VISION IAS
INSPIRING INNOVATION

June 2023

Security

International Relations

Science & Technology

Geography

Environment

Economy

Ethics

Government Schemes

Polity

Art & Culture

Monthly
CURRENT AFFAIRS

📞 8468022022 | 9019066066   🌐 www.visionias.in

AHMEDABAD | BHOPAL | CHANDIGARH | DELHI | GUWAHATI
HYDERABAD | JAIPUR | LUCKNOW | PRAYAGRAJ | PUNE | RANCHI

Table of Contents

NOTE:

Dear Students,

Memorisation and recollection of information in Current Affairs is as important as understanding the articles. In order to enhance the learning outcomes from the Monthly Current Affairs Magazine, we are introducing following additions:

A thematic based colors has been used in the document in the boxes, tables etc to enable easy identification and recollection of various concepts and topics.

Questions are an important tool to assess and retain information. To enable this we are adding a Smart Quiz at the end of each section in the document for practicing the questions.

A wide variety of infographics have been added to ensure smoother learning experience and enhanced retention of the information. This will also help in effective presentation of information in the answer writing as well.

Places and persons in news are being presented in an objective manner through Maps, Tables & Pictures. This will help in easier recollection of factual information.

1. POLITY AND GOVERNANCE

1.1. NEW PARLIAMENT HOUSE

Why in News?

Recently, new Parliament House was inaugurated.

More about News

- Current project is **part of Central Vista development/redevelopment plan**, an infrastructure investment project, involving multiple projects.
    - **Inaugurated in 1931**, Central Vista **included Rashtrapati Bhavan, North and South Blocks**, **Parliament House**, **Record Office** (later named as The National Archives) **along with India Gate monument** and civic gardens on either side of Rajpath.
- Central Vista development/redevelopment project **aims to strengthen governance infrastructure** by building new facilities for India's Parliament, an efficient and sustainable Central Secretariat.

Need for a new Parliament

- **Narrow seating space:** Present building was never designed to accommodate a bicameral legislature. **Number of seats is likely to increase substantially after 2026** as the freeze on total number of seats is only till 2026.
- **Distressed infrastructure:** Over the period addition in services have led to seepages and destroyed the overall aesthetics of the building.
    - **Fire safety is a major concern** as the building is not designed according to the present fire norms.
- **Obsolete Communication infrastructure** in the present Parliament House. E.g., poor acoustic systems.
- **Structural safety concerns:** The current Parliament building was built when Delhi was in Seismic Zone-II, currently it is in Seismic Zone-IV.
- **Inadequate Workspace for Employees:** To accommodate ever increasing space requirements, sub-partitions were created within existing workspaces, leading to crammed, poor quality and narrow workspaces.

Present Parliament House Building — New Parliament Building

- Lok Sabha
- Central Hall Joint Session
- Central Lounge
- Central Hall
- Constitutional Hall
- Rajya Sabha
- Offices
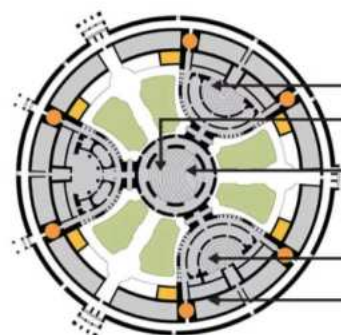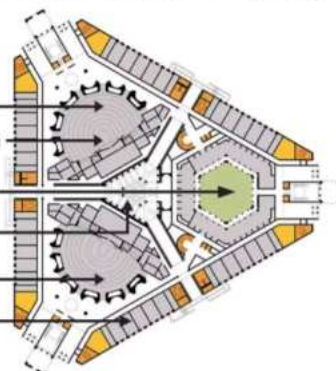
About Present Building
- India's present Parliament House is a colonial-era building **designed by British architects Sir Edwin Lutyens and Herbert Baker**, which took **6 years to construct (1921-1927).**
- Building **housed the Imperial Legislative Council.**
- It is popularly believed that the **unique circular shape of the Chausath Yogini temple in Morena**, (Madhya Pradesh) had **inspired the design** of the Council House.
- The Parliament building witnessed the **addition of two floors in 1956** to address the demand for more space.
- **First elected Parliament** came into **existence in April 1952.**

Ek Bharat Shreshtha Bharat Spirit
- **Lok Sabha Hall** is based on the **theme of National Bird, Peacock.**
- **Rajya Sabha Hall** is based on the **theme of the National Flower, the Lotus.**
- **National tree**, the banyan, has been **planted on the premises** of the Parliament.
- **Inclusion of the symbolic Sengol** (sceptre), symbolising the transfer of power, is **placed next to the Speaker's chair**.
- **Ashoka Pillar on the roof** of Parliament House.
- **Hand-woven carpets from Bhadohi**, known as 'Carpet City' due to its beautiful hand-woven carpets, in Uttar Pradesh have been fitted in the new Parliament House.
- **Six gates dedicated to water, land, and sky** that express its gratitude to the friendly nature of Indian civilization.
- **Ashok Chakra is made on the gate** of the new Parliament House, and **Satyamev Jayate is written**.
- **Wood from Nagpur, marble of Gujarat, stone work is of Rajasthan** and **bamboo wood flooring from Tripura** is used.

Main Features of New Building

- **Ek Bharat Shreshtha Bharat spirit:** Its triangular design, by Padma Shri architect Bimal Patel, is inspired by India's cultural diversity and built to meet the needs of the next 150 years.
- **Modern infrastructure:** Earthquake-proofing mechanisms for better space management, ensuring the safety, eco-friendly green construction, and power consumption reduction of up to 30%.
  - New Smart Parliament House is completely paperless.
- **Spacious:** The new Parliament House has more than 150 percent more seating capacity than the previous one.
  - The Lok Sabha chamber now has a seating capacity of 888 MPs, the Rajya Sabha chamber has 384 MPs, and the Joint Parliament session has a seating capacity of 1272 MPs.

Conclusion

Independent India received its own Parliament House, presenting a new ideal while strengthening democratic institutions and moving the country forward. The newly built Parliament is not just a building but also a reflection of the aspirations and dreams of 140 crore Indians.

This new building is also ideal for the coexistence of the new and the old. It will see the fulfilment of the resolutions of a developed India.

1.2. LAW ON SEDITION

Why in news?

Recently, 22nd Law commission in its 279th Report on "Usage of the Law of Sedition" recommended the retention of law on sedition.

What is the law on Sedition?

- Section 124A of the Indian Penal Code (1870) defines sedition as: "Whoever, by words, either spoken or written, or by signs, or by visible representation, or otherwise, **brings or attempts to bring into hatred or contempt, or excites or attempts to excite disaffection towards, the Government established by law**".

Criticism of Sedition law over the years

- **Subjective definition**: In **Shreya Singhal case (2015)** Supreme Court held that vague and over-broad offences would be unconstitutional and cannot be considered to be a reasonable restriction on free speech.
- **Chilling effect on dissent**: The fear of being charged with sedition can discourage individuals from expressing their opinions and engaging in legitimate criticism, leading to self-censorship.
- **Low conviction rate**: The conviction rate in cases filed under Section 124A, has fluctuated **between 3% and 33% over the years**, and the pendency of such cases in court reached a high of 95% in 2020. Thus, filing cases under the law itself can become a punishment.
- **Allegations of Misuse**: Once arrested under the sedition law, it is extremely difficult to get bail as the trial process could get stretched for long. This leads to harassment of innocent people.

How Judiciary interpreted Section 124A over the years
- **Romesh Thapar v. State of Madras, 1950**: Supreme Court said criticism of the government **exciting disaffection or bad feelings towards it, is not to be regarded as a justifying ground for restricting the freedom of expression** and of the press, unless it is such as to undermine the security of or tend to overthrow the state.
- **Kedar Nath Singh v. State of Bihar, 1962:** Supreme Court **upheld the validity of Section 124A.** The Court explicitly recognized that the **State needs protection from the forces who seek to jeopardize the safety and stability of the State**.
  - However, it said that only speech that is **likely to incite "public disorder"** would qualify as sedition.
- In **Vinod Dua v. Union of India**, 2021: Supreme Court held citizen has a right to criticize and comment upon the measures undertaken by the Government and its functionaries so long as he does not incite people to violence against the Government established by law.
- **S.G. Vombatkere v. Union of India, 2023**: Supreme Court directed all the State Governments and the Central Government to **keep all pending trials, appeals and proceedings arising out of a charge framed under Section 124A to be kept in abeyance**.
  - It opined that the rigours of Section 124A of IPC were **not in tune with the current social milieu** and were intended for a time when this country was under the colonial regime.

- o Supreme Court in Vinod Dua v Union of India case **quashed FIRs** with charges of sedition and **cautioned against unlawful application of the provision**.
- **Existence of other laws**: There are already laws which allow for preventive detention and imposition of restrictions under Section 144 of the Code of Criminal Procedure, 1973 on those who seek to threaten the unity, integrity and security of India. Thus, separate law under Section 124A may not be needed.
- **Repealed in other jurisdictions:** In the United Kingdom, the sedition law was officially repealed in 2009, citing **negative effect on freedom of speech and expression**. Also in Australia, Singapore it was repealed.

Arguments given by law commission for retention of Section 124A

- **To Safeguard the Unity and Integrity of India**: Section 124A has utility in **combating anti-national and secessionist elements**.
- **Sedition is a Reasonable Restriction under Article 19:** The fundamental right to freedom of speech and expression guaranteed under Article 19(1)(a) of the Constitution is not absolute and law on sedition it is a reasonable restriction.
- **Existence of Counter-Terror Legislations does not fill the space of Section 124A:** In the absence of a provision like Section 124A of IPC, **any expression that incites violence against the government would invite stringent laws like**, Unlawful Activities (Prevention) Act and the National Security Act.
- **Law to judged independently and not from the prism of Colonial Legacy**: The mere fact that a particular legal provision is colonial in its origin does not validate the case for its repeal.
- **Realities Differ in Every Jurisdiction**: Courts of competitive jurisdictions, like the US, the UK, etc. had their own history, geography, population, diversity, laws, etc. Some of these countries have merged their sedition law with counter-terror legislation.
  - o Doing this may not compatible with Indian circumstances.
- **Misuse not ground for removal**: Any alleged **misuse can be reined in by laying down adequate procedural safeguards**. Repealing the provision altogether can have adverse ramifications for the security and integrity of the country.

Way Forward

Recommendations by the law commission

Current scenario	Law commission proposal
• **Incorporation of Kedar Nath Judgment, 1962 in Section 124A of IPC.**	• By adding the words "**with a tendency to incite violence or cause public disorder**" in the definition of sedition.
• **Currently, Section 124A has a jail term of up to three years or life imprisonment**. It would mean either imprisonment for life or imprisonment up to three years only, but nothing in between, with the minimum punishment being only fine.	• **Proposed enhancing the jail term up to seven years or life imprisonment.** This **removes the wide discretion on sentencing** available with the judges.
• **Procedural safeguard:** None exists.	• **No FIR shall be registered for sedition "unless** a police officer, not below the rank of Inspector, **conducts a preliminary inquiry** and, grants permission for registering a First Information Report."

Some other suggestions in this regard are:

- **Limited application**: In 2018, the Law Commission, in consultation paper on sedition, underscored that Section 124A should be **invoked only in cases where the intention behind any act is to disrupt public order or to overthrow the government** with violence and illegal means.
- **Training and awareness police officers**: Provide comprehensive training to police officers on the specific provisions of Section 124A of the IPC, including its elements, scope, and the legal thresholds can ensure that unwarranted arrests do not happen under the law.

1.3. GRIEVANCE REDRESSAL ASSESSMENT AND INDEX (GRAI)

Why in news?

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

More about GRAI 2022

- GRAI 2022 was conceptualised and designed by the **Department of Administrative Reforms and Public Grievances (DARPG)** under Ministry of Personnel, Public Grievances & Pensions.
  - These reports **are part of 10-step Centralised Public Grievance Redressal and Management System (CPGRAMS) reforms** that were adopted by the DARPG to work on improving the quality of disposal of public grievances while reducing the time it takes to address these issues.
- **Objective of the Index** is to present **organisation-wise comparative picture** and provide **valuable insights about strengths and areas of improvement in** grievance redressal mechanism (GRM).
- **Index is based on 12 Indicators spread across 4 key dimensions -** Efficiency, Feedback, Domain, Organisational commitment.
- **89 Central Ministries and Departments** were assessed and ranked based on a comprehensive index.
- **Average disposal time** of Central Ministries and Departments has **improved from 32 days in 2021 to 27 days in 2022.**
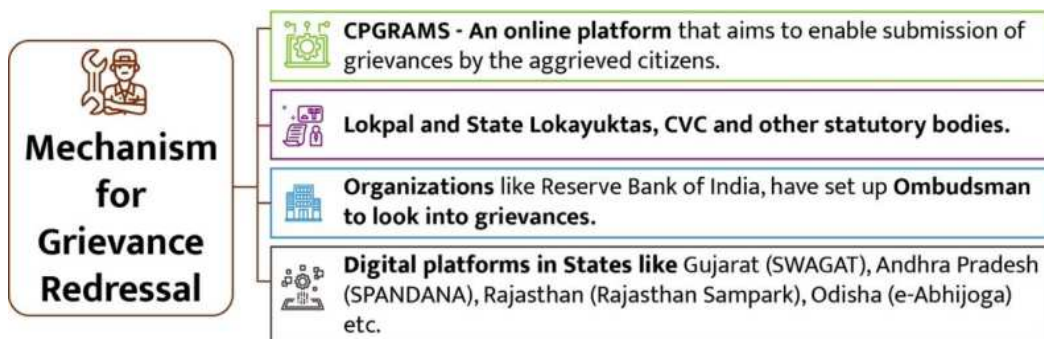
Grievance Redressal Mechanism (GRM)

- **As per 2ⁿᵈ ARC Report,** GRM is one of important mechanisms which can be usefully employed to make the **administration citizen centric.**
- The basic principle of a grievance redressal system is that **if the promised level of service delivery is not achieved or if a right of a citizen is not honored then the citizen should be able to take recourse** to a mechanism to have the grievance redressed.
- **2 Nodal agencies handling public grievances-**
  - **DARPG**, Ministry of Personnel, Public Grievances and Pensions
  - **Directorate of Public Grievances**, Cabinet Secretariat.

Issues with existing public grievance system

- **Low levels of Awareness of the Rights and Duties of Citizens:** People are not aware that a system of redressal exists in many of the Government departments.
- **Overburdening judiciary**: Department having their internal system for redressal of grievances of its personnel, but it is not working satisfactorily, and **non-settlement of grievances result in filing of petitions** in the courts on petty issues.
- **Non-Uniformity**: wide variations exist across Ministries and other organisations with respect to the framework, process, and capacity to handle grievances.

CPGRAMS – 10 STEP REFORMS
- Universalization of CPGRAMS 7.0
- Use of AI in CPGRAMS
- CPGRAMS in all Regional Languages
- Grievance Redressal Index
- Feedback Call Centre
- CPGRAMS in citizen service centres (CSCs)
- Sevottam Capacity Building Programs
- Monthly Progress Reports
- Data Strategy Unit
- One Nation One Portal

- **No statutory back up:** GRM is **not treated as mandatory** like RTI in many departments.
- **Lack of resources**: Public Grievance Cells often suffers from shortage of staff and resources. Moreover, these cells have not been adequately empowered.
- **CPGRAMS not behaving as facilitator:** In several cases the complainant was asked to approach the state government and the grievance was disposed and not forwarded to the concerned state government.
- **Systemic Problems:** Slackness in administration, low morale of the 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 audit of such areas.
- **Awareness among citizen:** Wide publicity through national, regional, and local media as well as through electronic media.
- **Attitudinal change in civil servants:** Through rewarding good work and awarding effective suggestions and punishing the deliberate negligence.
- **Recommendation of 2nd ARC**
    - **Public grievance officers** on the lines of the 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 play **role of a facilitator** without impinging on the **nature of federalism.**
    - All Ministries to undertake **a regular review** of grievances raised in print and electronic media.

> **Citizen Centric Administration**
> - **As per 2nd ARC Report** the concepts of **good governance and citizen centric administration** are intimately connected.
> - **Apart from GRM other Mechanisms** which can be usefully employed to make the administration citizen centric are-
>   - Adoption of Appropriate Modern Technology.
>   - Right to Information.
>   - Citizens' Charters.
>   - Independent evaluation of services.
>   - Active citizens' participation.
> - **Recommendations by 2nd ARC to ensure citizen centric administration.**
>   - **Making Citizens' Charters Effective**
>   - ✓ **One size does not fit all.**
>   - ✓ **Wide consultation** which includes Civil Society.
>   - ✓ **Redressal mechanism** in case of default.
>   - ✓ **Periodic evaluation** of Citizens' Charters.
>   - ✓ **Hold officers accountable** for results.
>   - **Consumer Protection: Lok Adalats** would be effective in settling many consumer disputes.
>   - **Citizen's Participation in Administration**
>   - ✓ **Regular citizens' feedback and survey and citizens' report** cards.
>   - ✓ Need for a **suitable mechanism** for receipt of suggestions from citizens, like simple **Suggestion Box, periodic consultations** with citizens' groups etc.
>   - ✓ Establishing robust **social audit norms.**

Conclusion

GRM is part and parcel of the machinery of any **administration**. No administration can claim to be **accountable, responsive, and user-friendly** unless it has established an efficient and effective grievance redress mechanism.

1.4. OTT REGULATION IN INDIA

Why in news?

Recently, Digital Publisher Content Grievances Council has recommended punitive action on an OTT platform invoking the Information Technology 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** is going to create a big push for new content creation.
- In India's regulatory parlance, OTT platforms are called '**publishers of online curated content**'.

- o Online curated content is **audio-visual content** such as films, web-series, podcasts etc. made available to the **viewers on demand**, including but not limited through subscription by OTT platforms.
- o "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.

Digital Publisher Content Grievances Council (DPCGC)

Ministry: Registered by the Ministry of Information & Broadcasting

Genesis Set up under the aegis of Internet and Mobile Association of India (IAMAI), in 2021.

Mandate:
- o It is an **officially recognized, independent self-regulatory body** for online curated content providers (OCCPs).
- o Aims to usher in a **redressal mechanism** which ensures a balance between addressing viewer complaints fairly and showcasing content without ad-hoc interventions.
- o **Adheres to IT Rules 2021** and such other existing or new statutes, and rules relating to publishing of online curated content.

Current mechanism for OTT regulation in India

- **Existing Laws**: Certain laws such as Information Technology 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 come up with **Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules 2021** under section 87 (2) of the Information Technology Act, 2000. Its key provisions include:
  - o Rules gave the **Ministry of Information and Broadcasting (I&B)** the task of regulating content on OTT and online platforms.
  - o **Code of Ethics for online news, OTT platforms and digital media:** This Code of Ethics prescribe the guidelines to be followed by OTT platforms and online news and digital media entities.
  - o **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)

  - o **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".
  - o **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.
  - o **Grievance Redressal Mechanism**: **A three-level** grievance redressal mechanism has been established under the rules with different levels of self-regulation.

3 Tiered Mechanism for OTT Regulation

Level-I: Self-regulation by the publishers

Level-II: Self-regulation by the self-regulating bodies of the publishers

Level-III: Oversight mechanism

  - ✓ **Grievance Redressal Officer**: Publisher shall appoint a Grievance Redressal Officer based in India who shall be responsible for the redressal of grievances received by it.
  - ✓ **Self-Regulatory Body:** There may be one or more self-regulatory bodies of publishers. Such a body shall be headed by a retired judge of the Supreme Court, a High Court or independent eminent person and have not more than six members.
  - ✓ **Oversight Mechanism**: Ministry of Information and Broadcasting shall formulate an oversight mechanism. It shall establish an **Inter-Departmental Committee** for hearing grievances.
- Also, Centre looks to regulate the content on digital platforms under the proposed **Digital India bill.**

Way ahead

- **Need for national broadcasting policy**: The 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 is generally more liberalised, covering themes and concepts that are not seen in conventional media.
  o Thus, it tends to stray from conventional censorship paradigms, and promotes innovation and creativity.

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 grievance redressal mechanisms on OTT websites/interface. However, compliance is very low.

Privacy and Data Protection: Balancing the need for data protection and user privacy with the 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 vastness of the digital space, the sheer volume of content being generated, and the rapid pace

- **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**: A periodic audit of the actual existence and efficacy of access controls and age verification mechanisms and the display of grievance redressal details by each OTT platform can be undertaken by an independent body.
- **Engage the stakeholders**: In order to ensure fine-tuning of any significant bottlenecks, implementation challenges, and prevent possible misuse of the regulations, policymakers and stakeholders should continue to engage with each other to put in place a regulatory framework that is effective and balanced.

1.5. NEWS IN SHORTS

1.5.1. AFFIRMATIVE ACTION

- **US Supreme Court limited affirmative action** in college admissions.
- In landmark ruling, SC effectively **overruled judgements of Grutter v. Bollinger (2003)** and **Regents of University of California v. Bakke (1978)** which validated affirmative action in college admissions based on race.
- **Affirmative Action** means **positive action/discrimination** which was **introduced in US to counter historical patterns of prejudice against individuals** with certain identities.
  o In context of higher education, **it refers to admission practices that seek to increase the representation of Black, Hispanic and other minority students in colleges** and universities of US.
  o **Reservation is a system of affirmative action in India** that provides historically disadvantaged groups representation in **education, employment, government schemes, scholarships, and politics**.

- **Affirmative actions in India and USA**

Parameter	India	USA
Purpose	Uplift lower strata of society who were referred as Scheduled Castes and Tribes.	Provide level playing field for groups that have been historically discriminated based on race, gender, sexual orientation, disability.
Genesis	Introduced as fundamental right under Article 15(4) and 16(4).	Embedded in Civil Rights Act of 1964 which ban discrimination on various grounds.
Quota	Fixed at 50% (Indra Swahney judgement) for OBC, SC & ST in both employment and education.	Varies across states and institutes and is not fixed.

1.5.2. GOVERNOR'S POWER

- Tamil Nadu **Governor rejected** Government's **request to shift portfolios of Ministers.**
- **Article 164(1)** states that the **CM shall be appointed by the Governor** and the other **Ministers shall be appointed by the Governor on the advice of the CM.**

- However, the **States complain that the actions of the Governor amounts to interference** in their administration and is **against the concept of Federalism.**
- The governor is the **chief executive head of the state** who acts as an agent of the central government. He possesses various powers like-
  - **Executive**: Appointing Chief Minister of the state along with the council of ministers.
  - **Judicial:** Pardon, remit or commute the sentence under state laws.
  - **Legislative:** Issue ordinances in times of emergency.
- **Various other cases of misuse of Governor's office**
  - **Governor's Political affiliations** lead to his/her alleged partisan functioning.
  - **Lack of coordination** between the elected government and appointed Governor.
  - **Mistrust due to frequent recommendation of bills to the President** under **Article 200**.
  - **Delaying the assent to the resolutions** passed by the state assemblies,
  - **Rejecting the recommendation of names** to various posts by the states.
- Various committees like **Rajamannar Commission, Punchi Commission, Sarkaria Commission, Venkatachaliah Commission** have recommended steps for better relationship between the Governor and the States.

1.5.3. GENERAL CONSENT TO CBI

- **Tamil Nadu withdrew general consent accorded to CBI** to probe cases in state.
- The Central Bureau of Investigation (CBI) is governed by **The Delhi Special Police Establishment (DSPE) Act of 1946**, which requires the investigative agency to **obtain the consent of state governments before it can investigate a crime in a particular state.**
- The consent of the state government to CBI can be either **general or case specific.**
  - **General consent is normally given by states to help CBI to conduct a seamless** investigation of corruption cases against central government employees in their states.
    - ✓ **General consent is consent by default.**
    - ✓ **Recently multiple States have withdrawn General Consent** like West Bengal, Mizoram, Punjab etc.
  - **In case Specific consent**, **CBI would have to apply** to the state government in every case.
- **If specific consent is not granted**, the CBI officials will not have the power of police personnel when they enter that state.

- Withdrawal is **not applicable to cases in which the investigation is already in progress.**

Exception to General Consent

Supreme Court and High Courts can order CBI to **investigate** a crime anywhere in the country without consent of the state.

Consent does not apply in cases where someone has been caught red-handed taking a bribe.

1.5.4. APPOINTMENT OF DGP

- Punjab assembly **passed Punjab Police Amendment Bill, 2023.**
- The bill amends the procedure to select **Director General of Police (DGP)** and paves the way for the state to appoint him/her.
  - State government cited that '**public order and Police'** is listed under the **State List in the Seventh Schedule of Constitution.**
  - The bill amended the **Punjab Police Act, 2007 to bypass the requirement of the empanelment by UPSC.**
    - ✓ It enables the State Government to form a **seven-member Empanelment Committee** to form a **panel of three senior-most officers** to choose DGP**.**
- **Procedure of DGPs Appointment**
  - Appointments of DGPs are made based on the **Supreme Court's judgment** on police reforms in **Prakash Singh vs Union of India (2006).**
  - As per the judgment, **DGP is to be selected by the state government from among the three seniors most** officers **empaneled for promotion to that rank**.
    - ✓ It also recommended the setting up of **establishment boards in states** to oversee transfers and postings.
  - State sends the names of eligible officers to UPSC, which appoint a **three-member panel (representatives of UPSC, central and state government concerned)** to **pick the candidate for the post**.
- In 2018 SC order stated that **any conflicting rule/legislation counter to the direction for the appoint of post by state or central government** shall remain in abeyance.

1.5.5. JUSTICE CLOCKS

- It is an **Electronic signage systems** which have been installed across the court complexes of High Courts.
- The initiative will **inform stakeholders about court-related key parameters and bring awareness among**

public by providing bird eye view of court-related data.

1.5.6. NYAYA VIKAS PORTAL

- **Nyaya Vikas Portal** has been created by **Ministry of Law and Justice** for **monitoring the implementation of Centrally Sponsored Schemes (CSS).**
- **About Nyaya Vikas**
  - o **Department of Justice** has been implementing CSS for Development of Infrastructure Facilities for Districts and Subordinate Judiciary **since 1993-94**.
  - o **Central assistance** is provided to the State Government / UT Administrations for **construction of court halls and residential units for Judicial Officers / Judges of District, etc.**

- o **Funding:** Northeastern and Himalayan States (90:10); Union Territories (100%), remaining states (60:40).

1.5.7. PANCHAYAT DEVELOPMENT INDEX (PDI)

- **It is released by the Union Ministry of Panchayati Raj.**
  - o It provides a **matrix to monitor and evaluate the progress of panchayats** through the scores achieved by them.
  - o It ranks **panchayats on the basis of scores and categorize them into four grades.**
  - o **Grades include A (75 to 90%), B (60-75), C (40-60%) and D (under 40%).**

You can scan this QR code to practice the Smart Quiz of Polity at our open test online platform for testing your understanding and recalling of the concepts.

LAKSHYA
Mains Mentoring Programme 2023

LAKSHYA
(A Targeted Revision, Practice & Mentoring Program for Mains Examination- 2023)

Starts: **5th JULY**
(55 DAYS EXPERT INTERVENTION)

Starts: **18th JULY**
(45 DAYS EXPERT INTERVENTION)

- Highly experienced and qualified team of mentors
- Structured plan of revision and practice for GS Mains, Essay & Ethics
- Research based subject-wise strategy documents
- Scheduled group sessions for strategy discussion, live practice and peer interaction
- Special emphasis on subjects with high scoring potential
- Access to Lakshya Mains Practice Tests
- One-to-one sessions with mentors
- Continuous performance assessment and monitoring

SCAN THE QR CODE TO REGISTER

For any assistance call us at:
+91 8468022022, +91 9019066066
enquiry@visionias.in

2. INTERNATIONAL RELATIONS

2.1. INDIA US RELATIONS

Why in News?

Indian Prime Minister visited the US on a three-day state visit, in which various strategic deals and partnerships were signed.

More about News

- **This is the 31st Visit of an Indian PM to the US and only the 3rd Official State Visit** (the earlier two state visits happened during 1969 and 2009).

*For more details on **India-US relations** refer April 2022 Current Affairs Magazine*

Key Outcomes of the visit

- **Trade:** An **interagency-led Strategic Trade Dialogue was launched** to undertake efforts to address export controls and facilitate technology transfer between the two countries.

INDIA-US RELATIONSHIP OVERVIEW

The confluence of common factors like democratic values, Shared areas of Interests, Stand against terrorism makes India and US enjoy a comprehensive strategic partnership.

- **$ 128.55 billion** Bilateral trade in 2022-23 (increase of 7.65% over 2021-22)
- **Largest Export destination** US is the major export hub for Indian goods.
- **3rd largest defence Supplier** US (~11%) is India's 3rd largest defence supplier after Russia (~45%) and France (~29%)
- **$28 billion** India maintains a trade surplus with the US

Defence ties
- US recognized India as a **"Major Defence Partner"** in 2016.
- US Defence agreements like
  - **Logistics Exchange Memorandum of Association (LEMOA), 2016**
  - **Communications Compatibility and Security Agreement (COMCASA), 2018**
  - Industrial Security Agreement 2019
  - **Basic Exchange and Cooperation Agreement (BECA)** 2020 are signed with India
- Bilateral military exercises like **Yudh Abhyaas, Vajra prahar, Malabar, RIMPAC etc.** are conducted between the two countries.

People to People ties
- Indian diaspora in US is around 4.9 Million and they form the **second largest immigrant group in US after the Mexicans**

- **Semiconductors:** An **MoU on Semiconductor Supply Chain and Innovation Partnership was signed** between the two countries to promote commercial opportunities, research, talent, and skill development.
- **Telecommunication: A public-private Joint Task Forces co-lead by India's Bharat 6G and US Next G alliance,** for the development and deployment of **Open Radio Access Network (Open RAN) systems was launched.**
  - **An Open RAN is a system that allows interoperation between cellular network equipment provided by different vendors**, thereby bringing down the cost of data and communication.

Areas of Strategic Partnership between India and USA: Critical Minerals, Quantum Technology, Health, Education, Space Technology, Counter Terrorism, Indo Pacific Security, Defence Technology, Telecommunication, Civil Nuclear Cooperation, Clean Energy Partnership, Critical Emerging Technologies, Trade and Economy

- **Quantum Tech: Indo-U.S. Quantum Coordination Mechanism was established** to facilitate collaboration among industry, academia, and government.
  - It **aims to work toward achieving a comprehensive Quantum Information Science** and Technology agreement between the two countries.
  - **U.S.-India Science and Technology Endowment fund** was launched for the joint **development and commercialization of Artificial Intelligence (AI) and quantum** between the countries.
- **Research and Innovation:** A new initiative called "**Innovation Handshake**" was started to connect the startup ecosystems of the two countries, which is to support the US-India **Initiative on Critical and Emerging Technology (iCET).**
  - **iCET was set up in Jan 2023,** to strengthen and broaden the defence industrial cooperation and strategic technological partnership between the companies, and academic institutions of the two nations.

- o It is **headed by the National Security Council Secretariat in India and the US National Security Council.**

*For more details on **iCET** refer February 2023 Current Affairs Magazine.*

- **Clean Energy Partnership: The India-U.S. New and Emerging Renewable Energy Technologies Action Platform was launched**, which will accelerate cooperation in green hydrogen, offshore and onshore wind, and other emerging technologies.
  - o The **U.S. Agency for International Development is to support Indian Railways' ambitious target to become a "net-zero" carbon emitter** by 2030.
- **Critical Minerals: India** became the new **member of the US-led Mineral Security Partnership (MSP),** which aims to ensure the supply of critical minerals.
- **Collaboration in Education:** A **Joint Task Force of the Association of American Universities and leading Indian educational institutions, including the Indian Institutes of Technology, was formed** for expanding research and university partnerships between the two countries.
  - o The **Indo-U.S. Global Challenge Institutes was established for deeper research partnerships** between institutions in the U.S. and India.
- **Visa:** U.S. has mentioned that it **would launch a pilot run to adjudicate domestic renewals of certain petition-based temporary work visas in 2023**, including for Indian nationals.
  - o The U.S also highlighted its **intent to implement the domestic renewal for a pool of H1B and L visa holders in 2024.**
- **Consulates:** The U.S is to open two **new consulates in India in Bengaluru and Ahmedabad and India is to operationalize its new consulate in Seattle** and open two more consulates in U.S soon.

2.1.1. INDIA US DEFENCE RELATIONS

Why in News?

The Indian PM visit resulted major defence deals signed between India and US.

More about the news

- An agreement **to Co-produce the GE F414 jet engine** was signed between General Electric (GE) and Hindustan Aeronautics Limited (HAL).
- India has agreed **to procure 31 High Altitude Long Endurance (HALE)** Unmanned Aerial vehicles (UAV) named General Atomics (GA) **MQ-9B drones** from the US.
- The **U.S.-India Defence Acceleration Ecosystem (INDUS-X) was launched.**
  - o 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:** The deal will **allow HAL to manufacture the GE's F414 engine** for the indigenous Light Combat Aircraft (LCA) Tejas Mk2.
  - o **The LCA Tejas currently uses GE F404 engine** procured from the same company.

GE-414 Jet engine:
- It is a **turbofan engine** produced by the GE and has been used in the US Navy for more than 30 years.
- **Eight nations have the F414-powered jets in operation** and is used in superior jets like Boeing Super Hornet and EA18G Growler.

MQ-9B drones
- The drone **has two variants the Sky Guardian and the Sea Guardian**.
- The drone **can fly over the horizon via satellite for up to 40 hours**, in all types of weather.
- The drone can **reach a maximum speed of 388 km/hr** and its **flying range is around 11,112 km**.

INDUS-X
- The **U.S. Department of Defense (DoD) and the Indian Ministry of Defense (MoD)** have launched the INDUS-X
- It **aims to expand the strategic technology partnership** and defence industrial cooperation between governments, businesses, and academic institutions.
- **It will pay the way to:**
  - o **Enhance connectivity between American and Indian defence startups.**
  - o **Explore joint opportunities in high-tech defence** innovation, research, and development.
  - o **Strengthen bilateral trade relationships and defense establishment linkages.**
  - o Creation of **Indo-U.S. Joint Innovation Fund** for the funding of the defence startups.

- **Technology Transfer:** Only a handful of countries such as the US, Russia, the UK, and France have mastered technology and the **80% technology transfer** will help India to join the league in future.
- **Future indigenous developments:** Indian scientist's hands on the engine will help India in its future indigenous defence developments.

- **Understand drone technology**: The establishment of a Comprehensive Global Maintenance, Repair and Overhaul (MRO) facility in India for the drones will support of India's indigenous drone capabilities.
- **Boost local defence industries:** The indigenous content clause with respect to the drones will help Indian firms to get manufacturing contracts thereby boosting local defence industries.
- **Reduces the cost:** The introduction of drones in the Indian Navy will save it the time, cost, and wear of manned aircrafts that are normally sent for surveillance.

Challenges in 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 in world arena irks the US.
- **India's stand in joining alliances: India wishes to uphold its strategic sovereignty** and has recently **rejected the US's invitation to join the 'NATO Plus' arrangement** is also against the wishes of US.
- **Technology transfer:** The US defence companies are reluctant to share their technologies with Indian counterparts.
- **US's funding to Pakistan:** The **US is still funding Pakistan for its military requirements** and has recently granted funding for spares for the Pakistan's F-16 fleet.
- **Inconsistency in US's stance:** In the past, the US has helped both Pakistan and China and has changed its stance since the 9/11 attacks, but it continues to sell arms to Pakistan.

Way Forward:

- **Balancing the relationship with Russia and US:** Balancing the relationship with both the countries is essential, The US is necessary for India's technological and economical ambitions, whereas Russia still stands relevant for India's energy and security needs.
- **Developing indigenous defence technologies:** India needs to strive forward its defence research and reduce its dependence on foreign powers for defence supplies.
- **Continue cooperation in Indo pacific:** Only a combined effort along with other regional powers can deter the aggression of China in the Indo pacific region.

2.1.2. INDIA US SPACE RELATIONS

Why in News?

The Indian PM visit has led to signing of important agreements in the Space sector.

Major Developments

- **NASA will provide advanced training to Indian astronauts** with the goal of mounting a joint effort to the International Space Station (ISS) in 2024.
- **India signed the US led 'Artemis Accord' as its 27th Member**, which aims to establish a common vision via a set of principles, guidelines, and best practices to enhance the governance of the civil exploration and use of outer space.

Significance of the agreements for India

- **Push to the Gaganyaan Mission:** The in-hand training assurance to Indian astronauts by the NASA, **will help India to achieve the objective of its first manned space mission i.e., the Gaganyaan**.
- **Entry to ISS:** The NASA trained Indian astronauts might be the first set of Indians to ever enter into the ISS and conduct research and experiments there.
- **Entry to the Gateway: Gateway is an upcoming NASA-led international lunar orbital station for Artemis astronauts**. With NASA providing crew seats to the Gateway development contributors, India can also get its berth through the Accords and active participation.
- **Enhance capabilities of ISRO:** The signing of the accord **could fast-track India's space capabilities and ambitions and help it achieve cost-effectively,** via collaborations with the members of the Accords.

Challenges in space cooperation

- **Mismatched interests:** While the NASA's ambitions are beyond earth's orbit, ISRO's ambitions lie mostly within the earth orbit and building nations capabilities in various sectors.

- **Asymmetry in capabilities:** The U.S. has the highest number of registered satellites in space and SpaceX alone has managed to make 61 launches in 2022, whereas India has only over 60 satellites in orbit and is yet to make double- digit launches in a year.
- **Russian Collaboration:** Russia's space agency has helped ISRO from its first mission '**Aryabhatta**' to recent '**Gaganyaan**' and has various MoUs signed with ISRO, a sudden fillip towards NASA will irk the Russian agency as well.
- **Financial Constrains:** While the funding for ISRO is hardly sufficient for its existing programs, it will need to widen its funds to suit the demands of the new agreements with NASA.

Way Forward

- **Induce long-term cooperation**: Long-term cooperation with NASA will help ISRO to gain specific expertise which can be used in indigenous missions.
- **Inducing Private participation:** ISRO needs to induct and incubate more private companies in its research and launch activities, to meet the growing demands.
- **Voicing for Space as global common: India should abide by the values of the 'Outer space treaty'** and continue to push, the Space as a global common for all.

For more details on NISAR refer February 2023 edition of Monthly Current Affairs Magazine

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.**

Artemis Accords

Asia	North America	Europe
Singapore	Canada	France
Bahrain	The United States of America	Spain
India	Mexico	Poland
Israel		Ukraine
Republic of Korea	**South America**	Italy
United Arab Emirates	Brazil	Romania
Japan	Colombia	United Kingdom
Saudi Arabia	Ecuador	Czech Republic
Africa	**Australia**	Luxembourg
Nigeria	Australia	
Rwanda	New Zealand	
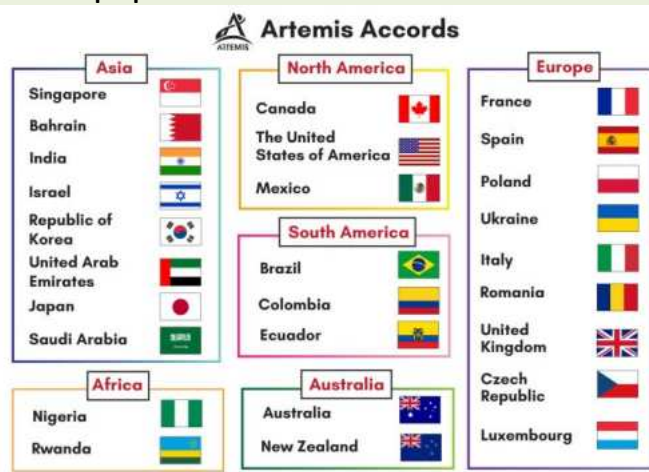
The signatories are committed:
- To **share national space policies and scientific information's** resulting from their activities
- **To implement MOUs** between government or agencies **in accordance with the Outer Space Treaty 1967.**
- To **preserve outer space heritage,** including historic landing sites and evidence of activity on celestial bodies.
- To **mitigate orbital debris** and induce safe and timely disposal of spacecraft at the end of missions.

2.1.3. INDIA US DIGITAL TRADE RELATIONS

Why in News?

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:

- Though the bilateral trade between India and US stands at **$ 128.55 billion** in 2022-23, the **digital or technology services did not emerge as a major factor**.
- The **USA, has a $27 billion deficit in trade in digital services** with India as of 2020.
- The two countries are improving their tech partnership by:
  - Announcement of **Initiative on Critical and Emerging Technology (iCET).**
    - ✓ Under the iCET**, both countries will cooperate on critical and emerging technologies in areas including artificial intelligence, quantum computing, semiconductors, and wireless telecommunication**.
  - An MoU was signed between the two states on the **Semiconductor Supply Chain and Innovation Partnership**, which includes a combined investment valued at $2.75 billion.
  - Two Joint Task Forces were set up, to focus on **the Open RAN network and research and development in 5G/6G technologies.**
  - A **joint Indo-US Quantum Coordination Mechanism** to facilitate collaborative 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 commercialization of AI and quantum technologies.

Concerns raised by US tech firms

- **Protectionist Indian Policy:** CCIA has complained that India is deploying various tools to protect its local industries and does not provide an open access for US companies to freely operate and succeed in India.
- **Preferential treatment to Indian Companies:** CCIA accuses the Indian government over preferential treatment to local companies and acting against the foreign companies in India.
- **Greater Government Censorship:** The group has highlighted the increasing censorship and control over political speech and state institutions have been employed against the companies.
- **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 and further complicated the taxation framework.

Policy concerns for Digital technology industry in India

The IT Rules, 2021 (Intermediary Guidelines and Digital Media Ethics Code)	• The code has **placed a deadline of 72 hours to takedown a flagged content** by the Government notification or Court order, to the Social Media Intermediaries (SMIs). • The SMI's are also **required to appoint a local compliance officer.** • The **institution of a three-member Grievance Appellate Committees (GAC),** to hear user complaints about the decisions of SMIs regarding their content-related issues and have the power to reverse those decisions. • The Ministry of Electronics and IT (MeitY) has made it mandatory for platforms **to make efforts to prevent the publication of fake or false news** as declared by the Press Information Bureau (PIB).
Digital Personal Data Protection Bill (draft), 2022	• **The draft still lacks clarity on cross border data flow**, compliance timelines, and data localisation. • **The localisation requirements tend to increase operating costs** of companies and can be seen as discriminatory by foreign companies
Telecommunications Bill (draft), 2022	• The **definition of "telecommunication services" is to be broadened** to include a wide range of internet-enabled services that bear resemblance to the telephone and broadband services like Over-the-top (OTT) services. • The CCIA cites that it **might cause burdensome obligations, licensing requirements**, and monetary obligations on the sector.
Digital Competition Act	• Proposed to address the anti-competitive practices in the sector, the CCIA refers the **move was done to specifically targeting the US big tech companies.**
Competition Commission of India rulings	• The Commission has issued orders explaining how the android operating system and Google play store should function in India, can **invariably create cyber security risks in the applications**

Way Forward

- **Ensure Secure Cross border data transfer:** Any form of digital trade would require cross-border data transfers and to make the sector flourish we should enable data transfer but also ensure that the data is used only for the intended purpose.
- **Support Start-ups and Innovation:** The Country is yet to create a global tech giant like Google, Microsoft or Samsung, nurturing a vibrant start-up ecosystem in the digital trade tech and encouraging innovation can boost India's digital trade relations.
- **Strengthening Cyber security Measures:** A Robust cybersecurity framework is crucial for fostering trust in digital trade. India should focus on enhancing its cyber security capabilities, implementing robust data protection measures, and collaborating with international partners to combat cyber threats.
- **Collaborate on Digital Standards:** Collaborating with other countries to develop and adhere to common digital standards can simplify cross-border digital trade. India should actively participate in international standard-setting bodies to ensure compatibility and interoperability with global digital trade practices.
- **Eliminating Red-tapism and Excessive censorship:** The foreign companies trying to invest in India should be treated at par with Indian counterparts and there should be certain guidelines set to moderate the digital content and government should avoid interfering in the daily chores of the digital companies.

2.2. INDIA-NEPAL

Why in news?

India and Nepal have recently unveiled several initiatives and agreements during the visit of the Prime Minister of Nepal to India.

Key initiatives and agreements

- Both countries **vowed to resolve the vexed boundary dispute** under the spirit of friendship.
- Inauguration of the **twin Integrated Check Posts (ICPs),** in Rupaidiha in India and Nepalgunj in Nepal.
- Various **MoUs were signed for-**
  - Development of Dodhara Chandani check post along India-Nepal Border,
  - Development of Phukot- Karnali Hydroelectric Project,
  - Cross border payments
  - Laying the second cross-border petroleum pipeline between Siliguri in India and Jhapa in Nepal
  - Extension of Motihari-Amlekhganj Pipeline to Chitwan.
- **Power sector:** India agreed to the **first trilateral power trade** from Nepal to Bangladesh through India for up to 40 megawatts of power.
- **Treaty of Transit:** Revised **treaty of transit** that would provide Nepal access to inland waterways of India.
- **Hydropower cooperation:** Project Development Agreement of Lower Arun Hydroelectric Project
- **Connectivity:**
  - **Line of credit of $680 million by India** to fund three major transmission corridors in Nepal- Bheri Corridor, Nijgadh-Inaruwa Corridor and Gandak-Nepalgunj corridor.
  - India to fund and build **two additional bridges across the Mahakali River.**
  - Inaugural run of the **cross-border freight rail operations** between Bathnaha in India and Nepal custom yard on the Jogbani-Biratnagar rail link.
  - Handing over of **Kurtha-Bijalpura rail section** of the Jaynagar-Kurtha passenger rail link to Nepal.

India-Nepal overview
- India and Nepal share unique ties of friendship and cooperation characterized by an **open border and deep-rooted people-to-people contacts of kinship and culture**.
- **Nepal shares a border of over 1850 km** with five Indian states – **Sikkim, West Bengal, Bihar, Uttar Pradesh, and Uttarakhand**.
- The **India-Nepal Treaty of Peace and Friendship of 1950** forms the bedrock of the special relations that exist between India and Nepal.
  - Nepalese citizens avail facilities and opportunities on par with Indian citizens in accordance with the provisions of the Treaty.

Importance of Nepal for India
- **Strategic location of Nepal** as it acts as a **natural security buffer between India and China.**
- **India's internal security:** The harmonious relations between the two countries is necessary **to curb terrorism and maoism.**
- **Security of India aided development projects** such as cross border railways, Pacheshwar multipurpose project, bridges over Mahakali river etc.
- **Flood water management and development of hydropower.**
- **People to people connect and empowerment of Madhesis** (residents of Terai region in at the foothill of the Himalayas on the border with India in Bihar) to avoid political spillovers in India.

Major areas of engagement between India and Nepal

- **Economic cooperation:** India is the **largest trading partner of Nepal** and **highest source of FDI**. Bilateral trade crossed **US$ 7 billion** in FY 2019-20.
- **Connectivity and Development Partnership:** India has been assisting Nepal in development of border infrastructure through **upgradation of roads, development of cross-border rail links** and **increasing the overall economic assistance.**
- **Multilateral Co-operation: Such as** BBIN (Bangladesh, Bhutan, India, and Nepal), BIMSTEC (Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation), Non-Aligned Movement, and SAARC etc.
- **Defence Cooperation:** India assists in modernizing Nepal Army through equipment supply and training. Recruitment of **Nepalese soldiers in Gorkha regiments** of the Indian Army. Joint military exercises (e.g., Surya Kiran) and disaster assistance.
- **Energy Cooperation:** India and Nepal have a **Power Exchange Agreement since 1971** for meeting the power requirements in the border areas.
  - South Asia's first cross-border petroleum products pipeline, constructed and funded by Indian Oil Corporation Ltd., **connecting Motihari in India to Amlekhganj in Nepal** was inaugurated in 2019.

- **Hydropower cooperation:** India and Nepal recently signed an MoU **to develop the West Seti and Seti River (SR6) projects** (1,200 MW) and also agreed to take forward the **Sapta Kosi high dam project on Kosi river**.
  - **West Seti River is a tributary of Karnali River located in the far western region of Nepal.**
  - Other projects include **Mahakali Treaty** (6,480 MW), the **Upper Karnali Project** (900 MW) and the **Arun - III projects** (900 MW) **in western and eastern Nepal, respectively.**
- **Culture: Swami Vivekananda Centre** for Indian Culture was set up in Kathmandu to showcase the best of Indian culture. **India International Centre for Buddhist Culture** and Heritage was inaugurated in Lumbini, Nepal.

Major Issues in India-Nepal Relations

- **Border Dispute:** The ties between the two countries came under severe strain after Kathmandu published a new political map in 2020 that showed three Indian territories -- Limpiyadhura, Kalapani and Lipulekh -- as part of Nepal.
- **China's influence:** China has increased its economic engagement with Nepal through projects under its Belt and Road Initiative (BRI).
  - Also, there are concerns over Chinese interference in Nepal's politics.
- **Trust Gap:** Due to India's slow pace of project implementation and the alleged perception of India's interference in Nepal's politics.
- **Security issues:** Porous border facilitates arms smuggling, terrorist activities and flow of counterfeit Indian currency, all of which pose serious security risks to India.
- **Gurkha issues:** Relations came under strain when Nepal government blocked recruitment of Nepalese Gorkhas for the Indian Army's Gorkha Regiment claiming that the **Agnipath Scheme** violated the **1947 Tripartite Agreement** signed between the two countries and the UK.
- **Connectivity issues:** Despite several requests from Nepal, India refused to open more air routes to Nepal as it requires opening up India's airspace close to its border with China.
- **Treaty of Peace and Friendship, 1950:** India's lackadaisical approach for Nepal's request to revise the 1950 Friendship treaty is an irritant in the relationship.

Way Forward to strengthen the relations

- **Emphasizing on digital connectivity initiatives** such as e-governance and cross-border digital collaborations can enhance connectivity, create economic opportunities, and strengthen bilateral relations.
- **Bilateral mechanisms are needed to discuss contentious issues** such as border disputes.
  - Boundary dispute resolution between India and Bangladesh can serve as a model.
- **Multilateral platforms** such as BBIN, BIMSTEC, SAARC must be utilised **to serve common interests** such as climate change, disaster management, and regional security.
- **Sustained engagement and limited interference by India** in Nepal's politics.
- **Enhancement of air connectivity** between the countries which is crucial for Nepal's economy.
- **Revisiting Friendship treaty** as recommended by Eminent Persons Group set up jointly by the two countries.
- **Organizing joint cultural events, film festivals, and wellness retreats** to showcase India's rich heritage to influence public opinion.

2.3. CHINA'S RISING INFLUENCE IN CENTRAL ASIA

Why in 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 which issued a blueprint for the future development of China-Central Asia relations.

- **The leaders also focussed on** people-to-people exchanges, a '**Cultural Silk Road'** programme, and issues of regional terrorism and extremism.
- The **first C+C5**(China + 5 Central Asian countries) **summit was held in virtual format last year**, to commemorate the 30th anniversary of diplomatic relations between China and Central Asian countries.
- China has been investing heavily in Central Asia through its **BRI and the relationship with the region was institutionalized through Shanghai Cooperation Organisation (SCO).**

Implications of rising influence of China in Central Asia for India

- **Geopolitical Competition:** China's presence and leverage in India's neighboring region impacts India's strategic interests and limits its influence in the region.
  - **Post t**he Taliban takeover, the Central Asian region has emerged as a geopolitical arena where great contestations for influence are unfolding between countries like Russia, China, US, Turkey, Iran, Europe, EU and others.
- **Creates economic competition for India:** China is **Central Asia's largest trading partner while** India's combined trade with Central Asia already only **around $2 billion** (much lesser than China's $32 billion).
- **Connectivity and Infrastructure:** China's BRI, which includes projects such as the China-Pakistan Economic Corridor (CPEC), could affect India's efforts to enhance its own connectivity with Central Asia and limit its access to the region.
  - China's influence may affect India's ability to foster closer ties with these countries through initiatives like the **International North-South Transport Corridor (INSTC)**.
- **Security Concerns:** The growing Chinese presence may impact the regional security dynamics and influence the balance of power in the immediate neighborhood.
  - India and the CARs share common concerns on the issue of rising threat from terrorism, extremism and drug trafficking which pose challenges to regional stability.
- **Energy Security:** The region is crucial for India's energy security. Growing Chinese influence might hinder India's prospects for securing energy from the region.
  - For example, Kazakhstan is the world's largest producer of uranium and Turkmenistan has huge reserves of natural gas.

Initiatives taken by India to increase its imprint in the region

- **Improving connectivity:** Through renovation of Chabahar port, faster development of the INSTC, becoming a member of the Ashgabat Agreement and TAPI pipeline.
- **Connect Central Asia (CAA) policy, 2012: It** is a broad-based framework involving political, economic, security and cultural connections.
  - India recently hosted the first India-Central Asia Summit.
- **Commitment to Extended Neighborhood Policy (ENP): It** calls to diversify India's geopolitical partners and diplomatic goals, and its willingness to engage its Central Asian partners on a multitude of fronts.
- **Bilateral engagements:** India signed Strategic Partnership Agreements (SPA) with Kazakhstan, Tajikistan and Uzbekistan and Civil nuclear agreement with Kazakhstan.
  - **India's international Technical and Economic Cooperation (ITEC)** programme attracts young professionals for capacity building.

Challenges in India CAR relations
- **Poor connectivity:** India does not share physical borders with any of the Central Asian states.
  - Also, India's antagonistic relations with Pakistan has further complicated connectivity and trade prospects for India.
- **Limited Resources:** India's resource constraints especially financial, can limit its ability to actively engage with all Central Asian countries simultaneously.
- **Regional Conflicts: Political Instability and Security Concerns** in certain Central Asian countries, such as narco-terrorism, and regional conflicts, can impact India's engagement.

- **Multilateral organisations:** Platforms like SCO and Conference on Interaction and Confidence-Building Measures in India (CICA) have helped India to maintain regular channels of communication with the CARs.
- **Developmental assistance:** The $1b Line of Credit announced by India is aimed at High Impact Development Projects (HICDPS) for socio-economic development of the region.

Way forward for India

- **Soft power diplomacy:** India should leverage the historical, cultural and civilizational bonds as well as traditionally close people to-people contacts to build its Central Asia partnership.
- **Focus on Economic Relations**: Recently launched **India-Central Asia Business Council (ICABC)** can help promote business linkages, facilitate greater understanding of taxation, business regulations in India and the Central Asian countries.
- **Connectivity**: There have been suggestions that **India should provide connectivity for people and trade in Central Asia through "air corridors",** as it had done for Afghanistan.
- **Exploring other sectors:** IT, pharma and textiles, higher education, space, SME, power generation, food processing and agriculture present rich potential for deeper engagement.

2.4. ROLE OF INDIA'S DEFENCE COOPERATION INITIATIVES IN MEETING FOREIGN POLICY GOALS

Why in news?

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

More about the news

- Experts point out that India has **expanded its activities of military cooperation**, humanitarian assistance, contribution to UN Peace Keeping Forces, etc. in the recent times.
  - Currently, India **has defence cooperation agreements** with over 53 countries.
- **The Defence Production and Export Promotion Policy 2020,** released by the Ministry of Defence targets an increase in export of aerospace and defence goods and services.
- This type of defence cooperation is termed as **Defence Diplomacy.**
  - It means establishing cooperation in strategic arenas and facilitating a collective strategy of armed forces to advance mutual interests.
  - For instance, Increase in the **joint military exercises** with friendly countries for example Yudh Abhyas with the USA.
    - ✓ **Constructive participation** in international forums such as Regional Anti-Terrorist Structures.
- **Disaster Management and Humanitarian Relief** for example, launched 'operation dost' to help earthquake hit Turkey and Syria.
  - By this, India seeks to forward its foreign policy goals.

India's foreign policy important goals:
- To engage and protect Indian Diaspora.
- To protect India from traditional and non-traditional threats.
- To ensure that India's voice is heard on global forums and that India can influence world opinion
- To create an external environment conducive to India's inclusive development.

Linkage between Defence Cooperation and Foreign Policy

- **Security and Stability:** Defence cooperation plays a crucial role in achieving security and stability, which are vital objectives of foreign policy.
- **Globalization:** The scope of international trade, finance and communications is influenced by external factors like cryptocurrencies, shell companies etc. beyond the control of national governments.
- **Terrorism:** It has emerged as one of the primary threats to domestic and international security and has ushered in greater convergence in security perceptions among nations.
- **Role of training service:** A number of senior officers of the three Services, past and present, in many developing countries, have been trained in India. For example, YB Tun Hussain Bin Onn from Malaysia rose to the position of Prime Minister of Malaysia.

- **Power politics:** The international stature and role of a country in the international system has a positive correlation with its military strength.

Benefits of defence cooperation to foreign policy goals

- **Enhancement to regional stability:** Measures to build capacity and capability have helped tangibly in improving the combined ability to respond to natural disasters and mitigating turbulence in neighboring countries.
- **Strengthening relations:** Defence cooperation has played a key role in strengthening India's linkages and building 'Bridges of Friendship' with countries in its neighborhood and with key global powers.
- **Capacity Building of Armed Forces**: Exposure to technology, organizations, doctrines, concepts, and working ethos of countries with a wide spectrum of technology, sharing combat experience.
- **Boost to Defence Industry:** India is beginning to co-produce advanced weapons systems with its partners and expanding its defence exports thus drawing higher financial benefits to the country.
- **Research and development:** Defence cooperation activities have improved prospects in the fields of research and technology by transfer of technology and joint development of the projects.
- **Confidence building:** Defence cooperation activities signal a political commitment to develop cooperative relations, promote military transparency, reduce misperceptions and common interests.

Challenges for Defence Cooperation to achieve foreign policy goals

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

Way forward

- **Formulation of Policy Guidelines:** An engagement matrix needs to be stipulated to ensure that defence cooperation activities are progressed and are carried out in sync 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:** An audit of defence cooperation activities, to ascertain cost vis-à-vis achievements in relation to the stipulated focus areas.
- **Integrated planning:** Ministry of external affairs and Defence must aim at expanding defence cooperation and establishing an Indian military presence around the globe to secure India's national interests.
- **Strengthening relations with neighbouring countries:** India can change course in its dealings with its neighbours and becomes more sensitive to their concerns such as delivering projects in a time-based manner to reduce China's influence.

2.5. 75 YEARS OF THE UNIVERSAL DECLARATION OF HUMAN RIGHTS

Why in news?

The year-long Human Rights 75 initiative will culminate in December 2023 marking the 75th anniversary of the UDHR.

More on news

- **2023 Theme:** Dignity, Freedom, and Justice for All
- **Objective of Human Rights 75 initiative:** Contribute to change and concrete progress on the ground on the promise of freedom, equality, and justice, and accountability.
- **Human Rights 75 initiative has three goals**
  - Promoting universality and indivisibility.
  - Looking to the future.
  - Bolstering the human rights ecosystem.

Some of the rights under the declaration

- All human beings are born **free and equal in dignity and rights.**
- No one shall be held in **slavery or servitude.**
- No one shall be **subjected to torture.**
- All are **equal before the law.**
- No one shall be subjected to **arbitrary arrest, detention, or exile.**
- **Economic, social, and cultural rights,** such as the rights to social security, health, and adequate housing.
- No one shall be subjected to **arbitrary interference with his privacy.**

Human rights and UNDR

- **These universal rights are inherent to us all,** regardless of nationality, sex, national or ethnic origin, color, religion, language, or any other status.
- **They range from** the most fundamental - the right to life - to those that make life worth living, such as the rights to food, education, work, health, and liberty.
- **The Universal Declaration of Human Rights (UDHR),** adopted by the UN General Assembly in 1948, was the first legal document to set out the fundamental human rights to be universally protected.
- It is **not legally binding.** The Declaration outlines **30 rights and freedoms that belong to all.**
- The UDHR, together with the 2 covenants **- the International Covenant for Civil and Political Rights, and the International Covenant for Economic, Social and Cultural Rights** - make up the **International Bill of Rights**.

Significance of UDHR

- **Strengthening Human Rights:** The Declaration has also provided the foundation from which a wealth of other legally binding human rights treaties has been developed.
- **Strengthen citizens:** It provides a foundation for a just and decent future for all and has given people a powerful tool in the fight against oppression, impunity, and affronts to human dignity.
- **Universal recognition:** Promises to all people the economic, social, political, cultural, and civic rights that underpin a life free from want and fear.

Challenges to Human Rights

- **Poverty**: According to UNDP's Human Development Report 2023, 1.1 billion out of 6.1 billion people (just over 18%) live in acute multidimensional poverty across 110 countries.
- **Climate change**: As of 2022, at least 8.7 million people in 88 countries and territories were living in internal displacement as a result of disasters that happened not only in 2022, but also in previous years.
- **Wars, conflicts, and terrorism**: Ukraine war and other conflicts have pushed the **number of people fleeing to more than 100 million** for the first time on record.

> **Related news**
> June 2023 marks the 30th anniversary of the Vienna Declaration and Programme of Action (VDPA).
> **About VDPA**
> - It is a **human rights declaration adopted by consensus at the World Conference on Human Rights** in 1993 in Vienna, Austria.
> - It paved a common plan for the strengthening of human rights work, as well as the establishment **of the Office of the High Commissioner for Human Rights**.
> - It affirmed the **universality, indivisibility, and interdependency of human rights.**
> - The declaration **reaffirms the principles of the UDHR.**

> **Mechanism to protect and promote Human Rights**
> - **Major Conventions**:
>   - Convention on the Prevention and Punishment of the Crime of Genocide (1948),
>   - Convention on the Rights of the Child (1989) and
>   - Convention on the Rights of Persons with Disabilities (2006) etc.
>   - 1951 Refugee Convention and its 1967 Protocol
> - **Human Rights Council**: It is tasked with **strengthening the promotion and protection of human rights** around the globe.
> - **Human Rights and the UN System:** Human rights is a cross-cutting theme in all UN policies and programmes, for examples are SDGs.
> - **UN Peacekeeping:** UN peacekeepers provide security and the political and peacebuilding support to help countries make the difficult, early transition from conflict to peace.
> - **Responsibility to Protect (R2P):** It is an international norm that seeks to ensure that the international community never fails to halt the mass atrocity crimes of genocide, war crimes, ethnic cleansing, and crimes against humanity.
> - **National Human Rights Institutions (NHRIs):** For example, National Human Rights Commission of India.

- **Food insecurity**: Right to food is a human right. WFP estimates that more than 345 million people face high levels of food insecurity in 2023. That is more than double the number in 2020.
- **Women's Rights:** As per World Economic Forum's Global Gender Report 2022, it will take 132 years to reach gender parity.
- **Racial, ethnic, and religious hatred**: There has been global rise in hatred being directed at members of racial, ethnic and religious groups, foreigners and other minorities.
- **LGBTQ+ rights:** Discrimination and violence against people in the LGBT+ community are all too common. Homophobic, and transphobic attitudes remain deeply embedded in many cultures around the world.
- **Violence by authoritarian regimes:** Examples include executions and arrests in Iran, military coup in Myanmar, rolling back of human rights by Taliban etc.

Way forward

- **Protecting and empowering individuals:** Uphold all human rights by working towards the universal abolition of the death penalty, the eradication of torture and cruel and inhumane treatment,
- **Building resilient, inclusive, and democratic societies:** Support should be provided to functioning pluralist, participatory, and representative democracies, and protecting the integrity of electoral processes.
- **Safeguarding fundamental freedoms:** Create and maintain an environment conducive to the full exercise of all fundamental freedoms both offline and online.
- **Promoting a global system:** Enhance strategic partnerships with key actors, such as the Office of the UN High Commissioner for Human Rights (OHCHR), the International Criminal Court (ICC), regional human rights systems, national human rights institutions, and the private sector.
- **Collective Responsibility:** Everyone including civil societies, private entities, government, individuals, etc should do their part to make these universal rights a living reality for every man, woman and child, everywhere.
- **Human rights education**: It must systematically penetrate each society, whether at school, in the community, in the family, in professional settings or otherwise.

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

Why in News?

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

United Nations Educational, Scientific and Cultural Organization (UNESCO)

HQ Paris, France

About Specialised agency of UN, established in 1945 to **contributes to peace and security by promoting international cooperation in education, sciences, culture, communication and information.**

Objectives :Attaining quality education for all and lifelong learning; Addressing emerging social and ethical challenges etc.

Membership :**194 countries** and **11 Associate Members**

Composition :Secretariat, headed by Director-General, implements the decisions of General Conference and Executive Board.

Awards related to UNESCO
○ **UNESCO Asia-Pacific Awards for Cultural Heritage Conservation programme** (awarded to private individuals and organizations).
○ **UNESCO Felix Houphouet-Boigny Peace Prize** awarded (to living individuals, active institutions) for promoting peace.

Other key information:
○ It is also a **member of United Nations Sustainable Development Group (UNSDG).**
○ Three UNESCO member states are **not UN members: Cook Islands, Niue, and Palestine.**
○ Three UN member states **(Israel, Liechtenstein, United States) are not UNESCO members.**

US and UNESCO	
Why did the US leave UNESCO (in 2018)?	**Reasons for US re-joining**
• In 2011, US **halted the agency's funding** in retaliation to the **induction of Palestine as member in UNESCO.**	• **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.

o In 2013, **The US lost its voting rights** over the non-payment of dues.	• **To Challenge Chinese influence:** China has replaced the US, as the largest funder to UNESCO and has started asserting its influence.
• 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**.**	• **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.
o Earlier in 1984, the **US has pulled out from UNESCO citing mismanagement, corruption and advancing Soviet interests**. Later re-joined in 2003.	

Issues faced by UNESCO

- **Mismatch in Member Priorities:** Each UNESCO member state have their own foreign policy priorities, political agenda, and perceptions of how the organization should work.
- **Financial Woes:** The withdrawal of US alone accounted to loss of 20% funding to the body, which has moved it away from its targeted goals.
- **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 its main priority.
  - o Citing the reduced focus of UNESCO other organizations like **The** Global Partnership for Education, has partly replaced UNESCO's functions on the ground.
- **Inability to Protect and Preserve World Heritage Sites:** The procedural and practical issues that the organisation faces led to destruction of cites like **Bamiyan Buddhas of Afghanistan.**
- **Selection Process of World Heritage Sites:** The Local Government should propose the names for it to be included in the list and the Heritage Committee and the body does not have its own procedure for inclusion of a site.
- **Rising Chinese Influence:** With the absence of USA, **China is indirectly pushing UNESCO** to support vocational and job training programs **in countries partnering with It on Its Belt and Road Initiative (BRI).**

> **Admission to the UNESCO**
> - A **membership of the UN** carries with it the **right to membership of UNESCO**.
> - States that are **not members of UN** may be admitted to UNESCO, upon **recommendation of the Executive Board, by a two-thirds majority vote of the General Conference.**
> - Territories that are not responsible for the conduct of their international relations are to be admitted as **Associate Members.**
>   - o Their admission and their rights and obligations are **determined by the General Conference**.

Way forward

- **More contribution from developed countries:** The developed countries should gradually increase their contributions to the body and make it financially strong to achieve its objectives.
- **Revamp in selection process of Heritage Sites:** The Heritage Committee should also push itself away from the country's submissions pertaining to Heritage site selection and structure its own team to find such sites across globe.
- **Strengthening Governance structure:** The body should enhance transparency, accountability, and efficiency in its decision-making processes and management.
- **Enhanced partnerships and collaboration**: By Fostering stronger partnerships and collaboration with other UN agencies, international organizations, civil society, academia, and the private sector.

> **Achievements of UNESCO**
> - UNESCO **preserves 1157 World Heritage sites in 167 countries** and the UNESCO designated **sites represent 10 million sq.km.**
> - The **Intangible Heritage Convention has 177 State Parties** to it and is supporting innumerable 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 (aged 15 and above) has increased from 76.7% to 86.81% between 1999-2020.
> - **The Media Development Indicators (MDIs) developed by UNESCO** provide a framework to assess 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.

2.7. NEWS IN SHORTS

2.7.1. INDIA-EGYPT

- The Indian Prime Minister recently visited Egypt.
- **India and Egypt signed a 'Strategic Partnership' agreement** which was conveyed earlier in Jan 2023 during Egypt's President's visit to India.
- Both the Governments **signed three MoUs on Agriculture, Archaeology & Antiquities and Competition Law.**
- The **Indian PM was conferred with the 'Order of the Nile' award**, which is the country's highest state honour.
- The **PM also visited Heliopolis Commonwealth War Grave Cemetery and the Al-Hakim Mosque in Egypt.**

Order of the Nile Award
- Established in 1915 by the then **Sultan of Egypt**, for **recognition of persons who have rendered useful services to the country.**
- It is considered as the highest state honour.

Heliopolis Commonwealth War Grave Cemetery
- This Cemetery in Cairo comprises of the Heliopolis Memorial (Port Tewfik, now called Port Suez) and the Heliopolis (Aden) Memorial.
- It commemorates **the sacrifices of nearly 4300 Indian soldiers who fought for Egypt and Palestine**; and Aden respectively in World War I.

Al-Hakim Mosque
- It is the **fourth oldest mosque in Egypt (1013 AD)** and the second largest after the Mosque of ibn Tulun.
- **People of the Bohra community**, who is settled in India from Egypt renovated the mosque in 1970 and have been maintaining it since then.
  - o The **Dawoodi Bohra Muslims are a sect of followers of Islam** who adhere to the Fatimi Ismaili Tayyibi school of thought, which originated from Egypt.
  - o They settled in India in the 11th century and the **seat of the sect was moved to Sidhpur (Gujarat) in 1539 from Yemen**.

To know more about India-Egypt relations, kindly refer to Article 2.2 India-Egypt of January 2023 edition of Current Affairs Magazine.

2.7.2. 75 YEARS OF UNITED NATIONS PEACEKEEPING

- Recently, the 75th anniversary of the beginning of UN Peacekeeping was celebrated.
- **The theme** of the 75th anniversary "Peace begins with me".
- A ceremony was held to posthumously award **the Dag Hammarskjold medal** to peacekeepers who died in 2022.
- **The Peace Begins with Me campaign** recognizes the service and sacrifice of United Nations peacekeepers, past and present, and the resilience of the communities they serve.
- This campaign also calls on **everyone to join the global movement for peace.**
- **For 75 years, more than two million peacekeepers have worked** to save and change lives in the world's most fragile political and security situations.

To know more about UN Peacekeeping, kindly refer to Article 2.7. India and UN Peacekeeping of January 2023 edition of Monthly Current Affairs Magazine.

2.7.3. INDIA-UN SDG COOPERATION FRAMEWORK

- **NITI Aayog and UN** have signed **Government of India - United Nations Sustainable Development Cooperation Framework** (GoI- UNSDCF) 2023-27.
- **GoI-UNSDCF 2023-2027 is built on four strategic pillars** derived from the 2030 Agenda **– People, Prosperity, Planet and Participation.**
  - o **Four interlinked pillars have six outcome areas** focusing on Health and Well Being; Nutrition and Food Security; Quality Education; Economic Growth and Decent Work; Environment, Climate, WASH and Resilience; and Empowering People, Communities, and Institutions.

- o **GoI-UNSDCF** represents **UN development system's collective offer** to India for **achievement of Sustainable Development Goals**.
- o UNSDCF has been **designated as principal planning and implementation instrument** for UN Development System at country level.

2.7.4. INTERNATIONAL CRIMINAL COURT (ICC)

- South Africa is thinking about legal options if Russian President, **the subject of a war crimes arrest warrant issued by the ICC,** did attend the BRICS summit.
  - o As a member of the ICC, South Africa would **theoretically be required to arrest Russian President if he attended.**
  - o **States Parties to the Rome Statute have a legal obligation to cooperate.**
- **About ICC (HQ- Hague, Netherlands)**
  - o It is an **international court to investigate and prosecute individuals** accused of serious international crimes: **genocide, crimes against humanity, war crimes, and aggression**.
  - o It was established by the **Rome Statute of the International Criminal Court in 1998.**
  - o It has **jurisdiction only over crimes committed** after **July 1, 2002,** when the Rome Statute entered into force.
  - o The Court **does not have its own police force. Accordingly, it relies on State cooperation, which is essential to the arrest** and surrender of suspects.
  - o **There are 123 countries party to the Rome Statute**.
    - ✓ **Countries that never signed the treaty**: **India**, China, Iraq, North Korea, Saudi Arabia, Turkey, etc.
    - ✓ **Countries signed but not ratified the treaty**: Egypt, Iran, Israel, Russia, the United States, etc.

SOURCES OF CASES BEFORE THE COURT

Member country can refer situation within its territory to the court

UN Security Council can refer to a situation- in this all–UN Member States must cooperate regardless of party status

Prosecutor can initiate an investigation into member state

2.7.5. UNIVERSAL POSTAL UNION (UPU)

- Cabinet approved **establishment of a Regional Office of UPU** in New Delhi.
- **Established in 1874,** UPU is the **second oldest international organization** worldwide.
  - o **HQ:** Berne, Switzerland.
  - o **It has 192 member countries** (including **India**).
- It is the **primary forum for cooperation between** the postal sector entities.
- It **sets the rules for international mail exchanges** and makes **recommendations to stimulate growth in mail, parcel and financial services** volumes.

2.7.6. ASIA PACIFIC PLANT PROTECTION COMMISSION (APPPC)

- APPPC unanimously **elected India as chair of Standing Committee on Integrated Pest Management (IPM)** for biennium 2023-24.
- **APPPC** convened **for the first time in 1956.**
- It **administers Regional Plant Protection Agreement for Asia and the Pacific,** approved in 1956 by the **Food and Agriculture Organization (FAO)** Council.
- **A total of 25 countries** (including India) **are members** and APPPC **meets at least once every two years.**
- **Objectives are:** promoting development of regional plant protection systems, Assistance to develop effective plant protection regimes, Setting standards for phytosanitary measures etc.

2.7.7. COMBINED MARITIME FORCES (CMF)

- **UAE withdrew its participation** in CMF.
- **Headquartered in Bahrain**, CMF is a **multinational maritime partnership** (**India also a member**), that focuses on **counter-narcotics, counter-smuggling, suppressing piracy, training** etc.
  - o CMF **also respond to environmental and humanitarian incidents**.
  - o **Combined task forces of CMF** include **Maritime Security Operations outside Arabian Gulf**, Maritime Security Operations **inside Arabian Gulf**, **Red Sea** maritime security etc.
- CMF is **Commanded by** a **U.S. Navy Vice Admiral**.

2.7.8. NORTHERN SEA ROUTE

- **Russia has announced to invest $24 bn** to develop Northern Sea Route.
- The Northern Sea Route (NSR), or the Northeast Passage (NEP), **connects the eastern and western parts of the Arctic Ocean.**

- o The NSR runs from the **Barents Sea, near Russia's border with Norway, to the Bering Strait between Siberia and Alaska.**
  - o NSR is **different** from the **Northwest Passage** which is a **series of possible shipping routes** connecting the **Atlantic and Pacific Oceans** through the **Canadian Arctic.**
- The entire route lies in Arctic waters and within **Russia's exclusive economic zone.**
  - o Due to Climate Change, NSR in Russia is **becoming more accessible**. Usually the route only opens for **two months annually**.
- **Significance**
  - o **Energy and time savings** compared to the normally used route vie Suez Canal are about 30-40%.
    - ✓ It is **one-third of the distance of the traditional route through the Suez Canal.**
  - o **Piracy risk is non-existent.**
  - o Easier to **explore, exploit and transport natural resources** of the region.
- **Challenges:**
  - o Russia exercising its sovereignty over NSR and **denial of the principle of freedom of navigation** might lead to **geo-strategic conflict.**

- o **Arctic fog will reduce sailing time.**
- o **Environmental risks and increased operating costs.**

NORTH SEA ROUTE

3. ECONOMY

3.1. STATES' CAPITAL EXPENDITURE

Why in 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

- **Genesis:** Such a scheme was **first instituted by the Ministry of Finance in 2020-21** in the wake of the COVID-19 Pandemic.
- **Objective:** In view of a **higher multiplier effect of capital expenditure** and in order to provide a **boost to capital spending** by States (announced in the Union Budget 2023-24).
- **Assistance:** Under the scheme, special assistance is being provided to the State Governments in the form of a **50-year interest-free loan**.

Other Parts of the Scheme

Part-II	Incentives for Scrapping Old Vehicles
Part-III	Urban Planning Reforms
Part-IV	Financing Reforms in Urban Local Bodies
Part-V	Housing for Police Personnel within the police station area
Part-VI	Construction of Unity Malls to promote national integration
Part-VII	Children and Adolescents' Libraries and Digital Infrastructure
Part-VIII	Incentive for implementing timely release of CSS funds by state governments to vendors and beneficiaries

- **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** (See infographic).

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.
  - Their **capex growth was flat in FY23** compared with **29% growth in FY22**.
- **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%),** followed by Rajasthan and Haryana.
- **Capex Target:** According to a study by the Bank of Baroda, 25 states have **cumulatively achieved 76% of their capex target in FY23**.

Significance of Capex by states

- **Multiplier effect:** Capital spending can induce **high multiplier benefits**, crowd in private investment and ease critical supply constraints.
  - Combined capex spending is more than that of the Centre and thus they play a significant role. In FY22, **states spent ₹10.5 trillion on capex** compared to the Centre's ₹8.4 trillion.
- **Future Growth:** They contribute to **future economic growth** through the creation of employment and capacity development.
- **Inclusive Growth:** A sustained improvement in the quality of public expenditure, with a focus on infrastructure, research and development, health, education and other social services can play a conducive role in **promoting inclusive and sustainable economic growth**.
- **Positive Impact on other States:** The impact of capex in one State can have **positive externalities** on that of others.

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.
  * The election cycle is also fraught with **freebies and populist promises** which results in wasteful expenditure.

> **Encouragement to states for capex**
> * The Centre is offering states a **50-year interest-free loan** for capex under the scheme **'Special Assistance to States for Capital Investment 2023-24'.**
> * The Centre has also been **releasing tranches of tax devolution early** to help states front-load capex rather than wait till the end of the fiscal.
> * The Central government has **regulated states' borrowings under Article 293** of the Constitution from FY23.
>   * The Centre **tightened borrowing norms** for the states by **including off-Budget liabilities as part of the states' annual net borrowing ceiling.**

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), especially into technology; telecommunication; banking, financial services and insurance (BFSI); retail and consumer-facing services.
* **Fiscal Prudence through Finance Commission:** The **16th Finance Commission** can be given a mandate to look into the issue of freebies and how to **disincentivise states from indulging in such fiscal imprudence**.
* **Need for a Council:** There is a need for a **supervisory body** such as an **Expenditure Council**, whose role would be to formulate guidelines and foster agreement on the best practices for State governments in terms of resource allocation.
* **Increase in Revenue Sources:** States need to **raise their revenue generation capacity** and can tap alternative sources such as electricity and mining for this.
* **Rebalancing Expenditure:** States with sub-optimal expenditure patterns like low social sector spending, low capital expenditure and high committed expenditure relative should **undertake corrections through rationalisation/ rebalancing of expenditure**.
* **Capex Buffer:** States must **mainstream capital planning** and consider **creating a capex buffer fund** during good times when revenue flows are strong so as to maintain expenditure quality and flows through the economic cycle.

3.2. URBAN CO-OPERATIVE BANKS (UCBS)

Why in 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.
* **FSWM Criteria:** To avail this facility, UCBs have to get the policy approved by their board and comply with the **Financially Sound and Well Managed (FSWM) Norms.**
  * RBI terms select **UCBs as FSWM** subject to fulfilment of **prescribed criteria** (refer infographic).
  * The branch expansion **under the prior approval route** as per the existing framework will also continue.

- **One-time settlements:** Co-operative banks through board-approved policies may provide 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

Though **not formally defined**, it refers to primary cooperative banks located in **urban and semi-urban areas**. There are **about 1,514 UCBs** in the country.

- **Regulation:** In 2020, Government made **changes to The Banking Regulation Act, 1949** and brought cooperative banks under the **direct supervision** of the RBI.
  - The amended law has given RBI the power to **supersede the board of directors** of cooperative banks after consultations with the **concerned state government**. Earlier, it could issue such directions **only to multi-state cooperative banks.**
  - To strengthen the regulatory framework and financial soundness of UCBs, a four-tier structure categorization was introduced. *(Refer infographic).*
- **Minimum net worth (MNW)**: Tier 1 UCBs operating in a single district should have **minimum net worth of ₹2 crore.** For all other UCBs (in Tier 1, 2 and 3) tiers, the minimum net worth **should be ₹5 crore.**
- **Capital to risk weighted assets ratio (CRAR):** Tier 1 UCBs have to maintain a **minimum CRAR of 9% of Risk Weighted Assets (RWAs)** on an ongoing basis. Tier 2 to 4 UCBs have to maintain a **minimum CRAR of 12% of RWAs** on an ongoing basis.
- **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.

Issues with UCBs

- **High gross non-performing assets (GNPA):** As per RBI FSB report (2023), Gross NPAs ratio for UCBs **was 8.7%** whereas it is just **3.9% for Scheduled Commercial Banks (SCBs).**
  - Also**, increasing competition** from SCBs as well as Small Finance Banks (SFBs) and Payments Banks.
- **Governance issues:** Vulnerability stemming from **internal weaknesses**, including the inability to prevent frauds.

Criteria for FSWM status

- CRAR shall be at least 1 percentage point above the minimum CRAR applicable to an UCB
- Net NPA of not more than 3%
- Net profit for at least 3 out of the preceding four years subject to it not having incurred a net loss in the immediate preceding year
- No default in the maintenance of CRR / SLR during the preceding financial year
- Sound internal control system with at least two professional directors on the Board
- Core Banking Solution (CBS) fully implemented
- No monetary penalty imposed on account of violation of RBI guidelines during the last two financial years

Categorization of UCBs

- **Tier 4**: UCBs with deposits **more than 10,000 crore.**
- **Tier 3**: UCBs with deposits **more than 1000 crore and up to 10,000 crore.**
- **Tier 2**: UCBs with deposits **more than 100 crore and up to 1000 crore.**
- **Tier 1**: All **unit UCBs and salary earners' UCBs** (irrespective of deposit size), and all other UCBs having **deposits up to 100 crore.**
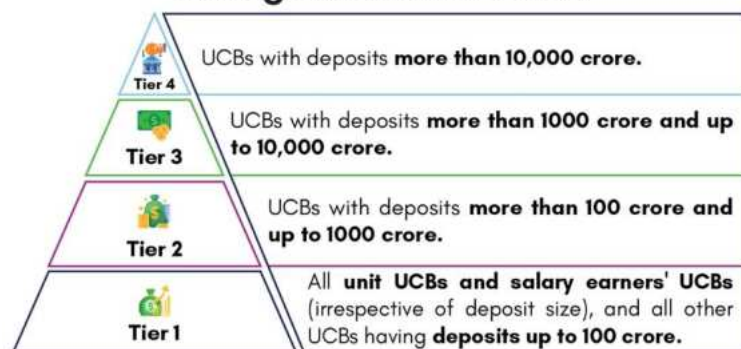
Do YOU KNOW?

- The origins of the urban cooperative banking movement in India can be traced to the **close of nineteenth century** when such societies were set up in India.
- Inspiration had come from success of the experiments related to the **cooperative movement in Britain** and the cooperative credit movement in **Germany.**

- o For instance, **collapse of Punjab and Maharashtra Cooperative Bank** in 2019 following grave financial irregularities.
- **Inability to adopt best practices**: Low capital base doesn't allow them to deploy requisite resources in **either manpower or in technology.**
  - o The **s**tate-of-the-art technology adopted by new players like fintech entities can **disrupt the niche customer segment** of the UCBs.
- **High influence of top management**: They are almost like a **promoter-driven company** wherein the top management, more **often the chairperson**, has **significant influence over all the matters.**
- **High cost-income ratio:** Most of the UCBs fail to operate efficiently and their **cost-income ratio remains on a higher side**. The average cost-income ratio of UCBs is **roughly 10% higher** as compared to commercial banks.
  - o A lot of urban cooperatives are localised with **processes and products** designed to meet local needs.

Importance of UCBs: Large untapped area of expansion; Predominant domestic orientation; Good network at grassroots level; Tailored to local needs; Massive financial inclusion quotient; Helps in economic upliftment of the weaker sections; Offers loans at reasonable interest rates

- **Face high credit, market, and liquidity risk**: RBI's Financial Stability report (June 2023) found that a few UCBs are highly vulnerable to-
  - o Credit risk (default risk and concentration risk),
  - o Market risk (interest rate risk in trading book and banking book) and
  - o Liquidity risk
- **Low share in banking sector**: Market share of UCBs in the banking sector has been low and stands at **around 3%.**
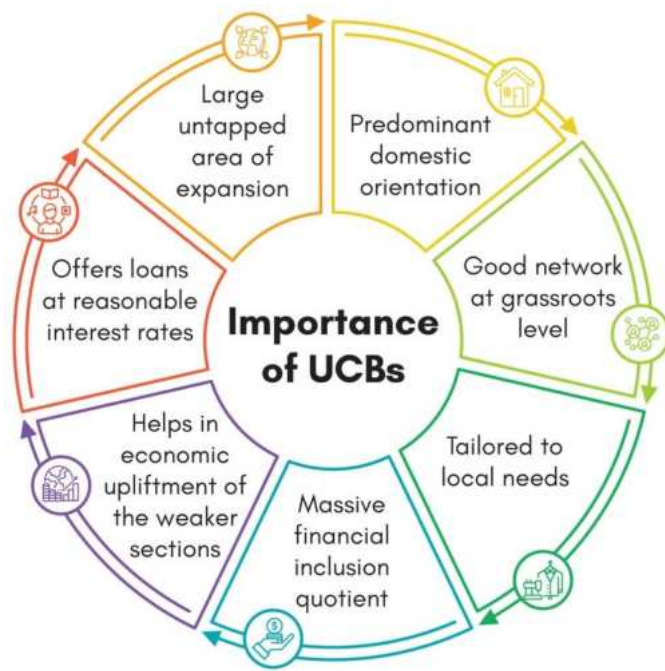
Other Initiatives taken for overcoming issues of UCBs

- **Supervisory Action Framework (SAF):** It seeks **expeditious resolution** of UCBs experiencing financial stress.
  - o The SAF entails 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 had 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 formation of an UO for the UCB sector. The approval inter-alia permits UCBs to **subscribe to capital of the UO** on voluntary basis.
  - o 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.**
- **Other steps:**
  - o UCBs were permitted to provide **door-step banking services** to their customers.
  - o **Individual housing loan limits** for Urban Cooperative Banks have also been **more than doubled**.

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 **achievement of the vision- 'Sahakar se Samridhi'**.

3.3. CRITICAL MINERALS

Why in 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),** each designated as critical based on their limited availability in India's geological reserves.
  - REE include **15 Lanthanides** (**atomic numbers 57** — which is Lanthanum — **to 71** in the periodic table) plus **Scandium (atomic number 21) and Yttrium (39)**. REEs are classified as Light REE (LREE) and Heavy REE (HREE).
  - The criticality of minerals is **judged mainly by two parameters** (refer image).
- The list will serve as a **guiding framework for policy formulation**, **strategic planning, and investment decisions** in the mining sector.
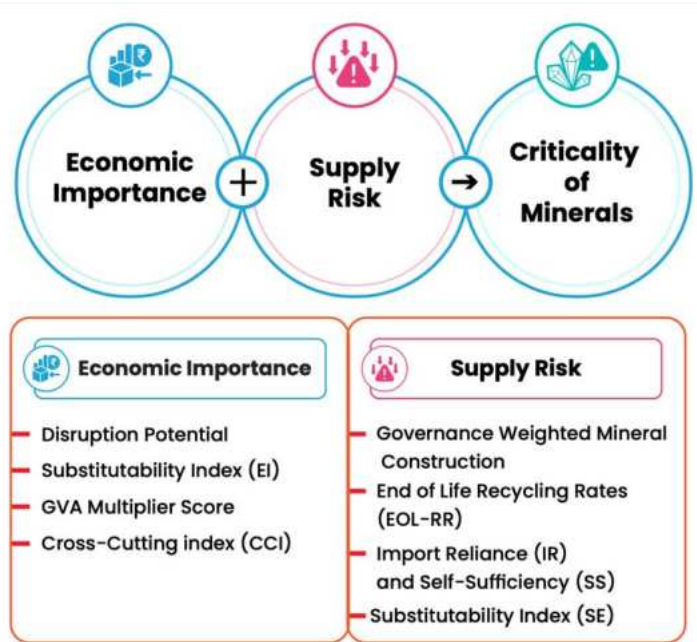
What are Critical Minerals?

- 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, computers to batteries, electric vehicles** and green technologies like solar panels and wind turbines.
- Based on their individual needs and strategic considerations, **different countries create their own lists**.

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. There are also some critical minerals of which there exist no known resources within the country.
- **Supply chain Issues:** Geographical **concentration** of extraction or processing **in a few 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, while more than fourth fifths are processed there.

- **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 that are paid 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** and become a global manufacturing hub, including for electric vehicles.
- **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** globally.
- **Mines and Minerals (Development and Regulation) Amendment Bill 2021:** It ensures **transparency in the auction process** of mines and **enhances domestic and foreign investment** in mining sector.
- **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** and established a **Centre of Excellence for Critical Minerals.**
  - **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:** To ensure a continuous supply of critical minerals, reduce dependence on China and develop resilience to global supply chain shocks such as the Russia-Ukraine war, COVID-19 etc. a diversified supply chain is necessary.
- **National Framework:** The government needs to 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.

3.4. SEMICONDUCTOR INDUSTRY IN INDIA

Why in 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

- **Ministry:** The **Ministry of Electronics and Information Technology (MeitY)** has launched the **Semicon India programme** for the development of a **sustainable semiconductor and display ecosystem** in 2021.
- **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.
  - According to the India Electronics and Semiconductor Association (IESA), **semiconductor consumption in India** is growing at a rate of 15.1%.

4 Schemes of Modified Semicon India Programme
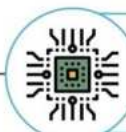
Modified Scheme for setting up of Semiconductor Fabs in India
Objective: Attract large investments for setting up semiconductor wafer fabrication facilities to strengthen electronics manufacturing ecosystem.

Modified Scheme for setting up of Display Fabs in India
Objective: Attract large investments for setting up display fabrication facilities to strengthen electronics manufacturing ecosystem.

Modified Scheme for setting up of Compound Semiconductors / Silicon Photonics / Sensors Fab/ Discrete Semiconductors Fab and Semiconductor ATMP/OSAT facilities in India
Objective: To attract investments for setting up different semiconductor fabrication facilities.

Design Linked Incentive (DLI) Scheme
Objective: Nurturing 100 domestic companies of semiconductor design and achieving significant indegenization in semiconductor and electronic products.

- **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 given the **increasing penetration of emerging technologies**.
- **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)** and create an enabling environment for the industry to compete globally.
  - One of the main strategies of NPE 2019 is to **facilitate 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**.

o   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

*   **Infrastructure requirements:** There are often **challenges in meeting the infrastructural requirements** of a cluster of semiconductor manufacturing fabs such as 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 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.
*   **Need for the ecosystem:** Beyond locating and building structures, fabs require a **variety of high-purity gases and wafers** to fabricate the chips. Presently, India has to **import many of these raw materials** from external sources.

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.

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

Why in 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**
    o   **Identify** emerging technologies/areas of future relevance for the energy sector.
    o   **Create a vibrant & innovative ecosystem** and **provide a common platform** for energy Sector Stakeholders for various tasks.
    o   **Support pilot projects** of indigenous technologies and facilitate their commercialization.
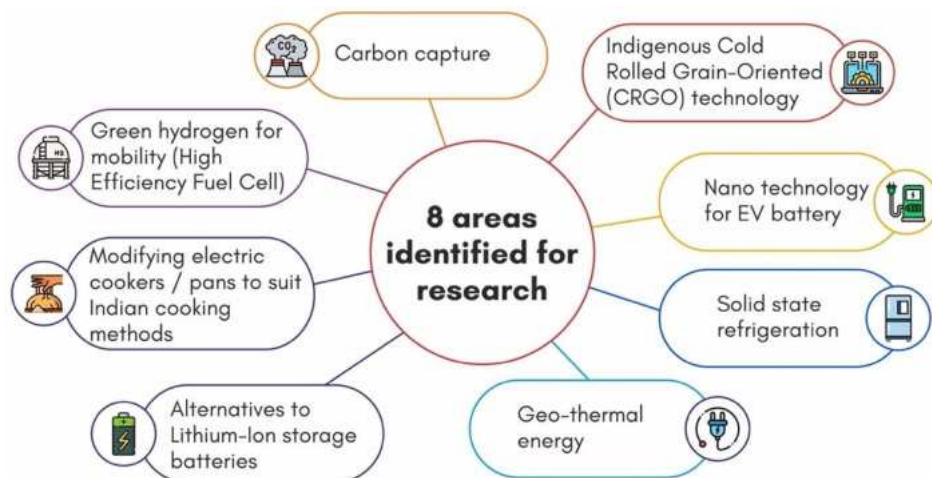
- o **Leverage foreign alliances** and partnerships to accelerate R&D.
  - o **Make our Nation among the leading Countries** in the Power System.
- **Funding: Ministry of Power, Ministry of New and Renewable Energy and the Central Public Sector Enterprises** under them, and also Centres' budgetary resources.
- **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**
  - o **The Technical Scoping Committee** chaired by Central Electricity Authority (CEA)
    - ✓ **Role: Identify and recommend potential** technologies for development, monitoring of approved projects, etc.
  - o **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.**

Significance of MAHIR

- Helps to **achieve net zero emission**
- Help in **meeting growing energy demand**
- Promote initiatives like **Make in India and Start-up India**
- Contribute towards **achieving the United Nation's Sustainable Development Goals (SDGs)**

Some of the emerging technology in power sector

- **Air Gen:** Capable of generating electricity from the water vapour that is naturally present in the atmosphere.
- **Micro grids:** Local energy grids which can operate freely or by staying connected to a bigger conventional grid
- **Powerwalls:** Designed to store your clean energy, so you can use it anytime you want.
- **Vertical wind turbines:** Capture the waves created by passing vehicles

Other initiatives recently launched in power sector

Initiatives	Description
Financial incentives to states for reforms in the power sector	• The **Ministry of Finance** has allowed **states additional borrowing ranging from 0.25% to 0.5% of the Gross State Domestic Product (GSDP) annually** in lieu of reforms in the power sector. • The initiative was announced in **Union Budget 2021-22 for a four-** **Mandatory reforms for fulfilling the eligibility by the states** Progressive **assumption of responsibility for losses of public sector DISCOMs** by the State Government **Transparency in the reporting** of financial affairs of power sector Timely rendition of financial and energy accounts and **timely audit.** **Compliance** with legal and regulatory requirements.

	year period from 2021-22 to 2024-25. • This additional financial window is **dependent on implementation of specific reforms** (refer to the infographics) **in the power sector by the States.**

Market Coupling	• The Union Ministry of Power has directed the Central Electricity Regulatory Commission (CERC) to initiate the process **of "market coupling" of power exchanges**, in order to have uniform prices across multiple exchanges.
	• Market coupling refers to the forming of **a single power trading entity owned by the government**.
	   ○ Under it, buy and sell bids from **all power exchanges in the country will be aggregated** and matched to **discover a uniform power price or market clearing price (MCP).**
	   ○ **At present, MCPs are different** in three **power exchanges that India has** - Indian Energy Exchange Limited (IEX), Power Exchange India Limited (PXIL) and Hindustan Power Exchange Limited (HPX).
	   ○ **IEX currently enjoys a monopoly status** with almost 90% share in the electricity market.
	• **Market coupling will pave the way for**
	   ○ **"One Nation, One Grid, One Frequency, One Price" framework** by implementing the **Market-Based Economic Dispatch (MBED) mechanism**.
	      ✓ MBED mechanism envisages **centralised scheduling for dispatching the entire yearly consumption of electricity**, both at the inter-state and intra-state levels, of around 1,400 billion units.
	   ○ **The implementation of electricity derivatives** in the market.

Guidelines for Resource Adequacy Planning Framework	• The Guidelines, issued by the Union Ministry of Power in consultation with Central Electricity Authority (CEA), have been framed under the **Rule 16 of Electricity (Amendment) Rules, 2022**.
	• The guidelines aim to establish a Resource Adequacy framework for power procurement by distribution licensees, **ensuring a reliable operation of the power system across all timeframes**.
	   ○ **DISCOMs** have **statutory obligation to ensure procurement** of sufficient capacity **to meet demand in their area.**
	• Guidelines are a major reform to provide consumers **24 x 7 reliable power supply at optimized electricity tariffs.**
	• **Key highlights of the guidelines**
	   ○ **Provides a time-bound and scientific approach to assess** the electricity **demand** for the future and to take **advance action** to procure it.
	      ✓ The **new generation capacities, energy storage and other flexible resources**, needed to reliably meet future demand growth at optimal cost, **will be assessed well in advance.**
	   ○ The capacity which the DISCOMs tie up shall be **a judicious mix of long/medium- and short-term contracts to ensure security of supply** to their consumers at least cost.
	      ✓ The share of **long-term contracts is suggested to be in the range of 75-80%.**
	      ✓ The **medium–term contracts** should be in range of **10-20%,** while the **rest** of the power demand can be met through **short-term contracts**.
	   ○ **Over reliance on the electricity market is to be avoided**.

Electricity (Rights of Consumers) Amendment Rules, 2023	• Central Government amended Electricity (Rights of Consumers) Rules, 2020 which were **notified by the government to provide reliable services** and **quality electricity to consumers**.
	• **Rules seeks to ensure that**
	   ○ **New electricity connections**, refunds and other services are **given in time-bound manner.**
	   ○ **Willful disregard to consumer rights** results in **levying of penalties on service providers** and payment of compensation to consumers.
	• Ministry of power has now **introduced Electricity (Rights of Consumers) Amendment Rules, 2023** to bring following changes:

Changes	About
Introduction of Time of Day (ToD) Tariff	• **Rather than being charged** for electricity at **same rate at all times of the day, price** for electricity **will vary according to the time** of day. ○ **Power Tariff to be 20% less during Solar Hours** (duration of eight hours in a day as specified by State Electricity Regulatory Commission), **10%-20% Higher during Peak Hours.** • It will enable consumers to **reduce electricity bills** and will help **power system to use resources more efficiently**.
Amendment made in smart metering provision	• Post installation of a smart meter, **no penal charges will be imposed on a consumer based on maximum demand** recorded by the smart meter **for the period before installation date.**

3.6. NATIONAL ELECTRICITY PLAN (NEP)

Why in news?

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

More about news

- As per **Electricity Act 2003**, CEA is required to prepare a NEP in accordance with **National Electricity Policy** and notify such Plan **once in five years.**
- NEP includes the **review of last five years (2017-22)**, a detailed plan for **next five years (2022-27)** and prospective plan for 2027-32.
- **First NEP** was notified in 2007.

Key highlights of NEP

- **Rising energy demand:** India has witnessed electricity demand **increased at CAGR of around 4.1 % during the last decade** and it is projected that electricity demand is likely to grow at CAGR of 7.18 % for 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 **CO2 emission rate from coal-based stations** has been **on a declining trend** indicating improvement in efficiency of power generation from coal-based power plants.
- **Contribution of Renewable Energy (RE) sources**: Installed capacity of RE sources is expected to contribute **around 35% in the total energy mix by 2026-27** and **around 44% by 2031-32.**
- **Energy efficiency and conservation**: India has achieved a **reduction in emission intensity of GDP by 24%** over the period 2005-2016 and now committed **to reduce emission intensity by 45 % in 2030** against the levels of year 2005.

Transforming the Power Sector in India

From power deficit to power surplus by addtion of over **175 GV of** generation capacity in the past 9 year

4th globally in Renewable Energy Installed Capacity, with **43% of its total installed capacity from renewables**

2.86 crore houses connected with electricity under SAUBHAGYA

100% village electrification under DDGJY

Procured price of LED bulbs decreased by almost 90% between 2014 and 2019 under UJJALA

Distribution losses of DISCOMS reduced from 21.5% to 16.5% under RDSS

ALL INDIA INSTALLED CAPACITY AS ON 31.03.2022 (ALL VALUES ARE IN MW)

- RES, 156607.90, 39%
- Coal, 204079.50, 51%
- Lignite, 6620.00, 2%
- Nuclear, 6780, 2%
- Gas, 24899.51, 6%
- Diesel, 509.71, 0%
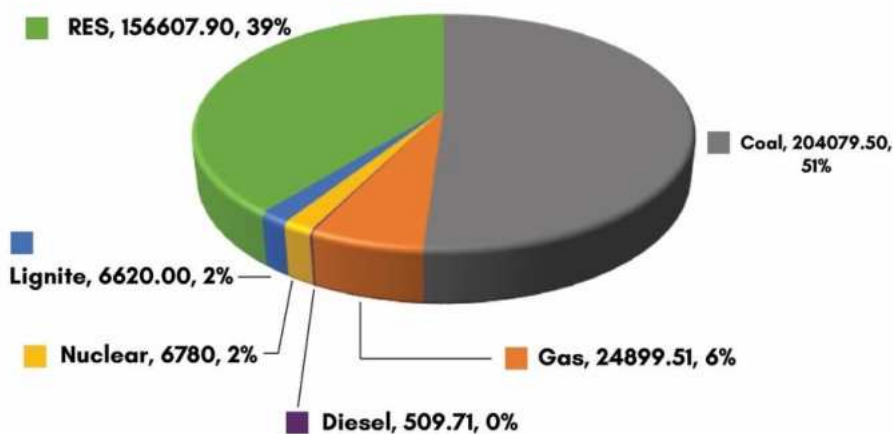
ALL INDIA RE INSTALLED CAPACITY(MW) AS ON 31.03.2022

- Large Hydro, 46722.52 MW, 30%
- Solar, 53996.54 MW, 34%
- Small Hydro, 4839.39 MW, 3%
- Biomass, 10682.36 MW, 7%
- Wind, 40357.58 MW, 26%
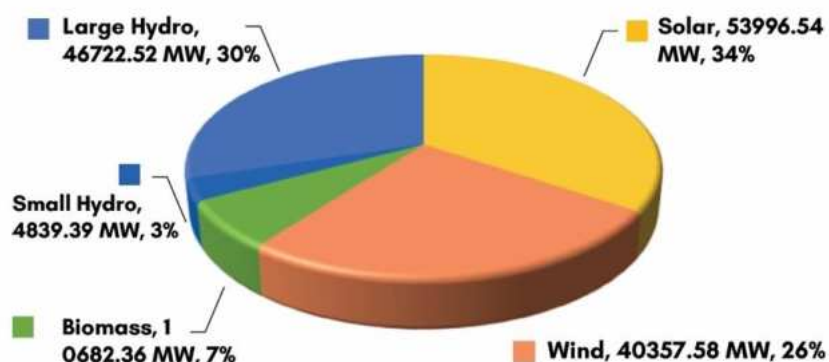
TOTAL: 156607.90 MW

- **Power generation resources**:
  - **Conventional Sources**.
  - **New and Renewable Energy Sources**.
  - **Storage Sources** - Pumped Storage Systems, Battery energy Storage System, Green Hydrogen etc.
    - ✓ **Energy storage technologies** like Flywheel Energy Storage Systems, Compressed Air Storage Systems, Hydrogen, etc.

Challenges highlighted by NEP

- **Challenges with the integration of renewable energy sources with the grid**:
  - **Intermittency:** Temporal variability and output uncertainty of Solar and Wind generation **makes the supply uncorrelated with 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 depending on the grid requirement.
  - **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 hydro power plants.

> **Various initiatives for growth of Power Sector**
> - **Competitive Federalism:** State Energy Efficiency Index to help the states in monitoring their programmes
> - **Universal Electrification:** Deen Dayal Upadhyaya Gram Jyoti Yojana, Pradhan Mantri Sahaj Bijli Har Ghar Yojana, Unnat Jyoti by Affordable LEDs for All.
> - **International Cooperation:** SAARC framework on energy cooperation, MoU for BIMSTEC Grid interconnection.
> - **Energy Conservation:** Enhancing energy efficiency in Industries– Implementation of Perform Achieve and Trade (PAT)
> - **Carbon Market:** Bureau of Energy Efficiency (BEE) announced a national carbon market called the "India Carbon Market (ICM)
> - **Growth of Renewable Energy:** International solar alliance, One World, One Sun, One Grid (OSOWOG), PM KUSUM, Green Energy Corridors.
> - **Fly Ash Utilisation:** Mandatory use of flyash based products in schemes or programmes e.g., Pradhan Mantri Gramin Sadak Yojana, Swachh Bharat Abhiyan, etc.

- **Issues with carbon capture techniques:** Such as high cost, large scale deployment, etc.
  - **Technologies for conversion of CO2** to useful products are also very costly and **proprietary of 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**: In India **solar and wind resources are complementary to each other** as wind is stronger during evening and night, when there is limited input from solar power. Hybridization reduces the 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**. It enables excess energy to be stored for consumption at a more convenient time.
- **Demand Response:** Demand side management measures encourage the customers to maximize the use of variable renewable energy sources while the supply is naturally high.
  - For example, when wind and solar PV are producing more than the demand, demand response can incentivize consumers to use more power during that time through appropriate price signals of low rates, thus helping shift the load and ensuring better utilization of generation resources.
- **Promotion of Off-grid renewable sector**: As it is much more competitive with conventional power as it avoids investment in transmission to remote location.

- o E.g., Rice Husk gasifiers-based electricity generation is one such model.
- **Cooperative federalism:** By ensuring more alignment between **the Central Government and the States** on key energy efficiency related activities.
- **Private investment:** Measures should be taken to **attract private investors** and more funds should be allocated to support **research and innovation** activities in renewable energy sector.
- **Adoption of low water use technologies:** In solar PV, innovations **methods like dry-cleaning/ robotic cleaning of panels/modules** need to be encouraged with the objective of reducing the water usage.

3.7. PRODUCTION-LINKED INCENTIVES (PLI) SCHEME

Why in news?

The government has decided not to launch production-linked incentives (PLI) scheme for new sectors and will assess the need for course correction for some sectors.

About PLI scheme

- First introduced in March 2020, PLI is a special incentive scheme for producers to promote manufacturing in multiple sectors.

Major objectives of PLI Scheme: Transform India into a manufacturing hub by creating global champions; Increase investments in manufacturing and innovation; Achieve self-reliance with globally competitive domestic manufacturing

  - o The incentives are linked to the performance of the organisation i.e., the government provides **incentives on incremental sales**.
- PLI scheme is built on the **foundation of multiple sectors** with an incentive **outlay of Rs. 1.97 lakh crore** (about US$ 26 billion) to strengthen their **production capabilities and help create global champions.**

Benefits of PLI scheme

- **Strengthen manufacturing sector:** Since the incentives are directly proportional to **production capacity/ incremental turnover**, it is expected to have a direct impact on **capacity expansion**.

Sectors under PLI Scheme

  - o PLI can significantly **restructure India's domestic manufacturing**, push its share in the GDP to **25 per cent**.
  - o It is also expected to bring improvements in **industrial infrastructure**, benefiting the **overall supply chain ecosystem**.
- **Capital expenditure:** The implementation of the PLI scheme will lead to a potential capital expenditure (capex) of **Rs 2.5-3 lakh crore** over the scheme period.
  - o It will **account for 13-15% of average annual investment spending** in key industrial sectors.
- **Spur green investment**: **Nearly 55%** of the scheme expected to be in green sectors such as electric vehicles, solar photovoltaics etc.
- **Self-reliance and increase in exports:** PLI schemes intend to plug **the gap between the highly skewed Indian import-export basket**, which is mainly characterized by **heavy imports** of raw materials and finished goods.
  - o It will help in **offsetting the effects of geopolitical conflicts** and their consequent impact on **food, fertilizer, and crude oil prices.**
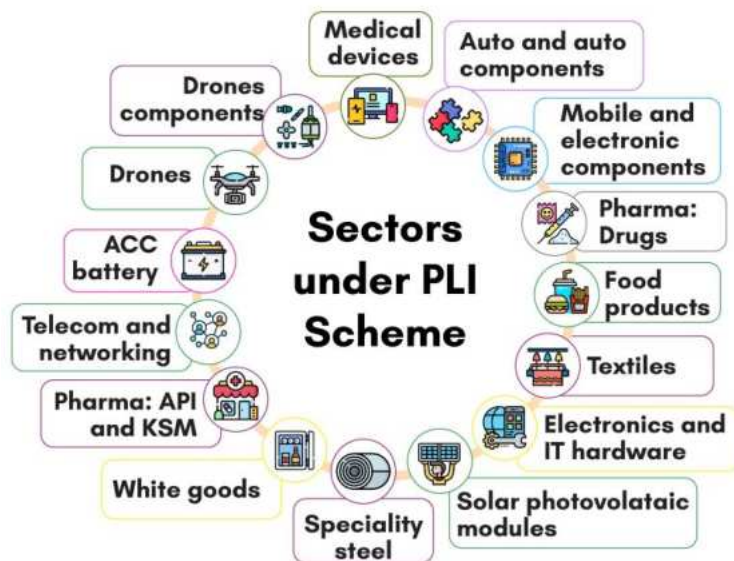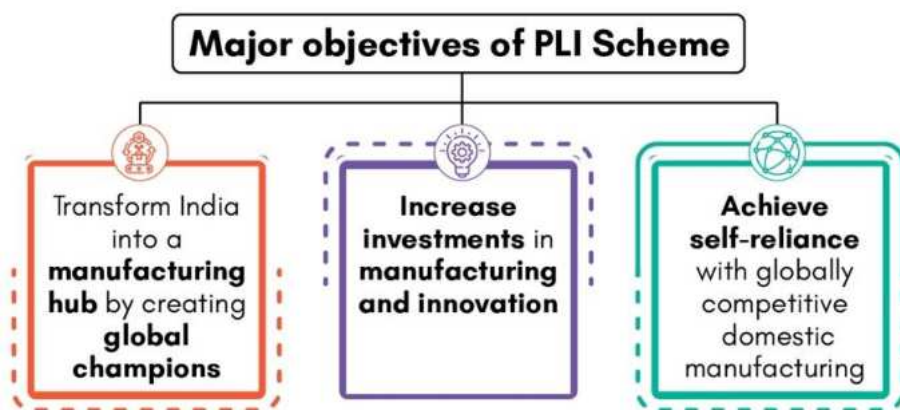
- **Faster adoption of technology**: For e.g., in telecom and networking products, where **timely intervention** by the scheme will enable **faster adoption of 4G and 5G products** across India.
- **Reducing regional imbalances in development:** PLI scheme enables smooth implementation of **region-specific incentives** to promote **industrial development** in underdeveloped or backward regions.
- **Others:**
  - PLI scheme will utilize India's abundant human capital and **enable upskilling** of labour force.
  - It will replace technologically obsolete machinery and make the manufacturing sector **globally competitive.**
  - Better productivity will create a **thrust in free trade agreements** for better market access.

Challenges to PLI scheme

- **Ambiguity around the incentives**: The manner in which incentives are to be awarded **remain ambiguous**. There are **no set criteria or common parameters** for consideration for giving these incentives.
- **Fail to capture critical factors**: Efficacy of manufacturing depend on multiple **factors** like **raw materials**, size of the **domestic market**, and relationship between upstream and downstream manufacturers etc.
  - Thus production subsidies to scale **sector specific manufacturing** will not work until other critical factors shaping the ecosystem are **understood and factored in.**
  - Also, some of the schemes have been designed to accommodate **as many players as possible** (over 50 in many cases), **rather than a few champions.**

Achievements of PLI scheme (as per Department for Promotion of Industry and Internal Trade)

- A significant increase of 76% in FDI in the Manufacturing sector in FY 2021-22
- Exports boosted by Rs 2.56 Lakh Crore
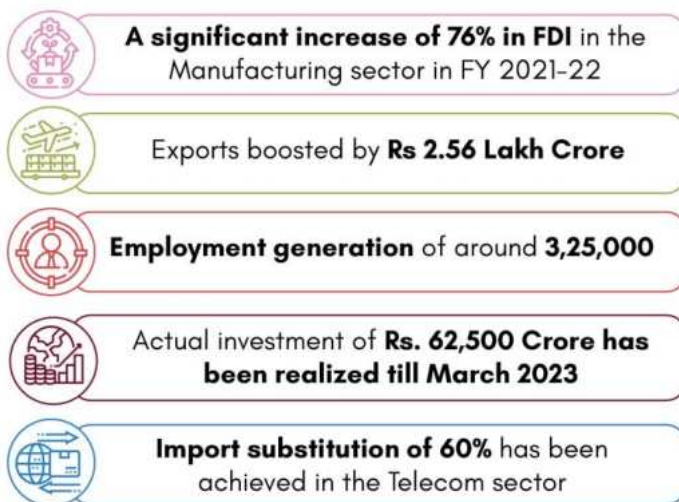- Employment generation of around 3,25,000
- Actual investment of Rs. 62,500 Crore has been realized till March 2023
- Import substitution of 60% has been achieved in the Telecom sector

- **May create subsidies-dependent manufacturing industry:** Withdrawing of these benefits at a later stage may ultimately lead to **industrial inefficiencies** and engender a **decline in productivity** both at sectoral and firm-level.
- **Greater orientation towards larger firms:** Beneficiaries under the scheme such as automobiles, electronics and technical textiles are **largely constituted by big firms**.
  - This is not representative of the actual configuration of the Indian industrial structure, which is **largely composed of MSMEs**.
- **Difficulties in evaluation:** The **lack of a centralised database** that captures information like increase in production or exports make the evaluation process difficult.
  - This information ambiguity impacts transparency and can lead to malfeasance, further **widening the fault lines and weakening the policy structure.**

Way Forward

- **Enhanced collaboration:** There should be dynamic collaborations between **industry players, research institutions, and academia** to foster innovation, research, and development.
- **Strengthening institutional mechanism**: For targeted implementation, a **strong, technically evolved**, institutional mechanism **accountable** to the highest levels of governance is necessary.
- **Ensure smooth implementation**: To ensure streamlined and efficient implementation of the PLI scheme, steps like **reducing bureaucratic hurdles and simplifying application processes** can be considered.
- **Periodic evaluation:** Regular monitoring and evaluation of the PLI scheme's outcomes can h**elp identify areas for improvement** and make **necessary adjustments** to achieve the goal.
- **Focus on MSMEs: Separate provisions** can be created within the PLI scheme to **incentivize Micro, Small, and Medium Enterprises (MSMEs)**.

- This can be achieved by introducing lower investment thresholds, and **dedicated support mechanisms** for MSMEs to participate and benefit from the scheme.
- **Complement with other reforms**: PLI scheme should be followed by measures to further **improve the business environment** in the country through a **transparent and predictable** policy framework.
  - Alongside the PLI scheme, there should be a focus on supporting **skill development programs and technology upgradation initiatives.**

3.8. FERTILISERS SECTOR IN INDIA

Why in news?

Recently, Cabinet Committee on Economic Affairs (CCEA) has approved a unique package of innovative schemes for farmers with a total outlay of Rs.3.70 Lakh crore.

INDIA'S FERTILISER SECTOR

2nd largest fertiliser consuming country after China.

3rd largest producer

Amongst world's **largest importer** of fertiliser materials.

More on news

- **Key highlights of approved schemes**
  - **PM Programme for Restoration, Awareness Generation, Nourishment and Amelioration of Mother – Earth (PM-PRANAM),** announced in Budget 2023-24, to incentivize States/ UTs to **promote alternate fertilizers** and **balanced use of chemical fertilizers.**
  - Rs. 1452 crore has been approved for **Market Development Assistance (MDA) for promoting Organic Fertilizers** from GOBAR-Dhan (Galvanizing Organic Bio-Agro Resources- Dhan) Plants.
    - ✓ **GOBAR-Dhan was launched** in 2018 **under Swachh Bharat Mission (Grameen)** (SMB-G) **to positively impact village cleanliness** and **generate wealth and energy** from cattle and organic waste.
  - **Introduction of Sulphur coated Urea** (**Urea Gold**), for the first time, **to address the sulphur deficiency** of soil and save input costs for the farmers.
    - ✓ **Urea Gold** is **more economical and efficient** than the currently used Neem-coated urea.
  - **Urea Subsidy Scheme,** Central Sector Scheme, has been **extended** for another three years **till March 2025** to maximize indigenous production of urea to **reach self-sufficiency levels by 2025- 26.**
- **Significance of approved group of schemes**
  - Focused on **overall well-being and economic betterment of farmers** by promoting sustainable agriculture.
  - **Boost farmers' income, strengthen natural/organic farming, rejuvenate soil productivity, and ensure food security**.

Initiatives taken for efficient use of fertilisers
- **One Nation One Fertilizers scheme** was announced by **Ministry of Chemicals and Fertilisers** under Fertilizer Subsidy Scheme named "Pradhanmantri Bhartiya Janurvarak Pariyojna" (PMBJP) to ensure **timely supply of fertilizers**.
- **Nano Urea (Liquid) Plants** set up to **boost productivity and help increase their income.**
- **Fertilizer Flying Squads (FFS)** was constituted by Department of Fertilizers to stop diversion and black marketing.
- **Nutrient Based Subsidy scheme:** Under this, a **fixed rate of subsidy** (in Rs. per Kg basis) is **announced on nutrients** namely Nitrogen (N), Phosphate (P), Potash (K) and Sulphur (S) by the government on annual basis.
  - It is **applicable to 22 fertilizers (other than Urea) for which MRP will be decided** taking into account the international and domestic prices of P&K fertilizers, exchange rate, and inventory level in the country.
- **Soil Health Card scheme** provides crop-wise recommendations of nutrients and fertilizers required for the individual farms.

  - **Better utilization of crop residue** like parali will help to **resolve air pollution and improve cleanliness** and help to **convert waste into wealth**.

Fertilizer industry in India

- Fertilizers are materials used to **provide plants with nutrients which are deficient in soils**. It is a chemical product which is either mined or manufactured.
  - It is **one of the eight core industries**.

- ✓ **Urea** accounts for over **2/3rd of overall fertiliser consumption.**
  - o The requirement of **potash is met through imports**.
- Fertilizers are classified as **Primary, Secondary and Micronutrients**.
  - o **Primary fertilizers** are further classified on the **type of nutrients they supply to soil such as nitrogenous** (urea), phosphatic (Di-Ammonium Phosphate (DAP)) and potassic (muriate of potash (MOP)) fertilizers.
  - o **Secondary fertilizer** includes **calcium, magnesium, and Sulphur** while **micronutrients include iron, zinc, boron, chloride** etc.

Concerns associated with the use of fertilisers in India

- **Soil degradation**: Excessive use of urea adversely impacts soil fertility, and crop quality and can lead to pest and insect attacks.
  - o Also, **plants are damaged** due to decreased fertility and toxicity of ammonia, carbon dioxide released from urea degradation.
- **Environmental pollution**: Excessive use of fertilizers containing substances like **nitrates and phosphates** can contribute to **Eutrophication. It further leads to algal bloom, oxygen depletion, and harms aquatic life** (death of fish and other aquatic flora), thereby disrupting the food chain and ecosystem balance.
  - o **Nitrogen-based fertilizers emit nitrous oxide, a potent greenhouse gas,** exacerbating climate change.
- **Human Health:** Agricultural ammonia emissions can combine with pollution from vehicle exhausts to create dangerous particulates in the air and **exacerbate respiratory diseases.**
  - o **Nitrates and phosphates chemicals** present in fertilizers can percolate to groundwater and **contaminate drinking water sources** thus, increasing the **risk of cancer in adults**.
- **Fiscal Burden**: Government provides subsidised fertilizer to farmers which is leading to a huge fiscal burden on the state. For example, the total **fertilizers subsidy stood at Rs 1.62 lakh crore in 2021-22.**
- **Promoting inefficiency:** The subsidy received by a firm is determined by its cost of production- the greater the cost, the larger the subsidy. As a consequence, inefficient firms with high production costs survive and the incentive to lower costs is blunted.
- **Import dependency**: India, the top importer of urea, **imports an average of 7 million tonnes** of its annual Diammonium Phosphate (DAP) needed to feed its huge agriculture sector.
- **Limited awareness**: Lack of soil testing, and scientific application of fertilizer along with lack of awareness with respect to the balance use of nutrients leads to their indiscriminate use and hampering soil quality in longer run.
  - o **Ideal NPK use ratio for the country is 4:2:1** however, in the 2022 Kharif season, the overall **ratio got distorted to 12.8:5.1:1.**

Way Ahead

- **Efficient use:** India should pay attention to **improving fertilizer efficiency through need-based use**. Recently developed Nano urea by IFFCO shows promising results in reducing the usage of urea. Such products need to be promoted expeditiously after testing.
- **Promote Local Production:** Encourage the establishment of production units to decrease reliance on imports by lowering the import duty on phosphoric acid and ammonia.
- **Sustainability:** Government can **promote the use of bio and organic fertilizers and incentivize farmers** to shift from chemical fertilizers to environmentally friendly fertilizers.
- **Soil testing:** Provide access to **affordable soil testing facilities and encourage farmers to regularly test soils** to determine nutrient levels and rationalise the use of fertilizer accordingly.
- **Awareness:** Conduct awareness campaigns to **educate farmers on appropriate fertilizer use**, negative environmental impacts of overuse on productivity and soil fertility, and promote sustainable agricultural practices.
- **Research and Development:** Invest in R&D to develop fertilizer delivery systems that promote **fertilizer efficiency, and slow-release fertilizers** to improve nutrient use efficiency.

3.9. REGULATION OF START-UP ECOSYSTEM

Why in news?

Recently, experts have pointed that self-regulation is essential for the start-up environment to thrive.

India's Startup Ecosystem

Startup refers to a company in the **initial stages of operations** which is driven by **ideas and innovation, risk taking**, and can-do spirit.

Status of India's Startup Ecosystem

3rd largest start-up ecosystem in the world	**80,000** DPIIT recognized startups including **100+ unicorns**	For **tech startups**, India is the **2nd largest ecosystem**	Around **40%** of start-ups are in **tier-II and tier-III cities**

Why Startup culture is essential?

- Promote **ideas, innovation and research**
- Develop **backward and forward linkages**
- **Wealth creation** through future scale-ups
- **Fulfilment of societal needs** in areas like affordable healthcare, education etc.
- **Stimulate domestic investment**

Government Efforts to develop this ecosystem

- **Startup India** and Standup India
- **Startup India Seed Fund Scheme (SISFS)** to provide early-stage assistance
- **Fund of Funds for Startups (FFS) Scheme**
- Onboarding of startups on **Government e-Marketplace (GeM)**
- Providing **global market access** through inter-governmental cooperation
- Support for **IPR protection** with fast-tracked patents and simplified rules

Regulation of Startup Ecosystem in India

- **Ministry of Corporate Affairs (MCA)** has **defined "start-up"** through an executive order **under the Companies Act 2013 and** gives few operational and compliance relaxations for a "start-up company".
- **Department of Promotion and Industry and Internal Trade (DPIIT)** (under the Ministry of Commerce & Industry) **recognizes the business as a start-up (as part of Start-up India)**.
  o This recognition grants tax exemptions for 3 years
- **The Securities and Exchange Board of India (SEBI)** notifies rules for listing start-ups.
- **Reserve Bank of India (RBI)** created a **dedicated helpline for start-ups in India to offer guidance/assistance** for undertaking cross-border transactions within the ambit of the regulatory framework.

Issues in the regulation of Start-up

- **Incorporation:** Incorporating a company in India is a **complex and time-consuming process**, taking 2-3 months on average, unlike Singapore's 2-day average.

- o **Compliance Burden** due to the complex compliance mechanism for obtaining licenses, permits etc. is time-consuming and resource intensive.
- **Regulation:** Start-ups in India face regulatory **challenges such as dispute resolution due to frequent policy changes etc.** making it difficult for start-ups to plan and operate their businesses effectively.
- **Lack of Funding:** Indian start-ups (early stage) encounter funding issues as Venture capital firms target established start-ups.
  - o Also, funding new businesses in India is difficult due to financial restrictions like the **prohibition on raising funds through convertible notes,** limits on Foreign Direct Investment (FDI) etc.
- **Intellectual Property (IP):** Start-ups face challenges in protecting their IPRs as **enforcement of IPRs is time-consuming and costly**, and start-ups may face difficulties in combating infringement disputes.
- **Taxation:** Despite tax benefits to start-ups, they face issues related to tax compliance, especially when it comes to issues such as **transfer pricing, valuation of shares, and taxation of angel investments** etc.

Way Forward

- **Sandbox approach:** Establish **regulatory sandboxes allowing start-ups to test innovative products** or services in a controlled environment, granting temporary regulatory exemptions.
  - o E.g., the FinTech regulatory sandboxes created by RBI from time to time.
- **Policy to enable funding:** Creating a **comprehensive and precise business policy** emphasizing on vision, objectives, and growth potential can help **attract venture capitalists and angel investors etc.**
  - o Innovative funding ideas such as **crowdfunding** can be encouraged and supported.
- **Regulatory Research to keep up with Start-ups:** Conducting in-depth research on relevant regulations, seeking legal counsel, maintaining transparency and compliance, and utilizing technology to streamline processes can help to overcome regulatory obstacles.
- **Multi-Stakeholder approach:** It can be utilised to influence policy by joining industry associations, enhancing **coordination between government agencies and stakeholders, and advocating for regulatory reform** to address issues like the entry-exit problem.
- **Intellectual Property Protection:** Expediting patent examination, **establishing IPR facilitation centres and awareness generation** can enhance the IP protection framework.

3.10. INVESTOR SERVICES FUND (ISF) AND INVESTOR PROTECTION FUND (IPF)

Why in News?

Securities and Exchange Board of India (SEBI) came out with the comprehensive **guidelines for Investor Protection Fund (IPF) and Investor Services Fund (ISF)** maintained by stock exchanges and depositories.

More on News

- Earlier, **Supreme Court (SC)** had announced an expert committee to **examine India's investor protection regulatory framework**.
- The Court also suggested measures to **strengthen Indian investor awareness** given the risks and vulnerabilities of the system such as frauds with investors, high-risk investments and market manipulations.
- In this context, SEBI has announced **regulatory reforms for the establishment of IPF and ISF.**

Investor Protection Fund (IPF)

The objective of establishing an IPF is to **protect the interests of participants** (like stockbrokers and investors) of the Exchange.

- **Establishment:** All stock exchanges and depositories shall **establish an IPF**.
- **Administration:** The IPF of the stock exchange and depository shall be **administered through separate trusts** created for the purpose.
  - o The **IPF Trust of the stock exchange** and the depository shall consist of **five trustees-**

- ✓ Three public interest directors,
- ✓ One representative from SEBI recognized investor associations and
- ✓ Chief Regulatory Officer (CRO) or Compliance Officer (CO).
  - o **The maximum tenure of a trustee** excluding CRO or CO shall be **five years** or as specified by SEBI.
- **Segregated funds:** The stock exchange and depository shall ensure that the **funds in the IPF are well segregated** and that their **IPF is immune from any liabilities of the stock exchange and depository respectively**.
- **Review:** The stock exchanges and depositories shall conduct half-yearly review to ascertain the adequacy of the IPF corpus.

KNOW THE TERM

- **Depository:** A depository is a financial institution or organization that **accepts deposits from businesses and individuals and assists in buying and selling financial instruments,** such as stocks and bonds.
  - ▪ For example, demat accounts can be opened in India only in depositories– Central Depository Services (India) Limited (CDSL) and National Securities Depository Limited (NSDL).

	Contribution to IPF	Utilization of IPF
Stock Exchanges	• **1% of listing fee** received. • **100% of interest earned on 1% security deposit** kept by the issuer companies at the time of offering of securities for subscription to the public. • **Penalty collected from Trading Members and from listed companies** for non-compliance with SEBI regulations. • **At least 70% of interest or income received out of any investments** made from IPF.	• To meet the **legitimate investment claims** of the clients of the **defaulting Trading Managers (TMs).** • To pay **interim relief to investors.**
Depositories	• **5% of their profits** from depository operations. • **All fines and penalties** from Depository Participants and other members. • **Interest or income received** out of any **investments** made from the IPF.	• Promotion of **investor education and investor awareness programmes** aimed at enhancing securities market literacy and promoting retail participation in securities market. • To meet the **legitimate claims of the beneficial owners.**

Investor Services Fund (ISF)

ISF aims at providing **different kinds of services to the investing public** such as investor education and awareness programs, dissemination of companies' information etc.

- **Funding:** The stock exchange shall set aside **at least 20% of the listing fees** received for ISF for providing services to the investing public.
- **Supervision**: Supervision of the ISF will rest with the **Regulatory Oversight Committee**.
  - o The Regulatory Oversight Committee is **one of the seven committees for Market Infrastructure Institutions (MIIs)** specified by Stock Exchanges and Clearing Corporations) Regulations, 2018.
- **Utilization of ISF of Stock Exchange:**
  - o Promotion of **investor education and investor awareness** programmes.
  - o At least **50%** of the corpus should be spent **at Tier II & Tier III cities.**
  - o Cost of **training of arbitrators**.
- **Transfer of un-utilized IPF/ISF:** If a stock exchange or a depository is wound up or derecognized or exits, then the balance in the IPF and/or ISF lying un-utilised with the stock exchange and depository shall be transferred to **Investor Protection and Education Fund (IPEF)** of SEBI.

KNOW THE TERM

- **Market Infrastructure Institution (MII):** A **financial entity** that provides **essential infrastructure** for running the daily operations in the **Stock Market / Capital Markets.** Stock exchanges, depositories and clearing houses are all MIIs.

Conclusion

The regulatory framework for IPF and ISF has paved the way towards a financially aware and institutionally protected investor. Going forward, these steps can be complemented with improvement in financial literacy and market transparency.

3.11. MIDDLE CLASS IN INDIAN ECONOMY

Why in news?

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

Middle class in India

Who are middle class?
Simply put, it is the class that occupies a **socioeconomic position between the working and upper classes.**

How many people lie in this bracket?
→ **31% of India's population is Middle class** (estimated to grow to **61% by 2047**), People Research on India's Consumer Economy (PRICE) and India's Citizen Environment Report.
→ The middle class **holds about a quarter of the country's wealth.**

Significance of 1991 for the Middle Class
→ Size of the middle class **approximated less than 1% of the population in the 1990s.**
→ Economic Growth post **1991 reforms expanded the size of this middle class substantially.**
→ The **current middle class** which is characterized by **consumer-driven sentiment** can be said to have taken shape in this era.

Why Middle class is important?

- **High consumption**: Indian middle class contributes **about 70 per cent** to the total consumer spending. It accounts for **expanding demand** for consumer durables, housing, shopping malls, and other infrastructure.
- **Tax contribution:** Middle class accounts for **79 per cent of the total taxpayer base**. A strong tax base enhances a country's capacity to **finance social services** such as health and education, critical infrastructure etc**.**
- **Savings and human capital:** About half of the **income, expenditure and saving** is with this section. It is a major contributor to **savings and human capital**, as savings rates and the willingness to invest in human capital are **higher amongst middle-class households**.

Informalization and Low-productivity trap
- The nature of temporary or contract workers in the informal **economy disincentivises the employer from investing in productivity-enhancing tools and training workers** to use them besides.
- Also, the conditions in the informal sector are such that workers are trapped in situations where they are **unable to-**
  - **Increase productivity and income** by working with better tools,
  - **Get access to easy learning of new skills**,
  - Get the **effort-multiplier benefit** of team work, and
  - Access the **full suite of reasonably priced and regulated financial services**.
- This creates a vicious inter-generational cycle of **low productivity – low income – poor socio-economic status.**

- **Virtuous cycle:** Once the size of the middle class passes a threshold size, a virtuous cycle is initiated: a bigger middle class **spends more**, leading to **higher business profits**, savings and investment, higher growth, and an **even larger middle class.**

Challenges faced by middle class

- **Increased cost of living**: The cost of a "typical" middle-class lifestyle has **increased faster than income**. This has been driven by consumption patterns which tend to **imitate the behaviour of richer peers.**
  - Worryingly, these trends have also led to **an increasing debt burden** on middle-class families, which is not **sustainable in the longer run**.
  - Also, the **steep inflation eroded the purchasing power** of this class and a large chunk of the household budget is being eaten away by **food and fuel**.
- **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** but generates **only a third of the value added** to the economy.
- **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**.
- **Limited social-economic mobility:** The middle class may also face difficulties in improving their socio-economic status, as there may be **limited opportunities for social mobility** in the country.
  - Also, **barriers** such as caste-based, gender-based discriminations further **hinder socio-economic mobility.**

Road ahead to overcome these challenges

- **Improving public infrastructure:** Better basic infrastructure is closely intertwined with **productivity and inclusion.** For instance, **efficient and affordable transportation** can enable finding better work farther away from home and create more options for leisure, recreation, and shopping.
- **Enhancing formal economy**: Connecting more working Indians with the formal economy could generate huge benefits at **both the micro and macro levels**.
  - At the micro level, a **greater sense of job security** would positively affect longer-term financial planning.
  - At the macro level, **aggregate household consumption** would rise, resulting in stronger domestic demand which **offers more opportunities** for local entrepreneurs and small businesses.
- **Tackling the cost-of-living issues:** Decent, affordable, and accessible housing including home ownership is a key element of the middle-class status. Policies need to address **shortages in the supply** while helping households through **demand-side support**.
- **Supporting education and health**:
  - Policies to support students from middle-income families **for tertiary education** include tuition fee loans and assistance for **non-tuition costs** such as books can be considered.
  - An expansion or **deepening of healthcare cost coverage** could provide substantial relief for the middle class.
- **Possible reforms in the taxation system:**
  - **Eliminating the "bracket creep"** i.e., an **inflation-induced increase in tax rates** which affects middle-class taxpayers in particular – could be considered.
  - More generally, the tax burden should be shifted from **labour to broader bases**, including income from capital and capital gains, property, and inheritance.

3.12. RAILWAY SAFETY IN INDIA

Why in news?

Recent train accident in Balasore district of Odisha brought to the fore issue of railway safety in India.

Issues in Railway Safety in India

- **Finance Related**
  - **Limited expenditure on safety:** In March 2023, the parliamentary committee pointed out that **not once had the annual funding to** Rashtriya Rail Sanraksha Kosh has **been spent fully.**

- o **Deterioration in Operating Ratio:** Operating ratio represents the ratio of working expenses to traffic earnings.
- o For, Indian 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.
- o This limits spending on capacity upgradation and safety.
- **Infrastructure related**
  - o **Derailments**: According to **Comptroller and Auditor General of India** (CAG) report titled Derailment in Indian Railways' (released in December 2022), **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 cause of derailments.
  - o **Lack of modernisation, track renewal**: The vast majority of rail passengers who use the Railways to commute daily use "General" coaches, where infrastructure is yet to be significantly touched by the modernisation efforts. Between 2017-21, nearly 289 derailments (or 26 per cent) were linked to track renewals.
  - o **Congestion of tracks:** Capacity utilisation 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.
    - ✓ In comparison, China's total route length (1,55,000 km) exceeds India's (68,100 km) by more than twofold.
- **Organisational issues**
  - o **Not following mandated safety norms**: As per CAG report, Fire extinguishers had not been provided in 62 per cent coaches in violation of existing norms. Also, **Track Management System,** a web-based application for online monitoring of track maintenance activities — was not operational.
  - o **Delay in inquiry**: As per the CAG report, in 63 per cent 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.

Indian Railways

- Indian Railways is the **world's 4th largest railway network,** after the US, China and Russia, with the entire track covering a route length of 67,368 km.
- Indian Railways is the world's **second-largest network operated under a single management.**

Railway Safety Ecosystem In India

Operational Level:
- Fire Extinguishers
- Track Management System
- Kavach
- HOTS-3X for track safety
- Track Recording Car
- Bridge Management System (BMS),
- Electronic Interlocking and Ultrasonic Flaw Detection

Administrative level:
- Commission of Railway Safety (CRS)
- Railways' Depreciation Reserve Fund (DRF)
- Rashtriya Rail Sanraksha Kosh
- Railway Protection Force (RPF)

Commission of Railway Safety (CRS)

Lucknow, Uttar Pradesh

Ministry: Ministry of Civil Aviation
- o The **rationale of keeping it under administrative control of Ministry of Civil Aviation** is, to keep the CRS insulated from the influence of railway establishment and **prevent conflicts of interest.**

Genesis: earlier, it was Railway Inspectorate. It **was re-designated as the Commission of Railway Safety** in 1961.

Mandate:
- o Deals with **matters related to safety of rail** travel and operations.
- o Has **statutory functions** – inspectorial, investigatory, and advisory – under **Railways Act, 1989.**
- o **Investigates** serious train accidents

- o **Top-down approach**: There are mechanisms for periodic field inspections by authorities at various levels to ensure compliance with laid-down procedures and standards of workmanship. However, currently, the onus of detecting deviations from the norm lies on the higher authorities. This reduces effective monitoring.
- **Human resource related**
  - o **Vacancies**: According to Ministry of Railways, there are 3.12 lakh non-gazetted posts are vacant all-India, many in the safety category. The situation remains unchanged since the **Kakodkar Committee** report brought out a decade ago, which flagged this issue.
  - o **Unskilled and untrained staff**: CAG has identified high contribution of "Failure of Railway staff " as a prominent cause of accidents. As many as 40 out of 55 accidents in 2019-20 fall in this category. There is skills deficit of the **contractual workforce** as well as poor follow-up training of staff.
  - o **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. The shortage of manpower had resulted in loco pilots being on duty beyond the stipulated duty hours.

Steps Taken for Railway Safety

Over the last two decades, the **number of derailments** which constitute the majority of accidents has **drastically declined** from around 350 per year around the turn of the millennium, to 22 in 2021-22. Government has taken various steps to reduce Rail accidents.

- **Rashtriya Rail Sanraksha Kosh (RRSK):** It was a ded**icated fund created for the railways in 2017-18** with a corpus of ₹1-lakh crore for five years. In 2022, government decided to extend the currency of the fund for another five years.
  - o 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.
  - o These coaches are equipped with cutting-edge technologies such as **disc brakes, a hydraulic suspension system, a center buffer coupling system, and side suspension.**
- **Increasing budgetary expenditure**: This year, the government made a **record 2.4-trillion-rupee ($30 billion) capital outlay** for the railways, a 50% increase over the previous fiscal year, to upgrade tracks, ease congestion and add new trains.
- **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:**
  - o The **maintenance of Tracks on Indian Railways** has been revolutionized by the introduction of **mechanized track maintenance** using technologically advanced machines like High Output Tamping & Stabilizing Machines (HOTS-3X), etc.

> **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"**
> - It is an **indigenously developed** by the Research Design and Standards Organisation (RDSO) in collaboration with the Indian industry.
> - It is a **state-of-the-art electronic system** with Safety Integrity Level-4 (SIL-4) standards.
> - **Key features:**
>   - o Provides protection by **preventing trains to pass the signal** at Red (which marks danger).
>   - o **Activates the train's braking system automatically** if the driver fails to control the train as per speed restrictions.
>   - o **Prevents the collision between two locomotives** equipped with functional Kavach systems.
>   - o **Relays SoS messages during emergency** situations.
>   - o Has **centralised live monitoring** of train movements through the Network Monitor System.
>   - o In Kavach, the **probability of error is 1 in 10,000 years.**
> - **How Kavach works?**
>   - o The tracks contain **radio-frequency identification (RFID) tags** that are fitted on each section of a track and provide information directly to the locomotive TCAS unit inside the train.
>   - o There is also a **Stationary TCAS unit** installed at stations with a radio tower to communicate with nearby locomotives.
>   - o When a **train passes two RFID tags sequentially, its direction and speed can be determined**.
>   - o When an approaching signal is red, the Stationary TCAS will relay the information to Loco TCAS, slowing down and stopping the train. If the loco pilot is unable to do so, **automatic brakes are applied.**

- o The **inspection of tracks has also been modernized** by using technologically advanced Track Recording Car which is faster and more reliable.
  - o **Bridge Management System** (BMS), a web based IT application has been developed to facilitate 24x7 availability of information such for analysis, assessment of progressive deterioration and capacity to carry increased loads.
  - o **Signalling System: Electronic Interlocking** are being adopted on a large scale to derive benefits of digital technologies in train operation and to enhance safety.
    - ✓ Interlocking is a system meant to **ensure that conflicting signals are not sent**, resulting in more than one train ending up on the same section of the track around the same time, risking a collision.
- **Removal of unmanned crossings**: By end of 2022, All Unmanned Level Crossings (UMLC) were **eliminated on Broad Gauge network** of Indian Railway.
- **Electrification of Rail network**: In its mission to make the entire rail network of the country run on electric traction, Indian Railways has completed **electrifying all broad gauge (BG) routes in 12 states and union territories (UTs), as of March 2023.**
- **Deploying Railway Protection Force (RPF):** On vulnerable and identified routes, trains are **escorted by RPF** in addition to trains escorted by Government Railway Police of different States daily.

Suggestions for Railway Safety

- **CAG suggestions:**
  - o Ensure **strict adherence to the scheduled timelines** for conducting and finalisation of accident inquiries.
  - o Develop a **strong monitoring mechanism to ensure timely implementation of maintenance activities** by adopting fully mechanized methods of track maintenance and improved technologies.
- **Need for attitudinal change**: From the conventional approach of fault-finding and punishment to one of **shared commitment to ensure complete safety at all levels**. The aim should be to correct, not punish.
- **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. The underlying philosophy is to encourage the lower staff to point out deviations on a real-time basis.
- **Reducing habitation near tracks:** Habitation near tracks is hazardous and reducing the speed of passing trains is at best, a temporary solution. If need be, people living too close to the tracks should be given alternate accommodation where feasible.
- **Infrastructure and skilling**: Immediate action to improve safety should involve more focus on the upgradation of infrastructure. While vacancies in Safety categories should be filled up, greater stress is needed for the skilling of workmen.
- **Automatic locking of doors**: Among the world's major railways, it is only on Indian Railways that a **train can start without closing and locking the door**. Locking the door before will have a positive spinoff for passenger security on trains.

3.13. ROAD SAFETY

Why in 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 lakh per spot.**
  - o Such accident-prone spots are identified and recommended by the respective State Police Chief or by the District Road Safety Committee.
- **Short-term measures** costing **more than Rs.10 lakhs and up to Rs. 25 lakhs** have been delegated to the **concerned Regional Office.**

KNOW THE TERM

> **Blackspots:** A Road Accident Black spot is a **500m stretch** on a National Highway where
> either **5 road accidents** with fatalities/ grievous injuries occurred in the **past 3 years** or
> There were **10 fatalities in total** in past 3 years

- **Short Term Measures** include 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 hail storms **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.

DATA BANK

- More than **4.12** lakh road accidents in 2021
- Claimed **1.5** lakh lives, according to road accidents in india 2021 report

Initiatives taken to enhance road safety

National Road Safety Policy in 2010 outlines the policy initiatives to be framed by the Government at all levels.

The Motor Vehicles (Amendment) Act, 2019 provides for grant of licenses and permits related to motor vehicles, standards for motor vehicles, and penalties for violation, etc.

Safety standards for automobiles have been improved in respect of Airbags, Anti-Breaking System (ABS), Tyres, Crash test, Whole Vehicle Safety Conformity of Production (WVSCoP) etc.

Road safety has been made an integral part of road design at planning stage.

iRAD – Integrated Road Accident Database to capture relevant details about the **accident-prone areas throughout India.**

Brasilia Declaration on road safety, 2015 to reduce the deaths due to road accidents to half by 2020.

National Highway Accident Relief Service Scheme, Scheme for grant of Award to the Good Samaritan **'Surakshit Safar'** initiative, among others.

- o Implementing the **Bharat NCAP (New Car Assessment Program)** a **rating based safety assessment (**line with the global standards) of Indian cars.
  - o **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.

Conclusion

The UN has declared **2021-2030, as Decade of Action for Road Safety,** that targets of preventing at least 50% of road traffic deaths and injuries by 2030. India needs to take **a multipronged approach to meet this target.**

3.14. NEWS IN SHORTS

3.14.1. DEVELOPING COUNTRY STATUS

- Legislation establishes a **US policy against granting China developing country status** in future treaties and international organisations.
  - o **Earlier**, a similar legislation was **passed by House of Representatives.**
- It has been asserted that **China can no longer be considered** a developing country, given its **significant economy, military power, and extensive investments worldwide.**
- **World Trade Organization (WTO)** has **not defined 'developed' and 'developing' countries** and therefore **member countries are free to announce** whether they are 'developed' or 'developing'.
  - o **UN also has no formal definition** of developing countries, but still **uses the term for monitoring** purposes.
- **Advantages of Developing country status:**
  - o **Receive preferential treatment** in terms of **market access, loans, reduction in government support and technical assistance** from international organisations.
  - o **Longer transition period** before they are required to fully implement WTO agreement.
  - o **Benefit from unilateral preference schemes** of some of developed country members such as USA's Generalized System of Preferences (GSP).
  - o **Favourable treatment concerning issues** such as **climate change** responsibilities.

3.14.2. GLOBAL LIVEABILITY INDEX 2023

- It was released by **Economist Intelligence Unit's (EIU).**
- Index **ranked 173 cities based on their liveability or living conditions.**
  - o **Ranking is based on five factors-** stability, healthcare, culture and environment, education and infrastructure.

- o Most weightage is given to **culture and environment, and stability.**
- **Key findings:**
  - o **Vienna, Austria,** has been named the **best city to live** in world for second time in a row.
  - o From **India, New Delhi and Mumbai are at 141st position.**

3.14.3. UNDP AND DAY-NULM PARTNERSHIP

- **UN Development Program** (UNDP) and **Deendayal Antyodaya Yojana-National Urban Livelihood mission** (DAY-NULM) entered into **a collaborative partnership.**
- The partnership aimed at **empowering women to make well-informed career choices** in the field of **entrepreneurship.**
  - o Women account for **only 15 percent of the total entrepreneurs** in India.
  - o It will provide support for women looking to **start and expanding their own enterprises**, particularly in sectors like care economy, digital economy, electric mobility, waste management etc.
  - o **It is a three-year project**, extendable beyond 2025 and will cover **eight cities in the initial phase**.
  - o It will aid in developing community **business mentors called Biz-Sakhis** in selected project locations.
- **About DAY-NULM:**
  - o It is being implemented since **2014-15**.
  - o **It is a Centrally Sponsored** Scheme being implemented by the **Ministry of Housing and Urban Affairs.**

OBJECTIVES OF DAY-NULM

Aims at **universal coverage of the urban poor** for skill development and credit facilities.

Strives for skills training of the urban poor for **market-based jobs and self-employment**, facilitating **easy access to credit.**

Extends its coverage to **all the 4,041 statutory cities and towns,** thereby covering most of India's urban population.

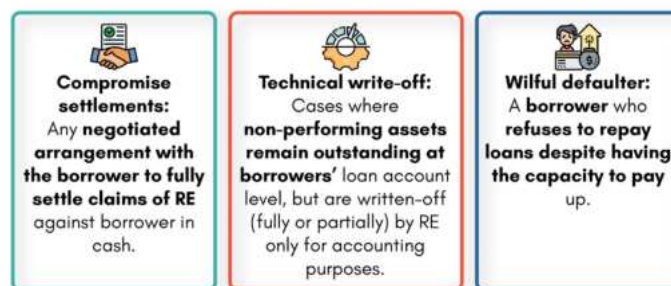## 3.14.4. FAIR AND REMUNERATIVE PRICE (FRP)

- Cabinet Committee on Economic Affairs **approved FRP of sugarcane for 2023-24 sugar season.**
- FRP is **minimum price at which sugarcane is to be purchased by sugar mills** from farmers.
  - It is determined **under Sugarcane (Control) Order, 1966**.
- There is **dual pricing mechanism for sugarcane:**
  - **FRP** is announced **by central government** at recommendations of **Commission for Agricultural Costs and Prices** (CACP).
  - States can announce **State Advised Prices,** usually higher than FRP.

3.14.5. FRAMEWORK FOR COMPROMISE SETTLEMENTS AND TECHNICAL WRITE-OFFS

- **Recently the (RBI) issued Framework** for Compromise Settlements and Technical Write-offs
- It aims is to provide **further impetus to resolution of stressed assets** as well as **to rationalise instructions across all Regulated Entities** (REs).
  - REs **includes** all **Commercial Banks**, Primary (Urban) **Co-operative Banks**, **State and Central Co-operative Banks**, **NBFCs** (including Housing Finance Companies) etc.
  - **In 2019**, RBI also **released Prudential Framework for Resolution of Stressed Assets** regarding compromise settlements.
- **Key features of the framework**
  - **REs shall put in place Board-approved policies for** undertaking **compromise settlements** and **technical write-offs.**
    - ✓ Policies to **include specific conditions** such as **framework to assess staff accountability**, **methodology** for arriving at **realisable value of security**, **delegation of powers** for approval/sanction etc.

- A **reporting mechanism** to the next higher authority, **at least on a quarterly basis**.
- **Cooling period** (for borrowers subject to compromise settlements) in respect of **exposures other than farm credit** exposures shall be **subject to a floor of 12 months**. REs are **free to stipulate higher** cooling periods.
- **REs can undertake compromise settlements** or technical write-offs regarding accounts **categorised as wilful defaulters or fraud** without prejudice to criminal proceedings against such debtors.

KEY TERMS

Compromise settlements: Any **negotiated arrangement with the borrower to fully settle claims of RE** against borrower in cash.

Technical write-off: Cases where **non-performing assets remain outstanding at borrowers'** loan account level, but are written-off (fully or partially) by RE only for accounting purposes.

Wilful defaulter: A **borrower who refuses to repay loans despite having the capacity to pay** up.

3.14.6. FINANCIAL STABILITY REPORT (FSR)

- FSR is a **bi-annual report, released by the RBI, that reflects risks to financial stability** and resilience of Indian financial system (**Global FSR is released by IMF).**
- **Key Highlights**
  - **Indian banking system is well capitalised** and capable of absorbing **macroeconomic shocks over a one-year horizon** even in the **absence of any further capital infusion**.
  - **Gross Non-Performing Assets (GNPA) ratio** of Scheduled commercial banks (SCBs) continued its downtrend and fell **to a 10-year low of 3.9% in March 2023**.
  - **Net non-performing assets (NNPA) ratio** declined **to 1.0%.**
  - **Capital to Risk-Weighted Assets Ratio (CRAR) of** SCBs rose to **historical highs of 17.1%** in March 2023.
  - **Creating a framework for global regulation**, including possibility of prohibition, of **unbacked crypto assets, stablecoins etc**. would be a priority.
    - ✓ **Stablecoins** are cryptocurrencies whose **value is pegged to that of another currency, commodity, or financial instrument.**

- o **Insolvency and Bankruptcy Code (IBC) has rescued 72% of the distressed assets** since it came into being in 2016.
    - ✓ **Average time for concluding** corporate insolvency resolution process (CIRPs) that yielded resolution plans **was 512 days** (330 days provided in IBC).

TERMS RELATED TO NON-PERFORMING ASSETS

Capital-to-risk weighted assets ratio (CRAR): Compares **capital** to risk-weighted assets

Gross Non-Performing Assets (GNPA): Total value of all **non-performing assets** a bank or a business holds

Net Non-Performing Asset (NNPA): It is the sum that is **realized after the amount of the provision has been deducted** from the overall NPA's
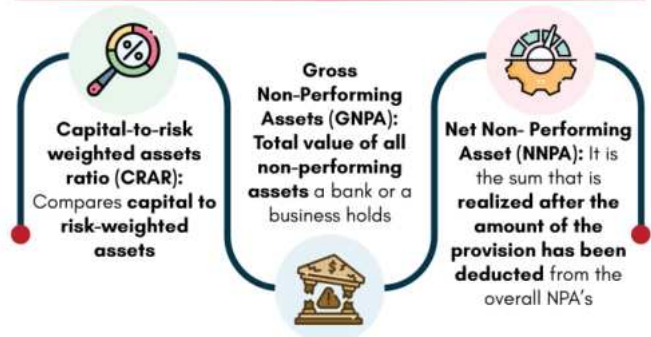
3.14.7. GLOBAL ECONOMIC PROSPECTS REPORT

- It is **released by World Bank** which is **issued twice a year**, in January and June.

- **Findings**
    - o The **global economy is projected to "slow substantially"** this year, with a "pronounced deceleration" in advanced economies.
    - o **GDP growth for FY24 in India is seen at 6.3% compared** with a previous estimate of 6.6% in January.
    - o India's **private investment was likely boosted by increasing corporate** profits while **unemployment declined to 6.8% in the first quarter of 2023.**

3.14.8. FINANCIAL SERVICES INSTITUTION BUREAU (FSIB)

- The FSIB selected **new chiefs for General Insurance Corporation of India (GIC Re) and National Insurance Company (NIC).**
- **About FSIB:** Set up under **Department of Financial Services (DFS), Ministry of Finance**. It **replaced Banks Board Bureau (BBB).**
- **Composition**
    - o Chairperson to be **nominated by Central Government**.
    - o **Ex officio members**: Secretary in charge of DFS, Department of Public Enterprises, Chairperson of IRDAI, Deputy Governor of RBI.
    - o **Several part-time members** with subject matter knowledge.

Functions of FSIB

Mandated to recommend **whole-time directors and non-executive chairpersons** on Boards of financial services institutions.

Advise on certain other matters relating to **personnel management** in these institutions.

3.14.9. GREEDFLATION

- Greedflation, in basic terms, is the **inflation and hike in prices** not driven by economic flow, but **by corporate greed**.
- It can be understood as **a condition where corporate desire for excessive profit** (greed) is leading to **inflation.**
- **Companies artificially inflate their prices** not just to cover the input cost but **to increase their profit margins.**

3.14.10. ANTARDRIHSTI

- **RBI governor** launched a **Financial Inclusion Dashboard**, named, ANTARDRIHSTI.
- It will provide the required insight to a**ssess and monitor the progress of financial inclusion** by capturing relevant parameters.
- It will also enable to **gauge the extent of financial exclusion at granular levels** across the country so that such areas can be addressed.
- The dashboard is **presently intended for internal use** in the RBI.

3.14.11. GIFT TAX

- CBDT exempted **buyers from gift tax when they acquire equity shares in public-sector units (PSUs)** through **strategic disinvestment.**
- **About Gift tax:**
    - o A "gift" can be in the form of **money and movable/immovable property** that an individual receives from another individual or organization **without making a payment.**
    - o Before the amendment, **the difference in book value and fair market value was considered deemed income for the buyer under Section 56(2)(x) of the Income Tax Act**.
    - o For the buyer, the **difference is treated as deemed income, which gets taxed** at the rate applicable to the individual.
- **The relaxation will stay as long as the strategic investor retains at least 51 per cent** in the PSU after the takeover.

3.14.12. GLOBAL COMPETITIVENESS INDEX

- Recently Global Competitiveness Index was published by the **International Institute for Management Development (IMD).**
- **About the Index**
  - **Denmark, Ireland, and Switzerland** have been named the top three among 64 economies measured for their global competitiveness.
  - **India dropped 3 spots to finish 40th** but is still in a better position than it was in 2019-2021.
  - The three main measures that helped India in its score are **exchange rate stability, compensation levels, and improvements in pollution control.**

Note: The Global Competitiveness Report (GCR) is a yearly report published by the World Economic Forum.

3.14.13. NATIONAL AGRICULTURE MARKET (eNAM)

- E-NAM is set to cross **1 Trillion Rupees trade in FY24.**
- Launched in 2016, e-NAM is a **pan-India electronic trading portal** that **networks** the existing **Agricultural Produce Market Committee mandis.**
  - It creates a **unified national market for agricultural commodities** by:
    - ✓ **streamlining of procedures** across the integrated markets.
    - ✓ **removing information asymmetr**y between buyers and sellers.
    - ✓ promoting **real-time price discovery**.
  - It is completely **funded by the Central Government** and is **implemented by the Small Farmers Agribusiness Consortium,** under the Ministry of Agriculture and Farmers' Welfare.
- **Other key features**
  - Facilitate trade from warehouses based **on e-NWR (electronic Negotiable Warehouse Receipt).**
    - ✓ NWR system allows **transfer of ownership of a commodity stored in a warehouse** without having to deliver it physically.
  - **Platform of Platforms (POP)** to facilitate farmers to **sell the produce outside their state borders**.
    - ✓ **41 service providers from different platforms** facilitating various value chain services like trading, quality checks, warehousing, fintech, etc. are covered
    - ✓ **AI based assaying equipments** have been integrated with e-NAM platform.
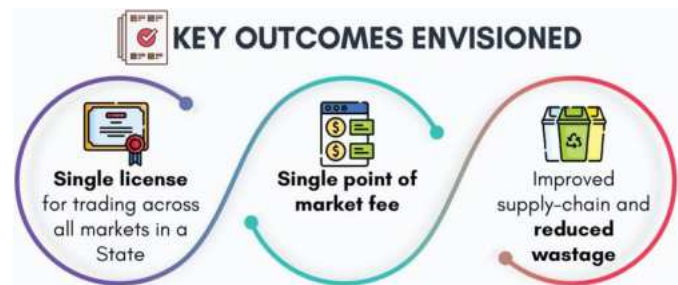
3.14.14. PRADHAN MANTRI KISAN SAMMAN NIDHI (PM- KISAN) SCHEME

- Ministry of Agriculture & Farmers Welfare (MoA&FW) launched **PM-Kisan Mobile App with Face Authentication Featur.**
- **PM- KISAN** scheme has become the **first scheme of government to do e-KYC** through facial authentication mobile app.
  - App will **enable farmers to complete their e-KYC process** by scanning their face on mobile phones instead of using OTPs or fingerprints.
  - App **resolve difficulties related to Aadhaar verification and updating bank account details** on PM Kisan Portal through effective use of digital public goods
- **Face Authentication Process** is used to **uniquely identify a person** based on facial features like distance between eyes, shape of cheekbones etc.
  - It is a **part of a larger biometric security tool** which includes iris scan, fingerprints etc.
  - **Advantages:** Based on facial uniqueness enhances security, Faster process of identification etc.
- Additionally, **Digi Yatra app,** based on **Facial Recognition Technology,** user base crosses the one million marks.
  - Launched by Ministry of Civil Aviation, Digi Yatra is conceived to **achieve contactless, seamless processing of passengers at airports.**
  - It facilitates **paperless travel and avoids identity checks** at multiple points in an airport.

3.14.15. GOVT WITHDRAWS DRAFT LIVESTOCK BILL

- The government has withdrawn '**Livestock Products Bill, 2023'** due to concerns raised by animal activists.
  - As a result the existing **Live-stock importation Act, 1898, and Live-stock Importation (Amendment) Act of 2001** will continue to regulate the livestock.
- **Livestock Importation Act 1898:**
  - The **Central Government has the right to regulate, restrict or prohibit the import of any livestock** which may be liable to be infected.
  - The **Customs officers shall have the powers to implement the Govt's order**.
  - The **State Government may also make rules for the imported live-stock** within its jurisdiction.
  - The last amendment was done in 2001, which **altered the definition of livestock products** and also included the provisions of the Customs Act 1962.

Need to Replace the 1898 Act

- Regulates only **importation** of live-stock and **does not cover exports.**
- Lacks power to **make arrangements for the promotion** and development of exports of **live-stock and live-stock products.**
- Scope of **definition of live-stock is limited,** it does not include feline and canines.
- To **curb zoonotic diseases** arising out of import and export of livestock.

3.14.16. ELECTRONICS REPAIR SERVICES OUTSOURCING (ERSO)

- Recently, the Ministry of Electronics and Information Technology (MeitY) launched **pilot project on ERSO.**
- **MeitY,** along with several other ministries/departments, **converged with industry to launch ERSO Pilot initiative** to make India the **Repair Capital of the World**.
  - Over the next 5 years, **ERSO industry is likely to fetch India around $20 billion** in revenue and also **generate millions of jobs.**
  - **Global electronic equipment repair service market** is forecast **to reach USD 188 billion by 2026**.
- ERSO involves **outsourcing defective/damaged electronic items to Indian repair service organizations** for repair, refurbishment, and calibration to achieve optimal functionality.
- **India's advantage in the ERSO sector**
  - **Availability of a skilled & affordable workforce** provides **significant repair advantage** (almost 57% more competitive than China) over other countries.

- Factors such as **availability of electronic equipment insurance, right to repair concept**, **Domestic Digital push** by Government.
  - **Other factors** include **innovative offerings to target customers**, **rapid urbanization** and technological advancements, growing **demand for refurbished electronic equipment** etc.

Significance for India

- **Contribution** to Mission **LiFE** and **Circular Economy**
- **Incremental tax revenue** for the Government
- **Skill enhancement** of workforce
- **Growth** of MSME sector etc.

3.14.17. STRATEGIC RESERVES OF CRUDE OIL

- **Rajasthan** being considered a **potential site for strategic reserves** of crude oil in **salt caverns.**
- Government-owned consultancy firm **Engineers India (EIL)** is studying **prospects and feasibility** of **developing salt cavern-based strategic oil reserves in Rajasthan** to achieve energy security.
  - Rajasthan, **which has bulk of requisite salt formations in India**, is seen as the **most conducive for developing salt cavern-based strategic storage facilities.**
  - Construction of strategic oil reserves facilities is **managed by Indian Strategic Petroleum Reserve Limited (ISPRL),** special purpose vehicle, under **Ministry of Petroleum and Natural Gas.**
- **Salt cavern-based reserves vs. Rock cavern-based reserves**
  - Unlike underground rock caverns, which are developed through excavation, **salt caverns are developed by process of solution mining,** which **involves pumping water into geological formations** with large salt deposits to dissolve the salt.
  - Process is **simpler, faster, and less cost-intensive** than developing excavated rock caverns.
  - Unlike rock caverns, salt cavern-based **storages can be created and operated almost entirely from the surface**.

Strategic Petroleum Reserves (SPR)

- India's SPR have a **cumulative capacity of 5.33 Million Metric Tonnes (MMT) of crude oil**, and can **meet around 9.5 days of the country's oil demand.**
  - **International Energy Agency (IEA) (India, an associate member)** recommends that **all countries should hold an emergency oil stockpile sufficient to provide 90 days** of import protection.

- Presently, **India has three SPRs** (made up of excavated rock caverns) at **Mangalore 1.5 MMT, Padur 2.5 MMT (both in Karnataka), and Visakhapatnam 1.33 MMT (Andhra Pradesh)**.
  - Another 6.5 MMT of strategic crude reserves is planned at **Chandikhol 4 MMT (Odisha) and Padur 2.5 MMT.**

3.14.18. EXPLORATION OF COAL AND LIGNITE SCHEME

- The Cabinet **approved the continuation** of the Central Sector Scheme of "Exploration of Coal and Lignite scheme"
  - It will **run from 2021-22 to 2025-26.**
- **About Exploration of Coal and Lignite Scheme**
  - Exploration for Coal and Lignite is conducted in two broad stages: **Promotional (Regional) Exploration and Detailed Exploration in Non-Coal India Limited blocks**.
  - Importance: It proves and **gives an estimated coal resources available in the country which** helps in preparing detailed project report to start coal mining.
  - The Geological reports prepared through these exploration is **used for auctioning new coal blocks.**

3.14.19. STEEL INDUSTRY

- **India currently ranks as the World's 2nd Largest Producer of Crude Steel** with the production of crude steel at 133.596 MT.
  - It **surpassed Japan in 2018.**
  - **China remains the global leader in crude steel production.**
- **About Steel**
  - Steel is an **alloy of iron and carbon containing less than 2% carbon and 1% manganese and small amounts of silicon, phosphorus, sulphur and oxygen**.
    - ✓ Iron is made by removing oxygen and other impurities from iron ore.
  - **Steel is the world's most important engineering and construction material**.
    - ✓ It is used in every aspect of our lives; in cars and construction products, refrigerators and washing machines, cargo ships and surgical scalpels.
- **Initiatives for steel industry:**
  - **Steel Scrap Recycling Policy** for promoting the scientific processing and recycling of ferrous scrap;
  - **National Steel Policy 2017** set the targets of achieving the **total crude steel capacity of 300 MTPA** and **total crude steel demand/production of 255 MTPA** by **2030-31;**

- Policy for providing **preference to Domestically Manufactured Iron and Steel Products** (DMI & SP Policy);
- **Production Linked Incentive Scheme for domestic production of specialty steel** has been approved in 2021.

> **About Iron Ore:**
> - Iron ores consist mainly of **hematite, magnetite, limonite, siderite (FeCO3).**
> - **Key Active Mines:** Bailadila, Nuagaon, Gandhamardhan, Joda, Balda, Narayanposhi, Daitari, and Barsua Mine.
> - In 2021, **India exported $4.3B in Iron Ore**, making it the **7th largest exporter of Iron** Ore and, imported $177M in Iron Ore, becoming the 41st largest importer of Iron Ore.
>   - **Low-grade ores comprised 92% of India's total iron ore exports.**

3.14.20. PETROLEUM COKE (PET COKE)

- Recently the **Directorate General of Foreign Trade (DGFT)** permited **import of pet coke as raw material for lithium-ion batteries**
- **Import of needle pet coke (NPC),** with sulphur content less than 0.8%., is **permitted for making graphite anode material for lithium-ion batteries** and not for any other purposes.
- As **world's largest consumer of petcoke**, India **imports over half its annual petcoke consumption**, mainly from USA.
  - In 2018, **Government banned import of pet coke for use as fuel**, but allowed for cement, lime kiln, calcium carbide and gasification industries.
- **Petroleum coke** (pet coke) is a **carbon-rich solid material** derived from **final cracking process**, a thermo-based chemical engineering process that splits long chain hydrocarbons of petroleum into shorter chains.
  - **Grades of pet coke:** Green Coke (high moisture and volatile matter content), Calcined coke (a higher carbon content than green coke).
  - **Types of Pet coke:** NPC, Honeycomb Coke, Sponge Coke, Shot Coke
  - **Applications: Feed stock/Fuel use** (Cement, gasification, boilers etc), **Carbon source** (Electrodes, Synthetic Graphite, silicon carbide, TiO2 pigments, Carbon Raiser etc.)

Issues due to pet coke use:

- It has **over 80% Carbon** and **emits 5 to 10% more CO2 than coal** on a per unit of energy basis.
- **Apart from sulphur**, it also releases **other toxic gases** including **nitrous oxide, mercury, arsenic, chromium, nickel, and hydrogen chloride** after burning.
- Contains **heavy metal content.**

Benefits of Petcoke over coal

	Higher calorific value (>7800Kcal/Kg as compared to 3500-4500 Kcal/Kg for coal).
	Hydrophobic (coal is hydrophilic), thereby **having edge during rainy season.**
	Low volatile matter thus **no evaporation losses.**
	Low ash content.

3.14.21. NATIONAL ENERGY DATA: SURVEY AND ANALYSIS 2021-22

- It is the **maiden report of Energy Data Management Unit**, under Bureau of Energy Efficiency.
- **Key highlights**
  - **Total estimated reserves of coal** (caters to almost half of India's energy requirement) as of 2022 were 361411.46 MT (Millon Tonnes).
  - India's **crude oil production has declined** from 36.01 MT 2016-17 to 29.69 MT in 2021-2022.
  - From 2016-17 to 2021-22 India's domestic **production of LPG has grown at a CAGR of 2%.**
  - In 2016-17, **India exported 26% of its domestic production of diesel**, while this share increased to **30% in 2021-22.**

4. SECURITY

4.1. ILLEGAL IMMIGRATION AND INTERNAL SECURITY

Why in news?

Violence between Manipur's Kuki tribe and the majority Meitei community continued in several parts of Manipur.

More on news

- **Roots of the violence:** It is over 10-year-old demand by the non-tribal Meitei community for a Scheduled Tribe tag.
- **Trigger point:** Manipur High Court ordered the state government to recommend a ST Tag for the community to the Ministry of Tribal Affairs.
- **Instability in Myanmar:** After the military coup in Myanmar in 2021, around 4,000 refugees are said to have entered Manipur.
  - The refugees belonging to the **Kuki-Chin-Zo ethnic group comprising the Lai, Tidim-Zomi, Lusei, and Hualngo tribes** are closely related to the communities in Mizoram and Manipur.
  - **Such illegal immigration is considered a threat to internal security for India.**

How illegal immigration is a threat to Internal Security?

- **Threat to National Security:** It is alleged that among the illegal migrants there are also militants especially groups such as NSCN/KUFLA, who enter India to carry out terrorist activities.
- **Human trafficking:** In recent decades, **trafficking of women and human smuggling** has become quite rampant across borders.
- **Community tension:** The Commission on Integration and Cohesion found that tension usually exists with the presence of high levels of migration combine with other forms of social exclusion like poverty, poor housing, etc.
- **Increase financial burden**: Immigration has increased pressure on the part of the government, as the government has to increase the expenditure on education and health facilities for the immigrants.
- **Illegal voters:** Most illegal immigrants have got their names enlisted in the voting list illegally, thereby claiming themselves as citizens of the state.

Ethnic composition of Manipur
- There are **33 recognized tribes of Manipur that either fall** under the Nagas or the Kukis
- Despite the socio-political and linguistic differences among them, all the **ethnic tribes originate from the same Mongoloid group.**
- The tribals make up **40 % of Manipur's population and live largely in the hills**.
- The Meiteis make up **53 % of the population and live in the Imphal valley.**

The process of inclusion or exclusion from the Scheduled Tribes list
- **A State government recommends** certain communities for addition or subtraction from the list of STs based on its discretion.
- The proposal is sent to the **Union Ministry of Tribal Affairs.**
- The Ministry of Tribal Affairs, through its own deliberations, examines the proposal **and sends it to the Registrar General of India (RGI).**
- Once approved by the RGI, the proposal is sent to **the National Commission for Scheduled Tribes.**
- After these institutions concur, the proposal goes forward to the Cabinet to bring in the appropriate amendment to **the Constitution (Scheduled Tribes) Order, 1950.**
- The final decision rests with the **President's office issuing a notification specifying the changes under powers vested in it from Articles 341 and 342.**

Reasons for Illegal Immigrantion

- **Ethnic, linguistic, and religious commonalities** between the illegal migrant migrants and native citizens
- **Persecution** of minority communities in **neighboring countries.**
- **Porous borders and difficult terrains** that are hard to monitor.
- **Possible employment opportunities** in India.

Laws in place to tackle illegal migration
- **Under the Foreigners Act, 1946:** The Central Government can deport illegal foreign nationals.
- **Under the Passport (Entry into India) Act, 1920:** to remove an illegal foreigner by force has been entrusted to all the State Governments.
- **The Citizenship Act, 1955:** It provides for the acquisition and determination of Indian citizenship.

- **Crisis of identity:** The influx of immigrants created a crisis of identity among the indigenous people of the region.
- **Environmental degradation:** Large areas of forestland were encroached upon by the immigrants for settlement and cultivation.
  - This **creates conflict in resource utilization** with the local communities.

Way forward

- **Effective policy:** A considerable portion of the problem of illegal immigration lies in the fact that we have no such effective refugee policy. The central government should frame a holistic refugee policy.
- **Diplomatic Effort**: India has to make a diplomatic effort to get neighbouring countries to cooperate as illegal migration cannot be solved unless the origin country cooperates.
- **Unique identity card:** Government should introduce identity cards for the borderland people who frequently used to cross borders for different reasons.
- **Fencing border:** There is a vast area of the border that is not protected by fencing. The central government should complete the border fencing.
- **Use of regional forums:** Forums like BIMSTEC can be used to discuss issues like illegal migration from neighboring countries and garner support and coordination from the members.
- **Better management of borders:** Border guards like BSF, and ITBP should be strengthened and a second line of defense can be created by the State government through the state police force.

4.2. PRIVATE MILITARY COMPANY (PMC)

Why in news?

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

About Private Military Companies (PMC)

- **Meaning**: PMC refers to a **privately owned and operated organization** that provides military and security services on a contractual basis.
- **Operative Aspects**: Private military companies **operate**

> **About Wagner Group**
> - The Wagner Group also known as PMC Wagner is **controlled indirectly by the Russian military and intelligence** which supply it weapons and also provide Russian military facilities for training.
> - The group was **first identified in 2014 while backing pro-Russian separatist forces in eastern Ukraine** and it is said that the Group was involved in Russia's capture of Bakhmut city (Ukraine).
> - The group has **operated in conflict-ridden African and Arab countries.**
> - Western countries and UN experts have accused the group of human rights abuses in Africa and the U.S. has also **designated it a transnational criminal organization.**
>
> **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.

independently of government military forces and are distinct from official state military organizations.
- They are **hired by governments, corporations, international organizations, or individuals** to carry out specific tasks, often in conflict zones or areas with security risks.

Factors driving the rise in Private Military companies

- **Outsourcing of Security:** Private armies supplement Government's security efforts of cost-effectiveness, flexibility, and the desire to maintain a smaller standing military.
- **Apt for sensitive missions:** Private military companies 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:** Advances in technology, such as sophisticated weapons systems, surveillance equipment, and communication tools, have made it easier for private armies to operate on a global scale.
- **Other interests:** Private armies can be employed to provide military training, advisory support, or security assistance to governments or rebel groups aligned with certain geopolitical interests.
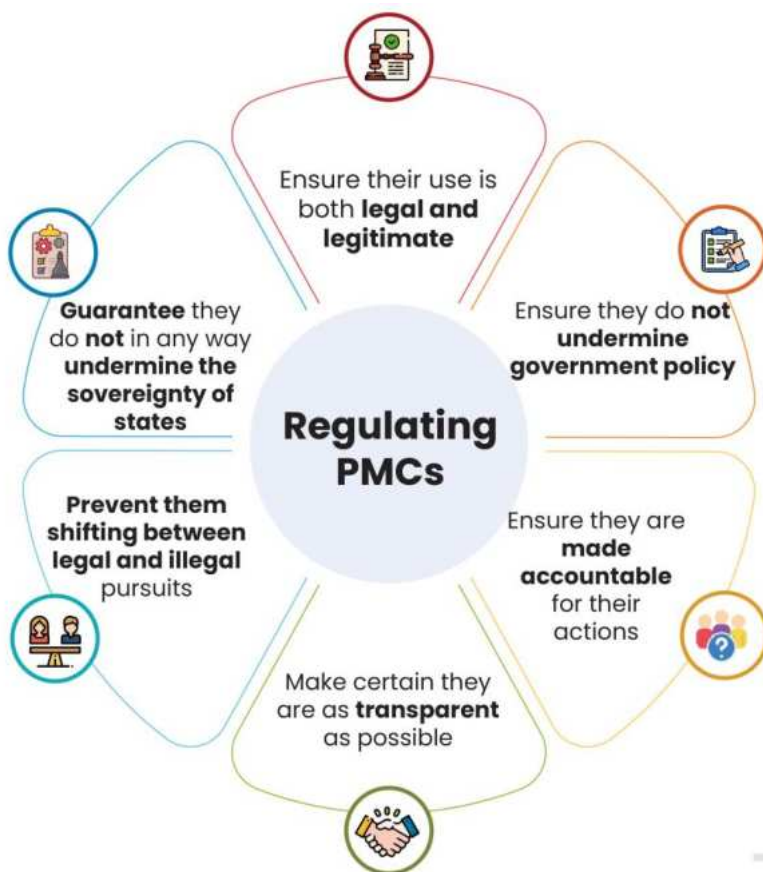
- **Legal Ambiguities:** The lack of clear international regulations and oversight regarding the activities of private armies has allowed them to operate in a **legal grey area**.

Issues associated with PMCs

- **Lack of Accountability**: The absence of clear legal framework and 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 responsibility of governments. This is potentially undermining the state's authority and control over security matters.
- **Conflict of Interest:** The pursuit of profit can compromise the impartiality, integrity, and effectiveness of their services.
- **Implications for Local Communities:** The presence of PMCs in conflict or post-conflict settings can have social and economic implications for local communities such as displacement, resource exploitation, or socio-cultural tensions.

Conclusion

Regulating Private Military Companies (PMCs) is essential to address the ethical, legal, and security concerns associated with their operations. Effective regulation requires **collaboration among states, international organizations, and other stakeholders**.

Ensure their use is both **legal and legitimate**

Ensure they do **not undermine government policy**

Guarantee they do **not** in any way **undermine the sovereignty of states**

Regulating PMCs

Ensure they are **made accountable** for their actions

Prevent them shifting between legal and illegal pursuits

Make certain they are as **transparent** as possible

International Laws and their applicability to PMCs
- **International human rights treaties** provide for individual petitions and reporting systems referred to by the states 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 and registered within its jurisdiction, 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.

4.3. NEWS IN SHORTS

4.3.1. SIPRI YEARBOOK 2023

- Stockholm International Peace Research Institute (SIPRI) released its **annual assessment of state of Armaments, Disarmament and International Security**.
- **Key findings**
  - o **USA has the largest number of deployed nuclear warheads** followed by Russia, France and UK **while**

Russia has the highest total inventory of nuclear warheads followed by USA and China**.**
- o **India, China, Pakistan, North Korea and Israel have no deployed nuclear warheads.**
- o **India has a total of 164 nuclear warhead** stockpiles.
- o Overall, **number of nuclear warheads continues to decline**, primarily **due to USA and Russia dismantling retired warheads.**

- With China modernizing and expanding its nuclear arsenal, **India and Pakistan** also appear to be **increasing the size of their nuclear weapon inventories.**
  - Raw material for nuclear weapons is either Highly Enriched Uranium (HEU) or separated Plutonium. **India has produced mainly plutonium**.
- SIPRI is an **independent international institute dedicated to research into conflict, armaments, arms control and disarmament**.

4.3.2. AGNI PRIME OR AGNI-P

- **New Generation Ballistic Missile** 'Agni Prime' was **successfully flight-tested by DRDO.**
- Agni-P is a **two-stage canisterised solid propellant ballistic missile** with dual redundant navigation and guidance system.
  - It has a **range between 1000 to 2000 km.**
  - It is **lighter than all the earlier Agni series** of missiles.
- Agni missiles **form the backbone of India's nuclear deterrence.**
  - **Agni-1 to 5 surface to surface ballistic missiles** are designed & **developed by DRDO**.
- Also, a successful training l**aunch of a Medium-Range Ballistic Missile, Agni-1 was carried out by the Strategic Forces Command from APJ Abdul Kalam Island**, Odisha.

4.3.3. MH-60R ROMEO HELICOPTER

- The Indian Navy achieved a unique feat after an **MH-60 'Romeo' multi-mission helicopter landed on the indigenously-built aircraft carrier INS Vikrant**.
- **About MH-60R helicopter:**
  - Manufactured by Lockheed Martin Corporation, it is an **all-weather helicopter** designed to support multiple missions with **state-of-the-art avionics and sensors**.
  - It is a versatile platform known for its exceptional **Anti-Submarine Warfare** (ASW), **surveillance, anti-shipping, and search and rescue capabilities.**

4.3.4. VARUNASTRA

- **Varunastra** was successfully test-fired with a live warhead against an undersea target, by **the Indian Navy.**
- It is **indigenously designed** and developed **ship-launched anti-submarine torpedo.**
- It was designed and developed by **Vizag-based Naval Science and Technological Laboratory (NSTL)** under the **DRDO** and is manufactured by **Bharat Dynamics Ltd (BDL)**

- With a maximum speed of **40 knots** and a maximum **operating depth of 600 m**, has a long range with **multi-manoeuvering capabilities.**
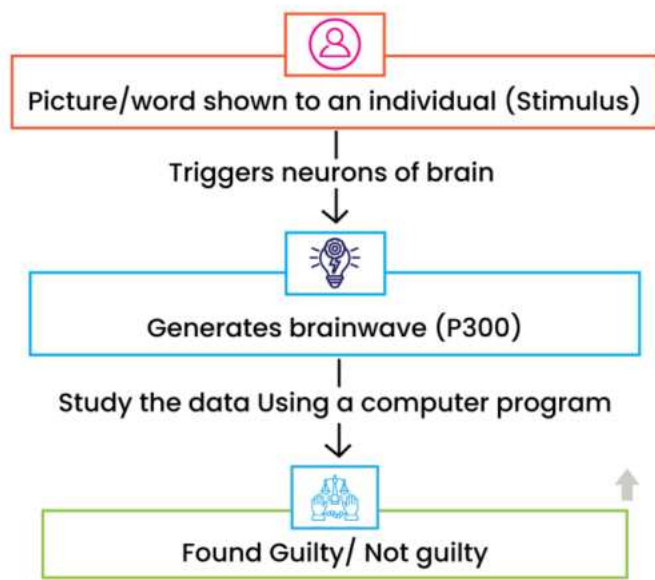
4.3.5. TAPAS UNMANNED AERIAL VEHICLE (UAV)

- **Indian Navy and DRDO** have successfully carried out control capabilities of TAPAS (Tactical Airborne Platform for Aerial Surveillance) UAV from a distant ground station to onboard INS Subhadra.
- Indigenously developed TAPAS 201 is a **Medium Altitude Long Endurance (MALE) UAV.**
  - It is **designed and developed by Bengaluru based Aeronautical Development Establishment (ADE).**
  - It is **capable to carry different combinations of payloads** like Medium Range Electro Optic, Long Range Electro Optic, Synthetic Aperture Radar etc. to perform **missions during day and night**.
  - It has an **endurance of more than 18 hours** and can operate at **altitudes of up to 28,000 feet**.
  - It can carry **payloads up to 350 kg.**

4.3.6. BRAIN ELECTRICAL OSCILLATION SIGNATURE PROFILING (BEOSP)

- **BEOSP, also known Brain Fingerprinting/Brain mapping/ P-300 test,** is a **neuro psychological method of interrogation**.
  - It is designed to **bring up the information** which could be **hidden in a person's brain by sensing brain wave responses** respective to words, phrases, or pictures presented.
  - BEOSP test is carried out via a **process known as electroencephalogram**, conducted to study the electrical behaviour of human brain.
- **How is it different from polygraph test?**
  - Unlike polygraph test, **it does not involve a question answer session with accused**.
    - ✓ In a **polygraph test**, accused person's **physiological indicators are taken into account** which includes blood pressure, pulse rate, respiration and skin conductivity.
  - Brain mapping is considered much **more credible than polygraph test**.
- **Applications of Brain fingerprinting**
  - **Determine the participation of accused** in a crime.
  - **Medical diagnosis and treatment** of Neurological diseases like Alzheimer.
  - **Counter Terrorism** by probing the possibility of a terrorist act by an individual.
- **In Selvi versus State of Karnataka case (2010), SC stated that narco analysis, polygraph and brain mapping tests** cannot be forced upon any individual

without their consent and test results **cannot be admitted solely** as evidence.

OPERATING MECHANISM

Picture/word shown to an individual (Stimulus)

↓

Triggers neurons of brain

↓

Generates brainwave (P300)

↓

Study the data Using a computer program

↓

Found Guilty/ Not guilty

4.3.7. EXERCISES IN NEWS

- **Exercise Ekatha:** It is an annual exercise **conducted between the navies of India and Maldives**.
- **EKUVERIN:** It is **joint military exercise** between **Indian Army and Maldives** National Defence Force.
- **Ex Khaan Quest 2023: Indian Army participated** in Ex Khaan Quest (in Mongolia), **a multinational peacekeeping joint exercise.**

5. ENVIRONMENT

5.1. 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).

More on news

- **ICIMOD** is an **intergovernmental knowledge** and **development organization** (established in 1983) that focuses on climate and environmental risks, green economies, and sustainable action.
  - Afghanistan, Bangladesh, Bhutan, China, **India**, Myanmar, Nepal, and Pakistan are its members.

OTHER IMPACTS ON HKH

- **Adverse impacts on biodiversity** like genetic and species loss, alteration in ecosystem structure, increase in invasive species, range shift etc.
- **Socio-economic impact** like crop loss and failure, fodder shortage, livestock deaths, migration, psychological impacts etc.
- Deposited **Persistent organic pollutants (POPs)** in glaciers such as PCBs (Polychlorinated Biphenyls) are released into the water cycle.
- **Decline in albedo will reduce** which will ultimately **impact the heat budget** of the earth.

- The WISE report highlighted the following impacts **climate change on HKH**:
  - **Glacier: Water Glaciers disappeared 65% faster in the 2010s** than in the previous decade.
    - ✓ For global warming between 1.5°C to 2°C, by **2100** glaciers are set to **lose 30%–50% of their volume compared with 2015.**
  - **Water Security:** With accelerated glacier melt, '**peak water' will be reached around mid-century** in most HKH river basins, and overall water availability is expected to decrease by the end of the century.
    - ✓ Peak water is a **stage in which the supply of fresh snow water** due to **glacier melt will be the highest ever.**
  - **Increase in Hazards:** Hazards like floods, and landslides, large avalanches, glacial lake outburst floods (GLOFs) etc. are projected to increase over the coming decades.
    - ✓ A **three-fold increase in GLOF risk** across the HKH is projected by the end of the twenty-first century.
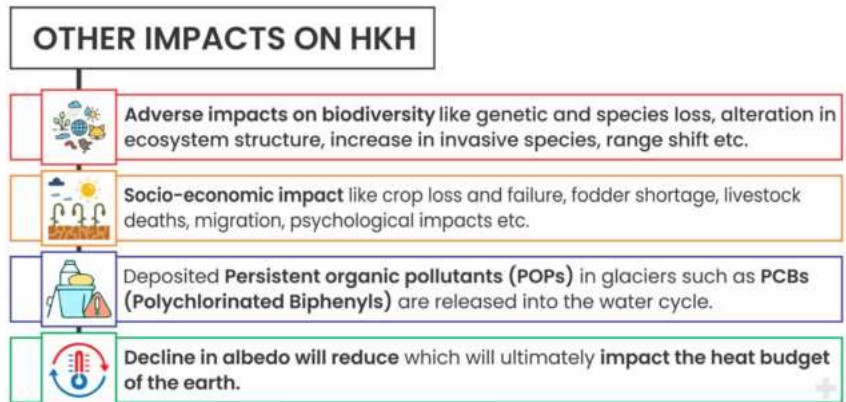
Hindu Kush Himalaya (HKH)

About HKH

- Stretches 3,500km **from Afghanistan to Myanmar.**
- Has the highest mountain ranges in the world and the **largest volume of ice on Earth outside the polar regions.**
- The region is also known as the **'Water Towers of Asia'.**

Hindu Kush Himalaya
River basins
Major rivers

Significance of HKH

| Feeds major Rivers Ganges, Indus, Irrawaddy, etc. | Regulates global climate system as the snow cover cools the atmosphere by reflecting sunlight. | Provides economic opportunities through recreational activities. | Cultural and spiritual importance, for example Gangotri glacier. | Cryosphere components including permafrost and glacial lakes provide various ecosystem services. |

Challenges in tackling the deteriorating situation in HKH

- **Poor adaptation capabilities:** There are large gaps between the adaptation needs of communities and their access to the necessary adaptation support due to less financial and technical support.
- **Complex and unpredictable Hazards:** Early warning and adaptation measures are difficult to implement as several different slow- onset hazards (like erosion) and fast-onset hazards (like GLOFs) are occurring in the same watersheds frequently at same time.
- **Population growth and infrastructure development:** It has exposed larger communities to increased hazards.
- **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:** HKH is spread over multiple countries leading to issues in data collection and implementing uniform policies.
- **Neglect at International Forums:** HKH's concerns are not given due priority in the international climate discussion such as the **United Nations Framework Convention on Climate Change's (UNFCCC's) Conference of Parties.**

Way Forward

- **Regional and global cooperation** are needed for-
  - **technical and financial assistance** to facilitate adaptation and mitigation,
  - enhancing **transboundary data and information sharing** and
  - effectively **protecting mountain communities and biodiversity hotspots**.

> **Steps Taken to protect Glacial Ecosystem**
> **India's Initiatives**
> - **National Mission for Sustaining the Himalayan Ecosystem (NMSHE)** is implemented by the **Department of Science and Technology.**
>   - It is 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.
> - **National Institute of Hydrology (NIH)** is conducting several studies for the assessment of runoff from the melting of glaciers at catchment and basin scales.
> **Global Initiatives**
> - **ICIMOD's** initiatives **like Hindu Kush Himalayan Monitoring and Assessment Programme (HIMAP), Mountain Ministerial Summit, etc**.
> - Framework for regional cooperation by **United Nations Development Programme (UNDP)** and ICIMOD.
> - **UNESCO's** World Glacier Monitoring Services.

- **Improve monitoring Network:** Techniques such as **in-situ measurements, remote sensing, satellite data, and modelling** can be combined to generate high-quality products.
- **Building adaptation and early warning strategies** taking into account the increased likelihood of multi-hazards and cascading events due to climate change.
- **Adopting Integrated Water Resources Management Approach:** Governments should thoroughly understand **water sources' contribution** to river flows to anticipate future changes.
- **Stakeholder engagement and communication:** Raising awareness among stakeholders (including mountain communities, civil society, private sector, governments, etc.) about the ongoing changes and preparation needed for tackling them.

5.2. ENERGY TRANSITION

Why in News?

World Economic Forum (WEF), in collaboration with Accenture, released the report titled "**Fostering Effective Energy Transition 2023**". In this report, **Energy Transition Index (ETI)** was published.

About Energy Transition Index (ETI), 2023

- It is prepared on the three parameters- **equity**, **security**, and **sustainable.**
- **Key Findings**
  - **Sweden** is placed at the first spot, followed by Norway and Denmark.
  - India has been **ranked at 67th place** out of 120 countries.
  - **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**, due to **rising challenges** to the **equity** and **inclusiveness** of the transition.

About Energy transition

- It 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

- **Reducing emissions and tackle Global warming:** Sector-wise**, electricity generation** is a major contributor in India's Greenhouse Gases (GHG) emissions (contributing around **34 %** in total emissions in 2019).
- **Environmental Impact**: Fossil fuel extraction and combustion have significant negative environmental impacts, such as **air and water pollution**, **habitat destruction**, etc.
- **Fulfill International Commitments**: India needs to accelerate the energy transition in order to fulfil its **Nationally determined contributions** (**NDCs**) and **Panchamrita Pledge**, such as- achieving **50%** energy from **non-fossil fuel** resources **by 2030, net-zero emissions by 2070, etc.**
- **Reduced Energy Dependency/Energy Security**: India needs to reduce its dependency on energy imports to overcome issues related to energy **supply chain volatilities**.
  - o For instance, recent economic and geopolitical developments, such as the Ukraine crisis, have led to high fuel prices, reducing accessibility of energy.
- **Energy accessibility and affordability**: Renewable power generation technologies, notably solar photovoltaic and onshore wind power, have become mature, cost competitive, and can enhance accessibility at different topography.
- **Create green jobs**: **International Renewable Energy Agency's Global Energy Transition Outlook** estimates that 43 million people could be employed in the RE sector by 2050.

WORLD ECONOMIC FORUM (WEF) — Geneva, Switzerland

Genesis: Established in 1971 as a **not-for-profit foundation**, it is the International Organization for **Public-Private Cooperation.**
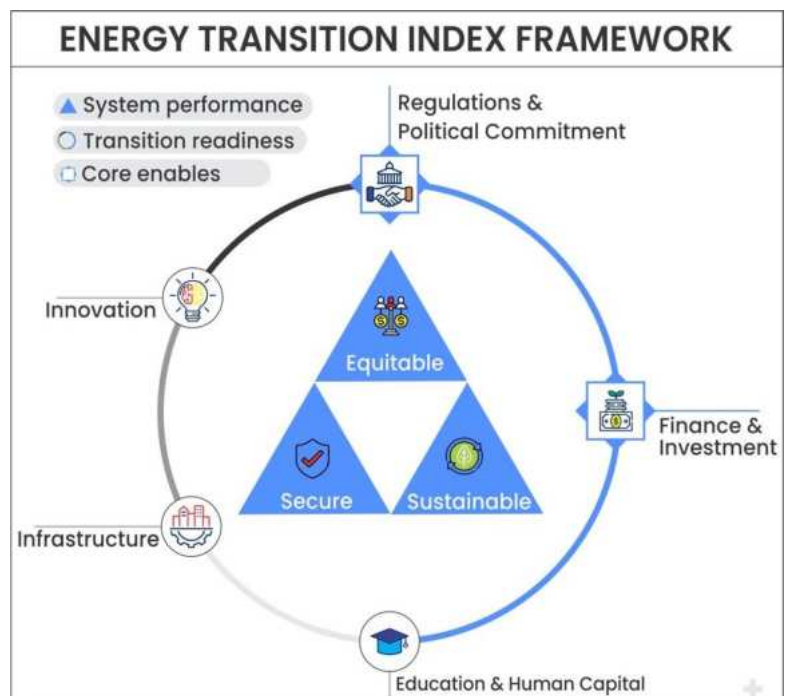
Objective: Engages the foremost **political, business, cultural,** and other **leaders of society** to shape **global, regional,** and **industry** agendas.

Key areas of focus: Fourth Industrial Revolution, Solving the **problems of global commons**, and addressing **global security issues.**

Membership: More than 390 firms from over 60 countries. (Membership is by invitation only)

Major Reports: Global Competitive Index, Global Gender Gap Report, etc.

Major Initiatives: G20 Global Smart Cities Alliance, Giving to Amplify Earth Action (GAEA), etc.

ENERGY TRANSITION INDEX FRAMEWORK

- ▲ System performance
- ○ Transition readiness
- ▢ Core enables

Regulations & Political Commitment
Finance & Investment
Education & Human Capital
Infrastructure
Innovation

Equitable / Secure / Sustainable

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.
- World Bank's First Low-Carbon Energy Programmatic Development Policy Operation.

Challenges in Energy Transition

- **High Dependence on Conventional sources:** As of June 2023, the total installed capacity from fossil sources in India is more than 50% of the total installed capacity.
- **Financial constraints:** As per some estimates, cumulative investments of up to **6–8 trillion USD** will be required **during 2015–2030** to transform the current energy systems in India.
  - The recently released **Low-cost finance for the Energy Transition Report (**by **IRENA** in close collaboration with the **Ministry of New and Renewable Energy)** also highlight the **need for an increase** in the **availability of low-cost capital** in G20 countries and beyond for the energy transition.
- **Low Private participation**: Private participation is limited due to low return and high risk, unclear or inconsistent policies and regulations, etc.
- **Ensuring Just Transition:** Unjust energy transition can exacerbate the **economic vulnerabilities of sectors and workers** engaged in **fossil fuel supply chains**.
- **Ambitions and implementation gaps between the Centre and the States:** Goals set at national levels could be misaligned with State priorities (e.g., coal rich resource preferring its utilization).
  - Further, energy transition can exacerbate legacy issues in the electricity sector, such as high discom losses, impacting state economies.

KNOW THE TERM

- **Just transition:** It is defined as a **low-carbon transition** that is fair, inclusive, creates decent work opportunities and leaves no one behind.
  - It adopts a **people-centered approach** and **focuses on addressing current** and **future challenges** of the energy system.

- **Availability of Technology**: India still lacks the capability of manufacturing large-scale **low carbon technologies (LCTs),** especially in segments of offshore wind, hydrogen electrolyzers, energy storage etc.
- **Inadequate infrastructure** such as energy storage systems, grid connectivity, transmission networks, etc.

Way Forward

- **Closing inefficient fossil fuel-based thermal power plants** and gradual phasing down of fossil fuel-based energy.
- **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** incorporating coordinated policies and actions to drive innovations in four areas – namely, enabling technologies, business models, market design, and system operation.
- **Promoting R&D for frontier technologies** in emergent fields like coal gasification, offshore wind, carbon capture, utilization and storage, high-efficiency fuel cells, advanced chemistry cells, etc.
- **International collaboration** through mechanisms such as **Just Energy Transition Partnerships (JETPs)**.
  - **JETPs** are financing cooperation mechanisms that help **heavily coal-dependent economies**, to make a just energy transition and **address the social consequences** of transitioning.
- **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 News: 'Tracking SDG 7: The Energy Progress' report
- It was released through the **collaboration between the International Energy Agency (IEA), International Renewable Energy Agency (IRENA), United Nations Statistics Division, World Bank,** and the WHO.
  - **SDG 7** provides for **achieving affordable, reliable, sustainable, and modern energy for all**.
- **Key Findings:**
  - The current pace is **not adequate to achieve any of the 2030 targets**.
  - Globally, access to electricity between 2010 and 2021, **grew from 84% of the world's population to 91%.**
  - To enable an energy system aligned with the 1.5°C target through the century, the **share of renewables in global energy mix** must reach **33–38% by 2030**, from the current 19.1% in 2020.
  - India alone **accounts for the largest share of the access deficit** (defined as the population lacking access to electricity), with **505 million** people lacking access, followed by China.

5.3. COAL BASED THERMAL POWER PLANTS EMISSION NORMS COMPLIANCE

Why in News?

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

More about news

- Report is based on data provided by the **Central Electricity Authority (CEA)** under the **Ministry of Power**.
- CSE had done assessment based on installation of **Flue Gas Desulphurization (FGD)** at TPPs.
- **Major finding:**
  - **Only 5%** of the coal power capacity has complied with emission norms so far.
  - **17% of** overall coal power capacity was still at very **initial stages** of compliance.

Central Electricity Authority (CEA)

New Delhi

- **Genesis:** It is a **statutory body, under Ministry of Power,** which has been constituted under the **Electricity Act, 2003.**

- **Vision:** To ensure reliable **24×7 power supply** of adequate quality to all consumers in the country.

- **Recent steps:** National Electricity Plan for the period of 2022-32; Guidelines on Design, Construction, O&M and Annual Certification of Coal Ash Ponds

- **Objective:** It **advises the central government** on the matters relating to the national electricity policy, and formulate short-term and prospective plans for the development of the electricity system.
  - It also specifies **technical standards and safety requirements** for electrical plants and electric lines.
  - It also specifies **grid standards and collects and records data** concerning the generation, trading, distribution and utilization of electricity.

- **Membership:** It consists of **not more than 14 members** including the Chairperson, who holds office during **the pleasure of the Central Government.**

Emission Norms for TPPs

- In 2015, **Ministry of Environment, Forest and Climate Change** first time introduced environmental emission standards **for controlling SO2, NOx & Mercury emissions** from coal-based TPPs under the **Environment (Protection) Act, 1986.**
- In **2021,** government extended the timelines for the majority of coal-based power plants in India.
  - **Three Categorization with three different deadlines**

Category	Location/area	Changed Deadlines
Category A	Within a **10-km radius of Delhi-NCR** and **cities population more than 10 Lakh**	**December 31, 2022 to December 31, 2024.**
Category B	**10-km radius of critically-polluted areas** or **non-attainment cities (**those cities failed to meet the **National Ambient Air Quality Standards**)	**December 31, 2023 to December 31, 2025.**
Category C	**For all other power plants**	**December 31, 2024 to December 31, 2026.**

  - Power plant units declared to retire before December 31, 2027 **will not be required to meet the specified norms for SOx.**
- **On water use:** All plants with **Once Through Cooling (OTC)** shall install **Cooling Tower (CT)**.
  - There is **temperature Limit** for discharge of Condenser Cooling Water from TPPs.
- **Use of beneficiated coal:** Its aim is to minimize **flyash generation**.
  - **Coal beneficiation** is a process through which the **combustion attribute of the coal is enhanced** by separating the inorganic impurities (volatile matter or ash) from **raw coal.**
  - Each TPPs generating station should achieve **100%** utilisation of total ash generated at plant.

Pollution Control Technologies (PCTs) at different stages of a power plant's operations		
Pre-combustion	**In-combustion**	**Post-combustion**
Coal washing and blending	• Installation of **Low NOx Burner (LNB)** and **Over-Fire Air (OFA)** inside the boiler are the in-combustion controls available for **NOx.** • **Limestone injection** into the **furnace** is an effective in-combustion control applicable for **SOx reduction.**	**Technologies available for** • **SOx emission:** Flue-gas desulfurization (FGD) • **NOx Emission**: **Selective Catalytic or Non-Catalytic Reduction** (SCR/SNCR) • **Particulate Matter (PM) Emission:** Electrostatic Precipitators (**for large PM)** or **fabric filters**.

Challenges in meeting New Standards

• **High investment:** As per CSE estimate, around one lakh crore (in 2020) required to achieve emission norms. Money is required for hiring skilled manpower, equipment, etc.
• **Import of Pollution Control Technologies (PCTs) equipment:** Certain components of FGD are not manufactured in India and **Lack of bidders for supply of FGD** is coming in the way of meeting the target for implementation in time.
   o Also due to deadlines there is **lack of time** for developing **indigenous manufacturing facility** in the country.
• **Impact of COVID-19 pandemic:** It delayed the entire process of planning, tendering and implementing the Flue Gas De-sulphurisation (FGD).
• **Meagre penalty for violating emission norms:** Power plant continues to function even if they are failing to achieve emission norms.

Suggestions

• **Dis-incentivise/incentivise plants:** It should be based on measures taken to meet the deadline by implementing policies.
• **Collaboration:** Central Electricity Authority and Ministry of Power should work in tandem and ensure that thermal power plants implement norms that are good for environment as well as the health of people.
• **Emission Data**: Stakeholders must publish transparently about emission data and their impact to immediate vicinity of TPPs for **public research** and **scrutiny.**
• **Provide one year grant window or subsidy scheme:** This can be done to expedite the implementation of the norms to enable fund-raising for the high upfront costs.
• **Removal of tax levied on imported Pollution Control Technologies (PCTs):** Tax benefits will encourage TPPs to utilize and import the technologies.

5.4. DISASTER MANAGEMENT IN INDIA

Why in News?

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

More on News

• The schemes were launched at a meeting conducted with States'/Union Territories' administrations under the **Vision @2047,** to further **strengthen the disaster risk reduction system** in the country to make **India disaster resilient.**

Institutional Mechanism of Disaster Management in India (under Disaster Management Act, 2005)

National
▸ National Disaster Management Authority (NDMA) the apex body, headed by the Prime Minister of India.
▸ National Executive Committee (NEC) prepares the National Plan for Disaster Management.
▸ National Disaster Response Force

State
▸ State Disaster Management Authority (SDMA) oversees disaster management in the state.
▸ State Executive Committee (SEC) assists the SDMA.
▸ State Disaster Response Forces (SDRFs)

District
▸ District National Disaster Management Authority (DDMA), headed by the District Collector, Deputy Commissioner, or District Magistrate.

• **Three major scheme includes:**
   o **Rs. 2,500-crore Project to reduce the risk of urban flooding** in the seven most populous metros- Mumbai, Chennai, Kolkata, Bengaluru, Hyderabad, Ahmedabad, and Pune.
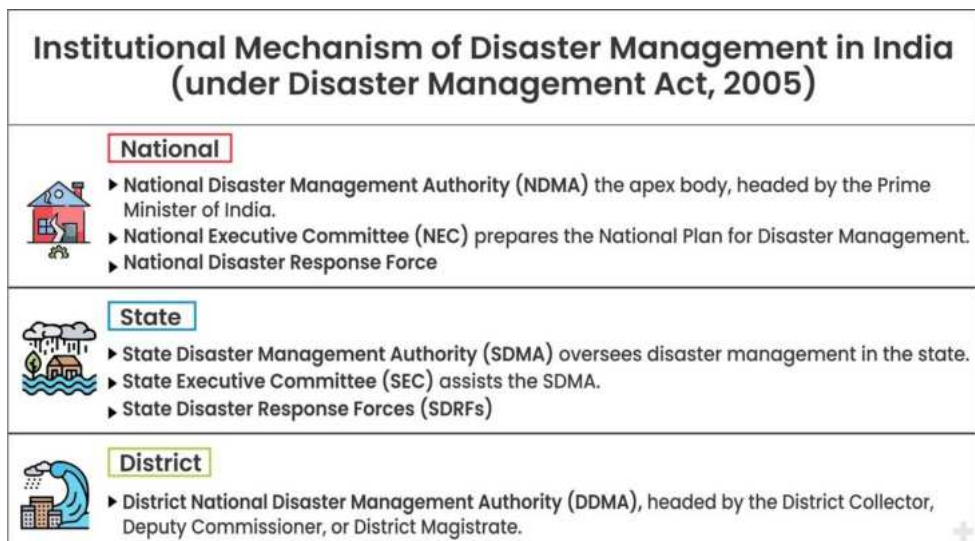
- o **Rs. 825 Crore National Landslide Risk Mitigation Project** for Landslide Mitigation in 17 States and Union Territories.
  - o **Rs. 5,000 crore Project to expand and modernize Fire services** across the states.
- Also, the Ministry highlighted that the approach to **disaster management in the country has been improved** by **replacing** the earlier approach of **reactionary and relief-centric** with a **holistic and integrated management approach.**

* The disasters covered under the newly launched schemes have been discussed in subsequent articles.

To know more about Landslides in India, refer to Monthly March 2023 magazine.

Steps taken in India to move away from reactionary and relief-centric approach

- **Holistic approach to disaster management**: In addition to rehabilitation and response, the Government of India also focussed on **prevention, mitigation and preparedness-based disaster management** at the grassroots level, through steps like-
  - o **Establishing National Disaster Mitigation Fund** and State Disaster Mitigation Fund in 2021 for mitigation activities.
  - o **Undertaking prevention activities** like planting of saplings on the banks of 13 major rivers which are prone to floods.
  - o **Developing advanced early warning systems**, e.g., India Meteorological Department (IMD) issues 5 days advance forecast of rainfall and flood.
- **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)**: It includes **Common Alerting Protocol** through SMS, **Disaster Management Information System Portal**, and Emergency Response Support System.
- **Cooperation between States and Union**: Collective responsibility and response mechanism was developed at the centre and state level.

> **Other initiatives for disaster Management in India**
> - **Policies like National Disaster Management Plan (NDMP), 2016 and National Policy on Disaster Management, 2009** cover all phases of disaster management: prevention, mitigation, response and recovery.
> - **NDMA guidelines** for disasters like earthquakes, cold wave, cyclone etc.
> - **Prime Minister released a ten point agenda** on Disaster Risk Reduction.
> - **National Disaster Response Fund** managed by the Central Government.
> - India is a **signatory to the Sendai Framework for Disaster Risk Reduction**.
> - India launched a multi-stakeholder global partnership- the **Coalition for Disaster Resilient Infrastructure (CDRI) in 2019.**

- **Involvement of community at grass root level**: Emphasis has been given to capacity development of the first responders to the disaster through awareness drives etc.
  - o For instance, **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.
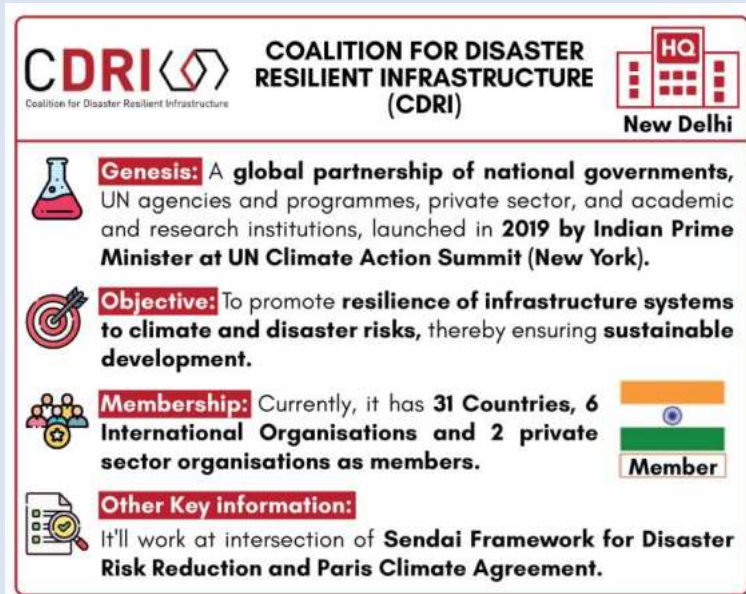
Challenges in Disaster Management

- **Poor coordination/Multiple Agencies**: Responsibilities of institutions such as NDMA and NEC as well as Union and state governments often overlap.
- **Slow progress at district level**: District Disaster Management Plans in 87 districts of 8 states are still pending.
- **Limited integration of Climate change into risk reduction plans**: Climate change has led to an increase in the frequency and intensity of disasters such as flash floods, landslides, droughts, cyclones, etc.
- **Capacity building and training**: Insufficient funds have been allocated for developing specialized units for different disasters.
- **Inadequate Early Warning Systems (EWS's)**: They still face issues like **lack of impact-based forecasts**, **poor dissemination** of **information** about risks, etc. in several disaster-prone areas.
- **Lack of infrastructure**: Many remote areas lack proper roads, communication networks, and emergency services, making it difficult to provide **timely assistance** during disasters.
- **Other issues: Limited public awareness** about disaster risks and preparedness measures; **weak compliance of policies** like building laws; timely mobilization of central assistance etc.

Way Forward

- **Strengthening coordination** mechanisms, **clarifying** roles and responsibilities, and **establishing clear lines of communication**.
- **Integrating climate change impacts into disaster plans** and developing **effective local response systems** for different disasters.
- **Promoting community-based disaster preparedness** and conducting awareness campaigns.
- **Training programs**, simulations, and exercises should be conducted regularly to enhance the skills and knowledge of stakeholders.
- **Improving** and **expanding early warning systems**, including weather forecasting and seismic monitoring.

Related News: Coalition for Disaster Resilient Infrastructure (CDRI)

- **Cabinet approved Ratification of the Headquarters Agreement (HQA)** between India and Coalition for Disaster Resilient Infrastructure (CDRI)
- In 2022, Cabinet had **approved recognition of CDRI as an International Organization** and for **signing of HQA** for **granting CDRI exemptions, immunities and privileges** as contemplated **under** Section- 3 of **United Nations (Privileges & Immunities) Act, 1947**.
  - o Act was **enacted to give effect to Convention on the Privileges and Immunities of the United Nations**, adopted by UN General Assembly in 1946.
    - ✓ **UN Charter allows UN**, and **also its officials**, to enjoy in the territory of each of its Members such **legal capacity, privileges and immunities** which are **necessary for the exercise of its functions** and the fulfilment of its purposes.
  - o **Section 3 of the act** states that **premises of UN** shall be **inviolable.** Act was also **extended to several other international organisations**.
- **Signing of HQA** will provide **CDRI an independent and international legal persona**, so that it can **carry out its functions internationally**, more efficiently.
- **It will allow CDRI to**
  - o **Deputing experts** and **also bringing in experts from member countries** to India.
  - o **Deploying funds globally and receiving contributions** from member countries.
  - o Providing **technical expertise** to assist countries to develop resilient infrastructure.
  - o **Leveraging international engagement** to foster disaster resilient infrastructure at home.

CDRI — COALITION FOR DISASTER RESILIENT INFRASTRUCTURE (CDRI) — New Delhi

Genesis: A global partnership of national governments, UN agencies and programmes, private sector, and academic and research institutions, launched in **2019 by Indian Prime Minister at UN Climate Action Summit (New York).**

Objective: To promote **resilience of infrastructure systems to climate and disaster risks,** thereby ensuring **sustainable development.**

Membership: Currently, it has **31 Countries, 6 International Organisations and 2 private sector organisations as members.** Member

Other Key information: It'll work at intersection of **Sendai Framework for Disaster Risk Reduction and Paris Climate Agreement.**

5.4.1. URBAN FLOODS

- Urban floods are defined as **excessive runoff in developed urban areas**, where the stormwater doesn't have anywhere to go due to poor capacity of the drainage system, **causing inundations**.
  - o They are **significantly different from rural flooding** as the developed catchments of urban areas increase the **flood peaks from 1.8 to 8 times** and **flood volumes by up to 6 times**.
- **Examples**: New Delhi (2023), Bengaluru (2022), Hyderabad (2020), etc.
- **Current Challenges in Urban Flood management**
  - o **Global climate change and the urban heat island effect is resulting in changed weather patterns** and increased episodes of high intensity rainfall events occurring in shorter periods of time.
  - o **Drainage infrastructure becoming easily overwhelmed** due to inadequate capacity and poor maintenance.
  - o **Unplanned development and poor land use planning in cities** leading to **encroachment of floodplains** and a **severe lack of blue and green spaces** to absorb excess water.
  - o **Lack of financial resources for implementing effective flood management strategies**: For instance, **retrofitting** existing **buildings and infrastructure** to withstand flooding can be costly and technically challenging.

- **Way Forward**
  - **Adopting integrated ecological approaches** which combine watershed land-use planning with the regional development planning.
  - **Enhancing capacity of drainage systems** by removing encroachments, redesigning storm water drainage based on scientific methodology etc.
  - **Creating detailed flood hazard and zonation maps.**
  - **Conservation and restoration of urban water bodies** by providing legal protection to lakes, remove encroachments, etc.

> **Initiatives to tackle urban flooding**
> - **Standard Operating Procedures (SOP) for mitigating Urban Flooding** by the Central Government under the **Atal Mission for Rejuvenation and Urban Transformation (AMRUT).**
> - **Flood management programme** provides financial assistance to the state governments for undertaking flood management works in critical areas.
> - **National Guidelines on Management** on **Urban Flooding** by the **National Disaster Management Authority (NDMA)**.
> - **Uniform System of Alerts and Warnings** by the **Ministry of Home Affairs**- categorizing alerts in stages – **Yellow, Orange and Red.**
> - **Integrated Flood Warning system like IFLOWS-Mumbai**.
>   - Similar system was also **introduced in Chennai (C-FLOWS)**

5.4.2. FIRES

- In India, fire incidents are often witnessed in **densely populated urban** areas, **congested markets**, **factories, slums, residential buildings**, and **public transport systems**, causing widespread destruction and loss of life and property.
- **Examples**: Commercial complex fire in Secunderabad, Hyderabad (2023), Hotel fire in Karol Bagh, Delhi (2019), Uphaar cinema, New Delhi (1997) etc.
- **Current challenges in fire risk management**
  - **Poor enforcement of Fire safety norms and building bylaws** by the civic authorities leading to **unauthorized construction, lack of regular monitoring and inspection, obsolete fire safety equipment, use of unsafe and low-quality fixtures** 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** to take effective safety measures to deal with fire incidents.
- **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, sprinklers, gas leakage 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, cinema halls, etc.
  - **Proper evaluation and scrutiny** before the sanction and renewal of the permits, licenses, approvals, etc.

> **Fire safety regulations in India**
> - **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.

5.5. CLOUD SEEDING

Why in news?

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

About Cloud Seeding

- Cloud seeding is a **kind of a weather modification technology** to create artificial rainfall.
  - Rain happens when moisture in the air reaches levels at which it can no longer be held.
  - **Cloud seeding aims to facilitate and accelerate** that process by making available **chemical 'nuclei' around which condensation can take place**.
- It works **only when there is enough pre-existing clouds in the atmosphere**.
- **Two ways of adding nuclei particles to clouds:**
  - Using **large cannons** that shoot particles into the sky
  - **Using airplanes** that drop the particles from above.
    - ✓ **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.
- **Mainly 8 Chemicals are used in Cloud seeding**: Silver iodide, dry ice, Potassium Iodide, Propane, Calcium Carbide, Ammonium Nitrate, Sodium Chloride, Urea Compound.
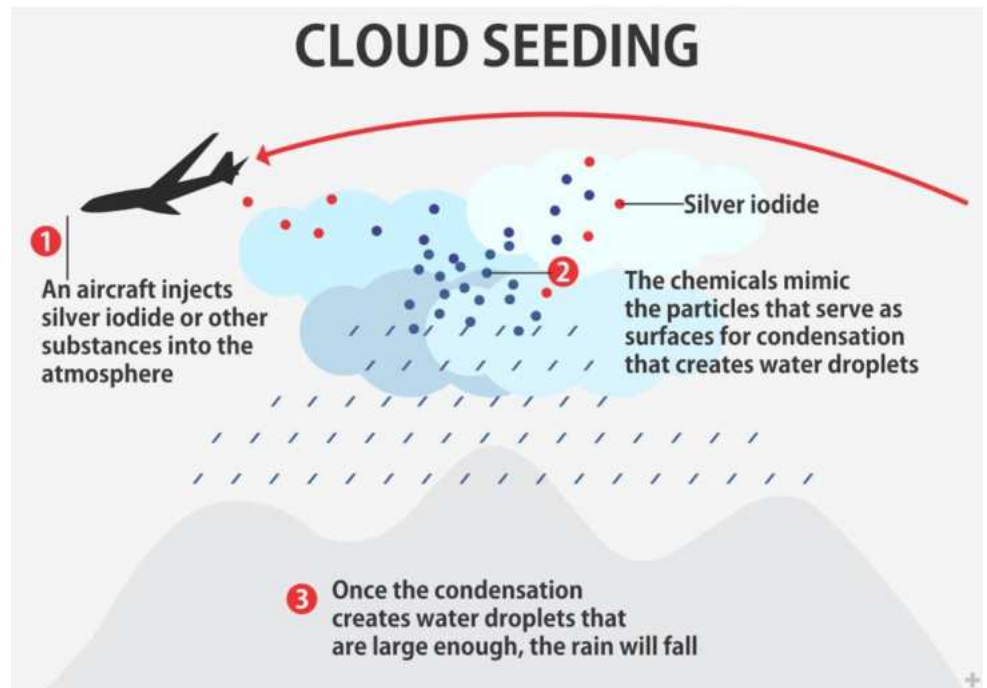
Benefits of Cloud seeding

- **Drought management:** Cloud seeding technique is useful for drought affected areas. As per India Meteorological Department (IMD), **87% of India's districts vulnerable to droughts.**
- **Clearing fog in airports:** During fog season many flight gets affected due to lowering visibility hence cloud seeding technique can help to improve the visibility.
- **Fight forest fires:** As per **India State of Forest Report (2021), 35.46%** of the forest cover is prone to forest fires. Rain through cloud seeding will help to reduce the forest fire affected region.
- **Suppress hail:** As seeding accelerates hail embryos growth at lower level in the cloud, where liquid water content is smaller and updrafts are weaker.
- **Divert rainfall:** Clouds can be diverted to other region based on requirement such as during 2008 Olympics opening ceremony Beijing used it to make ceremony **precipitation-free.**
- **Improve water availability:** Cloud seeding will help to distribute rainfall across the country and hence help to recharge aquifers.

Issues in Cloud seeding

- **Bioaccumulation:** For example Silver iodide chemical is most commonly used to seed a cloud is known to be toxic for aquatic life because of bioaccumulation.
  - **Bioaccumulation** is a process of accumulation of chemicals in an organism that takes place if the rate of intake exceeds the rate of excretion.
- **Increasing Carbon footprint:** Cloud seeding through dry ice (Carbon di oxide) is source of Greenhouse Gases and affects the climate change.
- **Uncertainty on effectiveness:** The World Meteorological Organization adopted guidelines in 2017 advising members not to perform weather modification activities without considering the high levels of uncertainty in effectiveness and potential harms involved.
- **Not all types of clouds are suitable:** Clouds must be deep enough and of a suitable temperature (between -10 and -12 degrees Celsius) to be seeded effectively.
- **Disturbing the Hydrological cycles:** Cloud seeding simply redistributes rain in drought affected areas which can ultimately affect the Hydrological cycles.

Conclusion

Cloud seeding technology holds significant promise for addressing water scarcity and mitigating drought conditions. However, to fully unlock its potential, further improvements are needed. Such as incorporating **nanotechnology-based Titanium dioxide coating** on salt particles can enhance the effectiveness of cloud seeding operations. Nevertheless, it is imperative to conduct extensive research to fully comprehend the long-term implications and potential risks associated with cloud seeding.

5.6. NEWS IN SHORTS

5.6.1. UN'S HIGH SEAS TREATY

- **Adopted by** the **Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction** (BBNJ), "high seas" treaty aims at **taking stewardship of ocean** on behalf of present and future generations.
  - It has been **adopted under** the framework of **United Nations Convention on Laws of the Sea (UNCLOS).**
  - **It is legally binding** in nature. It will only enter into force once **60 countries have ratified** it.
- **Key highlights of the treaty**
  - **Strengthening resilience** and contains provisions **based on polluter-pays principle** as well as mechanisms for disputes.
  - Parties must **assess potential environmental impacts** of any planned activities **beyond their jurisdictions.**
  - Offers guidance, including through an **integrated approach to ocean management** that builds ecosystem resilience **to tackle** adverse effects of **climate change** and **ocean acidification**.
  - **Recognize rights and traditional knowledge of indigenous peoples and local communities**, freedom of scientific research, and need for the fair and equitable sharing of benefits.

  - It **aims to establish large-scale marine protected areas in international waters**, which protect marine biodiversity in high seas.
  - It also **calls for setting up of a Conference of Parties to oversee and enforce compliance** with treaty's terms.

5.6.2. BONN CLIMATE MEET

- **Bonn climate meet was held to** set the agenda and preparation for CoP 28 to be held at Dubai.
- **Key Discussions during the conference:**
  - **A draft framework for Global Stocktake (GST) was released**
    - ✓ It is an exercise **aimed at assessing countries progress against climate change**, and deciding ways and means to enhance global action against climate change.
    - ✓ **The first GST will take place in CoP 28** as mandated by the 2015 Paris agreement.
  - **The Mitigation Work Programme (MWP):** It was set up at **COP26 in Glasgow** in 2021 for climate action focusing on increasing emission cuts.
    - ✓ **The developing countries complained that the developed countries are yet to offer finance and technology transfers** to achieve their emission targets.
  - **Loss and Damage Principle**: It was a **result of CoP27.**

- ✓ Developed and Developing countries were divided on how it would be funded.
  - o **The New Collective Qualified Goals (NCQG)** which was **agreed upon by the 2015 Paris conference for climate financing prior to 2025 is set to miss its target.**
    - ✓ The **Developed countries are reluctant and called for viewing NCQG as a "collective goal" for all developed and developing countries**.

> **Related News**:
> - **European Investment Bank, is expected to back 'Debt for Nature Swap'** this year.
>   - o **Debt for Nature Swap, is an arrangement in which countries cut their debt in return for conservation commitments.**

5.6.3. PARIS FINANCE MEET

- **Summit for a New Global Financing Pact** concluded recently in Paris, France.
- Summit's objective is to **boost crisis financing for low-income states** and ease their debt burdens, **reform post-war financial systems** and **free up funds to tackle climate change.**
- **Key announcement made at summit**
  - o An additional lending capacity of **$200 billion of Multi-Development Banks (MDBs) would be unlocked for emerging economies.**
    - ✓ World Bank announced **disaster clauses for debt deals** that would suspend debt payment in case of extreme weather events.
  - o **$100bn is to be provided to poorer countries** through SDRs (form of currency provided by IMF).
    - ✓ **Recycling of SDRs from rich countries to poor countries** has been proposed to expand the amount of concessional finance to developing countries.
  - o New **2.5 billion Euro Just Energy Transition Partnerships (JETP) deal was announced** for Senegal to increase renewable share in energy mix.
  - o Momentum on **polluter taxes accelerated.** Pollution tax is a **tax levied on persons who pollute** environment.
  - o **Proposed a Global Expert Review on Debt, Nature, and Climate** to assess impact of debt on low- and medium-income countries' capacity.
  - o EU unveiled a call to action on '**Paris Aligned Carbon Markets'** with the goal of **covering at least 60 percent of global emissions** with carbon pricing mechanisms.
  - o Long overdue **$100 billion climate finance goal will be delivered this year (2023).**

5.6.4. GLOBAL ENVIRONMENT FACILITY (GEF) APPROVES GLOBAL BIODIVERSITY FRAMEWORK FUND (GBFF)

- **64th GEF council meeting** was held in Brazil.
- **GEF's governing board has approved the establishment of a new fund GBFF** to finance the implementation of Kunming-Montreal Global Biodiversity Framework (KMGBF).
  - o The approved GBFF will be launched at the next GEF Assembly in Canada by August 2023.
- GBFF will draw in capital from governments, private sector, and philanthropic organisations and **will focus on eight thematic Action Areas** namely Biodiversity conservation, restoration, land/sea-use and spatial planning, etc.
  - o GBFF **acknowledges the important roles and contributions of indigenous peoples** as custodians of biodiversity and in its conservation, restoration and sustainable use.
- **Three principles that guide the country's allocation of resources for GBFF**
  - o Allocation system must **accommodate financial contributions on a rolling basis**.
  - o Consider **special needs of Least Developed Countries and Small Island developing States**.
  - o Acknowledge that biodiversity is not evenly distributed across the globe and some areas have greater potential to contribute to global biodiversity benefits than others.
- **KMGBF** was **adopted by COP15 (Montreal)** of UN Convention on Biological Diversity.
  - o It has **set 23 targets to be achieved by 2030**, which include 3**0% conservation of land and sea, 30% restoration of degraded ecosystems** and halving the introduction of invasive species.
- **About GEF**
  - o GEF is a **multi stakeholder partnership** to tackle various environmental issues **established during the 1992 Rio Earth Summit of UNFCCC.**
  - o GEF funding is provided by **participating donor countries** and is **mobilized through a replenishment process every four years**.
  - o It serves as **"financial mechanism" to five conventions**
    - ✓ **Convention on Biological Diversity (CBD).**
    - ✓ **United Nations Framework Convention on Climate Change (UNFCCC).**
    - ✓ **Stockholm Convention on Persistent Organic Pollutants (POPs).**
    - ✓ **UN Convention to Combat Desertification (UNCCD).**
    - ✓ **Minamata Convention on Mercury.**

- o **Structure of GCF:**
    - ✓ The GEF **Assembly** is composed of **all 185 member countries**, or participants including **India**.
    - ✓ The **GEF Council is the main governing body**, with 32 members appointed by constituencies of GEF member countries.
    - ✓ The **GEF Secretariat** is based in Washington, D.C.

5.6.5. WORLD ENVIRONMENT DAY (WED) 2023

- World Environment Day 2023 marks the completion of **50 years** of its establishment on 5th June, 2023.
    - o WED is observed on **5th June** every year since **1973** as part of the **United Nations Environment Programme (UNEP)** to build awareness to save life on planet Earth.
- Every year World Environment Day has a **specific host country and a theme.**
    - o This year host is the **West African country of Côte d'Ivoire**, in partnership with the **Netherlands** with theme '**Beat Plastic Pollution**.'
    - o **45th World Environment Day** with the same theme was held under the leadership of **India.**
- Ministry of Environment, Forest and Climate Change on occasion of WED 2023 launched two schemes named **Amrit Dharohar** and **MISHTI (Mangrove Initiative for Shoreline Habitats and Tangible Incomes).**

UN Environment Programme (UNEP)
Nairobi, Kenya

Genesis: An **intergovernmental organization** established in June 1972 as **an outcome from the United Nations Conference on the Human Environment** (Stockholm Conference, 1972).

Objective: Sets the global environmental agenda, promotes the coherent implementation of the environmental dimension of sustainable development and serves as an authoritative advocate for the global environment.

Membership: 193 Member States

Other key information:
- Works **under the umbrella of the UN 2030 Agenda for Sustainable Development,** identifying and addressing the most relevant environmental issues of our time.
- **Structure:** Chaired by its Executive Director.
- Depends on **voluntary contributions for 95% of its income.**
- **Administers,** or provides **secretariat functions** for many multilateral environmental agreements (MEAs) and other entities

Major Reports:
- Global Environment Outlook (GEO) Report
- Adaptation Gap Report
- Triple Emergency
- Cooling Emissions And Policy Synthesis Report (published by UNEP in association with Cooling Emissions And Policy Synthesis Report)

5.6.6. CLIMATE CHANGE AND FOOD CHOICES

- A recent study highlighted the importance of **bringing changes in food choices and dietary habits** to reduce emissions and tackle global warming.
- According to the research, **food consumption** in the 5 highest emitting countries, China, India, Indonesia, Brazil, and the US, was responsible for more than **40% of the global food supply chain emissions** in 2019.
- **Food choices** are **increasingly contributing to global emissions** due to-
    - o **Shift in diets to animal-based products**, like red meat, dairy, and farmed shrimp, resulting in increased ruminant enteric emissions, deforestation, etc.
    - o **Preference to packaged and processed goods.**
    - o **Globalisation of food choices** (increases emission due to transport, refrigeration etc.).
    - o **Widespread consumption of unsustainably produced food** (increase in emissions from overuse of synthetic fertilizers).
    - o **Food wastage**: At least 6% of global greenhouse gas emissions come from wasted food.
- **Way forward:** Promoting **plant-rich diets** or **plant-based protein** (such as beans, grains, etc.); alternatives such as lab-grown meat; preferring **locally produced and seasonal food**; prioritizing **unpackaged** and **sustainably farmed whole food** products, minimizing food wastage at home etc.
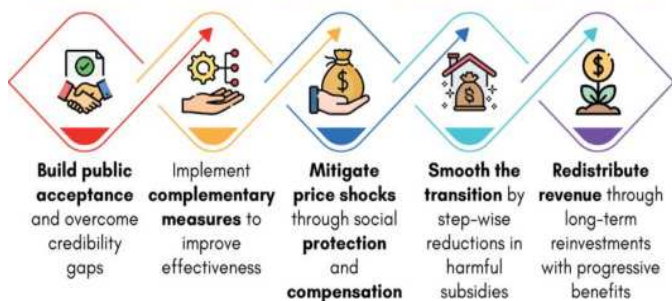

DO YOU KNOW?

- Substantial increase in consuming animal-based products between 2000 and 2019 contributed to some 95% of the global emissions rise associated with food.

5.6.7. SUBSIDIES AND CLIMATE CHANGE

- According to a recent report by the World Bank **subsidies don't help fight climate change**.
- **Key Highlights of the report:**
    - o Report highlights the **negative consequences of inefficiently subsidising agriculture, fishing, and fossil fuel sectors,** both implicitly and explicitly, by spending trillions of dollars, exacerbating climate change.

- o These subsidies exceed about **8% of global gross domestic product.**
- o The distribution of subsidies across sectors and countries is **highly skewed and uneven.**
- **Effects of subsidies:**
  - o **Agriculture subsidies** are responsible for the **loss of 2.2 million hectares of forest per year** - or 14% of global deforestation.
  - o **Fossil fuel usage,** incentivized by subsidies, is a key driver of the **7 million premature deaths each year** due to air pollution.
  - o Fisheries subsidies, which **exceed $35 billion each year**, are a key driver of **dwindling fish stocks, oversized fishing fleets, and falling profitability.**

GUIDING PRINCIPLES FOR SUBSIDY REFORMS

| Build public acceptance and overcome credibility gaps | Implement complementary measures to improve effectiveness | Mitigate price shocks through social protection and compensation | Smooth the transition by step-wise reductions in harmful subsidies | Redistribute revenue through long-term reinvestments with progressive benefits |

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

- Ministry of Environment, Forest and Climate Change (MoEF&CC) notified Draft GCP Implementation Rules 2023.
- MoEF&CC has decided to institute GCP under **Environment (Protection) Act, 1986 and issued these draft rules**.
- **Draft GCP Implementation Rules 2023**
  - o Green Credit (GC) means a **singular unit of an incentive** provided for a specified activity, delivering a **positive impact on the environment**.
  - o **Objectives of GCP:**
    - ✓ Create a **market-based mechanism for providing GCs** to individuals, organizations, local bodies, gram panchayats, private sectors etc. for environment positive actions.
    - ✓ Create **mass movement around environment positive actions** and realize the vision of **Mission LiFE**.
  - o 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.

- o The **Indian Council of Forestry Research and Education** is the administrator of the GCP, responsible for its implementation, management and monitoring.
- **GCP was announced during the Union Budget 2023,** aligning with India's climate goals under Paris Agreement and realizing the vision of "Mission LiFE".
  - o GCP aims to leverage a **competitive market-based approach for Green Credits** thereby incentivising voluntary environmental actions of various stakeholders.
  - o **Article 6 of Paris Agreement** allows for carbon trading through market mechanisms**.**
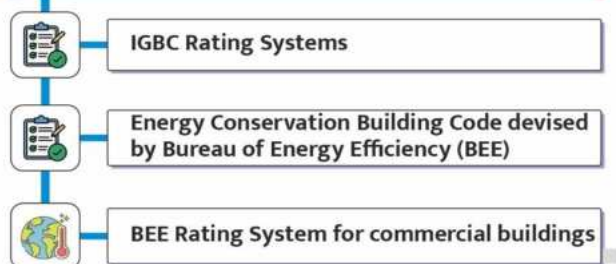

5.6.9. SHORT-LIVED HALOGENS (SLH)

- As per a recent study, **oceans cool the planet by releasing short-lived halogens** that contribute 8-10 per cent of cooling.
- **SLH (lifetime of less than six months) are gases** that contain the halogen elements chlorine, bromine, or iodine.
  - o **Source:** Marine phytoplankton and algae, as well as abiotic sources from ocean and tropospheric chemistry.
  - o **Impact:** SLH from oceans reduces warming by depleting ozone and **reduce** the formation of **cooling aerosols**
  - o SLH **increase methane's lifetime** in the atmosphere and **increase the levels of water vapour.**

5.6.10. LEED RATING SYSTEM

- **India outperforms US and China** in Leadership in Energy and Environmental Design (LEED) net zero certifications.
- **LEED rating system** provides a framework for healthy, efficient, carbon and cost-saving green buildings.
  - It is a **globally recognized certification system** developed by **U.S. Green Building Council** and administered by **Green Business Certification Inc.**
  - It **achieves and recognizes building at four certification level** (Certified, Silver, Gold, Platinum).
  - **LEED India Programme** is administered **by Indian Green Building Council (IGBC).**
- A complement to LEED certification, **LEED Zero** recognises projects that have **reached net zero or net positive status in the categories of carbon, energy, water, or waste**.
  - India has **73 LEED Zero certified projects**, comprising **45% of the more than 150 total LEED Zero certifications.**
    - ✓ Nearly **one-third of all carbon emissions in India** come from **building and construction sector.**
  - **Haryana and Tamil Nadu are leading** states in certifications.
  - **India's DLF group** is the leader globally in total LEED Zero certifications.
- **Green Rating for Integrated Habitat Assessment (GRIHA) is India's own green building rating system** jointly developed by The Energy & Resources Institute (TERI) and Ministry of New and Renewable Energy.
  - GRIHA is a **five star rating system**. Rating is **valid for a period of 5 years.**

Other initiatives for Green Building in India

- IGBC Rating Systems
- Energy Conservation Building Code devised by Bureau of Energy Efficiency (BEE)
- BEE Rating System for commercial buildings

5.6.11. NATIONAL WATER AWARDS

- President of India conferred **4th National Water Awards, 2022. Prominent winners are** Madhya Pradesh (**Best State**), Ganjam in Odisha (**Best District**).
- **About National Water Awards:**
  - First **launched in 2018** by Department of Water Resources, River Development & Ganga Rejuvenation.
    - ✓ **2nd and 3rd editions** were given for the **years 2019 and 2020**.
    - ✓ Awards were **not given in the year 2021** due to COVID pandemic.
- **Objective**: To encourage various stakeholders towards adopting a **holistic approach towards water resources management** in the country.

5.6.12. DESICCATION-TOLERANT VASCULAR (DT) PLANTS

- New study discovered **62 desiccation-tolerant vascular plant species in India's Western Ghats**, having applications in agriculture.
  - DT Plants **are plants that are capable to withstand extreme dehydration**, losing up to **95% of their water content**, and they revive themselves once water is available again.
  - **Plants resistant to desiccation** are commonly known as "**resurrection plants**" (vascular and non-vascular plants).
- In tropical regions, they are the **predominant occupants of rock outcrops**.
- Rock outcrops are visible exposures of **bedrock or other geologic formations at the surface of the Earth.**

5.6.13. PROTOSTEROL BIOTA

- According to a recent study **Protosterol Biota inhabited the underwater world over 1.6 billion years ago** (Proterozoic Eon).
- These microscopic organisms belong to **eukaryotes and** are **the source of the evolution of life on Earth.**
  - **Eukaryotes** are single-celled or multicellular organisms whose cells contain a **nucleus and other membrane-bound organelles.**
  - Modern forms of **eukaryotes include fungi, plants, animals and single-celled organisms** such as amoebae.

5.6.14. BAN ON DRUGS HARMFUL FOR VULTURES

- **Drugs Technical Advisory Board (DTAB)** recommended ban **on two more drugs** harmful for vultures.
- DTAB agreed to **prohibit manufacture, sale and distribution of drugs Ketoprofen and Aceclofenac** for treatment of livestock animals **to conserve vultures.**
  - DTAB is the **highest statutory decision-making body on technical matters related to drugs in the country.**

- It is part of **Central Drugs Standard Control Organization (CDSCO)** in Ministry of Health and Family Welfare.
- **Ketoprofen, Aceclofenac, Diclofenac and Nimesulide are Non-steroidal Anti-Inflammatory drugs (NSAIDs)** used in veterinary practice **that have been proven toxic to vultures** and other birds of prey.
  - **Diclofenac is already banned** by India.
- **Some NSAIDs are not fully metabolized** by vultures and **cause damage to the birds' kidneys**.
  - **Treated cattle metabolize NSAIDs** within 3-4 days of treatment and **therefore do not pose a threat** to vultures **if they die after such a period** has lapsed.
- **A total of nine species of vultures are found in India.** These are:
  - Oriental White-backed Vulture, Slender billed Vulture, Long billed Vulture, Egyptian Vulture, Red Headed Vulture, Indian Griffon Vulture, Himalayan Griffon, Cinereous Vulture and Bearded Vulture or Lammergeier.
  - **Population of White-backed Vulture, Slender billed Vulture and Long billed Vulture** (all three **Critically Endangered**) has **declined drastically** over the past decades.

5.6.15. RIVER SAND MINING

- National Green Tribunal (NGT) has made it **mandatory to obtain consent from concerned SPCBs** for **river sand mining.**
  - NGT directed **MoEFCC** to issue guidelines within two months to ensure that it is uniformly applicable.
  - **No river sand mining will be allowed to continue in country without obtaining these consents** with effect from **1st September 2023.**
- Sand mining is **extraction of sand, mainly through an open pit** but sometimes mined from inland dunes from oceans, riverbeds and beaches.
  - It is classified as a '**minor mineral**' under **section 3(e) of Mines and Mineral (Development and Regulation) i.e., MMDR Act 1957** and **administrative control vests with State Governments.**
- **Impact of sand mining**
  - **Alter river bed,** force river to change course, erode banks and lead to flooding.
  - **Destroys habitat of aquatic animals** and micro-organisms besides **affecting groundwater recharge**.
- **Initiatives taken to curb sand mining**
  - **Sustainable Sand Mining Management Guidelines 2016**, issued by **MoEFCC,** encourages scientific

sand mining and environmentally friendly management method.
  - **Sand Mining Framework, 2018,** prepared by **Ministry of Mines,** envisages **alternative sources of sand in form of Manufactured -Sand from crushed rock fines** (crusher dust), etc.

5.6.16. MARINE NOISE POLLUTION

- **The Convention on the Conservation of Migratory Species of Wild Animals (CMS)** released a report to address a major threat to marine species: **noise pollution.**
- The report focuses on **three major sources of noise pollution**:
  - **shipping**,
  - **seismic airgun surveys (**used in oil and gas exploration)
  - **pile driving (**used for offshore wind farms and other marine infrastructure).
- **Solution offered to reduce noise pollution:**
  - Alterations in **ship design** and **propeller technology,** and **improving operating conditions**;
  - **Marine Vibroseis,** a **technology designed to produce controlled vibration as compared to airgun.**
  - **Lower-frequency seismic signals**, etc.

5.6.17. INDIAN OCEAN DIPOLE (IOD) AND EL-NINO

- While the El Nino is already firmly **established in the Pacific Ocean** this year, a **positive IOD development** is also being forecasted by different meteorological agencies.
- **IOD** is defined by the difference in sea surface temperature between the eastern and western sides of the Indian Ocean.
- **Relation between Niño-Southern Oscillation (ENSO) and IOD**
  - The air circulation in the Indian Ocean **is from west to east, and in opposite directions at the upper level.**
  - In a normal year warm water from the **west Pacific cross over to the Indian Ocean** and make the air rise and strengthening the air circulation.
  - During ELnino, the western side of the Pacific is cooler than normal because of which the Indian Ocean side also gets cooler and helps **in the development of positive IOD.**
  - Similarly negative **IOD is associated with LA-lina.**
  - Researchers believe that while external factors such as ENSO can trigger IOD, **many times is caused by the local circulations.**

- A positive IOD helps **rainfall along the African coast, and Indian subcontinent** while suppressing it in the eastern Indian Ocean, and the opposite during a negative IOD.
  - Compared with ENSO events, the impact of IODs is much weaker but they can subdue the impact of ENSO
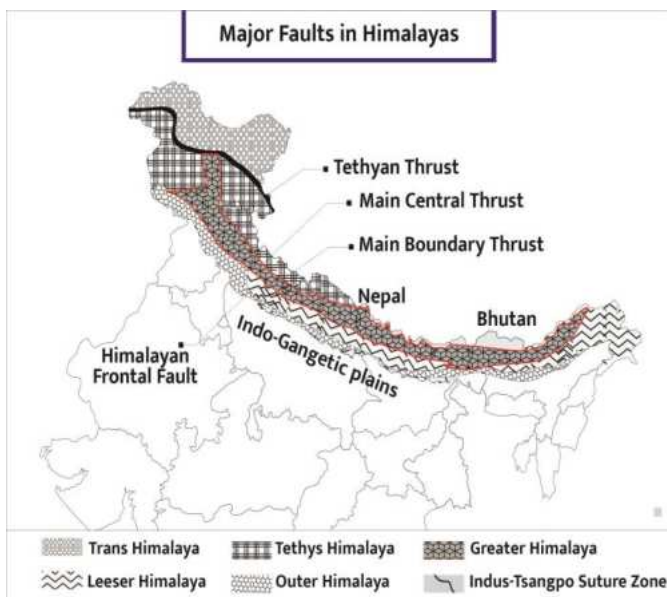

INDIAN OCEAN DIPOLE (Negative phase)

INDIAN OCEAN DIPOLE (Positive phase)
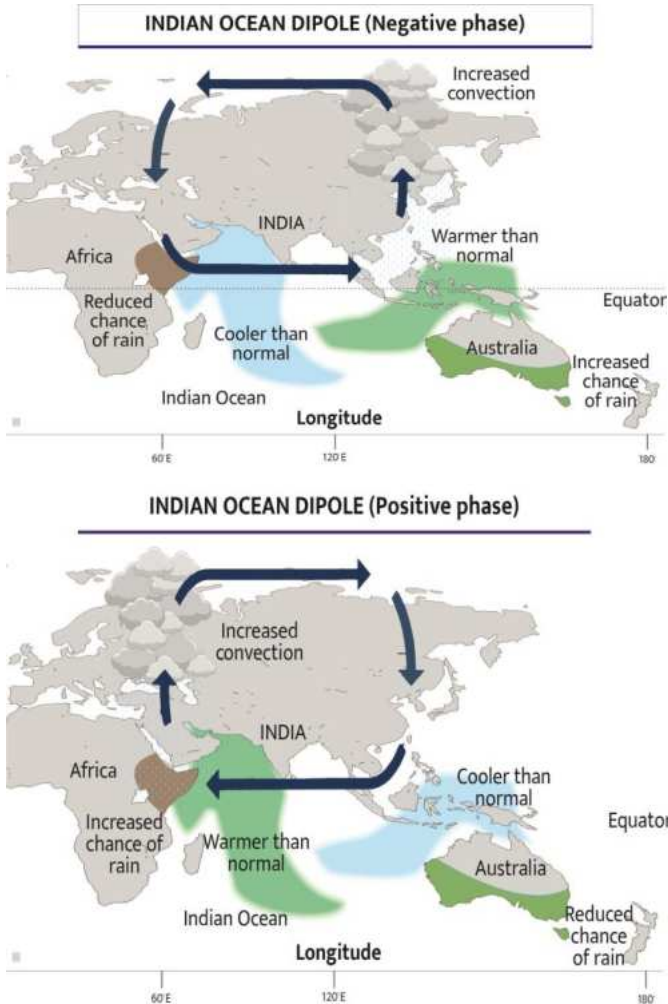
5.6.18. CYCLONES IN ARABIAN SEA

- Cyclone Biparjoy, **earlier headed towards Pakistan coastline**, is now **predicted to move towards northern Gujarat coast**, with a landfall expected on June 15.
  - Cyclones in Arabian Sea **usually do not move towards Indian coast**.
  - **Most of them**, more than 75%, **move northwards or north-westwards** with trajectory directed **towards Pakistan, Iran or Oman.**
- 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.**

5.6.19. EARTHQUAKE IN JAMMU & KASHMIR AND LADAKH

- Jammu & Kashmir and Ladakh hit by **several mild-intensity earthquakes within 24 hours.**
- **Geology of the Himalayas**, determined largely by the **ongoing collision of Indian tectonic plate with Eurasian plate**, makes the region particularly **vulnerable to earthquakes**.
  - **Indian plate is diving under** (subduction) the **Eurasian plate** in north-northeast direction.
- **Geology of the Himalayas** on its southern side **is characterised by three major tectonic units:**
  - **Main Central Thrust** (MCT)
  - **Main Boundary Thrust** (MBT)
  - **Himalayan Frontal Thrust** (HFT) or **Main Frontal Thrust** (MFT).
- **Highest and oldest of these is MCT**, which is a north-dipping fault and marks **tectonic contact between higher and lesser Himalayas.**
  - **Lesser and sub-Himalayas are separated by MBT**, and HFT constitutes southern-most and youngest thrust.
  - All these three faults **conjoin along basal detachment plane**—called decollément in geophysical language—called Main Himalayan Thrust (MHT).
- In the current era, **both MBT and HFT faults are considered more active** compared to MCT.
- There is **about 700 km stretch in Central Himalayas** where **MFT has shown no sign of any rupturing** for several centuries, which is **referred to as "Central seismic gap".**
- Seismic gap regions are **high risk areas for large earthquakes** in the future.

Major Faults in Himalayas

Trans Himalaya · Tethys Himalaya · Greater Himalaya · Leeser Himalaya · Outer Himalaya · Indus-Tsangpo Suture Zone

5.6.20. GROUNDWATER EXTRACTION TILTED EARTH'S SPIN

- A new study found that Groundwater pumping has **tilted the planet nearly 80 centimetres east** between 1993 and 2010 alone.
- Planet's **geographic north and south poles** are where its axis **intersects the surface**; however, **they are not fixed**.
  - The axis and hence the **poles fluctuate due to variations in Earth's mass distribution.**
  - Water circulated across the planet determines **how mass is distributed.**

6. SOCIAL ISSUES

6.1. SOCIAL JUSTICE AND DECENT WORK

Why in news?

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

About social justice

- **Social justice is about fairness, equality and having a voice** and the agency to shape one's own life.
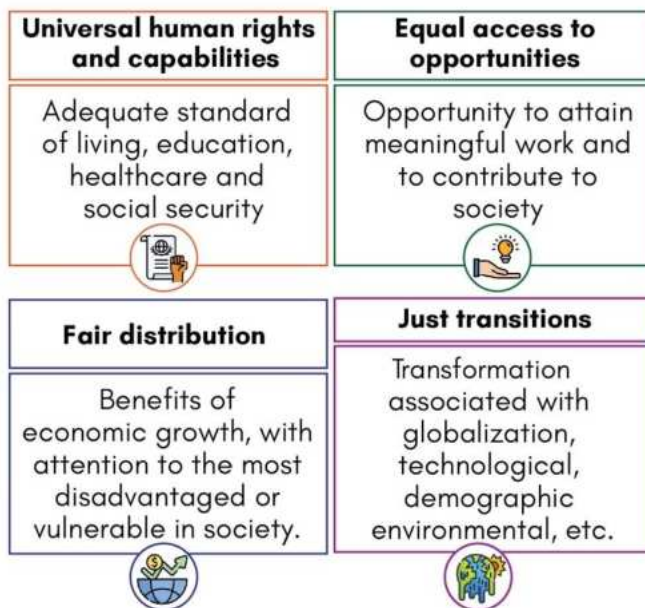- It has four **interrelated and interdependent dimensions (See infographics).**

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 **to low-income households.**
  - **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, it can be said that **Social justice and decent work reinforces 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** were living in **extreme poverty and 160 million children** were engaged in **child labour** in 2020 **(ILO).**
  - Also, close to **50 million people** were living in **modern slavery in 2021 (ILO).**
  - These people are **unable to secure sufficient resources** to meet their basic needs for safe drinking water, food and sanitation, health and shelter.
- **Widespread labour market insecurity:** Globally, more than **4 billion people** are excluded from any form of social protection (as per recent ILO data).
  - Also, more than **60% of the global workforce** is in the **informal economy** and is **twice as likely to live in poverty** as than those in the formal economy.

Dimensions of Social justice

Universal human rights and capabilities	Equal access to opportunities
Adequate standard of living, education, healthcare and social security	Opportunity to attain meaningful work and to contribute to society

Fair distribution	Just transitions
Benefits of economic growth, with attention to the most disadvantaged or vulnerable in society.	Transformation associated with globalization, technological, demographic environmental, etc.

International Labour Organisation
International Labour Organization — Geneva, Switzerland

Genesis: Created in 1919, as part of the **Treaty of Versailles** that ended World War I to reflect the belief that **universal and lasting peace** can be accomplished only if it's based on **social justice.**

ILO and UN: In 1946, the ILO became a **specialized agency of the UN.**

Tripartite structure: Gives an equal voice to **workers, employers and governments** providing a unique platform for promoting decent work for all women and men.

4 strategic objectives:
- Promote **standards and fundamental principles and rights at work**
- **Create greater opportunities** for decent employment and income
- **Social protection for all**
- **Strengthen tripartism and social dialogue**

Members: 187 Members   Member

Key reports:
- **World Employment and Social Outlook**
- **Global Wage Report**

- o **Casual work is widespread** and is rising in importance, whereas **climate change endangers jobs, livelihoods and enterprises.**
- **Inequality high and rising:** Globally **women earn approximately 20% less than men.**
  - o Pay gaps are even wider when gender intersects with other grounds of discrimination, such as **race, disability and migrant status.**
  - o **Lack of investment in** public services and other public goods like **health and education** is also reinforcing inequality.
- **Weakening Social Contracts:** Disaffection and loss of trust in national governance is rising. And the **increasing polarization** 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.
  - o **Rural diversification of decent jobs** is also crucial for providing decent jobs outside urban areas, including in the agricultural (for example with the agro-processing sector).
  - o Ensure **women's access to productive resources** such as **land and credit** which are particularly relevant for women in the **agricultural sector and micro and small enterprises.**
  - o Embed employment objectives and social protection policies in **climate change mitigation and adaptation strategies**.
  - o Minimum wages should be regularly **adjusted with inflation** and take into account **the needs of workers and their families.**
    - ✓ It must be wider and cover **agricultural workers, domestic workers and migrant workers** and achieve sufficient levels of compliance.

- **Restore trust in public institutions**: Governments, employers' and workers' organizations can engage in **social dialogue** on policies to shape joint solutions and build trust.
- **Fair transition to technology:** Adequate attention needs to be given to **data privacy and the risks of Artificial Intelligence (AI)** bias, such as discrimination.
- **Global Coalition for Social Justice:** It would elevate **social justice as a global policy imperative** requiring greater multilateral cooperation and policy coherence.
- **Other:** Protecting people over the life cycle, quality early childhood care and education, investing in social protection systems, etc.

6.2. NEWS IN SHORTS

6.2.1. NATIONAL INDICATOR FRAMEWORK (NIF) FOR SDGS

- **The Ministry of Statistics and Programme Implementation (MoSPI)** has released the Sustainable Development Goals (SDGs) National Indicator Framework (NIF) Progress Report 2023.
- For monitoring SDG Goals and targets, a **Global Indicator Framework (GIF)** was framed by the **Inter-agency and Expert Group on SDG Indicators (IAEG-SDGs).**

- o IAEG-SDGs composed of **Member States** and including regional and international agencies as observers.
- o It was **set up by the UN Statistical Commission (UNSC).**
- o **India,** through MoSPI, **represented Southern Asia in IAEG-SDGs** for the term 2021-2023.
- o India was also a **member of IAEG-SDGs** during 2015-2017 and 2017-2019 **for two consecutive terms.**

- At present, the GIF includes **248 indicators, with 231 unique indicators.**
  - **National statistical agencies** and other relevant institutions are responsible for **collecting data and reporting on the indicators.**
  - Towards this endeavor the **MoSPI** developed a **National Indicator Framework (NIF) in 2018.**
- The **NIF** includes indicators that **align with the SDGs global indicators** and also includes the 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**.
- **NIF,** similar to GIF, **is evolving in nature.** At present, there are **284 indicators in the NIF, 2023.**
  - The 2023 NIF **provides an overview of the progress made by India on SDGs** a**nd the data gaps** which need to be addressed for better monitoring of SDGs.
- In 2019, the Ministry has developed and circulated Guidelines to the States/UTs for development of **State Indicator Framework (SIF)** in respective States/UTs.

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

6.2.2. GENDER GAP REPORT-2023

- World Economic Forum's (WEF) **released Gender Gap Report- 2023.**
- As per the latest report, **India has ranked at 127 out of 146 countries in terms of gender equality.**
  - India has **improved 1.4% points and 8 places from its earlier rank of 135 from 2022 index.**
- **Key Highlights of the report:**
  - At the current rate of progress, **it will take 131 years to reach full parity.**
  - **Iceland with 91.2% takes the top spot** along with **Norway (87.9%) and Finland (86.3%)**
  - **India** has attained **better parity in education enrolment**
    - ✓ However, it has reached **only 36.7% parity on Economic Participation and Opportunity and 25.3% parity On Political Empowerment.**
  - Bangladesh (59), China (107), Nepal (116), Sri Lanka (115) and Bhutan (103) fared better than India on Gender parity.
- **Govt initiatives to improve Gender Parity:**
  - **Economic Participation and Health & Survival:** Beti Bachao Beti Padhao, Rashtriya Mahila Kosh,Pradhan Mantri Matru Vandna Yojna, Sukanya Samriddhi Yojna.
  - **Education attainment:** Samagra Shiksha initiative, Kasturba Gandhi Balika Vidyalayas.

- **Political participation:** Govt has reserved 33% of the seats in Panchayati Raj Institutions for women.

Gender Gap index Parameters

Economic Participation and Oppurtunity | Educational Attainment | Health and survival | Political Empowerment

6.2.3. 2023 GENDER SOCIAL NORMS INDEX (GSNI) REPORT

- **United Nations Development Programme (UNDP) released** 2023 Gender Social Norms Index (GSNI) report.
- Report is titled as '**Breaking Down Gender Biases: Shifting social norms towards gender equality'.**
- GSNI captures **beliefs, biases and prejudices regarding gender equality in capabilities and rights,** which provides an account of the root causes of gender inequality.
- GSNI covers **four key dimensions** and their indicators (refer infographic). Each indicator takes a **value of 1 when an individual has a bias and 0 when the individual does not**.
  - GSNI is **calculated using data from World Values Survey** which are used to **create seven indicators using data from 80 countries and territories**, covering 85% of global population.
- **Key findings**
  - Close to **9 out of 10 men and women hold biases** against women.
  - Nearly **50%** of people believe that **men make better political leaders** than women do, and **around 40%** believe that **men make better business executives** than women do.
  - Biased gender social norms are **major impediment to achieving gender equality and empowering all women and girls** (SDG 5).
  - Gender biases are **pronounced in both lower and higher HDI countries**.
- **Reasons for persistence of gender social norms**
  - **Socialization into gender norms** from early age and parental attitudes.
  - **Institutionalization of discriminatory social practices** and gender hierarchies.
  - **Social sanctioning**, where behaviour abiding with norms is socially rewarded.

Dimensions and indicators of the Gender Social Norms Index

DIMENSIONS	INDICATORS
Political	- Women having the same rights as men is essential for democracy - Men make better political leaders than women do
Educational	- University is more important for men than for women
Economic	- Men should have more right to a job than women - Men make better business executives than women do
Physical Integrity	- Proxy for intimate partner violence - Proxy for reproductive rights
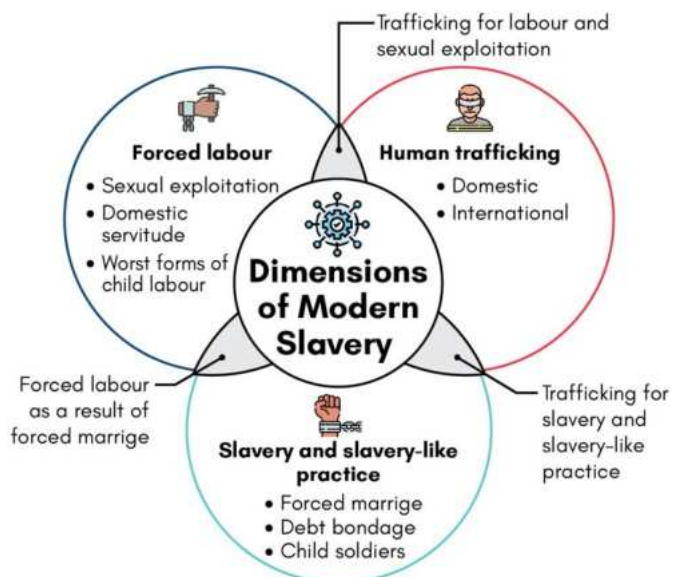
6.2.4. MODERN SLAVERY

- **G20 countries including India are fuelling modern slavery**, says new report.
- **Walk Free** (international human rights group) released the **Global Slavery Index 2023**, an **assessment of modern slavery conditions in 160 countries**.
  o Index uses the data released by International Labour Organisation (ILO), Walk Free, and International Organisation for Migration (IOM).
- Modern slavery refers to **situations of exploitation** that a **person cannot refuse or leave** because of **threats, violence, coercion, or deception.**
  o It is **an umbrella term that comprises various instruments of repression**. (see image)
- **Key findings**
  o **50 million people were living in modern slavery** on any given day in 2021, an **increase of 10 million people since 2016.**
    ✓ Among the 50 million, **28 million suffer from forced labour** and **22 million from forced marriages.**
  o **India tops the list with 11 million people working as forced labourers**, followed by China, Russia.
  o **North Korea** followed by Eritrea has **highest prevalence** and **Switzerland** followed by Norway have **lowest prevalence** of modern slavery.
  o **Driving factors** of slavery: **Climate degradation, gender inequality, COVID-19, and conflict**.
- **Recommendations**
  o **Recognise and respond** to modern slavery as an intersectional issue.
  o **Strengthen social protection and safety nets** to boost resilience.
  o **Repealing migration policies** that place national security above human rights.

6.2.5. GLOBAL TRENDS: FORCED DISPLACEMENT IN 2022 REPORT

- Report was **released by the United Nations High Commissioner for Refugees (UNHCR)**.
- **Report provides data on** Refugees Asylum seekers, Internally displaced, Stateless persons, and People who have returned to their countries or areas of origin
- **Key highlights of the report**
  o Around **108.4 Mn people were forcibly displaced worldwide** as a result of fear of persecution, conflict, violence, human rights violations
    ✓ The number of people who **migrated forcefully due to social and climate crises** in 2022 was 21% higher than in 2021 — the most significant increase ever.
    ✓ 30% of forcefully **displaced were children.**
  o **76 % of the world's refugees are hosted by Low- and middle-income countries**.
  o Around **4.4 Mn people are stateless** or of undetermined nationality, which is 2% more than that of 2021.
  o **6 million displaced people returned** to their areas or countries of origin in 2022.
- **Recommendations**
  o Durable **solutions like voluntary repatriation and resettlement in a third country** can be done in a phased manner.
  o By **enhancing refugees' self-reliance** by building their capacities and ease pressure on host countries.
  o **Through Local integration** the refugees can build new lives in host countries.
  o **Ensuring Safety and security of internally displaced people** and provide them better access to livelihood.

United Nations High Commissioner for Refugee (UNHCR) — HQ Geneva, Switzerland

Genesis: Established by the **General Assembly** of the **United Nations** in 1950.

About: It is **dedicated to saving lives, protecting rights,** and **building a better future** for people forced to flee their homes because of conflict and persecution.

Mandate: It works with **countries to improve and monitor refugee** and **asylum laws** and **policies, ensuring human rights** are upheld.

Other Key Information:
- It is guided by the **1951 Refugee Convention and its 1967 Protocol.**
- It works in 135 countries.
- It releases Global Appeal report.

6.2.6. UGC (INSTITUTIONS DEEMED TO BE UNIVERSITIES) REGULATIONS, 2023

- **Ministry of Education (MoE) released** UGC (Institutions Deemed to be Universities) Regulations, 2023.
- **Superseding UGC (Institutions Deemed to be Universities) Regulations 2019**, new regulations will encourage universities to **focus on quality & excellence**, **strengthen research ecosystem** and **transform higher education** landscape.
    o **Earlier, Regulations was notified in 2010** and **revised in 2016 and 2019.**
- **Salient features of regulations**
    o Regulations are aligned with **National Education Policy, 2020**.
    o **Cluster of institutions managed by more than one sponsoring body** can apply for **Deemed to be University (DtbU) status.**
    o Institutions DtbU **may start new courses or programs in any field**, with **prior approval of its Executive Council** and, also wherever applicable, with **approval of relevant statutory council**.
    o Institutions DtbU shall **compulsorily create Academic Bank of Credits (ABC) identities of their students** and upload their credit scores in digital lockers.
- **Deemed to be University (DtbU)**
    o **UGC Act 1956** provides for **Central Government to declare any institution other than a University to a status of Institution DtbU** under Section 2(f). Upon declaration, such institution shall be deemed to be a university.

Eligibility Criteria to Apply for Deemed-to-be University Status

- NAAC 'A' grade with at least a 3.01 CGPA for three consecutive cycles.
- NBA accreditation for two third of eligible programmes for three consecutive cycles.
- In top 50 of any specific category of NIRF (National Institutional Ranking Framework) for last three years continuously.
- In top 100 of overall NIRF Ranking for last three years continuously.

6.2.7. INDIA RANKINGS 2023 OF HEIS

- **Ministry of Education** has released 8th edition of **India Rankings of Higher Educational Institutions (HEIs) in country.**
    o Ranking is **based on National Institutional Ranking Framework (NIRF).**
    o **Five broad categories of parameters identified in NIRF includes**
        ✓ Teaching; Learning and Resources; Research and Professional Practice; Graduation Outcome; Inclusivity and Outreach; and Perception.
- **2023 edition of India Rankings**
    o **Introduced a new subject namely Agriculture & Allied Sectors**
    o **Integrated "Innovation" ranking** previously executed by Atal Ranking of Institutions on Innovation Achievements (ARIIA) **into India Rankings**.
    o **Expansion of scope of "Architecture" to "Architecture and Planning"**.
- **IIT Madras topped in Overall Category** followed by Indian Institute of Sciences.
- The rankings are based on **indicators** taking into account **academic reputation, employer reputation** and **faculty**

6.2.8. WORLD DRUG REPORT 2023

- World Drug Report 2023 **released by the UN Office on Drugs and Crime (UNODC)**.
- The UNODC is a **global leader in the fight against illicit drugs and international crime** headquartered in **Vienna.**
    o It provides **technical assistance, research and normative support** to Member States
- **Key findings of the report**
    o **23% increase in the previous decade in the number of people using drugs** (296 million) globally.
    o **45% increase in the past decade in people suffering from drug use disorder**(39.5 million).
    o The report stressed on

- **Drug-related disparities and inequalities:**
  - **Inequality and social and economic disparities** continue to drive and be driven by the drug phenomenon.
  - Disparities between the global North and South, urban and rural settings, and across subpopulations all contribute to the harm from drugs.
- **Illicit drug economies accelerating conflicts, human rights abuses, and environmental devastation**
  - **Illegal logging, mining and land occupation** along with wildlife trafficking leading to environmental damage like in Amazon forest.
  - **Illicit drug trade finances non-state armed and insurgency groups** in the Sahel region.
- **Prioritizing public health in regulating medical use of controlled drugs:** Without adequate framework psychedelic drugs meant to medicinal use it could be diverted to illegal drug markets.
- **Increasing dominance of synthetic drugs:** Criminals producing synthetic drugs like methamphetamine, Fentanyl create challenges for law and enforcement.

7. SCIENCE AND TECHNOLOGY

7.1. OUTER SPACE GOVERNANCE

Why in News?

The United Nations (UN) has recently released a policy brief titled **"For All Humanity — The Future of Outer Space Governance,"**

More on News

- The policy brief came ahead of the upcoming **UN Summit of the Future,** scheduled for September 2024, in New York.
  - The summit aims to facilitate **multilateral solutions and strengthen global governance to address future challenges.**
- **The policy brief examines changes** in outer space such as space tourism, militarization, etc. and an assessment of the sustainability, safety and security impacts of these changes due to loophole in existing framework.

Opportunities in the space

- **Earth observation:** Satellite data and images enable scientists to monitor weather patterns, temperature fluctuations, etc.
- **Communication:** Twenty-first-century communication networks rely increasingly on access to space based assets.
- **Satellite navigation:** The use of global navigation satellite systems is vital to our global logistics chain and economic development.
- **Science:** Scientific experiments in orbit have been a major driver of growth.

Existing governance framework

- **In 1958, the United Nations General Assembly established the Committee on the Peaceful Uses of Outer Space (UN COPUOS)** to govern the exploration and use of space for the benefit of all humanity.
- The UN COPUOS has been supported in its work **by the United Nations Office for Outer Space Affairs (UNOOSA).**
- **That work has led to the creation of five international space treaties:**
  - **Outer Space Treaty 1967:** Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies.
  - **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.

Space Debris

8,410 satellites orbiting the Earth in outer space

along with

36,500 pieces of space debris

larger than 10 centimetres

Need for the new mechanism

- **Resource activities**: There is not an agreed international framework on space resource exploration, exploitation, and utilization, or a mechanism to support its future implementation.
  - Space mining will be one of the major focus areas of commercial space activity in the coming decades.
- **Space debris:** It is a challenge that will be compounded by the large number of satellites being launched into low Earth orbit.
  - There is not at present an international mechanism or body to monitor space debris or facilitate its removal.
- **Space traffic coordination:** At present, national and regional entities coordinate space traffic with different sets of standards, best practices, definitions, languages, and modes of interoperability.
  - This relative lack of coordination widens the gap for countries with less space capacity, making it harder for them to operate their limited space assets in an increasingly complex environment.
- **Prevention of conflict in outer space:** Additional normative frameworks are needed to prevent any extension of armed conflict into outer space and to prevent the weaponization of outer space.
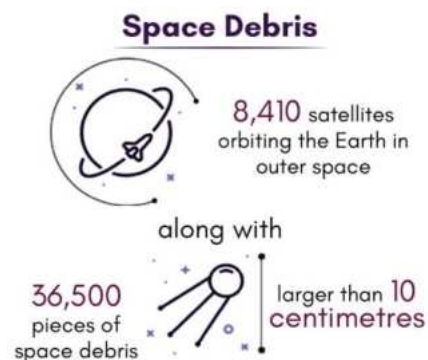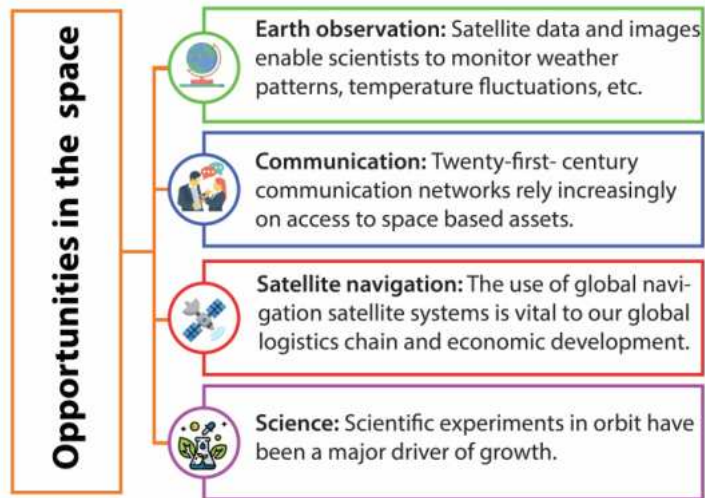
- o A major challenge in space security is the dual-use nature of many capabilities. Any satellite capable of maneuvering to change can destroy other satellites.
- **Increase in the satellite launch:** There has been an exponential increase in satellite launches over the past decade, driven by both government and private sector participation.

Recommendations given in the policy brief

- **New treaty for peace and security:** The UN recommends the negotiation and development of a new treaty to ensure peace, security, and the prevention of an arms race in outer space.
- **Space debris removal:** Develop norms and principles for space debris removal that take into account the legal and scientific aspects of space debris removal.
- **Space traffic management:** Develop an effective framework for the coordination of space situational awareness, space object maneuvers, and space objects and events.
- **Space resource activities:** Develop an effective framework for sustainable exploration, exploitation, and utilization of the Moon and other celestial bodies.
  - o This framework could include binding and non-legally binding aspects and should build upon the five United Nations treaties on outer space.
- **Inclusiveness:** Member States to consider how to facilitate the participation of commercial actors, civil society representatives, and other relevant actors in the work of outer space-related intergovernmental processes.

United Nations Office for Outer Space Affairs (UNOOSA) New Delhi

Genesis: Initially created as a small expert unit within the UN Secretariat in 1958, it was established in its present form in 1993.

Membership: 102 countries.

Objective: To foster **global collaboration in the** Member **peaceful utilization and exploration of outer space, as well as the effective application of space** science and technology to achieve sustainable economic and social progress.

Functions: It assists any UN Member States to **establish legal and regulatory frameworks** to govern space activities and **strengthens the capacity of developing countries** to use space science technology and applications for development.

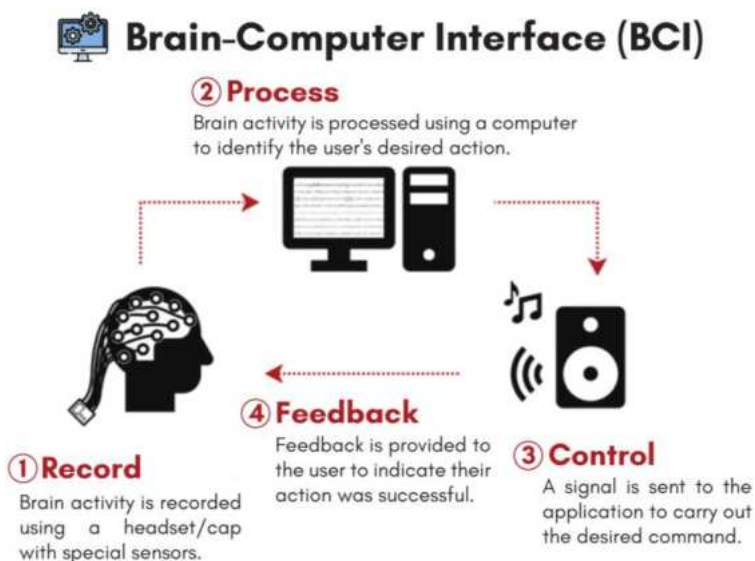# 7.2. BRAIN-COMPUTER INTERFACE (BCI)

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)

- It is a system that **determines functional intent** - the desire to change, move, control, or interact with something in our environment - **directly from brain activity**.
  - o In other words, BCIs allow to control an application or a device using only our mind.
- **It has three main parts:**
  - o **A device** to detect and record signals coming from the brain.
  - o **A computer to process and analyze** the recorded brain activity.
  - o **An application/device to control**.
- **Another important part of a BCI is feedback:** the system must somehow let the user know what decision or intended action the computer was able to interpret.

Brain-Computer Interface (BCI)

② Process
Brain activity is processed using a computer to identify the user's desired action.

④ Feedback
Feedback is provided to the user to indicate their action was successful.

① Record
Brain activity is recorded using a headset/cap with special sensors.

③ Control
A signal is sent to the application to carry out the desired command.

- **Different techniques to measure brain activity for BCIs**
  - o **Electroencephalography (EEG)**
    - ✓ EEG is a test that **measures electrical activity in the brain** using small, metal discs (electrodes) attached to the scalp.
    - ✓ **Brain cells communicate via electrical impulses** and are active all the time, even during asleep.
  - o **Functional Magnetic Resonance Imaging (fMRI)**
    - ✓ It works by **detecting the changes in blood oxygenation and flow** that occur in response to neural activity.
    - ✓ **When a brain area is more active it consumes more oxygen** and to meet this increased demand, **blood flow increases to the active area.**

Applications of BCI

- **Helping people with physical disabilities and ageing:** BCIs can enable precise control of prosthetic limbs, giving amputees natural motor skills. It can also help older people train their motor and cognitive abilities.
- **Treatment for diseases:** such as Parkinson's disease, epilepsy and spinal cord injuries. It also shows some promise for potential treatment of obesity, autism, **depression**, schizophrenia and tinnitus.
  - o Tinnitus is ringing or buzzing noise in one or both ears that may be constant or come and go, often associated with hearing loss.
- **Facilitate brain research**: Scientists could use BCIs to improve understanding of the brain. Some researchers have used a BCI to detect the emotions of patients in a vegetative or minimally conscious state.
- **Improving human performance:** BCIs can now be used as a neurofeedback training tool to improve cognitive performance, augment human capabilities and human-computer interactions.
  - o BCI could be used to affect alertness and to improve subjects' performance in a cognitively-demanding task.

Concerns related to BCI

- **Technical and user challenges:** Each person generates unique brain signals, which are difficult to measure clearly. Also, Translation of brain signals to speech by a BCI could cause harm if it is not accurate.
- **Data Privacy and Security:** BCIs are vulnerable to cyberattacks as hackers could use malware to intercept brain-wave data generated by the device.
- **Social impact:** Reported costs of wearable BCIs range from hundreds to thousands of dollars, which may result in unequal access.
- **Ethical issues:** BCIs may raise questions about what constitutes consent and 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 is likely to continue to grow and we may see greater widespread use of BCIs in people's daily lives. Also, there is a need to improve the accuracy, reliability and efficiency of BCIs so as to realise its full potential.


About Neurons
- **Brain is made of up millions of cells called neurons**, also known as nerve cells.
  - o These neurons **work together in large networks to coordinate and control processes in body**, from understanding what we see, hear, smell, taste etc., to executing movements, to regulating breathing, heart rate etc.
- **Neurons are information messengers**. They use **electrical and chemical signals to send information** between different areas of the brain, as well as between the brain, the spinal cord, and the entire body.
  - o Specialized projections called **axons allow neurons to transmit electrical and chemical signals** to other cells.

Neurons — Dendrites, Axon, Nucleus
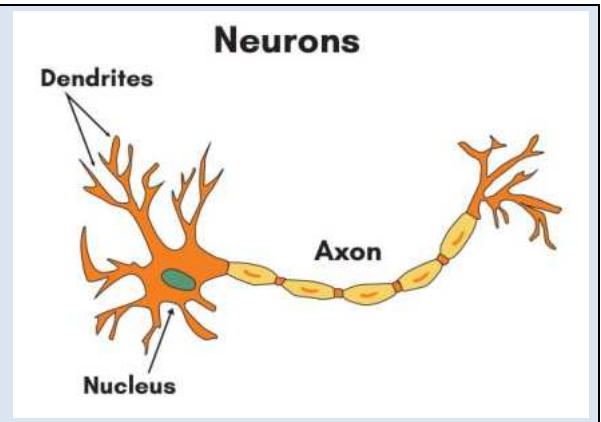
- o Neurons **can also receive these signals via** rootlike extensions known as **dendrites.**
- **There are three kinds of neurons:**
  - o **Sensory neurons** carry information from the sense organs (like eyes and ears) to the brain.
  - o **Motor neurons** control voluntary muscle activity, such as walking and talking, and carry messages from nerve cells in the brain to the muscles.
  - o **Interneurons,** neural intermediaries found in our brain and spinal cord. They pass signals from sensory neurons and other interneurons to motor neurons and other interneurons.
- **Types of Neurons**
  - o **Multipolar neurons:** These neurons have a single axon and symmetrical dendrites that extend from it.
  - o **Unipolar neurons**: Usually only found in invertebrate species, these neurons have a single axon.
  - o **Bipolar neurons:** Have two extensions extending from the cell body. At the end of one side is the axon, and the dendrites are on the other side.
  - o **Pyramidal neurons:** These neurons have one axon but several dendrites to form a pyramid type shape.
  - o **Purkinje neurons:** Have multiple dendrites that fan out from the cell body. These neurons are inhibitory neurons, meaning they release neurotransmitters that keep other neurons from firing.

How neurons work?
- A **nerve impulse is transmitted** from one neuron to another **through junctions called synapses.**
- There are **two types of synapses**, namely, **electrical synapses and chemical synapses.**
  - o **At electrical synapses**, the membranes of pre- and post-synaptic neurons are in very close proximity. **Electrical current can flow directly from one neuron into the other** across these synapses.
    - ✓ Electrical synapses **are rare in our system.**
  - o **At a chemical synapse**, the membranes of the pre- and post-synaptic neurons are **separated by a fluid-filled space called synaptic cleft.**
- Chemicals called **neurotransmitters are involved in the transmission of impulses** at these synapses.
- The **released neurotransmitters bind to their specific receptors**, present on the post-synaptic membrane.


Axon Terminal and Synapse
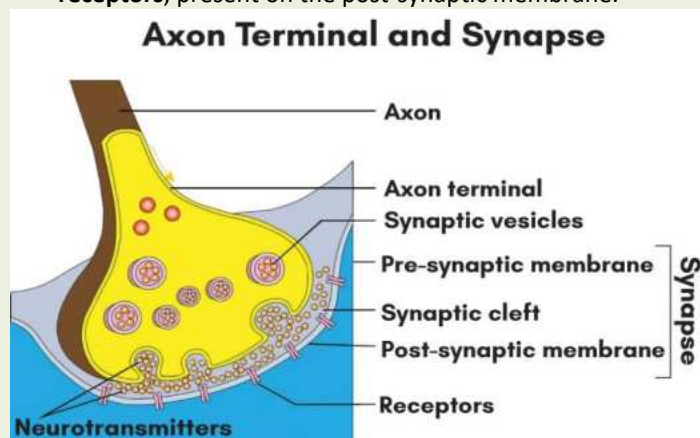
7.3. GRAVITATIONAL WAVES

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)

- **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**.
  - o Most powerful **gravitational waves are created** when **objects move at very high speeds.**
- 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.**
- **But those waves were of high frequency**, believed to be produced by the merger of two relatively small black holes that took place about 1.3 billion years ago.
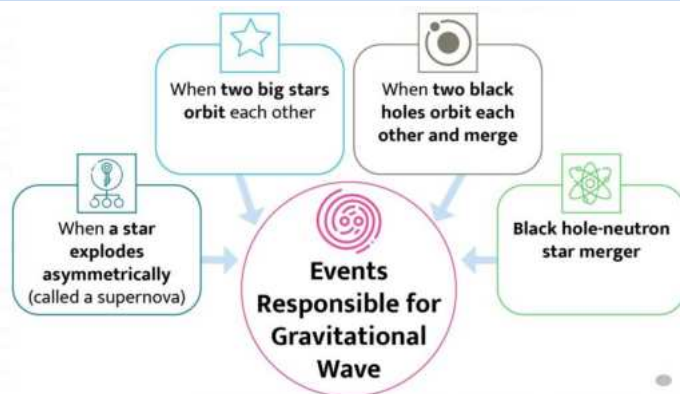
Higher and lower frequency gravitational waves
- **Higher-frequency** gravitational waves **come from smaller pairs of black holes zipping around each other rapidly** in the final seconds before they collide.
- **While the lower-frequency waves** are thought to be generated **by huge black holes at the hearts of galaxies**, up to billions of times the mass of our sun, that **lumber around each other slowly** and have **millions of years to go before they merge.**

How scientists detected low-frequency gravitational waves?

- **For discovering low-frequency gravitational waves**, researchers **used six large radio telescopes** around the world to study objects called pulsars.
  - **India's Giant Metrewave Radio Telescope (GMRT, Pune)** was among the world's six large telescopes that played a vital role in providing evidence.
  - **Other 5** are located in **Germany, UK, France, Italy and Netherlands.**
- **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'.

About Giant Metrewave Radio Telescope (GMRT)
- GMRT is **an instrument for studying astrophysical phenomena**, ranging from nearby Solar system to the edge of observable Universe, **at low radio frequencies** (40 to 1450 MHz).
  - **Metre wavelength part** of the radio spectrum has been **particularly chosen for study** with GMRT **because man-made radio interference is considerably lower** in this part of the spectrum in India.
- It is **operated by National Centre of Radio Astrophysics** (NCRA) Pune, which is **part of Tata Institute of Fundamental Research.**
  - GMRT is an **indigenous project**. **Design is based on `SMART' concept** - for **S**tretch **M**esh **A**ttached to **R**ope **T**russes.
- **Major objectives of GMRT:**
  - **To detect the highly redshifted spectral line** of neutral Hydrogen expected **from protoclusters or protogalaxies.**
  - To search for and study **rapidly rotating Pulsars** in our galaxy.
- **Some scientific results from GMRT**
  - **Mapped distribution of atomic hydrogen gas** from host galaxy **of a fast radio burst (FRB)** for the first time.
  - **A new pulsar has been discovered** in the Globular Cluster NGC 1851
  - **Solar and coronal hole** related observations.
  - **Radio signal originating from atomic hydrogen** in an extremely distant galaxy
  - **Study of radio galaxies, quasars** etc.

- After examining pulsars over a period of 15 years, it was noted that **some of the signals from these neutron stars arrived a little early** while a few others were late, the **discrepancies ranging in millionths of seconds.**
- Scientists have proposed that the **observed inconsistencies were 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.

Significance of the discovery

- Provides enough **data to suggest that there is a gravitational wave background**, which exists in our universe.
- It will help scientists expand their **knowledge about the nature and evolution of the universe**.
- It will help to **answer mysteries about the nature of merging supermassive black holes**, such as how common they are, what brings them together, and what other factors contribute to their coalescence

Conclusion

Researchers hope that continuing to study this kind of gravitational waves can help us learn more about the biggest objects in our universe. It could open new doors to track the history of black holes and galaxies merging all around us.

About Gravity and Space-time
- In his theory of gravitation, **Isaac Newton postulated** that the **force that makes an apple fall to Earth is also** the one **that keeps the moon in its orbit** around the Earth.
  - This force, he proposed, was proportional to the masses of the two bodies and inversely proportional to the square of the distance between them.
- However, it does not say about **why two bodies are attracted to each other.**
  - Also, it fell short in telling **how gravitational force** exerted on the two bodies **seemed to be propagating instantaneously**, over any large distance, without any delay at all.
- **These were addressed by Einstein** in his General Theory of Relativity.

Illustration of how mass bends space
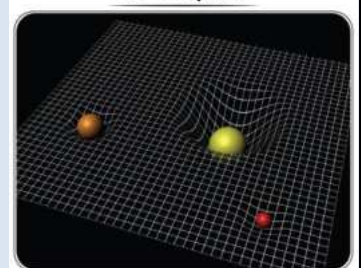
- o **He had already shown**, with Special Relativity, **that space and time** were not independent entities but **had to be woven together as space-time.**
- Einstein proposed that **gravitational attraction was a result of the bending of the fabric of space-time** by the equivalent of a heavy object.
  - o **The greater the mass** of an object the **more extreme the warping of space** it causes, so a **star warps spacetime more than a planet, and a black hole warp it more than a star.**
  - o Einstein said the Sun, the Earth and all other bodies formed similar curvatures around them, and this was the reason for smaller objects getting pulled towards them.
- But since the **Earth, sun and everything else are also moving**, the **curvature around them moves too**. This **creates ripples in space-time**, just like a moving boat in water creates ripples.
- It is **these ripples** that Einstein **called gravitational waves.**

7.4. 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

European Organization for Nuclear Research (CERN)

About : Founded in 1954, researchers at CERN are **probing fundamental structure of the universe** and study basic constituents of matter – the fundamental particle.

Members : 23 Members.

Mission : To perform **research in fundamental physics.**
- To provide a unique **range of particle accelerator facilities.**
- To use its flagship accelerator, **Large Hadron Collider (LHC), to its maximum potential.**

Key Achievements Higgs Boson, W Boson, Z Boson, LHC, World Wide Web etc.
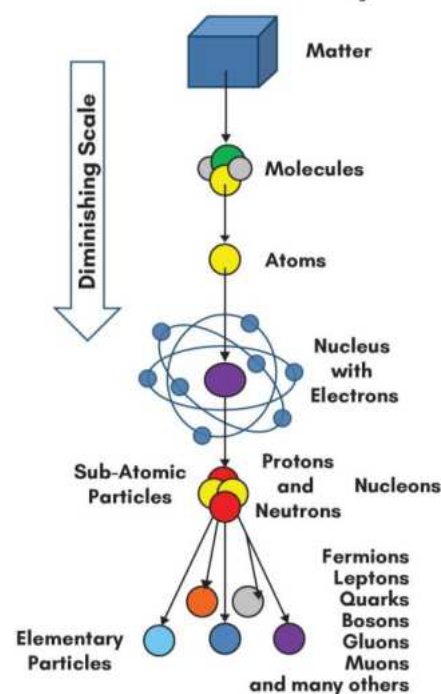
- This is a **very rare decay process** that tells us important things about the Higgs boson as well as about our universe.
- **The decay was reported in the ATLAS and CMS,** general-purpose detectors of the Large Hadron Collider (LHC) of CERN.
- **Implications of the discovery**
  - o This evidence of decay **can provide indirect evidence to the existence of particles beyond those predicted by the Standard Model of particle physics.**
  - o The discovery **can lead to a fifth fundamental force, which is yet to be discovered**.
  - o Physicists **currently recognise four fundamental forces namely the strong force**, the weak force, the electromagnetic force and the gravitational force.

Large Hadron Collider (LHC):
- It is the **world's largest and most powerful particle accelerator**, set up in 2008 at CERN near Geneva.
- The **LHC consists of a 27-kilometre ring of superconducting magnets** to boost the energy of the particles along the way.
- The **particle beams travelling close to the speed of light are collided** inside the LHC.

Higgs Boson

- It is 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 at CERN.
- 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.
  - o **For example**, when an electron interacts with the Higgs field, the effects it experiences are said to be due to its interaction with Higgs bosons.

Particle Hierarchy

- **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?
- The Standard Model is **a theoretical framework that describes the fundamental particles of matter and their interactions.**
- It also **explains the three of the four fundamental forces of nature** i.e except that of Gravitational force.
- It **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 two groups namely **Quarks and Leptons**
  - **Bosons are particles that carry the force**, they mediate the interactions between particles.
    - ✓ Bosons in 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)

7.5. 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.
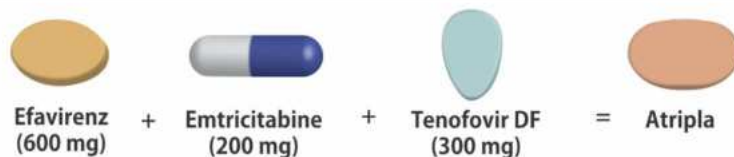
More about News

- Action was taken after an expert committee recommended that "there is **no therapeutic justification** for these FDCs and they may involve **risk to human beings**".
  - Banned FDC includes drugs such as Nimesulide + Paracetamol dispersible tablet, and Amoxicillin + Bromhexine, etc.
- These **FDCs are part of 344 FDCs** which government had earlier banned in **2016**.

Example of Fixed-Dose Combination HIV Drug

Efavirenz (600 mg) + Emtricitabine (200 mg) + Tenofovir DF (300 mg) = Atripla

About Fixed Dose Combination (FDCs)

- It refers to products **containing one or more active ingredients** used for a particular indication.
  - **Active Pharmaceutical Ingredient (API)** is the biologically active component of a drug product (tablet, capsule, cream, injectable) that produces the intended effects.
- If it is combined for the first time, it would fall **under the definition of a new drug.**
- New Drugs require prior approval from the **Drugs Controller General of India (DCGI)** before being licensed by the **State licensing authorities (SLAs).**
  - DCGI heads the **Central Drugs Standard Control Organisation (CDSCO)** which is responsible for ensuring quality drugs supply across the country.
  - **CDSCO** works under **Ministry of Health & Family Welfare.**
    - ✓ It is a **statutory body** and established as **Central Drug Authority** for discharging functions assigned to the Central Government under the **Drugs and Cosmetics Act 1940.**

Issues in Regulation of FDCs in India
- To **evade the drugs price control**, some companies **reformulate** the individual drugs into an FDC.
- **Compromised quality** as New FDCs after **4 years** gets produced by other manufactures by getting license from **State licensing authorities (SLAs)** without checking laxity with regard to **pharmacological studies**.
- **Lack of coherence** among stakeholders as **SLAs** have been issuing manufacturing licenses for FDCs **without prior clearance from DCGI**.
- **Poor capacity of State Drug Control Organisations (SDCO)** such as **infrastructure facilities, number** and **quality of drug inspectors, etc.**
- **Adverse drug reaction reporting system** is poor in India.
- **Lack of Data** as India **does not have the exact database** of currently available FDCs in the market, their sales turnover and use pattern.

Merits of FDCs

- **Advantages over the single entity preparations:** Such as:
  - **increased efficacy**, and/or a reduced incidence of adverse effects,
  - **reduced cost** due to proportional mixing of various drugs which reduces cost of production.
  - **simpler logistics of distribution** relevant to situations of limited resources.
- **Treatment of infectious diseases:** FDCs have shown to be particularly useful in the treatment of infectious diseases like HIV, malaria and tuberculosis where giving multiple antimicrobial agents is the norm.
  - FDCs are also of **use in chronic conditions** especially when multiple disorders often co-exist.
- **Improved patient adherence:** FDCs can reduce the '**pill burden'** for customers and hence improve the adherence.

Demerits of FDCs

- **Pharmacodynamic (Drugs power) mismatch:** Mismatch between the two components such as one drug having additive/antagonistic effect 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.
- **Questionable effectiveness:** Diseases such as for Tuberculosis (TB) treatment in the absence of Direct Observed Therapy Short course (DOTS) and therapeutic drug monitoring questions often get raised about FDCs effectiveness.
- **Antimicrobial Resistance (AMR):** The irrational FDCs with sub-standard doses of antimicrobials, fail to offer adequate therapeutic response to successfully kill the bugs and end up rather helping them develop 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**.
- **Testing capacities of Central Drugs Testing Laboratories** under CDSCO are being constantly strengthened to expedite testing of drug samples in the country
- **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.

Related News
Fixed Retail prices for Essential Medicines
- NPPA has fixed retail prices of 23 formulations, including the medications to treat diabetes and high blood pressure.
  - It has also **revised the ceiling price of 15 scheduled formulations** under **Drugs (Prices Control) Order, 2013 (NLEM 2022).**
- **Drug Price Control in India:**
  - **The Ministry of Health and Family Welfare** draws up a **National List of Essential Medicines (NLEM) 2022** for price control.
    - ✓ These e**ssential medicines automatically come under the Drug (Prices Control) Order (DPCO),2013.**
  - **The National Pharmaceutical Pricing Authority (NPPA)**, which is an independent body in the **Ministry of Chemicals and Fertilisers, enforces these price controls.**
    - ✓ Also, **monitor the availability of drugs, identify shortages**; **collect/ maintain data on production, exports and imports, market share** of individual companies, etc.
  - **Other legislations:** Drugs and Cosmetics Act, 1940; Pharmacy Act, 1948; Drugs and Magic Remedies (Objectionable Advertisement) Act, 1954; Narcotic Drugs and Psychotropic Substances Act, 1985.

Suggestions to improve regulation of FDCs

- **Need periodic surveys:** Drug manufacturers and wholesale and retail outlets periodic surveys can be conducted to get a measure of the existing problem of sector.
- **National Drug Authority (NDA):** Establishing this body 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.
  - Like for manufacture or sale of spurious drug punishment should change from **life imprisonment to death penalty** as recommended by Committee.
- **Multistep approach**: To curb the irrational use of FDC in India, multistep approach involving all stakeholders, for example, consumers, physicians, regulatory authority, industry, and the academicians, is needed.
- **Essential Commodities (Control of Unethical Practices in Marketing of Drugs) Order, 2017:** Finalising and implementing the order will help to curb unethical activities.

7.6. SICKLE CELL ANAEMIA

Why in news?

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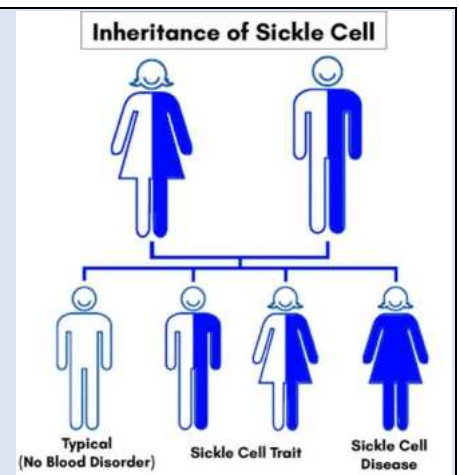
Sickle Cell Disease

- Sickle Cell Disease (SCD) is a **type of hemoglobin disorder**, **inherited blood diseases** that affect how oxygen is carried in the body.
- SCD is **characterized 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)
  - o **Mis-shaped cells lack plasticity** and can **block small blood vessels**, impairing blood flow.
  - o This condition leads to **shortened Red Blood Cell (RBC) survival** and **subsequent anaemia**, **often called Sickle-Cell Anaemia (SCA).**
  - o Common symptoms are **jaundice, liver and spleen enlargement.**
- **Stem cell or bone marrow transplants (Hematopoietic stem cell transplant)** are the **only cure for this disease**, but they involve significant risks.
- India is the **second-worst affected country** in terms of predicted births with SCA — i.e., chances of being born with the condition.
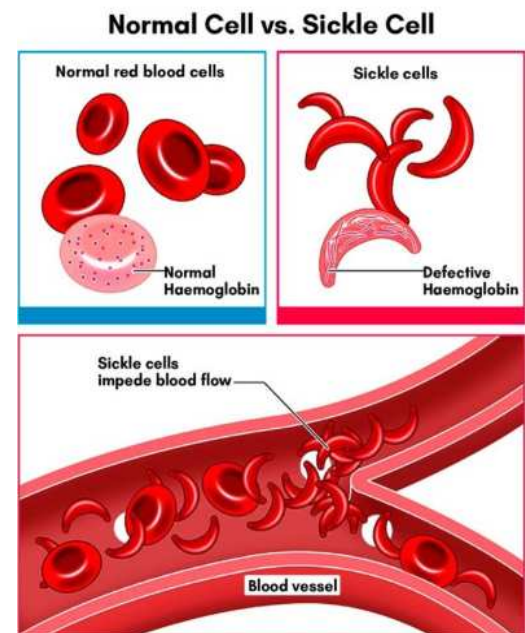
Sickle Cell Disease in Tribal Population

- In India, SCD is **more common in tribal populations because of malnutrition**.
  - o Tribes like Pawara, Bhil, Madia, Gond and Pardhan from Maharashtra have a very high prevalence rate.
- Tribal areas were **endemic to malaria** for many years, leading to many deaths, thus, **as an evolutionary trait (refer infographic),** their RBCs were becoming sickle-shaped. This led to their high susceptibility to SCD.
  - o As per a screening exercise conducted by the Ministry of Tribal Affairs, **20 per cent of tribal children with SCD would die before reaching two years of age**.
- Ministry of Health & Family Welfare (MoHFW) **Tribal Health Expert Committee Report** has listed SCD as **one of the 10 special problems in tribal health** that affect the tribal people.

About National Sickle Cell Anaemia Elimination Mission

- **Objective:** The objective of the mission is **to provide affordable and accessible** care to all SCD patients, ensure the **quality of care** and **lower the prevalence** of the disease.
  - o The vision of the mission is **to eliminate SCD as a public health problem** in India **before 2047.**
- **Strategy:** It will be **carried out in a mission mode** and will **emphasize a three-pillar strategy** i.e.,
  - o **Health promotion**: Awareness generation & pre-marital genetic counselling.
  - o **Prevention:** Universal screening and early detection.
  - o **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).
  - o Initially**,** the focus shall be on **17 states with a higher prevalence of SCD** including Gujarat, Maharashtra, Rajasthan, MP, Jharkhand, Chhattisgarh, etc.
  - o The mission aims to **cover 7 crore people** with screening, counselling for prevention and care for people with SCD 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.**
  - **It will be** for pre-marital and pre-conception screening backed by genetic counselling services as a strategy for addressing SCA.
- Government plans to **distribute special cards across tribal areas** to people below the age of 40. Cards will be divided into different categories based on screening results. The mission will receive funding under NHM.
- **Ministry of Tribal Affairs launched** a portal wherein **people can register themselves** if they have a disease or trait to collate all information related to SCA among tribal groups.

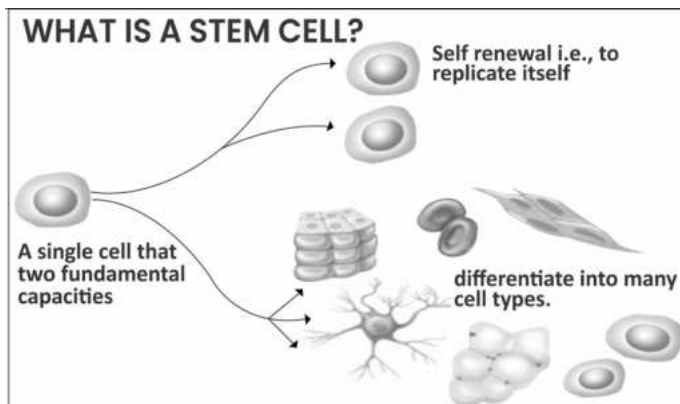| Concerns in controlling SCA	Way forward
• **Lack of screening awareness** and **inadequate screening centres** in tribal and rural areas. • Cures in the form of gene therapy and stem cell transplants are **both costly and still in developmental stages**. • Tribals generally rely on traditional medicine for treatment and have **disbelief and mistrust in modern treatment techniques**.	• **Timely diagnosis through cost-effective** and large-scale **screening camp** along with counselling. • **Prenatal diagnosis** can play an important role in reducing the prevalence of SCA in children. • **Resource utilisation, proper implementation** of the projects**, and awareness generation** at the grassroots level. • **Collaboration between the government and NGOs** is the key to addressing the SCA. • **Patients Support Groups** by frontline workers to improve treatment compliance and engaging not only patients but also family members or caregivers.

7.7. STEM CELLS

Why in News?

Recently, a team of scientists in the US and the UK have created the **first synthetic human embryo-like structures** in the world **using stem cells** bypassing the need for eggs and sperm.

More on news

- These synthetic embryos **resemble natural embryos in the earliest stages** of human development.
- They **lack a beating heart or the beginnings of a brain,** but they contain **cells** that would give rise to the **placenta, yolk sac and the embryo.**
- These models would help scientists **understand the impact of genetic disorders** and the **biological reasons behind recurrent miscarriages.**
  - Research will help scientists understand the **"black box of human development",** the period before a pregnancy's progress can be detected on a scan.

Relevance of stem cells in biomedical research and therapies

- **Understanding nature of disease:** Information on **genetic and molecular signals** that regulate **differentiation in stem cells** can help **understating development of diseases and finding therapy.**
- **Stem cell therapy (SCT):** Also known as **regenerative medicine,** the SCT refers to **introducing new stem cells into damaged tissue** to treat a particular type of **disease.**
  - It could be either **Autologous transplantation** (uses the patient's own stem cells) or **Allogeneic transplantation** (uses stem cells from a donor).
- **Toxicology (drug side effects):** Testing drug candidates directly on patients can be extremely dangerous.
  - However, iPS cells can be differentiated into the requisite cell type, and the drugs tested on them for reactions.

Challenges related to stem cell technology

- **Ethical concerns:** Ethical dilemma involving the **destruction of a human embryo** and **differentiation potential of iPSCs** which can be used in **human reproductive cloning**.
- **Safety concerns:** Due to higher deferential rates, stem cells have a much higher probability of accumulating genetic mutations and leading to tumor growth or **cancer.**
- **Immune rejection:** There are issues with **post-transplant rejection** of embryonic stem cells (since they cannot be used from a patient's own cells).
- **Understanding stem cell mechanism:** It is not yet clear whether the synthetic embryos have the **potential to continue maturing beyond the earliest stages** of development. For example,
  - In Israel and China efforts to **develop synthetic embryos,** grown from mouse and monkey, by implementing it in the womb of the respective animals **failed.**
  - So, it is **not clear whether the barrier to more advanced development is merely technical** or has a more fundamental biological cause.
- **Legal issues:** The use of synthetic embryos for clinical purposes is not legally imminent in the UK and most other countries. **Implanting them into a patient's womb is currently illegal.**
- **Other issues:** Stem cell therapies are **highly expensive**, and it is **difficult for developing nations to keep pace with technological advancements.**

Way ahead

- **Resolving ethical dilemma**
  - **Ensure regulatory framework and mechanisms** can **keep up with the rapid pace of changes** in stem cell research and ground realities.
  - Continuous endeavor to **actively engage with all stakeholders** and come up with timely and **suitable reforms**.
  - Resolving **regulatory issues to prevent** unscientific or unethical stem cell therapy that poses a threat to the well-being of patients and other vulnerable individuals.
- **Tackling safety concerns:** Under controlled conditions, stem cells derived cells could serve as a potentially safe new source in regenerative medicine.
- **Promoting R&D:** Scientists must first **learn more about how embryonic stem cells develop**. This will help them understand how to control the type of cells created from them and facilitate **Informed decision making.**
  - **Quality clinical research also demands skilled human resources** besides adequate finance**.**
- **Collaboration:** Private sector funding, international collaborations, and the promotion of exchange studies.
- **Awareness against the misuse:** Regulatory bodies need to ensure that people are aware about the availability of stem cell therapy and the therapies which are banned.

Current status of use of SCT in medicine
- The only stem cells now used to treat disease are **hematopoietic stem cells** found in bone marrow.
- These cells are used in **bone marrow transplants** to help **people with cancer make new blood cells.**
- They may also be used to **treat people with conditions, such as Fanconi anemia,** a blood disorder that causes the body's bone marrow to fail.

Initiatives by India to promote stem cell research

- **National Guidelines for Stem Cell Research** (first launched in 2007 and updated many times since then).

- Support to **basic as well as clinical research through national funding agencies** like the ICMR, DBT and DST.

- Two level of monitoring by the **National Apex Committee for Stem Cell Research and Therapy (NAC-SCRT)** and **Institutional Committee of Stem Cell Research (IC-SCR).**

7.8. LAB GROWN DIAMONDS

Why in news?

Recently, the Indian Prime Minister during his state visit to the USA gifted a **7.5 carat eco-friendly lab grown diamond** to the first lady of the USA.

More on Lab Grown Diamonds

- **Lab grown diamonds (LGD) are artificially manufactured** diamonds through **crystallisation of pure carbon** with the same **physical and chemical properties** as natural diamonds.
  - The first LGD was created in 1954 by scientists at a General Electric research laboratory in New York.
- They are **commonly used for industrial applications** due to their hardness and strength. They are ideal for **use as cutters and in other tools and machines** that require these properties.
  - In electronics, pure synthetic diamonds are **used as heat spreaders for high-power laser diodes**, laser arrays, and high-power transistors due to their excellent thermal conductivity.
- India produces over **3 million lab-grown diamonds (15 % of global production).**
  - India is the largest producer of lab grown diamonds through the CVD technology and contributes to nearly 25% of global LGD production.
- The government has introduced various measures to promote the growth of lab-grown diamonds, including the **elimination of the 5 percent tax on LGDs**.
  - Additionally, government had announced to establish the **India Centre for Lab-grown Diamond at IIT Madras.**

Methods of Production of LGD

- **High Temperature High Pressure (HTHP) Method.**
  - This method requires **extremely heavy presses** that can produce up to 730,000 psi of pressure **under extremely high temperatures** (at least 1500 celsius).
  - Usually graphite is used as the diamond seed.

LGDs	Natural Diamonds
• **No dirt or impurities** ingrained. • **Affordable** even in better quality • Created with **little to no environmental damage.** • **Guaranteed origins** and **trackable source**	• **Impurities and strains** in crystal structure • Can be **expensive** because of their natural clarity and hard mining process. • Mining natural diamonds causes **water pollution**. • Natural diamonds can **come from conflicted regions.**

- **Chemical Vapour Deposition Method.**
  - A **chamber is filled with a mixture of gases** (carbon, hydrogen etc) along with a diamond seed substrate (usually graphite).
  - The **chamber is then heated to temperatures of 800º to 900º C**, using microwaves, lasers, or a hot filament which causes carbon to precipitate into a diamond.

7.9. NEWS IN SHORTS

7.9.1. GENETIC ENGINEERING APPRAISAL COMMITTEE (GEAC)

- Few states have refused to give no objection certificates (NOC) of **biosafety research trials** of **genetically engineered (GE) cotton hybrids**, regulated by the Genetic Engineering Appraisal Committee (GEAC).
  - Field trials are to be conducted in **Telangana, Maharashtra, Gujarat, and Haryana.**
  - Since 2011, **it has been made mandatory to obtain 'NOC' from the state governments** for conducting field trials.

- **Agriculture is a state subject** and their involvement is essential for compliance monitoring.
- **GEAC** is the **statutory committee** that functions in the Ministry of Environment, Forest, and Climate Change.
  - It is **constituted under the "Rules for the Manufacture, Use/Import/Export and Storage of Hazardous Micro Organisms/Genetically Engineered Organisms or Cells (Rules, 1989)"** framed under the **Environment (Protection) Act, 1986**.
  - Its main function is to **approve activities involving large-scale use of hazardous** and recombinants in industrial production.

- It **conducts experimental field trials** before releasing **any genetically engineered organism into the environment**.
- **BT (Bacillus thuringiensis) Cotton** is hybrids/varieties that cotton **that contain 'cry1Ac' and 'cry2Ab' genes**, isolated from the soil bacterium Bacillus thuringiensis (Bt) and coding for proteins toxic to **bollworm insect pests**.
  - Bt cotton is the **only GM crop that has been approved for commercial cultivation**.

Genetic Engineering Appraisal Committee (GEAC)
New Delhi

Functions under: Ministry of Environment, Forest and Climate Change (MOEF&CC).
- **Established:** under the "Rules for the Manufacture, Use/Import/Export and Storage of Hazardous Micro Organisms/Genetically Engineered Organisms or Cells (Rules, 1989)" framed under the **Environment (Protection) Act, 1986.**

Objectives: Responsible for approval of
- **Large scale use of hazardous microorganisms and recombinants** in research and industrial production from environmental angle.
- **Release of genetically engineered organisms and products into environment** including experimental field trials.
- Taking **punitive action under the Environment (Protection) Act 1986.**
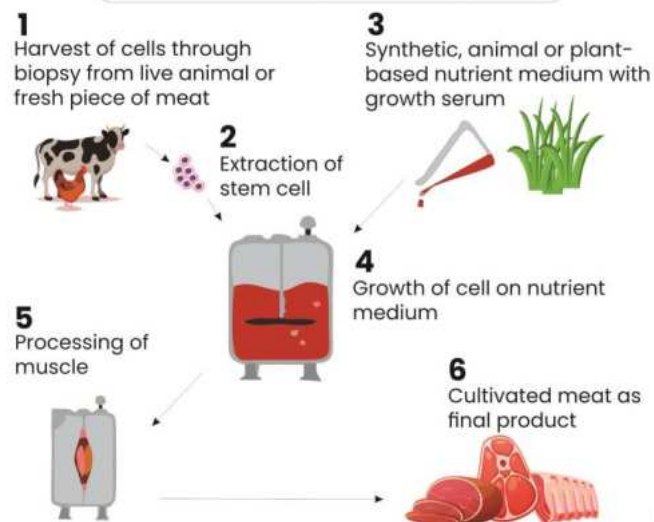
Composition: Presently, it has **24 members** and it meets every month. **Chaired by Special Secretary/Additional Secretary of MOEF&CC.**

7.9.2. CELL-CULTIVATED MEAT

- US has granted **approval to make and sell cell-cultivated chicken.**
- **Cellular agriculture** is the **process by which animal-based products are produced directly from cell cultures** rather than from animals.
  - It comprises two different approaches: **cell cultivation (cellular)** and **precision fermentation** (**acellular-** contain no cellular or living material in final product like Milk).
  - In 2020, **Singapore became the first country to approve** the sale of cell-cultivated meat.
- **Benefits of cell-cultivated meat**
  - **Reduce GHGs emissions**: FAO has estimated that **global livestock** is responsible for **14.5%** of all anthropogenic GHGs emissions.
  - **Animal Rights will be protected**.
  - Without changing dietary habits, it provides **Nutritional security.**
  - It can be customised to be **healthier than their animal counterpart,** such as being designed to contain **less fat.**
  - Compared to conventional beef, lab-grown meat requires **45% less energy use.**
- **Challenges associated with cell-cultivated meat**
  - **Cost of cell-cultivated meat** is expected to remain **high** in the near future.

- **Resource Constraints** like availability of high quality cells, suitable growth-medium.
- **Difficulty in replicating** taste, texture, fat content like bovine meat.
- **Uncertainty of consumer acceptance** due to lack of awareness.

Cultivated meat production process

1 Harvest of cells through biopsy from live animal or fresh piece of meat
2 Extraction of stem cell
3 Synthetic, animal or plant-based nutrient medium with growth serum
4 Growth of cell on nutrient medium
5 Processing of muscle
6 Cultivated meat as final product

7.9.3. MRNA VACCINE

- India's first mRNA vaccine get **approval Drugs Controller General of India (DCGI).**
- **GEMCOVAC-OM a mRNA COVID-19 booster vaccine** produced by Gennova Biopharmaceuticals Ltd have received Emergency Use Authorization (EUA) by DCGI.
  - It is a **lyophilized (freeze dried) vaccine,** stable at 2- 8 °C, is delivered using a device **called Tropis.**
    - ✓ Tropis use the technology that **propels liquid at high pressure to deliver vaccines** through the skin **without utilising needles.**
- **Clinical trials and approval of new drugs/vaccines** are governed by the **New Drugs and Clinical Trial Rules 2019 under the provisions of the Drugs and Cosmetics Act, 1940.**
  - **Central Drugs Standard Control Organisation (CDSCO) headed by the DCGI** is the authority to grant approval of Vaccine.
  - **Vaccine Testing and subsequent approval** involves **preclinical phase** (without testing on humans) and **three phases of human clinical trials.**
- **About mRNA vaccine**
  - It is **type of vaccine that use messenger RNA (mRNA)** molecules to provide instructions to the body's **cells for producing a protein that triggers an immune response** against a pathogen.
  - Once the **mRNA is injected into the body**, the **cells read the instructions and produces the protein.**

✓ **This** then stimulates the **immune system to recognize** and mount a response against the targeted pathogen.

Comparision of mRNA and Traditional Vaccine
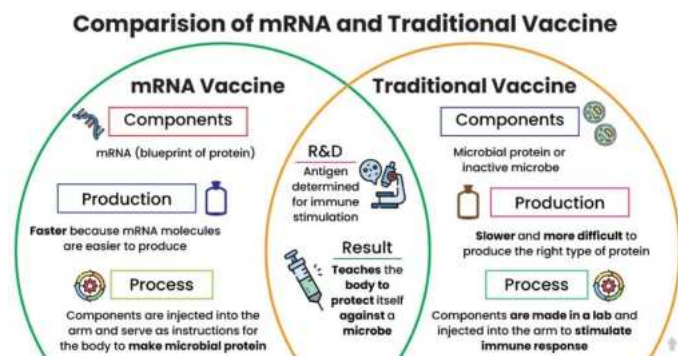
7.9.4. PHAGE THERAPY

- A study found out that the Public accepts use of **bacteria-killing viruses (Phage Therapy) as alternative to antibiotics.**
- Due to **improper use of antibiotics**, there has been **an increase in Antimicrobial Resistance (AMR).** Therefore, **an increasingly popular alternative to antibiotics is bacteriophages** to control bacterial diseases.
  o **By 2050,** antibiotic resistance will result in death of **10 million people from drug resistance diseases every year.**
- **Bacteriophages, or phages**, are **viruses that infect and replicate only in bacterial cells**. Phage therapy involves **using phages to treat bacterial infections**.
  o Bacteriophages were discovered by **Frederick Willian Twort in 1915 (Great Britain) and Felix d'Herelle in 1917 (France).**
  o In contrast to many antibiotics, which remove harmful bacteria, while **simultaneously decimating the microbiota** (triggering a new set of problems), **each phage has evolved to more narrowly target bacterial strains or species**.
- **Significance of phage therapy**
  o Phages are **unlikely to damage human cells** due to significant differences in bacterial cells and human cells.
  o Since they can replicate, **initial dosage can be relatively small**.
  o **Inherently nontoxic** as they are made up of **nucleic acids and proteins**.
- **Challenges in developing phage therapeutics:** Lack of clinical trials, time consuming process of finding right phages, difficulties in patenting phages as they are natural entities etc.

Life Cycle of Bacteriophage
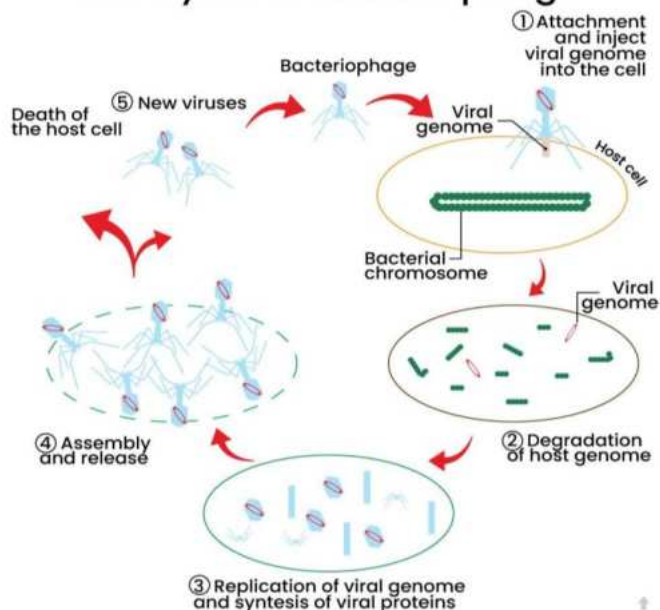
7.9.5. LEPTOSPIROSIS

- **With the onset of monsoon** in India, threat of **Leptospirosis disease has increased**.
- It is a potentially fatal **zoonotic bacterial disease**, caused **by a bacterium Leptospira interrogans**, or leptospira.
- It is a **contagious disease** in animals (carrier includes rodents, cattle, pigs, and dogs) but is **occasionally transmitted** to **humans** in certain environmental conditions.
- It is prevalent in **warm, humid countries** and in both **urban** and **rural** areas.
- Its **symptoms mimic** those of **dengue, malaria, and hepatitis.**

7.9.6. CAPTAGON PILLS

- Captagon is a **highly addictive amphetamine-type drug**, which is **produced mainly in Syria**.
- Captagon pills **stimulate central nervous system**, providing a **boost of energy**, **enhance someone's focus**, let someone **stay awake for longer periods** of time, and **produce a feeling of euphoria.**
  o It was widely consumed by **Islamic State and Syrian fighters**.
- It is actually a **counterfeit version of a medicine with same brand name,** first produced in 1960s and was banned in 1980s.
  o **Original Captagon contained fenetylline**, a synthetic drug **of phenethylamine family** to which amphetamine also belongs.

7.9.7. PHONONS

- Scientists have successfully **split phonons, demonstrating their quantum properties** and ability to manipulate and control quantum states.
  - Phonons are **quasiparticles that represent collective vibrations of atoms** or molecules in a solid material.
  - Achievement **may lead to development of sound-based versions of quantum computers** or extremely **sensitive measuring devices** in future.
- Presently, linear optical **quantum computing uses photons**, particles of light, **as qubits** (basic units of information for quantum computers).
  - **Both photons and phonons are of central interest** to quantum computing research. However, studying phonons is challenging due to their **susceptibility to noise and issues with scalability and detection.**

Photons	Phonons
Photons are tiny packets of energy for light or electromagnetic waves. - Photons **can travel through empty space**. - Photons **generally don't interact at all** if they have different wavelengths. - Photons **exhibit both particle-like and wave-like properties**, known as wave-particle duality	- Phonons are **packets of energy for sound waves.** - Phonons **need a medium such as air or water.** - Phonons **of different wavelengths can interact and mix** when they bump into each other, **producing a different wavelength.** - Phonons are **purely wave-like entities** and do not exhibit particle-like properties.

7.9.8. PROJECT TAARA

- **Alphabet,** parent company of **Google, under Project Taara** is currently deploying their **light beam internet technology** in India, Africa, and other locations around the world.
- **Project Taara** utilises **Free Space Optical Communication (FSOC)** technology where **free space acts as a communication channel** between transceivers that are in line-of-sight.
  - It **uses beams of light to deliver high-speed, high-capacity connectivity over long distances**.
  - It **can transmit data at** high speeds of **up to 20 Gbps bidirectional** through up to **20 km distances.**
- **FSOC refers to outdoor optical wireless communication** (OWC), whereas **short-distance (Largely indoor) OWC is called light Fidelity (LiFi).**
  - **LiFi uses light** within Visible Light Spectrum to Invisible light spectrum **to transmit data.**

- **Advantages of FSOC technology:** cost-effective and quickly deployable, can transmit data at high speeds, effective in areas that are difficult to connect using fiber cables etc.
- **Challenges faced:** signal reliability is compromised by conditions like fog and haze, or interruptions like birds flying in front of the signal; requires better mirror controls and motion detection capabilities etc.
- **Earlier Alphabet tried to deliver internet through Project Loon**, which aimed at utilising stratospheric balloons for internet connectivity.

7.9.9. HIROSHIMA AI PROCESS (HAP)

- **At the recent G7 summit**, hosted by Japan, leaders-initiated **HAP to regulate Artificial Intelligence** (AI).
  - HAP will be **established through a G7 working group**, in cooperation **with OECD and Global Partnership on AI (GPAI).**
- With the help of HAP, **G7 countries could move towards a divergent regulation** based on shared norms, principles and guiding values.

7.9.10. FRAMEWORK FOR SUBMARINE CABLE LANDING IN INDIA

- Telecom Regulatory Authority of India (TRAI) released recommendations on 'Licensing Framework and Regulatory Mechanism for Submarine Cable Landing in India'
- The framework will **ease the rules for setting up submarine (undersea) cable landing stations (CLS)** in India.
  - In August 2022 the **Department of Telecom (DoT)** sought such recommendations while highlighting various concerns related to **Submarine Cables (SMC) and Cable Landing Station (CLS).**
    - ✓ The **SMC are laid on the ocean floor and digitally connect countries typically, connect terrestrial telecom networks, and the CLS is the location where they make a landfall**.
- **Key highlights**
  - **Essential Services' and Critical Information Infrastructure (CII) status** can be accorded to **CLS and Submarine Cables (SMC) operation and maintenance services.**
  - **Exemption of custom duty and GST** on the goods and items required for CLS, and submarine operation and maintenance.
  - The clearances related to **Environmental Impact Assessment (EIA) and Coastal Region Zone (CRZ)** required for SMC and CLS may also be made online as a part **of Saral Sanchar portal.**

- o A section should be added in the **Indian Telecommunication Bill, 2022** to promote, protect and prioritise 'CLS' and 'SMC' in India.
  - ✓ The Bill provides a mechanism to exercise the **right of way (**right to pass over or through real property owned by someone else) **for laying telecom infrastructure.**

7.9.11. CORONAL MASS EJECTION (CME)

- Scientist spot a **Coronal Mass Ejection (CME) or solar eruption** that maintains constant **temprature for six years.**
- Scientists from Aryabhatta Research Institute of Observational Sciences (ARIES), Nainital **found that core of CME that occurred in 2017** had maintained a constant temperature.
  - o ARIES, Nainital, is an autonomous institute under **Department of Science and Technology.**
- **Highlights of finding**
  - o Scientists observed that **despite the core expanding**, which usually leads to cooling, **temperature remained constant.**
  - o **Density of the core decreased by about 3.6 times** as it moved outward.
  - o **Expansion of the core behaved more like an isothermal process** (constant temperature) **rather than an adiabatic process** (where heat exchange occurs).
- **Significance of finding**:
  - o **Improve the understanding of how such eruptions can impact communication systems** on Earth.
  - o **India's first solar mission, Aditya-L1,** equipped with Visible Emission Line Coronagraph (VELC), will **provide more data about CMEs thermodynamic properties in inner corona**.
- CME is a **giant cloud of solar plasma drenched with magnetic field lines** that is blown away from Sun often during strong, long-duration solar flares and filament eruptions
  - o CME contains **particle radiation (mostly protons and electrons) and powerful magnetic fields**. They cause disruption of space weather and satellite failures, and power outages etc.

Additional Information
Betelgeuse
- Betelgeuse, **seventh brightest star in sky** (discounting the Sun), is spotted in constellation Orion. It is also called as '**Thiruvathirai' or 'Ardra' in Indian astronomy.**
- Star is in its **late carbon-burning stage** as it has **already consumed both hydrogen and helium**.
- When it would **consume all the elements of periodic table**, the gravity **would compress the core and turn it into a neutron star or a black hole**.

7.9.12. GEMINID METEOR SHOWER

- Parker Solar Probe reveals mysterious origin of Geminid meteor shower on Earth.
  - o Meteor shower happens when **Earth passes through the path of a comet**. When this happens, the **bits of comet debris create streaks of light in night sky** as they burn up in Earth's atmosphere.
- Geminid meteors are created by **tiny bits of rocky debris** shed from a small asteroid named 3200 Phaethon, which was discovered in 1983.
  - o **Phaethon is small, only about 3 miles across**, and it **loops around the Sun every 1.4 years in an orbit** that approaches the Sun closer than any other known asteroid.

7.9.13. QUASI-MOON

- Astronomers have **discovered a new asteroid** (dubbed **2023 FW13**) **along Earth recently**.
- It is **considered a "quasi-moon" or "quasi-satellite,"** meaning it **orbits the sun in a similar time frame as Earth does**, but is only **slightly influenced by Earth's gravitational pull.**
  - o Experts believe that it has **been orbiting Earth since 100 BC.**
- Earlier, **a quasi-satellite known as Kamo'oalewa** was also discovered **in 2016.**

7.9.14. IRAN'S 'FIRST HYPERSONIC MISSILE'

- Iran presented its first domestically made **hypersonic Missile** named "Fattah" having a target range of 1,400 km.
- **A hypersonic missile refers** to a type of weapon that travels at speeds that exceed five times the speed of sound typically exceeding Mach 5 or approximately 6,174 km/h.
  - o Hypersonic missiles fly at a **much lower altitude than conventional ballistic missiles.**
- **The two types of hypersonic weapons systems**:
  - o **Hypersonic Glide Vehicles** launched from a rocket before gliding to the intended target
  - o **Hypersonic Cruise Missiles powered by air-breathing high-speed engines** or 'scramjets' after acquiring their target.
- **Advantages of Hypersonic Weapons**
  - o **use only kinetic energy** and energy derived from motion to destroy unhardened targets in underground facilities.
  - o **could enable responsive, long-range, strike options against distant**, defended, and/or time-critical threats (such as road-mobile missiles).
  - o challenges in detection due to their speed, maneuverability.

- **The US, Russia, and China** lead in **hypersonic weapons programs**, while Australia, India, France, Germany, and Japan are also developing such technology.
  - o As part of its **Hypersonic Technology Demonstrator Vehicle program** and India successfully tested a **Mach 6 scramjet**.
  - o **Hypersonic Wind Tunnel (HWT) test facility** of the DRDO.

Mach Number

Subsonic	Mach < 1.0
Transonic	Mach = 1.0
Supersonic	Mach > 1.0
Hypersonic	Mach > 5.0

7.9.15. TITANIC SUBMERSIBLE

- **US Navy stated it detected sounds "consistent with an implosion"** shortly after submersible lost contact **during a descent to Titanic wreck** at 3,800m (12,467ft) below sea level.
  - o **In explosion pressure builds up in a contained space** until energy is released violently **causing debris to project outwards.**
  - o **Whereas in implosion**, **pressure builds up over a structure** (For example from Water) **until it crushes inward** causing debris to collapse inward.
- **Deep-sea water pressure appears to have crushed submersible.**
  - o **At sea level**, **pressure inside your lungs** is the **same as pressure of air around you**, 1.033 kilograms on each square centimeter, **or one "atmosphere" of pressure**.
  - o Pressure **increase with the depth of the sea. For every 33 feet (10.06 meters)**, pressure **increases by one atmosphere.**
- **Experts are also suggesting potential safety problems** with Titan submersible.
  - o **Its hull** - surrounding hollow part where passengers sit - **was made from carbon fibre, largely untested for deep sea vessels.**
  - o **Hull of a deep-diving sub is usually spherical** for receiving an equal amount of pressure at every point, **but Titan's hull was tube-shaped** therefore pressure was not equally distributed.
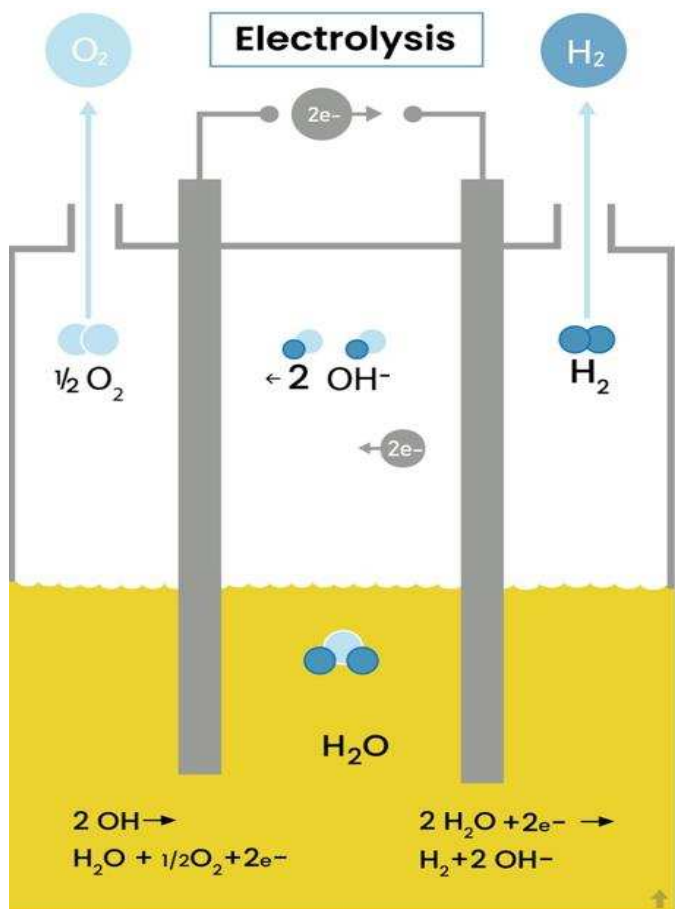

7.9.16. CENTRALIZED LABORATORY NETWORK (CLN)

- **Indian Council of Medical Research National Institute of Virology (ICMR NIV) has joined CLN** that works **to test vaccines** which can be used **during pandemic, epidemic disease outbreak.**
- CLN is a **part of the Coalition for Epidemic Preparedness Innovations** (CEPI) and is **largest global group** which has **standardised methods and materials** for testing.
- As CLN members, **each institution will support** the rapid **development of novel vaccines against a future Disease X** – a newly identified pathogen with epidemic or pandemic potential.
  - o **In interepidemic periods**, facilities will **support vaccine development against** one or more of **CEPI's priority diseases** – Chikungunya, Lassa virus, MERS, Nipah etc.

7.9.17. STRATEGIC INTERVENTIONS FOR GREEN HYDROGEN TRANSITION (SIGHT) PROGRAMME

- Guidelines for implementing the **Strategic Interventions for Green Hydrogen Transition (SIGHT) programme**
- SIGHT is a sub-component of the **National Green Hydrogen Mission**.
  - o SIGHT aims to **establish electrolyser manufacturing base** (Component I) and **green hydrogen producing facilities** (Component II).
  - o Hydrogen is a **clean-burning fuel with water as its by-product, produced with the help of an electrolyzer.**
    - ✓ Electrolysis is the process of using electricity to **split water into hydrogen and oxygen.**
    - ✓ In general, the **PEM (proton exchange membrane) is used for electrolysis**.
  - o They have been launched with the aim of **enabling rapid scale-up, technology development and cost reduction.**
  - o Total financial incentive is ₹17,490 crore.

o **State-run Solar Energy Corporation of India (SECI)** is the implementing agency.

Electrolysis

O_2 $2e^-$ H_2

$\frac{1}{2} O_2$ $\leftarrow 2\ OH^-$ H_2

$\leftarrow 2e-$

H_2O

$2\ OH \rightarrow$ $2\ H_2O + 2e- \rightarrow$

$H_2O + \frac{1}{2}O_2 + 2e-$ $H_2 + 2\ OH-$

- **National Green Hydrogen Mission** was launched in 2022, as part of India's decarbonization strategy.
  o Its other component is **Strategic Hydrogen Innovation Partnership (SHIP) which promotes** Public-Private Partnership framework for **Research & Development.**
  o It seeks to:
    ✓ Production of **5 million tonnes of green hydrogen by 2030.**
    ✓ Make India a **leading producer and supplier of Green Hydrogen in the world**.
    ✓ Creating **opportunities for employment and economic development**.
    ✓ **Supporting R&D projects in India** for further development of Green Hydrogen.

7.9.18. LI-ION BATTERY

- Recently, Nobel laureate and co-inventor of Lithium-ion (Li-ion) batteries, John Bannister Goodenough passed away.
- **Nobel Prize in Chemistry 2019** was awarded **jointly to Goodenough, M. Stanley Whittingham and Akira Yoshino** for the development of **Li-ion batteries.**

- A Li-ion battery is **a family of rechargeable battery types** in which **lithium ions move from the negative electrode to positive electrode during discharge** and back when charging.
  o **Materials used as electrodes include:** lithium cobalt oxide (cathode), most commonly found in portable electronic devices; lithium manganese oxide (used in electric automobiles), and lithium iron phosphate.
    ✓ **Goodenough developed** a lithium battery with **a cathode of cobalt oxide**. This cathode **gave a higher voltage** than earlier batteries.
  o Li-ion batteries **typically use ether** (a class of organic compounds) **as an electrolyte**.
- **Advantages of Li-ion battery:** light weight and has high energy density, have 5000 cycles or more compared to just 400- 500 cycles in lead acid batteries, comparatively low maintenance, low self-discharge rate, no memory effect etc.
  o Memory effect is a **process where repeated partial discharge/charge cycles** can cause a battery to 'remember' a lower capacity.
- **Disadvantages of Li-ion battery:** High-price, tendency to overheat, can lead to thermal runaway and combustion, require safety mechanisms to limit voltage and internal pressures etc.

7.9.19. UTPRERAK (UNNAT TAKNIKI PRADARSHAN KENDRA)

- **Ministry of Power established UTPRERAK**, a Centre of Excellence to **Accelerate Adoption of Energy Efficient Technologies** in Indian Industry.
  o It has been **set up by the Bureau of Energy efficiency** (BEE).
- Centre **would implement and support projects** in areas such as **training/capacity building**, **showcase for energy efficient technologies**, information centre and **knowledge repository** etc.
- Centre is **mandated to become the key reference and resource institution** on industrial energy-efficient technologies.

7.9.20. CHIRAL BOSE LIQUID

- Recently, Physicists from the **USA** and **China** have claimed the discovery of a completely new state of matter namely "**Chiral Bose Liquid State**".
- Researchers **discovered the Chiral-Bose liquid state in the super-small quantum scale b**y bringing two layers of a special material very close together at very low temperatures (close to absolute zero).
  o Researchers created a **"frustration machine," a bilayer semiconducting** device designed to create this state of matter.

- The "machine" works by incorporating an **electron-rich top layer** (where electrons move freely) and a **corresponding bottom layer with "holes" that electrons can occupy**.
- The machine creates a **local imbalance resulting in electrons not having enough holes to fill and this kicks off the novel state** called the chiral bose-liquid state.

- In this "quantum" states of matter, **matter behaves in ways quite different from the solid, liquid, gaseous states. Particle interactions within these states can give rise to infinite possibilities**.
- This new state could provide a **pathway for finding a more secure and reliable way to encode digital information**.

8. CULTURE

8.1. CHOLA ADMINISTRATION

Why in News?

Recently, Prime Minister (PM) placed the **Sengol or sceptre**, presented by head of **Thiruvaduthurai Adheenam (monastery)** to India's first PM, in the new Parliament building.

More on News

- On August 14, 1947, **Pandit Jawaharlal Nehru received the 'Sengol' as a symbol of the transfer of power** to the government from the specially arrived priests **from the Thiruvaduthurai Adheenam in Tamil Nadu**
- The word **'sengol'** is derived from the **Tamil word 'semmai'**, which means **'righteousness'**. As the observer of 'justice', the **hand engraved Nandi sits atop it**, watching with his unflinching gaze.
  - The Sengol **reminds the recipient** that he has the "aanai" (order or decree) **to rule justly and fairly.**
- Sengol **had an important place in Tamil culture.**
  - When a new king is crowned, he would be presented with a 'sengol' during the coronation by the high priest as a symbol of transfer of power.
- **In the Chola Empire**, Sengol was **considered a symbol of the path of duty**, the path of **service**, and the **path of the nation.**
  - Historians suggest that **handing over of a sceptre to denote the transfer of power** has been in practice for nearly 2,000 years **since the Sangam Age and finds mention in** texts such as **Purananooru, Kurunthogai, Perumpaanatrupadai, and Kalithogai.**

About Chola Administration

- **King was the most powerful** individual and he had complete power, **although he was guided by a council of ministers.**
  - **Top authorities were known as Peruntaram,** while the inferior officials were known as Siruntaram.
- **Chola empire was divided into mandalams or provinces** and these, in turn, **were divided into valanadu and nadu.**
  - Sometimes **princes of the royal family** were appointed **governors of provinces.**
- Chola administration **encouraged local self-government in the villages** all over their empire.
  - There is a **mention of two assemblies, Ur and the Sabha or Mahasabha**, in many inscriptions (including the Uthiramerur Inscriptions).
    - ✓ **Ur** was a general **assembly of village.**

About Thiruvavaduthurai Adheenam

- **Established by Namasivaya Murthy**, a Saivite saint and scholar**, in 16th century**, this Math **had outstanding scholars in Tamil and Saivite philosophy**.
  - Heads of Math were also **patrons of Tamil scholars and musicians**.
  - **Thirumoolar,** Siddhar and one of the Saivaite saints and **author of Thirumanthiram**, **attained enlightenment** under a Peepal tree **in Thiruvavaduthurai**.
- Math is on the **southern banks of river Cauvery.**

About Uthiramerur Inscriptions

- **Dated around 920 A.D** in reign of **Parantaka Chola-I** (907-955 AD).
- It is an **ancient Chola village** once known as Chaturvedimangalam and is **located near Chennai in Tamil Nadu.**
- As per Uthiramerur inscriptions on Chola Kudavolai Election System, **every village was categorised as kudumbu** (**ward** in modern day parlance) where **representatives of general assembly were elected.**
  - **Provide details** of the way in which the **sabha was organised**.
  - The **sabha had separate committees** to look after irrigation works, gardens, temples, etc.

Qualifications to become a (Kudumbu) ward member	Certain Norms for Disqualification
Ownership of at least **one fourth** veli of land.	Those who had been **members of the committees** for the **past three years.**
Own residence.	Those who had **failed to submit accounts** as committee members.
Above thirty years and **below seventy years** of age.	Those who had **committed sins.**
Knowledge of Vedas.	Those who had **stolen the property** of others.

Categories of Land

- **Vellanvagai**: Land of non-Brahmana peasant proprietors
- **Brahmadeya**: Land gifted to Brahmanas
- **Shalabhoga**: Land for the maintenance of a school
- **Devadana, tirunamattukkani**: Land gifted to temples.
- **Pallichchhandam:** Land donated to Jaina institutions.

- ✓ **Mahasabha was a gathering of adult men** in brahmana villages which were called agraharas.
  - o **Villages enjoyed a large measure of autonomy**. Affairs of villages were managed by an executive committee to which educated persons owning property were elected.
- Cholas **paid attention to irrigation**. River Kaveri and other rivers were used for this purpose. **Many tanks and wells** for irrigation **were built.**
- **In addition to land tax**, Chola rulers drew their income from **tolls on trade, taxes on professions etc.**
  - o Chola kings gave some **rich landowners titles like muvendavelan** (a velan or peasant serving three kings), **araiyar (**chief), etc.
  - o **Brahmanas** often received **land grants or brahmadeya.**
- **Cholas had an efficient army and navy.** The Chola army consisted of elephant, cavalry and infantry.
  - o Rajaraja's son Rajendra I developed a navy for his expeditions in Ganga valley, Sri Lanka and countries of Southeast Asia.

Conclusion

Cholas are remembered as one of the longest ruling dynasties in the southern regions of India. It witnessed the onset of a new culture and art flourishes like never before.

Cholas and their reign mark a remarkable period of medieval history that saw a massive cultural spurt along with a growth in civilization and its meaning. It symbolizes not only a period of rapid advancement but also a magnificent time to look back at and learn from.

8.2. CHHATRAPATI SHIVAJI MAHARAJ

Why in News?

Celebrations marking the 350th anniversary of the coronation of Chhatrapati Shivaji Maharaj began at the Raigad fort in Maharashtra.

Chhatrapati Shivaji Maharaj

About Chhatrapati Shivaji Maharaj (1627-1680)

- **Born:** At the Shivneri fort near Junnar in Pune district on 19th February 1630.
- **Mother:** Jijabai
- **Father:** Shahajiraje Bhosale
- At the time of Shivaji Maharaj's birth, **most of the territory** in Maharashtra was under the **possession of the Nizamshah of Ahmednagar** and the **Adilshah of Bijapur.**
- Chhatrapati Shivaji Maharaj **carved out a stable kingdom** with the support of **powerful warrior families (deshmukhs).**
- **After Chhatrapati Shivaji Maharaj's death**, effective power in the Maratha state was wielded by a **family of Chitpavan Brahmanas** who served Chhatrapati Shivaji Maharaj's successors as **Peshwa** (or principal minister).

Foundation of Swaraj

- Chhatrapati Shivaji Maharaj started the work of **founding the Swaraj in the Pune region** which is full of hills and valleys and is not easily accessible.
  - o The **inhabitants of this region** are called the **Mavalas.**
- **Objective in founding the Swaraj** is clearly expressed in his official seal- that kingdom of Shivaji will always seek the **welfare of the people.**
- **He skillfully utilized the geographical features of Maval region** for the purpose of the foundation of the Swaraj.
- He **captured the forts** of Murumbdev (Rajgad), Torna, Kondhana, Purandar and **laid the foundation of the Swaraj.**
- **Swaraj comprised of** large areas of **Nashik, Pune, Satara, Sangli, Kolhapur, Sindhudurg, Ratnagiri, Raigad and Thane** districts of Maharashtra.

About the Coronation
- **On 6th June 1674**, **Shivaji Maharaj was coroneted at Raigad** and he became Chhatrapati of the Swaraj.
- As a symbol of sovereignty, **Chhatrapati Shivaji Maharaj instituted a new era** commencing from the date of his coronation. It is known as **Rajyabhisheka shaka**.
- **Special coins were minted**- a gold coin called hon and a copper coin called shivrai **with the legend Shri Raja Shivachhatrapati** inscribed on them.

- It also **included parts of Belgaum, Karwar and Dharwad districts** of Karnataka and **Jinjee, Vellore** and their neighbouring areas in Tamil Nadu.

Administrative structure of Chhatrapati Shivaji Maharaj

- The **king was at the helm** of affairs. To assist the king, there was a **council of state ministers known as ashtapradhan** including:
  - **Peshwa** (Prime Minister), **Mazumdar** (accountant), **Wakenavis** (intelligence, posts and household affairs), **Dabir** (Foreign secretary and ceremonies), **Senapati, Nyayadhish and Panditrao** (in charge of charitable grants) etc.
- Chhatrapati Shivaji Maharaj **preferred to give cash salaries** to the regular soldiers, though **sometimes chiefs received revenue grants** (saranjam).
  - **Mirasdars** (those with hereditary rights in land) **were strictly supervised.**
- Chhatrapati Shivaji Maharaj **supplemented his income by levying a contribution** on neighbouring Mughal territories. This contribution **began to be called Chauth** (one-forth of land revenue).

Military Organisation of Chhatrapati Shivaji Maharaj

- Chhatrapati Shivaji Maharaj maintained light cavalry and light infantry trained in guerilla and hilly warfare.
  - The **Mevalis and the Hetkaris** were his most excellent troopers.
- **Establishment of Maratha Navy**
  - To protect his own territory from the Sidi's depredations, to protect the merchant ships and ports in order to secure and enhance revenue incomes derived from maritime trade and customs duty, he concentrated on building the Navy.
  - There were four hundred ships of various kinds in the Navy. They included battleships like Gurab, Galbat and Pal.
- **Forts found the prime place in Chhatrapati Shivaji Maharaj scheme** of military organisation. During his life, Shivaji **constructed around 250 forts**.
  - **No single officer was entrusted sole charge of a fort**. Instead, in every fort there were-a havildar (incharge of the keys), a sabnis (for muster-roll and government correspondences) and a sarnobat (incharge of the garrison).
  - **He also built Sea forts** that would provide **protection to the navy and keep in check the Sidi of Janjira** and the **Portuguese**.
    - ✓ **He built Suvarnadurg**. In 1664 he commenced the construction of **Sindhudurg at Malvan**. About the same time he strengthened a fort named **Vijaydurg.**
    - ✓ He **also built a fort named Padmadurg** on a small island in front of Rajpuri to counter the Sidi power.

Raigad Fort

- Raigad is a **hill fort situated in the Sahyadri Mountain ranges** or the Western Ghats.
  - **Fort was known** to early Europeans as the **Gibraltar of the East.**
- Chhatrapati Shivaji Maharaj **won this fort in 1656 in a battle with Chandrarao More**, a feudal lord ruling a part of the Western Ghats.
- Due to the **fort's massive size, steep slopes and easy communication with the mainland and the sea,** Chhatrapati Shivaji Maharaj chose this fort as **his capital in 1662.**
- **Famous structures at fort:** Maha Darwaja, Hirkani Buruj, King's Darbar etc.
  - The **fort also overlooks** an **artificial lake** known as the '**Ganga Sagar Lake'.**
- **Other famous forts in raigad district**: Kolaba Fort, Sudhagad Fort, Murud-Janjira Fort etc.

About Sidis
- **Sidis were Abyssinians** who had settled at Janjira in the 15th century.
- They **got Danda-Rajpuri from Ahmednagar rulers** and later acted independently.
- Majority of them were **brought to the Indian subcontinent as slaves, bodyguards and soldiers** during the time of the **Delhi Sultanate.**
- Sidis **fought many fierce sea battles** with the Dutch, Portuguese, French, British, Mughals, and the Marathas but remained undefeated.
- Sidi prowess **reached its peak under** their ruler **Surul Khan** (1706-1732 CE)

Conflict with the Mughals
- **Aurangzeb appointed Shaista khan**, to the viceroyalty of the Deccan, ordering him to invade and annex Shivaji Maharaj's dominions.
  - **In 1663, Shivaji Maharaj raided Lal Mahal and successfully attacked Shaista khan**..
- **Later in 1664, Aurangzeb sent Jaisingh of Ambar** to crush growing power of Shivaji Maharaj.
  - **Treaty of Purandar was signed** between Jaisingh and Maharaj in 1665.
- **In 1670, Shivaji Maharaj followed an offensive policy** against the Mughals.

Conclusion

Chhatrapati Shivaji Maharaj is one of the great national heroes of India. His greatest achievement was to inculcate the spirit of independence in his people. By his great deeds and achievements, he created an altogether a new order of things.

Chhatrapati Shivaji Maharaj's personality and message are as relevant today as they were in the past.

8.3. GEOGRAPHICAL INDICATION (GI) TAG

Why in News?

Seven new products from Uttar Pradesh get Geographical Indication (GI) Tag.

Geographical Indication (GI)

About GI

- **Good originating in territory of a member, or a regional locality in that territory,** where a given characteristic of good is essentially attributable to its geographical origin.
- **Defined in the TRIPS** Agreement.
- **Registered for a period of 10 years and can be renewed again** for a period of 10 years at a time.
- The first product to get a **GI tag in India was the Darjeeling tea in 2004.**
- Some of the states with maximum number of GIs **are Karnataka, Tamil Nadu, Uttar Pradesh, and Kerala.**

Importance

- **Enables right holders** to use the indication **to prevent its use by a third party.**
- **Does not enable** the holder **to prevent** someone from **making a product using some techniques.**

Legislation in India

- Geographical Indications of Goods (Registration & Protection) Act, 1999.
- Geographical Indications of Goods (Registration and Protection) Rules, 2002.

Mechanism

- **Registrar of Geographical indications:** Controller-General of Patents, Design and Trademarks under Department for Promotion of Industry and Internal Trade (DPIIT).
  - **Supervises** functioning of **Geographical Indications Registry** (GIR).
  - GIR has **All-India Jurisdiction.**

About the products

Product	Details
Amroha Dholak	• **Musical instrument made of natural wood**. Mango, jackfruit and teakwood is preferred. • **Wood from mango and sheesham trees** are used **to carve** the multiple sized and shaped **hollow blocks**, which are **later fitted with animal skin**, mostly goatskin, to create the instrument.
Baghpat Home Furnishings	• Baghpat and Meerut are **famous for their exclusive handloom home furnishing product** and running fabrics in cotton yarn, and **only cotton yarn are used in the handloom weaving process**. • **Products include** cotton handloom **bedsheets, curtains, cushions, etc** known for traditional geometric patterns.

Kalpi Handmade Paper	• Kalpi is **recognized for handmade paper** manufacturing.
	• Manufactured in an **eco-friendly manner using various types of paper scraps** and **not wood.**
	   ○ Raw materials such as **waste paper and hosiery cloth are the main raw material** making paper.
	   ○ Natural materials like, **flower petals, grass and silk waste are added** obtain the textures.

	• **Munnalal 'Khaddari,'** a Gandhian, **introduced the craft** in the 1940s, although its **roots in Kalpi's history may extend further.**
Mahoba Gaura Patthar Hastshilp	• **It is a stone craft**. It is a very **unique and soft stone** with scientific name, the '**Pyro Flight Stone'**. • Gaura stone craft is **made of radiant white-coloured stone** that is predominantly found in this region. • It is **cut into several pieces**, which are then used for making various craft items.
Mainpuri Tarkash	• Known for its **fine inlay work with brass wire, strips and motifs on dark sheesham** extensively for furniture and boxes and **mainly used for khadaous** (wooden sandals). • These days it is **also done on center tables, stools, bangle cases, name plates' idols of 'Radha-Krishana'**, other Gods and Godesses and great personalities.
Sambhal Horn craft	• Handicraft art products are **made from horns procured from dead animals** making it environment and animal friendly. • They are **completely hand-made**.
Barabanki Handloom	• The **main products are Scarfs, Shawls and stoles**. The cluster is famous for weaving during the nawab's period of Lucknow.

Related News: Kari Ishad Mango
- **Kari Ishad mango from Uttara Karnataka has earned GI tag**.
- Kari Ishad mango is **grown predominantly around Ankola.** Additionally, it is grown in **Karwar and to a certain extent in Kumta of Uttara Karnataka.**
  - **Features:** unique aroma, luscious taste, high amount of pulp.
  - **Ishad mango has two variants** — **Kari Ishad**, which has thin skin, more pulp and is sweeter, and **Bili Ishad,** which has thick skin and has less pulp and sweetness.

8.4. NEWS IN SHORTS

8.4.1. UPANISHADS

- PM gifted **first edition print of book 'The Ten Principal Upanishads'** written India and Iris scholar in 1937, to president of United State.
  - Book is **translated from Sanskrit** and **considered to be one of the best translations of Upanishads,** some of the most important Hindu religious texts.
- **Upanishads, also known as Vedanta** (signal the end of total Veda) speculate the **ontological connection between humanity and cosmos.**
  - Dated to roughly 800-500 BC, Upanishads discussed about **relationship between atman, unchanging self of an individual, and brahman, ultimate reality in universe**.
  - Ten main (or principal) Upanishads: Esha, Kena, Katha, Prashna, Mundaka, Mandukya, Taittiriya, Aitareya, Chandogya Brihadaranyaka.

8.4.2. RAJA PARBA

- **Raja Parba or Mithuna Sankranti** is a **3-day festival celebrated in Odisha.**
- The term **Raja has come from Rajaswala** (meaning a menstruating woman).

- It became popular during the medieval period as an **agricultural holiday** remarking the worship of Bhudevi, who is the **wife of Lord Jagannath**.
  - A **silver idol of Bhudevi** is still found in Puri Temple aside from Lord Jagannatha.
- It celebrates **womanhood**. It is believed that the **mother Goddess Earth** undergoes menstruation during the first three days and prepares herself for future agricultural activities with the arrival of monsoon.
  - The second day signifies the **beginning of the solar month of Mithuna** from, which the season of rains starts. It **welcomes the agricultural year in Odisha.**
  - The **fourth day is called as Vasumati gadhua** or ceremonial bath of Bhudevi.
- During the three days, **women are given a break from household work** and time to play indoor games. Girls adorn traditional saree and apply alatha on foot. All people **abstain from walking barefoot on the earth.**

8.4.3. AMBUBACHI MELA

- Ambubachi Mela, four day annual fair, begun at **Kamakhya temple** located atop the **Nilachal hills in Guwahati, Assam.**

o It is celebrated **to mark the annual menstruation of Goddess Kamakhya (**reigning deity).
o It also marks as an occasion to **promote awareness about menstrual hygiene.**
- **Kamakhya Temple** is **one of the 52 Shakti peeths** or Seat of Shakti followers. It is also considered as **one of the prime seats of Tantric rituals.**

8.4.4. JOHA RICE

- Scientists **explored nutraceutical properties** of Joha rice (a **GI Tag rice from Assam**) and **detected two unsaturated fatty acids:** linoleic acid (omega-6) and linolenic (omega-3) acid.
  o **Joha rice has a more balanced ratio of omega-6 to omega-3** in comparison to widely consumed non-scented variety.
- Joha is a **short-grain winter paddy** known for its **significant aroma and taste**.
  o Joha varieties are **mostly short or medium grained** and have **very low yield potential.**
- It is effective in **lowering blood glucose** and **preventing diabetes onset.**
  o It is also **rich in several antioxidants, flavonoids**, and phenolics.

8.4.5. MENHIRS

- Heritage enthusiasts of Telangana seek UNESCO tag for **Menhirs at Mudumal village in Telangana.**
  o Menhirs are **upright stones** from the Megalithic period. Generally, they are erected above a burial site or near a burial site as a memorial.
  o According to archaeologists, the menhirs have been designed in a manner such that **they align with the sun on particular days,** like Equinoxes and solstices. Thus, menhirs enabled the early agrarian people to **chart the movement of the Sun**. The knowledge of Suns' movement would have helped them understand seasons.
  o They were also **used as clocks and calendars**. They were used to measure time, identify specific days, months and seasons **from the shadows.**
- **About Menhirs, in Mudumal**
  o Mudumal village is home to **one of South-East Asia's largest cluster of Menhirs**. They are as old as **3,500 years.**
  o Locally they are called '**Niluvu rallu'- meaning standing rocks**.
  o These are **accompanied by nearly 3,000 alignment stones** related to the funerary rights of the ancient community. These stones are arranged in lines or rows in a 20-25 feet gap.

8.4.6. HOMO NALEDI

- New evidence suggests that Homo naledi, **an extinct human species, may have buried their dead and carved meaningful symbols in a cave.**
  o The burials are older than any known **Homo sapiens burials by at least 100,000 years.**
- **Features of Homo naledi**
  o They **walked fully upright** and had hands that were similar to ours.
  o **Shoulders were built for climbing** and teeth were shaped like that of older primates.
  o **Brain size was just one-third of that of modern humans.**
- Humankind's earliest ancestors**: Ardipithicines, Australopithecines, Homo habilis, Homo ergaster/ erectus, Homo neanderthalensis, Denisovans.**

8.4.7. PRESS INFORMATION BUREAU (PIB)

- Press Information Bureau (PIB) **marked** its **centennial anniversary.**

Press Information Bureau (PIB) New Delhi

About : **Nodal agency** of the Government of India to **disseminate information to the print and electronic media** on government policies, programmes etc.

Genesis:
⇨ Set up as a **temporary cell** (under then British government) in 1919. In 1923, the bureau was **made permanent** as the Bureau of Public Information.
⇨ It acquired its present **name in 1946**, and became a **department of the Ministry of Information and Broadcasting** after 1947.

Headed by: **Principal Director General** (Media & Communication) who is assisted by a Director General and **eight Additional Director Generals.**

Functions: Activities can be broadly **classified in three Categories** i.e. Information, Education & Communication; Feedback and Accreditation & Special Services.

8.4.8. JATAN: VIRTUAL MUSEUM BUILDER

- JATAN: Virtual Museum Builder, is a **digital collection management system for Indian museums**.
- It is a **client server application** with features such as image cropping, watermarking, unique numbering, management of digital objects with multimedia representations.
- It has been designed and developed by Human Centres Design and Computing Group, **Centre for Development of Advanced Computing (C-DAC), Pune.**
  - o C-DAC is the **premier R&D organization** of the Ministry of Electronics and Information Technology (MeitY) for carrying out **R&D in IT, Electronics and associated areas.**
  - o It was **established in 1988.**
- It is part of Central government's plan to **complete 3D digitisation of all museums under its administrative control** by the year end for better conservation of artefacts.
  - o **Ministry of Culture** has 10 museums under its ambit.
  - o Also, **Archaeological Survey of India** also has site museums at 44 locations spread throughout the country in proximity to important archaeological sites
- **Partners:** Memorandum of Understanding has been signed between the **Ministry of Electronics and Information Technology and Ministry of Culture.**

8.4.9. GANDHI PEACE PRIZE 2021

- Gandhi Peace Prize 2021 will be conferred on Gita Press, Gorakhpur.
- **Annual Gandhi Peace Prize was instituted in 1995 on occasion of 125th birth anniversary of Mahatma Gandhi.**
  - o **Award is open to all persons** regardless of nationality, race, language, caste, creed or gender.
  - o Award carries a **cash prize of ₹1 crore, a citation, a plaque and an exquisite traditional handicraft/handloom item**.
  - o Past awardees include organisations such as ISRO and Ramakrishna Mission.

8.4.10. SAHITYA AKADEMI AWARD

- Ministry of Culture intends to change nomination process for Sahitya Akademi Award.
- It is a **literary honour, conferred annually on writers of most outstanding books** of literary merit published in any of the major Indian languages.
  - o Besides 22 languages enumerated in Constitution, **English and Rajasthani language are also recognised.**
  - o Award includes **a casket containing an engraved copper-plaque, a shawl and an amount of Rs. 1,00,000/-.**
- Sahitya Akademi **functions as an autonomous organisation.** It is registered as a society under Societies Registration Act, 1860.

8.4.11. DIAMOND LEAGUE

- **Indian long jumper Murali Sreeshankar** secured a **third place in Paris Diamond League.**
- **Diamond League** is an annual **series of top-tier track and field competitions** organised **by World Athletics**, international governing body for athletics.
  - o It was **started in 2010 as a replacement for previous IAAF Golden League** and IAAF World Athletics Final events.
- **Number of meets in a particular season** of Diamond League is generally 14. The meets are **held in different cities** across the globe.

8.4.12. ICC WORLD TEST CHAMPIONSHIP (WTC)

- **Australia beats India to win** the WTC title.
- **WTC comprises the top nine Test teams**, all of whom played six series each – three at home and three away.
  - o **Top two teams competed** in WTC Final,
- **Rather than each series** being worth the **same number of points like in the first edition**, each **match was worth the same number of points** this time.
- **Teams qualified on a percentage of points won basis** to standardise the imbalance in the number of matches played by terms.

You can scan this QR code to practice the Smart Quiz of Culture at our open test online platform for testing your understanding and recalling of the concepts.

9. ETHICS

9.1. PATRONAGE APPOINTMENTS

Introduction

Patronage appointments refer to the appointments which are made on the basis of the recommendation or source (personal connections) of an influential person, political leader, public servants, etc. This has not only affected the people involved by has affected the overall Governance of India.

Ethical Issues involved in Patronage Appointments

- **Loyalty to the person vs. accountability to the system:** When appointees get their position through patronage, then they are likely to be **more accountable to that person** rather **than to the system**.

Motivations For Engaging In Patronage Appointments

Quid Pro Quo: Appointments offered in exchange for bribes or favours

Nepotism/Favouritism: Using power to appoint individuals who hold a personal relationship with the appointing authority

Creating administrative clout: Appointments are done in personal discretion in order to exert and maintain influence in the system

- **Violates the principles of meritocracy**: Ideally, positions should be awarded based on individuals' abilities and qualifications. Bypassing meritocracy indirectly **compromises integrity** of the system and can result in **ineffective** or **incompetent** individuals **occupying important roles**.
- **Violates Principle of Equality of Opportunity**: In the light of appointments through patronage, **qualified and capable individuals** may feel their **efforts and qualifications** are not given equal consideration.
- **Trust of People:** It erodes **public trust** in the **fairness** and **impartiality** of the system and people in power. It leads to a loss of confidence in the administration as a whole.
  - The **associated Nepotism/Favouritism** further erodes the trust of the individual in the system.

Impacts of Patronage Appointments

- **Corruption and Mismanagement:** It can be used as a means to reward political allies, secure support, or engage in **quid pro quo arrangements**. It promotes the diversion of resources away from public welfare toward personal gain.
- **Impaired policy implementation:** Incompetent and inexperienced officeholders appointed through patronage struggle to implement policies effectively. This can result in poor policy outcomes, delays, or hinderance in the overall governance process.
- **Demoralization of competent officials**: This can lead to a **loss of motivation** and talent within the public service as individuals feel undervalued and unappreciated.
- **Reduced legitimacy:** Citizens may perceive the system as corrupt, nepotistic, and lacking in transparency. This can weaken the legitimacy of the government and undermine its ability to govern effectively.
- **Stunted Economic development:** Growth and development are dependent on governance. **Ineffective officials who are appointed** through patronage system may not be able to effect optimal utilization of resources.

> **Measures taken to Curb Patronage Appointments**
> - **Right to Information (RTI) Act, 2005**: It has empowered citizens to **seek information from public authorities**, including information related to appointments and recruitments.
> - **National e-Governance Plan (NeGP)**: This has reduced human intervention and enhanced transparency and efficiency in the appointment process.
> - **Whistleblower protection**: The **Whistleblower Protection Act, 2014**, provides protection to **individuals who expose corruption** and wrongdoing, including cases of patronage appointments.
> - **Strengthening anti-corruption measures:** Government has set up **specialized anti-corruption agencies** like the Central Bureau of Investigation (CBI) and the Anti-Corruption Bureau (ACB).
> - **Other**: Prevention of Corruption Act, 1988, Lokpal etc.

Way Forward

- **Strengthening institutions:** Ensure that institutions have the **authority**, **resources**, and **mandate** to conduct **fair** and **transparent selection** processes based on merit.
- **Depoliticizing appointments**: Reduce political influence in the appointment process by **establishing an independent** and **non-partisan body** responsible for overseeing appointments in public offices.
- **Promoting merit-based recruitment**: Emphasize the importance of **qualifications**, **experience**, and **competence** in the recruitment and selection process.
- **Enforcing code of ethics and conduct**: Promote the **internalization of concepts of public service** and **integrity** to ensure ethical decision making.
- **Encouraging Multi-stakeholder deliberations:** Foster collaboration with civil society organizations, professional associations, and academic institutions to promote accountability, monitor the appointment process, and advocate for reforms.
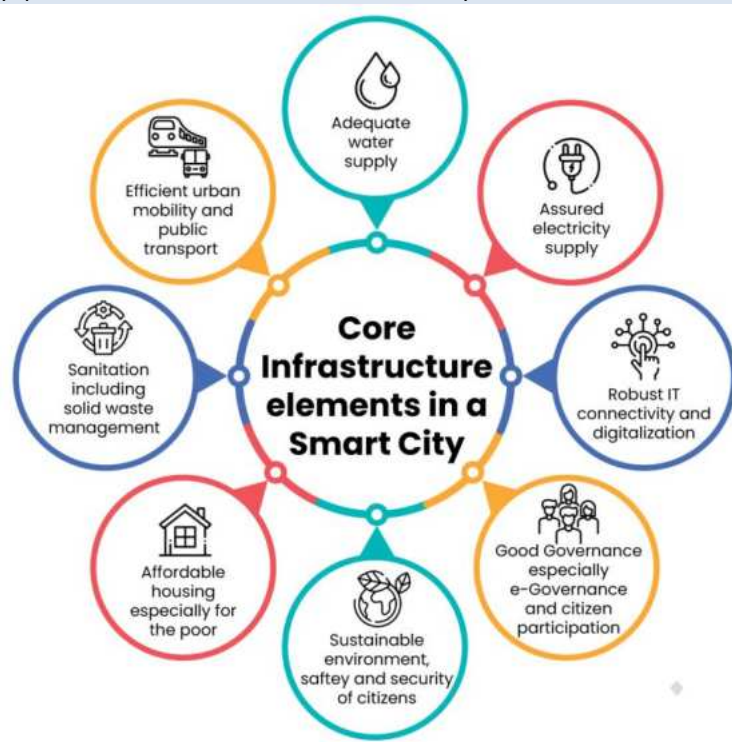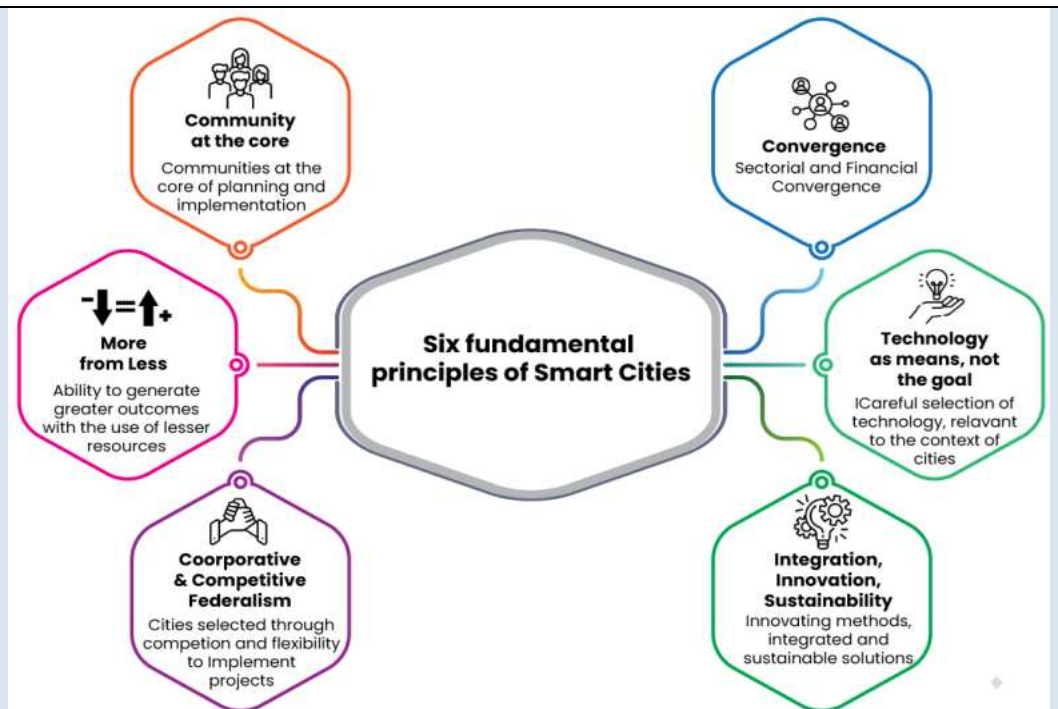
10. SCHEMES IN NEWS

10.1. SMART CITIES MISSION

Why in news?

Recently, The Government has decided to extend the Smart Cities Mission deadline by one year from June 2023 to June 2024.

Objectives	Salient features

• To **promote cities to provide core infrastructure, clean and sustainable environment** through the application of 'smart solutions'.
• To **drive economic growth** and **improve quality of life** through **comprehensive work on social, economic, physical and institutional pillars** of the city.
• To **create replicable models** which act as lighthouses to other aspiring cities.
	• The Mission is operated as a **Centrally Sponsored Scheme since 2015 and extended till 2024 by Ministry of Housing and Urban Affairs**.
	• **Smart City Features**
	  o **Creating walkable localities** - reduce congestion, air pollution and resource depletion, boost local economy, promote interactions and ensure security.
	  o **Preserving and developing open spaces** like parks, playgrounds, etc.
	  o **Promoting a variety of transport options** — Transit Oriented Development (TOD), public transport and last mile para-transport connectivity.
	  o **Promoting mixed land use in area-based developments**.
	  o **Giving an identity to the city** — based on its main economic activity, such as local cuisine, health, education, etc.
	  o **Applying Smart Solutions to infrastructure and services** in area-based development in order to make them better.
	• The Mission will cover **100 cities**.
	• The implementation of the Mission at the City level will be done by a **Special Purpose Vehicle (SPV)** created for the purpose.
	  o It will **plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate** the Smart City development projects.
	• The Smart City proposal of each shortlisted city is expected to encapsulate either a **retrofitting or redevelopment or greenfield development model, or a mix thereof and a Pan-city feature with Smart Solution.**
	• **Funding:** The Union Government gave financial support to the extent of **Rs. 48,000 crores over 5 years (FY15-FY20)** i.e., on an **average Rs.100 crore per city per year**.
	  o An equal amount on a matching basis is to be provided by the State/ULB.
	  o Additional resources are to be raised through convergence, from ULBs' own funds, grants under Finance Commission, innovative finance mechanisms such as Municipal Bonds, other government programs and borrowings.

Six fundamental principles of Smart Cities

- **Community at the core**: Communities at the core of planning and implementation
- **Convergence**: Sectorial and Financial Convergence
- **More from Less**: Ability to generate greater outcomes with the use of lesser resources
- **Technology as means, not the goal**: ICareful selection of technology, relevant to the context of cities
- **Coorporative & Competitive Federalism**: Cities selected through competion and flexibility to Implement projects
- **Integration, Innovation, Sustainability**: Innovating methods, integrated and sustainable solutions

- The emphasis has been given on the **participation of private sector through Public Private Partnerships (PPP).**
- There is **no standard definition or template of a smart city**.
- **ICCCs (Integrated Command and Control Centers) have been operationalized in all the 100 Smart Cities**, which have been envisaged to act as the **brain and nerve center** of the enabling cities with a decision support system for enhancing quality of life for its citizen.
  - These ICCCs are playing **important role in ensuring better monitoring and efficiency in areas like traffic management, solid waste management, water distribution management.**
  - Smart Cities have effectively used ICCCs and related Smart infrastructure for **better management of the COVID-19 pandemic.**

APPENDIX

APPENDIX: KEY DATA AND FACTS

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.

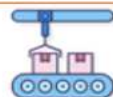|	
SDG 9 **Industry,** **Innovation and** **Infrastructure**	▷ **59.97% population** subscribed to **internet** in 2022-23 (26.98 in 2015-16) ▷ **50.65 tonnes per rupees crore CO2 emission** in 2018-19 (61.45 in 2015-16). ▷ **262 researchers per million population** in 2020-2021 (218 in 2015-16).
SDG 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.

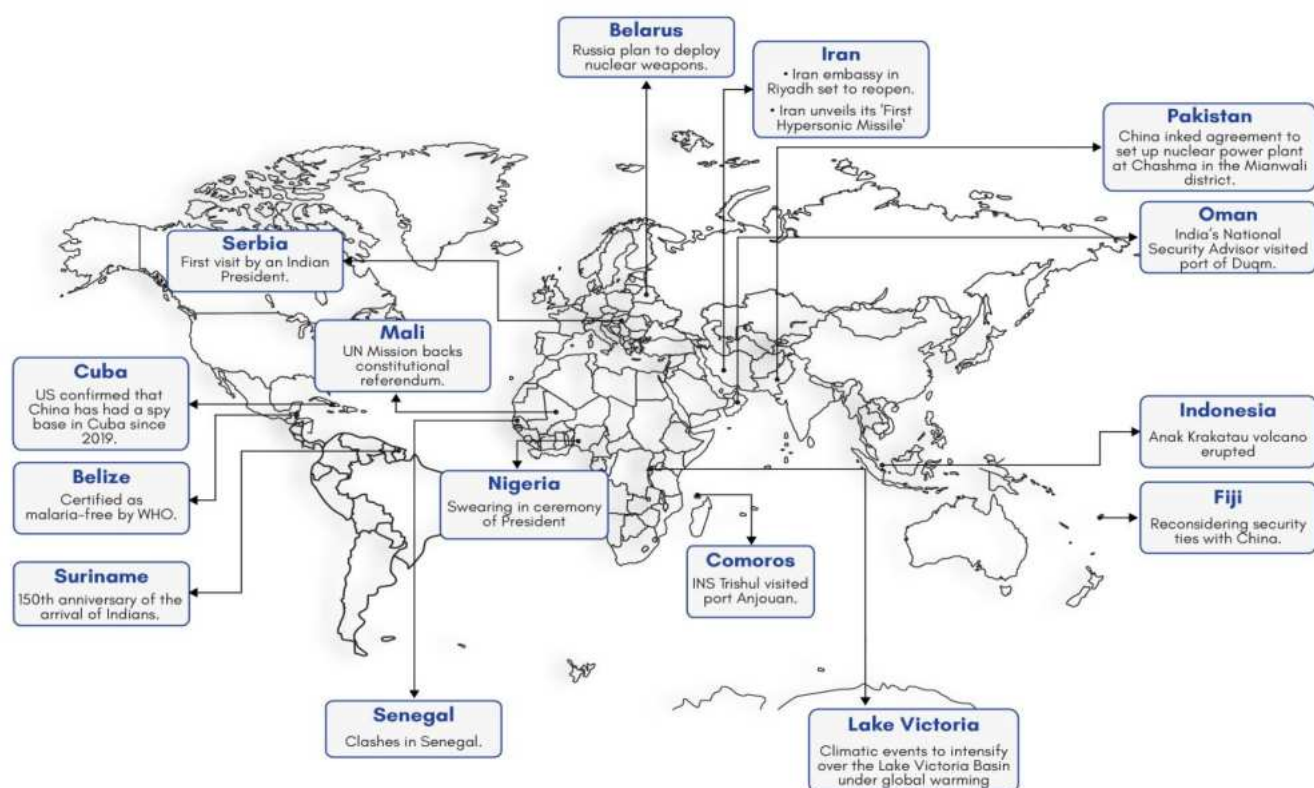| SDG 17 Partnerships for the Goals | ▷ **25 states** using the state monitoring framework (12 in 2019–20). |
	▷ **1.77% share of merchandise export** of total global export in 2021.
	▷ **4.0% Commercial Service export** of total global export in 2021.
	▷ **National Statistical Legislation** with compliance to **UN Fundamental Principles of Official Statistics**

ESSAY

ENRICHMENT PROGRAMME 2023

18 JUNE | 5 PM

▸ Introducing different stages from developing an idea into completing an essay

▸ Practical and efficient approach to learn different parts of essay

▸ Regular practice and brainstorming sessions

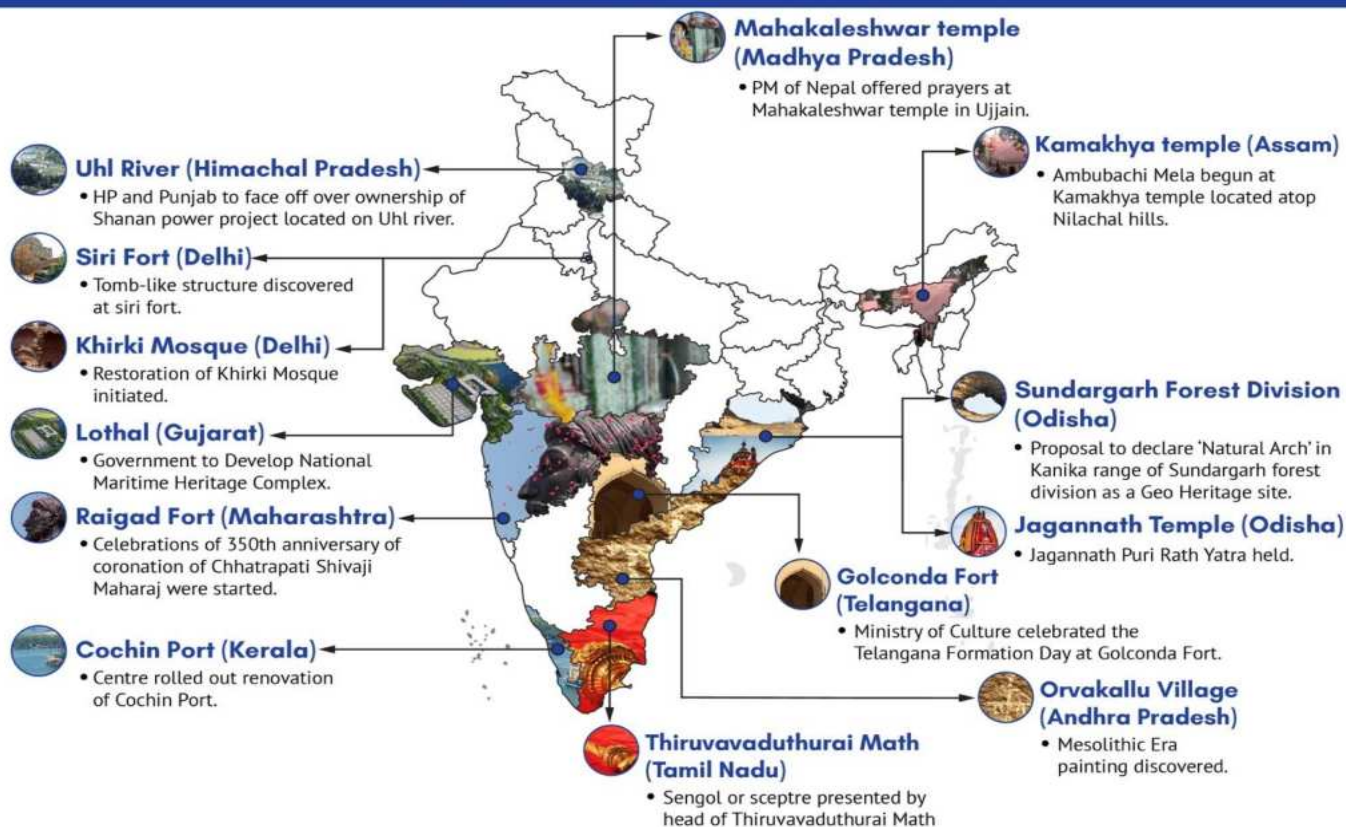▸ Inter disciplinary approaches

▸ **LIVE / ONLINE** Classes Available

Places in News: World

Belarus
Russia plan to deploy nuclear weapons.

Iran
• Iran embassy in Riyadh set to reopen.
• Iran unveils its 'First Hypersonic Missile'

Pakistan
China inked agreement to set up nuclear power plant at Chashma in the Mianwali district.

Oman
India's National Security Advisor visited port of Duqm.

Serbia
First visit by an Indian President.

Mali
UN Mission backs constitutional referendum.

Cuba
US confirmed that China has had a spy base in Cuba since 2019.

Belize
Certified as malaria-free by WHO.

Nigeria
Swearing in ceremony of President

Indonesia
Anak Krakatau volcano erupted

Fiji
Reconsidering security ties with China.

Suriname
150th anniversary of the arrival of Indians.

Comoros
INS Trishul visited port Anjouan.

Senegal
Clashes in Senegal.

Lake Victoria
Climatic events to intensify over the Lake Victoria Basin under global warming

Places in News: India

Mahakaleshwar temple (Madhya Pradesh)
• PM of Nepal offered prayers at Mahakaleshwar temple in Ujjain.

Uhl River (Himachal Pradesh)
• HP and Punjab to face off over ownership of Shanan power project located on Uhl river.

Kamakhya temple (Assam)
• Ambubachi Mela begun at Kamakhya temple located atop Nilachal hills.

Siri Fort (Delhi)
• Tomb-like structure discovered at siri fort.

Khirki Mosque (Delhi)
• Restoration of Khirki Mosque initiated.

Lothal (Gujarat)
• Government to Develop National Maritime Heritage Complex.

Sundargarh Forest Division (Odisha)
• Proposal to declare 'Natural Arch' in Kanika range of Sundargarh forest division as a Geo Heritage site.

Raigad Fort (Maharashtra)
• Celebrations of 350th anniversary of coronation of Chhatrapati Shivaji Maharaj were started.

Jagannath Temple (Odisha)
• Jagannath Puri Rath Yatra held.

Cochin Port (Kerala)
• Centre rolled out renovation of Cochin Port.

Golconda Fort (Telangana)
• Ministry of Culture celebrated the Telangana Formation Day at Golconda Fort.

Orvakallu Village (Andhra Pradesh)
• Mesolithic Era painting discovered.

Thiruvavaduthurai Math (Tamil Nadu)
• Sengol or sceptre presented by head of Thiruvavaduthurai Math

Personalities In News

Personality	About	Ethical Values Exhibited by the Personality
Rani Durgavati	• **Rani Durgavati Gaurav Yatra** was launched **in Madhya Pradesh.** • She belonged to **Mahoba's Chandela dynasty and** was **married to Dalpat Shah,** from **Gond Kingdom of Garha-Katanga.** • **She constructed several reservoirs** such as Ranital, Cheritial and Adhartal. • She **allowed Acharya Bitthalnath** to establish a **seat of Pushtimarg Cult at Garha.** • **Durgavati repulsed Baz Bahadur,** ruler of Malwa, between 1555 and 1560. • She was **defeated by Mughal governor** of Allahabad, **Asaf Khan.**	**Self-Determination** • She demonstrated a strong sense of self-determination by taking on the reins of government after the death of her husband. • Instead of succumbing to grief or relinquishing power, she chose to lead and govern her kingdom herself.

Ahilyabai Holkar	• **Maharashtra government** has decided to **rename Ahmednagar district as Ahilyanagar.**
	• She was an **18th century Malwa queen.**
	• She **took control of Malwa in 1754 after her husband's** (Khande Rao) **death in Battle of Kumbher** against king of Bharatpur.
	• **Highlights/achievements of her rule**
	  ▷ She **excelled at administrative and military strategies** and during her rule perfect order and good government prevailed.
	  ▷ **City of Maheshwar became a literary, musical, artistic and industrial centre,** and she helped establish a textile industry there, which is now home to famous Maheshwari saris.
	  ▷ **Restoration/revamp of various temples** including Kashi Vishwanath, Badrinath, Dwarka, Omkareshwari etc.
		Valour and administrator
		• The Queen of Malwa, apart from being a brave queen and proficient ruler, was also an erudite politician.
		• She observed the bigger picture when the Maratha Peshwa couldn't pin down the agenda of the British.

Savitribai Jyotirao Phule	• Savitribai Jyotirao Phule was a prominent **social reformer, educationist** and **poet.**
	• She is credited for founding the first girl's school in Pune with her husband Jyotirao Phule.
	• **Initiatives**
	  ▷ Took effort towards **educating** and **emancipating child widows,** campaigned against **child marriage** and **sati pratha,** and advocated for **widow remarriage.**
	  ▷ She started the Mahila Seva Mandal.
	  ▷ Started a care center called 'Balhatya Pratibandhak Griha.
	  ▷ Associated with a **social reform society called 'Satyashodhak Samaj'** founded by Jyotirao in, 1873.
		Rationalism and social justice
		• She believed in scientific understanding of Indian history particularly the origin of its caste based social order.
		• She was pioneer of women education in India.

Prasanta Chandra (PC) Mahalanobis	• National Statistics Day (June 29) is celebrated every year in recognition of contributions made by **Prasanta Chandra Mahalanobis** in the fields of **statistics and economic planning.**
	• **Contribution and Achievements**
	  ▷ He is often referred to as the **father of Indian statistics.**
	  ▷ He was one of the **members of the first Planning Commission of India and founded the Indian Statistical Institute (ISI).**
	  ▷ He found **Mahalanobis distance,** a statistical measure used to find the distance between a point and a distribution.
		Institution builder and Scholarship
		• He was a brilliant statistician and a scientist whose scholarly contribution led to development of large scale surveys undertaken for policy making in India.

Birsa Munda	- The PM recently paid tribute to **tribal icon Birsa Munda** on 123rd death anniversary. **About Birsa Munda:** - He belonged to the **Munda tribe in the Chhotanagpur Plateau area.** - He **converted to Christianity in order to join the German Mission school.** - He started the **faith of 'Birsait'.** - In the **Ulgulan movement of 1899** guerrilla warfare was resorted to drive out foreigners. - He refused to **follow colonial laws** and **pay rent;** he **challenged religious practices to fight against superstition.** - Became known as **'Bhagwan' (God)** and **'Dharati Aba'** (Father of the earth) by his followers.	**Fortitude and Vision** - He was a visionary who played a crucial role in the liberation of his community. - He was an Indian tribal freedom fighter who showed extraordinary courage by leading the revolts of his tribesman against the Britishers and powerful landlords.
Swami Sahajanand Saraswati	**Born in Ghazipur, Uttar Pradesh.** - By organising farmers, he infused a new consciousness in the Freedom Movement. - At Congress session in Lucknow in April 1936, **All India Kisan Sabha** was formed and he was elected as its **1st President.** **He organised Bakasht movement in Bihar** against zamindars evicting tenants from Bakasht lands. - This led to enactment of **Bihar Tenancy Act** and **Bakasht Land Tax** to protect farmers' rights. - He also **led the successful** struggle in the **Dalmia Sugar Mill** at **Bihta,** where peasant-worker unity was the most important characteristics.	**Community development and Selfless service** - He promoted Khadi and prohibition as a means of empowering and self-sustaining local communities. - He dedicated his life to the political and economic independence of the Indian people.
Shankar Trimbak Dharmadhikari	- Famously known as Dada Dharmadhikari, he was **an Indian freedom fighter and Gandhian thinker.** **Political contributions:** - Participated in **Non-Cooperation Movement** and **Quit India Movement;** - An active **member of 'Gandhi Seva Sangh';** - Elected to Madhya Pradesh Legislative Assembly and the Constituent Council. **Social contributions:** - Devoted majority of his time to the **advancement of Dalits and women.** - Advocated for an **ideological revolution.** **Had a very close association with Acharya Vinoba Bhave** and Participated in the **'Bhoodan Movement'.**	**Social Justice and Equality:** - He devoted a significant portion of his time to the advancement of Dalits and women. - His social contributions were centered around fighting for the rights, dignity, and equality of these marginalized sections of society.
Harry Markowitz	**Harry Markowitz,** father of modern portfolio theory (MPT), **passed away.** - He shared the **Nobel Prize in Economic Sciences (1990)** with Merton H. Miller and William F. Sharpe for his ideas on finance. - MPT is a **practical method for selecting investments** in order **to maximize their overall returns** within an **acceptable level of risk.** **Markowitz focused on combinations of assets,** rather than individual securities - Markowitz also did **ground-breaking work in mathematical programming** and **computer simulations.** **He developed Simscript,** a language used to write simulation software.	**Perseverance and Rationality** He not only advanced the understanding of portfolio management but also fostered a culture of evidence-based decision-making and continuous learning.

Lakshya Mains Mentoring Program 2023

Lakshya Mains Mentoring Program 2023 is a targeted revision, practice, and enrichment Program that aids students in achieving excellence in the UPSC Mains Examination 2023. The Program adopts a strategic approach by providing smart preparation strategies, developing critical thinking and analytical skills, and advanced answer-writing abilities.

Scan the QR code to Register

Features of the Program

Dedicated Senior Mentor

A Senior Mentor is assigned to each student to provide personalized guidance in each aspect of the Mains examination preparation and assist students in consolidating their strengths maximizing their performance by identifying and improving upon student weaknesses.

Emphasis on High-Scoring Potential Subjects

The Program lays special emphasis on subjects like Ethics and Essay and provides ample opportunity for students to inculcate the learnings and effect their implementation in the answer writing.

Regular Group Sessions

Aspirants engage in interactive sessions conducted by experienced mentors which provide subject-specific strategies, insights from toppers, advanced-level answer-writing skills, etc.

Answer Enrichment

Aspirants gain insights from institutional experience and the answer scripts of previous toppers to enhance the content and presentation of their answers, making them impactful and effective.

Live Practice Sessions

Through these practice sessions, aspirants can implement session learnings and receive immediate feedback from their mentors to refine their approach and boost their confidence.

Lakshya Mains Practice Test (LMPT)

Aspirants can undertake the scheduled LMPTs in online/Offline modes to put their knowledge and skills to the test and validate their preparation strategies.

Expert Evaluation

The LMPT is evaluated by the expert team at VisionIAS through an Innovative Assessment System to provide detailed feedback for further improvement.

Feedback Session with Assigned Mentor

In this session, students can discuss the feedback received on their LMPT performance and their Answer Scripts to address any doubts or concerns in a personalized setting with their Mentor.

Peer Interaction and Motivation

Aspirants participate in constructive discussions, share their experiences, insights, and motivation with fellow aspirants facilitating co-learning and development.

Multi-platform Support

Aspirants can benefit from a comprehensive support system in the form of online/offline Groups and One-to-One sessions, telephonic support, and a dedicated Telegram platform for immediate assistance whenever needed.

With its intelligent design, effective implementation, dedication from Senior Mentors, and active participation of Students, the Program has achieved tremendous success in a short period of time with **Waseem Ahmad Bhat** securing an impressive All India Rank (AIR) of 7, **Siddharth Shukla AIR 18**, and **Anoushka Sharma** securing AIR 20.

SPACE FOR NOTES

Heartiest Congratulations
to all Successful Candidates

39 in Top 50 Selections in CSE 2022

1 AIR Ishita Kishore
2 AIR Garima Lohia
3 AIR Uma Harathi N

8 in Top 10 Selections in CSE 2021

2 AIR ANKITA AGARWAL
3 AIR GAMINI SINGLA
4 AIR AISHWARYA VERMA

5 AIR UTKARSH DWIVEDI
6 AIR YAKSH CHAUDHARY
7 AIR SAMYAK S JAIN
8 AIR ISHITA RATHI
9 AIR PREETAM KUMAR

1 AIR SHUBHAM KUMAR
CIVIL SERVICES EXAMINATION 2020

HEAD OFFICE
Apsara Arcade, 1/8-B 1st Floor,
Near Gate-6 Karol Bagh
Metro Station
DELHI

Mukherjee Nagar Centre
Plot No. 857, Ground Floor,
Mukherjee Nagar, Opposite Punjab
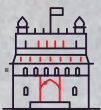& Sindh Bank, Mukherjee Nagar,

For Detailed Enquiry,
Please Call:
+91 8468022022,
+91 9019066066

ENQUIRY@VISIONIAS.IN /VISION_IAS WWW.VISIONIAS.IN /C/VISIIONIASDELHI VISION_IAS /VISIONIAS_UPSC

AHMEDABAD   BHOPAL   CHANDIGARH   GUWAHATI   HYDERABAD   JAIPUR   LUCKNOW   PRAYAGRAJ   PUNE   RANCHI