and transparency about ED's selection of cases to investigate,** which **exacerbates** perceptions of being used as a political tool by the ruling party.
- **Falling credibility: The image** of investigative agencies like ED, CBI, and SFIO has been tarnished by allegations of **corruption, lack of impartiality, and a close nexus with the political class**.
- **Lack of workforce**: ED needs more resources**, infrastructure, and workforce** to deal with rising complexities and economic offences.

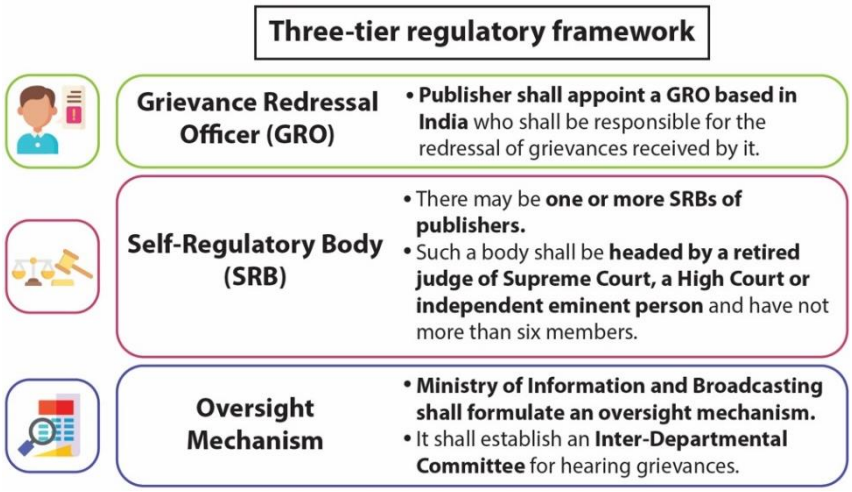
Way forward

- **Enhancing capacity:** ED requires an increased workforce and proper training in modern technology to effectively address the surge in high-value money laundering, cybercrimes, and cryptocurrency-related cases.
- **Regulation:** The discretion exercised by ED under PMLA should be **guided by the rule of law** and must be transparent, non-arbitrary and based on facts of the case rather than politically motivated.
- **Reducing Pendency:** Measures such as Fast Track courts and special benches should be constituted to expedite the adjudication process.
- **Oversight Committee:** A committee should be constituted to **overlook and streamline the case selection process** based on objective criteria and to boost transparency in the functioning of the ED.
- **Awareness and Protection:** Public **awareness should be generated about the ED's role**, reform its image, and **encourage whistleblowers to come forward**.

1.7. OTT REGULATION IN INDIA

Why in the news?

Recently, Digital Publisher Content Grievances Council has recommended punitive action on an OTT platform invoking the Information Technology (IT) Rules (2021).



What is OTT?

- **OTT or Over The Top Platforms** are services that **offer viewers access** to movies, TV shows and other media **directly through the Internet, bypassing cable or satellite systems**.
- India's OTT viewership stands at 43 million people and is projected to rise to 50 million by the end of 2023.
  - Also, increasing **mobile broadcasting** will create a big push for new content creation.
- In India's regulatory parlance, OTT platforms are called **'publishers of online curated content'**.
  - Online curated content is **audio-visual content** such as films, web series, podcasts etc., made available to the **viewers on demand**, but not limited through subscription by OTT platforms.
  - "On-demand" means a system where a **user is enabled to access, at a time chosen by them, any content** in electronic form, which is transmitted over a computer resource and is selected by the user.

Current mechanism for OTT regulation in India

- **Existing Laws**: Certain laws, such as the IT Act 2000, Indian Penal Code 1861, and Indecent Representation of Women (Prohibition) Act 1986 have been **made applicable to the content generated on OTT Platforms.**
- **New IT Rules 2021**: Government has developed **IT (Intermediary Guidelines and Digital Media Ethics Code) Rules 2021** under section 87 (2) of the IT Act, 2000. Its key provisions include:
  - Rules gave **Ministry of Information and Broadcasting (I&B)** the task of regulating content on OTT and online platforms.
  - **Code of Ethics for online news, OTT platforms and digital media:** This Code of Ethics prescribes the guidelines to be followed by OTT platforms and online news and digital media entities.
  - **Self-Classification of Content**: OTT platforms would self-classify the content into **five age-based categories**.

U (Universal)	U/A 7+	U/A 13+	U/A 16+	A (Adult)

  - **Parental locks**: Platforms would be required to **implement parental locks for content classified as U/A 13+ or higher,** and reliable age verification mechanisms for content classified as "A".
  - **Co-Regulation Approach**: India's approach to OTT regulation can be termed as a **light-touch 'co-regulation' model** where there is **'self-regulation'** at the industry level and final **'oversight mechanism'** at the Ministry level.
  - **Grievance Redressal Mechanism**: **A three-level** grievance redressal mechanism has been established under the rules with different levels of self-regulation. (refer image)
- Also, the Centre looks to regulate the content on digital platforms under the proposed **Digital India bill.**

Challenges associated with OTT regulation

- **Freedom of expression**: Regulating it too strictly could stifle creative freedom and limit artistic expression.
- **Low compliance**: Rules mandate the display of contact details relating to the grievance redressal mechanism on the OTT website/interface. However, compliance is very low.
- **Privacy and data protection**: Balancing the need for data protection and user privacy with requirements of regulation.
- **Jurisdictional issues**: Effective enforcement of domestic redressal mechanisms against foreign entities remains a concern.
- **Difficult to monitor and ensure compliance**: Due to the vastness of the digital space, the sheer volume of content being generated, and the rapid pace.

Way ahead

- **Need for national broadcasting policy**: Various broadcasters like media broadcasters, OTTs etc. have different mechanisms, regulations, and tariffs. So, there is a need for a national broadcasting policy.
- **Recognising distinction between online content from conventional**: Web content embraces liberalization, exploring unconventional themes beyond traditional media, thus **defying censorship norms, and fostering innovation and creativity**.
- **Awareness about provisions**: OTT industry associations could be mandated to run periodic campaigns in print and electronic media about the grievance redressal mechanism.
- **Regular auditing**: An independent body can conduct **regular audits to assess access controls, age verification, and grievance redressal details** on OTT platforms.
- **Engage the stakeholders**: In order **to ensure fine-tuning of any significant bottlenecks, implementation challenges, and prevent possible misuse of regulations**, policymakers and stakeholders must collaborate on an effective and balanced regulatory framework.

1.8. CINEMATOGRAPH (AMENDMENT) BILL, 2023

Why in the news?

Recently, Parliament passed the Cinematography (Amendment) Bill, 2023.

More about news

- Bill **amends the Cinematograph Act 1952, enacted to make provisions for certifying cinematograph films for exhibition and regulating exhibitions** using cinematographs.
  - Act provides for establishing **the Central Board of Film Certification (CBFC)** for certifying films for exhibition.
  - Such certifications may be subject to modifications/deletions.
  - Board may also refuse the exhibition of films.
- The proposed amendments aim to make the **certification process more effective** and in tune with the present by introducing new certification categories.

Key provisions of Bill

Specifications	Details
Age-Based Certification	• Bill introduces **three age-based certifications under 'UA' category —'UA 7+', 'UA 13+' and 'UA 16+'.**

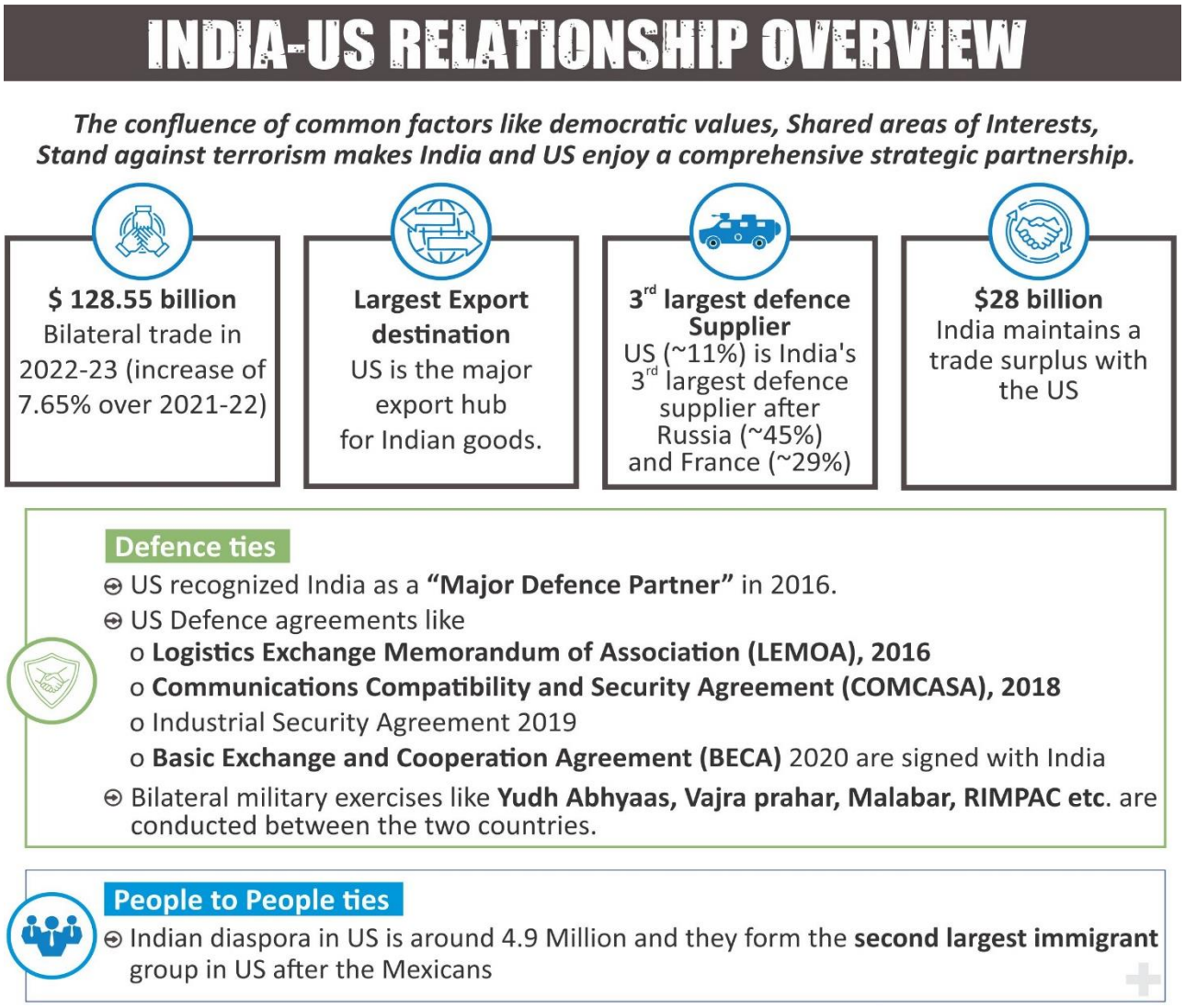
	• These age-based markers meant for parents or guardians to consider whether their children should view such a film. • These are **only recommendatory.**	**Categories of Film Certification** Category: U — Certified Audience: Universal and without restriction Category: UA — Certified Audience: Without restriction, but subject to guidance of parents or guardians Category: A — Certified Audience: Only for Adults Category: S — Certified Audience: Only to members of any profession or class of persons
Separate certificate for television/other media	• Films with an **'A' or 'S' certificate will require a separate certificate** for exhibition on television, or any other media prescribed by the central government.	
Certificates to be perpetually valid	• Certificates will be **perpetually valid** as opposed to the **present validity** of **10 years.**	
Revisional powers of central government	• Bill omits **section 6(1) of the Act** as directed by **Supreme Court in Union of India vs KM Shankarappa Case, 2000** which states that Centre cannot exercise revisional powers on films already certified by the CBFC.	
Makes film piracy a punishable offence	• The Bill prohibits the unauthorised recording and unauthorised exhibition of films and **makes it a punishable offence under the provisions of Copyright Act, 1957.**	
Penalty	• Bill proposes **penal action in case of violation.**	

Conclusion

The bill tends to address the existing problems faced by the film industry and regulates the content by new certification categories. Meanwhile, the current viewership is starting to tilt towards the **OTT platforms, and early regulation of them is necessary for the betterment of society and the industry.**

2. INTERNATIONAL RELATIONS

2.1. INDIA-US RELATIONS



2.1.1. PM VISIT TO THE US

Key Outcomes of the Visit

- **Trade: Strategic Trade Dialogue launched** to address export controls and facilitate technology transfer.
- **Technology:**
  - MoU on the **Semiconductor Supply Chain and Innovation Partnership**.
  - Two Joint Task Forces set up on:
    - ✓ **The Open RAN network and research and**
    - ✓ **development in 5G/6G technologies.**
  - A **joint Indo-US Quantum Coordination Mechanism** to facilitate research between the public and private sectors.
  - A **US-India Science and Technology Endowment Fund** was set up, and $ 2 million was allocated for the joint development and commercialisation of AI and quantum technologies.
- **Research and Innovation: "Innovation Handshake"** initiative was started to connect the startup ecosystems of the two countries.
- **Clean Energy Partnership:** The India-U.S. New and Emerging Renewable Energy Technologies Action Platform was launched.
- **Collaboration in Education:** The **Indo-U.S. Global Challenge Institutes was established for deeper research partnerships.**

2.1.2. INDIA US DEFENCE RELATIONS

Key defence deals signed in the recent visit

- An agreement **to Co-produce the GE F414 jet engine.**
- India agreed **to procure 31 High Altitude Long Endurance (HALE)** Unmanned Aerial Vehicle (UAV) **MQ-9B drones** from the US.
- The **U.S.-India Defence Acceleration Ecosystem (INDUS-X) was launched.**
  - It will **facilitate joint defence technology innovation and co-production of advanced defence technologies** between the two countries.

Significance of the deal for India

- **Boost to Indian fleet and local defence industries:** The deal will **allow HAL to manufacture GE's F414 engine** for the indigenous Light Combat Aircraft (LCA) Tejas Mk2.
- **Technology Transfer: 80% technology transfer** will help India to join the league of major countries like Russia, the UK, and France that have mastered technology.
- **Support for Defence Indigenization**
  - **Support indigenous drone capabilities by establishing** a Comprehensive Global Maintenance, Repair and Overhaul facility in India.

Challenges in India-US defence cooperation

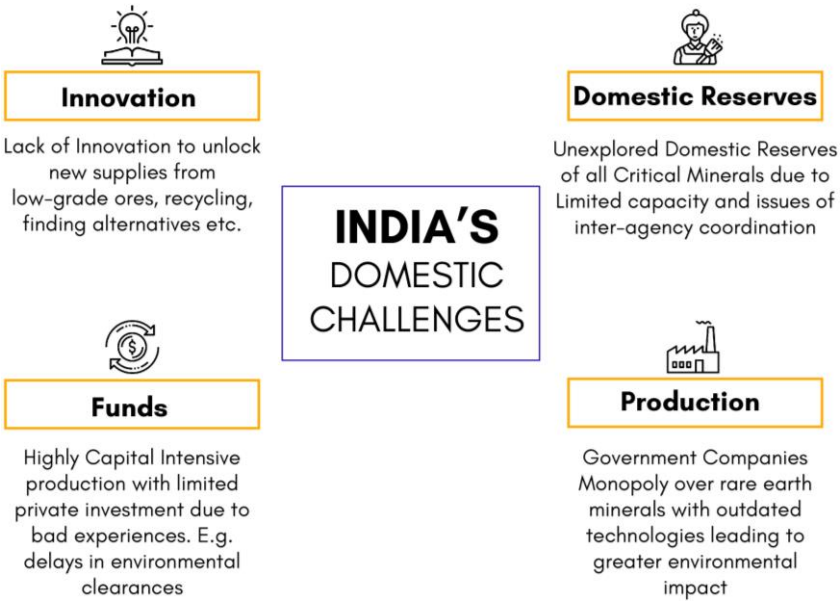
- **India's ties with Russia: Russia is still the largest defence supplier of India (45.1%),** and the silence of India in condemning Russia's aggression against Ukraine irks the US.
- **India's stand on joining alliances: India wishes to uphold its strategic sovereignty** and has recently **rejected the US's invitation to join the NATO Plus arrangement.**
- **The reluctance of US defence companies** to share their technologies with India.
- **US's funding to Pakistan for its military requirements.**

Way Forward

- **Balancing the relationship with Russia and US.**
- **Developing indigenous defence technologies.**
- **Continue cooperation in Indo pacific region** in the areas of shared interests.

2.1.3. MINERALS SECURITY PARTNERSHIP (MSP)

About Minerals Security Partnership (MSP)



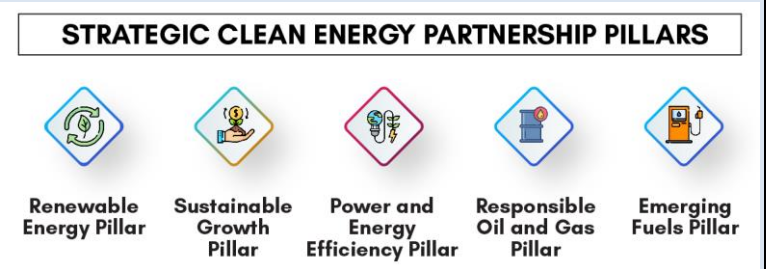
- It is an ambitious US-led partnership of 13 countries **to secure and strengthen supply chains of critical minerals** such as Cobalt, Nickel, Lithium, and other rare earth minerals.
  - India became a member of the Mineral Security Partnership (MSP).
  - Other members include the US, Australia, Canada, Finland, France, Germany, Italy, etc.
- The alliance is **aimed at catalysing investment** from governments and the private sector.
  - To ensure that countries realise their geological endowments' full economic development benefit.
- It **comes in the backdrop of recorded demand for critical minerals and the dominance of China** in the supply chain of these minerals.

- The **Democratic Republic of the Congo (DRC) and the People's Republic of China (China) were responsible for some 70% and 60% of the global production** of cobalt and rare earth elements, respectively, in 2019.

Significance of MSP membership for India

- **Vital for India's digital economy transition:** They are critical minerals for semiconductors, hybrid cars, wind turbines, batteries, defence equipment etc.
- **Achieve Self-reliance (AtmaNirbhar Bharat)** in multiple sectors by building a domestic manufacturing capacity.
- **Promotion of Energy efficiency** through advanced electricity networks, energy-efficient lighting and battery storage.
- **Faster adoption and manufacturing** of hybrid and electric vehicles. E.g. Electric cars have six times more critical minerals than conventional cars.
- **Decarbonisation of the energy system**. For instance, an **offshore wind plant** requires **13 times more** critical minerals when compared with the gas plant of the same size.
- **Overcome challenges:** India's domestic challenges limit India's abilities to tap critical minerals (see **image**).

2.1.4. OTHER IMPORTANT DEVELOPMENTS IN THE RELATIONSHIP

Agreements in the Space sector	• **NASA will provide advanced training to Indian astronauts.** • **India signed the US led 'Artemis Accord' as its 27th Member.** **About Artemis Accord** • The Accord was **established by the U.S. State Department and NASA In 2020.** • It sets common principles **to govern civil exploration and use of outer space, the moon, Mars, comets, and asteroids, for peaceful purposes.** **The signatories are committed:** • To **share national space policies and scientific information's** resulting from their activities. • **To implement MOUs in accordance with the Outer Space Treaty 1967.** • To **preserve outer space heritage.** • To **mitigate orbital debris.** **Significance of the agreements for India** • **Push to the Gaganyaan Mission via** training by the NASA. • **Entry to International Space Station(ISS):** The NASA trained Indian astronauts might be the first ever to enter into the ISS. • **Possible Entry to the Gateway:** Gateway is an upcoming NASA-led international lunar orbital station for Artemis astronauts. • **Enhance capabilities of ISRO:** The signing of the accord **could fast-track India's space capabilities and ambitions and help it achieve cost-effectiveness.**
Initiative on Critical and Emerging Technology (iCET)	**National Security Advisors** of India and USA led the inaugural meeting of the **initiative on Critical and Emerging Technology (iCET).** **About initiative on Critical and Emerging Technology (iCET)** • CETs are a **subset of advanced technologies** such as Supercomputing, Cloud Computing, AI, biotechnologies, etc. • iCET aims to: o Position two countries as **trusted technology partners** by building **technology value chains** and support the **co-development** and **co-production of items.** o **Address regulatory restrictions, export controls** and **mobility barriers.**
Strategic Clean Energy Partnership (SCEP)	Ministerial meeting of the U.S.-India SCEP was held recently. **About SCEP** • SCEP was established as **one of the two track engagements launched under the US-India Climate and Clean Energy Agenda 2030 Partnership.** o 2030 agenda was announced in 2021 to **accelerate progress toward shared climate and clean energy goals.** o Climate Action and Finance Mobilization Dialogue is its 2nd track of engagement. 

	○ SCEP was earlier established as Strategic Energy Partnership in 2018. **Key highlights of the joint statement released in the meet** • **U.S.-India New and Emerging Renewable Energy Technologies Action Platform (RETAP)** was launched to accelerate the development of critical technologies. • Establishment of **public-private Energy Storage Task Force** to **support large-scale integration of renewable energy.** • Launched **Phase 2 of South Asia Group for Energy (SAGE)** to deepen the engagement between Indian agencies and U.S. national laboratories. • Both sides agreed to work toward **developing net zero villages in India** to support the clean energy transition. • **Addition of Carbon Capture, Utilization and Storage** as a workstream under the Emerging Fuels and Technology Pillar.
Digital Trade	**Computer & Communication Industry Association (CCIA) of US** has highlighted Digital trade barriers with India and **flagged India as "Protectionist" in approach**. **Current Status of India US Digital Trade:** • **Digital or technology services did not emerge as a major factor** in the bilateral trade. • **USA has a $27 billion deficit in trade in digital services** with India as of 2020. **Concerns raised by US tech firms** • **Protectionist Indian Policy:** For instance, draft **Digital Competition Bill** to address the anti-competitive practices in the sector, is seen as the **move to specifically target the US big tech companies.** ○ **Greater Government Censorship and control, for instance, under the IT Rules, 2021, a deadline of 72 hours to takedown a flagged content** by the Government notification or Court order, to the Social Media Intermediaries (SMIs). • **Complicated Tax structure by 'Equalisation Levy'**: The current Equalisation levy of 2% (earlier at 6% since 2016) charged on the gross revenues received by a non-resident "e-commerce operator" to the resident Indians, amounts to double taxation. • **Other policy concerns**: ○ **Localisastion requirements in Personal Data Protection Bill**. ○ **Proposal to broaden the definition of "telecommunication services" under the Telecommunications bill 2022** to include OTT like services, **might cause burdensome obligations, licensing requirements**, and monetary obligations. **Way Forward for India** • Ensure Secure Cross border data transfer. • Support Start-ups and Innovation • Strengthening Cyber security Measures • Collaborate with countries on Digital Standards to ensure compatibility and interoperability. • Eliminating Red-tapism and Excessive censorship of the digital companies.

2.2. INDIA-FRANCE

Why in the news?

India and France marked the 25th anniversary of their strategic partnership.

More on news

- Both countries outlined the roadmap of bilateral ties till 2047, **"Horizon 2047 framework"**.
  - The framework has **three pillars** focusing on security, planet, and people and includes cooperation in areas like **defence, nuclear energy & space, climate change etc.**
- **Long-term LNG Sale and Purchase Agreement (SPA)** is to be established between the countries.
- Adopted a roadmap for **the Indo-Pacific**.
- France to support the 2nd phase of **the Indian program on sustainable cities - CITIIS 2.0.**

Convergence between India-France Relations

- **Modernization of the defence sector:** France is India's second-largest exporter of defence equipment**.**
  - **P-75 Scorpene technology transfer and Rafale aircraft** are some major examples**.**

Challenges between India and France relations

- **France has joined the China's BRI**.
- **Delivery of the Rafale plane** was delayed and there were charges of corruption against the middleman.
- **Bilateral trade remains far below potential** (only 1.41% of India's total international trade).
- **Technical, financial, and civil nuclear liability issues** that are to be resolved on Jaitapur nuclear power reactors.

- **Economic Cooperation:** France is India's 11th largest foreign investor (~USD 10 Mn).
  - Recently countries signed an **agreement to roll out UPI in France and Europe.**
- **Countering terrorism:** Both have resolved to work together for the adoption of the Comprehensive Convention on International Terrorism (CCIT) in the UN.
- **Strengthening development:** Agence Française de Dévelopement (AFD) has allocated 200 million Euros to support welfare measures and the most vulnerable sections of society in India.
- **Tackling Climate Change:** Both jointly launched the **International Solar Alliance (ISA).**
- **Respect for each other's strategic autonomy.**
- **International cooperation**: France supports India's claim for permanent membership of the UNSC and also helped in India's accession to **the Missile Technology Control Regime (MTCR), Wassenaar Arrangement (WA) and Australia Group (AG).**
- **Geo-Strategic:** Both are committed to ensuring a free and rule-based Indo-pacific region.
  - In 2018, India and France agreed on a '**Joint Strategic Vision of India-France Cooperation in the Indian Ocean Region'.**

Conclusion

India can use its positive relations with France to progress the India-EU Broad Based Trade and Investment Agreement (BTIA). Also, completing stalled projects and Strengthening people-to-people would further enhance s ties between the two countries.

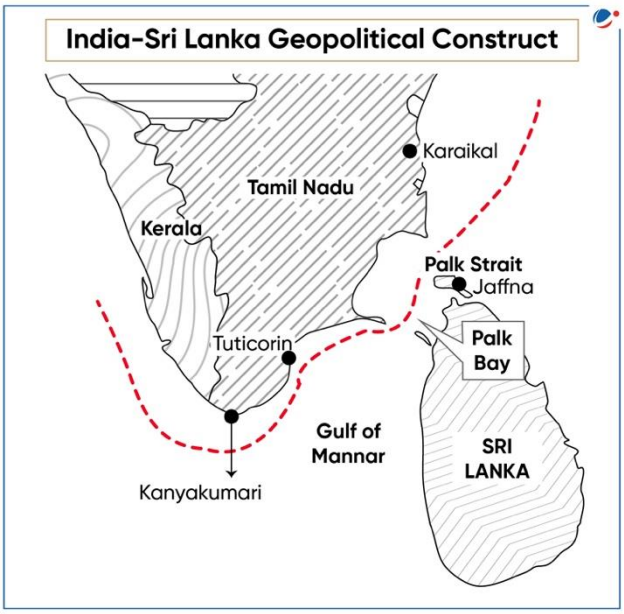
2.3. INDIA-SRI LANKA

Why in the news?

Recently, the President of Sri Lanka visited India.

Key outcomes of the visit

- India and Sri Lanka released a **bilateral economic vision document** titled **"Promoting Connectivity, Catalysing Prosperity: India-Sri Lanka Economic Partnership Vision."**
- **MoUs** were signed on **operationalising UPI digital payments in Sri Lanka, designating the Indian Rupee as currency for trade, renewable energy and economic development projects in Trincomalee.**
- Both countries have also decided **to start passenger ferry services** between Nagapattinam in Tamil Nadu and Kankesanturai in Sri Lanka.



Overview of India-Sri Lanka Relations

- **Bilateral Trade**: India was Sri Lanka's **largest trading partner** in 2021, with an overall bilateral merchandise trade of **US$ 5.45 billion**.
  - India is also **one of the largest contributors to FDI** in Sri Lanka.
  - **India-Sri Lanka Free Trade Agreement (ISFTA)** was signed in 1998.
- **Geopolitical interest:** Sri Lanka is essential to India's **Neighbourhood First policy and SAGAR vision.**
- **Defence cooperation:** The military exercise Mitra Shakti and the Naval exercise **Slinex are conducted regularly.**
- **Cultural significance: through** Buddhism and Tamil population.
- **Connectivity:** Agreements like **Open Sky, Air Bubble arrangement**s.

Role of India in Helping Sri Lanka in the 2022 Economic Crisis

- India was the first country to hand over **its letter of support for financing and debt restructuring of Sri Lanka to the IMF.**
- India has extended nearly US**$4 billion in food and financial assistance to Colombo** (including currency swaps and credit lines)**.**
- **India dispatched several shipments of essentials** such as fuel, food, and fertilizers to its neighbour.
- **India also had in-depth talks** with the Sri Lankan government and the Paris Club for debt relief and finances.

Divergence in India-Sri Lanka Relations

- **Trust deficit:** The asymmetrical nature of relations shaped the majority view against India in Sri Lanka.
- **Fishing Disputes:** Disagreements between the countries over fishing rights and using mechanised trawlers.
  - In 1974, an agreement was signed to cede the resource-rich Katchatheevu islet to Sri Lanka, where the Tamil fishermen had tradtional fishing rights for centuries.
- **Economic and political crisis:** Recent crisis has affected the country's ability to engage with India and implement policies that promote economic cooperation and regional stability.
- **Strategic issues due to increased Chinese presence:** As part of the Maritime Silk Route (MSR) policy, China built Colombo and Hambantota ports.
- **Tamil Question:** The issue of Tamil minority rights in Sri Lanka remains a sensitive topic, with India advocating for national reconciliation through a political settlement (13th amendment) of the ethnic issue.
  - 13th Amendment to **allow devolution of power to provinces has yet to be implemented.**

Way Forward

- **Continued efforts:** The role of India as the "first responder" can bolster better relations with Sri Lanka.
- **Broadening cooperation and addressing challenges** through platforms like BIMSTEC and SAARC.
- **Permanent solution for the fisherman issue** through bilateral engagements.
- **Greater cooperation in counter-terrorism efforts** at the bilateral as well as regional levels.
- **Strengthening People-to-People Ties.**

2.4. INDIA-CENTRAL ASIA

India-Central Asia relations at a Glance

India and Central Asian countries are secular, pluralistic, diverse and peaceful societies and have several millennia old historical, cultural and civilizational links. They are natural allies and partners to promote inter-ethnic, inter-religious and inter-cultural harmony and amity.

- India's trade with the region amounts to **US$ 2 billion which is less 1% of India's overall trade.**
- Considered as part of **India's extended Neighbourhood**
- Completed **30 years of diplomatic relations between India and Central Asian** countries last year

Overall Relations

Significance for India

- **Energy Security:** Central Asian countries are endowed with commercially viable natural, mineral, and hydel resources.
- **Geostrategic importance:** Central Asia has been an **arena of "great game",** the region lies at the crossroads of Russia, the Middle East, South Asia, and the Far East.
- **Common challenges** like Illegal Drug trade, Religious extremism, fundamentalism, arm trafficking, and terrorism.
- **Agricultural cooperation** like setting up of **commercial agro-industrial complexes.**
- **Trade and Investment** in the sectors like Banking, Insurance, Power generation, IT, and pharmaceutical.

Challenges

- **Poor connectivity** due to adverse geographic terrain and India-Pakistan border issues.
- **Untapped trade potential** due to trade regulatory hindrances and political fragility.
- **Geopolitics of energy** and presence of major powers like China through its BRI.
- **Volatile security scenario** especially in regards to Pakistan, Afghanistan and Iran-USA dynamics.
- **Internal issues:** Problems of governance, regulation of movement across borders and many inter-state disputes.

Steps Taken to strengthen the relationship

- **Defence agreement** with Tajikistan
- Civil nuclear cooperation with Kazakhstan
- **TAPI pipeline**
- India provides grants under **HICDP**
- Recently started the **India-Central Asia Summit.**
- **Connectivity efforts:**
  - **Connect Central Asia Policy**
  - **International North-South Transport Corridor (INSTC) agreement**
  - **Chabahar Port Project**
  - India acceded to the Customs Convention on International Transport of Goods under cover of **TIR Carnets** to facilitate the transport of goods between India and Central Asia via Iran,
  - **Ashgabat Agreement** on International Transport and Transit Corridor (ITTC)

Way forward

- **Finalize FTA** between India and Eurasian Economic Union (EAEU)
- **Revitalizing interaction in cooperation with countries like US, and Russia** for stabilizing the region and ensure interests of all partners.
- **Annual military exercises and joint manufacturing** of defense-related equipment
- India can help Central Asia in strengthening their local self-government.
- **Soft-diplomacy**
- **Sub-regional alliances** such as SAARC and BIMSTEC can also be formed between South Asia and Central Asia

Despite several challenges, India and Central Asian Countries' relations are moving forward which shows each other's commitment to further their relations even in the face of adversities. A strong and good relationship between India-Central Asia is key not just for Eurasia but also for the Peace and Stability of the world.

2.4.1. CHINA'S RISING INFLUENCE IN CENTRAL ASIA

Why in the news?

China recently hosted the **"C+C5 summit"** in the city of Xi'an (the first of its kind) with the leaders of five Central Asian countries.

More on news

- **'Xi'an Declaration'** was signed, issuing a blueprint for the future development of China-Central Asia relations.
- China has been investing heavily in Central Asia through its **BRI, and the relationship with the region was institutionalised through Shanghai Cooperation Organisation (SCO).**

Implications of the rising influence of China in Central Asia for India

- **Geopolitical Competition:** China's presence impacts India's strategic interests in the region.
- **Creates economic competition for India:** China is **Central Asia's largest trading partner, while** India's combined trade with Central Asia is only **around $2 billion.**
- **Connectivity and Infrastructure:** China's BRI, which includes projects such as the CPEC, could affect India's ability to foster closer ties with these countries through initiatives like the **INSTC**.
- **Security Concerns:** The growing Chinese presence may impact the regional security dynamics and influence the balance of power in the immediate neighbourhood.
- **Energy Security:** Kazakhstan is the world's largest producer of uranium, and Turkmenistan has vast reserves of natural gas. Growing Chinese influence might hinder India's prospects for securing energy from the region.

2.5. INDIA-EGYPT

Why in News?

The Indian Prime Minister recently visited Egypt.

Key outcomes of the visit

- India and Egypt **signed a 'Strategic Partnership' agreement.**
- The **Indian PM was conferred with the 'Order of the Nile' award** (the country's highest state honour).

Significance of Egypt for India

- **Geopolitical**: Egypt is a **significant partner to deepen India's ties with Arab nations.**
  - Egypt accords **great importance to multilateral forums that comprise developing countries**, such as **NAM** and the G77, considering their contributions to south–south cooperation.
- **Geostrategic:** Egypt is strategically located (refer to map), making it a **hub for trade routes between Europe, Africa, and Asia.**
- **Economic:** Bilateral trade is **$7 billion** (registered a **growth of 75%** in 2021-22).
  - Egypt procured wheat from India amid Russia-Ukraine War.
- **Energy Security**: Both countries have signed an MoU to set up a green hydrogen plant in the Suez Canal Economic Zone.
- **Boost Defence Industries**: Egypt is interested in procuring LCA Tejas, missiles like Akash, DRDO's Smart Anti-Airfield Weapon, and radars.
- **Terrorism:** The two countries have been sharing intelligence and conducting joint operations to tackle terrorism.

Challenges in the Development of the India-Egypt Relation

- **Economic crisis:** Egypt is facing an economic crisis and battling a spike in inflation, which makes investment in the country less lucrative.
- **Presence of China**: China sees the Suez Canal as a vital part of its Belt and Road and Maritime Silk Road projects.
  - **China's bilateral trade with Egypt is currently at $15 billion**, double that of India.
- **Political dynamics:** Changing Political dynamics of the Gulf region, such as the Abraham Accord, New Quad and India balancing out approach, might impact it.

Way Forward

- **Leverage the Non-Aligned Movement (NAM):** To find common ground and reform international organisations such as the UNSC and the World Bank.
- **Collaboration with like-minded countries:** India can collaborate with countries like Japan to reduce the dominance of China and explore the Asia-Africa Growth Corridor (AAGC) model.
- **Utilising India-Africa Forum:** To strengthen multilateral relations with Egypt.
- **People-to-people contact**: The two countries can foster closer ties through initiatives such as education, tourism, culture, and academic exchanges.

2.6. INDIA'S ENERGY DIPLOMACY

Why in the news?

India is considering trading power with Southeast Asian countries through Myanmar and Thailand as part of the energy diplomacy.

What is energy diplomacy?

- It pertains to government-related foreign activities that aim to ensure a country's energy security while promoting business opportunities related to the energy sector. It seeks to:
  - **Secure a sustainable source of energy** for society at large and economic growth.
  - **Use energy capacities as an instrument of foreign policy**.

How is India pursuing energy diplomacy?

Power transmission	• Part of the **SAARC energy agreement on electricity cooperation signed in 2014.** • **India exports power to Bangladesh, Nepal, and Bhutan.** • India has issued the **"Guidelines for Import/Export (Cross Border) of Electricity-2018"**
Renewable energy transmission	• **International Solar Alliance and its One Sun One World One Grid (OSOWOG) initiative:** to connect different regional grids through a common grid for transferring renewable energy.
Pipeline connectivity	• **Turkmenistan-Afghanistan-Pakistan-India (TAPI)** pipeline to transport natural gas from Turkmenistan to the remaining three countries.
Nuclear energy cooperation	• **Indo-US Nuclear deal.** • **India-Japan Civil Nuclear Deal.**
Hydroelectric cooperation	• India imports power from **Tala, Chukha, Kurichu, and Mangdechu hydroelectric** power plants in Bhutan. • India is involved in the **Mahakali Treaty, the Upper Karnali Project, the Arun projects in Nepal.**

Challenges of India's energy diplomacy

- **Single Source region:** The share of the Persian Gulf has remained at more than 60% of the total import of oil and gas.
- **Power charges:** Transmission charges on power supplied using an interconnected regional network are challenging to decide.
- **Technology constraint:** The energy sector is highly technology-intensive.
- **Cybersecurity:** The growth of digitalisation and interconnectivity in the energy sector can raise security and privacy risks without an international rules-based framework.
- **Overdependence on coal:** accounted for nearly 50% of power generation. By comparison, renewable sources such as wind, solar, and biomass accounted for 26%.

- **Energy Infrastructure Bottlenecks:** Developing and maintaining pipelines and transmission grids across borders is challenging.

Way forward

- **Import diversification:** India can diversify its sources instead of relying on particular countries or regions.
- **Geographical Advantage**: India's strategic location near energy-rich areas could be utilised.
- **Investment and Financial Resources**: India has earmarked US $2 billion for international finance for solar by 2025.
- **Better monitoring and cooperation:** Develop appropriate arrangements and international collaboration to govern cross-border grids.

International Solar Alliance
India's energy diplomacy tool
Currently, there are **no specialized agencies created under the UN system** to promote renewable energy. ISA can become an important tool to promote renewable energy particularly to promote, disseminate and deploy solar energy.

- ISA can induct a multidimensional **approach to promote science diplomacy for building global solar capacity.**
- **India can become a key energy supplier of renewable energy** in the future.
- ISA is evolving as a platform to **create global coherence on common standards related to the solar sector.**
- Demand for renewable energy will rise exponentially **due to global and national countries achieving net zero emissions** and solar energy can meet these target (as other sources face constraints like wind energy(requires high velocity wind), hydroelectricity(require high flow of water)).
- ISA has partnered with nearly **32 international organizations to mobilize USD 1000 bn investment** by 2030.

India's Alternative model of Development

- ISA is India's alternative model of development that is **based on values like transparency and inclusive development**.
- With OSOWOG, it seeks to develop a **global grid of the Torrid Zone** (area between Tropic of Cancer and Tropic of Capricorn) and **overcome the issues of domestic land scarcity, import of solar inputs and reduce reliance on fossil fuels**.

2.7. DEFENCE DIPLOMACY

Why in the news?

India gifted the indigenously built in-service missile corvette **INS Kirpan** to Vietnam.

About India's Defence Diplomacy

Defence Diplomacy means establishing **cooperation in strategic arenas** and facilitating a collective strategy of armed forces **to advance mutual interests** and fulfil **foreign policy goals.** For instance,

- India **has defence cooperation agreements** with over 53 countries.
- **Promotion of aerospace and defence goods and services export** under **The Defence Production and Export Promotion Policy 2020.**
- **Joint military exercises** with friendly countries, for example, Yudh Abhyas with the USA.
- **Constructive participation** in international forums such as RATS(SCO).
- **Disaster Management and Humanitarian Relief measures** such as 'Operation Dost' to help earthquakes hit Turkey and Syria.

Benefits of India's defence cooperation to achieve its foreign policy goals

- **Enhancement to regional stability** and **strengthening relations.**
  - Defence cooperation has been key in building 'Bridges of Friendship' with neighbourhood countries.
- **Capacity Building of Armed Forces**: Through exposure to countries' technology, doctrines, and combat experience.
- **Boost to Defence Industry by** co-producing advanced weapons systems with its partners and expanding its defence exports.
- **Research and development** by transfer of technology and joint development of the projects.
- **Confidence building by signalling** a political commitment to develop cooperative relations, promote military transparency and shared interests.

Challenges for Defence Co-operation to Achieve Foreign Policy Goals

- Defence cooperation is **being implemented country-wise** rather than outlining uniform principles.
- **Assertiveness of China** in the neighbourhood.
- **Low defence spending,** i.e. 2% of the overall GDP in 2022-23
- **Only a few Indian embassies have defence wings** compared to countries like the USA, UK, etc.
- **Lack of coordination between ministries** and departments involved in defence cooperation.

Way forward

- **Formulation of Policy Guidelines:** To ensure that defence cooperation activities align with the foreign policy objectives.
- **Requirement of Specialists:** Considering the scope, intensity, and derivatives of the defence cooperation activities, it should be handled by experienced specialist officers.
- **Annual Audit of Activities Conducted:** To ascertain cost vis-à-vis achievements in relation to the stipulated focus areas.
- **Integrated planning:** Expanding defence cooperation and establishing an Indian military presence around the globe to secure India's national interests.
- **Strengthening relations with neighbouring countries** to reduce China's influence.

2.8. UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION (UNESCO)

Why in News?

The United States (US) formally rejoined UNESCO after a five-year absence by proposing to pay its due of more than $ 600 million.

About UNESCO

- It is a specialised **agency of the UN** established in 1945.
- It **contributes to peace and security by promoting international cooperation** in education, science, culture, etc.
- It has a **secretariat which is headed by Director-General**.

US and UNESCO	
Why did the US leave UNESCO (in 2018)? • In 2011, US **halted the agency's funding** in retaliation to the **induction of Palestine as member in UNESCO.** • In 2017, **citing bias and the naming of ancient Jewish sites as Palestinian heritage sites,** the US announced its withdrawal from the body for the second time which came into effect by end of 2018**.** ○ Earlier in 1984, the **US has pulled out from UNESCO citing mismanagement, corruption and advancing Soviet interests**. Later re-joined in 2003.	**Reasons for US re-joining** • **To reassert US's soft power:** UNESCO will be the right forum to reassert the soft power influence of US over the other member countries. • **To Challenge Chinese influence:** China has replaced the US, as the largest funder to UNESCO and has started asserting its influence. • **To impart its role in new standards:** UNESCO through its role in science and technology, plays a large part in setting ethical standards of the UN.

Issues Faced by UNESCO

- **Financial Woes:** The withdrawal of the US alone accounted for the loss of 20% of funding to the body.
- **Mismatch in Member Priorities:** Each member state has their foreign policy priorities and perceptions of how the organisation should work.
- **Reduced focus on Education:** The **allocation for education was reduced from 18% - 15% of its overall budget** (between 2018 to 2022), showcasing a move from one of its main priorities.
- **Inability to Protect and Preserve World Heritage Sites** like the **Bamiyan Buddhas of Afghanistan.**
- **Selection Process of World Heritage Sites:** The Local Governments propose the names to be included in the list, and the Heritage Committee and the body does not have their procedure for the inclusion of a site.
- **Rising Chinese Influence:** With the absence of the USA, **China is indirectly pushing UNESCO** to support vocational and job training programs **in countries partnering with it on its BRI.**

Way forward

- **More contributions from developed countries to make the organisation** financially strong.
- **Revamp in the selection process of Heritage Sites:** The Heritage Committee should structure its own team to find such sites across the globe.
- **Strengthening Governance structure:** By enhancing accountability and efficiency in its decision-making.
- **Enhanced partnerships and collaboration** with other UN agencies, international organisations, civil society, academia, and the private sector.

Achievements of UNESCO

- **Preserves 1157 World Heritage sites in 167 countries.**
- **Intangible Heritage Convention** supports cultural heritages of mankind from extinction.
- **UNESCO's Education for All initiative has contributed to significant progress in global education.** The global literacy rate for adults has increased from 76.7% to 86.81% between 1999-2020.
- **The Media Development Indicators (MDIs)** assesses media landscapes and support policies that promote pluralistic and independent media.
- **A separate list of World Heritages in danger is maintained by the World Heritage Committee** (Has 55 cites as of 2023) and special attention is provided to retrieve them.

2.9. BLACK SEA GRAIN DEAL

Why in News?

Recently, Russia withdrew from the Black Sea grain deal.

More about the news

- Russia claims that **the promises made to it under the deal have not been met,** and it is still facing trouble exporting its agricultural products and fertilisers.
- According to Russia, Ukraine has since **exported mainly to high-and middle-income countries** and only 3 % to poor countries.

What was the Black Sea Grain Deal?

- The Black Sea Grain deal was **brokered by the United Nations and Türkiye** in July last year between **Russia and Ukraine.**
- The deal **tackled escalating food prices** from **supply chain disruptions** due to the effective blockage of the Black Sea.
- It provided a **safe maritime humanitarian corridor for Ukrainian exports** (particularly for food grains) from three key ports: Chornomorsk**, Odesa, and Yuzhny/Pivdennyi.**
- The deal was **for 120 days** with an option to extend or terminate. It was extended two times.

Impact of the closure of the deal

- **Inflation in food prices:** Grains and oilseeds prices have already risen in response to Russia's decision and are expected to rise further.
- **Increased logistical costs** for Ukraine's farmers.
- **Unequal impact on the poor: LDCs are disproportionately at risk of food insecurity,** with several countries facing complex and prolonged humanitarian crises.
- **Impact on edible oil in India:** India imports sunflower and soybean oils to meet domestic demand. Since the suspension of the deal, sunflower oil prices have risen.

- **Shortfall of fertilisers:** It may intensify as Russia and Belarus are one of the world's largest sources of mineral fertilisers (14% of the world).

Way forward

- **International cooperation** is needed to solve the ever-increasing conflict between Russia and Ukraine.
- **Strengthen and reform United Nations** to represent the entire international community.
- **Strengthening the global food supply chain:** Adopt cognitive planning, AI-driven predictive analytics, advanced track and trace, and blockchain technologies to improve global supply chains.

2.10. OTHER IMPORTANT NEWS

India-UAE	• India and United Arab Emirates (UAE) **signed a pact to establish a Local Currency Settlement System (LCSS) framework.**
	About LCSS Framework
	• The **LCSS framework aims to promote the use of the Indian Rupee (INR) and UAE Dirham (AED) for cross-border transactions.**
	  ○ It would **enable exporters and importers to invoice and pay in their respective domestic currencies,** promoting the **development of an INR-AED foreign exchange market.**
	  ○ Using local currencies **would promote investments and optimise transaction costs and settlement time.**
	• Both sides agreed to **link India's Unified Payments Interface (UPI) with UAE's Instant Payment Platform (IPP).**
	• Both sides agreed to **link their respective Card Switches vis-a-vis the RuPay switch and UAESWITCH** to enable **mutual acceptance of domestic cards** and processing of these card transactions.
	  ○ **India's Structured Financial Messaging System (SFMS)** will be **linked with messaging system in UAE.**
	Significance of UAE for India
	• India-UAE **trade rose to USD 85 billion in 2022**, making **UAE India's third-largest trading partner** for 2022-23.
	• India is UAE's **second-largest export destination.**
	• UAE has **highest number of Indian diasporas** contributing high remittances to India.
	• In 2022, **UAE signed a Comprehensive Economic Partnership Agreement** (CEPA) **with India.**

3. ECONOMY

3.1. FISCAL POLICY AND MONETARY POLICY

3.1.1. CAPITAL EXPENDITURE

Capital Expenditure (Capex) at a Glance

Status of Capex in India

- The total capital expenditure in 2023-24 is estimated at ₹ **10 lakh crore (an increase of 33.4%** over 2022-23)
- Total Capex grew at an **average rate of 13% during FY12 and FY22**
- The **Centre's Capex** has steadily increased from an average of 1.7% of GDP (FY09 to FY20) to **2.5% of GDP** in FY22
- **Capex by the Corporate sector increased** in FY23, driven by heavy investments in electricity, steel, chemicals, auto and pharmaceuticals sectors

Significance of Capex

- **Multiplier Effect:** The economic output of the country is set to **increase by at least four times the amount of Capex.**
- **Efficiency improvement:** Capex creates assets. These **improve the efficiency of the economy.**
- **Future Growth:** Capex contributes to **future economic growth** through the creation of employment and capacity development.
- **Inclusive Growth:** A sustained improvement in the quality of public expenditure can play a conducive role in **promoting inclusive and sustainable economic growth.**
- A **sustained increase in private Capex** is imminent with the **strengthening of the balance sheets of the Corporates** and the consequent increase in credit financing it has been able to generate.
- **Other Effects:** Capital spending can result in **crowding-in private investment** and ease critical supply constraints.

Challenges in Capital Expenditure

- For increasing capex, there is a **need for huge amounts of funds** and pooling of such funds becomes difficult.
- **Delays in implementation** of capital-intensive projects result in cost and time overruns, limiting the effect of capex.
- The long-term cost and benefits of capex are **challenging to measure** and governments generally focus on short-term benefits.
- The **inflation, geopolitical scenario and supply chain disruptions** increase the input costs and limit the intended outcomes of capex.
- **Lack of required human resource capability** with limited skill development makes implementation of projects challenging.

Government initiatives

- **Increased capital outlay** in Union Budget 2023-24.
- Continuation of **50-year interest-free loans** to state governments to incentivize infrastructure investment.
- Highest ever capital outlay of ₹ **2.4 lakh crore for Railways.**
- **100 transport infrastructure projects** identified for end-to-end connectivity for ports, coal, steel, and fertilizer sectors.
- Creating Urban Infrastructure in Tier 2 and 3 cities via the establishment of an **Urban Infrastructure Development Fund.**
- **Increase in tax collection** providing adequate funds for capex.
- **Various Schemes** such as Production Linked Incentive Schemes.

Way forward

- Governments can promote **investment through both direct and indirect channels.**
  - The **direct channel** involves spending on physical infrastructure and human capital.
  - The **indirect channels** act by crowding in private investment, promoting good governance, and attracting foreign direct investment (FDI) etc.
- There is a need for a **supervisory body** such as the **Expenditure Council** to formulate guidelines for governments in terms of resource allocation.
- Governments need to r**aise their revenue generation capacity** and can tap alternative sources.
- Governments can consider **creating a capex buffer fund** during good times when revenue flows are strong so as to smoothen and maintain expenditure quality and flow through the economic cycle.

3.1.2. STATES' CAPITAL EXPENDITURE

Why in the news?

The Department of Expenditure, Ministry of Finance has approved **capital investment proposals of Rs. 56,415 crores in 16 States** in the current financial year. Approval has been given under the **scheme entitled 'Special Assistance to States for Capital Investment 2023-24'**.

Special Assistance to States for Capital Investment 2023-24

- **Objective:** In view of a **higher multiplier effect of capital expenditure** and to provide a **boost to capital spending** by States.
- **Assistance:** Under the scheme, special assistance is being provided to the State Governments in the form of a **50-year interest-free loan**.
- **Parts:** The **scheme has eight parts,** Part-I being the largest with the allocation of Rs. 1 lakh crore.
    - The amount under Part-I has been allocated amongst States in **proportion to their share of central taxes & duties** as per the award of the **15th Finance Commission**.
    - Other parts of the scheme are **either linked to reforms or are for sector-specific projects**.

Trends in Capital Expenditure (Capex) by States

- **Higher Subsidies Expenditure:** The **expenditure by states on subsidies rose at a faster pace** even as their capital spending slowed down in FY23.
- **Capital outlay-GDP ratio:** The States' **Capital outlay-GDP ratio** is expected to improve from 2.3% in 2021-22 to 2.9% in 2022-23.
- **Debt-to-GSDP ratio:** The **state's debt-to-GSDP ratio was the highest in Punjab (48%).**
- **Capex Target:** According to a study by the Bank of Baroda, 25 states have **cumulatively achieved 76% of their capex target in FY23**.

Reasons for failure in increasing capex by states

- **Limited Fiscal Space:** States are legally **mandated under the Fiscal Responsibility and Budget Management (FRBM) Act** to keep their fiscal deficit under control.
    - **Unable to reduce their revenue expenditure** on salaries, pension, subsidies etc., they end up **cutting down on capex** to meet the deficit norms.
- **Lagging Capacity:** States are also **constrained by a lack of projects or skills** in the absorption of high capital expenditure.
- **Decision-Making on Political Considerations:** There are **state-level political disruptions** such as government instability or elections which come in the way of decision-making pertaining to capex.

Way Forward

- **Channelizing Capex:** State governments can promote **investment through both direct and indirect channels**.
    - The **direct channel** involves spending on physical infrastructure and human capital.
    - The **indirect channels** act by crowding in private investment, promoting good governance, and attracting foreign direct investment (FDI) etc.
- **Fiscal Prudence through Finance Commission:** The **16th Finance Commission** can be given a mandate to look into the issue of freebies and **states fiscal imprudence**.
- **Rebalancing Expenditure:** States with sub-optimal expenditure patterns like low social sector spending, low capital expenditure and high committed expenditure should **undertake corrections through rationalisation/ rebalancing of expenditure**.
- **Capex Buffer:** States must **mainstream capital planning** and consider **creating a capex buffer fund** to ensure capital flows throughout the economic cycle.

3.1.3. JAN VISHWAS (AMENDMENT OF PROVISIONS) BILL, 2023

Why in the news?

Recently, the Jan Vishwas (Amendment of Provisions) Bill, 2023, was passed in Lok Sabha. The Bill aims to give a boost to ease of living and ease of doing business.

Key highlights of the Bill

- **Decriminalises around 180 offences across 42 laws** governing environment, agriculture, media, industry and trade, publication, etc.
- **Converts several fines into penalties**, implying that judicial prosecution is not necessary to administer punishment.
- **Removes all offences and penalties** under the **Indian Post Office Act 1898.**
- **Periodic revision** (10% increase of the minimum amount every three years) of fines and penalties for various offences in specified Acts.
- **Changes in grievance redress and appellate mechanisms and appointment of one or more adjudicating officers** for determining penalties under acts such as the Cinematograph Act, 1952, Environment (Protection) Act, 1986, Merchant Shipping Act, 1958, etc.

How do laws/policies hamper the ease of doing business in India?

- **Regulatory Cholesterol:** A typical MSME with 150 employees faces around 500 to 900 compliances yearly with significant financial costs.
- **Clauses of imprisonment:** There are around 26134 imprisonment clauses under 843 economic legislations, rules and regulations that oversee and influence doing business in India.
- **Lack of proportionality:** Disproportionate selection of punishment vis-à-vis offences.
- **Overlapping and cross-purpose laws:** Existence of multiple overlapping and cross-purpose laws leading to legal ambiguities and sub-optimal regulation.
- **Legal and policy unpredictability:** Frequent amendments in laws, retrospective taxation, etc.
- **Administrative discretion and rent-seeking: The creation** of **regulatory excesses** lead to **regulatory bottlenecks** resulting in **administrative discretion** and **rent-seeking activities** by enforcement agencies.

How does the Bill help?

- **Rationalisation of criminal provisions** for minor, technical, or procedural defaults.
- **Establishing Proportionality**: A balance between the severity of offence/ violation and severity of prescribed punishment.
- **Ease of living**: Decriminalization of provisions will help citizens and public servants live without fear of imprisonment for minor violations.
- **Ease of doing business:** Consolidated amendment in various laws with a common objective will save **time and cost for both government and companies.**
- **Decreased burden on the judiciary:** Suitable **administrative adjudication mechanism** can help reduce undue pressure on the justice system and make the justice system more efficient.

Way Forward

- **Procedural safeguards:** Informed policy formulation and decision-making based on objective analysis.
  - **Informal instruments** such as consultations, Open House Discussions, etc., can help address the **'democratic deficit'** in the institutional structure of **delegated legislation**.
  - **Involve all independent sectoral regulators** in compliance reforms and rationalising criminality clauses, like FSSAI, BIS, RBI, etc.
  - **Declaration of policy stances**, in advance, by the government **on the lines of monetary policy stances** as declared by the Monetary Policy Committee from time to time.
- **Regulatory impact assessment:** Constitute a **regulatory impact assessment committee within the Law Commission** to assess and evaluate the impact of laws.
- **Define legal standards:** To provide a general, indicative set of legal regulations standards, including the **principles of necessity and proportionality.**
- **Sunset clauses inbuilt within laws:** To accommodate the **ever-evolving knowledge economy and technology space** among modern businesses and entrepreneurs.

3.1.4. GOODS AND SERVICES TAX

Goods and Services Tax (GST) at a Glance

- GST is a **unified tax system that replaced multiple indirect taxes** levied by both the Central and State Governments.

Structure of GST

- The GST system follows a **dual structure,** comprising **Central GST (CGST) and State GST (SGST),** levied concurrently by the Central and State governments, respectively. Additionally, an **Integrated GST (IGST)** is levied on interstate supplies and imports.
- Under GST, goods and services are categorized into different tax slabs, including **5%, 12%, 18%, and 28%.** Some **essential commodities are exempted** from GST
- **GST Council under Article 279A** of the Constitution makes decisions on various aspects of GST.

Need for GST

- Establishment of a **single national market.**
- Rationalisation of **complicated taxation** regime.
- Rectifying issues like **tax cascading.**
- Need for **incorporation of technology** in strengthening tax regime.
- Promoting **ease of doing business** and competitiveness.
- Increasing **revenue efficiency** and reducing cost of tax collection.

Impact of GST

- Promoted **cooperative federalism** through centre state deliberations on taxation issues.
- **Reduction in tax burden** and other benefits to taxpayers such as easier process, smooth refund flows etc.
- **Increased revenue collection** over the last six years.
- **Improvement in tax buoyancy** for states to 1.22 from 0.72 in pre-GST regime.
- **Market integration** and ease of doing business.
- **Increased technology penetration** and better data analytics for policy formulation.

Challenges to GST

- **Tax evasion and fraudulent claims** with fake GST identification numbers and ITC claims.
- **Erosion of taxpayers' trust** due to arbitrary cancellation of GST registration and ITC denials.
- **Technology glitches** in GST portal and e-way billing system.
- **Delay in creation of GST Appellate Tribunals (GSTATs).**

Steps being taken to improve GST

- **Information Sharing** among different government agencies such as ED and GST Network.
- **Use of Technology** and advanced data analytics to nab tax evaders.
- **Tightening of registration norms** with plans for biometric authentication and geotagging.
- **Tightening of return filing** system to act against fraudsters.

Way Forward

- **Rationalization of tax rates** for ease of compliance.
- **Tightening enforcement** provisions to curb leakages and evasions.
- Use of **technology-based monitoring** systems.
- **Streamlining of audits, assessments and investigations.**
- **Expansion of tax network** to cover products such as alcohol, petroleum.

3.1.4.1. ONLINE GAMING

Why in the news?

The GST council recently imposed a GST of 28% on online gaming, horse racing and casinos.

Implications of the move

Positive	Negative
• **Increase in Revenue** from Rs 2000 Crore to Rs 20,000 Crore. • The act might **deter the development of gaming addiction** among youngsters. • Move aims to **simplify the mechanism, eradicate complexity and imbibe transparency** in the gaming sector.	• The decision could **severely impact the $2.5 billion of Foreign Direct Investment (FDI) already invested** and potentially jeopardise any further FDI in the industry. • May lead to an **increase in unlicensed operators.**

Online Gaming Industry in India

- Online gaming has seen a significant **spike in demand** across various online games such as Multiplayer online games, Role-playing games, real-time strategy or skill games.
- **Status & Potential:**
  - **Current Value:** Estimated to be worth $ 2.6 Bn.
  - **Projected Growth:** A Compound Annual Growth Rate **(CAGR) of approximately 27%** over the next five years.
  - **User Base: India has the largest fantasy sports market,** with a user base of 180 Mn.
  - **Employment: Employed around 100,000 people** in 2022.
  - **FDI:** Attracted **₹15,000 crore in FDI** till FY2022**.**

Challenges in regulating online gaming

- **Jurisdictional dilemma:** On one hand, online gaming is a **state subject (under 'Gambling' and 'Betting');** on the other, the Centre has made **the Ministry of Electronics and IT (MeitY) the nodal ministry for online gaming.**
- **Moral stand vs Revenue collection dilemma:** While the industry is providing revenue to the government in thousands of crores on one side, hundreds of people have lost their lives and lifetime savings due to their addiction to online games.
- **Protection of the player's rights:** While the gaming companies act as mere intermediaries in the game, no concrete regulatory framework has been established to address the players' grievances and protection.

Way Forward

- **Ensure legal clarity and reduced multiplicity of regulation:** E.g. the Centre can invoke residuary powers under Article 248 to frame a model law.
- **Ensuring transparency of the online gaming companies:** So that codes are not tweaked to favour any particular set of individuals or the company itself.
- Setting a **clear distinction between Game of Skills and Chance**
- Introducing **Screen timeout/limiting the number of games** per individual.

- **Curbing loss chasing:** A cap can be introduced on the number of transactions from an individual across platforms or one platform to avoid more significant economic losses.

3.1.4.2. GST APPELLATE TRIBUNAL (GSTAT)

Why in News?

Finance Bill, 2023 provided for the establishment of **Goods and Service Tax Appellate Tribunal (GSTAT).**

More on News

- **Finance Bill, 2023 amended section 109** of **Central Goods and Services Tax Act, 2017** to facilitate the creation of **GSTAT and its benches.**

Need of GSTAT

- **Streamline pending litigations.**
- **Alternative to CESTAT (Customs Excise and Service Tax Appellate Tribunal):** It played an important role in **dispensing litigation in the Pre-GST tax regime**.
- **Validity of GST Provisions**: The question of **transitional provisions to the constitutionality** of certain GST provisions needs to be addressed.
- **Bringing Efficiency:** Appellate authorities have **rejected the export refund claims. Without GSTAT, taxpayers have been left remedied against such adverse orders,** thereby blocking **huge working capital** for them.
- **Preventing Economic loss:** Delay in **the settlement** of cases will eventually expose the taxpayers to **heavy interest liabilities at 18%** (which is much higher than the prevailing bank lending rate).

Way Forward

- **Constitution of GSTAT:** Shall be a priority of government considering its wide-ranging impact on ease of doing business.
- **Empowering State Governments:** They should be delegated power to constitute State benches to reduce their dependence on union.
- **Enhancing Efficiency of First Appellate Authority:** This will **reduce the burden** on the GSTAT.

3.1.5. MONETARY POLICY

Monetary Policy at a Glance

Monetary policy refers to central bank activities that are directed toward influencing the **quantity of money and credit** in an economy. Central banks use monetary policy to **manage economic fluctuations and achieve price stability,** which means that inflation is low and stable.

- Year 2022 marked the return of **high inflation**, leading to central banks **tightening their monetary policies**
- In India, Monetary Policy Committee (MPC) also **increased policy repo rates** by a significant margin
- Reserve Money (M0) and Broad Money (M3) both registered **growth in FY22-23** and **Money Multiplier** (Ratio of M3 and M0) remained **stable** at 5.1
- **Double-digit bank credit growth** (15% in FY22-23) is being seen along with decline in Gross NPAs of banks

Key objectives

- The primary objective is to **maintain price stability** while keeping in mind the objective of **growth.**
- **Implementation of the Flexible Inflation-Targeting (FIT) (currently 4% (+/- 2%)) framework,** which is revised every 5 years.
- **Financial stability** and adequate availability of credit for growth.
- Safeguarding the value of Rupee and ensuring **Exchange rate stability.**

Constraints

- **Developing economies** like India are subject to **greater supply shocks than developed economies.**
- **COVID 19** has resulted in major supply and demand-side shocks in the economy **disrupting the monetary policy dynamics.**
- Greater hinge towards Inflation Targeting **tends to compromise growth.**
- **Uncertain environment** due to lags in data, informational constraints, and accuracy of data.
- **Difficulty to forecast** in a volatile environment.
- **Limitations in monetary policy transmission and underdeveloped money market.**

Monetary Policy Framework

- **Six-member MPC** implements the FIT framework under RBI Act, 1934.
- **Consumer Price Index (CPI)** has been chosen as a **measure of inflation.**
- Instruments of monetary policy include **Repo, Reverse Repo, CRR, SLR, LAF, MSF, Open Market Operations etc.**
- Use of **innovative tools of monetary policy** such as GSAP, LTROs etc.

Way forward

- Improving the **data collection** and **analysis** framework.
- Broadening the **investor base** in Government securities.
- Strengthening coordination of **Monetary and Fiscal policy.**
- Make the economy more **resilient** in light of the fragilities exposed by t**he impact of COVID-19 on the economy.**
- **Staggered appointments** to MPC increasing its independence and avoiding political influence.
- Reserve Bank of India has adopted a **Medium-term Strategy Framework – Utkarsh 2.0.**
  - It aims to s**trengthen the trust** of citizens, adopt **ethical internal governance** and nurture dynamic and skilled **human resources.**

3.2. BANKING AND FINANCIAL MARKETS

3.2.1. URBAN CO-OPERATIVE BANKS (UCBS)

Why in the news?

The Reserve Bank of India has notified these vital measures to **strengthen Urban Co-operative Banks**.

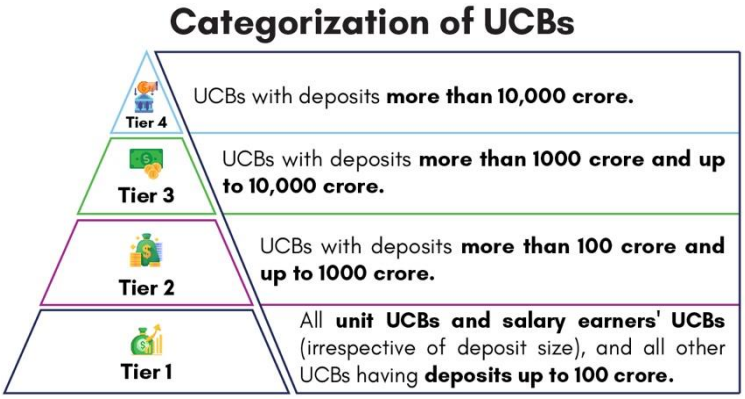
Key measures announced

- **New branches:** UCBs can now open new branches up to 10% (max 5 branches) of the number of branches in the previous financial year without prior approval (i.e., automatic approval) of RBI in their approved area of operation.
  - The objective is to rationalize the process of branch opening and to enable the UCBs to tap growth opportunities in the sector.

- **Financially Sound and Well Managed (FSWM) Norms:** To avail of branch expansion facility, UCBs have to get the policy approved by their board and comply with the FSWM Norms.
  - RBI terms select UCBs as FSWM subject to fulfilment of prescribed criteria.
- **One-time settlements:** Co-operative banks through board-approved policies may provide a process for technical write-off as well as settlement with borrowers.
  - This has brought cooperative banks at par with other commercial banks now.
- **PSL Target:** RBI has decided to extend the timeline for UCBs to achieve Priority Sector Lending (PSL) targets by two years (i.e., up to March 31, 2026).
- **Coordination with RBI:** RBI has notified a nodal officer (in RBI) to meet the long pending demand of the cooperative sector for closer coordination and focused interaction.

About UCBs

- **Regulation:** In 2020, the Government made **changes to The Banking Regulation Act, 1949** and brought cooperative banks under the **direct supervision** of the RBI.
  - To strengthen the regulatory framework and financial soundness of UCBs, **a four-tier structure categorization was introduced.** *(Refer infographic).*



- **Priority Sector Lending (PSL) targets**: **75% of their advances** have to comprise PSL, including loans to MSMEs, export credit, housing, education, and agriculture, among others.
- **Importance of UCBs:** Financial inclusion, extensive grassroot network, large untapped area of expansion etc.

Issues with UCBs

- **High gross non-performing assets (GNPA):** Gross NPAs ratio for UCBs **was 8.7%** (RBI FSB report 2023).
- **Governance issues:** Vulnerability stemming from **internal weaknesses**, including the inability to prevent fraud.
  - For instance, the **collapse of Punjab and Maharashtra Cooperative Bank** in 2019 following grave financial irregularities.
- **Inability to adopt best practices**: The state-of-the-art technology adopted by new players like fintech entities **disrupts the niche customer segment** of the UCBs.
- **High influence of top management:** Often the chairperson, has **significant influence over all the matters.**
- **High cost-income ratio:** Average cost-income ratio of UCBs is **roughly 10% higher**.
- **Low share in the banking sector**: Market share of stands at **around 3%.**

Other Initiatives taken for overcoming issues of UCBs

- **Supervisory Action Framework (SAF):** It seeks **expeditious resolution** of UCBs experiencing financial stress.
  - The SAF entails the initiation of **corrective action by UCBs and/or supervisory action by RBI** on breach of the specified thresholds (triggers).
- **Scheme for voluntary conversion:** The RBI announced a scheme for the **voluntary conversion of eligible UCBs into SFBs** in 2018.
- **Umbrella organisation (UO):** RBI had accorded **regulatory approval** in 2019 for the formation of a UO for the UCB sector.
  - UO is also expected to set up **Information and Technology (IT) infrastructure** for shared use. It can also offer **fund management and other consultancy services.**

Conclusion

Long-term growth of UCBs warrants rapid technology adoption, clear accountability processes and efforts to ensure seamless integration with the overall financial system. Gradual but sustained adoption of these steps will ensure the **achievement of the vision- 'Sahakar se Samridhi'**.

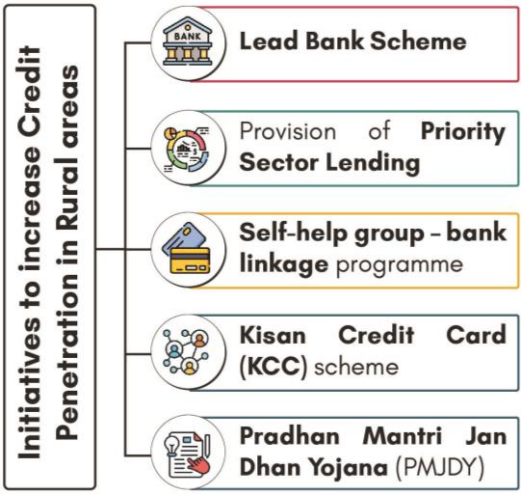
3.2.2. NATIONAL BANK FOR AGRICULTURE AND RURAL DEVELOPMENT (NABARD)

Why in the news?

The Union Home Minister recently stated that **National Bank for Agriculture and Rural Development (NABARD)** has worked as a backbone of India's rural economy.

NABARD as a Backbone of Rural Economy

- **Promotion and Development:**
  - Around Rs. 5 lakh crore has been sanctioned under the country's **Rural Infrastructure Development Fund (RIDF)** (created in NABARD)**.**
  - **Watershed Development Fund and Tribal Development Fund** are other important livelihood interventions.
- **Refinancing:** In the last 42 years, NABARD has **refinanced Rs 20 lakh crore** in the rural economy. (**Refinancing is taking a newer loan to pay off existing debt**.)
- **Strengthening Rural Financial Institutions (RFIs):** About Rs. **8 lakh crore** has gone to the rural economy through NABARD for capital formation.
  - NABARD supervises **Rural Cooperative Banks (RCBs) and Regional Rural Banks (RRBs).**



Issues in the current institutional rural credit system

- **Regional imbalance in credit dispensation:** In 2020-21, the Southern Region had the largest share (45.9%) but the Eastern Region hardly accounted for 9.5 % of **agriculture credit disbursed.**
- **Disparity based on landholding**: Medium and large farmers, who are just 14 % of total farmers, get 48 % of the agricultural credit.
  - The primary reason behind the low credit disbursement to small and marginal farmers is the **decrease in the share of RRBs and Cooperatives in total credit disbursement.**
- **Gender disparity in credit distribution:** As per **World Bank findex** data, only 5 % of Indian women accessed bank credit**.**

Way Forward

- **Land Lease Markets:** State governments should be encouraged to reform their legal framework based on the **Model Land Leasing Act proposed by NITI Aayog**.
  - **The computerisation of land records** can help provide information and further aid in streamlining such a market.
- **Addressing Regional Disparity**: Allocation of RIDF in **central, eastern and north-eastern states may be increased** over time to strengthen the rural infrastructure in these regions.
- **Credit Guarantee**: A **credit guarantee scheme** on the lines of Credit guarantee fund trust for micro and small enterprises can be created to provide collateral-free loans to tenant farmers.

3.2.3. CAPITAL MARKETS

CAPITAL MARKETS AT A GLANCE

Capital markets are part of the financial markets where buyers and sellers can engage in the trade of long-term (period greater than one year) financial instruments.

Status of India's capital market

- **Consistent growth in terms of size** during the past few decades.
- Large number of new instruments such as **hybrids & convertibles, Real Estate Investment Trusts (REITs), Infrastructure Investment Trusts (InvITs), etc.**
- **Money raised by Initial Public Offering** has been the greatest in the last decade. FY2022 has been oft cited as the "Year of IPOs".

Role of Capital Markets

- **Reducing funding costs** for industries, enable their expansion and bring transparency.
- **Alternative source of funding** for government, its enterprises, and local bodies.
- **Facilitates disinvestment** of government enterprises.
- **Helps in capital formation** with better returns to investors, attracting foreign investment and funding innovative solutions.
- **Social upliftment** with various instruments such as impact bonds, social stock exchange etc.
- Promotion to **sustainable investment and climate finance** such as through green bonds, establishment of ESG considerations etc.

Factors responsible for the growth of the capital market in India

- Modernization of trading system by **depository system and computerized Screen-Based Trading** to improve efficiency.
- **Quicker settlement of trades** with recent adoption of T+1 settlement.
- **Growth of awareness** of capital market instruments and investment opportunities.
- **The emergence of new instruments** like mutual funds, venture capital funds, REITs, InvITs etc.
- **Growth of ancillary industries** like merchant banking and underwriting business.
- **Liberalization measures** to tap foreign capital.
- **Development of the institutional framework** like credit rating agencies, development banks, and independent regulatory body (SEBI).

Challenges in the Indian capital market

- **Inadequate disclosure:** Lack of quality information disclosed by companies, especially climate related disclosures.
- **Inadequate Protection to Investors** like lack of grievance redressal mechanism.
- **Slowing retail participation** and lack of investment from smaller cities.
- **Malpractices, unfair practices and scams** like price manipulation and insider trading hamper the trust of investors.
- **Issue of independence of Credit Rating Agencies (CRAs).**
- **Misuse of technologies** like Algo trading, artificial intelligence, robot advisory, etc.

Way Forward

- **Expanding the participation of retail investors.**
- **Strengthening the legal and regulatory framework for investor protection**
- **Enhancing the quality of disclosures** by increasing the quality of financial results, annual reports, and adoption of ESG norms etc.
- **Stringent measures against unethical trade practices** and redressing insider trading.
- **Reforming credit rating industry** through measures like 'investor pay' model, etc.
- **Regulation of algo trading** and other disruptive technologies such as generative AI.
- **Diversification** for increasing resource mobilization.

3.2.4. SOCIAL STOCK EXCHANGE

Why in the news?

National Stock Exchange (NSE) has got the final approval from the Securities and Exchange Board of India (SEBI) to launch a Social Stock Exchange.

About Social Stock Exchange (SSE)

- **SSE** is a separate segment of the existing Stock Exchange that can **help Social Enterprise(s) to raise funds from public** through the stock exchange mechanism.
- Eligible activities for **demonstrating primacy of Social Impact** include, inter alia:
  - Eradicating **hunger, poverty**, malnutrition and inequality;
  - Promoting **education, employability and livelihoods**;
  - **Disaster management**, including relief, rehabilitation and reconstruction activities;
  - Protection of **national heritage, art and culture** etc.

Importance of SSE

- **Improved market access** for Social Enterprises and investors/donors with inbuilt regulation for providing sanctity and accountability of finances.
- **Zero Listing and Admission cost**: SSE saves cost for both issuer and investor/donor by charging negligible fees for registration and listing.
- **Performance based philanthropy**: Performance of the enterprises listed on an SSE would be monitored thus it will instill a culture of performance (Social return) driven philanthropy.
- **Promote market discipline**: Given that listing on SSE would **involve regular audit of impact** that SEs create, it will **promote competition** between firms and **encourage market discipline**.
- **Reduced burden on government**: SSE would leverage private sector participation in some key areas, engendering a collaborative approach with government in achieving the developmental goals.

Concerns associated with SSE

- **Lack of awareness**: Presently investors **do not have enough information** about such Social Enterprises.
- **Complexity:** An SSE can be more complex than a traditional stock exchange, given the need to evaluate both financial and social performance metrics.
- **Inadequate research on SSEs**: There is also a dearth of **adequate and meaningful literature and analysis** of SSEs and their implications on civil society.
- **Limited liquidity**: Social enterprises and non-profits may have limited liquidity in the secondary market.
- **Concerns about sustainability and scale:** A study by Impact Finance Network in 2018 found that 75% of platforms were unsuccessful in generating income sufficient to fund their operational costs.

Road Ahead

- **Increase investor education:** Investors need to be educated about the unique features of social enterprises and non-profits, including their financial and social performance metrics.
  - **Develop innovative financial instruments** such as social impact bonds, revenue-sharing agreements, and crowdfunding platforms that can help to attract more investors to the social stock exchange.
  - **Learning from other countries:** A **comprehensive analysis** of the experiences, structures, and learnings from SSEs across the world can aid in creating a **more enabling environment** for social organizations.

3.3. AGRICULTURE AND ALLIED ACTIVITIES

3.3.1. LIVESTOCK SECTOR

Livestock Sector at a Glance

Status of Livestock sector in India

- It contributes **4.11% to the country's GDP** and constitutes **25.6% share of total agriculture GDP**
- **8.8% of population** in India **draws employment** from livestock sector
- **India is first in global milk** production with around 24% of the global share
- The sector receives **only around 12% of public expenditure** on agriculture and the allied sector

Significance of livestock sector

- Ensures food and nutrition security.
- Provide **subsidiary income** to the rural households and social security to the landless.
- **Employment generation** in labour intensive sectors.
- Promotes **gender equity** and women empowerment in the primary sector.
- Promotion to **organic/integrated farming.**

Government initiatives

- **National Livestock Mission** to promote entrepreneurship and breed improvement.
- **Rashtriya Gokul Mission** for conservation of indigenous bovine breeds.
- **Livestock Health & Disease Control and National Animal Disease Control Programme.**
- **National Programme for Dairy Development and Dairy Infrastructure Development Fund**
- Supporting Dairy Cooperatives and Farmer Producer Organizations
- **Livestock Census**

Issues with India's livestock sector

- **Low productivity** and shortage of feed and fodder.
- Increased **susceptibility** of livestock **to various diseases.**
- **Absence of extension services** like agri-credit, technology, knowledge gap etc.
- **Lack of attention on small ruminants** like sheep and goats.
- **Absence of necessary** marketing, processing, and value-addition infrastructure.
- **Implications of climate change.**

Way Forward

- **Improve Animal Health** through mobile veterinary dispensaries, strengthening surveillance and One-Health Approach
- **Selective breeding** of indigenous cattle and formation of breed associations.
- **Development of forward linkages** through cold storage infrastructure, food processing industries, textile industries etc.
- **Quality control** with organic farming and standardization of production processes.
- **Institutional Strengthening** with promotion of cooperatives, FPOs and SHGs.

3.3.2. FERTILISERS SECTOR

Fertilisers Sector at a Glance

Status of Fertilizer sector in India

- India is the **3rd largest producer of fertilisers** and the **2nd largest fertilizer-consuming country** after China
- **Urea** is **the most produced (86%)**, the **most consumed (74% share)**, and the **most imported (52%)**
- Fertiliser industry **forms a part of the eight core industries**
- Indian fertilizer market is projected to register a **CAGR of 11.9% (for 2022-2027)**

Key Concerns with Fertiliser Use

- **Soil degradation**, damage to plants and increased **toxicity.**
- **Environmental pollution** including eutrophication, algal bloom, greenhouse gas emissions etc.
- **Harmful effects on human health** such as respiratory diseases, cancer risks etc.
- **High Fiscal Burden** on government in subsidizing fertilisers (0.5% of GDP).
- **Import dependency** for fertilizer materials.

Government Initiatives for Efficient use of Fertilisers

- **PM Programme for Restoration, Awareness Generation, Nourishment and Amelioration of Mother – Earth (PM-PRANAM)** to incentivize States/ UTs to **promote alternate fertilizers** and **balanced use of chemical fertilizers.**
- **Market Development Assistance (MDA) for promoting Organic Fertilizers** from GOBAR-Dhan (Galvanizing Organic Bio-Agro Resources- Dhan) Plants.
- **One Nation One Fertiliser Scheme** under Pradhan Mantri Bhartiya Janurvarak Pariyojana (PMBJP).
- **Nano Urea (Liquid) plants** to boost productivity.
- **Fertiliser Flying Squads** to stop the diversion and black marketing.
- **Nutrient-Based Subsidy (NBS) Scheme,** applicable to 22 fertilisers other than urea.
- **Soil Health Card Scheme** for crop-wise recommendations for nutrients and fertilizers.

Way forward

- **Improving fertilizer efficiency** through need-based use.
- **Promoting local production** of fertilisers to decrease reliance on imports.
- Promote **use of bio and organic fertilisers** and incentivize farmers to shift towards their use.
- Provide **access to affordable soil testing facilities** to rationalize fertilizer use.
- **Continuous R&D** to develop efficient fertilizer delivery systems such as nano urea.

3.3.2.1. ONE NATION ONE FERTILISER (ONOF)

Why in the news?

Ministry of Chemicals and Fertilizers launched **Pradhan Mantri Bhartiya Jan Urvarak Pariyojana - One Nation One Fertiliser scheme.**

About the scheme

- This scheme aims at **marketing fertilisers in the country under 'Bharat' brand name.**
- Under the scheme, **all subsidised soil nutrients** - urea, di-ammonium phosphate (DAP), Muriate of Potash (MOP), and NPK - **will be marketed under the single brand Bharat.**
  - The **uniform design of bags across the country** will now mention them as 'Bharat urea', 'Bharat DAP', 'Bharat MOP', 'Bharat NPK' and so on.

Rationale Behind the scheme

- **Ensure affordable quality fertiliser** of Bharat brand to the farmers.
- **Reduce the cost of fertilisers** and increase their availability
- **Avoid confusions** due to multiple brand.
- **Put an end to the misconceptions** among farmers that certain brands of fertilisers are better than others.
- **Reduce transport subsidies,** estimated to be over 6,000 crore per year

Fertilizer subsidy in India

- Government is making available fertilizers, **namely Urea and 25 grades for P&K fertilizers to farmers at subsidized prices** through fertilizer manufacturers/importers.
- Subsidy on P&K fertilizers is **being governed by Nutrient Based Subsidy (NBS) Scheme.**
  - It covers **fertilizers with primary nutrients (N, P, K and S) as well as any variant of fertilizers** with secondary and micronutrients (except S).
  - Subsidy is **released directly to fertilizer companies at approved rates** (based on Inter-Ministerial Committee) recommendation.
- Subsidy for urea is provided under **Urea subsidy Scheme.**

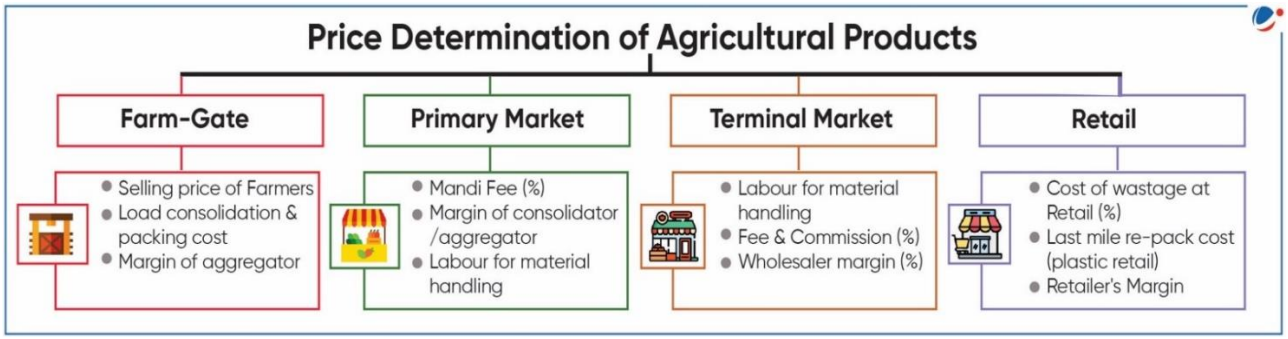
3.3.3. PRICING OF AGRICULTURAL PRODUCE

Why in the news?

Recently, a **rapid increase in the retail price of tomatoes** was witnessed, thus triggering a discussion on agricultural prices and their stability.

Factors responsible for the price rise in Tomato

- **Erratic weather conditions:** Tomato yield suffered due to **relatively high summer temperatures and unusually sharp rain spells** in the northern States.
- **Low prices of tomatoes in the April-May cycle:** Many farmers abandoned the crop or sold whatever produce they had at the earliest, causing a glut earlier and scarcity now.
  - **Farmers in various places also switched to other crops owing to higher prices**. For instance, many farmers in the Kolar district of Karnataka shifted to beans.
- **Virus impact:** Tomato crops in Maharashtra were impacted by the Cucumber Mosaic Virus (CMV) attacks**. In contrast,** crops in Karnataka and other South Indian states were affected by **Tomato Mosaic Virus (ToMV).**
  - Both viruses **can cause almost 100% crop loss** unless adequately treated promptly.



Challenges in Agri Produce Pricing

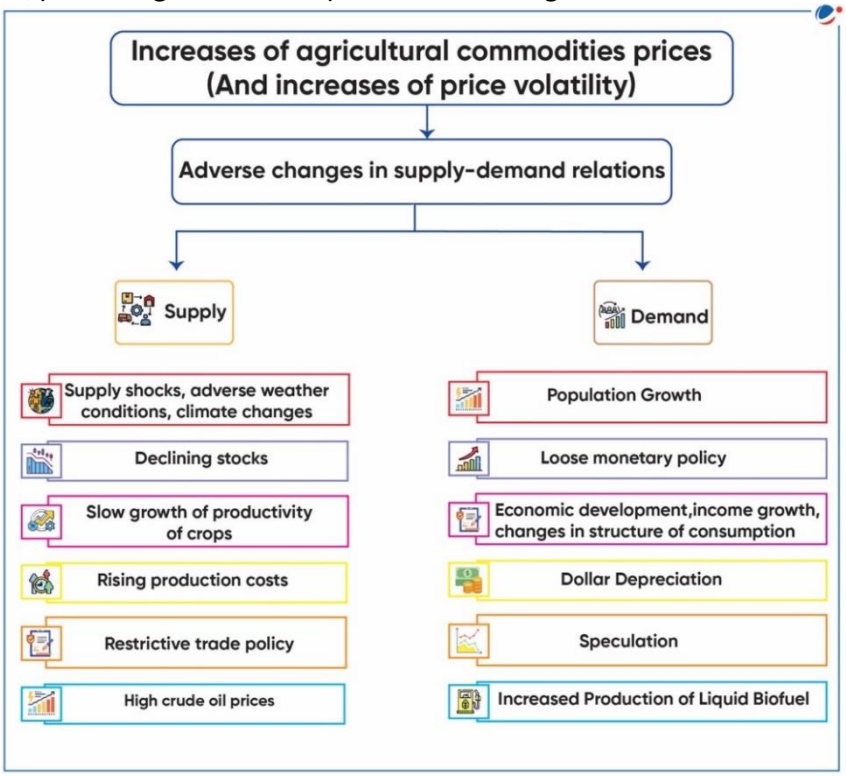
- **Climate Change:** High vulnerability to extreme variability in climatic factors, negatively affecting acreage, yield and production.
- **Input subsidies and inflation:** Fluctuations in input subsidies such as fertiliser, seed, power subsidies etc. and the prevalence of high inflation affect the cropping patterns.
- **Distorted MSP procurement:** Though the Minimum Support Price (MSP) is announced for 22 crops, actual procurement is done on a large scale for rice and wheat.
  - This results in only a tiny fraction of farmers realising MSP.
- **Effect of Global market:** Demand and supply can frequently change due to geopolitical environments such as the Russia-Ukraine conflict, global economic uncertainties etc.
- **Available Infrastructure and Technology:** Low prevalence of mechanised tools, use of weather data, scientific production methods, post-harvest infrastructure, processing and transportation facilities etc., amplifies the price fluctuations in the market.

The mechanism for Price Monitoring and Control

- **Price Monitoring Division (PMD):** Price Monitoring Division in the Department of Consumer Affairs monitors the prices of selected essential commodities.
  - It analyses the price situation and gives **advance feedback for taking preventive measures**.

- It implements commodity-specific **market intervention schemes** to give temporary relief.

- **Operation Greens:** It was launched on the lines of Operation Flood to promote Farmer Producers Organizations (FPOs), agri-logistics, processing facilities and professional management.
- **Essential Commodities Act, 1955:** It empowers the central government to control the production, supply, distribution, trade, and commerce of certain commodities.

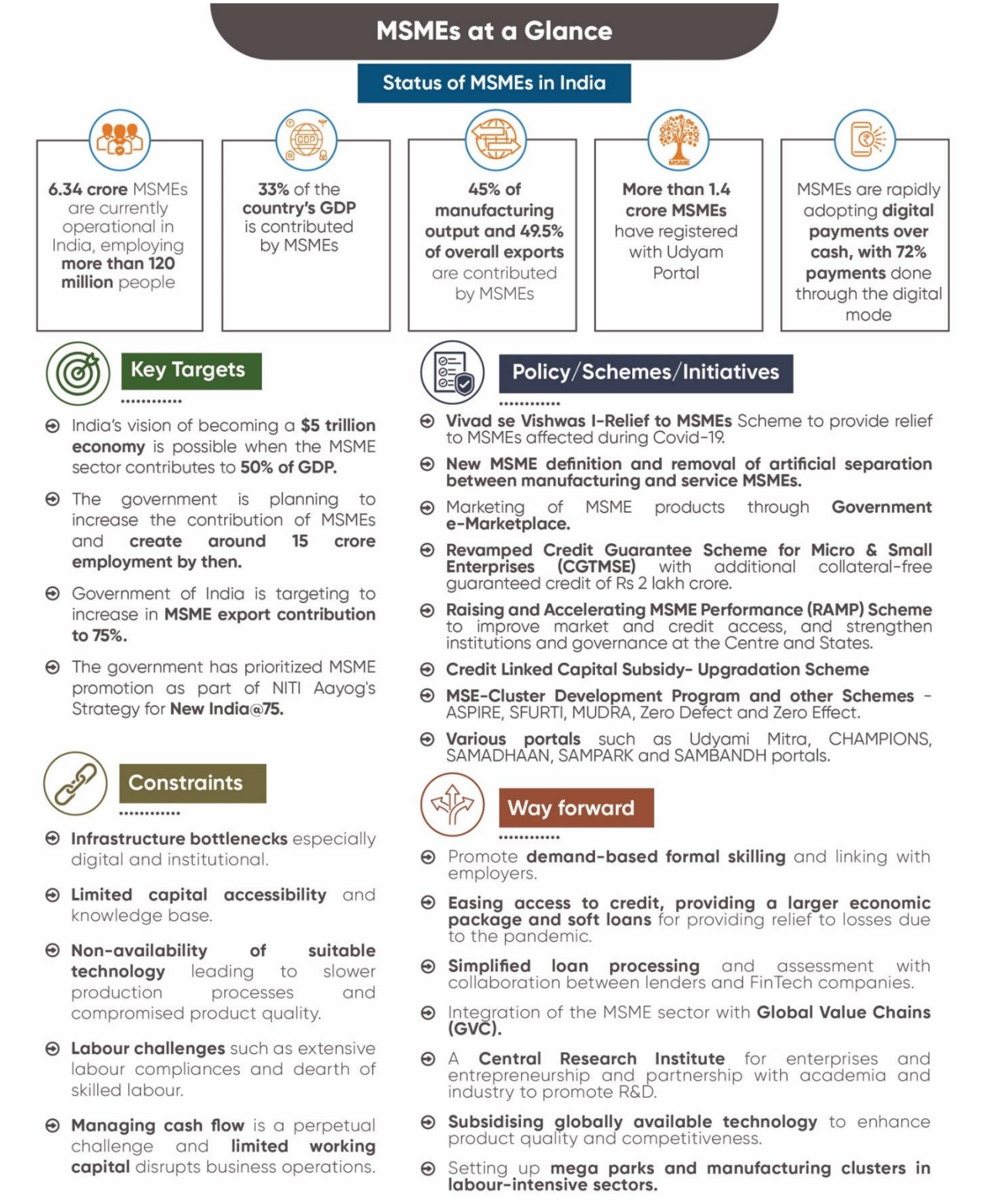


Way Forward

- **Adoption of Climate Resilient Agriculture**
- **Improved Price Monitoring** by ensuring better policy interventions at earlier stages of price fluctuations.
- **Reforming the MSP regime** alongside policies incentivising more agro-climatically suitable cropping patterns.
- **Strengthening agricultural research** and systematic disease monitoring.
- **Increased technology use** like using space technology for real-time weather advisory, use of Data Science and Blockchain systems in agricultural marketing etc.,
- **Better post-harvest infrastructure creation** including multimodal transportation.

3.4. INDUSTRY

3.4.1. MSMES



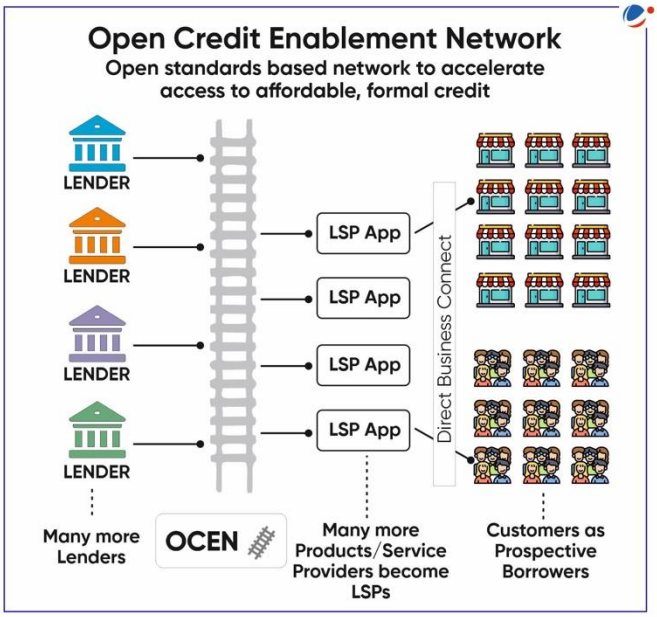
3.4.1.1. OPEN CREDIT ENABLEMENT NETWORK (OCEN)

Why in the news?

The Economic Survey 2023 stated that- Open Credit Enablement Network (OCEN) may democratise lending operations and help small borrowers in the country.

About OCEN

- **Concept:** OCEN is **a software architecture** that brings the different stakeholders in the credit ecosystem, i.e., lenders, borrowers and intermediaries, together under a single roof.
- **Founded by:** The **Indian Software Product Industry Roundtable (iSpirt),** an industry think tank & launched during the **Global Fintech Festival 2020.**
- **Working of OCEN:** Within the OCEN framework, there are three key market participants:
  - **Lenders**: **Banks, NBFCs and fintechs** provide credit and service access to the OCEN Ecosystem.
  - **Loan Service Providers (LSPs):** These are intermediaries such as **online marketplaces** and **internet startups** (e-commerce, food delivery etc.) that absorb credit and services provided by Lenders within their system (such as Apps, digital marketplaces etc.).
    - ✓ They also absorb data from the OCEN system, such as credit history and other data of MSME (it helps in the LSP's decision-making process).
  - **Borrowers**: **Small businesses and merchants** who will access credit from the OCEN system through Loan Service Providers (LSPs).



MSME Credit Access Issues

- **Poor MSME credit penetration:** The credit gap is estimated at around **$250 bn, almost 10% of GDP**. This is due to structural challenges like :
  - **High Risk**: Most potential borrowers have poor or non-existent credit scores.
  - **High Cost to Serve**: **Acquisition, underwriting, and collection costs** make it cost-prohibitive.
  - **Limited Access**: With existing online and offline channels.
- **Largely informal Credit System: Only 11% of MSMEs have access to formal credit,** and more than 60% of all credit demand is unmet.

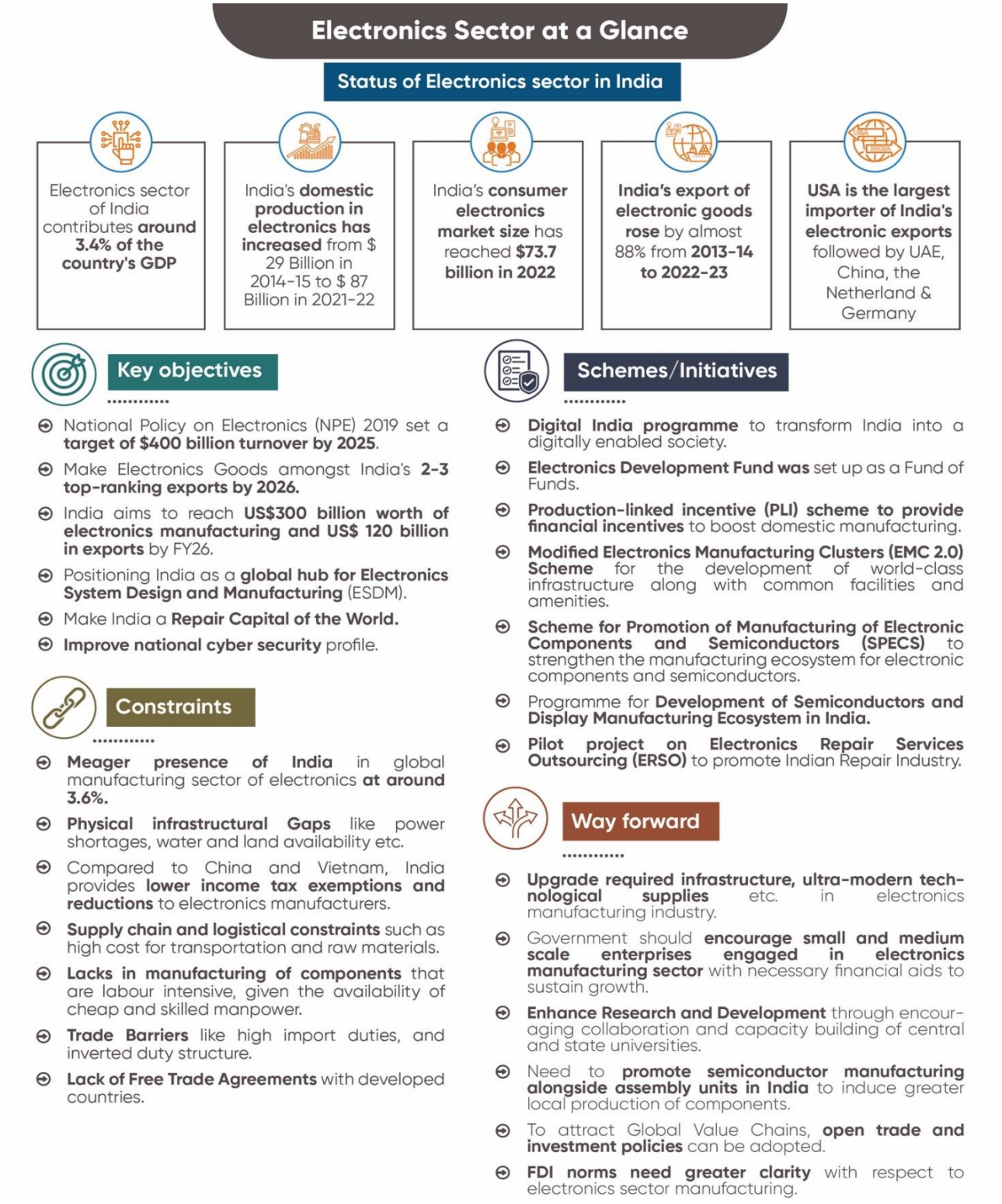
How can OCEN help?

- **Greater financial inclusion:** OCEN could help formalise **and democratise the credit channels for MSMEs** and help them get credit from the system without collateral based on their credibility.
  - Access to credit is democratised through **lower interest rates, access to customised credit products** and near-instant **loan approvals.**
- **Entrepreneurship and growth:** This will enable **lenders to build tailored lending instruments** and **businesses to simplify their access to the market**.
- **Access to loan-related data:** will help better formulation and implementation of policies.

Conclusion

OCEN implementation may encounter challenges such as more **loan defaulters, data leakage to third parties** and **increased risk of cyber-attacks.** But eventually, it will substantially affect MSME and the country's GDP.

3.5. ELECTRONICS SECTOR



3.5.1. SEMICONDUCTOR INDUSTRY IN INDIA

Why in the news?

The government has decided to invite new applications for **setting up Semiconductor Fabs and Display Fabs** in India under the **Modified Semicon India Programme.**

About Modified Semicon India Programme

- **Objective:** It aims to provide **attractive incentive support to companies/consortia** that are engaged in Silicon Semiconductor Fabs, Display Fabs, Compound Semiconductors, Semiconductor Design etc.

- **Tenure:** Support under the scheme will be provided for **six years.**
- **Nodal Agency: India Semiconductor Mission,** within Digital India Corporation, MeitY **is the designated nodal agency** for implementing the programme.

India's semiconductor market

- **Market Size:** Reports project India's semiconductor market to **value about $64 billion by 2026**, showing **three-times growth** from 2019.
- **Chip Manufacturing:** India has become the **hub for semiconductor design with nearly 2,000 chips** being designed per year.
- **R&D in the industry:** Research and development (R&D) in this industry, which includes electronic products and embedded systems, **generated about US$2.5 billion** in revenue.

Global Semiconductor Scenario and India's role

- **Major Producer:** Presently, **Taiwan is the world leader in manufacturing microchips** with producing over 60% of the world's semiconductors and over 90% of the most advanced ones.
- **US-China Conflict:** Presently, **USA and China are engaged in trade and technology conflict**.
  - The USA passed the **CHIPS and Science Act**, providing **subsidies for manufacturing chips** in the country, formed the **"Chip 4 Alliance"** and imposed **additional restrictions** on the Chinese semiconductor industry.
  - In a similar manner, China put **curbs on the exports of germanium and gallium**, two niche metals used in the manufacturing of semiconductors.
- **India's Role:** India has positioned itself as a **player in the critical semiconductor technology field** providing an opportunity for **companies to diversify their bases from China**.
  - In 2022, India signed **India-US Initiative on Critical and Emerging Technologies (iCET) deal**.
  - **India launched its India Semiconductor Mission (ISM)** in 2021 and **Production Linked Incentive (PLI) scheme** for the semiconductor industry.
  - India can be a major beneficiary of **Taiwan's New Southbound Policy**, focusing on shifting its trade and investments from China to Southeast Asia and South Asia.

Significance of semiconductor industry for India

- **Market Growth:** Currently valued at around **USD 2 Trillion (Rs. 150 lakh crore),** the global electronics market is expected to grow significantly.
- **India as a global hub:** The vision of National Policy on Electronics 2019 (NPE 2019) is to **position India as a global hub for Electronics System Design and Manufacturing (ESDM)**.
  - One of the main strategies of NPE 2019 is to **facilitate the setting up of semiconductor wafer fabrication facilities** and its ecosystem for the design and fabrication of chip components.
- **Strategic significance:** India wants to achieve **technological leadership** in this area of strategic importance which is also key to the security of the country's **critical information infrastructure**.
  - The program will **attract large global chip makers to make India their production base**, fulfilling the government's vision for **Atmanirbhar Bharat**.

Challenges/constraints in India

- **Challenges in meeting the infrastructural requirements** of a cluster of semiconductor manufacturing fabs such as a continuous supply of water, uninterrupted electricity etc.
- **Long gestation:** A state-of-the-art fab can take **up to five years before going into full production** but requires full financing and a continuous supply of labour during the gestation period.
- **Delays in setting up facilities:** Three entities that had applied to build the chips are all facing **hurdles in setting up their plants** – potentially delaying their manufacturing bases.
- **Shortage of skilled workforce:** There are **hardly any semiconductor engineers** trained in the knowledge of device physics and process technology.

Way Forward

- **Ecosystem Development:** Develop a strong ecosystem for the semiconductor industry to include **supply chain management** besides design and manufacturing facilities.
- **Skill Development:** India, with its demographic dividend, must focus on training the highly skilled labour required for the semiconductor industry.
- **Increased focus on R&D:** Increase **spending on research and development** and develop an **innovation culture**.

- **Incentivising Industry:** There is a need for incentivising industry to collaborate with academia to provide training and internship opportunities to students and invest in R&D to develop new technologies.
- **Partnership:** Strengthen partnerships with countries such as the USA, Taiwan and Japan for supply chain efficiency and availability of necessary raw materials and technologies.
- **Attracting foreign companies:** India needs to enable a **conducive environment for attracting foreign companies** to set up their manufacturing bases in India.

3.6. PHARMACEUTICAL INDUSTRY IN INDIA

PHARMACEUTICAL SECTOR AT A GLANCE

Status of Pharmaceutical Sector in India

- Economic Survey 2022-23 estimated India's **domestic pharmaceutical market to touch $130 billion by 2030**
- India is **3rd in the world in Pharma Production by volume**
- India is the **largest provider of generic medicines and a leading vaccine manufacturer**
- Pharma industry contributes **1.72% of India's GDP**
- It has a **5.92% share in India's global exports**

Factors for growth of Pharmaceutical Industry in India

- **Favourable government policies** such as tax incentives, R&D grants etc.
- **Low cost of manufacturing** due to cheap labour, and low-cost utilities.
- Upgrades in manufacturing plants and availability of **skilled workforce.**
- Strong **domestic demand and expanding exports,** especially of generics.
- Increasing **medical tourism**

Government initiatives for Pharmaceutical Industry

- **Strengthening of Pharmaceutical Industry (SPI) Scheme for MSMEs.**
- **PLI Scheme** for critical Key Starting Materials (KSMs)/Drug Intermediates (DIs)/ APIs in India.
- **Promotion of Bulk Drug Parks** to reduce the manufacturing cost of bulk drugs.
- **Pharmaceutical Promotion & Development Scheme (PPDS)** for export promotion and financial support.
- **Pharma Bureau** for resolution of coordination issues.
- **Pradhan Mantri Bhartiya Janaushadhi Pariyojana (PMBJP)** to make affordable quality generic medicines available to all.

Challenges in Pharmaceutical Industry

- **Lack of dominance in high value drugs** – India ranks 3rd in world in terms of volume of production but 14th by value.
- **Frequent changes in domestic pricing policies** creating uncertainty.
- **Poor R&D** acting as a barrier in development of new drugs and medical devices.
- **Dependence on external markets** such as China for import of APIs.
- **Difficulties in ensuring consistent quality** in production processes.

Way Forward

- Need to focus **on manufacturing high value pharmaceutical products.**
- **Increasing funding** for innovation and R&D and incentivizing development of new drugs and devices.
- **Enabling regulatory ecosystem** with regard to drug and vaccine trials, quality control and affordability.
- **Develop fair pricing policies** with industry stakeholders to **balance the need for affordable medicines with the industry sustainability.**

3.6.1. NATIONAL MEDICAL DEVICES POLICY, 2023

Why in the news?

Recently, Cabinet approved National Medical Devices Policy, 2023.

Aim of the policy

- **Make India a global leader in manufacturing and innovation of medical devices** over the next 25 years.
- **Help the medical devices sector grow** from the present $11 Bn **to $50 Bn by 2030.**
- **Facilitate an orderly growth** of the medical device sector **to meet public health objectives** of access, affordability, quality, and innovation.

Salient Features of the Policy

Regulatory Streamlining	• By **creation of a Single Window Clearance System** for Licensing, **enhancing Role of Indian Standards** like BIS and **designing a coherent pricing regulation.**
Enabling Infrastructure	• **Establishment and strengthening of large medical device parks, clusters** equipped with world class common infrastructure facilities **in proximity to economic zones.**
Facilitating R&D and Innovation	• Establishing **Centres of Excellence in academic and research institutions**, innovation hubs, **'plug and play' infrastructures and support to start-ups**.
Attracting Investments in the Sector	• **Encouraging private investments**, series of **funding from Venture Capitalists**, and Public-Private Partnership (PPP).
Human Resources Development	• **Leveraging available resources** in Ministry of Skill Development and Entrepreneurship **for skilling, reskilling and upskilling** of professionals. • **Develop partnerships with foreign academic/industry organizations.** • **Multidisciplinary courses** for medical devices in existing institutions.
Brand Positioning and Awareness Creation	• Creation of a **dedicated Export Promotion Council** for the sector. • **Learning from best global practices** of manufacturing and skilling system.

3.7. INFRASTRUCTURE

3.7.1. ROADWAYS

Roadways at a glance

Status of Roadways in India

- India has the **second-largest road network** in the world, spanning a total of **6.33 million kilometres** (kms)
- Road transport carries **~87% of India's total passenger traffic** and **more than 60% of its freight**
- **2.2%** of the country's total **road network is National Highways**
- India has **1% of the total vehicle** population in the world, but **accounts for 11% of road crashes and fatalities,** costing 3-5% of GDP

Key Objectives

- NHAI plans to construct **12,500 kms of national highways in 2023-24.**
- Government has set a target of **developing 40 km of National Highways and Expressways per day for FY 2023-24.**
- Government aims to construct **23 new national highways by** 2025.
- **Reduce the number of road accidents** and fatalities by half by 2025.
- Completing **Bharatmala Pariyojana Phase-I by 2027** (initial target year was 2022).
- Plan to install **charging stations** every 40 to 60 km on national highways.

Constraints

- **Land acquisition delays, time overruns and increasing cost of the projects.**
- **Inadequate road infrastructure** with poor construction quality.
- **Lack of funding - Annual outlay** earmarked for **maintenance and repair of national highway** is only about **40%** of the funds required.
- Congestion and **lack of road safety.**
- Overstrained NHs and SHs, carrying more than **65% of the road traffic.**
- Expansion of the **public transport** fleets has been hampered by the short supply of vehicles.
- Other issues like **Poor traffic management and Parking issues.**

Schemes Initiatives

- **PM Gati Shakti** (81 high impact roadways projects).
- **National Infrastructure Pipeline** spending 18% of its capital outlay on road sector.
- **Bharatmala Pariyojana** to develop 34,800 km of highways, including 27 Greenfield corridors.
- **Multi-Modal Logistics Parks (MMLPs)** for integrating multiple modes of transport.
- **Vehicle Scrappage Policy** to encourage vehicle owners towards discarding old vehicles which have higher fuel consumption costs.
- **100% FDI** allowed under automatic route.
- **Other schemes** such as Northeast Road Sector Development Scheme, Pradhan Mantri Gram Sadak Yojana, Setu-Bharatam project etc.

Way forward

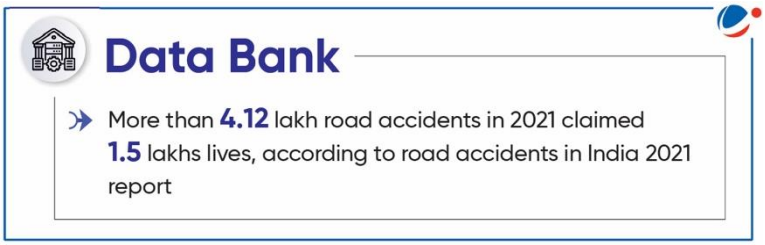
- **Earmark funds from the Central Road Fund (CRF)** for regular maintenance activities.
- Streamline **land acquisition** to decrease development costs.
- Increase the capacity, accessibility, and affordability of **public transport.**
- Increase **technology adoption and seamless movement between different modes of transport.**
- **Establish a common platform for coordination** among different stakeholders.
- **Increasing access to roads** to unconnected regions.
- **Adopt innovative models of public-private partnership.**

3.7.1.1. ROAD SAFETY

Why in the news?

National Highways Authority of India (NHAI) has **issued guidelines for rectification of accident-prone spots** on the National Highways by implementing short term measures.

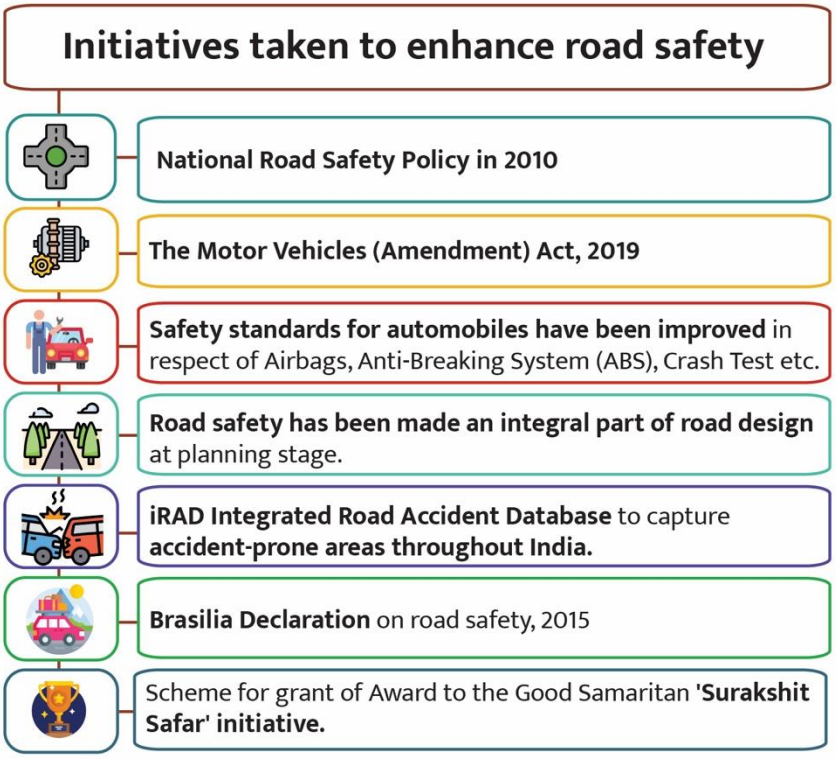
Key highlights of the guidelines



- **NHAI Project Directors** can undertake **rectification of accident-prone spots to the tune of up to Rs. 10 lahks per spot.**
- **Short-term measures** costing **more than Rs.10 lakhs and up to Rs. 25 lakhs** have been delegated to the **concerned Regional Office.**
- **Short Term Measures** include the installation of **pedestrian facilities** like zebra crossings with advance warning signs**, Crash barriers & railings, solar lights/ blinkers,** etc.

Factors driving road accidents

- **Road Environment Factors.**
  - **Poor designs: Sometimes** Highways come up haphazardly across the roads, and **street design** permits speeding, which leads to road safety concerns.
    - ✓ Problem is further aggravated due to **inadequate signage, road markings or incorrect location**, poor construction of **speed breakers.**
  - **Ongoing Construction Works astride road:** It restricts the availability of restricted space to the road user.
    - ✓ **Improper road markings, lack of traffic control,** etc. at such sites further increases the vulnerability
  - **Weather Conditions:** Heavy rain, dense fog and hailstorms **reduce visibility** and make the **road surface slippery** thus posing serious risks to the road users.
  - **Encroachment of Sidewalks:** Sidewalks not being available for pedestrian use who then move on the roads thereby becoming vulnerable to accidents.
- **Age of vehicles:** Old vehicles are relatively **more prone to breakdown and malfunction.**
  - It can result in **bursting of tyres, road collapse, wearing out of brakes, overturning of the vehicle**, etc.
- **Human factors:** Violation of Traffic Rules, Non-Use of Safety Devices (Helmets and Seat Belts), Triple Riding, **Overloading,** Distracted Driving, Road Rage, etc.
- **Regulatory issue:** Suboptimal **training and testing, lack of coordination** among different agencies.



Way ahead

- **Improving road environment**
  - **Design:** A well-designed highway should facilitate **high mobility while safely segregating the slower-moving traffic.** Also **merging of highways with streets** should be **methodical as well.**
  - **Accident Audit:** A six monthly audit of all roads must be undertaken to identify accident prone zones and ensure provisioning of adequate warning signages.
  - **Other: Crash barriers, parapets,** lighting provision, weatherproof roads, provision of large mirrors on sharp curves, etc. should be compulsory for all roads.
- **Improving vehicles:** Indigenisation of new technologies for safety features will bring the cost down which will increase its accessibility.

- Implementing the **Bharat NCAP (New Car Assessment Program)** a **rating based safety assessment (**line with the global standards) of Indian cars.
- **Vehicle Scrappage Policy** to scrap **old and unfit vehicles provides** incentives to the owner of old vehicles for purchasing a new vehicle.

- **Improving human behaviour:** Strong public focus on **wearing rear-seatbelts**, Road Safety Awareness Hubs, Interaction with Schools and Colleges, etc.
- **Improving regulation:** Stricter licensing norms, diligent driver training, ensuring coordination among various departments and ministries.

3.7.1.2. PRADHAN MANTRI GRAM SADAK YOJANA (PMGSY)

Why in the news?

Recently**,** Parliamentary Standing Committee on Rural Development and Panchayati Raj released its report on PMGSY.

About Pradhan Mantri Gram Sadak Yojana (PMGSY)

- According to the report, **96.24% under PMGSY-I and 97.01% under PMGSY-II** of the targets fixed have been **achieved** as on 31st January 2023.
- **Ministry of Rural Development (MoRD)** launched the first phase of PMGSY in 2000.
- **Online Management, Monitoring and Accounting System (OMMAS)** as a mechanism for monitoring the PMGSY
- **National Rural Infrastructure Development Agency (NRIDA):** Works are executed by the state and monitored by MoRD through NRIDA.

Issues in implementing PMGSY

- **Funds remain unspent:** The unspent balance as on January 2023, stands at around 6,800 crores.
- **Issues of land acquisition:** As per the CAG audit report for the period between 2010-2015, in 11 states, 372 projects were abandoned due to the non-availability of land or land disputes.
- **Poor Implementation of Projects:** Some projects were completed without required bridges or cross drainage structures, making the roads non-usable for all-weather connectivity.
- **Fund Diversion:** According to the CAG report, funds for road construction in multiple states were diverted towards maintenance and administrative expenditure, salaries and wages, etc.
- **Quality Control, Monitoring and Evaluation:** Irregularities such as non-establishment of field laboratories, non-availability of equipment, and non-deployment of trained manpower.
  - The Committee opined that **PMGSY roads do not take into account plying of heavy tonnage vehicles** which nowadays cause immense damage to the rural connectivity roads.
- **IT audit of OMMAS:** Data is not updated on OMMAS regularly, which has led to Management Information System reports being inaccurate and unreliable.

Way Forward

- **Staff training and transfer:** Staff responsible for updating data on the accounting system should be trained in the various modules of the system in a time-bound way.
- **State needs to update on OMMAS:** Regular updation about the physical and financial progress of the scheme on the OMMAS is needed.
- **Quality control system:** Ministry of Rural Development should review the quality control system to address deficiencies in the implementation of PMGSY.
  - The **committee opined that there is a need of increasing the thickness of the PMGSY** road from the existing 20 mm to 30 mm.
- **Stopping Fund Diversion**: Need to ensure that funds released for a specific purpose are not diverted.
- **Completing Land Digitalization programmes:** Schemes like SVAMITVA can help to create rural land pool. This can effectively reduce delays due to land acquisition.

3.7.2. INDIAN RAILWAYS

Indian Railways at a Glance

Status of Railways in India

- **4th Largest** Railway Network in the world **behind only US, Russia, and China**
- The Indian Railways consists of a total **track length of 1.26 lakh km with 7,335 stations**
- A daily passenger count of **24 million passengers and 204 million tonnes of freight**
- **1st and 4th** respectively in **passenger and freight transport globally**
- Indian Railways is the **single largest employer in India,** employing approximately **1.3 Mn people**

Key Targets

- Create a **'future ready' Railway system by 2030.**
- Vision 2024 has been envisaged to achieve targets of **2024 MT freight loading by 2024.**
- Increase **modal share of the Railways in freight to 45%** from existing 27%.
- **100% electrification** (Green Energy), **multi-tracking** of congested routes, upgradation of speed and **elimination of all Level Crossings** on all GQ/GD route by 2024.
- Identify new **Dedicated Freight Corridors** and **new High Speed Rail Corridors.**
- **Zero fatalities** in Railway transport.
- Increase the **share of non-fare revenues in total revenue to 20%.**

Constraints

- **Infrastructure bottlenecks:** Ageing infrastructure and delays in execution of new projects.
- **Internal generation of resources is low** with negligible non-fare revenues and high freight tariffs.
- **Safety and poor quality of service delivery.**
- **Poor terminal facilities** lengthen loading and unloading time.
- **Poor finances of Railways** leading to low investment, **poor services** and issues of low speed, delays, and safety concerns.
- **Capital Output Ratio (COR) increased in 2019-20,** indicates the decrease in physical performance of the IR as compared to capital employed.
- **Heavy dependence on transportation of coal** which constituted around **47% of the total freight earnings** during 2021-22.
- **Cross-Subsidization** as profits from freight traffic were utilised to compensate for the loss on operation of passenger services.

Schemes

- **Rail Kaushal Vikas Yojana** under PMKVY.
- **PM Gati Shakti** (Cargo terminal development).
- **KAVACH** (Automatic Train Collision Avoidance System)
- **Bharat Gaurav** and **Vande Bharat** Trains and **High-Speed Rail projects** such as Mumbai-Ahmedabad.
- **Rashtriya Rail Sanraksha Kosh** to strengthen safety measures.
- **Adarsh Station Scheme** for the development of Railway Stations and **One Station One Product** for promoting Vocal for Local.
- **Mission 100% Electrification** to become the largest green railway network in the world.
- Research and pilot projects on **all-aluminium wagon rake.**
- **100% FDI** is allowed in the railway sector.

Way forward

- **Infrastructure:** Major **infrastructure expansion and decongestion programme** with upgradation of technology and judicious track electrification with terminal capacity enhancement.
- **Technology:** Build a technology base in the country to achieve self-sufficiency in the railway sector.
  - Also, use **higher horsepower electric and diesel locomotives** which are more fuel efficient.
- **Diversify freight basket:** There is a need to take steps to diversify the freight basket to enhance freight earnings and also exploit its idle assets to increase other earnings.
- **Improve service quality:** To keep railway stations and trains clean, punitive laws can be introduced along with improving food quality and amenities at railway stations, train coaches etc.
- **Revisit tariffs:** It is imperative to revisit the passenger and other coaching tariffs so as to recover the cost of operations in a phased manner and reduce its losses in its core activities.

3.7.2.1. RAILWAY SAFETY IN INDIA

Why in the news?

Recent train accident in Balasore district of Odisha left 291 dead and more than 900 injured, bringing to the fore issue of railway safety in India.

Issues in Railway Safety in India

- **Finance Related**
  - **Limited expenditure on safety: Not once had the annual funding to** Rashtriya Rail Sanraksha Kosh **been spent fully.**
  - **Deterioration in Operating Ratio:** Railways' operating ratio was 107.4% in 2021-22.
    - ✓ This implies that in 2021-22, Railways spent Rs 107 to earn Rs 100 from traffic operations. This limits spending on capacity upgradation and safety.
- **Infrastructure related**
  - **Derailments**: According to a CAG report titled Derailment in Indian Railways', **69 per cent of railway accidents** over a four-year period, FY18- FY21, were because of derailments.
    - ✓ CAG has red-flagged issues like **track defects, engineering and maintenance issues and operating errors** as some of the primary causes of derailments.
  - **Congestion of tracks:** Capacity utilization on **about 10,000 km of the Railway's trunk routes exceeds 125 per cent**. Track, electrical, and signalling infrastructure maintenance and fault diagnosis have suffered because of this severe congestion.
- **Organisational issues**
  - **Not following mandated safety norms**: As per the CAG report, **Fire extinguishers** had not been provided in 62 per cent of coaches were in violation of existing norms.
  - **Delay in inquiry**: As per the CAG report, **in 63 per cent of cases the inquiry reports were not submitted** to the accepting authority within the prescribed timelines. In 49 per cent of the cases, there was a delay in accepting the report.
- **Human resource related**
  - **Vacancies**: According to the Ministry of Railways, there are 3.12 lakh non-gazetted posts vacant all India, many in the safety category.
  - **Unskilled and untrained staff**: There is a skills deficit in the **contractual workforce** as well as poor follow-up training of staff.
  - **Overworked pilots:** There have been instances of **loco pilots being deployed over and above their prescribed working hours** resulting in a threat to the safety of train operations.

About Kavach

- Kavach is India's automatic protection system in development since 2012, under the name **Train Collision Avoidance System (TCAS), which got rechristened to Kavach or "armour"**
- **Key features:**
  - Provides protection by **preventing trains to pass the signal** at Red (which marks danger).
  - **Activates the train's braking system automatically** if the driver fails to control the train as per speed restrictions.
  - **Relays SoS messages during emergency** situations.
  - Has **centralised live monitoring** of train movements through the Network Monitor System.
  - In Kavach, the **probability of error is 1 in 10,000 years.**

Steps Taken for Railway Safety

- **Rashtriya Rail Sanraksha Kosh (RRSK):** It was a **dedicated fund created for the railways** with a corpus of ₹1-lakh crore for five years.
  - The objective of the fund is to **clear the backlog of critical safety and related works** of railways, including track renewals, strengthening of bridges and signalling improvements among others.
- **Faster deployment of Linke Hofmann Busch (LHB) coaches**: Introduced by the Indian Railways in 1995, **LHB coaches** are considered far safer than the older Integral Coach Factory (ICF) coaches.

- These coaches are equipped with cutting-edge technologies such as **disc brakes, a hydraulic suspension system, a centre buffer coupling system, and side suspension.**

- **Introduction of Kavach system:** It is one of the safety devices introduced to eliminate trains colliding with each other. (See box for details)
- **Other Modernisation efforts for enhanced safety:**
  - **Mechanized track maintenance** using machines like High Output Tamping & Stabilizing Machines (HOTS-3X), etc.
  - **Bridge Management System** (BMS), an IT application to facilitate 24x7 availability of information for the assessment of deterioration and capacity to carry increased loads.
  - All Unmanned Level Crossings (UMLC) were **eliminated on the Broad Gauge network** of the Indian Railway.
  - Indian Railways has completed **electrifying all broad gauge (BG) routes in 12 states and union territories (UTs), as of March 2023.**
  - On vulnerable and identified routes, trains are **escorted by Railway Protection Force** in addition to trains escorted by Government Railway Police of different States daily.

Suggestions for Railway Safety

- **CAG suggestions:**
  - Ensure **strict adherence to the scheduled timelines** for conducting and finalisation of accident inquiries.
  - Develop a **strong monitoring mechanism to ensure timely implementation of maintenance activities** by adopting improved technologies.
- **Coordination on a real-time basis to identify and communicate shortcomings**: For example, a system called **Confidential Incident Reporting and Analysis System (CIRAS)** was used by British Railways.
- **Reducing habitation near tracks:** People living too close to the tracks should be given alternate accommodation where feasible.
- **Infrastructure and skilling:** Focus on the upgradation of infrastructure. While vacancies in Safety categories should be filled up, greater stress is needed for the skilling of workmen.

3.7.3. CIVIL AVIATION SECTOR

CIVIL AVIATION SECTOR AT A GLANCE

Status of Civil Aviation in India

- India has become **third largest domestic aviation market** in the world after USA and China.
- Between 2009- 2019, India contributed **5.9% to global growth in passenger traffic.**
- Overall, aviation industry **contributes $35 billion annually to India's GDP** and offer **7 million jobs.**
- India has jumped to **48th rank** in ICAO's global aviation safety rankings.

Key objectives

- To **regulate air transport services** to/from/within India and enforce civil air regulations, and airworthiness standards.
- Establish an integrated eco-system to **promote tourism, increase employment** and lead to balanced regional growth.
- **Ensure safety, security and sustainability of aviation sector** through use of technology and effective monitoring.
- **Enhance regional connectivity** through fiscal support and infrastructure development

Schemes/Initiatives

- **National Civil Aviation Policy (NCAP), 2016.**
- **Up to 100% FDI is permitted in Non-scheduled air transport services,** helicopter services and seaplanes under **automatic route.**
- **Regional Connectivity Scheme UDAN** to make flying affordable for common citizen.
- **AirSewa app** for air-passengers to register their complaints for swift redressal.
- **e-Sahaj portal** to provide security clearance to citizens in online mode.
- **Digi Yatra to enhance seamless travel experience** for passengers and simultaneously improving security.
- **PLI Scheme** for Drone and Drone Components.
- **Ratification** of three Protocols relating to amendments in **Chicago Convention**

Constraints

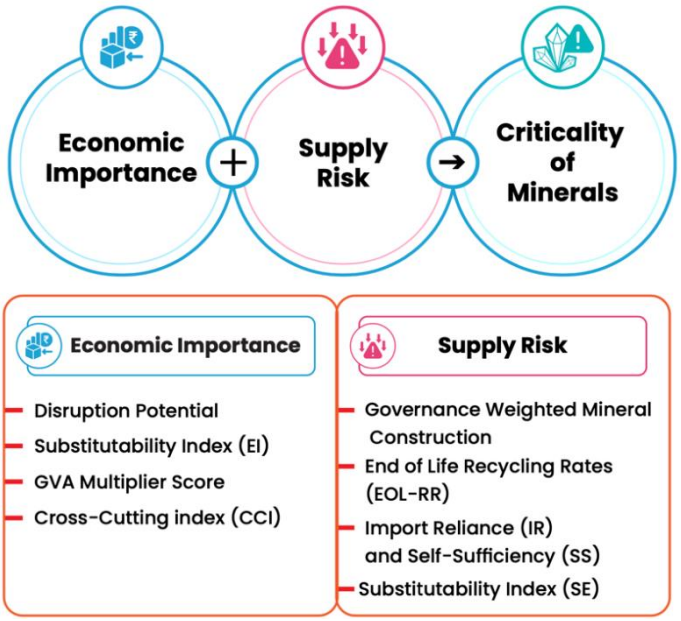
- **High jet fuel prices, increased cost of operations for airlines** which could lead to an increase in air fares by up to 15%.
- **Lack of infrastructure and airports** limits the growth of aviation market and hampers regional connectivity.
- **Inadequate trained and skilled manpower** from airline pilots to maintenance personnel.
- **Lack of technological advancements in upgrading aircraft communication systems,** causing the entire system to collapse.
- **Commercial liberalization** led to intense competition and reduction in real yields.
- **Increasing fear of terrorism** leads to stringent check-ins and consequently longer lines and delays

Way Forward

- **Reduction in fuel cost** which made low-cost airlines model possible and sustainable.
- Carriers need to **maintain their current fleet and ensure to purchase new, modern ones,** while ensuring fuel efficiency and lowered costs.
- Need to **promote collaboration between original equipment manufacturers (OEMs),** industry and educational institutes to assimilate latest technology and management practices in aviation industry.
- **Taxation and pricing structure of aviation turbine fuel (ATF) should be aligned to global benchmarks** by bringing it under the ambit of GST.
- **Complete the ongoing projects under UDAN initiative** in time-bound manner.
- **Establishing** India **as a trans-shipment hub in the region** to reap its multiple benefit.
- **Formulation of long-term plans for advanced research in aviation technologies** to create a manufacturing ecosystem in the country.

3.8. MINING AND POWER SECTOR

3.8.1. CRITICAL MINERALS



Why in the news?

Recently, the **Ministry of Mines** released the first-ever report of the country on **"Critical Minerals for India"**.

More on news

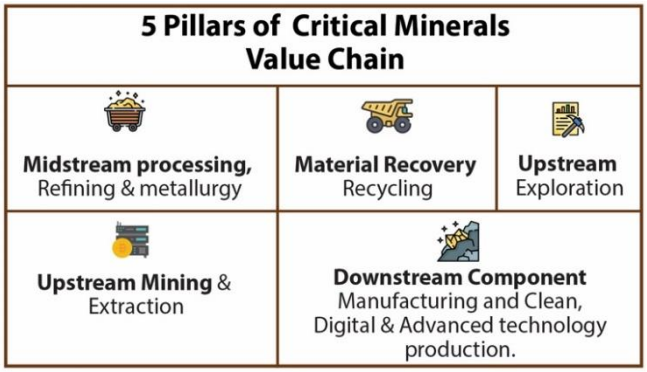
- Ministry of Mines has constituted a committee for the **identification of critical and strategic minerals**.
- The list comprises **30 critical minerals**, including **17 Rare Earth Elements (REEs) and 6 Platinum-Group Elements (PGE)**.
    - The criticality of minerals is **judged mainly by two parameters** (refer image).

What are Critical Minerals?

- Critical minerals are elements that are the **building blocks of essential modern-day technologies** and are at risk of supply chain disruptions. For example, Antimony, Beryllium, Bismuth, Cobalt, Copper etc.
    - For India, major **import sources of Cobalt are China**, US, Japan; Lithium (Chile, Russia, China); Nickel (Sweden, China) etc.
- These minerals are now **used everywhere from making mobile phones, and computers to batteries, electric vehicles** and green technologies like solar panels and wind turbines.

Significance of Critical Minerals for India

- **Economic growth**: Minerals such as lithium, graphite, cobalt, titanium, etc. are essential for the advancement of **high-tech electronics, telecommunications, transport** etc.
    - Self-sufficiency in Critical Minerals **ensures self-reliance and addresses the vulnerability** in its supply chain.
- **Promoting climate action**: Some Critical minerals are **important for climate-friendly technologies like electric vehicles, solar panels** and wind turbines etc.
- **Defence**: Critical minerals such as lithium, nickel and silicon are vital to manufacturing **technologies and materials used in the aerospace and defence** sector.
- **Security**: Critical minerals are necessary for India to **achieve its geo-economic goals, energy security, renewable energy goals, mineral security**, and commitment to electric vehicles **by 2030**.



Concerns associated with critical minerals

- **Dependence on imports:** Some critical mineral assets for the country's manufacturing sectors (particularly green technologies) are not ready to be mined.
- **Supply chain Issues:** Geographical **concentration** of extraction or processing **in a few global locations** may lead to **supply chain disruption or vulnerabilities.**
    - For example, three-fifths of rare earth minerals, essential for clean energy, electronics, and defence technologies, are mined in China.
- **Trade Policies:** The supply of critical minerals is dependent on trade agreements which can be driven by domestic interests.
    - For example, Indonesia (host to the world's largest nickel reserves), has banned export of raw nickel ore, as they seek to develop a domestic nickel processing industry.

- **Lack of Periodic assessment:** India lacks periodic assessment for judging the criticality of the minerals needed. This affects the prices for such minerals and long-term risk mitigation plans.
- **Limited Substitutes and Recycling:** These minerals lack substitutes and have low end-of-life recycling rates.

Initiatives taken with respect to Critical Minerals

- **India- Australia Critical Minerals Investment Partnership:** It'll build new supply chains underpinned by critical minerals processed in Australia to **help India's plans to lower emissions from its electricity network.**
- **Minerals Security Partnership (MSP)**: **India has joined MSP** which is a US-led collaboration of 14 countries that aims to **catalyse public and private investment in critical mineral supply chains**.
- **Supply Chain Resilience Initiative (SCRI):** India, Japan, and Australia unveiled SCRI to **enhance the resilience of supply chains in Indo-Pacific Region** and reliance on China.

Way ahead

- **Recommendations made by the Ministry of Mines:**
  - Establish a **National Institute or Centre of Excellence on critical minerals.**
  - Create a **separate wing in the Ministry of Mines.**
  - **Collaborate with international agencies** for strategic acquisition of foreign assets.
  - **An innovation funding mechanism** to focus on **processing and refining technologies.**
  - **Update the list of critical minerals** periodically, preferably every three years.
- **Diversify supply chains:** Reduce dependence on China and develop resilience to global supply chain shocks such as the Russia-Ukraine war, COVID-19 etc.
- **National Framework:** Plan a national framework for sourcing its reserves for critical metals including lithium to accelerate indigenous development of cells and create a reliable value chain.

3.8.2. THE MINES AND MINERALS (DEVELOPMENT AND REGULATION) AMENDMENT BILL, 2023

Why in the news?

Recently, the Parliament passed the Mines and Minerals (Development and Regulation) Amendment Bill, 2023.

Need for the reforms

- **Increasing the exploration and mining of critical minerals**.
  - Critical minerals have gained significance given **India's commitment towards energy transition** and achieving net-zero emissions by 2070.
- **FDI received** in the mining sector is **limited**.
  - This is despite the automatic route allowing 100% foreign direct investment (FDI) in the mining and exploration sector**.**

Key Features of the Bill

- **Introduction of exploration licence for deep-seated and critical minerals:** The license will be granted for exploration as well as mining through auction, for a period of 5 years.
- **Omission of 6 minerals from the list of 12 atomic minerals:** These minerals have various applications in the space industry, electronics, communications etc. and are **critical in the net-zero emission commitment of India**.
  - Upon removing these minerals from the said list, exploration and mining of these minerals will also be opened up for the private sector.
- **Empowering Central Government to exclusively auction mineral concessions for critical minerals.**
  - Even though the Central Government would conduct the auction, the mining lease or composite licence for these minerals to the successful bidders will **only be granted by the State Government.**

Implications

- **Reduced import dependency** in the long run as most of these minerals are largely import dependent.
- **Foreign investment and entrepreneurship:** This amendment is expected to provide a conducive legal environment for attracting FDI and junior mining companies in the country.
- **Private sector participation:** The proposed exploration licence would facilitate, encourage and incentivise the private sector in mineral exploration for critical and deep-seated minerals.

- The involvement of private agencies in exploration would also bring **advanced technology, finance and expertise** in exploration.

- **Speeding up the process:** Only 19 blocks of these minerals have been auctioned by the State Government, *viz*. out of 107 blocks handed over to the various State Governments.
  - Authorising the Central Government to auction concession for these critical minerals would **increase the pace of the auction and early production** of the minerals.

3.8.3. POWER SECTOR

Power sector at a Glance

Status of Power sector in India

- **Third-largest producer and third-largest consumer** of electricity worldwide
- Installed power capacity of **417 GW by April 2023** (172 GW Renewable Energy and 205 GW Coal-based)
- **Solar energy** contributed 67 GW, 42 GW from **wind power,** 10.2 GW from **biomass** and 46.8 GW from **hydropower**
- **1255 kWh** is India's per capita power consumption as against the world average at 3,260 kWh
- **FDI** in power sector reached **$ 15.84 billion (2000-2021)**

Key Targets

- Establish a **renewable energy capacity of 500 GW** by 2030.
- Providing **accessible, affordable, and on-demand access to consumers** across the country.
- **Diversifying the sources of production of energy** to ensure sustainability.
- **Increase distribution efficiency** by minimizing the Aggregate Technical & Commercial (AT & C) losses.
- The installed capacity of **Renewable Energy sources** to contribute **around 44% by 2031-32.**
- India is committed **to reducing emission intensity by 45 % in 2030** against the levels of the year 2005.

Constraints

- **Power DISCOMS under losses** (about Rs 59,000 crore in 2021-22).
- **Poor efficiency** due to **under-utilisation** of power plants and high **AT&C losses** at nearly **21% in FY22.**
- **Installed electricity production capacity is not enough** to support an annual economic growth of **7 to 8%.**
- Grid constraints, Theft, **Power cuts, Voltage fluctuation,** and extremely high **tariffs** in some areas.
- **Thermal power plants** are facing a **high deficit of coal and raw materials supplies.**
- **Billing efficiency decreased to 84%** in 2020-21, and **collection efficiency deteriorated** marginally to 92%.
- **100% metering is yet to be achieved** for certain categories of consumers by many utilities.

Schemes/Initiatives

- **Revamped Distribution Sector Scheme - A Reforms based and Results linked Scheme** aims to reduce AT&C losses.
- **Infrastructure status** to energy storage systems, including grid-scale battery systems.
- **Additional borrowing for states** in lieu of reforms in the power sector.
- **Market Coupling** of power exchanges through a single power trading entity.
- **Guidelines for Resource Adequacy Framework for power procurement** and **General Network Access (GNA) regulations.**
- **Other schemes - PLI Scheme, Deen Dayal Upadhyay Gram Jyoti Yojana** (DDUGJY), **Ujwal DISCOM Assurance Yojana** (UDAY), **Integrated Power Development Scheme** (IPDS), **Pradhan Mantri Sahaj Bijli Har Ghar Yojana,** "Saubhagya", **National Smart Grid Mission** (NSGM)

Way forward

- **Improve DISCOMs' revenue recovery** through performance incentives, improving staff capacity and building revenue collection capacity.
- **Making fiscal headroom through subsidy reduction** by making them more targeted.
- **Reducing government dues** with better financial management.
- **Regular Tariff revision and addressing idle regulatory assets** through monetization.
- **Liquidity infusion scheme** tied to credible action plan by States for the reduction of AT&C losses.
- **Corporate Governance Guidelines** to **DISCOMs** linking the release of funds by PFC and REC to these guidelines.
- Restricting emissions through **carbon capture technology.**

3.8.3.1. MISSION ON ADVANCED AND HIGH-IMPACT RESEARCH (MAHIR)

Why in the news?

The **Ministry of Power and the Ministry of New and Renewable Energy** have jointly launched the Mission on Advanced and High-Impact Research **(MAHIR)** to leverage Emerging Technologies in the Power Sector.

About MAHIR

- **Key objectives**
  - **Identify** emerging technologies/areas of future relevance for the energy sector.
  - **Create a vibrant & innovative ecosystem** and **provide a common platform** for energy Sector Stakeholders for various tasks.
  - **Support pilot projects** of indigenous technologies and facilitate their commercialization.
  - **Leverage foreign alliances** and partnerships to accelerate R&D.
  - **Make our Nation among the leading Countries** in the Power System.
- **Approach:** The Mission will follow the **technology life cycle approach of Idea to Product.**
- **Duration:** 5 years from **2023-24 to 2027-28.**
- **Structure of the Mission**
  - **The Technical Scoping Committee** chaired by Central Electricity Authority (CEA)
    - ✓ **Role: Identify and recommend potential** technologies for development, monitoring of approved projects, etc.
  - **The Apex Committee chaired** by Union Minister for Power & New and Renewable Energy
    - ✓ **Role:** Look into **international collaborations, approve and monitor the research proposals**
- **Coverage:** The proposals for **outcome-linked funding** will be invited from companies / organizations **across the globe.**
- **Selection of the proposal: To** be done **through Quality cum Cost-Based Selection (QCBS) basis.**
- **Patent: The IPR of the technology** developed would be shared by the **Government of India and the Research Agency.**

3.8.3.2. NATIONAL ELECTRICITY PLAN (NEP)

Why in news?

Recently **Central Electricity Authority** has notified the National Electricity Plan for the period of **2022-32.**

Key highlights of NEP

- **Rising energy demand:** India has witnessed electricity demand **increase at a CAGR of around 4.1 % during the last decade** and it is projected to grow at a CAGR of 7.18 % for the next five years.
- **Installed capacity**: Likely installed capacity for the year 2026-27 will be around 610GW with around 57.4% non-fossil-based capacity (from around 40% as of March 2022).
- **Carbon emission**: Average **CO_2 emission rate from coal-based stations** has been **on a declining trend** indicating improvement in the efficiency of power generation.
- **Contribution of Renewable Energy (RE) sources**: Installed capacity of RE sources is expected to contribute **around 44% by 2031-32.**
- **Energy efficiency and conservation**: India has achieved a **reduction in the emission intensity of GDP by 24%** over the period 2005-2016.

Challenges highlighted by NEP

- **Challenges with the integration of Renewable Energy (RE) sources with the grid**:
  - **Intermittency:** Temporal variability and output uncertainty of Solar and Wind generation **makes the supply uncorrelated with the demand pattern.**
  - **Integration with grid:** The large-scale addition of Renewables into the grid will require balancing from other energy sources with fast ramp up and ramp down.

- **Resource Location:** Location specificity of Solar and Wind resources is one of the major planning-related challenges.

- **Challenges in installing RE**:
  - **Operational issues:** Difficulties in land acquisition, used PV panel disposal, and resistance from affected communities.
  - **Issues with global supply chains** (including supply of critical minerals) and higher costs, both for material and for finance.
  - **A drastically changed climate** with higher temperatures, droughts that affect hydro generation, etc.
  - **Rehabilitation & resettlement** is a major issue for hydropower plants.
- **Issues with carbon capture techniques:** Such as high cost, large-scale deployment, etc.
  - **Technologies for the conversion of CO_2** to useful products are also very costly and **proprietary to a few companies** around the world.
- **Challenges with Smart Grid:** Information privacy and ensuring Cyber security.
- **Low quality of coal:** Indian coal is of **low grade with ash content of the order of 30%-50 %** in comparison to imported coals which have low ash content of the order of 10%-15%.

Way ahead

- **Addressing challenges of integration of Renewables with Grid**
  - **Hybrid of Solar and Wind Energy** reduces variability and optimizes the utilization of land and transmission systems.
  - **Energy Storage**: Storage plays a critical role in **frequency regulation** and in maintaining the **stability and safety of the grid**.
- **Demand Response: Demand-side** management measures encourage customers to maximize the use of variable renewable energy sources while the supply is naturally high.
- **Promotion of the Off-grid renewable sector**: It is much more competitive with conventional power as it avoids investment in transmission to remote locations.
  - E.g., Rice Husk gasifiers-based electricity generation is one such model.
- **Private investment:** Measures should be taken to **attract private investors** and more funds should be allocated to support **research and innovation** activities in the renewable energy sector.
- **Adoption of low water use technologies:** In solar PV, innovative **methods like dry-cleaning/ robotic cleaning of panels/modules** need to be encouraged with the objective of reducing water usage.

3.8.4. GAS BASED ECONOMY

GAS-BASED ECONOMY AT A GLANCE

Significance of a gas-based economy

- **Cleaner Energy Source:** CO_2 emissions (per unit of energy produced) from gas are **around 40% lower than coal.**
- **Energy Efficiency:** Natural gas-fired power plants have higher energy efficiency compared to coal-fired plants.
- **Rapid and Efficient Transport:** When it is cooled to –161.5 °C, natural gas becomes a liquid (LNG), filling only 1/600th of its original volume.
- **Backup power companions to renewables:** Natural gas fired generators can be the **ideal backup power companions** as they provide **clean source of power.**
- **Help in vision of reliable power:** In urban centres, piped natural gas can effectively cater to the **cooking, heating, and cooling needs** of both commercial and residential entities.

Schemes/Policies/Initiatives

- **Revised domestic natural gas pricing guidelines** based on recommendations of a panel headed by **Kirit Parikh,** Government has approved the **revised domestic natural gas pricing guidelines.**
- **Hydrocarbon Exploration and Licensing Policy (HELP)**
- Launch of India Gas Exchange.
- **Unified tariff for natural gas pipelines (One Nation, One Grid and One Tariff)**
- **Creating necessary Gas infrastructure** (like Dahej and Hazira in Gujarat, Dabhol in Maharashtra, Kochi in Kerala etc)**, National Gas Grid and City gas Distribution (CGD) network)**

Constraints

- **Variation in estimations:** Goals have shifted from 20% by 2025 to 11% by 2032 and then to 15% by 2030.
- **Concerns about energy security:** Around **50 percent of our current demand** is met through the **import of Liquefied Natural Gas (LNG)** from other countries.
- **Lack of competitive parity:** For e.g. coal is subject to Goods and Services Tax (GST) and therefore **taxed at 5%,** while natural gas is outside the purview of the GST and **typically taxed at a higher rate.**
- **Not conducive with decarbonization.**
- **Infrastructure Constraints.**
- **Environmental concern:** Extraction, production, and combustion still generate greenhouse gas emissions.

Way forward

- Facilitating **private party participation** in exploration through reforms in licensing policy.
- **Single window** and **time-bound** environment and forest clearances.
- **A National Data Repository (NDR) of Mineral Resources** should be created and uploaded online.
- **Robust and transparent public reporting** mechanism for exploration firms.
- **Capping taxation and other levies** at a maximum of 40% of the sale value, as per global practice.
- **Effective Utilization of PMKKKY and DMF funds** on drinking water/environment preservation and pollution control/Health care/education/skill development/welfare of women, children, aged and disabled people / sanitation.

3.9. BUSINESS AND INNOVATION

3.9.1. STARTUP ECOSYSTEM IN INDIA

Startup Ecosystem in India at a Glance

Status of Startup Ecosystem in India

- India has the **third largest startup ecosystem** in the world with over **80,000** DPIIT recognized startups including **100+ unicorns**
- For **tech startups**, India is the **2nd largest ecosystem**
- Around **40%** of startups are in **tier-II and tier-III cities**
- Overall startups are growing at an **average growth rate of 15%** year on year

Significance of a Strong Startup Ecosystem

- Promote **ideas, innovation, and research.**
- Develop **backward and forward linkages.**
- **Wealth creation** through future scale-ups.
- **Employment generation**- on average 12 jobs are created per startup.
- **Fulfilment of societal needs** in areas like affordable healthcare, education, financial inclusion etc.
- **Stimulate domestic investment.**

Challenges to Startup Ecosystem

- **Complex and time-consuming process** of incorporation of a startup.
- **Difficulties in accessing mentorship and support** due to weak industry linkages and lack of experience.
- **Underfunding of startups** due to weak venture capitalist and angel investor framework.
- **Difficulties in revenue generation** due to growing competition, digital divide, limited
- **Sporadic supporting infrastructure** such as technology parks, logistics parks with high concentration in metro cities.
- **Bureaucratic hurdles** like regulatory compliances, complex labour laws, tax laws, changing stance on emerging technology etc.
- **Difficulties in protecting and enforcing Intellectual Property Rights (IPR).**

Government Initiatives

- **Startup India Seed Fund Scheme (SISFS)** to provide early-stage financial assistance.
- **Fund of Funds for Startups (FFS) Scheme.**
- Onboarding of startups on **Government e-Marketplace (GeM).**
- Providing **global market access** to Indian startups through inter-governmental cooperation.
- Support for **Intellectual Property protection** with fast-tracked patents and simplified rules.
- **AIM-PRIME** to promote and support science-based deep-tech startups.
- **Schemes for Innovation and Entrepreneurship** such as AGNII, Uchchatar Avishkar Yojana, Women Entrepreneurship platform etc.

Way forward

- **Policy Reforms** to bring clarity, simplification, and boost startup confidence.
- **Structural changes** through creation of enabling infrastructure across the country.
- **Promotion of entrepreneurship and innovation** through educational reforms.
- **Strengthening of industry-academia linkages** to provide support, incubate ideas and ensure the availability of essential services to emerging startups.
- **Scale up accelerator networks and incubation ecosystem.**
- Facilitate greater **avenues of domestic investment with innovative funding ideas.**
- Establish **regulatory sandboxes** to test innovative products or services.
- Expediting patent examination, establishing IPR facilitation centres and **enhancing IP protection** framework.

3.9.2. STAND-UP INDIA

Why in the news?

Recently, **Prime Minister acknowledged Stand-Up India's role** in empowering the SC/ST communities, women, and job creation at the completion of 7 years of the Scheme.

Features of the Scheme:

- It covers all branches **of Scheduled Commercial Banks** (bank loans of **₹10-100 lakh to at least one SC/ST and one-woman borrower** per branch).
- Applicants can draw up to **₹10 lakhs as working capital by an Overdraft.**

Significance of the scheme

- **Identification of prospective entrepreneurs:** Linking prospective borrowers to banks for loans. E.g., through an online portal developed by the **Small Industries Development Bank of India (SIDBI).**
- **Collateral-free loans:** Setting up of **Credit Guarantee Fund for Stand-Up India (CGFSI).**
- **Financial inclusion:** It is based on "Funding the unfunded" and has ensured the availability of credit to SC/ST and women entrepreneurs.
- **Socio-economic empowerment:** It can act as a positive boost for job creation, improving social standing, and resulting in the socio-economic empowerment of women, Dalits, and tribals.

Challenges to the scheme

- **Limited credit availability:** The maximum loan limit of Rs 1 Crore is sometimes small for manufacturing or trading sector enterprises.
- **Lack of parallel skill development:** The applicants of the scheme may need additional handholding along with financial help in the form of training, and network support among others.
- **Bank-related issues:** The scheme offers **interest rates below the market rate**, which indirectly affects the viability of the system, especially the Public Sector Banks (PSBs).
    - Also, several studies have found that the **bank staff has limited awareness** regarding the scheme in the hinterland.

Way forward

- **Holistic empowerment**: The SC & ST population needs to be educated and empowered further (socio-politically) to reap the benefits of the Stand-Up India scheme.
- **Awareness generation**: It is important to invest in (Information, Education, and Communication) IEC activities and create a general sense of awareness that reaches the target beneficiary and the banking ecosystem.
- **Convergence with other schemes:** More synergy in implementation among schemes such as Startup India, MUDRA, Jan Dhan Yojana, etc.
- **Strengthening the banking system:** Overall strengthening of the Banking system will lead to optimal allocation of credit, better monitoring of the credit risk and ultimately better performance of entrepreneurs.

3.9.3. INDIA'S DIGITAL ECONOMY

India's Digital Economy at a Glance

- The digital economy is the **economic activity that results from billions of everyday online connections** among people, businesses, devices, data, and processes.

India's internet economy is **projected to grow to $1 trillion by 2030** from $175 billion in 2022	By 2030, the Internet economy's contribution to India's technology sector will **grow to 62% from 48% in 2022.** It will also account **for 12-13% of India's GDP**, up from 4-5% in 2022.	Aadhaar registration in India crossed 1.31 billion, while **UPI clocked over ₹126 trillion** in terms of value in 2022.	India's **cost per GB of data** consumed is the **lowest globally** and **internet penetration stands at 43%.**

Significance of Digital Economy

- Potential to **generate productivity and output** to support 55 - 60 million workers in 2025.
- **Emergence of new business models and industries** such as e-commerce, digital payments, and on line education.
- Increasing competition, transparent pricing and **broadening market**.
- **Quicker, efficient and effective public service delivery** through e-governance, JAM ecosystem etc.
- **Social Financial Inclusion** through FinTech products.

Challenges to Digital Economy

- **Data security and safety:** Issues like **privacy infringement, illegal storage of data, absence of consent** etc. limit the trust and automatically the usage of digital technologies.
- **Regulation-related challenges:** Issues like the absence of a comprehensive data framework, weak consumer protection regulations, etc.
- **Digital accessibility gap:** Only **3% of India's poorest 20% of households** have access to a computer, and 9% have internet connectivity.
- **Digital illiteracy:** According to India's inequality report 2022 by Oxfam, **only 38% of households** in the country are digitally literate. Non-availability of **digital services in local languages** is a great barrier to digital literacy.
- **Digital skills gap among workers** with or without advanced digital competencies.
- **Electronic waste (e-waste) is growing in India at the rate of 10%**.

Government Initiatives

- **Regulation of digital economy:** Information Technology Rules (2011), National Data Sharing and Accessibility Policy (2012), National Telecom M2M roadmap (2015) etc.
- **Digital India initiative** aims to expand e-governance, providing individuals with access to government entities, **expanding digital infrastructure** across the country.
- **Open Network for Digital Commerce (ONDC)** is expected to **digitise the whole value chain**, standardise operations, encourage supplier involvement, improve logistical efficiency, and increase customer value.
- **Push towards Data Centres** to further assist India's digital revolution.
- **Reforms in India's Digital Payments** through expansion of Unified Payment Interface (UPI).
- **Digital literacy missions** such as National Digital Literacy Mission and the Pradhan Mantri Gramin Digital Saksharta Abhiyan.

Way Forward

- **Investment in Public Digital Infrastructure (PDI)** have a **multiplier effect** on the digital markets. This will also **encourage private investment** in the long run.
- **Conducive regulatory framework** for private sector investment and innovation.
- **Developing human capital:** Governments need to invest properly in education, **particularly in STEM fields.**
- The private sector involvement in training employees for **technical skills specific to their business.**
- Better dialogue and collaboration are needed to **identify new pathways for the digital economy** that take into account varying kinds of **experience and expertise.**
- **Building an enabling e-commerce system.**

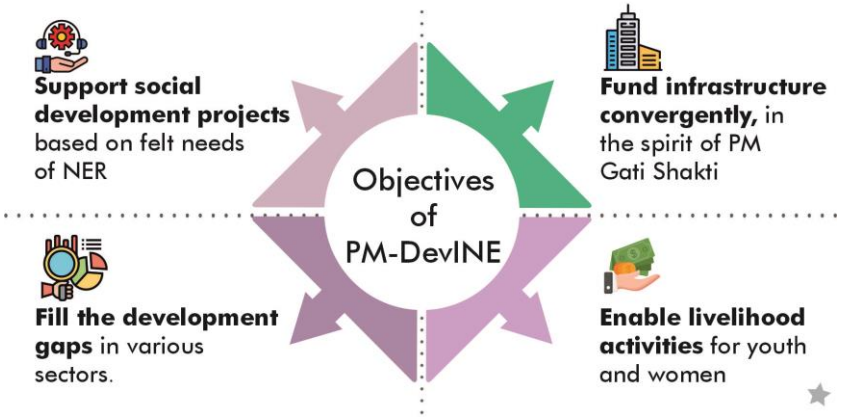
3.10. DEVELOPMENT OF THE NORTH-EAST REGION

Why in the news?

Recently, Cabinet approved **"Prime Minister's Development Initiative for Northeast Region (PM-DevINE)".**

About PM-DevINE

- It is a **Central Sector Scheme,** was **announced in the Union Budget 2022-23 to address development gaps** in the Northeastern Region (NER).



Importance of development of North-East Region (NER)

- **Geo-strategic location:** NER shares borders with countries such as Bangladesh, Bhutan, China, Myanmar and Nepal making it conducive to international trade.
- **Huge potential in agriculture trade:** The marketable surplus for pineapple (95%), jackfruit (83%), cabbage (74%), orange (85%) etc. is high enough for exports.
- **For the success of Act East Policy:** Without addressing the development-related challenges of NER, no trade deals involving value chains in the NER will yield desirable results.
- **Presence of potent input market catalysts** such as social capital (diversity, cultural richness), physical (potential energy supply hubs), human (inexpensive, skilled labour) and natural (minerals, forests) resources.

Challenges faced in the development

- **Geopolitical factors:** NER continues to suffer security concerns from cross-border conflicts and other illegal activities.
  - Military takeover in Myanmar and rising anti-India sentiments in Bangladesh further complicate the situation.
- **Difficult terrain:** Almost 70% of the NER is hilly, with forests covering between 42 and 76% of the area of each of the States.
- **Predominance of the Informal Economy** along with rampant narcotics trading, as well as other illegal activities like trafficking of rare animals.
- **Social unrest:** Because of armed insurgency, cross-border migration, movements that demand for separate federal states and autonomous units, and ethnic conflicts impede NER development.
- **Challenges with trade facilitation with neighbouring countries:** Goods must be transloaded between vehicles of different countries, and clearance processes are lengthy, this adds to the time and cost of transportation.

Initiatives taken for development of NER

- **Northeast Special Infrastructure Development Scheme.**
- **Non-Lapsable Central Pool of Resources (NLCPR) Scheme** to fill up the gap in infrastructure sector.
- **North East Venture Fund,** first and only dedicated venture fund for NER, aims to promote business growth and skill development.
- **NITI Forum for North East** has been constituted for inclusive and sustainable economic growth in NER.
- **Special Accelerated Road Development Programme for North East.**
- **Science and Technology Interventions in North East (STINER)** to bring relevant technologies from S&T institutions to the farmers/artisans of NER.
- **Three newly emerging corridors with neighboring countries:**
  - **Trilateral Highway** linking India with Myanmar and Thailand.
  - **Kaladan multimodal corridor** linking Port of Sittwe in Myanmar to NER states.
  - **Bangladesh-China-India-Myanmar** economic corridor.

Way Forward

- **Socio-economic empowerment:** to empower rural communities and create sustainable institutions.
- **Partnership development:** Partner with foreign investors, resource institutions and public and private sector organisations to bring resources such as finance, technology, and marketing.

- **Subregional forums:** More focused approach in subregional forums, such as ASEAN and BIMSTEC, can play an important role in enhancing trade and connectivity between the NER and India's neighbouring countries.
- **Ascertain consent of people to implement policies:** To ensure that economic development does not come at the expense of the environment or the social and cultural fabric of the region.

4. SECURITY

4.1. DIGITAL PERSONAL DATA PROTECTION BILL 2023

Why in the news?

Lok Sabha recently passed the Digital Personal Data Protection Bill (DPDP), 2023.

More about news

- Bill aims to **regulate the processing of digital personal data** while **ensuring individuals' right to protect their data** and the need to process it for lawful purposes.
- In 2017, the Supreme Court recognised privacy as a fundamental right in the K.S. Puttaswamy vs Union of India case.
  - Following this, the **Justice Srikrishna Committee** (established by MeitY) proposed the initial draft of the Personal Data Protection (PDP) Bill in 2018.
  - The government revised the draft and introduced it as PDP Bill 2019, but it was later withdrawn.

Key Provisions of Bill

Specifications	Details
Applicability	• **Processing of digital personal data within India** where such data is collected: o in digital form or o in non-digital form and digitised subsequently • **Processing of personal data outside India** if it is **for offering goods or services in India.** • **Does not apply to:** o personal data **processed for any personal purpose**. o personal data that is **made or caused to be made publicly available by** ✓ **Data Principal to whom such personal data relates**; or ✓ any other person who is under legal **obligation to make such personal data publicly available**.
Data Protection Board of India (DPBI)	• Provides for the **establishment of DPBI by the Central government**. • Key functions of the Board include **monitoring compliance, directing data fiduciaries** and **hearing grievances.** • **Appeals against** its decisions will **lie with Telecom Disputes Settlement and Appellate Tribunal** (TDSAT)
Consent	• Personal data may be **processed only for a lawful purpose** after obtaining the consent of the Data Principal (who shall have the right **to withdraw consent at any time**). o **Consent will not be required for** 'legitimate uses' including provision of benefits or services by the government, medical emergency etc.
Rights and Duties of Data Principal	• Data principal will have the right to o **obtain information** about processing, o **seek correction and erasure** of personal data, o **grievance redressal etc**. • Data principals **must not register a false or frivolous complaint** and **furnish any false particulars.** • Violation of duties will be **punishable with a penalty of up to Rs 10,000.**
Obligations of Data Fiduciaries	• **Data Fiduciary** (**entity determining the purpose and means of processing**) must o **ensure the accuracy** and completeness of data, o **build reasonable security safeguards** to prevent a data breach, o **erase personal data as soon as the purpose has been met** except in case of government entities.
Significant Data Fiduciaries (SDF)	• **Central Government may notify any Data Fiduciary** as SDF, on basis of an factors such as: o **volume and sensitivity** of personal data processed. o **potential impact on the sovereignty and integrity of India** o **security of the State etc.** • SDF will have certain additional obligations including **appointing a data protection officer and an independent data auditor** and **undertaking impact assessment** .
Exemptions	• Rights of the data principal and obligations of data fiduciaries (except data security) will **not apply in specified cases, including**: o **prevention and investigation** of offences and o **enforcement of legal rights** or claims.

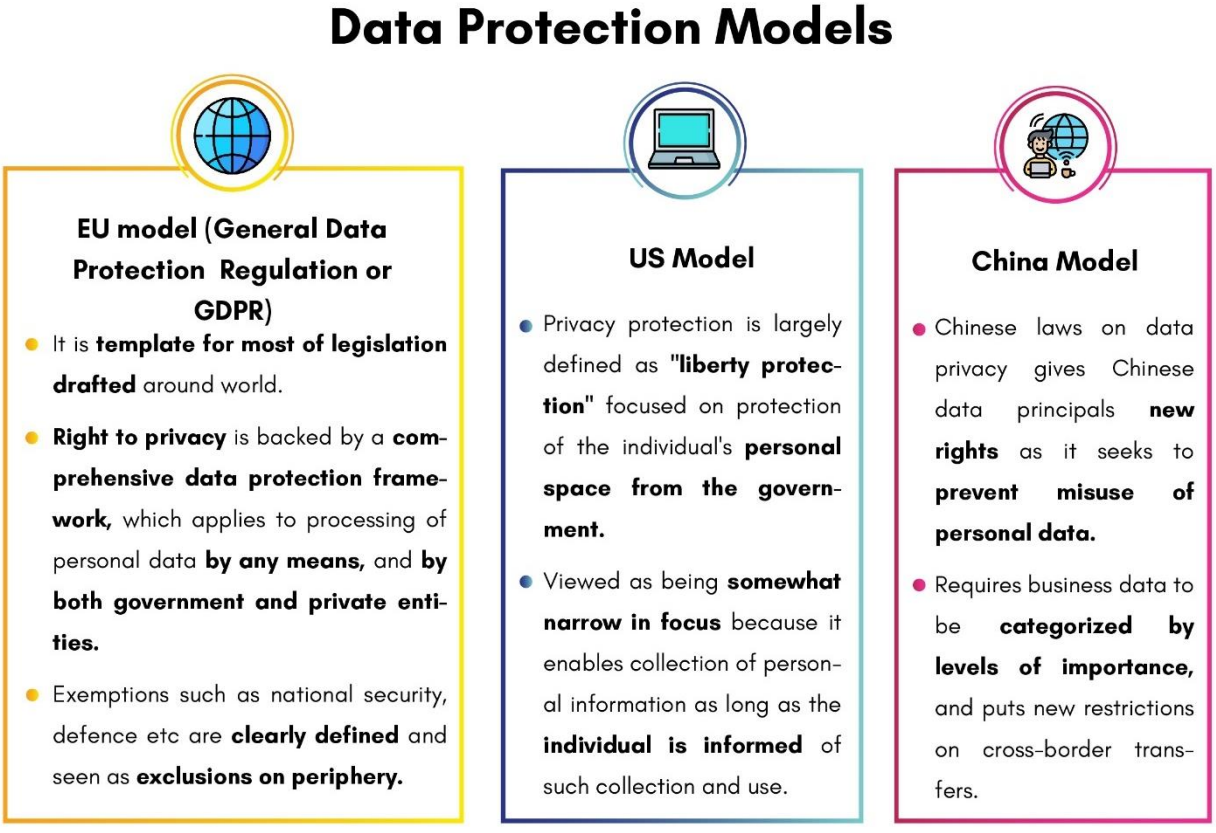
	• The **central government may exempt certain activities** in the interest of the security and public order.
Processing of personal data of children	• While processing the personal data of a child, **data fiduciary must not undertake.** o **processing that is likely to cause any detrimental effect** on well-being of child, and o **tracking, behavioural monitoring, or targeted advertising.**
Cross-border transfer	• Bill allows the **transfer of personal data outside India, except to countries restricted by the government.**
Penalties	• Bill specifies penalties for various offences such as **Rs 250 crore for failure to take data security measures.**

Limitations of Bill

- **Exemptions to central government:** Bill extends **safeguards any action done** in good faith **from prosecution or legal consequences.**
- **Inadequate Safeguard:** The transfer of personal data outside India **may not ensure adequate data protection standards in the countries where the transfer of personal data is allowed.**
- **No compensation:** Bill has removed Section 43A of the Information Technology (IT) Act, 2000, which mandated companies to compensate users in case of mishandling their data.
- **Complicated approach to grievance redressal :** Aggrieved individuals are required first to approach the data fiduciary's redressal mechanism.
  - Unresolved grievances can be escalated to the **Data Protection Board**, with further appeals to the **TDSAT.**
- The Bill **does not grant the right to data portability and the right to be forgotten** to the data principal.

Conclusion

DPDP Bill **creates a new framework for personal data security** and will **bring India one step closer to establishing the law on data privacy** and protection. It is being done to serve the greater aim of a digital economy.



4.2. PRIVATE MILITARY COMPANY (PMC)

Why in the news?

Recently, there was a rebellion in Russia by Wagner Group, a Private Military Company (PMC).

About Private Military Companies (PMC)

- PMC refers to a **privately owned and operated organisation** that provides military and security services on a contractual basis.
  - They are **hired by governments, corporations, international organisations, or individuals** to carry out specific tasks, often in conflict zones or areas with security risks.
- **Wagner Group:** is **controlled indirectly by the Russian military and intelligence**.
  - **First identified in 2014 while backing pro-Russian separatist forces in eastern Ukraine**.
  - Western countries and UN experts have accused the group of human rights abuses in Africa.
  - The U.S. has also **designated it a transnational criminal organisation.**
- **Other notable Instances of PMC deployment**
  - **Blackwater (now known as Academi) in Iraq** was contracted by the United States government to provide security services during the Iraq War in 2007.
  - **Executive Outcomes, a South African PMC** hired by the Angolan government, operated in Angola in the 1990s during the civil war.
  - **Sandline International, a British PMC**, was involved in Papua New Guinea in the late 1990s.

Factors driving the rise in Private Military companies

- **Outsourcing of Security:** Private armies supplement the Government's security efforts of cost-effectiveness, flexibility, and the desire to maintain a smaller standing military.
- **Apt for sensitive missions:** PMCs are often hired for operations which could be too risky or controversial for state soldiers, as they offer easy deniability.
  - **For instance,** they have been hired to defend against sea pirates and fight poachers in Africa.
- **Technological Advancements:** such as sophisticated weapons, have made it easier for private armies to operate globally.
- **Other interests:** Private armies can provide military training, advisory support, or security assistance to governments or rebel groups aligned with certain geopolitical interests.
- **The lack of clear international regulations:** regarding the activities of private armies has allowed them to operate in a **legal grey area**.

Issues associated with PMCs

- **Lack of Accountability**: The absence of clear oversight mechanisms can lead to impunity for human rights abuses, misconduct, or violations of international humanitarian law.
- **Impact on State Sovereignty:** PMCs may operate in conflict zones or provide security services that are traditionally the government's responsibility.
- **Conflict of Interest:** Pursuing profit can compromise their impartiality, integrity, and effectiveness.

International Laws and their applicability to PMCs

- **International human rights treaties** provide for individual petitions and reporting systems to protect citizens from human rights violations by local or foreign PMCs.
- **International Criminal Court (ICC):** If a state party refused to investigate an employee of a PMC suspected of war crimes, the ICC could initiate its own investigation.
- **State Responsibility:** As per International Law Commission's Articles on State Responsibility (2001), states are responsible for the activities of non-state actors working on behalf of the state.
  - However, state responsibility only extends to other states, not to individuals.
- **International Humanitarian Law (IHL):** IHL provides clear rules on the combat status of individual employees of PMCs, though only in cases of international and civil conflict.
- **The International Convention against the Recruitment, Use, Financing and Training of Mercenaries (1989)** mandates that states parties have an obligation to adopt the provisions of the Convention in national laws.
  - However, the treaty's definition of mercenary is obscure and few states have ratified it.

Conclusion

Regulating PMCs is essential to address the ethical, legal, and security concerns associated with their operations. It should be ensured that they **do not undermine government policy** and are made **accountable for their actions**. Effective regulation requires **collaboration among states, international organisations, and other stakeholders**.

5. ENVIRONMENT

5.1. CLIMATE CHANGE

5.1.1. GREENWASHING

Why in the news?

International Sustainability Standards Board (ISSB) issued **International Financial Reporting Standards (IFRS) S1** and **IFRS S2** to disclose material emissions, climate finance, etc. to mitigate greenwashing.

More on the News

- **IFRS S1** provides a set of **disclosure requirements designed to enable companies** to **communicate sustainability-related risks** and opportunities to investors.
- IFRS S2 sets out specific **climate-related disclosures.**
- ISSB standards are formulated voluntarily on the basis of the **G20's Task Force on Climate-related Financial Disclosures (TCFD).**

What is Greenwashing?

- Greenwashing (also known as green sheen) is the practice of **misleading the general public into believing that companies, sovereigns, or civic administrators are doing more for the** environment than they actually are.

Why is greenwashing problematic?

- **Deceptive progress of climate mitigation:** displaying a **false picture** of the **progress made on the climate** change front.
- **Undermines the credibility of Carbon Markets.**
- **Misuse of sustainable finance:** Funds earmarked for green projects are being utilised inappropriately for greenwashing.
- **Erodes trust in green products**: Consumers who genuinely want to **make environmentally responsible choices** can become sceptical of any environmental claims**.**
- **Unfair Competition**: Create **an unfair advantage for companies** that make false or exaggerated environmental claims.

Initiatives taken in India to Check Greenwashing

- SEBI issued **dos and don'ts relating to green bonds** to avoid greenwashing.
- SEBI has formulated a **framework for ESG**, to **address risk of greenwashing**.

Challenges in Tackling Greenwashing

- Lack of uniformly accepted definitions.
- Absence of strong regulatory standards and bodies for evaluating and monitoring.
- Resource constraints and limited expertise to monitor.
- Lack of transparency in company disclosures.
- Lack of accountability in voluntary business action.

Way Forward

- **Climate pledges** should contain detailed and interim targets and plans to fulfil commitments in line **with IPCC (Intergovernmental Panel on Climate Change) modelled pathways.**
- Setting up **global and national level regulatory bodies**.
- **Drafting regulations and standards** to allow companies to **demonstrate their commitment to sustainability** through verifiable and measurable actions.
- Encouraging companies to adopt **transparent accounting and public disclosure systems.**

5.1.2. DRAFT GREEN CREDIT PROGRAMME (GCP) IMPLEMENTATION RULES 2023

Why in the news?

Ministry of Environment, Forest and Climate Change (MoEF&CC) notified Draft GCP Implementation Rules 2023.

About Green Credit Programme (GCP)

- MoEF&CC has decided to institute GCP under **Environment (Protection) Act, 1986 and issued these draft rules.**
- **GCP was announced during the Union Budget 2023,** aligning with India's climate goals under Paris Agreement and realising the vision of "Mission LiFE".
  - **Article 6 of the Paris Agreement** allows for carbon trading through market mechanisms**.**
- It aims to leverage a **competitive market-based approach for Green Credits** thereby incentivising voluntary environmental actions of various stakeholders.
- Various sectors for GCP include **Tree Plantation, Water Conservation, Sustainable Agriculture, Waste Management, Air Pollution reduction** etc.

Draft GCP Implementation Rules 2023

- Green Credit (GC) means a **singular unit of an incentive** provided for a specified activity, delivering a **positive impact on the environment.**
- **Objectives of GCP:**
  - Create a **market-based mechanism for providing GCs** to individuals, organisations, local bodies, gram panchayats, private sectors etc. for environment-positive actions.
  - Create **mass movement around environment positive actions** and realise the vision of **Mission LiFE.**
- GCs will be **tradable outcomes** and will be made available for **trading on a domestic market platform.**
  - An activity generating GCs **may also get Carbon Credits** from the same activity under the carbon market.
- The **Indian Council of Forestry Research and Education** is the administrator of the GCP, responsible for its implementation, management and monitoring.

5.1.3. GLACIERS IN HINDU KUSH HIMALAYA

Why in News?

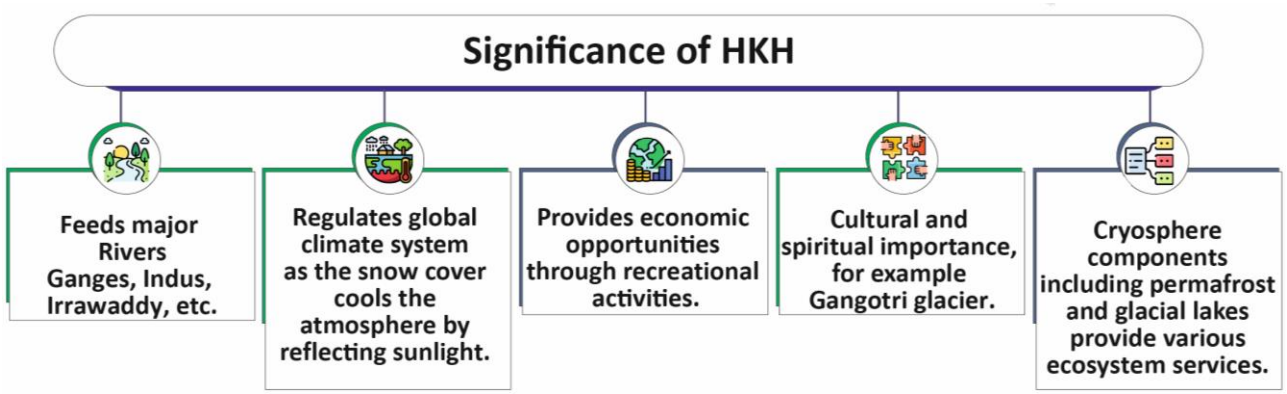
The **International Centre for Integrated Mountain Development (ICIMOD)** released **Water, Ice, Society, and Ecosystems (WISE)** report for the Hindu Kush Himalaya (HKH).

Key Highlights (impacts of climate change on HKH)

- **Glaciers disappeared 65% faster in the 2010's** than in the previous decade.
- With accelerated glacier melt, **'peak water' will be reached around mid-century** and overall water availability is expected to decrease by the end of the century.
- **Increase in Hazards, e.g.,** a **three-fold increase in GLOF risk** across the HKH is projected by the end of the 21st century.

About HKH

- **Stretches 3500 km** from Afghanistan to Myanmar.
- Has the **highest mountain ranges in the world** and a large volume of ice on Earth outside the polar regions.
- Known as **"Water Towers of Asia".**



Challenges in tackling the deteriorating situation in HKH

- **Poor adaptation capabilities** of communities due to low financial and technical support.

- **Complex and unpredictable Hazards** are making Early warning measures difficult.
- **Population growth and infrastructure** development in the region.
- **Low protection** (About 67% of ecoregions and 39% of global biodiversity hotspots that are in the HKH are still outside protected areas).
- **Limited regional Cooperation** and issues in data collection and implementing uniform policies.

Way Forward

- **Improve monitoring Network** with the help of techniques such as **in-situ measurements, remote sensing, satellite data,** etc.
- **Adopting Integrated Water Resources Management Approach.**
- Raising awareness among stakeholders (including **mountain communities, civil society, private sector, governments, etc.**) about the preparation needed for tackling them.

Steps Taken to protect Glacial Ecosystem

India's Initiatives

- **National Mission for Sustaining the Himalayan Ecosystem (NMSHE),** part of the **National Action Plan on Climate Change (NAPCC),** launched in 2008.
- **National Centre for Polar and Ocean Research (NCPOR)** established by the **Ministry of Earth Sciences (MoES).**
- **Research station 'Himansh'** was established in the Chandra basin (Himachal Pradesh) in 2016.

Global Initiatives

- **ICIMOD's** initiatives **like Hindu Kush Himalayan Monitoring and Assessment Programme (HIMAP), etc.**
- Framework for regional cooperation by **United Nations Development Programme (UNDP)** and ICIMOD.
- **UNESCO's** World Glacier Monitoring Services.

5.2. GLACIAL LAKES OUTBURST FLOODS (GLOFS)

Why in the news?

A recent study conducted by scientists revealed that about **3 million Indians reside in regions that are susceptible to glacial lake floods (GLOFs).**

Data Bank

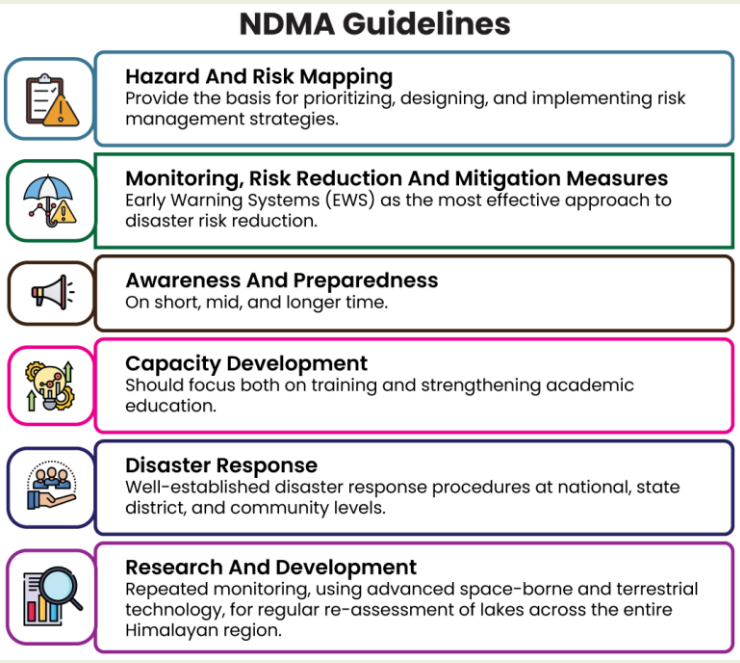
» 1/3rd of the people globally exposed to **GLOFs** reside in **India and Pakistan.**

About GLOFs

- **GLOF** is a sudden release of a significant amount of water retained in a glacial lake.
- **Due to global warming** glaciers are retreating and glacier lakes are expanding in size and numbers.
- **Recent example:** Chamoli, Uttarakhand (2021).
- **Factors triggering GLOFs include-**
  - **Rapid slope movement** (slides, falls and avalanches) into the lake.
  - **Increased water inflow into a lake** due to cascading processes (flood from a lake situated upstream).
  - **Black carbon** deposition reducing the albedo of earth and melting the glaciers.
  - **Anthropogenic activities** such as Mass tourism, and developmental interventions.
- **Impact of GLOFS** includes societal impact, impact on ocean circulation and climate, the impact of geomorphology etc.

Measures to deal with GLOF

- **Different agencies like Indian Space Research Organisation (ISRO), Central Water Commission (CWC)** and Geological Survey of India (GSI) are involved in monitoring, predicting and undertaking research on GLOF.
- Sikkim has installed **a Lake monitoring and information System (water level Sensor).**



Way ahead

- **Creating a nodal agency** for **inter-agency coordination.**
- **Enhance access to early warning systems and timely information** by setting up and widening the network of **high-altitude meteorological and discharge stations**.
- **Coordinating efforts of** monitoring agencies of glaciers and investing in manpower **and** logistics.

5.2.1. IMPACT OF CLIMATE CHANGE ON INDIAN MONSOON

Why in the news?

Monsoon in India has undergone several changes over the years due to climate change.

Impact of Climate Change on Monsoon

- **Changes in the spatial pattern of rainfall,** with some regions witnessing a reduction in rainfall while others witnessing surplus rainfall.
- **Future monsoonal rainfall is projected to become more intense and affect larger areas** due to **increased atmospheric moisture content** resulting from temperature rise ('Assessment of Climate Change over the Indian Region' report by Ministry of Earth Sciences).
- **Variability in terms of the timing of arrival (onset) and withdrawal** of monsoon.
- **Alterations in factors of monsoon affecting the onset and movement of monsoon systems** such as El Nino, Tropical Easterly Jet (TEJ), Jet streams, etc.
    - For instance, **low pressure** and **depression** are travelling south of their position.

Consequences of Erratic Monsoon

- **Impact on livelihood** and economic productivity in sectors such as agriculture.
- **Increase in Hazards and extreme events** like flash floods, mega-droughts, urban flooding, etc.
- **Forced Migration.**
- **Loss of ecological diversity**.
- **Infrastructure damage**

Way Forward

- **Mitigate** the emission of **Greenhouse gases (GHG)** by promoting decarbonisation in different sectors.
- **Promoting adaptation techniques** along with **the capacity development of people**.
- **Strengthen early warning systems** and ensure that **forecasts** and **warnings are accurate.**
- Promote **climate-resilient agriculture.**

Related News

- India experienced an extended spell of the La Nina, called a **'triple dip' La Nina.**
- It is a phenomenon lasting across **three winter seasons in the northern hemisphere**.
    - This is **only the third time since 1950 that a triple dip La Nina has been observed.**
- **As per World Meteorological Organisation**, it is likely that the protracted La Niña event will last until at least the end of the year, **becoming this century's first 'triple-dip' La Niña.**

5.3. AIR

5.3.1. COAL BASED THERMAL POWER PLANTS EMISSION NORMS COMPLIANCE

Why in the news?

Centre for Science and Environment (CSE), an Environmental NGO, assessed the status of compliance of coal-fired thermal power plants (TPP) with SOx emission norms.

Data Bank

» **Only 5%** of the **coal power capacity has complied** with emission norms so far.

Emission Norms for TPPs

- **In 2015,** MoEFCC first time introduced environmental emission standards **for controlling SO_2, NOx & Mercury emissions** from TPPs under the **Environment (Protection) Act, 1986.**
    - Coal TPPs contribute to **over half of SO_2 concentration, 30% oxides of nitrogen, 20% PM in the ambient air.**

- In **2021, the** government extended the timelines for the majority of coal-based power plants in India (3 different deadlines for different categories like for within 10 km radius of Delhi NCR and cities with more than 10 lakh population has a deadline of Dec 2024).
- All plants with **Once Through Cooling (OTC)** shall install **Cooling Tower (CT)**.
- **Use of beneficiated coal** to minimise flyash generation.
- Achieve **100%** utilisation of total ash generated at the plant.
- **Various Pollution Control Technologies (PCTs) include** Flue-gas desulfurisation (FGD) for Sox, Selective Catalytic or Non-Catalytic Reduction (SCR/SNCR) for NOx, Electrostatic Precipitators for large PM etc.

Challenges in Meeting New Standards

- **High investment required for equipment, skilled manpower etc.**
- **Requires retrofitting existing TPPs with auxiliaries**, to control emissions, such as Flue Gas Desulphurisation (FGD), Selective Catalytic Reduction etc.
- **Limited domestic manufacturing capability of Pollution Control Technologies (PCTs) equipment** such as FGD**.**
- **Meagre penalty for violating emission norms**.

Suggestions

- **Dis-incentivise/incentivise plants** based on measures taken to meet the deadline.
- **Central Electricity Authority** and the **Ministry of Power** should work in tandem to implement norms.
- Stakeholders must publish **transparently** about **emission data** and their **impact in the immediate vicinity** of TPPs for **public research** and **scrutiny.**
- **Provide a one-year grant window or subsidy scheme** to enable fund-raising for the high upfront costs.
- **Removal of tax levied on imported Pollution Control Technologies (PCTs)** to encourage TPPs to utilise and import the technologies.

5.3.2. GRADED RESPONSE ACTION PLAN (GRAP)

Why in the news?

Recently, **Commission for Air Quality Management in NCR & Adjoining Areas (CAQM)** announced a revision in the existing GRAP to abate air pollution in the region.

About Graded Response Action Plan

- GRAP is an **emergency response mechanism** based on Delhi's Air Quality Index level.
  - It brings together all stakeholders to respond to deteriorating air quality in **Delhi-NCR.**
- In pursuant to the **Supreme Court's** order of **2016** in the matter of **M. C. Mehta vs Union of India** regarding air quality in the **National Capital Region of Delhi**, a Graded Response Action Plan was prepared.
- The **GRAP** was first notified under **the Environment (Protection) Act of 1986 in January 2017** by the Ministry of Environment, Forest and Climate Change.
  - According to the notification, implementing the GRAP fell on the now-dissolved Environment Pollution (Prevention and Control) Authority for the NCR.
    - ✓ From **2021** onwards, the **GRAP is being implemented by the CAQM.**
- Since October 2022, **GRAP has been enforced based on the AQI.**
  - AQI includes **pollutants-PM10, PM2.5, NO_2, Ozone, SO_2, CO, NH_3 and lead (Pb).**
  - **The older version of the GRAP** was enforced based only on the concentration of **PM2.5 and PM10.**
- The GRAP for the NCR has been classified under **four different stages of adverse air quality in Delhi**. (Shown in Table)

Revised Graded Response Action Plan

Stages	Delhi AQI	Actions
Stage I - 'Poor' Air Quality	201-300	• Strictly enforce NGT / SC's order on over aged diesel / petrol vehicles and as per extant statutes. • Ensure hotels, restaurants and open eateries use only electricity / clean fuel gasbased appliances (**Shifted from Stage-II to Stage I**) • **New Additions:** ○ **Citizen charter:** Prefer hybrid vehicles or EVs to control vehicular pollution.

		○ Do not drive/ply end of life/ 10/15 years old Diesel/Petrol vehicles.
Stage II - 'Very Poor' Air Quality	301-400	• Schedule for regulated operations of DG sets across all sectors in the NCR including Industrial, Commercial, Residential and Office establishments etc. • **New Additions:** ○ Ensure focussed and targeted action on predominant sector(s) contributing to adverse air quality in all identified hotspots in NCR.
Stage III – 'Severe' Air Quality	401-450	• **NCR State Governments. / GNCTD Action:** To impose strict restrictions on plying of BS III petrol and BS IV diesel LMVs (4 wheelers). • **New Additions:** ○ **NCR State Governments. / GNCTD** may take a decision on **discontinuing physical classes** in schools for children up to Class V.
Stage IV – 'Severe +' Air Quality	450+	• **New Additions:** ○ Do not permit LCVs registered outside Delhi, other than EVs / CNG / BS-VI diesel, except those carrying essential commodities / providing essential services. ○ NCR State Governments/GNCTD may take a decision on discontinuing **physical classes** even for classes VI – IX, class XI and conduct lessons in an online mode.

Other Key Features

- **Time of enforcement**: The revised GRAP to come into force w.e.f. 01.10.2023 in the entire NCR.
- **Can be invoked at least three days in advance:** Based on the dynamic model and weather/ meteorological forecast by IMD / IITM on a day-to-day basis.
  - Actions under Stages II, III and IV of the GRAP shall be invoked at least three days before the AQI reaches that stage's projected levels.
- **Continued Restrictive Actions:** For example, restrictive actions under the Stage III category, whenever invoked, shall be in addition to those under Stage I and II, respectively and so on.
- **Additional Measures:** CAQM may decide upon **additional measures** and exceptions to the schedule of the GRAP under different air pollution categories, i.e., Stages I to IV, as per the prevalent AQI and weather forecast.

Conclusion

The 5th Annual World Air Quality Report released by IQAir reported that Delhi was ranked fourth in the world's most polluted cities. A graded Response Action Plan (GRAP) is the right step to curb NCR air pollution and reduce its negative impact on health.

5.4. SUSTAINABLE DEVELOPMENT

5.4.1. NATIONAL INDICATOR FRAMEWORK (NIF) FOR SDGS

Why in the news?

The Ministry of Statistics and Programme Implementation (MoSPI) has released the Sustainable Development Goals (SDGs) National Indicator Framework (NIF) Progress Report 2023.

About National Indicator Framework (NIF)

- **National statistical agencies** and other relevant institutions are responsible for **collecting data and reporting on the indicators under the Global Indicator Framework (GIF),** which the Inter-agency and Expert Group framed **on SDG Indicators (IAEG-SDGs).**
- Towards this endeavour, the **MoSPI** developed a **National Indicator Framework (NIF) in 2018.**
- The **NIF** includes indicators that **align with the SDGs global indicators** and also includes indicators which are **tailored to suit India's specific requirements.**
  - It also **specifies the data sources** (government statistics from different surveys, administrative data and various censuses) **and periodicity for each indicator.**
- The 2023 NIF **provides an overview of the progress made by India on SDGs and the data gaps** which need to be addressed for better monitoring of SDGs.

To know more on the Key Findings of the SDG NIF Progress Report 2023, refer to Appendix I.

5.5. RENEWABLE ENERGY AND ALTERNATIVE ENERGY RESOURCES

5.5.1. ENERGY TRANSITION

Why in the news?

World Economic Forum (WEF), in collaboration with Accenture, released the report titled **"Fostering Effective Energy Transition 2023"**.

Data Bank

- **43 million people could be employed in the RE sector** by 2050 (International Renewable Energy Agency's Global Energy Transition Outlook).

Key Findings

- **India** & Singapore are the only two countries making advances in **all aspects of energy system performance.**
- ET has increased each consecutive year over the last decade, but the **growth has plateaued in the past three years.**

About Energy transition (ET)

- Refers to the **global energy sector's shift** from **fossil-based systems** of energy production and consumption (including oil, natural gas, and coal) **to renewable energy** (RE) sources like wind and solar.
- **Need for Energy Transition in India**
  - **Fossil fuel extraction** and combustion have significant negative environmental impacts, such as **air and water pollution**, etc.
  - **Fulfil International Commitments** made through Nationally **determined contributions** (**NDCs**) and **Panchamrita Pledge**, such as- achieving **50%** energy from **non-fossil fuel** resources **by 2030, etc.**
  - **Reduce import dependency** and overcome issues related to energy supply chain volatilities.
  - Cost-competitive renewable power generation can **enhance accessibility at different topography**.

Challenges in Energy Transition

- **High dependence on fossil fuel sources** (more than 50% of the total installed capacity).
- **Financial constraints**, cumulative investments of up to **6–8 trillion USD** will be required **during 2015–2030**.
- **Low Private participation** due to low return, high risk, etc.
- **Ambitions and implementation gaps** between the Centre and the States (e.g., coal-rich states prefer its utilisation).
- **Limited the capability** of manufacturing large-scale low-carbon **technologies (LCTs)**.
- **Inadequate infrastructure** such as energy storage systems, grid connectivity, etc.

India's efforts towards Energy Transition

Policy Framework

- National Offshore Wind Energy Policy, 2015.
- National Wind-Solar Hybrid Policy, 2018
- Green Hydrogen/ Green Ammonia Policy, 2022
- Energy Conservation and Sustainable Building Code.

Schemes/Initiatives

- National Solar Mission.
- National Green Hydrogen Mission
- **Renewable purchase obligations (RPO)** under Renewable Energy Certificate (REC) Scheme.
- **Green Term-ahead Market** to provide enhanced avenues for sale of RE.
- **Carbon Credit Trading Scheme, 2023** incentivizes transition toward low-carbon pathways

International Cooperation

- **International Solar Alliance** and its **One Sun One World One Grid (OSOWOG)** programme
- **Mission Integrated Bio-refineries** under Mission Innovation.
- U.S.-India Strategic Clean Energy Partnership (SCEP).

Way Forward

- **Adopting blended finance structures,** which involves the public sector strategically providing capital to mitigate certain risks that private sector capital cannot absorb.
- **Effective innovation frameworks** incorporate coordinated policies and actions to drive innovations.
- **International collaboration** through mechanisms such as **Just Energy Transition Partnerships (JETPs).**
- **Creating a State-level framework for ET** to enhance the participation of states through adequate **plans, actions, and governance processes.**

- **Collecting adequate data** about the sectors, people, etc. who will be impacted by the energy transition and forming effective policies such **as reskilling and redeployment of manpower**.

Related Term
Just Energy Transition Partnership (JETP)
- An emerging mechanism for **multilateral financing by developed countries to support an energy transition** in developing countries.
- It was **first announced at UNFCCC COP26 in Glasgow**, where France, Germany, UK, USA, and EU announced JETP to support South Africa's decarbonization effort.

5.6. CONSERVATION EFFORTS

5.6.1. FOREST CONSERVATION (AMENDMENT) BILL, 2023

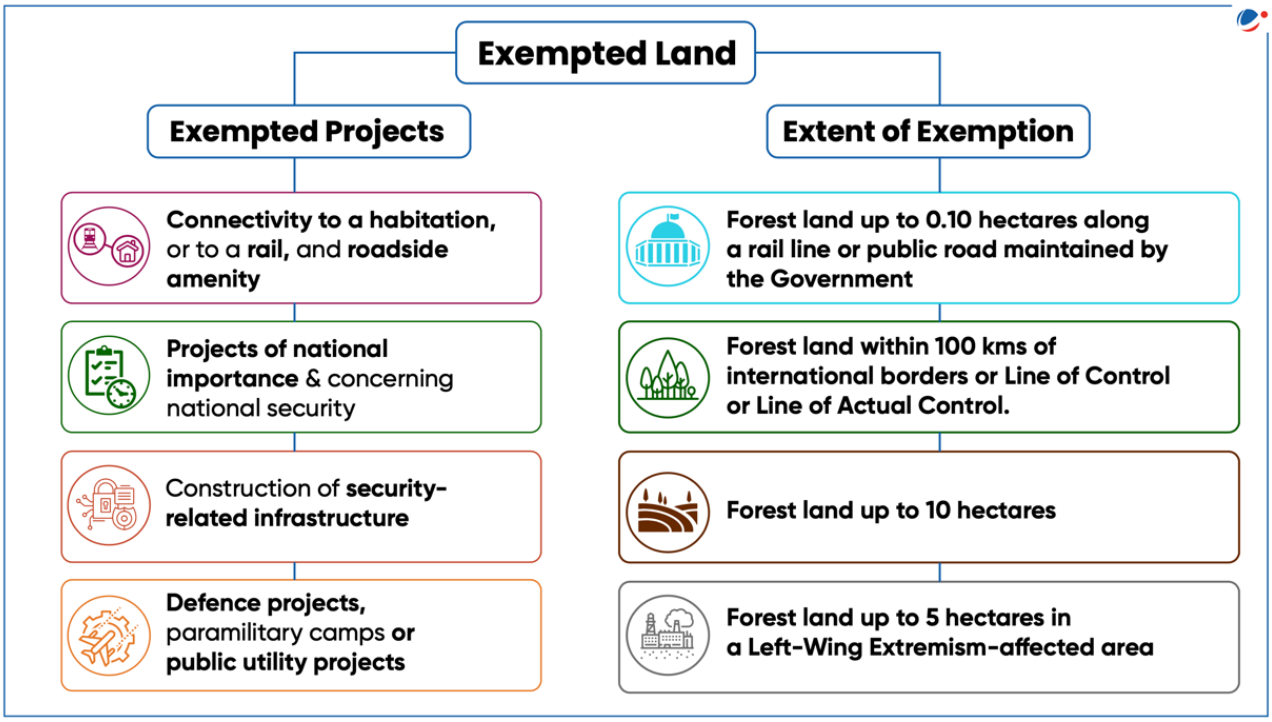
Why in the news?

Both houses of the Parliament has passed the Forest Conservation (Amendment) (FCA) Bill, 2023.

T.N. Godavarman Thirumulpad vs Union of India Case (1996)
- Till 1996 the FCA, 1980 only applied to the forests notified under the Indian Forest Act of 1927.
- The SC judgment, in this case, expanded the definition of "forest" covered under the Act to include:
  - All areas **recorded as "forest" in any government** (Union and State) record, irrespective of ownership, recognition and classification.
  - All areas that conformed to the "**dictionary" meaning of forest.**
  - Areas are **identified as "forests"** by an expert committee constituted by the SC following the 1996 order.

About Forest Conservation (Amendment) (FCA) Bill, 2023

- It will amend **the Forest (Conservation) Act 1980 (FCA,1980)** which puts **several restrictions on the de-reservation of forests or use of forest land for non-forest purposes** and specifies penalties for contravention of any of its provisions.
- The Act has been given a new name through the amendment– **'Van (Sanrakshan Evam Samvardhan) Adhiniyam', 1980.**
- Bill will enable India to **increase its forest/tree cover;** achieve national and **international targets;** Fast track Strategic & security-related projects; etc.



About the Amendments

- **Rationale:** Clarifies the scope of applicability of the Act after the ambiguity created by the Supreme Court judgment in the **T.N. Godavarman case (1996).**

- **Addition of Preamble which** encompasses **India's Nationality Determined Contribution and other National targets,** such as Net Zero Emission by 2070, etc**.**
- **Defines Land covered** under the provisions of the Act to include:
  - Land **declared/notified as a forest** under the Indian Forest Act, 1927 or other laws.
  - **Land recorded in Government records as forest**, as on or after **1980** (except **land which has been officially changed from forest use to use for non-forest purposes** on or before 1996).
- **Defines categories of land kept outside the purview of the Act** (see image).
- **Allows tree, tree plantation or reafforestation** raised on lands **not explicitly covered under the Act**.
- **Additional activities excluded from the definition of non-forest purposes** such as establishment of **zoos and safaris** in forest areas other than **protected areas**; **eco-tourism facilities**; **silvicultural operations,** etc.
- State governments now require **prior approval of the central government** before assigning of forest land by way of lease or otherwise to **government entities as well** (earlier needed for only private entities).
- **Central government further empowered to:**
  - **Specify terms and conditions for treating any survey**, such as reconnaissance, prospecting, investigation or exploration, including seismic survey**, as non-forest purposes.**
  - **Provide terms and conditions for exempted lands,** including **planting trees** to **compensate felling** of trees.
  - **Issue directions** to any government authority or organisation for implementation of the act.

Concerns regarding the Bill

- **Can promote large-scale deforestation** by excluding more activities for non-forest purposes.
- Placing **non-recorded forests** out of the **purview of the Act** leaves large areas of forests unprotected.
- **Dilutes Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights Act),** 2006 as exemptions to forest lands are provided without consent or clearance by authorities such as the **Gram Sabha.**
- **Compromises Federalism** as state government needs to take prior approval from the Central government for assigning forest land on lease to government authorities.
- Blanket exemptions may **threaten Ecologically Fragile Areas** across international borders.
- **Plantations cannot substitute** the ecological services offered by natural forests.

Conclusion

The Amendment Act aims **to promote the conservation of forests and fulfil India's international commitments**. A comprehensive survey of the extent of all forest land in the country can be conducted to address the concerns. Further, any diversion of forest land **should be done to protect the ecological integrity of the region** and ensure sustainable development.

5.6.2. BIOLOGICAL DIVERSITY (AMENDMENT) BILL, 2023

Why in the news?

Recently, both houses of Parliament passed the Biological Diversity (Amendment) Bill, 2023, amending the **Biological Diversity Act of 2002**.

Biological Diversity Act 2002

- Enacted to help India meet the objectives of the **United Nations Convention on Biological Diversity (CBD) 1992.**
- **Aim: Conserve biodiversity**; promote the **sustainable utilisation of its elements** and **ensure just and fair distribution** of the advantages arising from the use of biological resources.
- **Provides** for a **decentralised three-tiered mechanism** for regulation.
  - **National Biodiversity Authority (NBA)** at the national level,
  - **State Biodiversity Boards (SSB)** at the state level, and
  - **Biodiversity Management Committees (BMC)** at the local body level.
- **Provides for sharing benefits** (such as **monetary compensation**, sharing of **intellectual property rights**, or **technology transfer) with biodiversity conservers** and holders and creators of associated knowledge.

Key changes made in the Biodiversity Amendment bill

- **Registered AYUSH medical Practitioners, local people and communities of the area, including growers and cultivators of biodiversity, are exempted** from giving prior intimation to SBB for accessing biological resources from certain purposes.
- Applicants can obtain **NBA's approval before the grant of IPR** and not before the application.
- **Some foreign companies registered in India,** which are not controlled by a foreigner**, do not need to seek approval** from the NBA for obtaining biological resources.
- **Offences under the act are no longer cognisable and non-bailable.**
- **State government will prescribe the composition of BMCs** and may also constitute BMCs at the intermediate or district Panchayat level.
- Bill **decriminalises the offences** and makes offences punishable with a penalty between **Rs 1 lakh and Rs 50 lakh.**
  - **Continuing contravention** may attract an additional penalty of up to **1 crore rupees.**
- **Power to notify any threatened species can be delegated to the state government.**
  - However, before notifying any threatened species, the state government must consult the NBA.
- **Expansion of NBA to include** additional members.
- **Changes in Definitions:** E.g., the definition of codified traditional knowledge has been inserted and biological resources has been changed.

What is access and benefit-sharing?
Refers to the way in which **genetic resources** may be accessed, and how the **benefits that result from their use are shared** between the people or countries using the resources **(users)** and the people or countries that provide them **(providers).**

Significance of the Bill

- **Reduce the pressure on wild medicinal plants** by encouraging the cultivation of medicinal plants.
- Facilitate fast-tracking of **research, patent application process, and transfer of research results.**
- **Bring more foreign investments** in the chain of biological resources without compromising the national interest.

Key issues with the Bill

- **Ambiguity in the definition of codified traditional knowledge may lead to a broad interpretation,** exempting almost all traditional knowledge from benefit-sharing requirements.
- **Limits role of local bodies and benefits claimers** in determining mutually agreed terms **in benefit sharing.**
- Need of **legislative guidance** to the adjudicating officer on assessing the penalty within new range.
- **Large companies may evade the requirement for prior approval or sharing the benefits impacting benefit sharing with local communities,** such as AYUSH firms are registered under the name of the practicing AYUSH doctors, foreign companies registered in India etc.

Conclusion

There is a need to address the abovementioned concerns to ensure that India's rich biological diversity and associated traditional and contemporary knowledge systems be preserved without compromising the objectives and **hindering their growth and usability.**

5.6.3. PROTECTION OF PLANT VARIETIES AND FARMERS' RIGHTS (PPVFR)

Why in the news?

Recently, Delhi High Court dismissed an appeal filed by PepsiCo India Holdings (PIH) against a 2021 order revoking **PIH's registration of a potato variety FL-2027.**

Background of the Issue

- The **FL-2027 variety of potatoes** (commercial name FC-5) **was introduced by Pepsi in 2009** through a contract farming arrangement.
- The FL-2027 variety was registered under the **Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act** 2016.
- In 2019, **Pepsico sued some farmers in Gujarat for illegally growing its registered potato** variety and violating its IPR under the Act.
- In 2021, **the registration of FL-2027 was revoked on the grounds** of furnishing incorrect information and infringing farmers' rights.

About the Protection of Plant Varieties and Farmers' Rights (PPV&FR) Act 2001

- **Enacted:** In 2001 under Article 27(3) (b) of the **Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).**
  - The act conforms with **International Union for the Protection of New Varieties of Plants (UPOV), 1978.**
- **World's only IPR legislation:** that grants **intellectual property rights** not only to the **plant breeders but also to the farmers** by protecting new, extant and farmers' varieties.
  - Unlike UPOV, the Act facilitates the protection of **not only new** but even existing varieties.
- **Objective:**
  - To recognise **and protect farmers' rights regarding plant genetic resources** for the development of new plant varieties.
  - To **accelerate agricultural development in the country**,
  - Protect plant breeders' rights.
  - **Facilitate the growth of the seed industry in the country**.
- **Protection period**:
  - **Trees and vines:** 18 years.
  - **For other crops, 15 years.**
  - **For extant varieties: 15 years**
- **Institutions/Authorities:**
  - **Plant Varieties Protection Appellate Tribunal (PVPAT):** Decisions of the PVPAT can be challenged in the High Court. The Tribunal shall dispose of the appeal within one year.
  - **Protection of Plant Varieties and Farmers' Rights Authority** (**PPV&FR Authority):** Established to implement the provisions of the Act by the Department of Agriculture and Cooperation, Ministry of Agriculture.
    - ✓ Its function includes **Registration of new plant varieties, Facilitating the development and commercialisation of new varieties**, etc.

Rights under the Act	
Breeders' Rights • Breeders have **exclusive rights** to produce, sell, market, distribute, import, or export the protected variety.	**Researchers' Rights** • Researchers can use any of the **registered varieties** under the Act for **conducting experiments or research**. • **Can also use a variety as an initial source of variety** for the purpose of developing another variety.
Farmers' Rights • A farmer is **entitled to register and protect** a new variety. • A farmer **can save, use, sow, re-sow, exchange, share or sell his farm produce** including seeds of a variety protected under the PPV&FR Act, 2001. ○ The **farmer shall not be entitled to sell branded seed of a variety protected** under the PPV&FR Act, 2001. • In the case of **non-performance of variety**, the farmer shall be **compensated**.	

Concerns with PPV&FR

- **Limited Access to Seeds**: Breeders' rights can restrict small-scale farmers' access due to costly patented seeds.
- **Hybrid and GM Seeds Preference:** Contradicts PPV&FR's aim to conserve plant genetic resources.
- **Implementation Challenges** like lack of awareness, resources, and infrastructure hinder effective enforcement.
- **Biopiracy Concerns:** Local communities are exploited without fair compensation for traditional knowledge and resources.

Conclusion

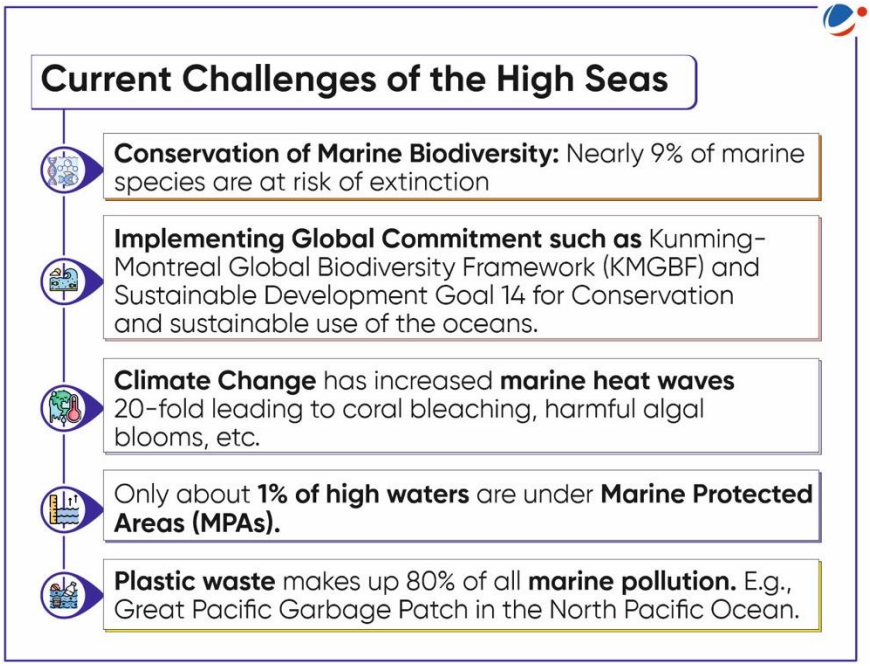
The PPV&FR Act 2001 promotes the interest of Breeders, Researchers' and Farmers. There is a need to ensure that Act is implemented comprehensively.

5.6.3. BIODIVERSITY OF AREAS BEYOND NATIONAL JURISDICTION TREATY (UNITED NATION HIGH SEAS TREATY)

Why in the news?

United Nations has adopted the Biodiversity of Areas Beyond National Jurisdiction Treaty or the High Seas Treaty.

More on News



- Adopted under the framework of the **United Nations Convention on Laws of the Sea (UNCLOS).**
- **Objective:** Ensure the **conservation** and **sustainable** use of **marine biological diversity** in areas beyond national jurisdiction through international cooperation and coordination.
- **Legally binding** in nature and will enter into force once **60 countries have ratified** it.
- Also referred to as the **'Paris Agreement for the Ocean'.**
- **High Ambition Coalition** played a key role in the adoption of the treaty.
- **The high seas** are all parts of the ocean that aren't included in the exclusive economic zone, the territorial sea, or the internal waters of a country.
- **Importance of High seas:** soaking up CO_2; provides seafood; genetic and medicinal resources; etc.

Key Highlights of High Seas Treaty	
Environmental Impact Assessments (EIA) • Parties obligated to conduct EIA undertaking processes of screening, scoping etc., under EIA. before implementation of the project. • EIA will be followed by an **environmental management plan.**	**Fair and Equitable Sharing of Benefits arising from of Marine Genetic Resources (MGR)** • **Access- and the benefit-sharing committee** will frame guidelines for sharing benefits from MGR and digital sequence information on MGR of areas beyond national jurisdiction. • **No State can claim its right** over marine genetic resources of areas beyond national jurisdiction.
Consent from Indigenous Community • Free, prior and informed consent is necessary for **accessing traditional knowledge associated with marine resources** in High seas areas that are held by indigenous people and local communities	**Institutional Mechanism** • **Conference of the Parties (CoP)**- Will be set up for governance. • **Clearing-house mechanism**- Will enable parties to **access, provide** and **give information** on activities taking place in relation to the agreement.
Other Highlights • **Area-based management tools** • **Capacity Building and Technology Transfer** • **Demarcating Marine Protected Areas (MPAs)** • **Equity** • **Global Environment Facility Trust fund** • **Settlement Of Disputes** • Agreement does not apply to any warship, military aircraft or naval auxiliary.	

Challenges in Implementing Treaty

- **Funding and Technology Transfer** has not been made mandatory for developed countries.
- **Unaddressed Issues** include mechanisms **for policing the protected areas,** projects that are **assessed to be heavily polluting,** and the **resolution of disputes (due to conflict of interest).**
- **Lack of Time period for forming rules and regulations** along with **implementation.**
- **Countries may oppose its legally binding nature** due to concerns about their sovereignty.
- **Exception:** Organisations responsible for regulating activities such as fisheries, shipping, and deep-sea mining could continue to do so without carrying out EIA.

Way Forward

- Countries should **cooperate with each other** in the implementation of the provisions of the treaty.
- **Other Initiatives** such as sensitisation **drives** need to be taken.
- **For the funding Mechanism,** a sustainable approach should be followed rather than dependence on developed countries.

5.7. DISASTER MANAGEMENT

5.7.1. INTEGRATED MANAGEMENT APPROACH FOR DISASTER MANAGEMENT

Why in the news?

Ministry of Home Affairs recently announced **three major schemes** worth more than ₹8000 crores for disaster management.

More on News

- **Three major scheme includes:**
  - **Project to reduce the risk of urban flooding** in the seven most populous metros.
  - **National Landslide Risk Mitigation Project** for Landslide Mitigation in 17 States and UTs.
  - **Scheme for Expansion and Modernization of Fire Services** to expand and modernise Fire services across the states.
- Also, the Ministry highlighted that the approach to **disaster management in the country has been improved** by **replacing** the earlier approach of **reactionary and relief-centric** with a **holistic and integrated management approach.**

** Fire safety has been discussed in subsequent article. To know more about Landslides and urban flooding in India, refer to Mains 365 2023 Environment.*

Steps taken in India to move towards a holistic and integrated management approach

- **Holistic approach to disaster management** with a focus on **prevention, mitigation and preparedness-based disaster management** at the grassroots level, through steps like-
  - **Establishing National Disaster Mitigation Fund** and State Disaster Mitigation Fund in 2021.
  - **Undertaking prevention activities** like planting of saplings on the banks of 13 major rivers which are prone to floods.
  - **Developing advanced early warning systems.**
- **Enhanced and proactive fund allocation:** Release of funds from NDRF has increased by nearly three times from 2005-14 to 2014-23.
- **Promoting the use of Information and Communication Technology (ICT)** including **Common Alerting Protocol** through SMS, **Disaster Management Information System Portal**, etc.
- **Cooperation between States and Union** through collective responsibility and response mechanism.
- **Involvement of community at grass root level:** E.g., the **Scheme for Training of Community Volunteers in Disaster Response (Aapda Mitra)** has set a target of preparing around one lakh youth volunteers in 350 high-risk disaster-prone districts.

5.7.1.1. FIRE SAFETY MANAGEMENT IN INDIA

FIRE SAFETY MANAGEMENT IN INDIA AT A GLANCE

In India, fire incidents are often **witnessed in densely populated urban areas, congested markets,** factories, slums, residential buildings, and public transport systems.

Examples: Commercial complex fire in Secunderabad, Hyderabad (2023), Hotel fire in Karol Bagh, Delhi (2019), Uphaar cinema, New Delhi (1997) etc.

Scheme/Policies/Initiatives

- **Amended Model Fire Bill, 2019,** aims at bringing a uniform law across the states for the maintenance of fire and emergency service.
- **National Building Code of India 2016** (published by Bureau of Indian Standards) contains detailed provisions **under Part – IV "Fire & Life Safety"** on fire prevention, life safety and fire protection.
- In 2020, Ministry of Health & Family welfare circulated strict **guidelines stipulating third-party accreditation for fire safety.**
- **NDMA has stipulated requirements for fire safety** in public buildings, including hospitals.

Challenges in fire safety management

- **Poor enforcement of Fire safety norms and building bylaws** by the civic authorities leading to **unauthorized construction, lack of regular monitoring and inspection,** etc.
- **Lack of uniformity in rules and limited applicability of fire safety norms,** e.g., fire safety norms in some states depend on building heights.
- **Capacity and resource constraints** in Local governments.
- **Infrastructural issues** like narrow lanes in densely populated areas which limit access to a site by Fire brigade services.
- **Negligence and low awareness among citizens.**

Way Forward

- **Enactment and enforcement of a uniform fire safety laws in every state** on the line of the Model Fire and Emergency Service Bill, 2019.
- **Enhance capacity** through awareness and mock drills.
- **Technological Upgradation** like use of automatic smoke alarm, etc. with built-in fire suppression system.
- **Mainstreaming of fire risks mitigation and management** in urban planning and development.
- **Conducting regular fire safety audits** of public spaces Hospitals, etc.
- **Proper evaluation and scrutiny** before the sanction and renewal of the permits, etc.

5.7.2. CYCLONE MANAGEMENT

CYCLONE MANAGEMENT IN INDIA AT A GLANCE

Favourable Conditions for cyclone formation
- **High sea surface** temperature (> 27° C)
- Presence of **Coriolis force**
- Small variations in the **vertical wind speed**
- Pre-existing **weak low-pressure** area or low-level-cyclonic circulation

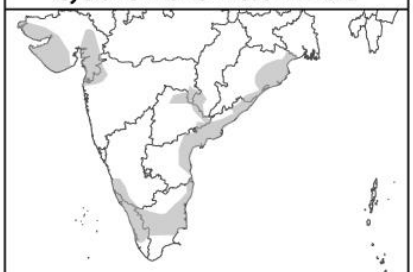
Cyclones in India
- Occur in the months of **May-June and October-November.**
- **More cyclones occur in the Bay of Bengal than the Arabian Sea** as it has higher sea-surface temperature and humidity, and a constant fresh water supply.

Recent cyclones in the Indian Ocean
- **Bay of Bengal:** Mocha,
- Sitrang and Asani
- **Arabian Sea:** Biparjoy

India's cyclone management framework

- **National Cyclone Risk Management Project** (Ministry of Home Affairs)
  - **Improvement of early warning dissemination systems.**
  - **Cyclone risk mitigation investment** in disaster infrastructure, coastal management and conservation etc.
  - **Technical assistance for hazard risk management and capacity building** through Vulnerability Analysis and Risk Assessment and community capacity building.
  - **Project management and institutional support** at National, State and District level.
- Other efforts:
  - **Indian National Centre for Ocean Information Services (INCOIS) set up Storm Surge Early Warning System (SSEWS)** for the Indian coasts.
  - **IMD launched dynamic, impact-based cyclone warning system** with four color-coded warnings: **green** (all is well), **yellow** (be updated), **orange** (be prepared) and **red** (take action).

Cyclone Prone Areas In India



"India is exposed to nearly 10% of the world's tropical cyclones."

Constraints

- **Increase in intensity and frequency of cyclones** due to climate change.
- **Technological and observational limitations** vis-à-vis forecasting.
- **Inadequacy of Infrastructural measures** such as embankments, cyclone shelters, cyclone resilient critical infrastructure etc.
- **Lack of awareness and community capacity development.**
- **Duplication of efforts due to lack of coordination among stakeholders** such as local panchayat, NGOs, State Government, Central Government and coastal authorities.

Way forward

- Establishing State-of-the-art **cyclone Early Warning System (EWS)** such as **Aircraft Probing of Cyclone Facility**
- **PPP to mobilise finance** in creating resilient infrastructure.
- Establishing a **comprehensive Cyclone Disaster Management Information System (CDMIS).**
- **Integrated hazard mitigation framework** taking into account cyclone and associated storm surge, wind hazard, etc.
- **Following NDMA guidelines for the Management of Cyclones with components like-** Structural and Non – Structural Measures; Disaster Risk Management and Capacity Development and Awareness Generation.

Related News: Rising Cyclones in Arabian Sea

- According to a recent study, there is a **52% increase in the frequency of cyclonic storms (CS) during 2001–2019 in the Arabian Sea** making India's west coast more vulnerable.
- **CS are increasing in Arabian sea because of**
  - **Warming of both the sea surface temperature** and **deeper waters in Arabian Sea.**
  - **Warm conditions** are very much **favourable for the rapid intensification of cyclones** so it has potential to **sustain the strength for a longer period.**
  - **Increasing frequency of El Nino Modoki phenomenon** which makes conditions conducive for cyclone formation over Arabian Sea.
  - El Nino Modoki causes **warm moist conditions in Central Pacific** and **dry cold conditions in Eastern and western pacific.**

5.8. UPDATES

5.8.1. GLOBAL BIODIVERSITY FRAMEWORK FUND (GBFF)

- Global Environment Facility's (GEF) **governing board has approved the establishment of a new fund** to finance the **implementation of the Kunming-Montreal Global Biodiversity Framework (KMGBF).**
  - The approved GBFF will be launched at the next GEF Assembly in Canada.
- GBFF will draw in capital from governments, the private sector, and philanthropic organisations and **will focus on eight thematic Action Areas** namely Biodiversity conservation, restoration, land/sea use and spatial planning, etc.
- GBFF **acknowledges the important roles and contributions of indigenous peoples** as custodians of biodiversity and in the conservation, restoration and sustainable use.
- **3 principles that guide the country's allocation of resources for GBFF**
  - Allocation system must **accommodate financial contributions on a rolling basis**.
  - Consider **special needs of Least Developed Countries and Small Island developing States**.
  - Acknowledge that biodiversity is not evenly distributed globally and some areas have greater potential to contribute to global biodiversity benefits than others.

5.8.2. TIGER CONVERSATION IN INDIA

Status of Tigers, co-predators and Prey in India-2022 report	• **Released by:** National Tiger Conservation Authority (NTCA). • **Key observation from the Status of Tiger report** ○ **Tiger population:** Number of tigers increased from **2,967 in 2018 to 3,682** (average number) in 2022, an annual rise of about 6%. ○ **Land area:** 53 tiger reserves cover 2.3% of India's total land area. ○ **Population:** India currently harbours almost **75% of the world's wild tiger population.** ✓ **Central India and the Shivalik Hills and Gangetic Plains** witnessed a notable increase in tiger population.
Management Effectiveness Evaluation (MEE) of Tiger Reserves	• **Released by:** National Tiger Conservation Authority (NTCA). • MEE is defined as **the assessment of how well Protected Areas (PAs)** are being managed primarily, whether they are protecting their values and achieving the goals and objectives agreed upon • **About the 5th cycle of MEE** ○ Based on MEE, 51 **tiger reserves have been classified into four categories: Excellent (12), Very Good (21), Good (13)** and **Fair (5).** ○ **The overall mean MEE score** has **increased from 65% in the second cycle in 2010 to 78%** in the present assessment, indicating continuous improvement in management effectiveness.

5.8.3. CENTRE MERGES PROJECT TIGER AND PROJECT ELEPHANT

- After the merger, **a new division named 'Project Tiger and Elephant Division' (PT&E)** has been **created under the Ministry of Environment, Forest, and Climate Change (MoEF&CC).**
- Now, **Additional Director General of Forests (ADGF) Project Tiger** will head the staffs of both divisions as ADGF of **Project Tiger and Project Elephant.**
- **Significance of the merger**
  - Makes the **administration of the projects efficient and linear.**
  - Since both **species share the same habitat**, an integrated approach can benefit both.
- **Challenge: The inclusion** of multiple species under one project may dwindle the actual fund allocation to the tigers.

6. SOCIAL ISSUES

6.1. RESEARCH AND DEVELOPMENT (R&D) ECOSYSTEM IN INDIA

Research and Development (R&D) Ecosystem in India at a Glance

- R&D ecosystem in India Include one or more of the categories of **Basic research, Applied research and Development research.**

Challenges in India's R&D ecosystem

- **Expenditure on R&D:** India currently spends only **0.7 per cent of GDP** (China and US spend more than 2%).
- **Issues in education system:** Outdated **curriculum** and pedagogy, **lack of systematic monitoring** or evaluation of R&D projects, etc.
- **Socio-cultural issues:** Risk-Averse Ecosystem, brain drain and ack of inclusivity.
- **Translation of research into technologies:** Due to Skewed focus towards basic research and Low Industry-academia connect.
- **Structural issues:** Fragmented R&D ecosystem, narrow focus, vacuum in planning/strategizing etc.

Initiatives to boost R&D

- **Institutional framework:** ISRO, DRDO, CSIR, ICAR, ICMR, Department of Atomic energy (DAE)
- **Encouraging patent filing:** Scheme for Facilitating Start-Ups Intellectual Property Protection (SIPP), Centre of Excellence in Intellectual Property (CoE-IP), etc.
- **Financing:** 100% FDI under automatic route (subject to some laws), provision of CSR
- **Leveraging Start:** Start-up India, NIDHI, iDEX, Atal Innovation Mission, etc.
- **Reversing brain drain to brain gain:** VAJRA, National Post-Doctoral Fellowship Programme.
- **Other initiatives:** National Supercomputing Mission, National Mission on Quantum Technologies and Applications, National Mission for Deep Ocean Exploration (DOE), etc.

Way forward

- **Increase R&D investments: Provide incentives to private sector** for investing in R&D
- **Reforms educational system:** Foster **innovation mindset**, promote **research as an attractive career option, etc.**
- **Industry academia connect:** For commercialization of **research activities**
- **Strategizing R&D activities:** Aligning research promotion activities with National Missions; expanding scope of research by identifying futuristic S&T areas etc.

6.1.1. ANUSANDHAN NATIONAL RESEARCH FOUNDATION (NRF) BILL, 2023

Why in the news?

Recently, **Anusandhan National Research Foundation (NRF) Bill, 2023,** was introduced in Lok Sabha.

Key highlights of the Bill

- **Establish the Anusandhan NRF to:**
  - Provide strategic direction for research, innovation and entrepreneurship in the fields of
    - ✓ natural sciences, including mathematical sciences, engineering and technology, environmental and earth sciences, health and agriculture, and
    - ✓ scientific and technological interfaces of humanities and social sciences,
  - promote, monitor and provide support as required for such research.
- **Repeals Science and Engineering Research Board (SERB):** and subsumes it into NRF.
- **Expenditure:** Provides for recurring and non-recurring expenditures of **Fourteen thousand crore rupees over a five-year** period from and **out of the Consolidated Fund of India.**
- **Administrative body:** Department of Science and Technology (DST)
- **Governing Board:**
  - **President: Prime Minister (ex-officio)**
  - **Vice-Presidents:** Union Minister of Science & Technology & Union Minister of Education (**ex-officio**)
  - **Members:** Eminent researchers and professionals across disciplines.
- **Anusandhan NRF** is **modelled on the US National Science Foundation (NSF).**

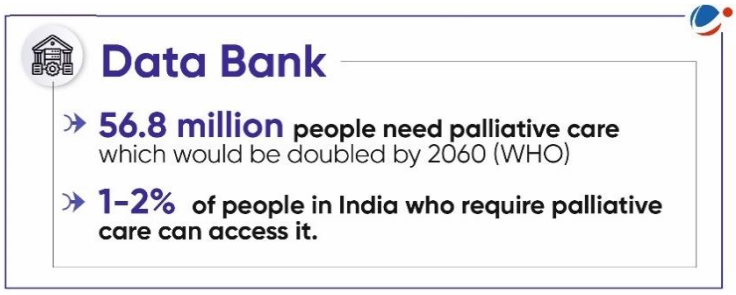
Objectives of NRF

- **Seeding and facilitating research** at academic and research institutions
- **Funding** competitive peer-reviewed grant proposals to eligible persons;
- **Assisting in setting up research infrastructure**
- **Supporting translation of research** undertaken into **capital-intensive technologies;**
- **Analyse the expenditure on scientific research** and their outcomes during each financial year, and report the same to the Central Government;
- **Evolving participation in international collaborative projects** and fostering the exchange of scientific information;
- **Encouraging the Public Sector Enterprises and the private sector entities** to invest in the activities of the Foundation.

6.2. PALLIATIVE CARE

Why in the news?

The revised National Programme for Prevention & Control of Non-Communicable Diseases (NP-NCD) for 2023-30 subsumed **various** programmes, including **National Programme for Palliative Care (NPPC**).



About Palliative care

- Palliative care is an interdisciplinary approach that aims to improve the quality of life of **terminally ill patients and their caregivers.**
- It provides **physical, emotional, psychosocial, spiritual and rehabilitative interventions.**
- 67th World Health Assembly, 2014, called for **palliative care to be integrated into health systems at all levels**.
- Only **three states** (Kerala, Karnataka, and Maharashtra) **have a palliative care policy.**

Challenges in providing quality Palliative care

- **Policy gaps:** For example, under NPPC, the delivery of palliative care starts **only from the district hospital**.
- **Lack of a dedicated budget**: This prevented the effective implementation of the **NPCC.**
- **Human and physical resources:** Inadequate number of **trained workforces** and limited **physical infrastructure.**
- **Restricted accessibility of morphine:** Access to inexpensive morphine is necessary for pain relief to palliative care patients.
  - However, its **supply is highly regulated b**y the Indian Narcotic Drugs and Psychotropic Substances Act (NDPS).
- **Lack of understanding:** Knowledge deficits in patients, families, and health care providers about palliative care.
- **Psychological barriers:** Palliative care have come to be associated with the end of life and dying. Most people fear and avoid anything relating to death.

Way ahead

- **Health systems governance:** Include Palliative care in the policies and structures of national health systems **at all levels with accompanying accountability mechanisms.**
- **Financing**: An essential package of palliative care must be included in **national health system budgets at all levels of care.**
- **Enhancing the accessibility of morphine**: To achieve this, countries can work with the **International Narcotics Control Board (INCB), UN Office on Drugs and Crime (UNODC), WHO and civil society partners** to address regulatory barriers.
- **Decentralised care: Home-based care** and the availability of services at the **health and wellness centre and sub-centre level** is ideal.
- **Health and social care workforce:** Palliative care should be integrated in the curricula of all new healthcare professionals and community healthcare workers training.

- **Medical insurance** should play a significant role in India's hospice and palliative care provision.

Conclusion

Palliative care in India is still at an early stage of development and faces numerous problems. Continued efforts are needed to overcome the barriers to successful implementation of palliative care.

6.3. UNIVERSAL SOCIAL SECURITY

UNIVERSAL SOCIAL SECURITY AT A GLANCE

'Social Security' refers to **protection that a society provides to individuals and households** to ensure **access to health care and to guarantee income security,** particularly in cases of old age, unemployment, sickness, invalidity, etc (ILO).

Social Security Protection in India

- **Only 24.4% of Indians** had some kind of social protection (World Social Protection Report).
- **India spends just 8.6% of GDP on social protection measures** as compared to Global Average of 12.9%.
- **Over 60% of the pension burden is on state** governments.
- **4.2%** is the overall **insurance penetration** in FY21.

Need for universal social security

- **Constitution mandate: Article 41** directs State for public assistance in cases of unemployment, old age, sickness, etc.
- **Prevalence of Poverty: 14.96%** of India's population is **multidimensionally poor** (NITI Aayog's NMPI, 2023).
- **Existence of missing middle:** About **90% workers** are in **unorganised sector.** They are highly vulnerable to fall in poverty.
- **Cost of Human capital:** Generally quality **health and education facilities** are either **inaccessible or unaffordable.**
- **Economic prosperity:** Critical for achieving **inclusive** growth, **human development, technology uptake, etc.**

Challenges in providing universal social security

- **Financial constraints:** India's **tax-to-GDP ratio is only around** 12% and the **direct taxation base** is significantly **small.**
- **Social justice vs. economic growth:** Social protection expenditure is constrained by **fiscal deficit targeting,** which is critical for macroeconomic stability.
- **Issues in implementation: Weak Civil Registration System** leading to inclusion and exclusion errors.
- **Perverse incentive:** People may not make their own effort in seeking opportunities to generate income.

Key initiatives for social security protection

- **Global commitment: Universal Social Protection (USP2030)** by the ILO and the World Bank to accelerate progress in line with target 1.3 of the SDG.
- **Social Security Code:** To extend social security to **all employees and workers** (working in organized/ unorganised or any other sector).
- **Income security:** Employees' Provident Fund Organization, PM Shram Yogi Maan-Dhan Yojana, Atal Pension Yojana, PM Kisan Samman Nidhi Scheme.
- **Health protection:** PM Suraksha Bima Yojana, Ayushman Bharat- Pradhan Mantri Jan Arogya Yojana, Janani Suraksha Yojana, Janani Shishu Suraksha Karyakram.
- **Social assistance:** National Safai Karamcharis Finance and Development Corporation, National Food Security Act.

Way ahead to strengthen the Social Security Services

- **Fiscal prudence:** Enhance **revenues collection,** reducing illicit fund transfers, etc.
- **Targeted social security:** Like **Brazil's Bolsa Família Program** which is rights-based, gender-sensitive and inclusive.
- **Social Protection Management Information Systems:** It can **improve quality and quantity of data** for decision making and robust delivery.
- **Strengthening governance:** Participative governance, institutional leadership, multisectoral coordination.
- **Urban Job guarantee scheme** (at par with MGNREGS in rural areas), achieving **Universal Health Care (UHC)** and making **quality education** affordable and accessible to all.

6.3.1. RIGHT-BASED APPROACH FOR DEVELOPMENT

Why in News?

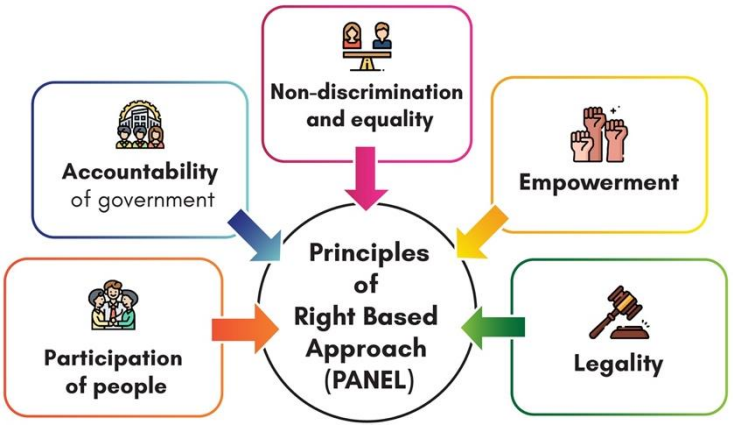
Recently**, the** Rajasthan government introduced **'The Rajasthan Minimum Guaranteed Income Bill, 2023'**.

More about News

- Bill proposes a minimum guaranteed income through a guaranteed wage or a pension.
  - The Bill is also in line with **Article 38(2) (to minimise inequalities) and Article 41 (Right to Work) of the Directive Principles of State Policy.**
- Similar approaches are also being followed by many states like Tamil Nadu, Jharkhand, Himachal Pradesh, etc, during the Covid-19 Pandemic.
- Experts believe that such initiatives are **advocates for a Right based approach towards development**.

About Right Based Approach

- A **rights-based approach views development as the process of realising fundamental human rights and freedoms**, thus expanding people's choices and capabilities to live the lives that they value.
- A rights-based approach **puts the poor, marginalised, and vulnerable groups at the core of policy and the focus of capacity development strategies**.
- **The developmental ecosystem generally includes Health, Education, Employment, Disability Cover, Gratuity, pension, etc.**
- India has implemented right-based approaches towards development like **MGNREGA Act, RTI Act, etc.**



Challenges in Implementing Right Based Approach

- **Development foregone:** The mass distribution of welfare goods also has high **costs to the public exchequer**, especially in terms of **trade-offs with long-term developmental initiatives.**
  - For example, the **cost of food subsidy** is estimated to be **Rs 2 lakh crore for the Centre** for 2023.
- **Technology constraints:** Lack of data protection legislation hinders effective utilisation of technological intervention.
- **Beneficiary may become averse:** This could be due to **cumbersome documentation** requirements during enrolment or subsequent **inclusion-exclusion errors** and **lack of grievance redressal**.

Way forward

- **Autonomy to Financial institutions**: So that invisible and **irrational expenditures** of Governments can be better monitored and channelled towards **more productive uses**.
- **Eliminate leakage:** Streamline identification measures for **better targeting of the poor and** implement sound **policy correction** is needed to plug corruption during the distribution of welfare goods.
- **Data-based policy: Collect** disaggregated data regarding **gender, age, ethnicity, and disability** to monitor and evaluate social protection programmes. Also**, the protection of such data is a prerequisite** for public trust.
- **Grievance redressal mechanism**: Incorporate effective complaints mechanisms that guarantee **anonymity, allow for individual and collective complaints, etc.**
- **Periodical reviews**: These will help rectify any shortcoming that is hindering the goal of the welfare scheme.

6.3.1. PENSION SYSTEM IN INDIA

Why in News?

The discussion on pension reforms has intensified in the recent past in light of the **Old Pension Scheme (OPS)** versus the **New Pension Scheme (NPS)** debate.

Why was NPS introduced?

- NPS was introduced in **2004** based on the report of **OASIS (Old Age Social and Income Security) Project** due to **increasing pension liability** of the government with **no specific growing corpus** for payments.
  - By **2020-21**, the **Centre's** pension bill jumped by **58 times from its 1991 figure**.

India's Pension System

The Indian Pension System is **highly complex** and **fragmented,** with a wide variety of options. E.g.

- **Public Pensions** such as **OPS** for civil servants and **NPS** (replacing OPS from 1 January 2004) for new entrants.
  - The **Civil Servants Provident Fund and Gratuity** after a certain service period are other benefits that Civil Servants enjoy.
- **Employee Pension Scheme (EPS)** for employees in the organised **sector** by **Employees' Provident Fund Organisation (EPFO)**.
- **Government Pension Schemes** such as **Atal Pension Yojana, Pradhan Mantri Vaya Vandana Yojana (PMVVY), Indira Gandhi National Old Age Pension Scheme (IGNOAPS)** etc.
- **Pension Plans from Organizations** such as LIC's Saral Pension etc.

Difference between NPS and OPS

Basis of Difference	New Pension System (NPS)	Old Pension System (OPS)
Nature	It is a **contribution pension** where employees contribute towards NPS during their years of employment.	It is a **benefit pension** for **government employees** on the basis of their **last drawn salary.**
Eligibility	**All Indian citizens** between 18 and 65 years.	**Government employees** only.
Risk	It **involves risk** as the NPS amount is **invested** in **market-linked securities**.	**No Risk involved**.
Tax Benefits	**Tax-deductible** annual investments of up to **₹1,50,000** under **Section 80C** and **₹50,000** under **Section 80CCD (1B)** of the **Income Tax Act, 1961**.	**No tax benefits** are applicable to the employees.
Pension Amount on retirement	**60%** of pension fund is **tax-free** when redeemed, while the remainder is taxable and remains **invested in annuities**.	It provides a **fixed monthly pension** of **50%** of the **last drawn salary.**

Other challenges in the Indian Pension System

Apart from the rising financial burden, the Indian Pension System faces other challenges as well. According to a **National Institute of Public Finance and Policy** study, the **Indian Pension System** has:

- **Low and Skewed Coverage** of the formal pension system or limited to civil servants and employees in the organised sectors. E.g., **at least 85% of current workers** are not members of any pension scheme.
- **Limited Social Safety net** for the elderly poor.
- **Longevity Risk** due to the rising Life Expectancy.
- **Large Percentage** of informal employment.
- **High Asymmetry and Burden** of **public pensions.** E.g., **11.4%** draw defined benefits as **government ex-workers** (or their survivors), **amounting to 62% of system expense.**

Way Forward

- **Introducing a minimum level of support** for the poorest aged individuals.
- **Increasing coverage of pension arrangements** for the unorganised working class.
- **Improving the regulatory requirements** for the private pension system.
- **Revive Traditional Old Age Support Mechanisms** to overcome ageing population issues.
- **Reduce Government Regulatory Control** over the pension sector, which impedes the growth of the private annuity market.
- **Enhancing the retirement age:** Given the increased ability of citizens to work beyond their current retirement age, it could benefit citizens and the Government.

6.4. SOCIAL JUSTICE AND DECENT WORK

Why in the news?

The International Labour Organization (ILO) recently released a report titled 'Advancing social justice' that calls for **advancing social justice through promoting decent work.**

Social justice and decent work

- ILO defines decent work as "**productive work** for women and men in conditions of **freedom, equity, security and human dignity".**
- Ensuring **decent work for all** is an essential aspect of **sustainable development as it promotes social justice through:**
  - **Eliminating poverty and inequality** through adequate living wage and social protection
  - **Ensuring material well-being** and improvements in **living standards** of the vulnerable sections
  - **Improving health and ensuring quality education** for the workers and their families.
  - Enables people to **work with dignity and fosters social inclusion.**
- Therefore, Social justice and decent work reinforce **each other.**
  - **In 2015** the ILO launched the Decent Work Agenda to help **achieve Goal 8 of the 2030 Agenda for Sustainable Development** (decent work and economic growth)**.**

Challenges in achieving social justice

- **Injustices persist:** In 2022, **685 million people** lived in **extreme poverty and 160 million children** were engaged in **child labour** in 2020 **(ILO).**
- **Widespread labour market insecurity:** Globally, more than **4 billion people** are excluded from any form of social protection (as per recent ILO data).
  - **Casual work is widespread** and is rising in importance, whereas **climate change endangers jobs, livelihoods and enterprises.**
- **Inequality is high and rising: Women earn approximately 20% less than men globally.** This disparity gets exacerbated due to discrimination based on **race, disability and migrant status.**
  - **Lack of investment in** public services and other public goods like **health and education** also reinforces inequality.
- **Weakening Social Contracts:** Disaffection and **loss of trust in national governance** are rising. And the **increasing polarisation** within societies is undermining solidarity.
- **Compounding crises:** The existing inequalities and injustices are compounded by the **pandemic, inflation, extreme weather events and Russia-Ukraine war, etc.**

Way ahead to attain social justice

- **Ensuring access to Decent work:** Create jobs through public and private investment and address macroeconomic imbalances such as the debt burden.
  - **Rural diversification of jobs.**
  - Ensure **women's access to productive resources** such as **land and credit.**
  - Embed employment objectives and social protection policies in **climate change mitigation and adaptation strategies.**
  - Minimum wages should be regularly **adjusted with inflation** and consider **the needs of workers and their families.**
- **Restore trust in public institutions**: through **social dialogue** on policies.
- **Fair transition to technology.**
- **Setup a Global Coalition for Social Justice**
- **Other:** Protecting people over the life cycle, quality early childhood care and education, investing in social protection systems, etc.

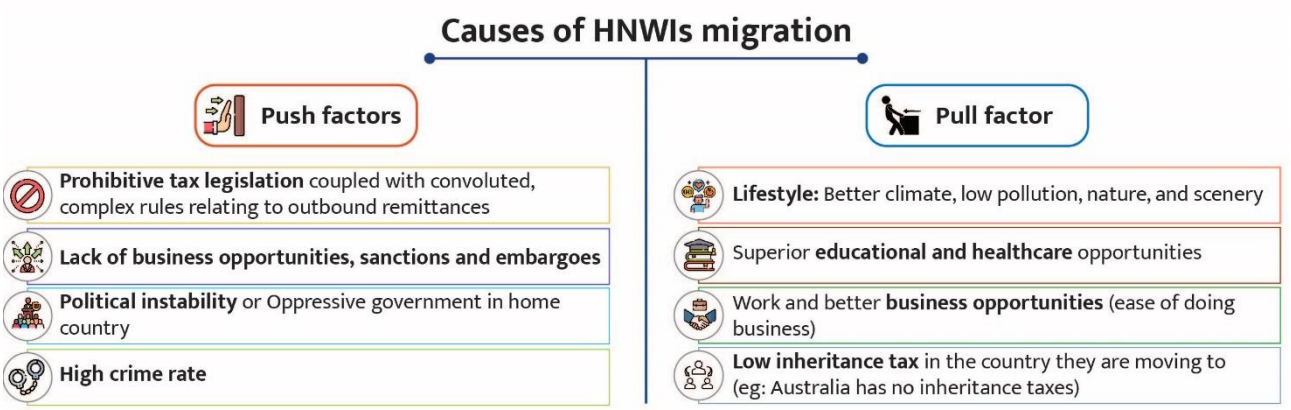
6.5. HIGH NET WORTH INDIVIDUALS (HNWIS) MIGRATION

Why in the news?

Recently **Henley Private Wealth Migration Report 2023** was released, which provides insights into **the mobility of HNWIs.**

Key Highlights of the Report

- **'High-net-worth individuals' (HNWIs)** refer to those with **investable wealth of US $1 million or more.**
- India is poised to become one of the **world's fastest-growing wealth markets by 2031,** with an **estimated 80% growth** in the **HNWI population.**
- India produces **far more new millionaires than it loses to migration.**
- But India is expected to see the **second-highest (after Australia) estimated outflow** number globally.



Impact of HNWIs migration on countries they migrate from

- **Economic loss,** including loss of **Wealth, Taxes and Networks (that could help in expanding productivity and efficiency).**
- **Loss of employment, skills, qualifications, and influence** due to the relocation of businesses by affluent entrepreneurs.
- **Negatively affects global perception** about the country as an **investment destination.**

Way Forward

- **Predictable, flexible, and conducive** taxation policies and avoiding steps like **retrospective taxes** can **motivate HNWIs to stay in the country.**
  - The **peak tax rate** in India, including **surcharge and cess,** applicable for an individual with income above ₹ 1 crore is **35.88%.**
  - Comparatively, countries in the neighbourhood like **Singapore and Hong Kong,** have a **much lesser peak rate of 22% and 17%,** respectively.

- **Ease of doing business (EoDB)** for ensuring that the country **remains competitive enough** to retain **private wealth onshore.**
- **Improving living standards** through **advanced private medical care**, a world-class **academic system**, making countries **resilient to climate change etc.**
- **Exploring the 'Golden Visa' route or investment migration programs.**
  - This implies acquiring the residency, immigration, and citizenship of a country **through investment**.
  - **United Arab Emirates (UAE), Italy, Greece and Spain** offer a golden visa to HNWIs.

6.6. MIDDLE CLASS IN INDIAN ECONOMY

Why in the news?

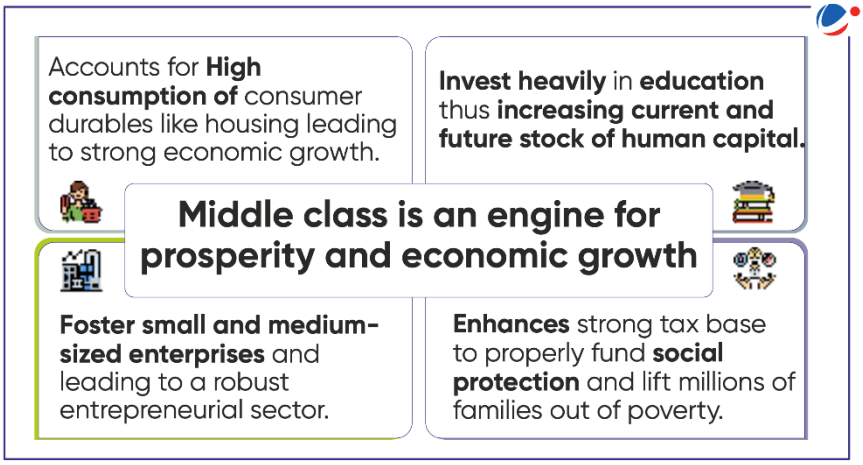
Experts have opined that a large, expanding, and increasingly prosperous genuine middle class is needed to realise the country's economic ambition.

About Middle class

- There is **no universal definition of the middle-class** — not just in terms of income thresholds, but even whether income should be used as a parameter.
- According to a recent survey by the Indian think tank **People Research on India's Consumer Economy (PRICE), 31% of Indians were middle class in 2020-21, up from 14% in 2004-05.**
- The importance of the middle class lies in the fact that **they improve not only their position but also that of others** (refer to the infographics).

Challenges faced by the middle class in India

- **Absence of standardised definition:** Lack of a universally acceptable definition, coupled with the problems associated with survey data, have resulted in varying estimates of the middle class.
  - Hence, several groupings of **heterogeneous households** are all labelled "middle class" **based on other country benchmarks.**



- **Widespread informal sector:** Stunted middle class is considered both the cause and consequence of the widespread informal sector that is commonly estimated to **account for 90% of employment.**
- **Increased cost of living**: The imitation of the **behaviour of richer peers** has led to **an increasing debt burden on middle-class families.**
  - Also, the **steep inflation eroded the purchasing power** of this class, making them suffer the most as most **do not qualify for subsidies.**
- **Inadequate social protection: According** to the NITI Aayog, **at least 30% of the population,** called the **missing middle,** is **devoid of any financial protection for health.**
- **Limited social-economic mobility:** The absence of adequate opportunities and discrimination based on caste, gender, etc., **hinder socio-economic mobility.**
- **Perception of the contribution-benefit gap:** There is a perception among the middle class that their contribution in the **form of taxes is much more** than the benefits they receive **from government services**.

Low-productivity trap in the informal economy

- The informal economy:
  - **Disincentivises the employer from investing in human capital like** training and skill development due to the **temporary nature of work.**
  - **Renders the worker unable to Increase productivity and income through investing in skills and new learnings** due to low and unstable income.
- This creates a vicious **inter-generational cycle of low productivity – low income – poor socio-economic status.**

Road ahead to overcome these challenges

- **Improving public infrastructure**
- **Formalisation of the economy**: A **greater sense of job security** would increase **aggregate household consumption.**
  - This will o**ffer more opportunities** for local entrepreneurs and small businesses.
- **Tackling the cost-of-living issues:** Implement policies that make it easier for people to afford the cost of living, such as **reducing the cost of housing, healthcare, and education.**
- **Possible reforms in the taxation system:**
  - **Eliminating the "bracket creep"** where inflation pushes income into higher tax brackets.
  - This results in an **inflation-induced increase in tax. So, instead of nominal real income should be taxed.**
  - **Tax relief measures to enhance the disposable income** of middle-class households and reduce their burden.
  - **Higher deductions** related to **housing loans, education and healthcare expenses** are a favourable measure.

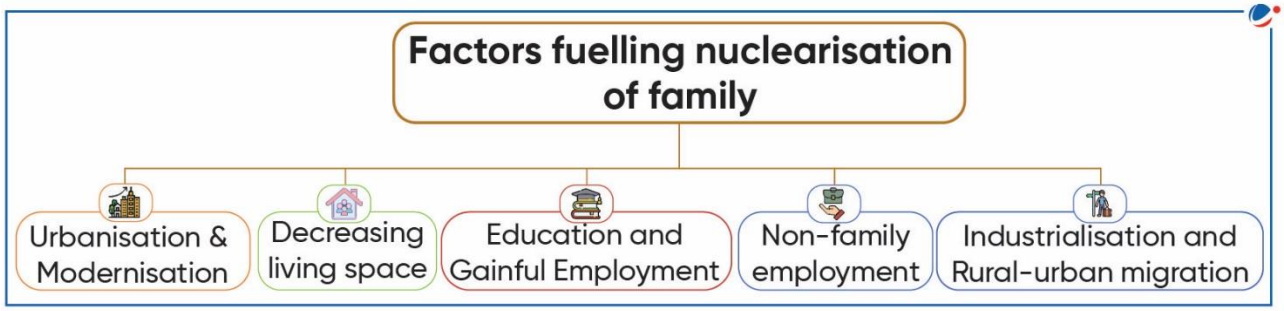
6.7. NUCLEARISATION OF FAMILY

Why in the news?

Nuclear families comprised half of Indian households in 2022, up from 34% in 2008, as per the Consumer Connections 2023 research.

About the institution of family

- The most used classification has two types of families.
  - **Nuclear family:** A two-generation family consisting of a **father and mother and children** or a single, possibly widow, parent and his/her children.
    - ✓ **52.1% households were nuclear in 2011** compared to 51.7% households in 2001 (Census).
  - **Joint or extending family: Three or more generations** lived together with a **vertical and lateral extension** having a single line of authority, either patrilineal or matrilineal.
- **Traditionally India had a joint family system** and bonding within a family, but over time, the balance has shifted **towards the nuclear family system.**
- The **superiority of either of these systems** is **a matter of debate** these days.



Impact of nuclearisation of family

- **Economy:** Nuclear families **tend to outspend joint families** and experiment with more premium products. Thus, giving a **boost to the economy.**
  - However, this also put pressure on the **availability of houses** in urban areas and the **fragmentation of agricultural lands** in rural areas.
- **Health: Home hygiene, nutritious diets,** etc., generally get more weightage.
  - However, there are instances of suboptimal levels of **breastfeeding,** rising **mental health issues, etc.**
- **Social norms:** More **acceptance of modern societal values** like inter-caste marriages, desertion of child marriages, equal treatment of daughters, etc.
  - On the other hand, in the nuclear family, there is an absence of support and counselling from kinsmen to the child**, marginalisation of elderly care, etc.**
- **Societal values:** Women have **more autonomy** over their life, and **more say in major family decisions than** nuclear families where the eldest male or female member solely makes decisions.

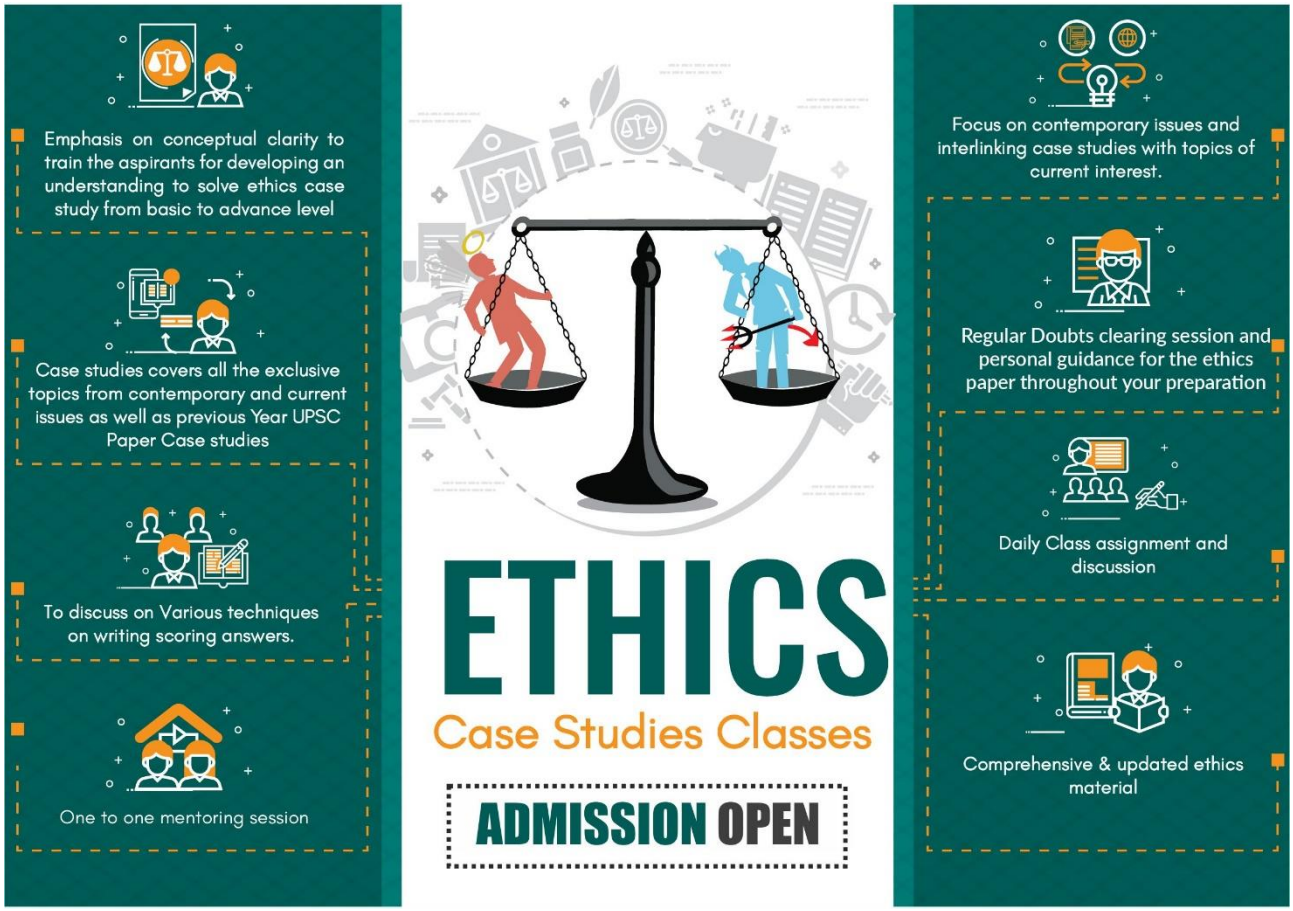
Conclusion

Many sociologists believe that joint families are dwindling, but the urge to have a close-knit relationship remains strong. Therefore, the transition to family structure should be complemented by women empowerment, improvement in facilities in rural areas and poverty alleviation to improve quality of life.

6.8. ERRATA

Mains 365 Social (August 2022 to May 2023)

1. **Article 7.2. INTERNAL DISPLACEMENT**, the information provided under the data bank **'108.4 million people were forcibly displaced at the end of 2020'** was misprinted. The correct information is **'108.4 million people were forcibly displaced at the end of 2022'**.
2. **Article 8.3: SPORTS IN INDIA**, In the infographic 'Sports in India at a glance', details under the Subheading 'steps taken by India' were misprinted. The correct information is
   - **Steps taken by India**
     - **Strengthening sports in schools** as part of Samagra Shiksha Abhiyan.
     - **National Sports Development Fund** and National Sports Talent Search Scheme (NSTSS).
     - **Special Area Games Scheme** through Sports Authority of India.
     - **Centre of Excellence (CoE) for Sports.**
     - **Eklavya Model Residential Schools,** Khelo India scheme, Mission Olympic Cell (MOC), Target Olympic Podium Scheme (TOPS).
     - Inclusion **of sports in the Corporate Social Responsibility (CSR) list.**
     - **Declaration of sports as an industry** by some States.



7. SCIENCE AND TECHNOLOGY

7.1. AWARENESS IN THE FIELD OF SPACE

7.1.1. CHANDRAYAAN-3

Why in News?

Chandrayaan-3 was successfully launched from the Satish Dhawan Space Center (SDSC) in Sriharikota.

About Chandrayaan-3

- **Objectives:**
  - Demonstrate Safe and Soft Landing on Lunar Surface
  - Demonstrate Rover roving on the moon and
  - Conduct in-situ scientific experiments.
- **Launch vehicle: Geosynchronous Satellite Launch Vehicle Mk III** will place the integrated module in an Elliptic Parking Orbit (EPO).
- **Indigenous Payloads:**
  - **Lander module (LM),**
  - **Propulsion module (PM): will carry the Lander** from launch vehicle injection **till final lunar 100 km circular polar orbit**
  - **Rover:** carry out in-situ chemical analysis of the lunar surface
- **Landing site:** Similar to **Chandrayaan-2** i.e. near south pole of moon at around 70 degrees latitude.
  - Chandrayaan-3 **will reach the lunar orbit almost a month after its launch.**
  - Its lander (Vikram), and rover (Pragyaan), are **likely to land on the Moon on August 23.**
- If successful, Chandrayaan-3 will become **world's first mission to soft-land near lunar south pole** and India will become **fourth country to soft land on moon**, after US, Russia, and China.
- **Some major missions to moon:** USSR (Luna 1,2,3), USA (Apollo, Artemis), China (Chang'e 1) etc.

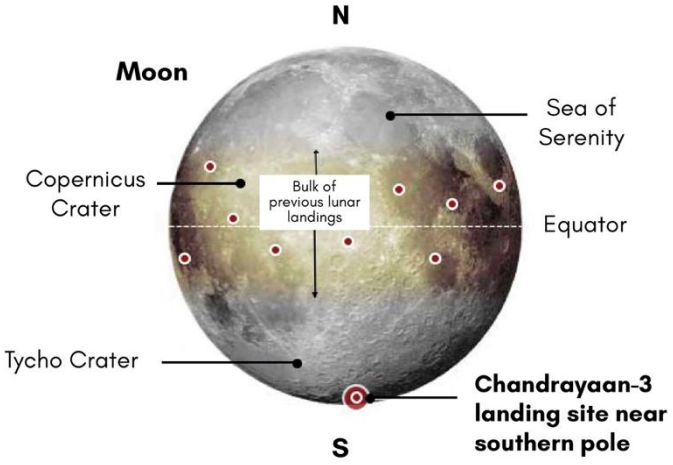
Soft-landing challenges

- **Difficult terrain:** Unexpected and sudden terrain changes can lead to altitude sensor errors or software glitches.

- **Speed:** Soft-landing a lunar module means going from the screaming speeds of over 6,000 km/h to zero. As the moon has no atmosphere, the parachutes cannot slow the descent.
- **Lunar Dust:** can obscure the camera lens and trigger faulty readings.

How Chandrayaan-3 plans to tackle this?

- **Larger landing site:** the area of landing has been expanded from earlier 500m x 500m to four km by 2.5 km.
- **Increased landing velocity:** from 2 m/sec to 3 m/sec. This means even at 3m/sec, the lander will not crash or break.
- **Improved thrusters:** While its predecessor had five thrusters, this mission's lander has only four, making it easier to maintain equilibrium.
- **Rigorous testing:** Tested equipment by soaking them in temperatures as cold as those in the moon and tested the lander's legs by running landing simulations on surfaces similar to the lunar surface.
- **Other improvements:** ISRO has given it larger solar panels, increased fuel-carrying capacity, added laser Doppler velocity metre, and improved soft-landing sequences.



Why the South Pole of the Moon?

- **Moon's south pole has certain advantages** including:
  - **Craters untouched by sunlight** for billions of years — offering an undisturbed record of the solar system's origins.
  - **Holding enough water** at its permanently shadowed craters that could potentially be **used for future missions.**
  - **Positional advantages** make it a suitable pit stop for future space exploration.
  - **Untapped source of essential resources** as it has traces of hydrogen, ammonia, methane, sodium, mercury, and silver.
- **All previous spacecraft** to have landed on Moon **have landed in equatorial region**.
  - **Easier and safer to land** near equator.
  - **Terrain and temperature are more hospitable** and conducive **for a long and sustained operation** of instruments.
  - **Sunlight is present in abundance**, at least on the side facing earth.

Previous Lunar Missions of India

	Chandrayaan 1 (2009)	Chandrayaan 2 (2019)
Objective	• To **prepare a three-dimensional atlas** of both near and far side of the moon. • To **conduct chemical and mineralogical mapping** of the entire lunar surface.	• **Widened the scientific objectives** of Chandrayaan-1 by way of **soft landing on the Moon and deploying a rover** to study the lunar surface.
Modules/ Payloads	• **Carried 11 scientific instruments** built in India, USA, UK, Germany, Sweden and Bulgaria.	• Comprises of an **Orbiter, Lander** (Vikram) **and Rover** (Pragyaan). • **Carried eight experiment payload** for studying surface geology, composition and exospheric measurements of Moon.
Launcher	PSLV C-11	GSLV Mk-III
Key Findings	• **Detected water in vapour form** in trace amounts and also **discovered water ice in the North polar region** of the Moon. • Confirmed **Ocean Magma Hypothesis.** • **Detected x-ray signals during weak solar flares** thus indicating presence of magnesium, aluminum, silicon and calcium on lunar surface.	• **Detected hydroxyl radical** (OH) and the **water molecule (H2O) separately** and further found unique characteristics about both. • Finding **water signatures at all latitudes** on the surface of the moon. • Observations related to the **distribution of Argon-40** in lunar exosphere. • **Detected minor elements** – chromium and manganese on lunar surface.

	• Detected **new spinel-rich rocks.**	• Collected **information about Solar flares**
• **Note:** Earlier in 2019, **Chandrayaan-2 mission** had **partially failed** after its lander and rover **could not execute a soft-landing on the Moon.**		

Conclusion

Success of Chandrayaan 3 will further strengthen India's place in global space research. By pushing the boundaries of scientific knowledge, it also throws challenges at the youth of the country, spurring future research and development.

7.1.2. GAGANYAAN

Why in the news?

Indian Space Research Organisation (ISRO), has successfully completed the Service Module Propulsion System (SMPS) Test for Gaganyaan**.**

About Gaganyaan Project

- **Objective:**
  - **ISRO's first manned space mission** for demonstration of human spaceflight capability by launching a crew of 3 members to an orbit of 300-400 km for a 3-day mission.
- **Mission details**
  - **Includes three space flights**: Two unmanned 'Abort missions' to test for crew safety, followed by the manned space journey.
    - ✓ **First trial (uncrewed flight)** will be followed by **sending Vyom Mitra, a humanoid** and **then with the crew onboard.**
- **Various Modules of Gaganyaan**
  - **Orbital Module (OM)** that will be Orbiting Earth comprises of Crew Module (CM) and Service Module (SM).
  - **CM is the habitable space** with Earth-like environment in space for the crew.
  - **SM for providing necessary support** to CM while in orbit.
- **Launch Vehicle:** Mark-III (LVM 3 rocket) previously known as GSLV Mk III.
- **Other details about the mission**
  - **Gaganyaan National Advisory Council** to deliberate on various aspects of the mission.
  - **ISRO is developing indigenous technologies** for Habitable Crew Module, Life Support System, Crew Escape System, Ground Station Network, Crew Training and Recovery etc.
- Mission will make **India 4th country to have human spaceflight capability after the US, Russia and China.**

Challenges to Carry out Manned Space Missions

- **Creating a Habitable environment:** like Earth inside a small volume and ensure that is adequately maintained throughout the mission.
- **Health impact of Gravity field transition:** It affects hand-eye and head-eye coordination.
- **Exposure to Radiation:** In space stations, astronauts receive over ten times the radiation (increasing risk of cancer, damage to the central nervous system etc) than what people are subjected to on Earth.
- **The technological challenge** for re-entry, recovery and launch escape system.
  - Gaganyaan got a **bipropellant-based propulsion system** for providing 3-axis control (Pitch, Yaw & Roll) to CM during re-entry.
  - ISRO tested Indigenously developed parachutes for safe re-entry.

Conclusion

Gaganyaan mission could **propel India** to the **centre of human space exploration** and with active participation of private sector, proactive decision making will push India further in controlling the next space race, which has the **potential to trigger major changes in the global order.**

7.1.3. OUTER SPACE GOVERNANCE

Why in News?

"For All Humanity —The Future of Outer Space Governance" policy brief was released by United Nation.

More on News

Brief **outlines the major trends impacting space sustainability, security of outer space activities,** and their possible implications for achieving Sustainable Development Goals (SDGs).

Other mechanisms on Outer Space governance

- **Convention on the Prohibition of Military** or Any Other **Hostile Use of Environmental Modification Techniques**
- **Space Debris Mitigation Guidelines** of the Committee on the Peaceful Uses of Outer Space
- **Safety Framework for Nuclear Power Source** Applications in Outer Space
- **The "Space2030" Agenda:** space as a driver of sustainable development (General Assembly resolution).

Need for Outer Space Governance

- **Lack of agreed international framework** on space resource exploration, exploitation, and utilization.
- Preventing any **extension of armed conflict into outer space** and to **prevent weaponization of outer space.**
- Lack of coordination in **space traffic management**.
- **Increasing risk of space debris.**

Existing Space governance framework

- UN established the **Committee on Peaceful Uses of Outer Space** (UN COPUOS) **in 1959.**
- Committee later led to **development of an agreement on following five UN treaties on outer space** negotiated between 1967 and 1979.
  - **Outer Space Treaty 1967:** Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water.
  - **Rescue Agreement 1968:** Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space.
  - **Liability Convention 1972:** Convention on International Liability for Damage Caused by Space Objects.
  - **Registration Convention 1976:** Convention on Registration of Objects Launched into Outer Space.
  - **Moon Agreement 1979:** Agreement Governing the Activities of States on the Moon and Other Celestial Bodies.
- India is a **signatory to all five** of these treaties but has **ratified only four**. India **did not ratify the Moon agreement.**

Recommendations in policy brief for space governance

- COPUOS shall **develop a unified regime for space sustainability.**
- **Develop framework for** the coordination of **space situational awareness, space object manoeuvres and space** objects and events.
- **Develop norms and principles for space debris removal** that consider the legal and scientific aspects of space debris removal.
- **Develop a framework for sustainable exploration, exploitation and utilisation** of the Moon and other celestial bodies.

7.1.4. BLACK HOLES

Why in News?

Scientists recently observed a **class of black holes (quasars) demonstrating time dilation in the early universe.**

More about News

- This time dilation showed **how time then passed only about a fifth as quickly as it does today.**
- Quasars are **tremendously active supermassive black holes** millions to billions of times more massive than our sun, usually residing at centres of galaxies.

About Time Dilation

- It refers to the fact that **time passes at different rates for different observers, depending on their relative motion** or positions **in a gravitational field.**
- It is **a consequence of Einstein's Theory of relativity.**
  - The theory showed that **time and space are intertwined** and that the **universe has been expanding outward in all directions since the Big Bang**.
- **Occurrence:**
  - **This occurs because objects with a lot of mass** create a strong gravitational field.

- **Stronger the gravity, the more spacetime curves**, and the slower time itself proceeds.

- **Present findings on Time Dilation:**
  - It was **previously dated to roughly 7 billion years ago**, based on observations of supernovas**.**
  - **Researchers now used** observations from several **quasars dating to about 1.5 billion years** after the Big Bang event.
  - **The brightness of these quasars was compared** to that of quasars existing today, **showing certain fluctuations about a fifth as quickly as it does today.**

About Black Holes

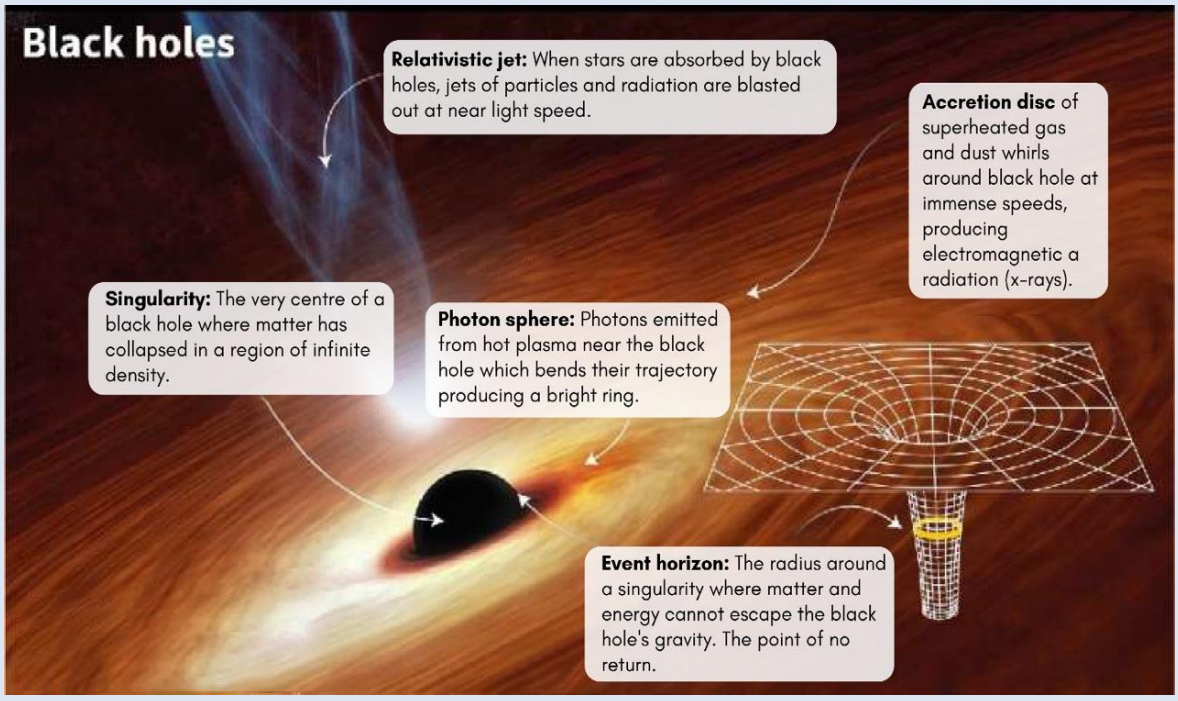
- It is a place in space where **gravity pulls so much that even light cannot get out.**
  - The gravity is so strong because **matter has been squeezed into a tiny space.**
- **Formation:**
  - Most black holes form **from the remnants of a large star that dies in a supernova explosion.**
  - **Our sun will never turn into a black hole** as it is not big enough to make a black hole.
- **Other Features:**
  - **Invisible** and can be **big or small.**
  - **No black hole is close enough to the solar system** for Earth to **fall into it.**
  - In 2019, **scientists got the first optical image of a black hole,** at the centre of a galaxy named Messier 87, **through Event Horizon Telescope**.
- **Detection**
  - **Cannot be directly observed** because they themselves do not emit or radiate light, or any other electromagnetic waves.
  - But the **area just outside the boundary of the black hole** (Event Horizon), **emits all kinds of radiation, including even visible light.**
- **Significance of studying black holes:** Help in testing **fundamental theories** about working of Universe, Enhancing **understanding of gravitational force, detection of gravitational waves** etc.

2020 Nobel Prize in Physics

- **Roger Penrose** was awarded for discovering that **black hole formation** is a robust **prediction of the General theory of relativity.**
- **Reinhard Genzel and Andrea Ghez** was awarded for the **discovery of a supermassive compact object** at the center of our galaxy. A supermassive black hole is the only currently known explanation.
  - They **focused on a region called Sagittarius A*** at the center of our galaxy.

Basic Parts of Black Holes

- **The Schwarzschild Radius:** This is the event horizon's radius at which the escape velocity is equal to the speed of light.
- **The Ergosphere:** If the black hole is rotating, then as it spins, its mass causes the space time around the black hole to rotate as well.



7.1.5. NEUTRINO PARTICLES

Why in the news?

For the first time, **scientists have seen neutrinos originating from the central disk of the Milky Way.**

About the discovery

- **Data collected by the IceCube Neutrino Observatory** has produced the first view of the **Milky Way galaxy through the lens of neutrino particles.**
  - IceCube is the **first detector** of its kind, designed **to observe the cosmos** from deep **within the South Pole ice** and **searches for neutrinos.**
  - Earth is in the Milky Way Galaxy.
- This **view differs fundamentally** from what one can see with eyes or with instruments that measure other electromagnetic sources like radio waves, microwaves, infrared, ultraviolet, X-rays etc.

About Neutrinos

- They are **fundamental particles** (but not part of the atom), **like electrons**, so they **can't be broken down** into smaller parts.
- **Key characteristics:**
  - **Very tiny mass has no charge and half spin.**
  - **Travel at almost the speed of light** and **in straight lines** from their source.
  - **Rarely interact** with other matter (therefore also referred to as ghost particle).
  - **Outnumber all the atoms in the universe**.
  - **Only affected by gravity and the weak force**.
  - **3 types** – electron neutrino, tau neutrino and muon neutrino.
    - ✓ They can change from one type to another as they travel. This process is called **neutrino oscillation.**
- **Sources of Neutrinos:**
  - **Emitted from our galaxy** when cosmic rays collide with interstellar matter.
  - **Produced by stars like the Sun**, exploding stars, supernovas, gamma-ray bursts and quasars as well.
    - ✓ Most of the **neutrinos around Earth come from the Sun** (produced in Sun's core).
  - **On Earth**, neutrinos are produced **when unstable atoms decay**, which happens in the planet's core and nuclear reactors.
    - ✓ **Created by particle accelerators** and **high-speed particle collisions** in the atmosphere.
    - ✓ **Even a banana emits neutrinos**—they come from the **natural radioactivity of the potassium in the fruit**.
- **Detection of Neutrinos**
  - **Interact with other particles in the ice** through the weak force **and turn into muons, electrons, and taus.**
  - The **new particles gain the neutrinos' speed** and travel faster than light in the ice, which produces a **particular kind of radiation** (Cherenkov radiation that gives off a blue light)**.**
  - **Proposed India-based Neutrino Observatory (INO)** will study **atmospheric neutrinos** only, typically produced around 15 kms above Earth's surface.

Conclusion

Neutrinos study will provide information about astrophysical sources like exploding stars, gamma-ray bursts etc and will help to improve understanding and phenomenon related to evolution of universe .

7.1.6. GRAVITATIONAL WAVES

Why in News?

Scientists recently unveiled evidence that gravitational waves are permeating the universe at low frequencies - creating a cosmic background hum.

About Gravitational Waves (GW)

- **Creation**
  - They are ripples in the fabric of spacetime **caused by the most energetic events** in the cosmos, such as **black hole mergers and neutron star collisions**.

- Most powerful **gravitational waves are created** when **objects move at very high speeds.**
- **Some events responsible for GW:** When a star explodes asymmetrically, two big stars orbit each other etc.

- **Higher and lower frequency gravitational waves**
  - **Higher-frequency** gravitational waves **come from smaller pairs of black holes zipping around each other rapidly** in the final seconds before they collide.
  - **While the lower-frequency waves** are thought to be generated **by huge black holes at the hearts of galaxies,** , that **lumber around each other slowly** and have **millions of years to go before they merge.**
- **Detection of High Frequency GW**
  - Their presence was **first given by Einstein in his Theory of Relativity**.
  - Gravitational waves **were first detected in 2015** using an experiment, involving **Laser Interferometer Gravitational Observatory (LIGO) detectors.**
    - ✓ These GW believed to be produced **by the merger of two relatively small black holes** that took place about 1.3 billion years ago.

How low-frequency gravitational waves were detected

- **Examining Pulsars over 15 years:** by using six large radio telescopes (including India's Giant Metrewave Radio Telescope, Pune) around the world.
  - **Pulsars are distant rapidly-rotating neutron stars** that emit pulses of radiation, observed from the Earth as bright flashes of light.
  - These **bursts take place at extremely precise intervals,** and therefore scientists use pulsars as 'cosmic clocks'.
- **Observed discrepancies in signals from neutron stars:**.due to deformities caused in spacetime **by gravitational waves.**
  - When **gravitational waves** travel across the cosmos, they **stretch and squeeze the fabric of spacetime** very slightly.
  - This stretching and squeezing **can cause the distance between Earth and a given pulsar to minutely change,** which results in delays or advances to the timing of the pulsars' flashes of light.
- They described the **universe's gravitational wave background as the equivalent of hearing the hum** of a large group of people talking at a party, without being able to distinguish any individual voice.

Conclusion

Continuing to study this kind of gravitational waves could open new doors to track the history of black holes and galaxies merging and will help to expand knowledge about nature and evolution of universe.

7.1.7. RARE HIGGS BOSON DECAY

Why in News?

Scientists at The European Organization for Nuclear Research (CERN) which hosts the Large Hadron Collider, (LHC) have discovered evidence of the Higgs boson decaying into Z boson and a photon.

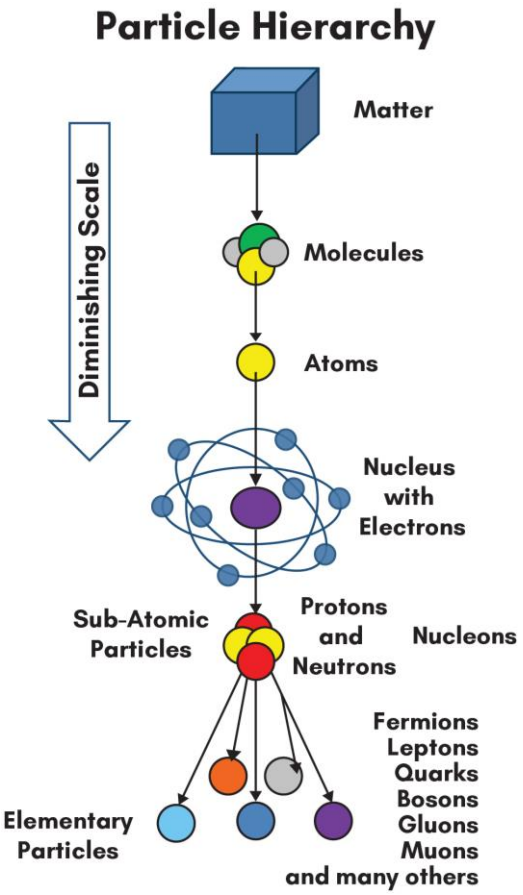
About the discovery

- A **very rare decay process** that tells us about the Higgs boson as well as the universe.
- **The decay was reported in the ATLAS and CMS,** general-purpose detectors of LHC.
  - LHC is the **world's largest and most powerful particle accelerator**, set up in 2008 at CERN near Geneva.
- **Implications of the discovery**
  - **Can provide indirect evidence** to the existence of **particles beyond those predicted by the Standard Model of particle physics.**
  - **Can lead to a fifth fundamental force,** which is yet to be discovered.
    - ✓ Physicists **currently recognise four fundamental forces namely the strong force**, the **weak force**, the **electromagnetic force** and the **gravitational force**.

About Higgs Boson

- **Popularly known as the God particle** and is a subatomic particle that was **first theorized in the 1960s by physicist Peter Higgs** and others.

- Its existence **was proved in 2012** through the experiments in LHC.
- It carries the **force that a particle experiences when it moves through an energy field**, called the Higgs field, that is believed to be present throughout the universe.
- **Properties of Higgs Boson:**
  - **Mass:** It has a **mass of 125.35 giga-electron volts (GeV)**, which is about **133 times the mass of a proton.**
  - **Spin:** It is **a scalar particle and has '0' spin**, and do not possess angular momentum.
  - **Lifetime: Very short** and it **rapidly decays into other particles** after it is produced in high-energy collisions
  - **Detection:** It is **detected indirectly** by observing the particles it decays into.
    - ✓ It **normally decays into pairs of photons or pairs of W or Z bosons** (the recent discovery has found the Higgs Boson decaying with a photon and Z boson, which is unusual)



What is the standard model of particle physics?

- A **theoretical framework that describes the fundamental particles of matter and their interactions.**
- Also **explains three of the four fundamental forces of nature** i.e. except that of Gravitational force.
- **Explains how two elementary particles Fermions and Bosons** and their interactions **make up all the matter in the universe.**
  - **Fermions are particles that make up matter** and are further divided into **Quarks and Leptons.**
  - **Bosons are particles that carry the force,** they mediate the interactions between particles.
    - ✓ Bosons in the standard model are **Photon, W and Z bosons, Gluons and Higgs Boson.**
- The **theory is silent on how particles acquire mass** (the current discovery can be a clue to find the reason for the same)

7.2. IT, COMPUTER, ROBOTICS

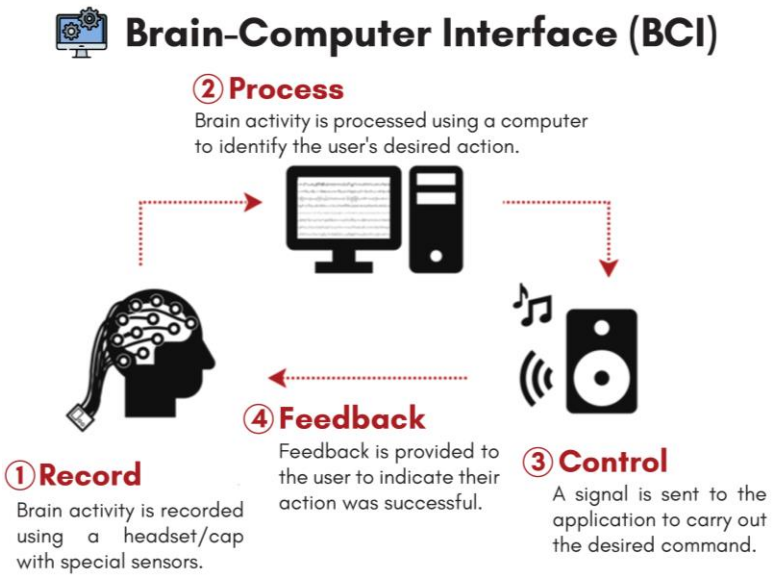
7.2.1. BRAIN-COMPUTER INTERFACE (BCI)

Why in News?

US Food and Drug Administration (FDA) approved Elon Musk's Neuralink chip for human trials.

More on News

- It aims to build a **next-generation brain implant with at least 100 times more brain connections** than devices currently approved by FDA.



About Brain–Computer Interface (BCI)

- A system that **determines functional intent** - the desire to change, move, control, or interact with something in our environment - **directly from brain activity.**
  - BCIs allow to control an application or a device using only our mind.
- **Main parts:**
  - **A device** to detect and record signals coming from the brain.
  - **A computer to process and analyze** the recorded brain activity.

- An application/device to control.
- A Feedback system.

- **Different techniques to measure brain activity for BCIs**
  - **Electroencephalography (EEG)**
    - ✓ EEG is a test that **measures electrical activity in the brain.**
  - **Functional Magnetic Resonance Imaging (fMRI)**
    - ✓ It works by **detecting the changes in blood oxygenation and flow** that occur in response to neural activity.

Applications of BCI

- **Improving motor and cognitive abilities** in people with physical disabilities (control of prosthetic limbs) and ageing
- **Treatment for diseases**: such as Parkinson's disease, epilepsy, spinal cord injuries etc
- **Facilitate brain research.**
- **To improve cognitive performance,** augment human capabilities and human-computer interactions

Concerns related to BCI

- **Technical and user challenges:** related to measuring of unique brain signals.
- **Data Privacy and Security:** as hackers could intercept brain-wave data generated by the device.
- **Social impact:** Reported higher costs of BCIs may result in unequal access.
- **Ethical issues:** about potential unfair advantages conferred by certain human enhancements.
- **Medical issues:** BCIs may unintentionally influence other brain functions, or cause any unwanted side effects such as seizures, headaches, mood changes, or cognitive impairment.

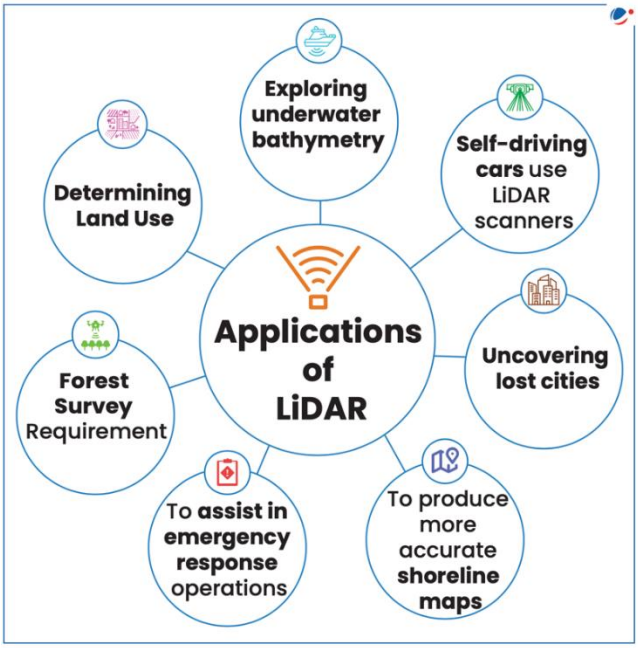
Conclusion

Over the next few decades, BCI research and development may see greater widespread use of BCIs in people's daily lives. So, there is a need to improve the accuracy, reliability and efficiency of BCIs so as to realise its full potential.

7.2.2. LIDAR (LIGHT DETECTION AND RANGING)

Why in News?

Archaeological Survey of India (ASI) aims to conduct a Light Detection and Ranging (LiDAR) survey before excavations.



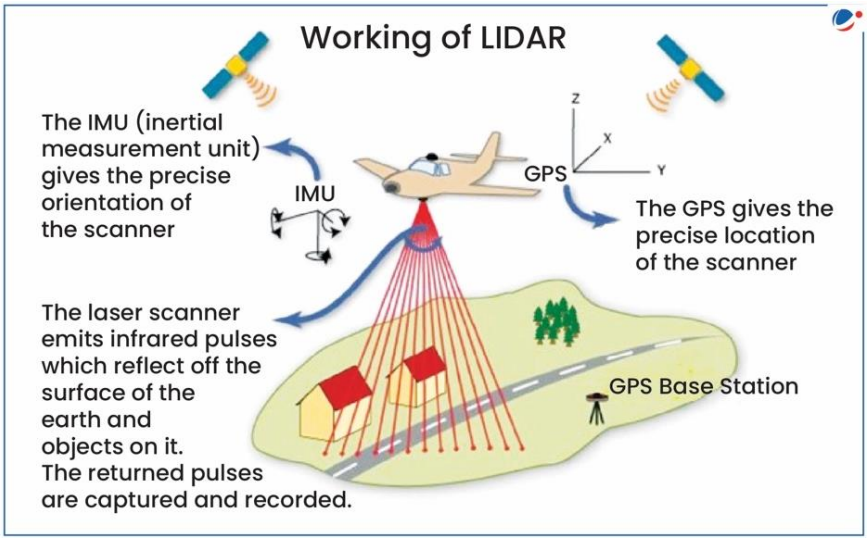
About LiDAR

- **A remote sensing technology** that uses light **in the form of a pulsed laser to measure ranges** (distances) to a target.
  - **Similar to radar and sonar** (that use radio and sound waves, respectively).
- **Types of LiDAR:**
  - **Topographic LiDAR:** uses **a near-infrared laser** to map the land.
  - **Bathymetric LiDAR:** uses **water-penetrating green light** to also measure seafloor and riverbed elevations.
- **Platforms used for acquiring data:** Airplanes and helicopters.

Functioning of LiDAR

- **An airborne laser is pointed** at a targeted area and **beam of light is reflected by the surface** it encounters.
  - **A sensor records this reflected light** to measure a range.
- When laser ranges are **combined with position and orientation data, a point cloud** (group of elevation points) **is created.**

- Point cloud helps in generating coordinates corresponding **to a particular point on the Earth's surface other geospatial products,** such as digital elevation models, canopy models, building models, and contours.



Conclusion

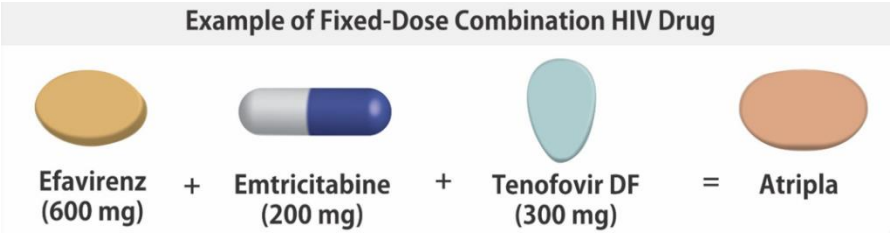
LiDAR makes it easy to **produce high resolution representation** of elevations to **estimate key characteristics** and providing **accurate geospatial measurements** over large areas.

7.3. HEALTH

7.3.1. FIXED DOSE COMBINATION DRUGS

Why in News?

Recently, **Ministry of Health and Family Welfare** prohibited the manufacture, sale or distribution of 14 fixed-dose combination (FDC) medicines.



More about News

- Banned FDC drugs, such as Nimesulide + Paracetamol dispersible tablet, and Amoxicillin + Bromhexine, etc., **are part of 344 FDCs** which government had earlier banned in **2016**.

About Fixed Dose Combination (FDCs)

- Products **containing one or more active ingredients** used for a particular indications.
- **Called a new drug** if it is combined for the first time**.**
- **Licensing a New Drug:** Require prior approval from the Drugs Controller General of India (DCGI) before being licensed by the State licensing authorities (SLAs).

Merits of FDCs

- **Increased efficacy, reduced cost** etc. than single entity preparations.
- **Treatment of infectious diseases** like HIV, malaria and TB and also useful **in chronic conditions.**
- **Improved patient adherence** by reducing the **'pill burden'**.

Demerits of FDCs

- **Pharmacodynamic (Drugs power) mismatch:** leading to reduced efficacy or enhanced toxicity.
- **Decreased shell life:** Drugs having non-compatibility when mixed for FDCs may lead to decreased shelf life of FDCs.
- **Antimicrobial Resistance (AMR):** The irrational FDCs with sub-standard doses of antimicrobials might end up developing resistance to the FDCs.

Steps taken by India for regulation of FDCs

- **Drugs & Cosmetics (Amendment) Act, 2008** provide stringent penalties for manufacturer of spurious and adulterated drugs and certain offences have also been made **cognizable** and **non-bailable**.
- **Strengthening Testing capacities** of Central Drugs Testing Laboratories.
- **Drugs and Cosmetics Rules 1945 amended in 2017:** Providing that applicant shall submit the result of **bioequivalence** study along with the application for grant of manufacturing License of oral dosage form of drugs.

Issues in Regulation of FDCs in India

- **Reformulating of individual drugs into an FDC** to evade the drugs price control.
- **Compromised quality as New FDCs** (after 4 years) **are produced** by getting license from State licensing authorities (SLAs) with **lax pharmacological studies.**
- **Poor capacity of State Drug Control Organisations (SDCO)** such as infrastructure facilities, number and quality of drug inspectors, etc.
- **Poor system for reporting** adverse drug reaction in India.

Way Forward

- **Need periodic surveys** to get a measure of the existing problem of sector and **curbing the irrational use** of FDC.
- **Establishing National Drug Authority (NDA):** by an Act of Parliament as envisaged by Hathi committee and as well as in Drug Policy of 1994.
- **Strong punitive action:** As suggested by **Mashelkar Committee** against those involved in drug-related cases of corruption will act as deterrence for others.
- **Finalising Essential Commodities (Control of Unethical Practices in Marketing of Drugs) Order, 2017.**

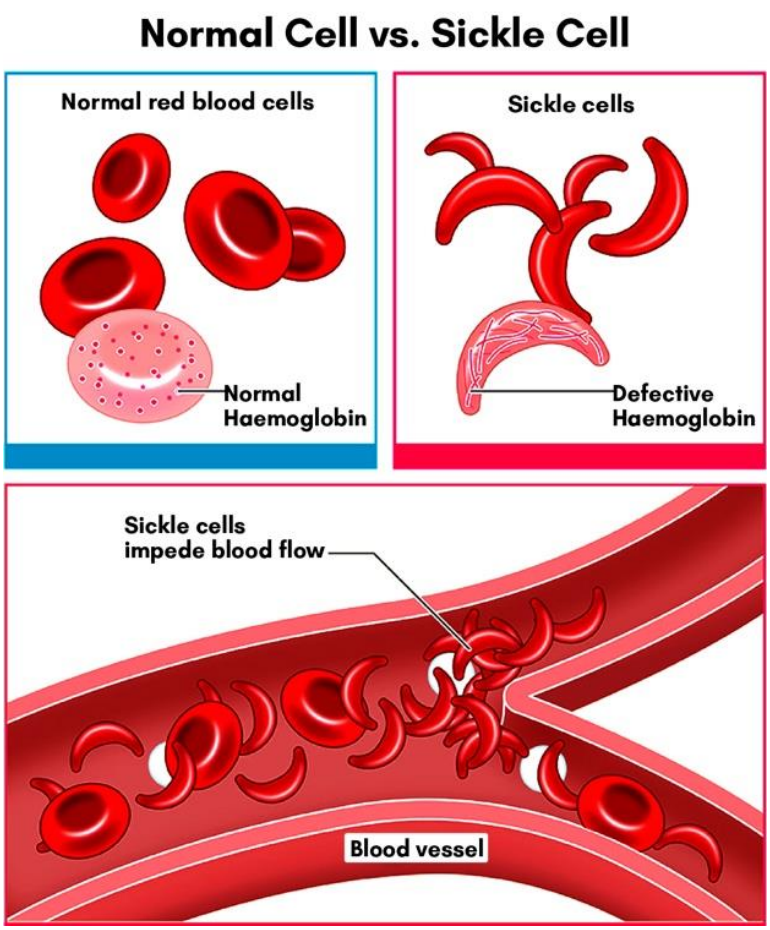
7.3.2. SICKLE CELL ANAEMIA

Why in the news?

The Prime Minister launched the **National Sickle Cell Anaemia Elimination Mission** in Madhya Pradesh.

Sickle Cell Disease (SCD)

- A **type of haemoglobin disorder, inherited blood diseases** that affect how oxygen is carried in the body.
- **Characterised by a modification in the shape of the red blood cell** from a smooth, doughnut shape into a crescent or half-moon shape. (refer image)
- **Cure:** Stem cell or bone marrow transplants (Hematopoietic stem cell transplant), but they involve significant risks.
- **SCD in India**
  - **India is the second-worst affected country** in terms of predicted births with Sickle Cell Anaemia (SCA) — i.e., chances of being born with the condition.
  - In India, SCD is **more common in tribal populations because of malnutrition.**
  - A report by Ministry of Health & Family Welfare (MoHFW) has listed SCD as **one of the 10 special problems** that affect **health of tribal people.**
    - ✓ Tribes like **Pawara, Bhil, Madia, Gond and Pardhan** from Maharashtra have a **very high prevalence rate.**



About National Sickle Cell Anaemia Elimination Mission

- **Objective:** To provide affordable and accessible care to all SCD patients, ensure the **quality of care** and **lower the prevalence** of the disease.
  - The vision of the mission is **to eliminate SCD as a public health problem** in India **before 2047.**

- **Strategy: A three-pillar strategy** to be carried out in a mission mode:
  - **Health promotion**: Awareness generation & pre-marital genetic counselling.
  - **Prevention:** Universal screening and early detection.
  - **Holistic Management** & Continuum of Care.
- **Beneficiaries:** Covering the entire population from **0 to 18 years of age** and shall incrementally include the **entire population up to 40 years** as a part of the National Health Mission (NHM).
  - **Initial Focus: 17 states with a higher prevalence of SCD** including Gujarat, Maharashtra, Rajasthan, MP, Jharkhand, Chhattisgarh, etc.
  - The mission aims to **cover 7 crore people** in three and half years.
- **Convergence:** The programme would be an **integration with existing mechanisms and strategies** (such as Pradhan Mantri Surakshit Matritva Abhiyan) under NHM.

Other initiatives taken to control Sickle Cell Anaemia

- **National Health Mission (NHM)** guideline on Hemoglobinopathies (encompass all genetic diseases of haemoglobin) identifies establishing **services at the community level.**
- Government plans to **distribute special cards across tribal areas** to people below the age of 40.
- **Ministry of Tribal Affairs launched a portal** to collate all information related to SCA among tribal groups.

Concerns in controlling SCA

- **Lack of screening awareness** and inadequate screening centres in tribal and rural areas
- **Costly and early developmental stages of cures** in the form of gene therapy and stem cell transplants
- **Reliance on traditional medicine by tribals.**

Conclusion

To address SCA, there is a need for **timely diagnosis** along with counselling, **formation of patients support groups** by frontline workers and a **better collaboration** with **between the government and NGOs.**

Prenatal diagnosis can also play an important role in reducing the prevalence of SCA in children.

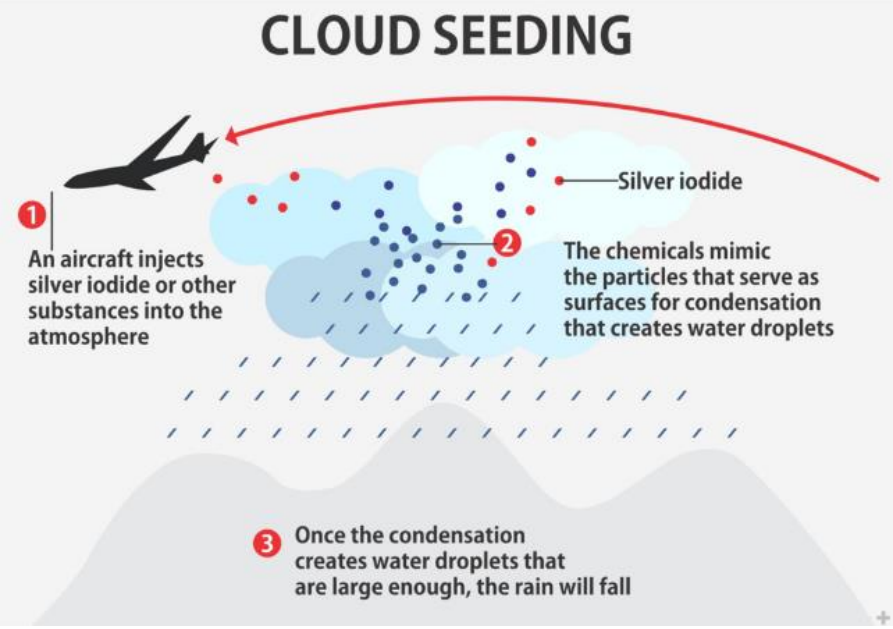
7.4. MISCELLANEOUS

7.4.1. CLOUD SEEDING

Why in the news?

Indian Institute of Technology (IIT) Kanpur has successfully conducted a test flight for **cloud seeding.**

About Cloud Seeding



- It is a **weather modification technology** to create artificial rainfall.
  - It **aims to facilitate and accelerate** the process by making available **chemical 'nuclei' around which condensation can occur**.
- **Two ways of adding nuclei particles to clouds:**
  - Using **large cannons** that shoot particles into the sky.
  - **Using aeroplanes** that drop the particles from above.
- **Main Chemicals used for it** include Silver iodide, dry ice, Potassium Iodide, Calcium Carbide, Ammonium Nitrate, Sodium Chloride etc.

Benefits of Cloud Seeding

- **Drought and forest fire management** (**87%** of India's districts are vulnerable to droughts and **35.46%** of the forest cover is prone to forest fires).
- **Clearing fog in airports** during fog season.
- **Suppress hail** as **seeding accelerates hail embryo growth** at a lower level in the cloud, where liquid water content is smaller and updrafts are weaker.
- Clouds can be **diverted to other regions** based on requirements**,** e.g., during the **2008 Olympics** opening ceremony Beijing used it to make the ceremony **precipitation-free.**
- **Improve water availability** across the country and hence help to recharge aquifers.

Issues in Cloud seeding

- **Silver iodide is known to be toxic** for aquatic life because of **bioaccumulation**.
- Cloud seeding through dry ice (CO_2) is a **source of GHG.**
- **Uncertainty on effectiveness**.
- **Not suitable for all cloud types,** clouds must be deep enough and of a suitable temperature to be seeded effectively.
- **Can disturb the Hydrological cycles**.

Cloud seeding experiments in India

- **IIT Kanpur used this method.**
- **Cloud Aerosol Interaction and Precipitation Enhancement Experiment (CAIPEX) – IV** was conducted during two consecutive monsoon seasons of 2018 and 2019 over Solapur, Maharashtra.

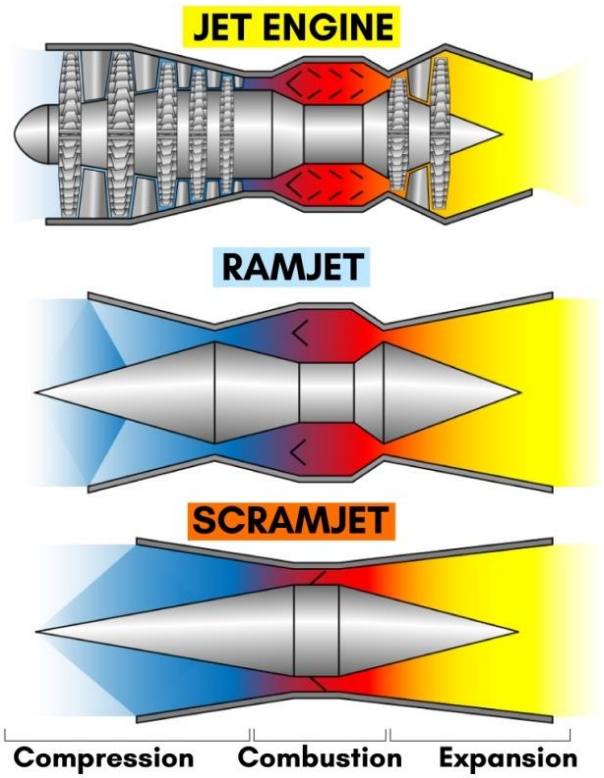
Conclusion

It is imperative to conduct extensive research to fully comprehend the long-term implications and potential risks associated with cloud seeding. Improvements such as incorporating **nanotechnology-based Titanium dioxide coating** on salt particles can enhance the effectiveness of cloud seeding operations.

7.4.2. SOLID FUEL DUCTED RAMJET (SFDR) TECHNOLOGY

Why in the news?

DRDO successfully **flight tested SFDR booster at the Integrated Test Range (ITR),** Chandipur off the coast of Odisha.



About SFDR

- A **missile propulsion system** includes a thrust-modulated **ducted rocket** with a reduced smoke nozzle-less missile booster.
- **Light in weight** as it utilises a solid fuelled air-breathing Ramjet Engine
  - Unlike solid-propellant rockets, the **Ramjet takes up oxygen from the atmosphere** during flight.
- **Range:** Enables missiles to hit the air targets in the **ranges from 70 - 340 km.**
- **First flight of SFDR,** developed under a **joint Indo-Russian R&D project,** was tested **in 2018.** It had achieved the **speed of Mach 3**.
- **Significance:** Enables missile to intercept aerial threats at very long range at supersonic speeds and high accuracy.

Difference between Ramjet, Scramjet and Dual Mode Ramjet (DMRJ)

- Ramjet, Scramjet and DMRJ are the **three concepts of air-breathing engines** which various space agencies are developing.

Ramjet	Scramjet (Supersonic combustion ramjet)	Dual Mode Ramjet (DMRJ)
• Air-breathing **jet engine** that uses the **vehicle's forward motion to compress incoming air for combustion** without a rotating compressor. • **Most efficient** at **supersonic speeds around Mach 3** (three times the speed of sound) and can **operate up to Mach 6.** • **Efficiency starts to drop** at **hypersonic speeds.** • Does **not have any turbines** unlike the turbojet engines (jet engines).	• **Efficiently operates at hypersonic speeds** and allows **supersonic combustion.** • Uses **Hydrogen as fuel** and the **Oxygen from the atmospheric air** as the oxidiser. • Both ramjets and scramjets have **no moving parts, only an inlet,** a **combustor** that consists of a fuel injector and a **flame holder,** and **a nozzle.**	• **Type of jet engine** where a ramjet transforms into scramjet **over Mach 4-8 range.** • Efficiently operate both in **subsonic and supersonic combustor modes.**

Conclusion

The **development of SFDR technology** has the **potential to revolutionise the aerospace industry** and it shows **India's quest to become self-reliant** in the development of **cutting-edge aerospace technology.**

APPENDIX

APPENDIX I: KEY FINDINGS OF THE SDG NIF PROGRESS REPORT 2023

Key Findings of the SDG NIF Progress Report 2023

SDGs	Progress made by India
 SDG 1 No Poverty	▶ **33.98 Lakh Self Help Groups (SHGs) linked to bank credit** in 2021-22 ▶ **1.20 Lakh senior citizens** provided **institutional assistance** funded by the government (2022-2023) ▶ India adopted and implemented **Sendai Framework For Disaster Risk Reduction**
 SDG 2 Zero Hunger	▶ **3.9% Net area** under Organic Farming. ▶ **₹ 84,921 gross value** added in agriculture per worker in 2022-23.
 SDG 3 Good Health and Well-Being	▶ **97 per lakh live births** was the **Maternal Mortality Ratio** in 2018-20 (130 in 2014-16). ▶ **32** was the **Under-Five Mortality Rate in 2020** (43 in 2015). ▶ Commitment to **eliminate Tuberculosis by 2025.**
 SDG 4 Quality Education	▶ **Free and compulsory elementary education** up to class 8. ▶ **57.6%** was the Gross Enrolment Ratio (GER) in Higher Secondary Education (2021-22). ▶ **27.30%** was the GER for tertiary education (2020-21) ▶ **89.30% schools with** access to electricity (2021-22)
 SDG 5 Gender Equality	▶ **14.36%** is the **women's political participation** in **parliament (lok sabha) in 2019'.** ▶ **907 is the Sex Ratio at Birth** in 2018-20 (898 in 2014-16). ▶ **92.7%** exclusive **women SHGs linked with the Bank** in 2021-22.
 SDG 6 Clean Water and Sanitation	▶ **100%** rural households have access to toilet facilites (2019-20) ▶ **100% districts are Opend Defecation Free (ODF) in 2019-20.** ▶ **91% water bodies** had ambient water quality in 2021.
 SDG 7 Affordable and Clean Energy	▶ **100%** households **electrified** in 2021-22. ▶ **99.80%** households using **clean fuel** in 2022-23. ▶ **22.5%** of total installed **electricity generation** is from **renewables (2022-23).**
 SDG 8 Decent Work and Economic Growth	▶ **34,134 Patents** were issued in 2022-23 (6,326 in 2015-16). ▶ **26,522 startups recognised** under Startup India Scheme in 2022 (428 in 2016). ▶ **National Strategy for Youth Employment** operationalised.

 **SDG 9 Industry, Innovation and Infrastructure**	▶ **59.97% population** subscribed to **internet** in 2022-23 (26.98 in 2015-16) ▶ **50.65 tonnes per rupees crore CO2 emission** in 2018-19 (61.45 in 2015-16). ▶ **262 researchers per million population** in 2020-2021 (218 in 2015-16).
 **SDG 10 Reduced Inequalities**	▶ **14.36% Members in the Lok Sabha** were women in 2019. ▶ **2.10% budget allocation to the north eastern states** in 2022-23 (1.66% in 2015-16). ▶ **6.19% budget (2023-24)** allocated for welfare of **SCs, and STs.**
 **SDG 11 Sustainable Cities and Communities**	▶ **98% wards achieved 100% door to door waste collection** service in 2022. ▶ **76% waste processed** in 2023 (17.97% in 2016). ▶ **24.76 was the injury rate** and **9.84 was the death rate** for road accidents in 2020
 **SDG 12 Responsible Consumption and Production**	▶ **187.8 kg per capita food availability** in 2021-22 (176 Kg in 2018-19). ▶ **6.81 MT hazardous waste generated per capita** in 2020-21 (7.19 in 2017-18). ▶ India has ratified **environmental agreements for effective management of hazardous wastes and other chemicals.**
 **SDG 13 Climate Action**	▶ **10,738.97 per lakh population** affected by **disasters in 2018** (14,743.14 in 2015). ▶ **24% reduction in emission intensity** of GDP over 2005 level.
 **SDG 14 Life Below Water**	▶ **Rs 498.95 crore budget estimate** for Ocean Services, Modelling, Application, Resources And Technology **(O-SMART) Scheme in 2022-23**
 **SDG 15 Life on Land**	▶ **21.71% forest cover** of total geographical area in 2021 (21.35% in 2015) ▶ **5.28% protected area** as percentage of total geographical area in 2022 ▶ **8.69% of the total wetland areas declared as Ramsar sites in 2022 (4.17% in 2016).** ▶ **0.07%** of the total government expenditure on **environmental protection in 2021-22** ▶ India has adopted a legislative, administrative and policy framework to ensure **Fair and Equitable Sharing of Benefits.**
 **SDG 16 Peace, Justice and Strong Institutions**	▶ **1.49 judges per lakh** population in 2022. ▶ **2.20 per lakh** population intentional homicide in 2021 (2.63 per lakh in 2015). ▶ **National Human Rights institutions compliant with international norms** set out in the paris principles.
 **SDG 17 Partnerships for the Goals**	▶ **25 states** using the state monitoring framework (12 in 2019-20). ▶ **1.77% share of merchandise export** of total global export in 2021. ▶ **4.0% Commercial Service export** of total global export in 2021. ▶ **National Statistical Legislation** with compliance to **UN Fundamental Principles of Official Statistics**

APPENDIX II: FAMOUS INDIAN SCIENTISTS AND THEIR INVENTIONS

Scientists	Inventions/Significant Achievements
 **Prafulla Chandra Ray**	▶ He was a **chemist, an industrialist who established the first Indian research school** in chemistry. ▶ He also conducted **research on platinum, iridium and sulphides of organic substances.**
 **Srinivasa Ramanujan**	▶ Made **contributions to several mathematical concepts** like infinite series, continued fractions, number theory and mathematical analysis. ▶ He **introduced a summation,** now known as the Ramanujan sum which is **currently used in signal processing.** ▶ He is also **credited for his work in 'Modular functions'** which are used to reveal properties of Black Holes by astrophysicists. ▶ In his **famous letter to Hardy in 1919,** he introduced the **"mock theta functions"** which are used today in 'String Theory' in theoretical physics. ▶ **He discovered Hardy Ramanujan number i.e., 1729** which is the smallest number which can be expressed as the sum of two cubes in two different ways- $1729 = 1^3 + 12^3 = 9^3 + 10^3$.
 **C. V. Raman**	▶ In 1922 he **published his work on the 'Molecular Diffraction of Light',** which ultimately led to his discovery of 'Raman Effect' in 1928. ▶ **Raman spectroscopy:** To understand composition of structures, crystallographic orientation of the sample and change in vibrational frequency for chemical bond in Raman effect. ▶ He **used a prism, miniature optical instrument and optical device to review the sky** and therefore the ocean and found that the ocean was scattering light.

 **Homi Jehangir Bhabha**	▶ As a student, **he worked with a Nobel Prize winner,** Niels Bohr in Copenhagen and played a major role in the **development of The Quantum Theory.**
	▶ **Published papers on The Absorption of Cosmic Radiation, electron-positron scattering** (later renamed Bhabha scattering).
	▶ **Chief architect of India's nuclear energy program** by taking several initiatives such as:
	  ▶ **First chairman** of the **Atomic Energy Commission of India.**
	  ▶ He **founded and directed Tata Institute of Fundamental Research (TIFR) and Atomic Energy Establishment, Trombay,** later renamed the Bhabha Atomic Research Centre (BARC).
	  ▶ He **pioneered the use of thorium to extract uranium from it** rather than relying on the meager reserves of uranium in India.
	  ▶ **Established the Cosmic Ray Research Unit** at Indian Institute of Science at Bangalore.

Vikram Sarabhai

- **Founded the Physical Research Laboratory (PRL)** in Ahmedabad in 1947.
- He **established the Indian National Committee for Space Research** in 1962, which was later, renamed ISRO.
- He **helped set up Thumba Equatorial Rocket Launching Station** in Thiruvananthapuram.
- He had **worked on India's first satellite 'Aryabhata'.**
- Some of the **other well-known institutions established by Dr. Sarabhai are:** Faster Breeder Test Reactor (FBTR), Kalpakkam; Variable Energy Cyclotron Project; Electronics Corporation of India Limited (ECIL), Hyderabad etc.

Satyendra Nath Bose

- His **work involves theoretical physics** and he has made some fundamental conceptual contributions in **development of Quantum Mechanics and Quantum Statistics.**
- He went on to **work with Einstein** and together they **developed Bose-Einstein statistics.**
- **Derived Planck's law for black body radiation** (which refers to spectrum of light emitted by any hot object) without any reference to classical electrodynamics.
- Joined **laboratory of Maurice de Broglie** where he learnt **techniques of X-ray spectroscopy and crystallography.**

A.P.J. Abdul Kalam

- Was the **project director of India's first Satellite Launch Vehicle (SLV-III)** which successfully deployed the Rohini satellite.
- Made an **effort to develop the Polar Satellite Launch Vehicle (PSLV) and SLV-III.**
- **Directed two projects** which sought to develop ballistic missiles.
- Worked **on Integrated Guided Missile Development Programme** (IGMDP) and played a major part in developing many missiles under the mission including Agni, Prithvi etc.

Har Gobind Khorana

- **1968 Nobel Prize for Physiology or Medicine** (shared with Nirenberg and Holley) for interpretation of genetic code and its function in protein synthesis.
- Constructed the **world's first synthetic gene** paving the way for further advancements in the field of genetic engineering and biotechnology.
- He **investigated mutations in rhodopsin** that are associated with retinitis pigmentosa, which causes night blindness.
- **Contributed to the science of polymerase chain reaction** (PCR) **tests.**
- **Discovered structure of transfer-RNA**, or tRNA (small RNA molecule that participates in protein synthesis).

Meghnad Saha

- **Formulation of 'equation of the reaction — isobar for ionization'**, which later became known as Saha's 'thermo-ionization equation' or the Saha Equation.
- His **theory of high-temperature ionization of elements and its application** to stellar atmospheres, as expressed by the Saha equation, is fundamental to modern astrophysics.

Subrahmanyan Chandrasekhar

- He played an **important role in the study of structure and evolution of the stars** including his most notable contribution of 'Chandrasekhar Limit'.
- Chandra also developed **theories on star atmospheres, black holes, the illumination of the sunlit sky,** star structures and star mass.
- **In 1983, Chandra was awarded the Nobel Prize in Physics** for his work on the physical processes involved in the structure and evolution of stars

Prasanta Chandra Mahalanobis

- **Founded the Indian Statistical Institute.**
- **Established the National Sample Survey** (1950) and **set up Central Statistical Organisation** to coordinate statistical activities.
- **Shaped India's second Five-year Plan** (1956-61), also **called the Mahalanobis Plan** focused on the development of public sector and rapid industrialisation.
- **Gave Mahalanobis distance,** a statistical measure.

Tessy Thomas

- She has **contributed to various fields such as Guidance, Control, Inertial Navigation, Trajectory Simulation and Mission Design.**
- She played a **leading role on Agni I-V series of missile systems,** Aeronautical Systems Cluster Laboratories.
- She also **worked on aeronautical systems,** including manned and unmanned aerial vehicles, lighter than air systems, aero engines, early warning airborne systems and subsonic cruise missiles.

C.N.R. Rao

- **Bharat Ratna** Professor C.N.R. Rao main research **interests are in solid state and materials chemistry.**
- He has also **worked on metal oxides, carbon nanotubes**, and other materials and **two-dimensional systems,** including graphene, boron-nitrogen-carbon hybrid materials, and molybdenum sulfide for energy applications and green hydrogen production.
- He has **contributed also to studies of synthesis, properties of transition metal oxides** and of phase transitions.

Gagandeep Kang

- Known for her inter-disciplinary research **studying the transmission, development and prevention of enteric infections** and their sequelae in children in India.
- She has also **built national rotavirus and typhoid surveillance** networks.
- **She is investigating** the complex **relationships between infection, gut function and physical and cognitive development.**

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