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IAS Aspirants

JULY 2023

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POLITY

COMPETITION (AMENDMENT) ACT, 2023

In News: The Parliament passed the **Competition (Amendment) Bill, 2023**, which seeks to amend the Competition Act, 2002.

- The amendment have been passed in the backdrop of **big-tech giant Google's alleged anti-competitive practices** in India.

Amendments to the Competition Act

- **Penalties** to be calculated upon **"global turnover" derived from all products and services**: it leads to higher penalties by CCI. Earlier, the penalties were imposed based upon the **relevant turnover**, which was presumed to be domestic turnover.
- Introduction of the **Deal Value Threshold (DVT)** for merger & acquisitions: if the **value of any transaction exceeding Rs 2000 Cr** in connection with acquisition, merger or amalgamation (if parties have **substantial business operations** in India), it must be reported to and approved by CCI. Earlier, the combination deals would be needed to be reported on the basis of **asset or turnover**.
- Broadening the scope of **definition**:
  - **Anti-competitive agreements** will deal with both **purchase and selling side** of the agreement;
  - **Cartels** will include **hubs and spoke**, both, ie, those who do not directly participate in supply or production but participate indirectly at the horizontal levels such as trade associates or consultants or intermediaries.
- The Amendment Act, 2023 also **reduces the overall time limit** for assessment of mergers and acquisitions by the Competition Commission of India **from 210 days to 150 days**.
- Power of the CCI to **appoint Director General** for investigation
- Introduction of **Settlements and Compromise** with commitments
- **Filing complaints** against anti-competitive practices **within 3 years** from the date of cause of action.
- **Pre-deposit of 25%** for filing of an appeal before the National Company Law Appellate Tribunal against the order of CCI.

Brief Background

- Since India has been one of the largest markets in the world for both consumers and producers, the **Monopolies and Restrictive Trade Practices (MRTP) Act, 1969** was enacted with the objective to **curtail the concentration of wealth** in fewer hands, **limit monopolistic practices** and regulate the market.
- To **promote competitive markets** in the era of privatization, globalization and liberalization, MRTP Act was replaced by the **Competition Act, 2002**.
- The Act **prohibits anti-competitive agreements, abuse of dominant position by enterprises and regulates combinations (acquisition, acquiring of control and M&A)**, which causes or likely to cause an **appreciable adverse effect on competition** within India.
- To achieve these objectives, the **Competition Commission of India** (CCI) was established under the Act.

About Competition Commission of India (CCI)

CCI's goal is to **create and sustain fair competition** in the economy that will provide a **level playing field** to the producers and make the markets work for the **welfare of the consumers**.

It is the duty of the Commission to **eliminate practices having adverse effect on competition**, promote and sustain competition, protect the **interests of consumers** and ensure **freedom of trade** in the markets of India.

The three main types of anti-competitive market behaviour that the Competition Commission monitors are **anti-competitive agreements (ACA), abuse of dominance (ABP), and combinations**.

The Commission is also required to give **opinion on competition issues** to the government, create **public awareness** and impart training on competition issues.

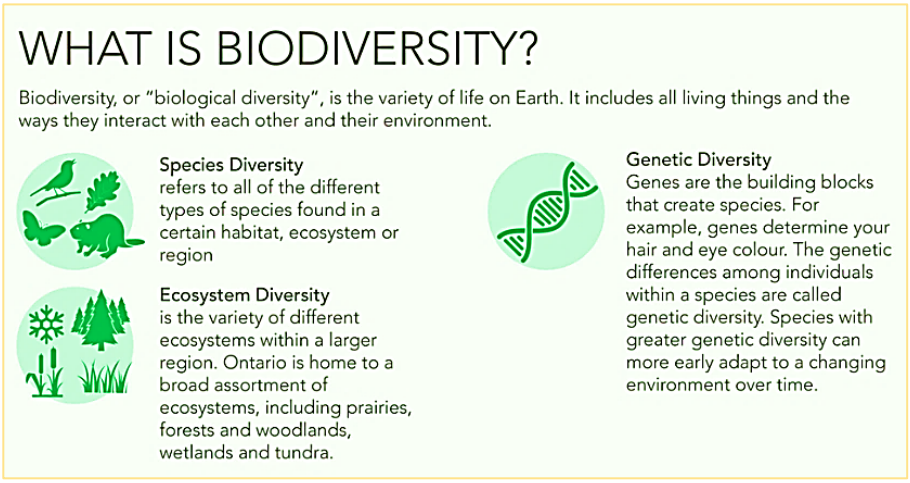
The CCI works as a **statutory body** and affiliate organization with **Ministry of Corporate Affairs.**

Opinion

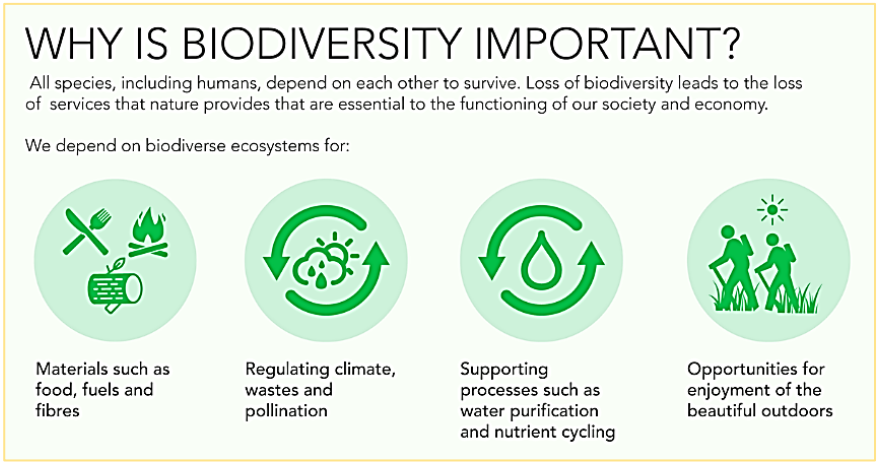
- While the new provision on global turnover will not be exclusively applicable **to tech companies**, they are likely to be **the most aggrieved** by it given the nature of their business which **cuts across geographies**.
- The revenue these businesses earn from **their India operations is much smaller** than their income in other regions such as the US and Europe.
- This means that enterprises found guilty of violation of the provisions of the Competition Act, 2002 can now be penalized not only on their total turnover derived from revenue generated from sale of all products and services within **India but also from all over the globe.**
- Interestingly, the concept of **penalties on global turnover is alie**n to competition regimes in all **matured and advanced jurisdictions** such as European Union and USA, where strict regulations for restricting it to "relevant" turnover based upon on fair principles of proportionality exist.

BIOLOGICAL DIVERSITY AMENDMENT BILL

In News: The **Biological Diversity (Amendment) Bill, 2022** was passed during Lok Sabha's monsoon session.



- The bill **amends** the **Biological Diversity Act of 2002** which was put in place to help India meet the objectives of the **United Nations Convention on Biological Diversity (CBD),** which in **1992** pointed out that countries have **sovereign rights** over their biological diversity.
  - The CBD strives for **sustainable, fair and equitable sharing** of benefits arising **from using biological resources and associated traditional knowledge.**
  - To do this, the law formulates a three-tier structure consisting of a **National Biodiversity Authority (NBA)** at the national level, **State Biodiversity Boards (SBBs)** at the State level and **Biodiversity Management Committees (BMCs)** at local body levels.



- The major amendments encourage the cultivation of **medicinal plants**; encourage the **Indian system of medicine**; facilitate **collaborative research and investments**; **reduce the need** of practitioners and companies making medicinal products to obtain permission from **National Biodiversity Authority.**
- Users of **codified traditional knowledge** and **AYUSH (Ayurveda, Yoga and Naturopathy, Unani, Siddha and Homeopathy)** practitioners will be **exempted** from **sharing benefits with local communities.**
- The Bill **decriminalises all offences** under the Act.

Key Issues with the bill

- The term codified traditional knowledge has **not been defined**. A broad interpretation might exempt **all local traditional knowledge** from benefit-sharing requirements.

- The **World Intellectual Property Organisation (WIPO)** defines codified traditional knowledge as "traditional knowledge which is in some **systematic and structured form**, in which the **knowledge is ordered, organised, classified and categorised in some manner".**

- The Bill **removes** the **direct role of local communities** in determining benefit-sharing provisions, which may be in contrast with the framework under **Nagoya Protocol** (2010)
  - Nagoya Protocol on Access and Benefit Sharing requires a **signatory country** to ensure that **prior informed consent** or **approval** and involvement **of indigenous and local communities** is obtained for access to genetic resources and traditional knowledge.
- The Bill **decriminalizes offences** and replaces them with penalties. The Bill shifts the **adjudicating authority from** a **Judge to a government officia**l. Penalties will be determined based on inquiries, **not judgments in open court**. The appropriateness of conferring such discretion to government officials is questionable.
- Environmental organisations have raised concerns about potential for **"bio piracy".** They say amendments **solely benefit** the **AYUSH industry** and there is **lack of clarity** on benefit sharing with local communities.

Bio-Piracy

Traditional knowledge (TK) is knowledge system that is held by the indigenous people, often relating to their surrounding natural environment. When traditional knowledge is used without permission by the researchers, or exploit the cultures they're drawing from, it is called biopiracy.

Key Features of Biological Diversity Act, 2002

- **Access to biological resources and associated knowledge:** The Act requires **prior approval** or intimation to the **regulatory authority** based on the **origin of the entity** for obtaining **biological resources** occurring in India or associated knowledge.
  - The regulatory authorities under the Act for these purposes are **National Biodiversity Authority (NBA) and State Biodiversity Boards (SBB).**
- **Approval for Intellectual Property Rights (IPR):** The Act specifies that **approval of NBA** is required before:
  - **(i)** applying for **IPR involving biological resources obtained from India**, or
  - **(ii) sealing of patent.**
  - The Bill has distinct approval processes based on the **entity's origin**; **foreign entities** will **require NBA approval**, whereas **domestic entities** will be required to **register with NBA**. However, domestic entities require NBA approval during IPR commercialization.
- The Bill removes **research and bio-survey activities** from the purview of **benefit sharing** requirements.
- **Benefit Sharing:** Benefit sharing will be based on terms agreed between the **user** and the **local management committee** represented by the **National Authority.**
  - Benefit sharing refers to requiring applicants to share **monetary and non-monetary benefits** with benefit claimers and local people.
  - **Benefit claimers** are **conservers of biodiversity**, or creators or holders of **associated traditional knowledge.**
- It has to be ensured that these amendments help India meet the targets set up under the **Kunming-Montreal Global Biodiversity Framework.**

The **Kunming-Montreal Global Biodiversity Framework** is a global agreement to **halt and reverse biodiversity loss**. The framework consists of global targets to be achieved by 2030 and beyond to **safeguard and sustainably use** biodiversity. Four overarching goals to be achieved by 2050 focus on ecosystem and species health including to **halt human-induced species extinction**, the **sustainable use of biodiversity, equitable sharing of benefits, and on implementation and finance to include closing the biodiversity finance gap of $700 billion per year.**

JALLIKATTU

In News: A five-judge Constitution Bench of the Supreme Court has **upheld the amendments** made by Tamil Nadu, Maharashtra, and Karnataka to **The Prevention of Cruelty to Animals (PCA) Act, 1960**, allowing **Jallikattu, Kambala,** and **bullock-cart races**.

- The court overturned the verdict of a two-judge Bench in **'Welfare Board of India v. A. Nagaraja' (2014),** which had banned practices such as Jallikattu, the traditional bull-taming sport of the **Pongal harvest** festival.

What is Jallikattu?

- **Jalli** also known as **salli or kasu** means **coins and kattu** means **bundle or pouch**. The person, who could **tame the bull by its horns**, walks away with the **kattu containing gold or silver coin or currency notes**, and is considered the winner.
- The historical references about the sport are found in **Tamil Classic Period (400-100 BC),** when this event was organised to find **suitable grooms for maidens.** Later, it went on to become a sport where men could display their **masculinity and strength.**
- It involves **releasing a bull into a crowd** of people when participants attempt to **grab its hump** and ride it as long as possible. Sometimes, participants must also try and remove **red flags** attached to the bull's horns.
- It is celebrated in the month of January, during the **Tamil harvest** festival, **Pongal.**

Timeline of Jallikattu Dispute

2006 — **Madras High Court Verdict**
- Madras High Court barred the conduct of events such as rekla race and jallikattu

2009 — **Tamil Nadu regulation of Jallikattu Act**
- Adopted regulations and safety measures to be followed during Jallikattu

2011 — **Notification of MOEFCC**
- Included "bulls" in a list of that prohibits exhibition or training of animals for performance

2014 — **Welfare Board of India vs A. Nagaraja**
- Banned Jallikattu citing the Prevention of Cruelty to Animals (PCA) Act. 1960

2017 — **Agitation in Tamil Nadu**
- A massive agitation broke out against the government's failure to conduct Jallikattu.

2023 — **Supreme Court Verdict**
- Allowed bull-taming sports like Jallikattu, kambala, and bullock cart races.

Controversy Surrounding this sport

- The practice of Jallikattu has long been contested, with animal rights groups expressing concern over cruelty to bulls.
  - According to an investigation by **People for the Ethical Treatment of Animals [PETA],** between January and June 2017, 15 people and five bulls died and nearly 2,000 spectators were injured due to the sport.

2014 Judgement (Animal Welfare Board of India v A. Nagaraja)

- The two-judge Bench backed a perspective that puts **animal rights** on a par with the **fundamental rights** that the Constitution of India guarantees to its citizens. Drawing upon **Upanishadic wisdom**, the Bench had advised Parliament to **"elevate rights of animals to that of constitutional rights**, as done by many of the countries, so as to protect their **dignity and honour"**.
- The erstwhile ruling has also held that **"bovine sports"** were contrary to the provisions of the **Prevention of Cruelty to Animals Act, 1960** which relate to the "**duties of persons having charge of animals**" and define animal cruelty respectively.

People for the Ethical Treatment of Animals (PETA) India

- It is a **charitable company** incorporated in the year 2000, under **section 25 of the Companies Act, 1956.**
- Focuses primarily on the areas in which the greatest numbers of animals suffer the most: in laboratories, in the **food industry**, in the **leather trade**, and in the **entertainment business.**
- Operates under the simple **principle** that **animals are not ours to eat, wear, experiment on or use for entertainment.**

Bovine sports is an overarching term that describes a group of sports that **involve a bovine,** commonly **a bull, ox, cow or calf.** This can be for sporting, recreational or work purposes.

- The judgment stated that bulls in events like Jallikattu are subjected to **beating, poking, prodding, harassment**, and being jumped on by people. They also have their **tails bitten and twisted**, and their eyes and noses filled with **irritating chemicals.**
- The Supreme Court banned Jallikattu and bullock-cart racing and held that the practices caused **unnecessary pain and suffering**, and subjected **bulls to cruel treatment** as per the Prevention of Cruelty to Animals Act, 1960 (PCA Act).

How did the current litigation begin?

- In 2016, the Ministry of Environment, Forest and Climate Change **prohibited the exhibition or training of bulls as performing animals.** However, an **exception** was made for events like **Jallikattu in Tamil Nadu,** considering the customs and culture of communities. The exception emphasized the need to minimize the pain and suffering of bulls involved in such activities.
    - In January 2017, the **Tamil Nadu government** enacted an **Amendment to the PCA Act**, allowing Jallikattu and introducing rules to govern its organisation and practice. The **Maharashtra and Karnataka legislatures** enacted similar Amendments to the PCA Act to allow bullock-cart races, which was **challenged at the Supreme Court** by animal rights activist and organisations.
    - In February 2018 a Division Bench comprising Justices Dipak Misra and R.F. Nariman **referred the case to a 5-Judge Constitution Bench** to decide if Jallikattu and other bull-taming sports are constitutionally protected under **Article 29** as cultural practices.

Issues	Petitioners	Respondents	Judgement
Can Jallikattu be protected as a cultural practice?	**No.** State only has anecdotal evidence to show that it is a cultural practice.	**Yes.** There is material showing that the sport has been played for hundreds of years.	**Yes.** The Tamil Nadu Legislature recognises it is a cultural practice. Judiciary cannot be the body to determine whether it is a part of TN's culture.
Is the Tamil Nadu Amendment contrary to the SC's ban on Jallikattu in A. Nagaraja v Animal Welfare Board of India (2014)?	**Yes.** The safeguards introduced do not address the concerns of animal cruelty raised in A. Nagaraja.	**No.** The Amendment introduces safeguards that address the concerns of animal cruelty raised in A. Nagaraja.	**No.** The Amendment minimises the pain and suffering inflicted on the animals. This creates a different situation from A. Nagaraja.
Does Jallikattu violate the Prevention of Cruelty to Animals Act, 1960?	**Yes.** The Amendment perpetuates animal cruelty which violates the intent of the Act.	**No.** The Act only addresses 'unnecessary' pain and suffering, recognising that some amount is necessary for domestication.	**No.** PCA based on the necessity of employing animals in load-carrying and entertainment activities while minimising their pain and suffering.
Did the President assent to the Amendment without sufficient information?	**Yes.** The President gave assent before rules were framed. He could not have made an informed decision.	**No.** Petitioner's arguments are pure speculation and there are no grounds to demand the material considered by the President.	**No.** There was no flaw in the process of obtaining Presidential assent.
Does the Amendment violate the Rights to Equality and Life of animals?	**Yes.** Court must look at impact on fundamental rights, not just text of the provision.	**No.** Animals do not have fundamental rights even if there is a constitutional duty to have 'compassion for living creatures'.	**No.** The Constitution does not grant fundamental rights to animals. Only the Legislature can confer rights to animals

- The primary question involved was whether Jallikattu should be granted **constitutional protection** as a **collective cultural right** under **Article 29 (1),** a **fundamental right** guaranteed under **Part III** of the Constitution to protect the **educational and cultural rights of citizens.**

SC Judgement

- The Constitution Bench observed that these laws **cannot be construed** as **"colourable legislations"** and that the **State legislature** had the legislative power to make these amendments as per Entry 17 to **List III** of the **Seventh Schedule.**

Article 29

(1) Any section of the **citizens** residing in the **territory of India** or any part thereof having a **distinct language, script or culture of its own** shall have the right to **conserve the same.** This right has **only for citizens of India** which resides within the territory of the country.

(2) No citizen shall be **denied admission** into **any educational institution** maintained by the **State** or **receiving aid** out of **State funds** on grounds only of **religion, race, caste, language** or any of them.

- The 5 Judge Bench observed that these amendments do not go contrary to the ratio of the judgment in Nagaraja. These laws cure the defects pointed out by the judgment in Nagaraja. The effect of these laws is to **minimise the pain and suffering** caused to animals. It also noted that the amendments, having received the assent of the President, cannot be faulted.
- SC noted that Jallikattu has been held in Tamil Nadu for at least a century, and **"we will not disrupt the view of the legislature that it is part of the cultural heritage of the state".**
- Shifting focus to whether Jallikattu is a cultural practice, the Bench held that **A. Nagaraja incorrectly held** that it was not. The Division Bench in **A. Nagaraja did not have sufficient material** to decide this question. In the present case, the Bench relied on the Tamil Nadu Legislature's finding that it is a cultural practice.

Doctrine of Colourable legislation

- The doctrine of colourable legislation means that if a **legislature lacks the jurisdiction** to enact laws on a **specific subject directly**, **it cannot make laws on it indirectly.**
- In simple words, the doctrine checks if a law has been enacted on a subject indirectly when it is barred to legislate on that topic directly.
- Legislation is termed as colourable when a legislature, having **insufficient or absolutely no authority** or legislative capability, enacts legislation that is so **disguising** that it misleadingly seems to drop within its legislative capability.
- **Article 246** of the Indian Constitution outlines **legislative powers for Parliament and State Legislatures**, under **Seventh Schedule**. Matters in **List I** are **under Parliament's exclusive jurisdiction**, **List II gives States legislative powers,** and **List III can be legislated by both. Residuary power** rests with **Parliament by virtue of Article 248 and List I.**

- Bench further stated that, **Jallikattu does not violate the Rights to Life or Equality of animals.**

Importance of Jallikattu in Tamil Culture

- Jallikattu is considered a traditional way for the **peasant community** to preserve their **pure-breed native bulls.**
  - At a time when cattle **breeding** is often an **artificial process**, conservationists and peasants argue that Jallikattu is a way to **protect these male animals** which are otherwise **used only for meat if not for ploughing.**
  - It is a competitive sport as well as an event to honour bull owners who **rear them for mating.**
- For agrarian communities like Thevars and Maravars, Jallikattu is one of the few markers of their **social standing and identity** in a fast-changing world. The contest, which evidently celebrates **masculinity**, is almost an act of **cultural resistance** to an **urban modernity** that tends to **marginalise rural and agrarian values.**
- Jallikattu's **association with Pongal** has elevated it beyond its regional and community roots, making it a **symbol of Tamil culture and pride.** Tamil Nadu's political discourse is shaped by **Dravidian nationalism**, which emphasizes pride in Tamil culture.
- Ignoring the cultural context while discussing rights discourse is oversimplistic. The transition from **anthropocentric vision to biocentric ethics** requires **cultural discussions.** Without such engagement, animal rights supporters may be seen as culturally insensitive and detached.

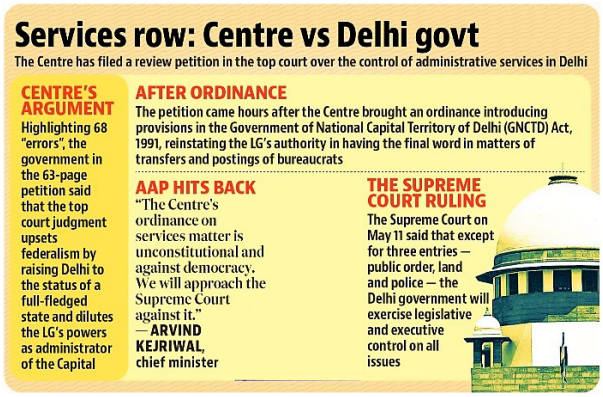
Biocentrism is the idea that we need to **protect nature** not because it provides resources, but because **all living beings have intrinsic value.** Unlike **anthropocentrism**, which believes **humans are more important and worth of value than other beings**, biocentrism places all life at the centre of its value system. Biocentrism believes that **all living beings** are worth of respect simply for existing, rather than because they provide any value to humans.

DELHI SERVICES ORDINANCE

In News: The **Union Cabinet** reportedly **approved a bill** to **replace the ordinance**, which was previously promulgated for **establishing an authority** to manage **transfers and postings of Group-A officers in Delhi.**

- The controversial Delhi ordinance was promulgated by the central government a week after the Supreme Court **handed over the control of services in Delhi** excluding **police, public order and land** to **the elected government headed by Chief Minister.**

- The ordinance facilitated the setting up of a **National Capital Civil Service Authority** for the **transfer of and disciplinary proceedings against Group-A officers** from the DANICS cadre.
    - Transfer and postings of **all officers** of the Delhi government were **under** the **executive control** of the **lieutenant governor** before the SC verdict.
- The Supreme Court referred the Delhi government's plea challenging Centre's Services Ordinance, to a five-judge Constitution bench.



What is an Ordinance?

- An ordinance is a decree or law promulgated by a **state or national government** without the **consent** of the **legislature**. **Article 123** of the Constitution of India grants the **President (**based on the Union Cabinet's recommendation) certain law-making powers to promulgate ordinances when **either** of the **two Houses of Parliament is not in session**.
- The fundamental reason to issue an ordinance is **"to deal with situations where an emergency in the country necessitated urgent action."** An ordinance has to be **converted into legislation** within **six weeks** of the **commencement of the Parliament session**, or else it will lapse. An Ordinance **"shall have the same force** and effect as an Act of Parliament".
- The **governor** of a state **can** also **issue ordinances** under **Article 213** of the Constitution of India, when the **state legislative assembly is not in session.**
- In 2017, a seven-Judge Bench of the Supreme Court held that **unfettered re-promulgation** of ordinances is **unconstitutional**.

Highlights of the Ordinance

- The Ordinance **amends** the Government of **National Capital Territory of Delhi (GNCTD) Act, 1991.** It **removes services** from the legislative competence of the Delhi legislative assembly.
- It establishes the **National Capital Civil Services Authority** with the **Chief Minister (Chairperson), Chief Secretary of Delhi, and Principal Home Secretary of Delhi.** The Authority will recommend transfers, postings, and disciplinary matters to the Lieutenant Governor (LG).
- The Ordinance **empowers** the **LG** to exercise his **"sole discretion"** on several matters including those related to National Capital Civil Services Authority, and the **summoning, prorogation and dissolution of the Delhi Legislative Assembly.**

Key issues

- The Ordinance excludes "Services" from the purview of the Delhi Assembly. The question is whether such a change **can be made without a Constitutional Amendment** under **Article 368.**
- Excluding "Services" from the Legislative Assembly may break the **triple chain of accountability** and violate the principle of parliamentary democracy, which is a part of the **basic structure doctrine.**
- The LG has been granted **sole discretion**, including **convening the Legislative Assembly,** which may prevent the Chief Minister from holding **necessary sessions for essential government business.**
- Two members (Chief Secretary and Principal Home Secretary) of the Authority are **appointees of the central government** and can in effect **outvote the Chief Minister of Delhi.**

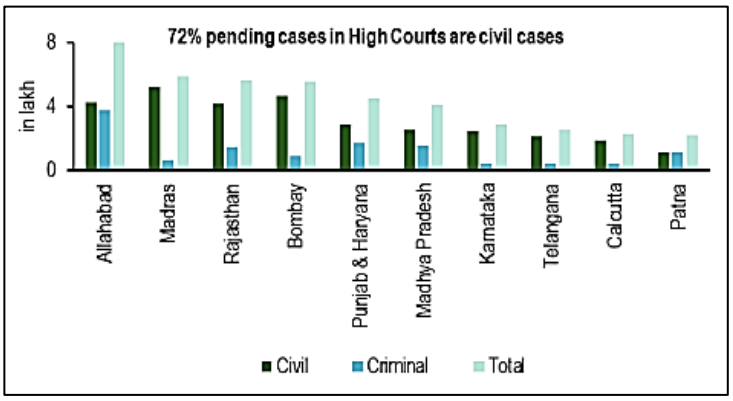
Triple Chain of Accountability

This principle says that in a parliamentary democracy, civil service officers are accountable to ministers; ministers are accountable to the legislature; and the legislature is accountable to the electorate. Severance of any link of this triple chain would be antithetical to parliamentary democracy.

PENDING CASES

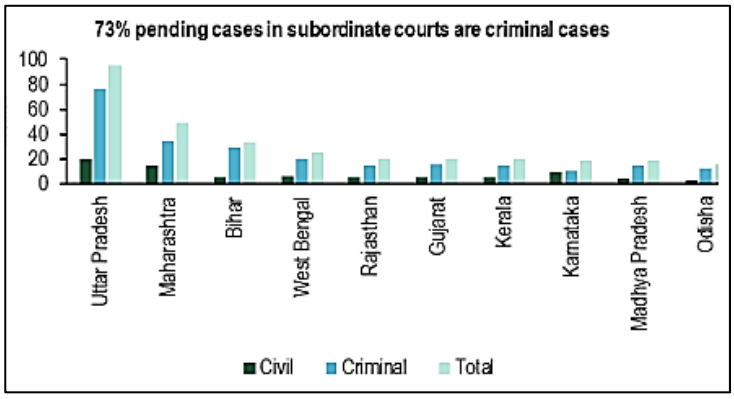
In News: Former Supreme Court Judge, Justice L.N Rao, suggests referring maximum cases to mediation first to clear the pending **five crore cases in courts** nationwide, without which it would take **323 years** to adjudicate and clear them all.

- **Mediation** is one of the effective and well-known **alternative dispute resolution methods**, which helps the litigants to resolve their disputes voluntarily and amicably with the assistance of a **third party** known as a **'mediator'.**
- The Indian judiciary faces an **increasing number of cases** to be decided and a challenge of **large number of vacancies** across all levels. The Supreme Court Collegium recently recommended the appointment of **129 High Court judges**, soon after the appointment of **seven judges** to the **Supreme Court.**



Pendency of Cases

- Between 2010 and 2020, court **pendency grew by 2.8% annually**. As of Sep 15, 2021, India had 4.5 crore pending cases. **Subordinate courts: 87.6% High Courts: 12.3%.**
- Between 2019 and 2020, pending cases increased by **20% in High Courts and 13% in subordinate courts.**
- As per data available on the **National Judicial Data Grid**, the total number of pending cases in High Courts (6050600) & and District Courts (42718466) are 48769066.



- In **HCs, 21% cases** are pending for **over ten years**; in **subordinate courts, 23% cases** for over **five years.**
- Generally, High Courts and subordinate courts that serve a larger population have a higher number of pending cases. However, the High Courts of **Madras, Rajasthan, and Punjab** and Haryana have **much higher** pendency than the High Courts of Calcutta and Patna (which serve relatively larger populations).

Tribunals and Special Courts Pendency

- Special courts and tribunals, like **Fast Track Courts and Family Courts,** were established for **speedy case disposal.** However, they also face high pendency and vacancies. For example, as of 2020, **NCLT** had 21,259 pending cases and had only **39 members out of 63 sanctioned positions** as of April 2021.
- In the two decades since Fast Track Courts were first set up, pending cases in both subordinate courts as well as these Fast Track Courts have **continued to increase.** As on May 31, 2021, over 9.2 lakh cases were pending in 956 Fast Track Courts across 24 states/UTs (the remaining do not have functional Fast Track Courts).

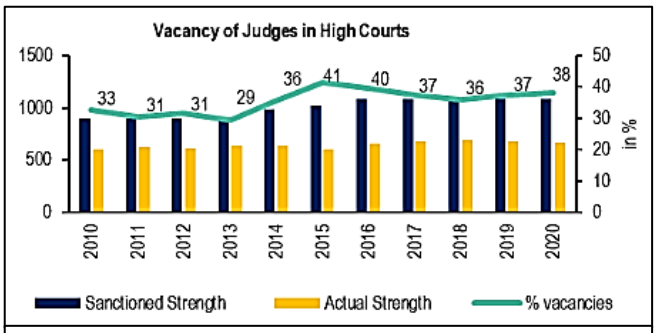
Tribunals

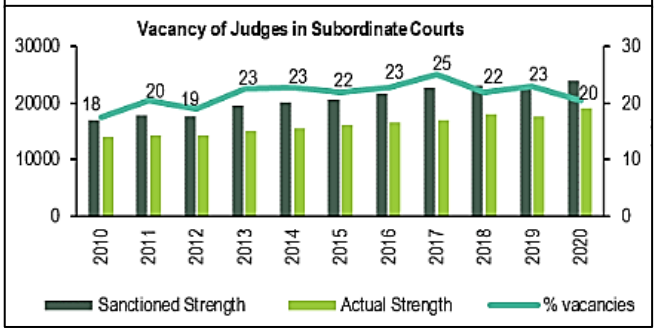
- They are institutions established for discharging **judicial or quasi-judicial duties**. The objective may be to **reduce case load** of the judiciary or to bring in **subject expertise** for technical matters.
- The Supreme Court has ruled that tribunals, being quasi-judicial bodies, should have the **same level of independence** from the executive as the judiciary. Key factors include the mode of selection of members, the composition of tribunals, and the terms and tenure of service.
- Examples of tribunals in India: Central Administrative Tribunal (CAT), National Companies Law Appellate Tribunal (NCLAT), National Green Tribunal (NGT), Competition Appellate Tribunal, etc.

Reasons for Pendency of Cases in India

- **Low Judge Strength and Appointment:** At present**, India has approx. 21 Judges per million population**, and the Law Commission in its 120th Report had recommended **50 Judges per million**. As on September 1, 2021, 42% i.e. 465 out of 1098 sanctioned posts for judges were vacant in the High Courts. The percentage was maximum in five states, Telangana, Bihar, Rajasthan, Odisha and Delhi which had more than 50% vacancies.
- **Lengthy process** of law Estimated disposal time (if no new cases are filed): **Supreme Court: 1.3 years, High Courts & subordinate courts: 3 years each.**

- **Lower working days** in a year: The Supreme Court works on an **average of 188 days a year**, while apex court rules specify a minimum of 225 days of work but due to frequent strikes done by the Bar Association, etc. the working of the court gets affected.
- Lack of **Infrastructure**
- **Ethical concerns** around the profession of advocates: delaying the pendency further for **monetary gains.**
- **Burden of Government Cases**
    - The government or its departments are party to approximately 50% of all the court cases.





Impact of Pendency of Cases

- **Denial of timely justice amounts to the denial of justice:** Timely disposal of cases is essential to maintain rule of law and provide access to justice. **Speedy trial** is a part of the **right to life and liberty** guaranteed under **Article 21** of the Constitution.
- **Affects human rights: Overcrowding of the prisons**, already infrastructure deficient, in some cases beyond **150 % of the capacity**, results in violation of human rights.
- **Increasing case pendency leads to reduced faith in the legal system:** People avoid filing suits due to the prolonged resolution process, wasting time and money.
- Prolonged case pendency leads to a significant number of **undertrials (accused persons who are either awaiting or undergoing trial)** in Indian prisons: In India, about 77% of the total prison population in 2021 were undertrials.

Solution to tackle the problem

- To establish an **Alternate Dispute Redressal Forum** within the court system, as the **Civil Procedure Code (CPC)** empowers the court to form a Commission for local investigations in matters in dispute. CPC allows for **dispute settlement outside the court** through **arbitration, conciliation, judicial settlement, Lok Adalat, or mediation.**
    - Constituting a similar commission for **criminal cases** can alleviate unnecessary court workload caused by tasks like examining witnesses. **Dividing the workload** through a commission will make courts more **efficient and expedite** the resolution process.
- **Increasing the retirement age of judges:** Current retirement age of judges in India: **Supreme Court:65 years, High Court:62 years.**
- Government **Ministries** like Railways & Revenue have been taking several measures for reducing the number of Court cases:
    - Effectively **monitoring** of court cases at all levels.
    - Promptly **finalization** of cases in all courts.
    - Expediting **resolutions** to reduce the burden on courts.
    - Cut down **expenditure** in contesting court cases.
- The **Central Board of Direct Taxes (CBDT)** and the **Central Board of Indirect Taxes and Customs (CBIC)** under the Department of Revenue, have issued a slew of instructions and brought in several measures, for reducing litigations and the resultant burden on Courts.
    - CBDT and the CBIC have also enhanced the threshold monetary limit for **filing appeals:**

For filing Appeals	Monetary Limits
Before Income Tax Appellate Tribunal	Rs.50 lakhs
High Court	Rs. 1 Crore
Supreme Court	Rs. 2 Crore

- The **Mediation Bill, 2021**, introduced in Rajya Sabha, aims to facilitate quick dispute resolution outside courts through mediation. It includes provisions for **pre-litigation mediation** by the parties involved.

- The Commercial Courts Act, 2015 was amended in 2018 to inter-alia provide for Pre-Institution Mediation and Settlement (PIMS) mechanism.
- Scheme for **Infrastructure facilities for Judiciary** has been extended till 2025-26, at a total cost of 9000 crore.
- Government is implementing **E-Courts Mission Mode Project** throughout the country for **ICT enablement of District and Subordinate Courts.**

ALTERNATE DISPUTE RESOLUTION

In News: Former CJI N V Ramana highlights a **mindset shift toward mediation** as a major challenge in dispute resolution at the first **'India Mediation Day'** organised by the **International Arbitration and Mediation Centre (IAMC), Hyderabad.**

- Stating that the power of mediation has **deep roots in Indian society,** he emphasized that **enforceability** is a major concern in mediation.
- Mediators need to develop **emotional intelligence** and have the ability to **communicate, conduct oneself, be spontaneous**, possess the ability to **build trust** and **understand strained relationships**.
- **Mindset shift** towards mediation is a major challenge. Speedy dispute resolution is crucial. Bringing in the shift is only possible when the **government, judiciary and advocates** come together.

What is ADR?

- **Alternative dispute resolution (ADR)** is a term that encompasses many different methods of dispute resolution **other than litigation**. ADR involves **resolving disputes outside of the judicial process**, though the judiciary can require parties to participate in specific types of ADR, such as arbitration, for some types of conflicts.
- ADR resolves disputes in **business, employer-employee, and consumer settings**. It is also applicable in diverse conflicts, from **domestic law** cases like divorce to **international issues** like transboundary pollution.
- It provides the opportunity to settle conflicting claims through **creative, collaborative bargaining**, and fulfil the interests driving their demands.

Litigation

Litigation is the practice of **settling disputes in the Courts of Law**. In India, due to the complex judicial structure, litigation as such can be a **complicated and time-consuming process.**

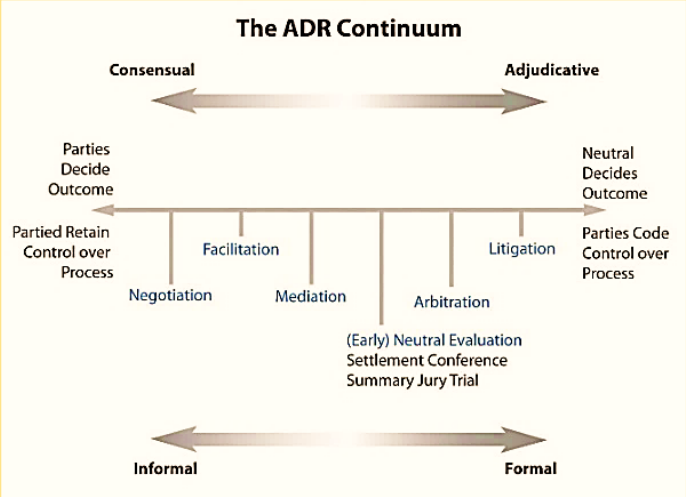
Types of ADR

- There are four types of Alternative Dispute Resolution methods:
  - **Arbitration**
    - It is a strategy for resolving conflicts outside of the court system in which the parties to a disagreement refer it to one or more people, known as **arbitrators,** to whom they intend **to be bound** by their **judgement.**
    - It has **limited rights of review and appeal.**
    - Arbitration may be either **"binding" or "nonbinding."**
      - **Binding arbitration** means that the parties **waive their right to a trial** and agree to accept the **arbitrator's decision as final**. Generally, there is no right to appeal an arbitrator's decision.
      - **Nonbinding arbitration** means that the parties are **free to request a trial** if they do not accept the arbitrator's decision.
    - It is **not the same as civil and mediation** proceedings and can be optional, or mandatory. Mandatory arbitration can **only come** from a **law or arrangement** that is **mutually signed.**
  - **Conciliation**
    - A **non-binding procedure** in which an impartial third party, the **conciliator**, assists the parties to a dispute in reaching a **mutually satisfactory agreed settlement** of the dispute.

- The method is **versatile,** which helps the parties to determine the **time, duration and content** of the conciliation procedure.
- These are **interest-based**, as the conciliator must take into account **not only the legal positions** of the parties but also their **economic, financial and/or personal interests** when negotiating a settlement.
- A conciliator can be **voluntary, court-approved, or as per mention in a contract.** However, the person appointed as a conciliator **cannot give decisions or judgment** regarding the dispute he/she dealing with.
- Once a settlement has been found before a conciliator between the parties to the conflict, the resolution has the **effect of an arbitration award** and is **legally tenable in any court** in the country.

Mediation

- It is a simple, voluntary, party-centered and structured negotiation process in which a **neutral third party** helps parties resolve their disputes friendly through the use of specified communication and negotiation techniques.
- The mediator acts as a **facilitator**, helping parties reach a **negotiated settlement**. The mediator is **neutral** and experienced and **doesn't impose** decisions or opinions.
- Mediation begins with parties explaining their views and desired remedies. The mediator conducts **caucus conferences** and **joint meetings** as agreed.
- The mediator **does not have the power to dictate** his decision regarding the party, as it allows a conflict to be handled swiftly.
- Mediation is **interest-based rather than rights-based**.



Negotiation

- A **non-binding procedure** in which discussions between the parties are initiated **without** the intervention of **any third party** with the object of arriving at a negotiated settlement to the dispute.
- It is the most **common method** of Alternative Dispute Resolution.
- Negotiation occurs in **business, non-profit organizations, government branches, legal proceedings**, among nations and in personal situations such as marriage, divorce, parenting, and everyday life.

Lok Adalat

- An interesting feature of the Indian legal system is the existence of voluntary agencies called **Lok Adalats (Peoples' Courts).**
- The **Legal Services Authorities Act** was passed in **1987** to encourage **out-of-court settlements**, and the new **Arbitration and Conciliation Act** was enacted in **1996.**
- The **first Lok Adalats** was conducted as far back as **1982 in Una village of Junagadh (Gujrat).**
- Lok Adalat or "People's Court" comprises an informal setting which facilitates negotiations in the presence of a **judicial officer** wherein cases are dispensed without undue emphasis on legal technicalities.
- The **order of the Lok-Adalat is final** and shall be deemed to be a decree of a **civil court** and **shall be binding on the parties to the dispute**.
- The order of the Lok-Adalat is **not appealable** in a court of law.

Importance of ADR in India

- To deal with the situation of **pendency of cases** in courts of India.
- ADR is also founded on such fundamental rights, **article 14 and 21** which deals with **equality before law and right to life and personal liberty** respectively.
- ADR also strives to achieve **equal justice and free legal aid** provided under **Article 39-A** relating to **Directive Principle of State Policy (DPSP).**
- Lok Adalats alone have disposed more than **50 lakh cases every year** on average in the last three years.

Advantages of ADR

- **Less Time Consuming:** People resolve their disputes in short period as compared to regular courts.

- **Cost-effective method:** it saves a lot of money if one undergoes in litigation process.
- It is **free from the technicalities of courts**; here informal ways are applied in resolving disputes.
- **Efficient way:** There are always chances of **restoring the relationship back** as parties discuss their issues together on the same platform.
- It **prevents further conflict** and maintains good relationship between the parties.

Article 39A

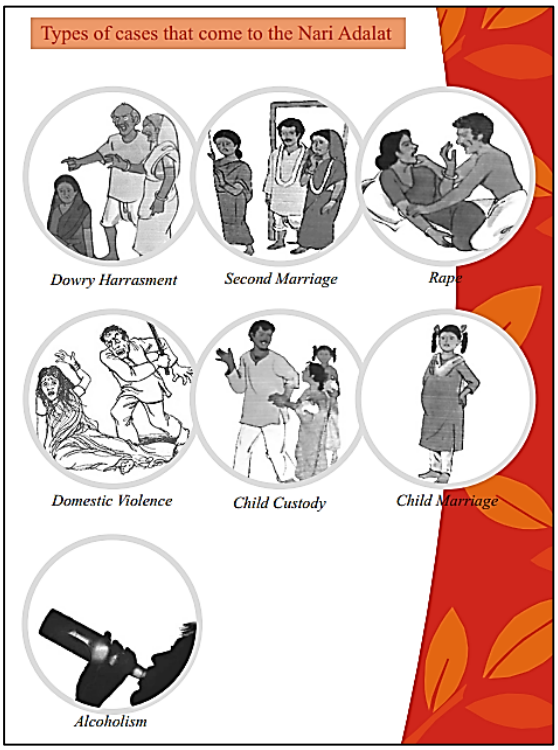
- The State shall secure that the operation of the legal system **promotes justice**, on a basis of **equal opportunity**, and shall, in particular, provide **free legal aid**, by suitable legislation or schemes or in any other way, to ensure that opportunities **for securing justice** are **not denied to any citizen** by reason of **economic or other disabilities.**

Legal Services Authorities Act

- It mentions that any person with an **annual income less than Rs 5,00,000/- in respect of a case filed before the Supreme Court** will be entitled to legal services.
- The article was **not a part of the Constitution** of India 1950. It was inserted by the **Constitution (Forty-second Amendment) Act, 1976**.
- A **woman** is entitled **for free legal aid irrespective of her income or financial status.**
- A **child** is eligible for **free legal aid** till the **age of majority i.e. 18 years**. **Senior citizens' eligibility** for free legal aid depends on the Rules framed by the **respective State Governments** in this regard.

NARI ADALAT

In News: The centre is launching **women-only courts** for **alternative dispute resolution (ADR) at the village level**, with a plan to address issues like **domestic violence and property rights** as well as countering the tribulation of the **patriarchal system**.



- The scheme would be launched on a pilot basis in 50 villages each in **Assam and Jammu and Kashmir** from August and would be extended to the rest of the country over the next six months.
- The **Nari Adalat** of each village would have **7-9 members (Nyaya Sakhis),** half of which would be the **elected members of the gram panchayat** and the other half women with social standing like **teachers, doctors and social workers,** who would be **nominated by the villagers.**
    - The **head** of Nari Adalat called the **Mukhya Nyaya Sakhi [chief legal friend]** will be chosen among the Nyay Sakhis, with a tenure of **six months.**
- The Nari Adalat will not only address individual cases but also **raise awareness about social schemes** under the government. It will cater to all women and girls who require **assistance** or have **grievances** within the local community.
- The Nari Adalat though **does not hold any legal status**, and has its primary focus on **reconciliation, grievance redressal** and **creating awareness** of rights and entitlements.
- The scheme would be run by the **Ministry of Women and Child Development** under the **Sambal sub-scheme of Mission Shakti.**
    - The **implementation process** will be done in collaboration with the **Ministry of Panchayati Raj, the Ministry of Rural Development and Common Service Centers** operated by the **Ministry of Electronics and Information Technology.**
- The scheme takes inspiration from the **Parivarik Mahila Lok Adalats [People's Court of Women]** which were run by the National Commission for Women (NCW) till 2014-15.

Need for Nari Adalat

- **Women-only courts** seem extremely beneficial, especially at the rural level, to **tackle the notorious patriarchal elements** of society that **overpower feminine voices** when calling for accessibility to justice.
- To help women **overcome barriers (social and cultural ones)** when seeking legal assistance, it is important to raise awareness about their legal rights and entitlements. Women-only courts at the rural level can make justice more accessible and convenient for women.
- Women have **30% reservation** at the **lower judiciary level**, however, the number of women in the lower judiciary is higher than in the reservation, which demonstrates that women are getting into the courts on the basis of their merit.

Nari Adalat member uses legal skills to reclaim her land

Jayshreeben Kanaiyalal Parmar, a Nari Adalat member, from Rampar Pati village in Padadhari block, received an order from the panchayat asking her to vacate her land. When the officials came to demolish her house, she stopped them asking for the list of houses to be demolished. The panchayat members refused to give the information to her. From the Nari Adalat training she had received, she had learnt that she can get the information under Right to information Act within 30 days. She then filed an application and got this information, which helped her understand that she was not living on government land. She then applied to the Revenue Collector (Tehsildar) to register the land in her name. The Tehsildar gave the order to the Gram Panchayat and 250 square feet of land was registered in her name. Jaysheeben was thus able to retain her land because of the training received through the Nari Adalat.

- Being the **first women-only court system for ADR**, it would be a pioneering scheme that will contribute to fostering gender equality and aim to ensure justice for women across the nation.

MISSION SHAKTI

In News: Intrigued by a possible **chronic shortage of protection officers** to deal with domestic violence cases, the Supreme Court has sought more information from the government about **Mission Shakti, an umbrella scheme** for the **safety, security, and empowerment of women**.

- With **4.4 lakh cases of domestic assault** pending **across 801 districts**, domestic violence is a significant concern in India, according to a government document presented in court.
- **'One-stop centres'** exist in many districts under **Mission Shakti**, but there is uncertainty about sufficient protection officers to aid traumatized survivors effectively.
    - Appointment of **protection officers** is **mandated** under Section 8 of the Protection of **Women from Domestic Violence Act, 2005.**
- Protection officers, who should **ideally be women**, have a pivotal role under the law. They assist victims with complaints, inform police, offer immediate protection and support, explain legal rights, and guide through court proceedings.
    - Protection officers, like the **Magistrates**, are the backbone for implementing laws with laudable objectives, as emphasized by the Supreme Court.
- Reports have suggested that the scheme is facing challenges due to a **shortage of protection officers** who are responsible for ensuring the safety of women and girls who have faced violence or are at risk of violence.

About Mission Shakti

- 'Mission Shakti' is a **scheme in mission mode** aimed at **strengthening interventions for women safety, security and empowerment.**
- It seeks to realise the Government's commitment for **"women-led development"** by addressing issues affecting women on a **life-cycle continuum basis** and by making them **equal partners in nation-building** through convergence and **citizen-ownership.**

- The scheme **empowers women economically,** promoting freedom of choice and safety from violence. It reduces caregiving burden and **boosts female labour force participation** through skill development, capacity building, financial literacy, and access to micro-credit.
- Mission Shakti' has two sub-schemes - **'Sambal' and 'Samarthya'**. While the **"Sambal"** sub-scheme is for **safety and security of women**, the **"Samarthya"** sub-scheme is for **empowerment of women.**
- The components of 'Sambal' sub-scheme consist of erstwhile schemes of **One Stop Centre (OSC), Women Helpline (WHL), Beti Bachao Beti Padhao (BBBP)** with a new component of **Nari Adalats,** women's collectives to promote and facilitate alternative dispute resolution and **gender justice** in society and within families.
- The components of **'Samarthya'** sub-scheme consist of erstwhile schemes of **Ujjwala, Swadhar Greh and Working Women Hostel** have been included with modifications.
    - In addition, the existing schemes of **National Creche Scheme** for children of **working mothers and Pradhan Mantri Matru Vandana Yojana (PMMVY)** under umbrella **ICDS** have now been included in Samarthya. A new component of **Gap Funding for Economic Empowerment** has also been added in the Samarthya Scheme.
    - Gap Funding aims to provide **financial support** to **women entrepreneurs**, particularly those from **marginalized communities**, to help them establish and grow their businesses
- The **Ministry of Women and Child Development (MWCD)** is the Nodal Ministry for implementing the mission.

PM SVANidhi

In News: PM Street Vendor's AtmaNirbhar Nidhi (PM SVANidhi) Scheme, aimed at empowering street vendors, marks its 3rd anniversary with success.

- PM SVANidhi Scheme, launched in June 2020, aims to **empower street vendors** with **self-employment, sustainability, and confidence**.

PM SVANidhi

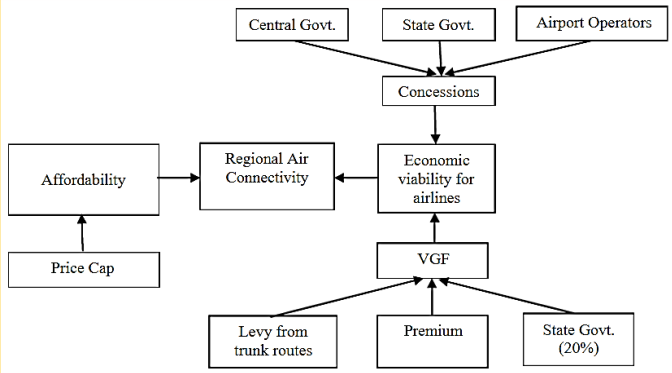
- The **Ministry of Housing & Urban Affairs** launched PM SVANidhi to empower street vendors through **collateral-free working capital loans** of up to **INR 10,000** for one year.
- The scheme aimed to support approximately 50 lakh street vendors, enabling them to **resume businesses in urban, peri-urban, and rural areas**, promoting holistic development and economic upliftment.
- PM SVANidhi scheme incentives:
    - 7% per annum interest subsidy on regular loan repayment.
    - Cashback of up to INR 1200 per annum for prescribed digital transactions.
    - Eligibility for enhanced next tranche of loans.
- Eligibility criteria for PM SVANidhi scheme:
    - Street vendors with a **Certificate of Vending**/Identity Card issued by Urban Local Bodies (ULBs).
    - Street vendors not covered in the ULB-led survey but have started vending after the survey can apply with a **Letter of Recommendation** (LoR) from **ULB/Town Vending Committee (TVC).**

RCS UDAN

In News: Civil aviation minister inaugurated **Udan 5.2 scheme** to connect remote areas of the country through **small aircrafts** and previously **UDAN 5.1 scheme** to award routes in the northeast and hilly regions that will be **serviced exclusively via choppers**.

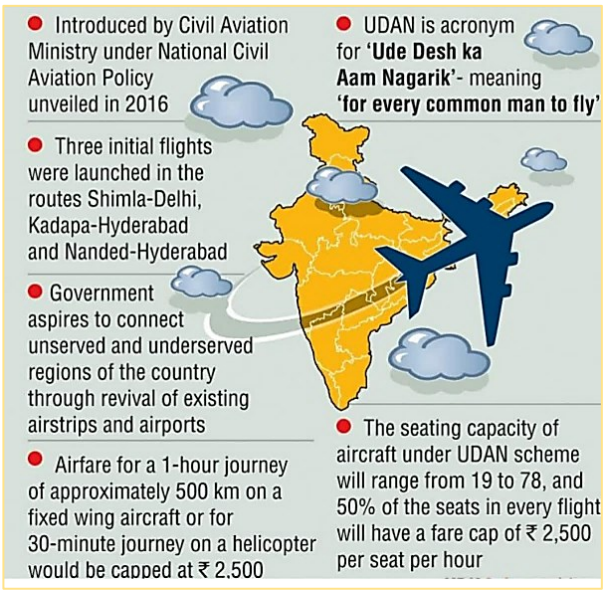
- **Priority for helicopter services**: **Under RCS-UDAN** (Regional Connectivity Scheme: Ude Desh ka Aam Nagarik), the scheme 5.1 is designed **specifically for helicopter routes**.
    - It allows operators operations in routes where **one of the origin or destination locations is in a priority area**. **Earlier both points had to be in priority areas.**
    - **Airfare caps** have been **reduced** by as much as **25%** to make flying in helicopters more affordable for passengers.

- **Viability Gap Funding (VGF)** caps for the operators have been increased substantially for both single and twin-engine helicopters to enhance financial viability for operating the awarded routes.
- **Mobile app HeliSeva:** single window ecosystem for helicopter services linkages and approval.



- The latest round of the UDAN scheme is a testament to two emerging phenomena in Indian civil aviation:
  - **Deeper democratisation** of air travel with a **focus on last-mile connectivity.**
  - **Growing appetite for helicopters** in aiding tourism.

About UDAN Scheme



- The scheme was **initiated in 2017** with the objective of enhancing **aviation infrastructure and air connectivity in tier II and tier III cities.**
- It envisages providing connectivity to **unserved and underserved airports** of the country through the **revival of the existing (brownfield) airstrips and airports.**
- The UDAN scheme has **doubled the number of operational airports** in the country, from **74 in 2014 to 141 at present**, significantly **improving regional air connectivity.**
- UDAN created a framework based on the need and led to the formulation of:
  - **Lifeline UDAN** (for transportation of **medical cargo** during the pandemic).
  - **Krishi UDAN** (value realization of **agriculture products** especially in North-Eastern Region {NER} and tribal districts).
  - **International UDAN routes** for NER (North-East Region) to explore international connectivity from/to Guwahati and Imphal.

Features of the Scheme

- A **Regional Connectivity Fund (RCF)** is created to fund the scheme through a levy on certain flights/trunk routes (popular routes between major cities). States are expected to **contribute 20%** to the fund.
- Allocations are **spread equitably** across 5 regions: North, West, South, East and North-East with a cap of 25% for balanced regional growth.
- The **RCS will be in operation for ten years** with individual route contracts to be for three years.

Challenges

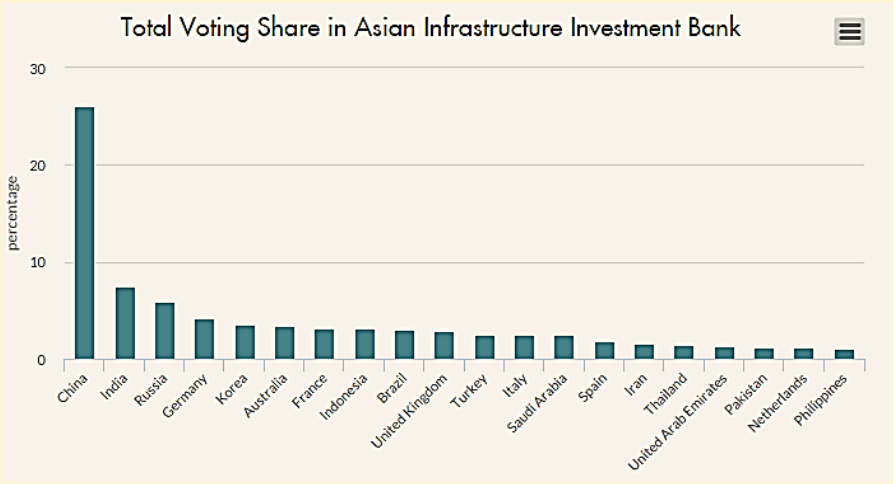
- **Complexities in calculating VGF:** If an airline using a regional route is not able to get profitable returns on their investment (e.g. volatile jet fuel prices), more **Viability Gap Funding** (VGF) is needed which would cause an additional subsidy burden.
- **Cooperation of the States:** The state governments are required to provide **tax subsidies** for regional operations, as well as security and fire **services free of charge**, besides providing electricity, water and other utility services at **concessional rates**.
- **Duration of national subsidies:** Even though RCS can help in boosting traffic growth, the scheme should not be dependent on VGF or national subsidies in perpetuity. **Cross-subsidies hinder cost reduction and cost efficiency**.

The **Viability Gap Funding** (VGF) Scheme aims at supporting **infrastructure projects** that are **economically justified** but fall marginally short of **financial viability.** Support under this scheme is available **only for infrastructure projects** where private sector sponsors are selected through a process of **competitive bidding**. The total VGF under the scheme **does not exceed 20% of the total project cost**, however, the Government may decide to provide additional grants up to a limit of a further 20%.

AIIB

In News: Finance Minister Nirmala Sitharaman discussed **Asian Infrastructure Investment Bank (AIIB)** projects in India's border regions with AIIB President Jin Liqun, suggesting **innovative financing**.

About AIIB



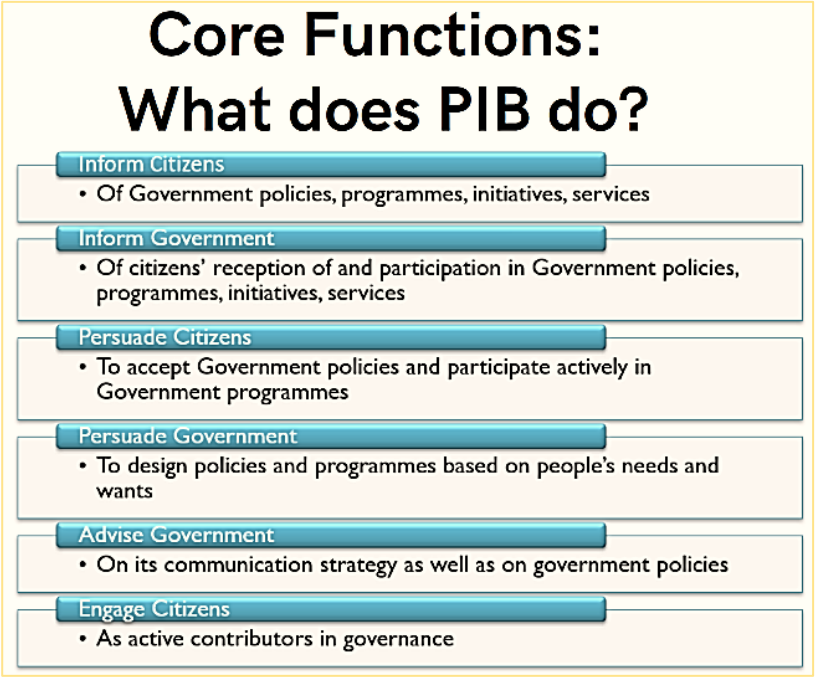
- **Formed in 2016 and is headquartered in Beijing, China**
- **Multilateral development bank** focused on developing Asia, with **global membership**.
- Mission: Enable clients to build **Infrastructure for Tomorrow (i4t) - green, sustainable, and connected infrastructure.**
- Goal: **Prosperity and economic development for Asia**.
- **Unlock finance and deliver customised solutions** for sustainable economic development.
- Create wealth and improve **infrastructure connectivity**.
- Empower regions and people with access to **physical, digital, and social services.**
- Member countries:
  - The bank presently has 106 members.
  - Armenia, Lebanon, Brazil, South Africa, Greece, and others are among the 27 potential members.
  - **France, Germany, Italy, and UK** are among the 14 G-20 countries that are members of the AIIB.
- In 2018, AIIB was granted **permanent observer status** in the United Nations General Assembly and the Economic and Social Council, two principal organs of the global body.

PIB

In News: Press Information Bureau (PIB) celebrated its **centennial** (100 year of formation) anniversary.

Brief about PIB

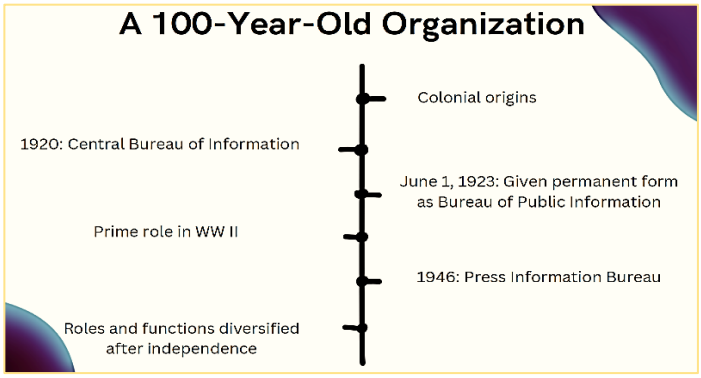
- Press Information Bureau (PIB) is the nodal agency of the Government of India to **disseminate information** to the **print and electronic media** on government policies, programmes, initiatives and achievements.
- It is a department of the **Ministry of Information and Broadcasting.**
- PIB **bridges** government-media relations and gathers **public feedback** from media responses.
- PIB spreads info via press releases, articles, media, and social media in **English, Hindi, and Urdu**.
- It also hosts **press conferences, briefings, interviews** with officials, and tours to project sites, fostering **media awareness** of vital government policies and developmental activities.



History of PIB

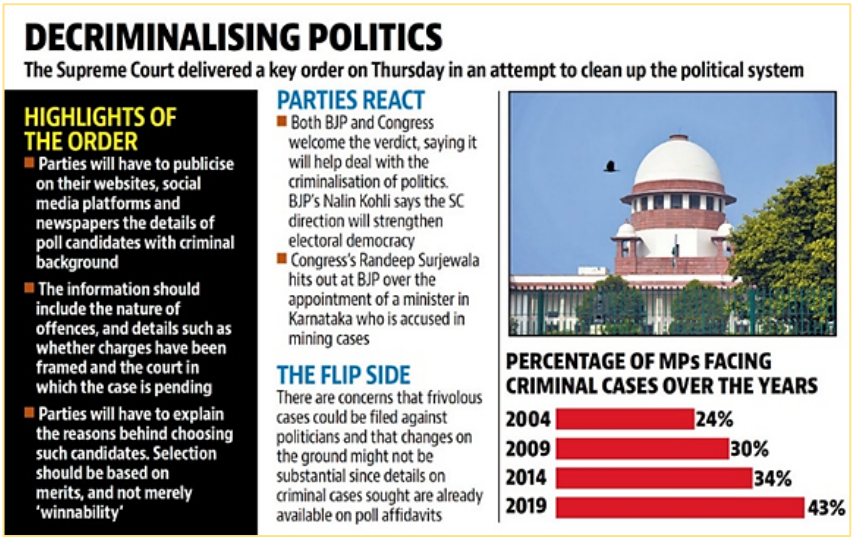
- PIB's roots: Originated during World War I, as **Central Publicity Board** under colonial Government's Home Member.

- In June 1919, a Cell was established under Dr. L.F. Rushbrook Williams for **preparing India's yearly report for the British Parliament.**
- PIB Evolution: Cell renamed **'Central Bureau of Information'** in late 1920, with Dr. L.F. Rushbrook Williams as Director. In 1938, the head's title changed to 'Principal Information Officer.'
- PIB Milestones: Sh. J. Natarajan, first Indian appointed as Principal Information Officer in 1941. Renamed the **Press Information Bureau** in 1946.



CRIMINALISATION OF POLITICS

In News: Supreme Court directed **Association for Democratic Reforms (ADR),** the electoral watchdog to approach Election Commission on parties fielding candidates with **criminal records**.

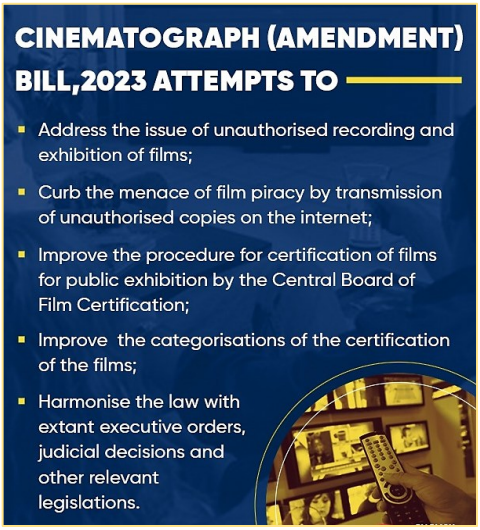


- According to ADR, after the **2019 Lok Sabha** elections, **43% of the newly-elected MPs** had **pending criminal cases** against them.
- In 2018, the Supreme Court **mandated political parties to disclose** candidates' pending criminal cases on their **websites** as per Election Commission format.
  - The court observed that **disclosure of antecedents** makes the election **fair** and the exercise of the **right of voting** by the electorate also gets sanctified. Such a right is paramount for a democracy.

CINEMATOGRAPHY AMENDMENT BILL, 2023

In News: Parliament passed the **Cinematograph (Amendment) Bill, 2023**, by amending the **Cinematograph Act of 1952.**

- The bill cracks down on **film piracy** along with changing how movies are **certified by the censor board.**



Key Provisions

- Under the **Cinematograph Act of 1952**, film may be certified for exhibition: : **'U' (unrestricted), 'UA' (under 12 with parental guidance), 'A' (adults), and 'S' (specific groups).**
  - **Age Certification**: The bill substitutes three certifications under the 'UA' category:
  - **UA 7+, UA 13+ and UA 16+**
- **Separate certificate for television/other media:** Films with an **'A' or 'S'** certificate will require a **separate certificate** for exhibition **on television**, or any other media prescribed by the central government.
- **Anti Piracy provision: 3 months to 3 year jail term** and a fine from **Rs. 3 lakhs to 5% of the audited gross production cost.**
- The Bill aims to harmonise the Cinematograph Act, 1952 with the existing laws that tangentially **address piracy**, the **Copyright Act, 1957** and the **Information Technology Act (IT) 2000.**
- **Certificates to be perpetually valid:** The bill has effectively eliminated the previous limitation of a **10-year validity period for CBFC certificates**. As a result, these certificates now hold indefinite validity, ensuring their **perpetual recognition**.
- The new Bill clarifies that the **Centre will not have any** revisional powers over **CBFC certificates.**

Cinematograph Act of 1952

- Section 3 of the Act outlines the establishment of the **Central Board of Film Certification (CBFC)**, which is commonly referred to as the censor board.
- CBFC is a **statutory body** under the Ministry of Information and Broadcasting
- The Act establishes the Central **Board of Film Certification** to certify films for exhibition, subject to modifications/deletions. The Board can reject film exhibition as well.

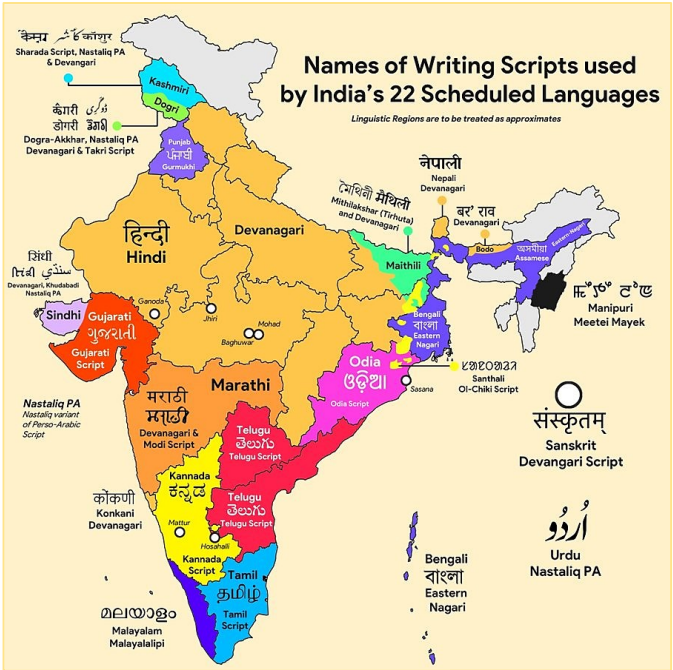
PRISM

In News: Lok Sabha Speaker sets up **Parliamentary Research and Information Support for MPs (PRISM),** a **24-hour research hotline** to help Members of Parliament (MP) debating policy and politics.

- It offers help to MPs **without extensive secretarial teams**, to speak in Parliament on policy issues with data and perspective and acts as a **reference section for legislations**.
- In the last 4 years**, 87% of MPs** have used online or offline reference services for enquiries, which are also shared by **WhatsApp and email.**
- The enquiries were mainly about issues like **juvenile justice**, **wildlife protection**, **climate change**, **drug abuse**, and **price rise**.
- It will help **first-term MPs** without experience to speak, debate on bills and also help MPs who **can't speak in Hindi or English** to seek support from a dedicated team of officers.

SCHEDULE LANGUAGE

In News: NCERT has started gearing up to produce **textbooks in 22 scheduled Indian** languages for teaching in **CBSE schools, alongside English medium.**

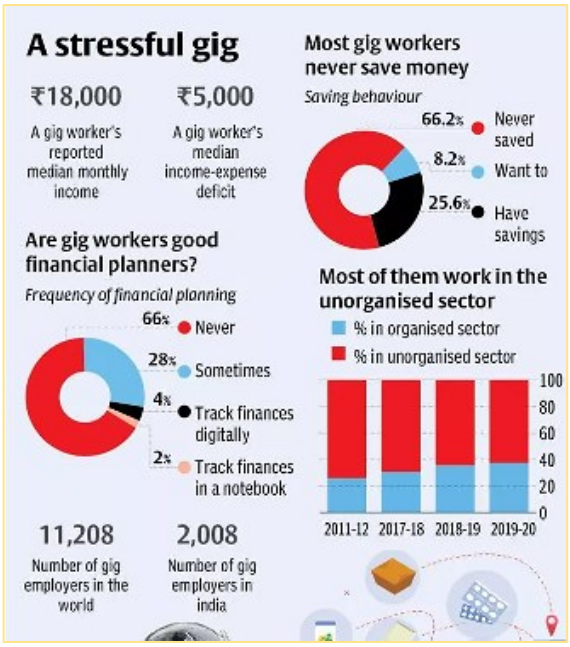


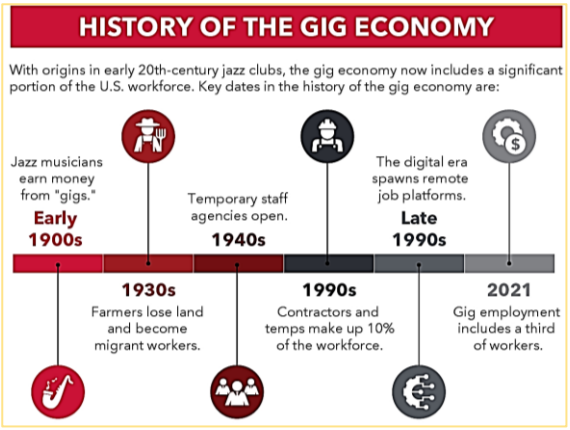
- CBSE schools can **optionally use** Indian languages listed in **Constitution's Schedule 8** as a medium of instruction alongside current choices, from **Foundational to Secondary Stage**.
- Constitutional provisions relating to **Eighth Schedule**:
  - **Article 344 (1)**: **mandates** the creation of a Commission **by the President** on expiration of **five years** from the commencement of the Constitution, which shall consist of a **Chairman and such other members** representing the different languages specified in the Eighth Schedule **to make recommendations** to the **President** for the progressive use of **Hindi** for **official purposes of the Union.**
  - **Article 351:** it shall be the **duty of the Union** to **promote the spread of the Hindi language** to develop it so that it may serve as a medium of expression for all the elements of the composite culture of India.
- The **Eighth Schedule** to the Constitution consists of **22 languages**.
  - **14** were initially included in the Constitution.
  - **Sindhi** language was added in **1967 (21st Amendment act).**
  - **Konkani, Manipuri and Nepali** were included in **1992 (71st Amendment act).**
  - **Bodo, Dogri, Maithili and Santhali** were added in **2004 (92nd Amendment act)**.
- **Status of inclusion of languages in 8th Schedule:**
  - As the evolution of dialects and languages is **dynamic**, influenced by socio eco-political developments, it is **difficult to fix any criterion** for languages, whether to distinguish them from dialects, or for inclusion in the Eighth Schedule to the Constitution of India.
  - Thus, **Pahwa (1996) and Sitakant Mohapatra (2003) Committees** formed couldn't effectively decide parameters for such inclusion.

GIG WORKERS BILL

In News: Rajasthan state passes a Bill extending social security to **gig workers: 'Platform-Based Gig Workers (Registration and Welfare) Bill, 2023'**

- The Rajasthan Gig Workers Bill grants gig workers rights like **state registration**, access to **social security**, and an opportunity to be **heard for any grievances.**
- A gig worker is a person who performs activities outside of the **traditional employer-employee relationship** and works on contract at a **fixed rate of payment**, and includes all piece-rate work.





Key provisions

- The bill establishes a **Platform Based Gig Workers Welfare Board.**
  - The Board includes **2 representatives each from gig workers and aggregators**, nominated by the state government apart from bureaucrats.
- The bill provides for maintaining **a database and unique ID** of the gig workers.
- The bill establishes "**Platform Based Gig Workers Fund and Welfare Fee".**
  - A social security fund for gig workers will be established, **funded by a fee on aggregators**, based on the value of each platform-based gig worker's transaction, as set by the state government.
- If any aggregator fails to pay the welfare fee within time, the bill empowers the state government to impose a fine up to **Rs 5 lakh** for the **first contravention** and up to **Rs 50 lakh** for subsequent contraventions.
- The bill includes imposition of a **cess fee** on **individual transactions** to finance the social security schemes for workers, ensuring that workers benefit from **social security** that they have earned from their own work, instead of having to rely on charity from the aggregators or allocations by the government.
- **Gig Economy:** As per **NITI Aayog's report, 7.7 million workers** were engaged in the gig economy in 2021.
  - It is expected to **rise to 23.5 million by 2029-30.**
  - At present, about 47% of the gig work is in **medium skilled jobs,** about 22% in **high skilled**, and about 31% in **low skilled jobs.**

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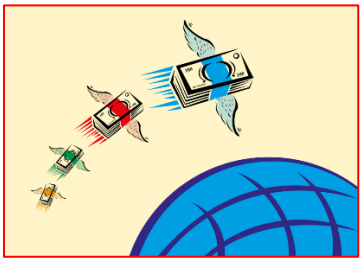
ECONOMY

RBI REPORT ON CURRENCY AND FINANCE



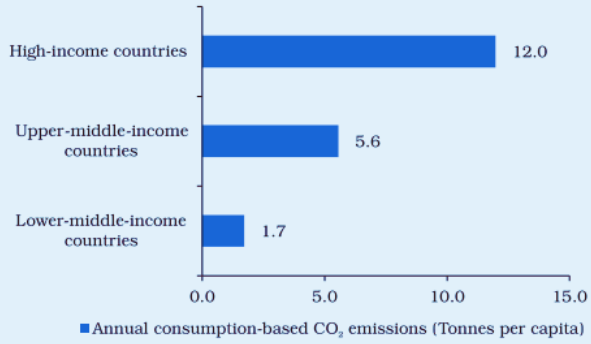
In News: The RBI's Currency and Finance Report for 2022-23 **'Towards a Greener Cleaner India'** traces India's journey towards achieving its **Nationally Determined Contributions (NDCs)** and explores all policy changes helpful in shaping **India's net-zero economy.**

- Report covers four major dimensions of climate change to assess future challenges to sustainable high growth in India, viz., the **unprecedented scale and pace of climate change**; its **macroeconomic effects**; implications for **financial stability**; and **policy options to mitigate climate risks.**

Macroeconomic Impact of Climate Change in India

- The carbon-growth nexus is based on the argument that as economies grow, energy usage requirement increases, however **Environmental Kuznets curve (EKC)** hypothesis argues that this relation is **non-linear**, with emissions increasing faster at **lower stages of economic development** and falling at higher stages with the use of energy-efficient resources.
- Up to **4.5 % of India's GDP** could be at **risk by 2030** owing to **lost labour hours** from **extreme heat and humidity conditions**.
- India could account for **34 million** of the projected **80 million global job losses** from heat stress-associated productivity decline by 2030.
- India could lose anywhere around **3% to 10% of its GDP** annually **by 2100** due to **climate change** and could and depress the **living standards of nearly half of its population** by 2050.
- Annual **GDP growth rate of 9.6%** would raise the **net GHG emissions 10.5 times** from the levels of 2021-22.
- **NBFCs** expose 50% of their credit to **high carbon sectors**, posing potential macro-financial instability due to defaults from **physical or transition risks**, impacting both financial and real sectors.

Chart 4: Consumption-based CO_2 Emissions, 2019 (Per capita)



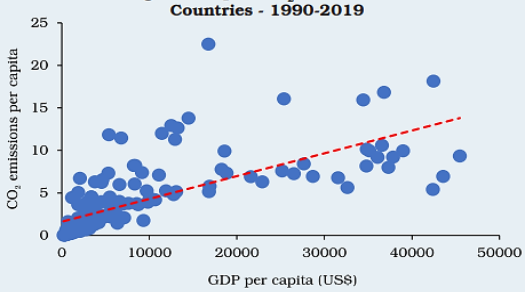
Sources: WDI; World Bank; OWID; and Authors' calculations.

Net zero refers to a state in which the greenhouse gases going into the atmosphere are **balanced by removal out of the atmosphere**. The **Paris Agreement** underlines the need for net zero. It requires states to 'achieve a balance between anthropogenic **emissions** by sources and removals by **sinks** of greenhouse gases in the second half of this century'.

India's green financing and Net-Zero Target

- Annual trend growth rate of **6.6%,** adhering to nationally determined contribution would require **doubling the rate of reduction** in energy intensity as well as **renewables** forming a share of **primary energy** consumption at **70% from the present level of 5.5% to achieve net zero by 2070**.
- The **money required by India**, to develop socio-economic infrastructure, has been estimated at **5-6 % of annual GDP a year** till 2030.
- The **Network of Central Banks and Supervisors for Greening the Financial System** (NGFS) has linked itself with a global macroeconomic model, the National Institute Global Econometric Model (NIGEM), to produce **policy insights** over the short-run, considering both physical and transition risks from climate change.

Chart 3: Average Per Capita CO_2 Emissions and Income of Countries - 1990-2019



Sources: WDI; World Bank; OWID; and Authors' calculations.

Transition Impact

- Transition pathway will have a different impact across the banking system as **public-sector banks** remain **more prone to climate-related risks** as well as capital shortfalls due to **higher exposure to the power sector.**
- Green sectors are a part of **priority lending**, but the share of **green sectors in industry gross non-performing assets (GNPAs) has increased.**
- The success of the transition hangs on the **development of taxonomy** as well as policy actions such as **taxation, spending, and budgeting.**
- Mitigation efforts will result in **inflationary pressures** that would emanate from a **carbon tax** and efforts like raising the cost of production.
- Transitioning to a net zero economy would require a **"deep decarbonisation"** strategy.

Policy Options to Mitigate

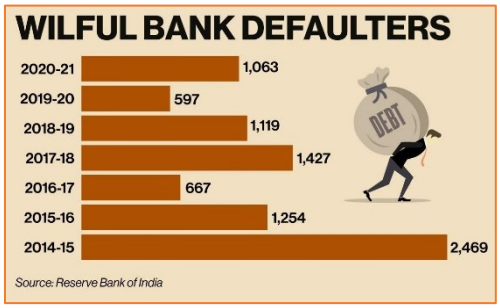
- Union Budget 2023-24 focuses on **'Green Growth'** as a priority, introducing schemes like **GOBARdhan (**Galvanizing Organic BioAgro Resources Dhan) for waste-to-wealth plants and **PM PRANAM** (Programme for Restoration, Awareness, Nourishment and Amelioration of Mother Earth) to promote alternative fertilizers and sustainable agricultural practices.
- **Carbon pricing** would reduce **carbon emissions by 80 % by 2050**, as 40 % of annual carbon emissions in India could be addressed by **replacing fossil fuels with renewables,** and another **15 % by switching over to electric vehicles (EVs)** and energy-efficient electrical appliances, remaining **45 % relate to hard-to-abate sectors.**
- Mission **LiFE (Lifestyle for Environment)** promotes **sustainable lifestyles**, reducing carbon footprints for a greener future.
- Higher use of **Central Bank Digital Currency** can help **lower the carbon footprint** through a less-cash economy.
- In the absence of a **taxonomy** or robust classification system **industries** can be classified as **green or brown** based on their energy intensity, so that raising funds for the former does not turn into **'greenwashing'.**

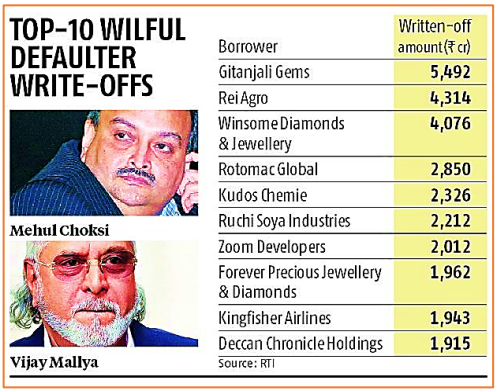
Greenwashing is essentially an **unsubstantial claim**, when a company or organisation spends more time and money on marketing themselves as being sustainable than on actually minimising their **environmental impact**.

WILFUL DEFAULTERS

In News: The **Reserve Bank of India (RBI)**, has allowed wilful defaulters and loan accounts involved in frauds to go in for a **compromise settlement** with banks **to settle their dues.**

- Regulated Entities may undertake **compromise settlements or technical write-offs** in respect of accounts categorised as **wilful defaulters or fraud**, without prejudice to the criminal proceedings underway against such debtors.
- Even the Parliament Standing Committee has **strongly criticised NCLT** on giving judgement in support of defaulters. In the last 10 years, NPA **reduction due to write-offs** stands at **Rs 13,22,309 crore.**
- As of March 31, 2022, India's **top 50 wilful defaulters** owed Rs **92,570 crore to banks,** according to RBI data presented in Parliament, last year.
- Proposals for compromise settlements in respect of debtors classified as fraud or wilful defaulters would require **approval of the board of the bank in all cases.**





NCLT (National Company Law Tribunal)

A **quasi-judicial body** under the **Ministry of Corporate Affairs** in India with adjudicating authority relating to **Indian companies**. It was formed in **2016, under the Companies Act 2013.** It has the power to deal with matters such as **arbitration, compromise, arraignments, reconstructions and the winding up** of companies, **insolvency resolution** process of companies and **limited liability partnerships** under the Insolvency and Bankruptcy Code, 2016. It has Judicial and technical members.

President of NCLT: should have been a judge of a high court for at least 5 years.

Other Judicial members of NCLT qualification:

- Is, or has been, a **judge of a high court,** or
- Is , or has been a **District Judge for at least five years**, or
- Has, for **at least ten years** been an **advocate of a court.**
- Every member shall **hold office** for a **period of five years** and shall be **eligible for re-appointment** for **another term of 5 years**, subjected to a **maximum age limit of 65 years.**

Who is a wilful defaulter?

- A **wilful defaulter** is a **borrower who refuses to repay loans** despite **having the capacity** to pay up, or **diverted funds** for purposes other than those specified while availing of financing, or **siphoned off funds**, or **disposed off secured assets** without the bank's knowledge." whereas, "a **fraudster** is one who **intentionally cheats** the bank with **false documents/information** and **misappropriates the money."**

Why has this been termed a detrimental step?

- The RBI's 'Framework for compromise settlements and technical write-offs' is seen as a **detrimental step** that compromises the banking **system's integrity** and undermines efforts against wilful defaulters by **rewarding unscrupulous borrowers** and **discouraging honest borrowers** who fulfil their financial obligations.
- The **RBI reversed its policy** on wilful defaulters, which previously stated that they would be **ineligible for restructuring**, as per the **'Prudential Framework for Resolution of Stressed Assets'** introduced in 2019.
- Allowing wilful defaulters and fraudsters to settle loans under the compromise, the RBI is effectively **condoning their actions**, placing the burden of their misdeeds on the shoulders of ordinary citizens.
- **Restructuring** is often **misused by banks** and corporates for **'evergreening' problem** accounts to keep the reported **NPA levels low**, but the enactment of the bankruptcy code reduced evergreening, despite **low recovery rates.**
- According to RBI, now, a wilful defaulter or a company involved in fraud **can get fresh loans** after a **cooling off period of 12 months** after executing a compromise settlement.

Why is loan recovery important?

- It is important for banks to recover the money; ultimately, the **value of money is time.**
- Debt recovery **protects depositors and stakeholders** as failure to recover NPAs harms depositors and stakeholders.
- In compromise settlements, public sector banks should **prioritize the interest** of the **taxpaying general public** over the borrowers.
- One of the reasons for the **high-interest rates** in India is the **high level of NPAs** in the banking system.

EXPECTED CREDIT LOSS

In News: The Reserve Bank of India (RBI) published a discussion paper on **"loan loss provision",** proposing a framework for adopting an **expected loss (EL)-based approach** for provisioning by banks in case of **loan defaults.**

- The RBI's proposal is based on the premise that the present **"incurred loss"** based approach for provision by banks is **inadequate**, and there is a need to shift to the **"expected credit loss"** regime in order to **avoid any systemic issues.**
- The incurred loss approach requires banks to provide for losses that have **already occurred,** leading to **increase in credit risk** for banks.
- In Expected Credit Loss (ECL), a bank is required to estimate expected credit losses based on **forward-looking estimations**, rather than wait for credit losses to be actually incurred before making corresponding loss provisions.
- Under the ECL norms, banks will be required to **classify financial assets** into one of the three categories: **Stage 1, Stage 2, and Stage 3**, depending upon the assessed credit losses on them.

Loan loss provision

It is an **expense** that banks set aside for **defaulted loans**. Banks set aside a portion of the **expected loan repayments** from all loans in their portfolio **to cover the losses** either completely or partially. In the event of a loss, instead of taking a loss in its cash flows, the bank can use its **loan loss reserves** to cover the loss. Since the bank does not expect all loans to become impaired, there is usually enough in the loan loss reserves to cover the full loss for any one or a small number of loans when needed. An **increase in the balance of reserves** is called a loan loss provision.

- **Stage 1 assets** are financial assets that have **not had a significant increase in credit risk** since initial recognition or that have low credit risk at the reporting date. For these assets, **12-month expected credit losses are recognised** and interest revenue is calculated on the **gross carrying amount of the asset.**
- **Stage 2 assets** are financial instruments that have a **significant increase in credit risk** since initial recognition, but there is **no objective evidence of impairment.** For these assets, lifetime expected credit losses are recognised, but interest revenue is still calculated on the **gross carrying amount of the asset.**

> Carrying value, also known as carrying amount, is an accounting concept used to **measure the current value of an asset**.

- **Stage 3 assets** include financial assets that have **objective evidence of impairment at the reporting date**. For these assets, lifetime expected credit loss is recognised, and interest revenue is calculated on the **net carrying amount.**

- The forward-looking expected credit losses approach will further enhance the **resilience of the banking system** in line with **globally accepted norms**. It is likely to result in excess provisions as compared to shortfall in provisions as seen in the incurred loss approach.
- It is proposed that the requirement for estimating impairment losses under the expected credit loss approach would apply to **all loans and advances** (including sanctioned limits under **revolving credit facilities**).

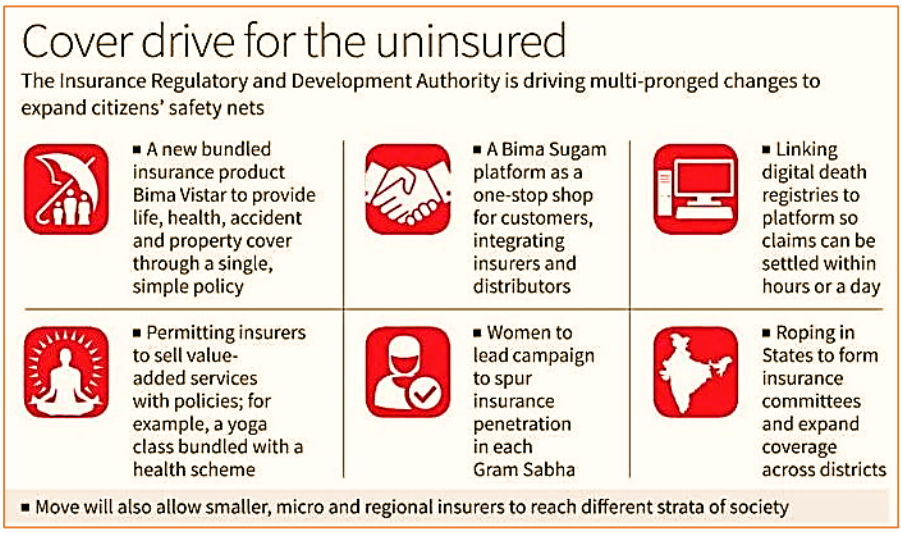
BIMA TRINITY

In News: To address the **low insurance penetration** in India and provide **insurance cover for all by 2047,** the Insurance Regulatory and Development Authority of India (IRDAI) has started a new initiative called as **'Bima Trinity'.**

- Bima Trinity will include **Bima Sugam**, **Bima Vistaar**, and **Bima Vahak**.
  - **Bima Sugam:** the protocol or the digital platform for selling-purchasing and settlement of claims
    - Will maintain the **insurance repository**, and **link** with state's certification registry after **consent of the user**.
  - **Bima Vistar:** an affordable and accessible **all-in-one insurance product**
    - Bundled product of life, health, casualty, property insurance, etc.
  - **Bima Vahak:** a **women-centric distribution channel** to focus on reaching untapped/rural areas.

Revolutionizing the Insurance Experience

- **Integration:** of insurers and distributors in a one-stop shop.
- **Parametric triggers:** eliminate the need for surveyor through **digital validation**
- **Expediting policyholders' claim settlements:** by integrating death registries onto a common industry platform.
- **Value-added services:** gym or yoga memberships, nursing services.
- **Differential products & niche players:** for various geographical and population segments on the lines of differentiated banking.

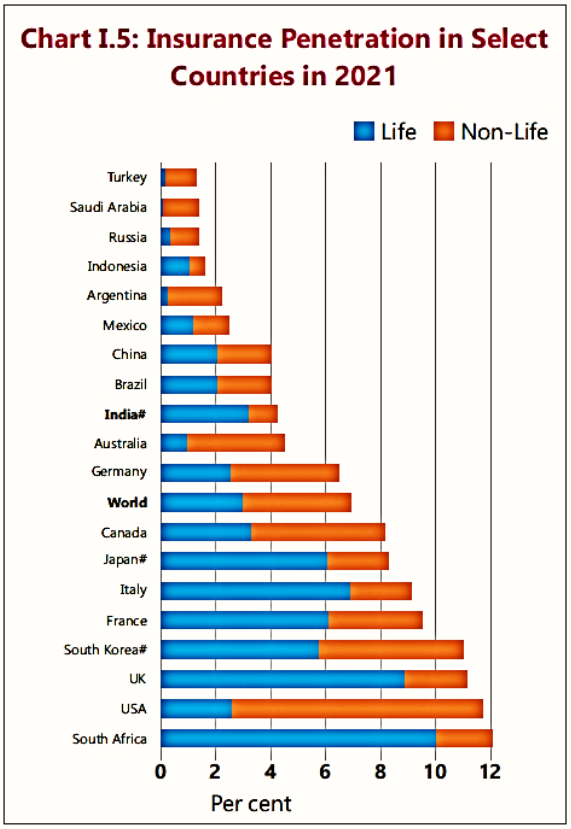


- This industry-wide, tech-enabled Bima Trinity could be a **game changer** and **IRDAI's UPI moment** for the insurance industry.

Need of the hour

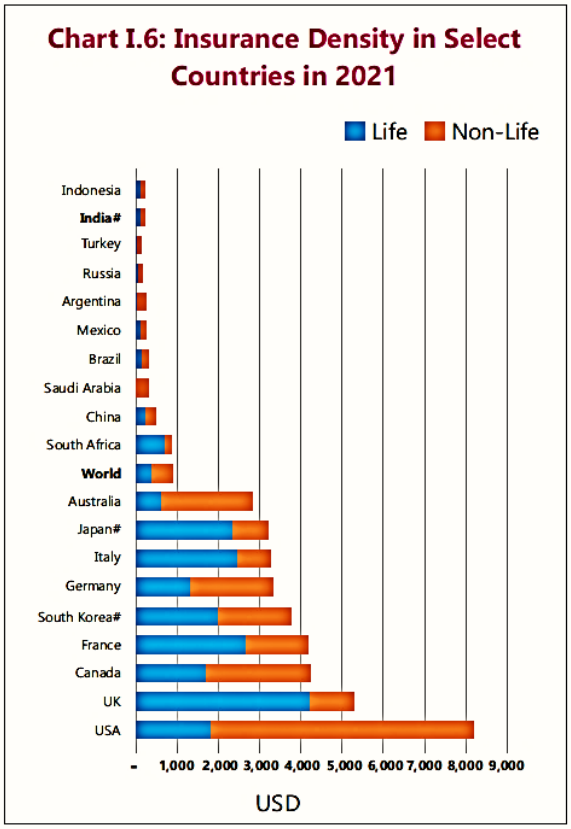
- **Amend the Insurance Act** to allow **composite licences** for insurance companies
- Enable the entry of **newer players**
- Spread **awareness** and set price of all-in-one insurance at **affordable levels**

Chart I.5: Insurance Penetration in Select Countries in 2021



Data relates to financial year
Note: Insurance Penetration is measured as percentage of insurance premium to GDP
Source: Swiss Re, Sigma No. 4/2022

Chart I.6: Insurance Density in Select Countries in 2021

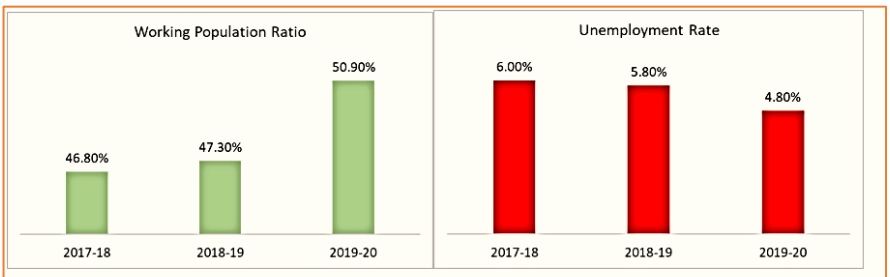


Data relates to financial year
Note: Insurance Density is measured as ratio of insurance premium to population.
Source: Swiss Re, Sigma No. 4/2022

EMPLOYMENT TRENDS

In News: Goverment of India recently issued its annual **Periodic Labour Force Survey** (PLFS) 2021-22, the most comprehensive government dataset on employment.

- The **headline employment numbers** show an **improvement** in the employment situation.
- The **unemployment rate** in the country is witnessing a **declining trend**. The unemployment rate was 4.8% in 2019-20, which was subsequently reduced to **4.1% in 2021-22.**
- **Worker Population Ratio (WPR)** has increased from 47.3% in 2018-19 to **52.9% in 2021-22**. For males and females, the ratios have increased from 71% to 73.8% and 23.3% to 31.7% respectively.



The Unemployment Rate (UR), the Labour Force Participation Rate (LFPR) and the Worker Population Rate (WPR) **almost reached their pre-pandemic levels** during the last quarter of 2020-21 as per Periodic Labour Force Survey Data.[3]

- Comparing with the pre-pandemic report, the number of Indians in the **labour force and their participation rate increased to 55.2%** on the back of a big jump in **women entering the job** market.

Contrasting trend (2016-21) from the **Centre for Monitoring Indian Economy** (CMIE) shows that India's labour force participation rate (LFPR) has **fallen to 40%** from an already low 47% in 2016. This suggests not only that **more than half of India's population** in the working-age group (15 years and older) is **deciding to sit out of the job market**, but also that this **proportion of people is increasing**.

Labour Force: the labour force consists of persons who are in the **15-64 age bracket**, and belong to either of the following two categories:

- are **employed** (category 1)
- are **unemployed** and are **willing to work** and are **actively looking** for a job (category 2)

Unemployment Rate (UER): the percentage of unemployed persons (category 2) as a proportion of the labour force.

Worker Population Ratio (UER): the percentage of employed persons in the total population in the working age group. It can also be called at Employment Rate.

What is Labour Force Participation Rate (LFPR)?

LFPR is the **percentage of the working-age (15-64 years) population that is asking for a job**. It includes those who are employed and those who are unemployed.

Deciphering the Trends

- Even as the unemployment rate has declined since the pandemic, **it remains elevated**.
- While the overall employment situation showed improvement, the **rise** was seen mostly in **low-quality, unpaid work and low wages category.**
- **Agriculture and Rural Workforce:** the reverse migration of labour from cities to villages increased the pressure on agriculture to absorb the workers.
  - **Agriculture's share** of total jobs: 42.5% (2018-19) to 45.5% by 2021-22
  - **Impact**: **reversing** the stages for India's **economic transformation**, impacting demographic transition
  - Increase in low quality rural self-employment like handcraft, street-vending, recycling, etc.
  - Hence, rural income could be a better indicator of employment stress in rural areas than employment rate.
- **MNREGA Jobs: continuous increase** in work demanded by households under the MGNREGA.
  - 4.13 crore households (2014-15) to 5.48 crore (2019-20) to 7.55 crore (2020-21)
- **Women Employment:** The rise in women's participation in the labour force is coming through **unpaid/low-income self-employment** and not jobs in factories or the service sector.
  - **Helper in household enterprises** excludes regular wages for work. Thus, many new jobs don't translate to steady **purchasing power.**
- **Youth:** The unemployment rate is higher among the **younger** (22%) **and more educated** (11%).
  - In **Bihar and Jammu & Kashmir**, educated youth were among the **worst hit**.
  - A quarter of young Indians in the 15-24 years age bracket could not find work, according to ILO 2020 estimates.
  - The corresponding number for Bangladesh was 14.8%, Indonesia 14.5%, Bhutan and Malaysia 14%, Vietnam 7.3% and Cambodia 0.8%.
- **Manufacturing Sector:** India has seen a dip in manufacturing employment: 12.1% in 2018-19 and 11.6% in 2021-22.
  - Consequently, the percentage of jobs in both the **salaried and casual labour categories** has declined.
  - While there are signs of increasing formalisation as indicated by the EPFO data, a substantial share of the labour force continues to remain **employed in the informal sector**, lacking a **safety net**.
- **Underemployment:** highly qualified candidates seeking low-level jobs, reduced wages, worsening quality of employment, movement from salaried jobs to casual work and disguised unemployment in India.
- **Demand for Jobs:** louder demands for **reservation** in the public sector, introducing reservation in **private sector, job quotas for locals**, etc.

Labour Force Participation Trends

According to CMIE, there has been a **sharp fall in the labour force participation rate** in India to **present the levels of 40%.**

This decline suggests that despite India's young population, many have simply opted out of the labour force, perhaps feeling let down by the **absence of remunerative or productive jobs or not being able to find work**.

Government's response

Large population was employed in **unpaid work or were pursuing education**

Increase in the labour force participation rate between 2017-2018 (49.8%) and 2019-2020 (53.5%)

Female Labour Force Participation Rate

According to CMIE data, as of December 2021, while the **male LFPR was 67.4%,** the **female LFPR was as low as 9.4%.** In other words, less than one in 10 working-age women in India are even demanding work.

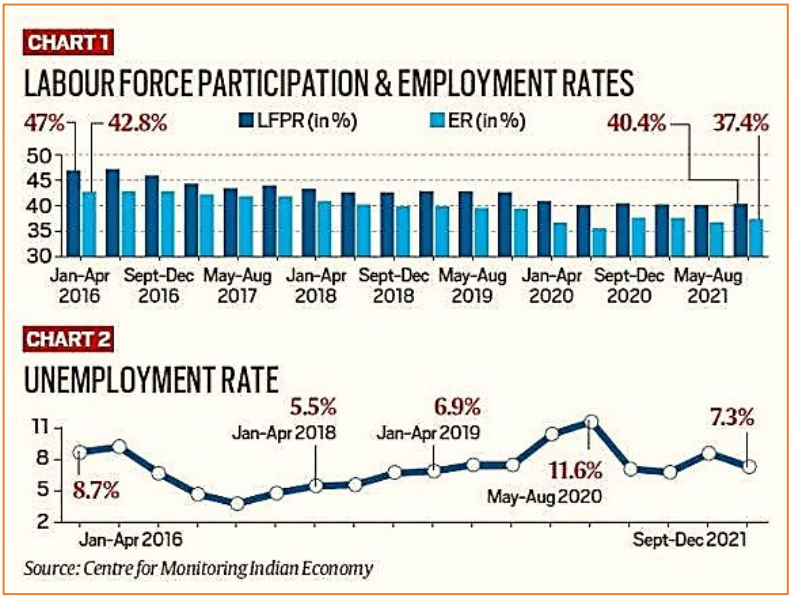
Even if one sources data from the **World Bank**, India's female labour force participation rate is **around 25%** when the **global average is 47%. Female LFPR** is **31.7%** according to PLFS, 2021-22.

Why do so few women demand work in India?

- Workplace working conditions
- Law and order situation
- Inconvenient public transportation
- Violence against women
- Societal norms
- Inadequate job opportunities
- Unpaid and unaccounted care economy

Issue with LFPR as an indicator of Unemployment (CMIE)

- In usual cases, the LFPR largely remains stable. As such, any analysis of unemployment in an economy can be done just by looking at the unemployment rate (UER).
- But, in India, the LFPR is **not only lower than in the rest of the world but also falling**.
- This, in turn, **affects the UER** because LFPR is the base on which UER is calculated.
- The world over, **LFPR is around 60%.** In India, it has been sliding over the last 10 years and has shrunk from 47% in 2016 to just 40% as of December 2021.
- This shrinkage implies that merely looking at UER will **under-report the stress** of unemployment status in India.



Something similar has happened in India's case (see Chart 1). The LFPR has sustained a secular decline. In fact, every time the LFPR falls, the UER also falls because **fewer people are now demanding jobs**, giving the incorrect impression to policymakers that the situation has improved.

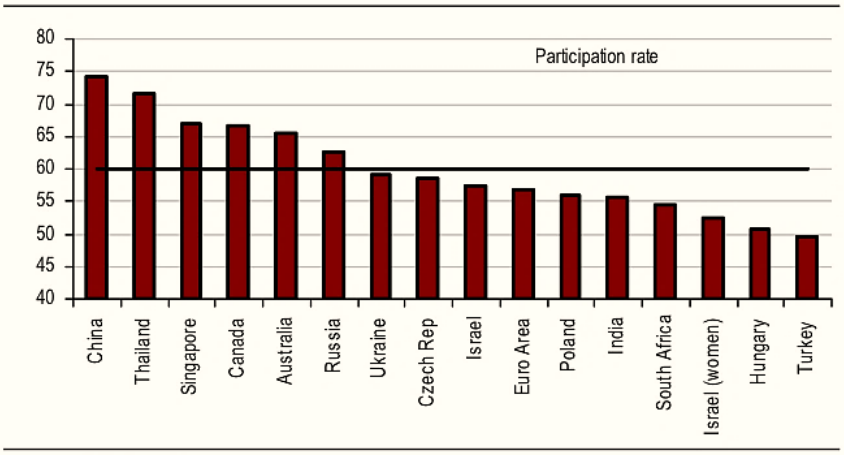
Correct parameter to assess India's Unemployment Stress

When LFPR is falling as steadily and as sharply as it has done in India's case, it is better to track another variable: the **Employment Rate** (ER). The **Employment Rate** refers to the total number of employed people as a percentage of the working-age population.

While India's **working-age population has been increasing** each year, the **percentage of people with jobs has been coming down sharply** (chart 1).

For example, in December 2021, India had 107.9 crore people in the working age group and of these, only 40.4 crore had a job (an ER of 37.4%). In December 2016, India had 95.9 crore in the working-age group and 41.2 crore with jobs (ER 43%). In five years, while the total working-age population has gone up by 12 crore, the number of people with jobs has gone down by 80 lakh.

Chart 4: Comparison of labour force participation rates



Source: UBS, World Bank

Why is India's LFPR so low?

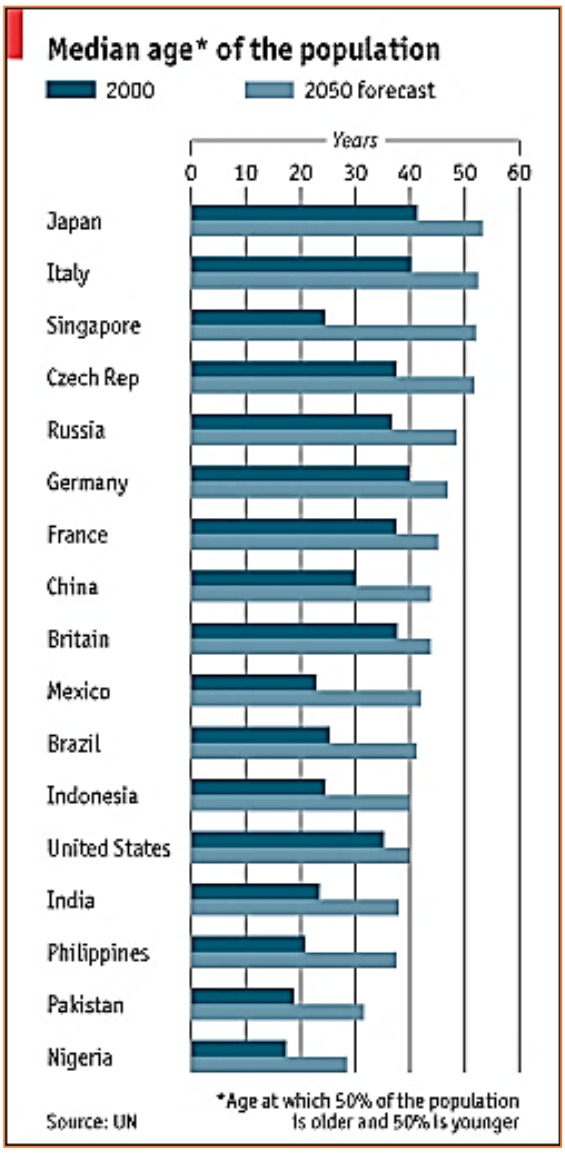
- Abysmally low level of **female LFPR**
- Pursuit of **extended/ specialized education**
- Absence of **remunerative or productive jobs**
- Presence of **earning member** in household
- **Hopelessness** due to not being able to find work

PLFS and CMIE

- Since the PLFS data released by NSO under MoSPI comes with inordinate delay and processing lag of 6-9 months after survey, a popular unofficial estimate on employment status is presented by Centre for Monitoring of Indian Economy (CMIE) and Ashoka University's CEDA. Both CMIE and the official Periodic labour force surveys have different sampling strategy, coverage, definition.

Special Case of Subsidiary Status

- The key labour market statistics reported in labour force surveys are typically based on **three different measures:** the **'usual status', 'current weekly status'** and **'current daily status'**.
- **Current Daily Status:** uses the day as the unit of analysis. Under CDS, a person is **considered as working**, if they **actually worked** for at least one hour in the day **or had work for one hour** but did not do the work.
- **Current Weekly Status:** The urban unemployment PLFS is based on the current weekly status approach, under which a person is considered unemployed if he/she did **not work even for one hour** on any day during the week **but sought or was available for work** at least for one hour on any day during the period.
- **Usual Status:**
  - Usual status covers the status of a person during the **365 days** preceding the date of the survey. They are employed either by **principal status** (PS) and/or by **subsidiary status** (SS).
  - A person is considered employed by PS if s/he is engaged in economic activities for a **major part of the preceding 365 days**.
  - In addition to their principal activity, some individuals may have pursued **another economic activity for 30 days or more** during the reference period of 365 days preceding the survey date. This is referred to as their **subsidiary economic activity**.
  - Hence, the PS category includes **(i) those who do only a principal activity and (ii) those who do both principal and subsidiary activities.**
  - On the other hand, among those who were either **unemployed or out of the labour force** by the major time criterion (of PS), some may have **worked for at least 30 days** over the reference year. These individuals are treated as **subsidiary status workers.**
  - Typically, with an **improvement in the employment scenario** and rising prosperity, we would **expect reductions in subsidiary employment**. This is because those who are employed by SS are predominantly engaged as **poor self-employed** (own account workers or unpaid family helpers) or casual workers.
  - This suggests that though women are entering the work force, they are not engaged in productive employment. Rather, they are engaged in marginal subsidiary work which is often unpaid.



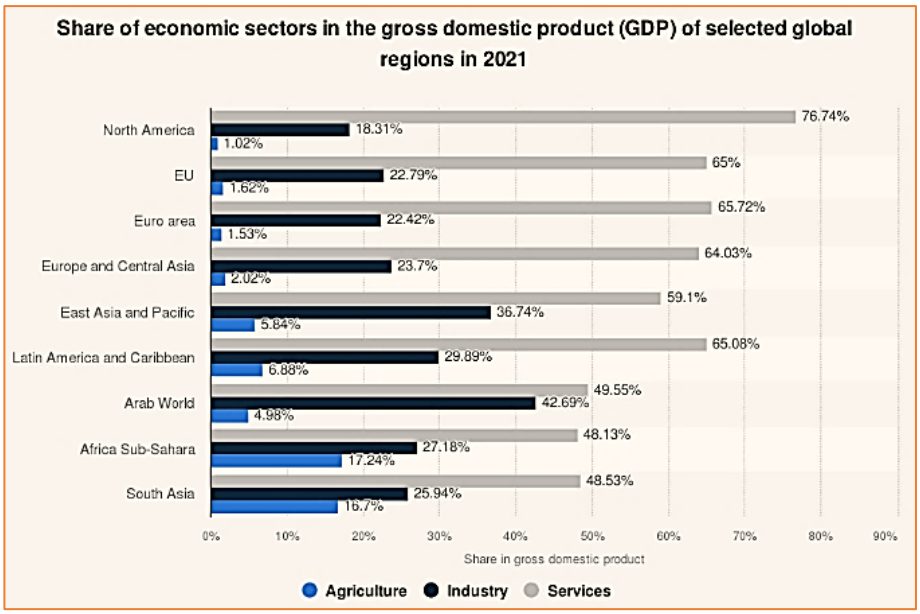
Solution

- The **present median age of an Indian 28.2 years** (World Population Prospects, 2022) with respect to China (39 years).
- India's demographic dividend mandates utilization of the working age population for growth and productive employment.
- The country needs **skill enhancement** of labour force and presence of **labour-intensive manufacturing** sector to prevent India's young population falling into a **demographic disaster or nightmare**.
- Thus, attaining **pre-pandemic levels of unemployment** could be treated as a **pitstop and not a goal** for providing employment security in India.

RURALIZATION

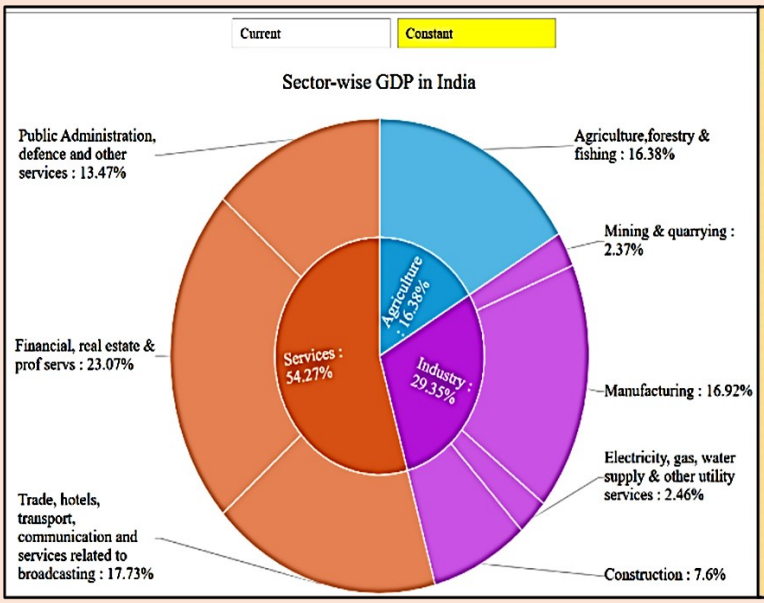
In News: Different studies around the **poverty levels and rise in urban unemployment** indicate towards a **structural shift** towards ruralisation of Indian economy.

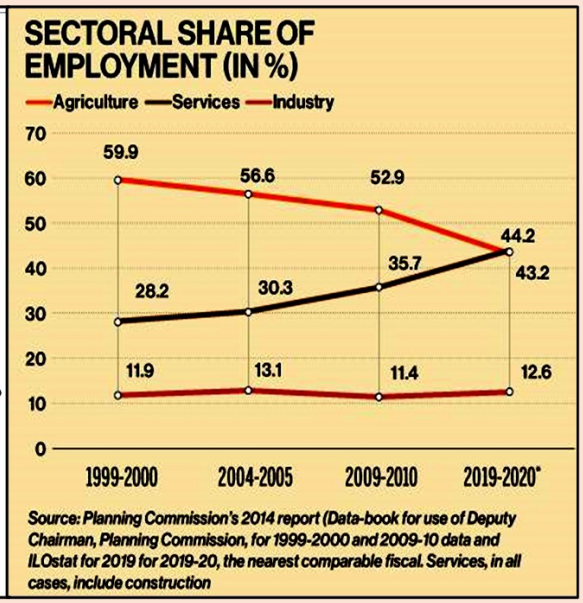
- Developing societies usually **shift towards the modern from the subsistence** sector resulting in a **virtuous cycle** of rapid growth, **urbanisation**, rise in investments, **productive employment** and income, and **poverty reduction**.
- The concern in **India's case** is that this transformation may have lately reversed in India.
- India's **workforce dependence on agriculture** has risen from 42.5% (2018-19) to 45.5% (2021-22) (PLFS).
- The **real agriculture gross value added** (GVA) has grown at 3.8% on a 3-year CAGR basis (FY23), higher than the 3.2% real GDP growth.



- As per CMIE data, at the post-pandemic peak, the **agriculture sector absorbed 10 million net additional workforce** since the Covid shock, while the industrial sector and services have **retrenched** 5.6 million and 2.5 million respectively.
- This **changed composition** of the workforce and the rise in **surplus labour** have resulted in low real wages and rise in labour force seeking employment in rural areas/agriculture, thus contributing to **ruralization of India.**

- The agriculture sector's contribution to the Indian economy is much higher than the world's average (6.4%). The industry and services sector's contribution is lower than the world's average 30% for the industry sector and 63% for the services sector.





INDIA'S SUGAR EXPORT STORY

In News: India has become the world's **second-largest sugar exporter**, after Brazil, by increasing its shipments from **$810.9 million to $4.6 billion between 2017-18 and 2021-22.**

- India achieved this by **building export markets, promoting raw sugar, diversifying destinations, leveraging trade agreements**, **reducing domestic stocks and hiking production.**

- At present, India faces opportunities and challenges in the global sugar market, such as **price competitiveness, product quality, supply reliability, policy support,** and **reduced production** and **environmental sustainability.**

Building export markets

- Diversifying **products**: raw sugar exports
- Diversifying **markets**: Indonesia, Malaysia, South Korea, China and Bangladesh
- **Competing** with lead exporter Brazil: exporting in their lean season
- **Competitive** product: free of dextran, with high polarisation
- **Logistics**: lower freight cost and shorter voyage time

Promoting raw sugar

- **Raw sugar** is what mills produce after the **first crystallisation of juice** obtained from crushing of cane. It is rough and brownish in colour, with a high ICUMSA value (a measure of purity based on colour).

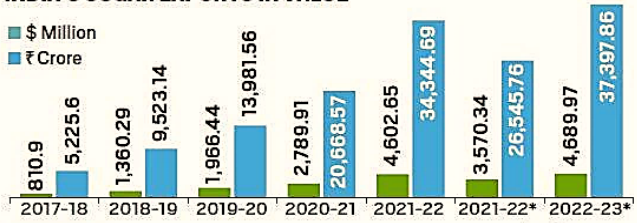
ICUMSA, i.e. **International Commission for Uniform Methods of Sugar Analysis**, is a measure of the **purity** of sugar based on **colour**. The lower the value, the more the whiteness.

Dextran is a **bacterial compound** formed when sugarcane stays in the sun for too long after harvesting. Indian raw sugar has no dextran, as it is produced from fresh cane crushed within 12-24 hours of harvesting (compared to 48 hours or more in Brazil).

Polarisation (pol) measures the purity of the sugar, with the sucrose content of the sugar provided as a mass percentage.

CHART 1

INDIA'S SUGAR EXPORTS IN VALUE



*April to January

CHART 2

INDIA'S SUGAR EXPORTS IN LAKH TONNES

Sugar Year	Raw Sugar	White Sugar***	Total
2016-17	0	0.46	0.46
2017-18	0.47	5.73	6.2
2018-19	13.13	24.87	38
2019-20	17.84	41.56	59.4
2020-21	28.16	43.74	71.9
2021-22	56.29	53.71	110
2022-23**	19.13	30.91	50.04

Note: Sugar Year is from Oct-Sept **As on March 15; ***Includes refined sugar*

- Raw sugar is refined after removing impurities and de-colourisation. The end-product is refined **white cane sugar** with a standard ICUMSA value of 45.
- India hardly exported any raw sugar till 2017-18. It mainly shipped plantation white sugar with 100-150 ICUMSA value. This was called **low-quality whites** or LQW in international markets.
- India created awareness about the quality of its raw sugar, which gets a **4% premium** over the global benchmark price. This is unlike white sugar, which sells at a $40/tonne discount to the world price for 45 ICUMSA whites.

Diversifying destinations

- India **exported 110 lt of sugar in 2021-22,** of which raws were almost 50%. The main importers of Indian raw sugar were **Indonesia, Bangladesh, Saudi Arabia, Iraq and Malaysia.**
- India exported white/refined sugar mainly to **Afghanistan, Somalia, Djibouti, Sri Lanka, China and Sudan.**
- India leveraged its **trade agreements** with countries such as **Bangladesh, Sri Lanka, Nepal, Afghanistan and Bhutan** to boost its sugar exports.

Challenge of reducing production & banning sugar exports

- India's peak production of sugar (**360 lakh tonnes** (LT) in 2021-22) dropped to an estimated **335 LT** in 2022-23 (season cycle October-September). It led the government to **cap India's exports** in the current sugar year to **61 LT**. Over 50 LT have already been dispatched.
- **Year-end stocks** of sugar with Indian mills peaked at **143 LT** in 2018-19 (6-7 months of spare for domestic consumption). The concerted export drive, coupled with diversion of sugarcane juice to produce **ethanol for blending with petrol**, helped bring down closing stocks to about 70 LT by 2021-22.
- The mills in Maharashtra are realising around **Rs 32/ kg** of sugar sold in the **domestic market**. However, the ex-mill realisations from **exports** work out much higher at **Rs 42/kg.**

Challenges and opportunities

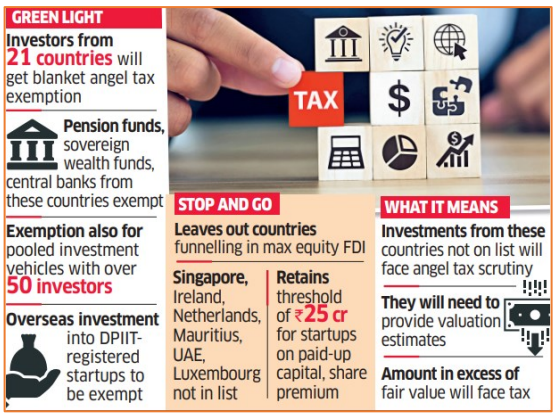
- Dilemma of higher export revenue and profit vs **export of virtual water**.
- Counter **high domestic food inflation**
- Handle **ethanol blending program** and regulate future sugar exports
- Difficulty of **regaining lost overseas markets**

Export of virtual water

- The amount of water required to produce the products that India exports.
- It takes 2,515 litres of water to produce a kilogram of sugar in Maharashtra, according to the Commission for Agricultural Costs and Prices (CACP).

ANGEL TAX

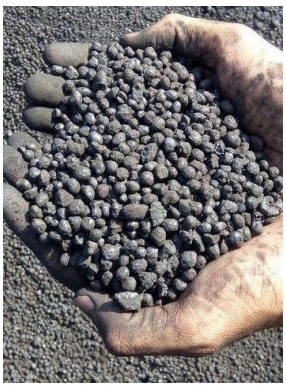
In News: The Finance Ministry has **exempted investors from 21 countries** including USA, UK and France from the levy of angel tax for non-resident investment in unlisted Indian startups.



- Countries like **Singapore, Netherlands, and Mauritius**, which constitute the major chunk of foreign direct investment in India, have not been included in the exemption list.
- Introduced in 2012, Angel tax is a term used to refer to the **income tax payable on the capital raised by unlisted companies** via issue of **shares** where the share price is seen in excess of the fair market value of the shares sold.
    - Under this, equity investment exceeding face value in unlisted companies is considered income for start-ups and subject to income tax under 'Income from Other Sources'.
    - Its objective was to deter the **generation and use of unaccounted money** through the subscription of shares of a closely held company at a value that is higher than the fair market value of the firm's shares.
- Latest amendment includes **foreign investors in the ambit**, meaning that when a start-up raises funding from a foreign investor, that too will now be counted as income and be taxable. Previously, it was applicable only to resident investors.
- This move aligns with the Government's initial intention of **bringing FDI under the purview of angel tax** to prevent the circulation of **unaccounted money**.

PET COKE IMPORT

In News: Govt permits import of **pet coke**, a by-product of oil refining, as a raw material for **lithium-ion batteries** which are widely used in electric vehicles and other applications.



- This move is expected to boost the **domestic production of lithium-ion batteries** and reduce the dependence on imports.
- India uses pet coke mainly as a **fuel for cement kilns**, **power plants**, and other industries, as well as an **anode material** for lithium-ion batteries.
- The import of pet coke for fuel purposes has been **restricted** by the Supreme Court since 2017 due to environmental concerns.
- However, the import of pet coke for **non-fuel purposes**, such as battery manufacturing, is allowed with prior permission from the Directorate General of Foreign Trade.
    - Petcoke is generally not used as fuel because of **toxic emissions**, it has a **high sulphur content**, which can contribute to air pollution and acid rain when it is burned as a fuel.
    - India is the **world's largest consumer of pet coke**, importing over half of its annual demand of about 27 million tonnes from the US. For the first time, it also imported pet coke from Venezuela in 2021.

PLI 2.0 FOR IT HARDWARE

In News: Aimed at boosting **domestic manufacturing** of laptops, tablets, all-in-one PCs, servers and ultra-small form factor devices, the Union Cabinet has approved a **renewed production linked incentive** (PLI) scheme of approx. Rs 20000 Cr for **IT hardware**, with a 6-year tenure.

Features of PLI 2.0 IT Hardware

- **Increase in outlay:** Increase to 2.5 times increase from the previous version
- **Higher percentage of incentives** and **increased duration of 6 years.**
- **Flexibility in investment:** could include **partial and progressive investments** for incentives, and investments made by **their suppliers** to avail incentives.
    - Manufacturer could **choose the start and end dates** of scheme to avail incentives
- **Promotion of local manufacturing:** additional incentive for using Indian manufactured components in **value chain**. Eg memory chips, printed circuit board assemblies, solid-state drives, chassis, power supply components, and adaptors.
- **Better data protection:** use firmware for servers from **trusted Indian/foreign sources**
- **Penalty:** of 5-10% for companies that **fall short** of their declared manufacturing goals.

PLI 1.0 IT Hardware

- Domestic players **investing** Rs 20 Cr and **clocking sales** of Rs 50 Cr, Rs 100 Cr, Rs 200 Cr and Rs 300 Cr in 1st, 2nd, 3rd and the final year would pocket **incentives of 1-4%** on incremental sales over 2019-20, the base financial year.
- Announced in **2021** with an outlay of **Rs 7300 Cr** for a period of 4 years.
- So far, a **meagre Rs 120 Cr** was invested by the companies selected under the scheme, far short of the **projected investments of Rs 2,500 Cr**.

Projected outcome

- Attract **major electronics manufacturing** companies like Apple and HP
- **Stimulate incremental production and boost exports**: **triple** India's electronics manufacturing industry from the current $105 billion to over $300 billion (2025-26)
- **Boost exports:** $120 billion (2025-26)
- **Eliminate the need for subsidies** in the electronics sector

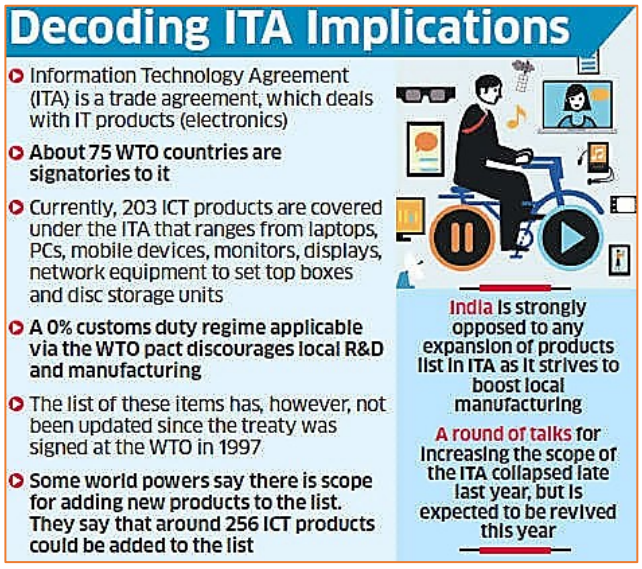
ICT DISPUTE AT WTO

In News: In a sign of easing tensions between India and the European Union (EU) in the information and communication technology (ICT) goods dispute case at the WTO, the EU has filed a **three-month deferment**, buying more time to chart out a **possible settlement**.

- Earlier, in April 2023, the **WTO panel had ruled against India**, stating that Indian tariffs on several information and communication technology (ICT) goods/electronic items were **not in line with global norms**.

Background of the Dispute

- In 2019, **Taiwan, Japan and the European Union** (EU) filed a dispute challenging the **import duty levied by India** on a range of ICT goods including mobile phones and their components, to **curb imports and step up domestic production**.
- India, at present, levies an import duty between **7.5% and 20%** on such goods.
- India is a signatory to the **Information Technology Agreement** (ITA) which came into effect in July 1997 and accounts for more than 95% of the world trade in products such as computers, telecom equipment, semiconductors and scientific instruments.
- As part of a signatory to the agreement, India is **required to eliminate tariffs** on these products.
- **India's stand:** since a **number of products mentioned in this ruling did not exist when the ITA was signed**, the need is to **renegotiate** agreement on new products.
- While the EU and Taiwan decided to have a dialogue with India over the matter, Japan went for adoption of the ruling by the WTO's dispute panel.



Impact in case India-EU talks fail/ India loses the appeal

- **EU:** The Indian government estimates that the WTO panel's report will have little impact on India's ICT products as the **EU's share** of total Indian imports of ICT products in 2022 was **3.03% or $550 million**.

- If the talks fail, the EU could adopt the WTO panel filing s (similar to Japan's decision) and India could take the case to the **Appellate Body** which hasn't been functional for nearly two years due to **America's blockage on the appointment of judges**.
- **Japan:** Since the products under question are **already zero rated under the India-Japan Comprehensive Economic Partnership Agreement** (CEPA), there would be **no change in status**.
- The norms are nonetheless negotiated upon in the WTO, even between countries that already have trade agreements, for two reasons: both countries may either decide to **exit the FTA** or when there is a difficulty in meeting **rules of origin** exception in some cases.

About World Trade Organisation (WTO)

The World Trade Organization (WTO) is the only global international organization dealing with the rules of trade between nations.

At its heart are the WTO agreements, **negotiated and signed** by the bulk of the world's trading nations and **ratified in their parliaments**.

The goal is to ensure that **trade flows as smoothly, predictably and freely** as possible.

It was established in 1995 and is located in Geneva, Switzerland.

DUTY-FREE QUOTA FREE SCHEME

In News: WTO has flagged **poor utilization** of the **Duty-free Quota Free Scheme**(DFQF Scheme) offered to Least Developed Countries (LDCs) by India.

- **85% of India's 11,000 products** offered at zero tariff to least developed countries (LDCs) under WTO's duty-free quota free(DFQF) scheme **remain unutilized**, as per the LDC Group's report.

Key findings of the report

- **85% of India's tariff lines** show zero utilisation rate, compared to **China's 64%.**
- Some beneficiary LDCs have very low utilisation rates (e.g., **Guinea** 8%, **Bangladesh** 0%).
- Highest utilisation rate: **Benin** 98%).
- Noteworthy, LDC **exports to India enter from China** under non-preferential tariff route despite being covered by Indian preference scheme.
- Report highlights **potential duty savings** due to preference margins.
- **Preference margin** are an indicator of major potential duty savings.

STATUS CHECK

Utilisation of India's preferential scheme by LDCs with covered imports higher than $60 mn

Country	Utilisation rate (in %)	Preference margin (percentage points)
Bangladesh	0	17
Afghanistan	0	24
Guinea	8	15
Burkina Faso	8	15
Myanmar	18	21
Sudan	32	17
Togo	60	16
Zambia	63	9
Madagascar	70	21
Tanzania	78	14
Guinea-Bissau	81	18
Mozambique	87	12
Senegal	87	13
Benin	98	25

Source: WTO

Duty-free Quota Free or Duty-Free Tariff Preference (DFTP) Scheme

- The objective of the DFTP Scheme for LDCs is **grant of tariff preferences** on the **exports** of the Least Developed Countries on **imports to India.**
- The decision to provide duty free quota free (DFQF) access for LDCs was first taken at the **WTO Hong Kong Ministerial Meeting in 2005.**
- **India** became the **first developing country** to provide DFQF access in **2008**.
- Presently, India offers 11,506 preferential tariff lines to LDCs, of which 10,991 are duty-free.

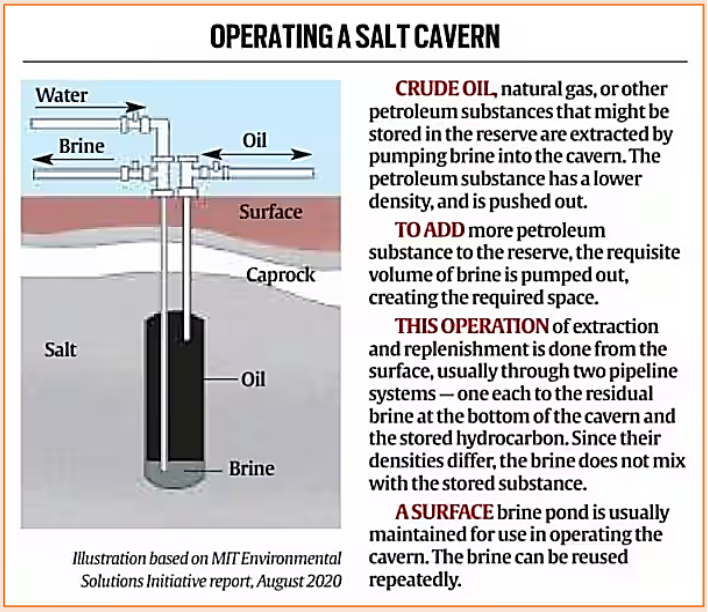
STRATEGIC PETROLEUM RESERVES

In News: India is exploring the idea of developing **salt caverns** in Rajasthan as **strategic petroleum reserves** to enhance its energy security.

- Engineers India Ltd (EIL), a public sector consultancy company, has been assigned to study the **prospects and feasibility** of the project. EIL has partnered with Germany's DEEP.KBB GmbH, a company that has the technology and expertise for preparing salt caverns for crude storage.
- The project is still in the initial stages and no specific site has been decided yet.
- Rajasthan has a **forthcoming refinery in Barmer** and crude pipelines, which are conducive for building strategic oil reserves.

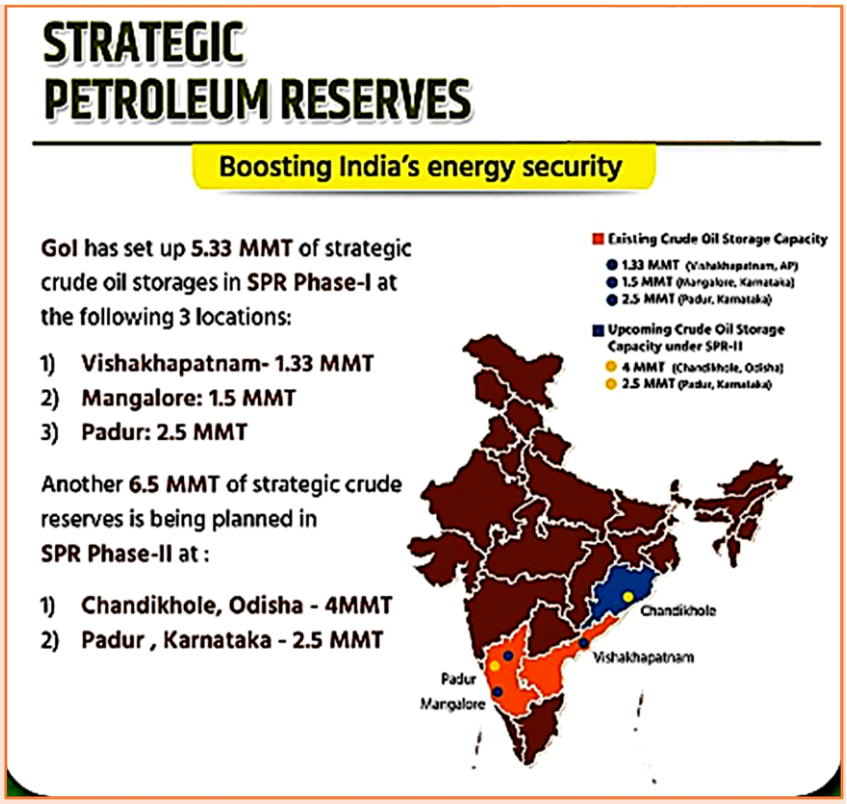
- India, the world's **third-largest consumer of crude,** depends on imports for more than 85% of its requirement and strategic petroleum reserves (SPR) could help ensure **energy security** and availability during **global supply shocks and other emergencies**.

- **Salt caverns** are **underground formations** that are created by dissolving salt deposits with water and then draining out the water. They are easier, faster, and cheaper to develop than **rock caverns**, which are excavated from hard rock.
- **Salt cavern-based oil storage facilities** are **naturally well-sealed**, and engineered for rapid injection and extraction of oil.
- Salt caverns have **several advantages** over rock caverns, such as lower construction **cost**, shorter development **time**, higher storage **efficiency**, lower **maintenance** cost, and greater **operational flexibility**.
- They also face some challenges, such as availability of **suitable geological formations**, environmental impact of **brine disposal**, risk of **leakage** or collapse, and regulatory hurdles.



Strategic Petroleum Reserve (SPR)

- These are **large stockpiles** of crude oil that are maintained by governments or private entities to ensure energy security in case of supply disruptions or emergencies.
- SPRs can also help in **stabilising oil prices** and **reducing dependence** on oil imports.
- India started its SPR program in **2003** under the **Ministry of Petroleum and Natural Gas**, implemented by Indian Strategic Petroleum Reserves Ltd (ISPRL), a special purpose vehicle.
- India currently has three strategic petroleum reserves at **Mangaluru, Padur, and Visakhapatnam**, with a total capacity of **5.33 million tonnes of crude**, which can meet around **9.5 days** of the country's oil demand. All of these are made up of **rock caverns.**



- India aims to have a total **SPR capacity of 15.33 million tonnes**, which can meet around **30 days** of the country's oil demand.
- The **IEA** mandates its member countries to maintain SPRs equivalent to **at least 90 days** of their net oil imports.

STRATEGIC GAS RESERVES

In News: India is exploring the possibility of developing a **strategic gas stockpile** as a hedge against **price volatility** and **supply disruptions.**

- The idea is to create a **buffer of natural gas**, similar to the **strategic petroleum reserves**, that can be used in times of emergency or market fluctuations.

- The **Ministry of Petroleum and Natural Gas** has constituted a committee to examine the feasibility, viability and modalities of such a stockpile.
- The committee will study various aspects of creating a strategic gas stockpile, such as the **size, location, ownership, operation and financing of the storage facilities** and submit its report within six months.
- The committee will also look into the **regulatory and legal framework**, the **procurement and pricing mechanism**, and the **international best practices** for such a stockpile.
- According to some experts, India can use **depleted oil and gas fields, salt caverns or LNG terminals as potential storage sites** for natural gas storage.
- The country can also explore partnerships with other **gas-producing or consuming countries for joint stockpiling arrangements.**

India's Gas Based Economy

- India is the **world's third-largest energy consumer** and imports about **half of its natural gas** needs.
- The country is aiming to increase the **share of natural gas in its energy mix** from **6.2% to 15% by 2030,** against a **world average of 24.42%,** as part of its efforts to **reduce carbon emissions** and **diversify its energy sources.**
- However, the global gas market is prone to volatility, as seen in the recent **surge in spot prices** due to supply constraints, demand recovery, weather factors and Russia-Ukraine war.
- A strategic gas stockpile can help India secure its **energy security, cushion against price shocks**, and leverage its **bargaining power** in the international market.

Challenges

- Developing a strategic gas stockpile involves several technical, financial and regulatory challenges, such as:
  - Identifying **suitable storage sites** that are safe, accessible and cost-effective.
  - **Ensuring adequate supply of gas** from domestic or international sources at competitive prices.
  - Creating a **robust legal and institutional framework** for managing the stockpile
  - Balancing the **trade-off** between stockpile and utilisation.
  - Coordination with stakeholders

Opportunities

- Enhancing its **energy resilience and self-reliance,** especially in times of crisis or geopolitical uncertainties.
- Supporting its transition to a **gas-based economy** by creating demand for gas infrastructure and services.
- Promoting **innovation and research** in the gas sector by fostering collaboration with other countries and institutions.
- Contributing to its **climate goals by reducing its dependence on coal & oil** and increasing its share of clean energy.

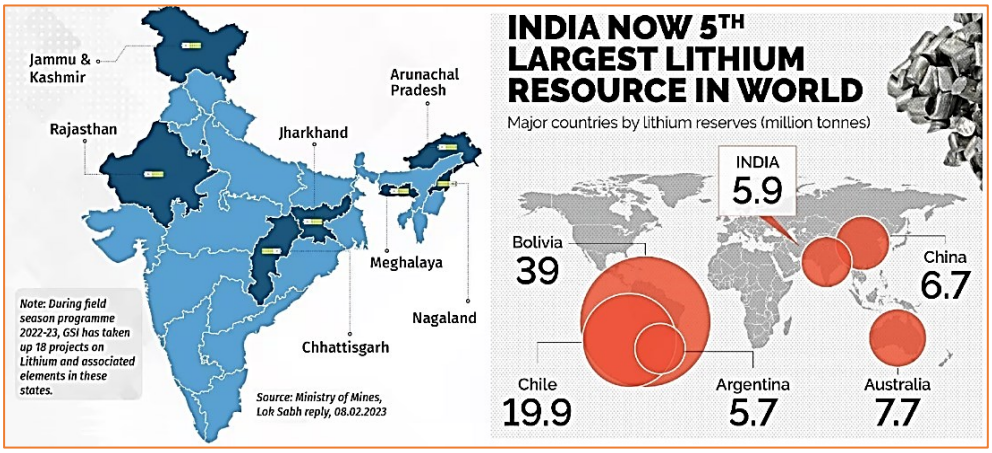
Perspectives

- The government has expressed its commitment to boost the gas economy by **increasing domestic production, expanding pipeline network, enhancing LNG import capacity, promoting city gas distribution** and **incentivising gas usage in various sectors.**
- The industry has welcomed the government's push for a **gas-based economy** and has **sought policy support, regulatory clarity, infrastructure development and market reforms** to enable greater **investment and growth** in the sector.
- Some experts view natural gas as a **strategic fuel for energy transition** as it can **complement renewable energy sources, reduce emissions intensity, improve air quality** and **enhance energy efficiency.**
- However, some experts warn that natural gas is **not a clean fuel** as it emits greenhouse gases and **methane leaks** during extraction, transportation and consumption. They suggest India should focus more on renewable energy sources and energy conservation measures.
- Some experts question the **feasibility and viability** of developing a strategic gas stockpile given the **high costs, technical complexities and uncertain benefits** involved. They suggest India should explore other options such as **diversifying its sources** of supply, enhancing its bargaining power with suppliers, creating a **regional gas market** and developing a domestic gas trading hub.

LI-ION BATTERY RECYCLING

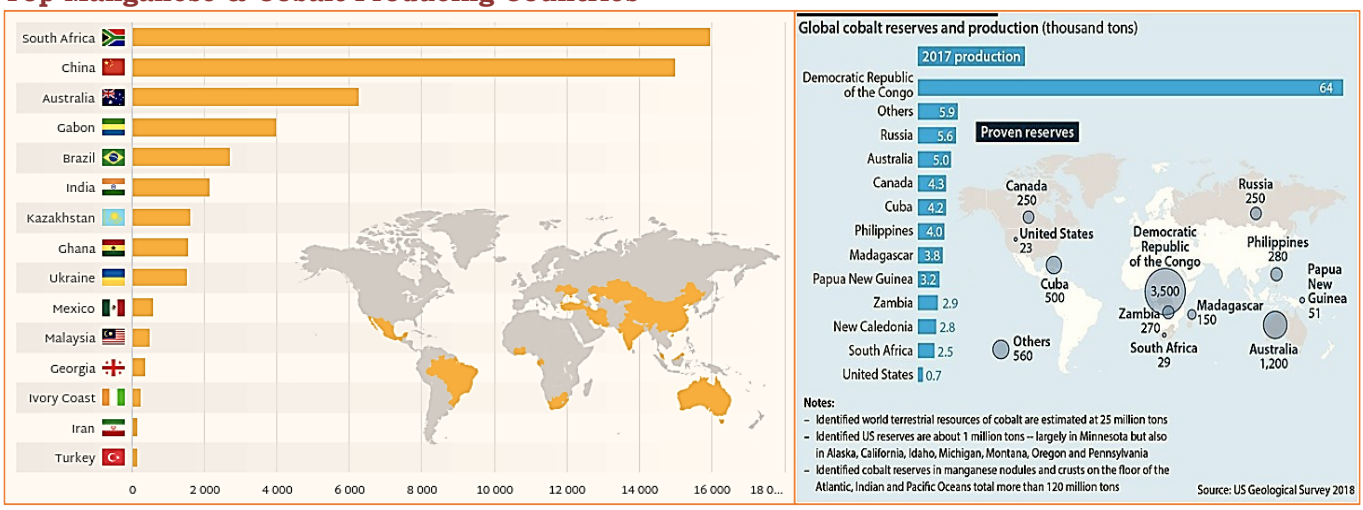
In News: The Ministry of Electronics and Information Technology (MeitY) **transferred cost-effective lithium-ion battery recycling technology** to nine recycling companies and issued letters of intent to nine more at Niti Aayog.

- The technology was developed in collaboration with the Government of Telangana and Greenko Energies Pvt. Ltd. as part of the "**Centre of Excellence on E-waste Management**" at C-MET, Hyderabad.
- **Features of the Technology**
  - The indigenous technology can process various types of discarded Li-ion batteries, **recovering over 95% of lithium (Li), cobalt (Co), manganese (Mn), and nickel (Ni)** contents in the form of their respective oxides or carbonates with a **purity of around 98%.**
  - The recycling process involves **leaching**, followed by hierarchical **selective extraction** of metal values using solvent extraction.
  - The secondary raw materials recovered can be employed in battery manufacture or other future uses.



- Niti Aayog's report indicates that India will require around 600 GWh of lithium battery storage for the period 2021-30 and about **125 GWh of lithium batteries will be ready for recycling by 2030.**

Top Manganese & Cobalt Producing Countries



E-APPEALS SCHEME

In News: The Central Board of Direct Taxes (CBDT) launched "e appeal" scheme to **reduce pendency of appeals** at the level of income tax commissioners.

- It is a ground-breaking initiative aimed at addressing the issue of pending income tax appeals, including related to **Tax Deducted at Source/Tax Collected at Source defaults**.
- The scheme incorporates **personal hearings** conducted through **video conferencing** for effective communication between the appellants and the authorities while saving valuable **time and resources**.
- It mandates **electronic filing** by eliminating the need for cumbersome paperwork and ensuring a more **user-friendly experience**.
- The appellant can, however, request a personal hearing, which would be done through video conferencing or video telephony.
- The JCIT (Appeals) possess the authority to send **show cause notices** (SCNs) and initiate **penalties** as per relevant provisions, but they do not have the power to issue summons.

- Its primary objective is to **reduce the backlog of appeals** at the income-tax commissioner, as they are overburdened due to the huge number of appeals.
- The Joint Commissioner (Appeals) (JCIT) is designated as the appeal authority under the scheme and is responsible for disposing of appeals filed before it or allocated or transferred to it.
- An appeal against an order of JCIT(A) will lie before **Income Tax Appellate Tribunal**.

INDIA'S GROWTH

In News: Despite India's economy not growing as fast as it would like to (8%-9% per annum), even a modest growth rate of 6% per annum will be enough for India to **overtake Germany and Japan by 2027.**

- As per the IMF, India is set to become the **third-largest economy (nominal) by 2027**.
- India's GDP has grown by **83% between 2014 and 2023**, slightly below **China's 84% growth**.
- Among the five countries India surpassed since 2014, the **UK's** GDP grew 3%, **France's** 2%, **Russia's** 1%. **Italy's GDP** has not grown at all, and **Brazil's contracted by 15%.**
- In 2027, it will be around **38% more than** what it is in 2023, while that of **Japan and Germany** will be only **15% more than their 2023 levels.**

Country	2004	2014	2023	2027*	2014 Rank	2027 Rank*
US	12,217	17,551	26,855	31,092	1	1
China	1,949	10,524	19,374	25,722	2	2
India	722	2,039	3,737	5,153	10	3
Japan	4,893	4,897	4,410	5,077	3	4
Germany	2,813	3,890	4,309	4,947	4	5
UK	2,424	3,067	3,159	4,016	5	6
France	2,119	2,857	2,923	3,322	6	7
Brazil	669	2,456	2,081	2,588	7	8
Canada	1,026	1,806	2,090	2,492	11	9
Italy	1,806	2,163	2,170	2,407	8	10
Russia	633	2,049	2,063	2,235	9	11

Challenges

- Moving from rank 10 to rank 5 was **relatively easier** because the GDPs were **within $1 trillion** of each other. The gap between the third rank and the first two is far greater.
- In 2027, India's GDP will be **one-fifth of China's** (short by $20 trillion), and **one-sixth of the US** (short by $26 trillion).
- At **$2,600 per annum**, India's **per capita GDP is the lowest** among the top 10 countries.

GREEDFLATION

In News: Many economists have questioned the validity that greedflation or corporate thirst for higher profits is the cause behind inflation.

- Greedflation refers to inflation fueled by **corporate greed and profit maximisation,** causing price hikes unrelated to **increased worker wages** but driven by **higher corporate profits.**
- This phenomenon highlights how rising prices are driven by companies' pursuit of **enhanced earnings** rather than improved worker compensation.
- Greedflation occurs when a crisis such as a pandemic or disaster transforms into an opportunity for **supernormal profits** to be made by businesses.

Greedflation Impact

- **Low to middle-income individuals**: Enriches the wealthy, **widening wealth gap**, worsening inequality.
- **Economic instability**: Raises **crash risks**, unsettling financial markets.
- **Global Imbalance:** Aggravates **trade tensions, geopolitical conflicts** amid self-focused nations.

BAD LOANS

In News: The **gross non-performing asset (GNPA) ratio** of **scheduled commercial banks (SCBs)** fell to a 10-year low of **3.9%** in March 2023, the Reserve Bank of India (RBI) said in its financial stability report (FSR).

FSB Report detailing on Bad Loans

- The **net non-performing assets (NNPA)** ratio dropped to **1.0 from 6% in 2018.**

Gross Non-Performing Asset is the total value of loans in a bank's portfolio that have been classified as non-performing according to the RBI guidelines (Loans not paid for 90 days).

Gross NPA= Sum of all Non-Performing Loans.

Gross NPA Ratio = Total Gross NPA/Total Loans given

Net Non-Performing Asset shows the **value** of NPAs after the bank makes **specific provisions** for it.

Provision refers to assets held by banks as security upfront, allowing them to sell these assets in case of bad loans or non-performing assets (NPAs).

It is arrived at by subtracting the doubtful and unpaid assets from the gross NPA. **Net Non-Performing Asset = Gross NPA – Provisions**

Net NPA Ratio = Net NPA/Total Loans Given

- As per the stress test results, the gross non-performing assets (GNPA) ratio of all SCBs may improve to 3.6 per cent by March 2024.
  - Stress tests assess the resilience of banks' balance sheets to unforeseen shocks emanating from the macroeconomic environment.
  - Using the stress tests, the RBI projects impairment or bad loans and capital ratios over a one-year horizon under a baseline and two adverse scenarios, medium and severe.
- **Return on Assets (RoA)** climbi ng to **1.1%** in 2023, up from a negative 0.2% in 2018.
  - RoA is calculated by dividing the **net income of a bank by its total assets.** An RoA of >=1% is **generally considered good.**
  - This positive shift has contributed to the **Capital to Risk-Weighted Assets Ratio (CRAR)** hitting a record peak, as urban cooperative banks CRAR rose to 16.5%, NBFCs at 27.5% and scheduled commercial banks at 17.1%. CRAR measures the bank's **exposure to riskier loans.**
- **Retail loans,** which form around **one-third** of the total banking system's **gross loans** and advances, grew at a **CAGR of 24.8 %.**
- India's **credit-to-GDP gap** remains **negative** since March 2013, reflecting still muted credit absorption in India relative to advanced and emerging market peers.

Chart 1 | *The chart shows the gross non-performing assets (GNPAs) and Net non-performing assets (NNPAs) in Indian banks.*

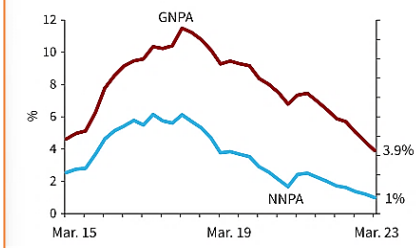
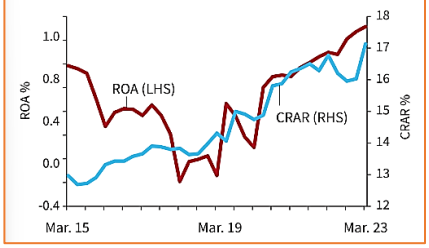


Chart 2 | *The chart shows the Return on Assets (RoA) and the Capital to Risk-Weighted Assets Ratio (CRAR). RoA is calculated by dividing the net income of a bank by its total assets.*



- **Financial Stability Report:** Published **biannually by RBI**, the FSB report reflects the collective assessment of the Sub-Committee of the **Financial Stability and Development Council** (**FSDC**) on risks to financial stability and the resilience of the Indian financial system.
- **NPA:** They are bad loans which the borrower is not in a position to repay and is overdue for **over 90 days.**
- **Stressed assets:** It refers to assets held by banks and financial institutions that are **unable to be quickly converted into cash** to reclaim the funds provided to the borrower.

INSTANT SETTLEMENT

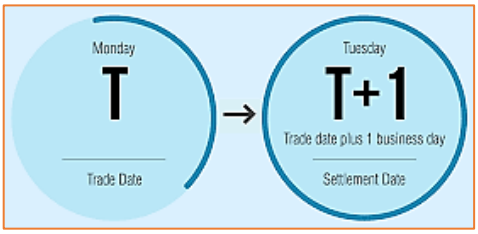
In News: SEBI is working on **real-time settlement of transactions** in India's stock exchanges.

Trade settlement

- 'Settlement' is a **two-way process:** involves the **transfer of funds and securities** on the settlement date.
- Presently, there is a **lag between trade and settlement,** and settlement date is different from the trade date.
- A trade settlement is said to be complete once purchased securities of a listed company are delivered to the buyer, and the seller gets the money.

Current Scenario

- The current cycle of **'T+1' in India** means trade-related settlements happen **within a day**, or within 24 hours of the actual transaction.
- India became the **second country** to start the T+1 settlement cycle in top listed securities **after China.**
- **Benefits of T+1 settlement: operational efficiency, faster fund remittances, share delivery, and ease** for stock market participants.



SEBI's announcement

- SEBI is planning for "instantaneous" settlement of trades in the securities market i.e **'T+0' settlement.**
- Under the current **T+1 settlement cycle**, if an investor sells securities, the money gets credited into her account the following day.
- Under the **T+0 settlement cycle**, if investors sell shares, they will get the money in their account **instantaneously,** and the buyers will get the shares in their demat accounts the same day.

- SEBI approved **ASBA (Application Supported by Blocked Amount)** like framework for trading in the secondary market to **protect investors' money** which is with stockbrokers, and to **enhance transparency.**
- ASBA is a process developed by SEBI to apply for **IPOs, Rights and Debts Issue, FPS** and more. It entails that the amount to be paid for subscribing the shares does **not get debited** from the investor's account **until the shares have been allotted** by the company.
- The investor needs to be an Indian resident to avail ASBA.

Demat Account: The Demat stands for a **Dematerialised Account**. Demat is a form of an **online portfolio** that holds a customer's shares, bonds, government securities, mutual funds, insurance and ETFs. It has **negated** the necessity of holding and trading **physical share certificates**. It was **first** introduced in India in **1996 for NSE transactions.**

SEBI DELISTING NORMS

In News: SEBI is reviewing delisting regulations as the capital markets regulator may allow companies to **delist shares** at a fixed price, as against the **current 'reverse book-building' process.**

- **Delisting of Securities**: It means **removing the securities** of a listed company from a stock exchange. Once delisted, the securities of that company can **no longer be traded** on the stock exchange.
- Delisting can be **either voluntary or compulsory:**
  - **Voluntary**: Company decides on its own
  - **Compulsory:** Removed as a **penal measure**
- In **voluntary delisting**, the company needs to buy back **90% of the issued shares.**
- **Reverse book-building process:**
  - Process used for **price discovery**
  - Offers are collected from shareholders at various prices, which are above or equal to the **floor price**, establishing the buyback price after the offer period.
- **Issue related to Reverse book-building: Price manipulation** concerns arise during delisting, as certain entities accumulate shares to exploit potentially elevated delisting prices, resulting in **unfair practices.**
- **Benefit of Fixed Price Method:** It may establish a consistent and **predictable pricing** policy, and avoid the risks and costs of frequent price changes.

CONFERENCE TOURISM

In News: Recently, PM Modi inaugurated **India's largest MICE destination, 'Bharat Mandapam'**, in New Delhi, to promote conference tourism.

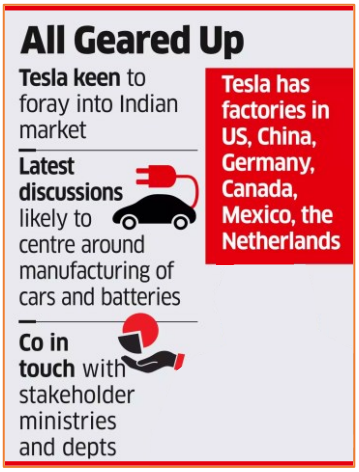
- **MICE** stands for "**Meetings, Incentives, Conferences and Exhibitions**".
  - It is a version of **business tourism** that draws **domestic and international tourists to a destination.**
- Indian MICE industry has less than **1% share** in the estimated **global MICE business** despite the **natural & cultural advantages of India** and being one of the highest growing economies.
- **Gujarat** government's recent tourism policy for 2021-25 seeks to make the state a **hub of "MICE" tourism.**
- The Gujarat policy is promoting the following tourist attractions:
  - **Statue of Unity**: the world's tallest statue
  - **Gir:** only home of the Asiatic lion
  - **Girnar ropeway:** Asia's longest
  - **Ahmedabad**: first UNESCO World Heritage City in India
  - **Lothal**: earliest known dock in the world, and India's first port city
  - **Dholavira:** a showcase of the urban civilisation of the Indus Valley
  - **Shivrajpur:** one of India's 'Blue Flag' beaches
  - India's **first seaplane** service from the Sabarmati Riverfront in Ahmedabad to the Statue of Unity in Kevadia.

TESLA

In News: After multiple twists and turns, Tesla Inc. has renewed active discussions with the Indian government for the possible **setting up of a car factory** in the country.

- In India, **import duties** on completely built units are currently around **100%, above $40,000, and a 70% import tax on those below $40,000.**

- Establishing a **manufacturing unit of Tesla in India** will reduce the cost of its EVs and solve logistics issues.
- Tesla plans to invest more than $1 billion on its **Project Dojo (autonomous-driving software)**, an in-house supercomputing project , by the end of 2024.
- Tesla plans to sell **20 million EVs a year** in 2030 from about 1.3 million currently.
- **India's EV goals:**
  - Government aims EV penetration to hit **40%** for buses, **30%** for private cars, **70%** for commercial vehicles, and **80%** for two-wheelers by 2030.
- **India's Car market:**
  - India is the world's **third largest** car market, with the auto sector contributing **6% to**
  - **India's GDP** and **35%** of the manufacturing GDP.
  - The Indian EV market is expected to grow at a **CAGR of 49%** between 2022-2030.



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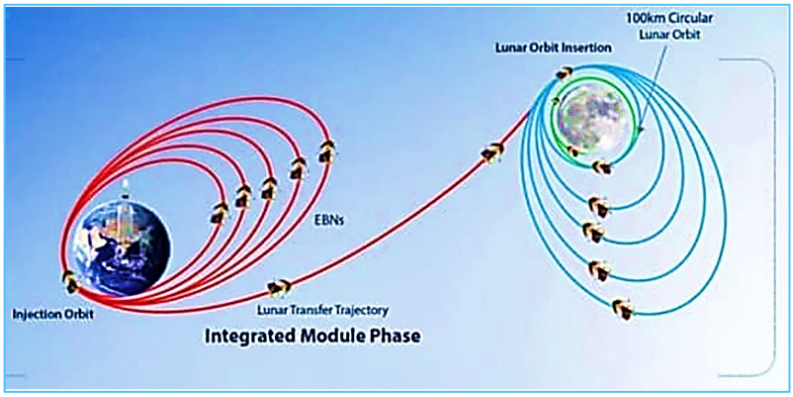
SCIENCE AND TECHNOLOGY

CHANDRAYAAN-3 MISSION

Introduction

- The image on the right side shows the preparation underway for the launch of **Chandrayaan-3 mission**, at Satish Dhawan Space Center at Sriharikota in southern Andhra Pradesh.
- India bids to become only the fourth country to execute a controlled landing on the moon with this launch.
- With Chandrayaan-3 (meaning moon vehicle), it is India's second attempt at a soft landing, after its previous effort with the **Chandrayaan-2** in 2019 failed. The first lunar probe, the **Chandrayaan-1**, orbited the moon in 2008.
- Developed by the Indian Space Research Organization (ISRO), Chandrayaan-3 is comprised of a **lander, propulsion module and rover**.
- Its aim is to **safely land** on the lunar surface, **collect data** and conduct a series of **scientific experiments** to learn more about the moon's composition.
- Only three other countries have achieved the complicated feat of soft-landing a spacecraft on the moon's surface – the **United States, Russia and China**.
- India's maiden lunar mission, Chandrayaan-1, **discovered water molecules** on the moon's surface. Eleven years later, the Chandrayaan-2 successfully entered lunar orbit but its **rover crash-landed** on the moon's surface. It was supposed to explore the moon's South Pole.
- Since the launch of first rocket in **1963**, India's space program is an epitome of the country's **rising prominence** on the global stage.
- In 2014, India became the **first Asian nation** to reach Mars, when it put the **Mangalyaan probe** into orbit around the Red Planet, for **$74 million** – less than the $100 million Hollywood spent making space thriller movie "Gravity."
- Three years later, India launched a **record 104 satellites** in one mission. In 2019, PM Modi announced in a rare televised address that India had shot down one of its own satellites, in what it claimed was an **anti-satellite test,** making it one of only four countries to do so.
- That same year ISRO's former chairman Kailasavadivoo Sivan said that India was planning to set up an **independent space station by 2030**.
- Currently, the only space stations available for expedition crews are the **International Space Station** (a joint project between several countries) and **China's Tiangong Space Station**. India's space ambitions do not stop at the moon or Mars. ISRO has also proposed sending an **orbiter to Venus**.
- With its rapid progress and innovation, space technology has become a lucrative and prominent sector in India, drawing the eyes of the world leaders.



Chandrayaan-3 Mission: The **Chandrayaan-3 spacecraft** took off from **the Satish Dhawan Space Centre** in **Sriharikota** on 14 July, 2023. The moon mission is scheduled to reach the **Moon's South Pole for a soft landing** on the lunar surface **with a lander and rover by** 23rd/24th August, 2023**.**

- The present updated status by Indian Space Research Organisation (ISRO) indicates that Chandrayaan-3 has **successfully completed the fourth orbit-raising manoeuvre** around the Earth. **The Earth-bound perigee**

firing from ISTRAC in Bengaluru was used to complete this critical milestone in India's lunar programme. The accomplishment pushes Chandrayaan-3 closer to its ultimate goal, the Moon.

- The **final and fifth orbit-raising manoeuvre** is expected to attain an **orbit of 1,27,609 km x 236 km.**

What is Chandrayaan 3 mission?

- Chandrayaan-3 marks **India's third lunar mission** and represents their second endeavour to achieve a soft landing on the moon's surface. The Chandrayaan-3 is built on a **budget of around Rs 615 crore.**
- The mission comprises **an indigenous Lander module (LM/Vikram), a Propulsion module (PM) and a Rover (Pragyan),** with the **primary aim of developing and showcasing innovative technologies essential for future interplanetary missions.** It's noteworthy that the landing site for Chandrayaan-3 will be located **near the south pole** of the Moon **at approximately 70 degrees latitude,** which is the same region targeted in the Chandrayaan-2 mission.
- The Propulsion Module's primary role is to transport the Lander Module from the **launch vehicle injection orbit** to the point of **lander separation**.

The objective of the mission

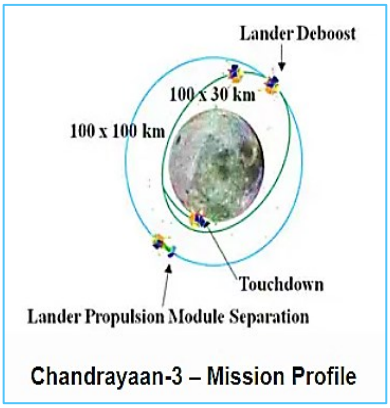
- **To showcase a secure and soft landing on the lunar surface:** A successful landing will solidify India's position as one of the top countries capable of achieving this extraordinary feat.
- **Demonstrate rover mobility on the moon**: Chandrayaan-3 plans to land a rover on the moon's surface, allowing it to travel and explore previously unknown locations.
- **Perform in-situ scientific experiments:** The mission's purpose is to conduct a series of **real-time scientific experiments** on the moon. These investigations will look into the **composition of the lunar surface, the distribution of minerals, and the moon's thin exosphere.** Such scientific initiatives are crucial to **understanding the geological evolution of the moon** and may reveal insights into the **early history of our solar system**.

Why do we want to go to the moon?

- The **Moon is the nearest cosmic body to Earth** and offers an excellent opportunity for space exploration and documentation. It was considered **a promising testing ground for showcasing technologies needed for future deep-space missions.**
- Additionally, the mission aimed **to accelerate technological advancements, foster international collaborations, and inspire the next generation of explorers and scientists**.

But why land near the south pole?

- The polar regions of the Moon have been **largely unexplored due to their rugged environment.** However, evidence from various orbiter missions suggests that **these areas hold great potential for exciting discoveries.**
- There are indications of significant amounts of ice molecules in deep craters, and India's Chandrayaan-1 mission in 2008 confirmed **the presence of water on the lunar surface** using its onboard instruments.
- The **extreme cold temperatures in these regions have preserved materials in a frozen state,** providing valuable insights into the early Solar System. Exploring the rocks and soil in the Moon's north and south poles could unlock **important clues about our cosmic origins.**



Chandrayaan-3 – Mission Profile

The issue with the landing of the spacecraft on Lunar's south pole

- All previous moon landings, including **China's Chang'e 4** on the far side, have been **concentrated in the equatorial region** for the reason that **the equatorial zone offers a safer and more hospitable environment** for landing and operating instruments. The terrain is even and smooth with fewer steep slopes, hills, or craters, making it conducive for sustained operations.
- **Abundant sunlight ensures a regular energy supply for solar-powered instruments**. In contrast, the polar regions present a challenging terrain with **dark areas devoid of sunlight and extremely low temperatures**. This makes instrument operation difficult, and the presence of large craters adds to the complexities.

What is a launch window, and why is it so precise?

- **A launch window** is a specific period within which a mission must be launched. It is crucially precise because if a spacecraft intends to get close to another spacecraft, a planet, or a specific point in space, their **orbits must be carefully timed to overlap in the future**. This ensures that they can reach their intended destination efficiently.

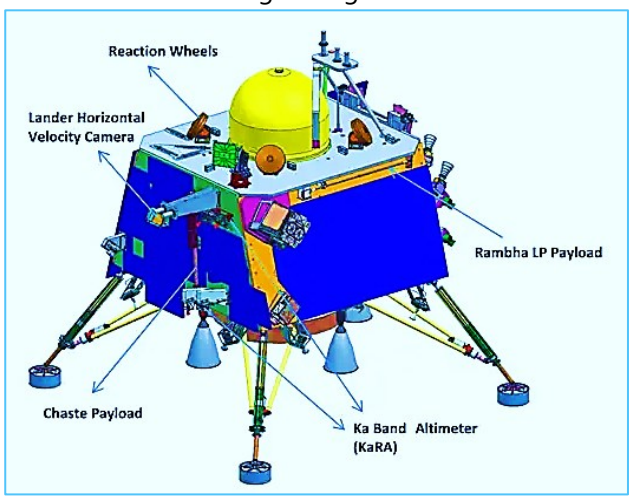
- **Spacecraft cannot follow straight-line paths in space due to the movements of planets and other celestial bodies**. Their orbits are **curved and constantly changing**, so calculations are necessary to determine the most efficient path for a spacecraft to reach its destination while conserving fuel.
- If there are **adverse weather conditions or malfunctions** during a launch window, the mission must be postponed until the next appropriate launch window that aligns with the flight requirements.

Why will it take so many days for the lander to reach the moon?

- The **Chandrayaan-3 mission** is scheduled to take **approximately 42 days**, with the planned lunar landing on August 23 at the **lunar dawn**. The spacecraft will be launched using the **Launch Vehicle Mark-III (LVM-III)** and will gradually increase its orbit around Earth to escape its gravity and head towards the Moon. Upon approaching the Moon, it will be **captured by lunar gravity** and undergo a series of **manoeuvres to achieve a circular orbit at 100×100 km.**
- The spacecraft consists of a lander carrying a rover inside it, and both have a mission life of **one Lunar day**, which lasts for about **14 Earth days**. To **avoid extreme temperature drops during the lunar nights**, they are planned to land at dawn.
- This mission aims to explore the polar regions of the Moon, where evidence of water and interesting materials has been found, and scientific investigations will be conducted during the Lunar Day period.

Significance of the Payloads

- Chandrayaan-3 carries 8 payloads. One of them is called **SHAPE (Spectro-polarimetry of HAbitable Planet Earth). SHAPE is an experimental instrument** designed to study Earth's spectro-polarimetric signatures in the near-infrared wavelength range from lunar orbit.



Spectro-polarimetry is a technique which involves the polarisation of light by **splitting the incoming light** into its constituent colours, and then analysing the polarisation of each colour individually. Understanding the spectro-polarimetric signatures of Earth can help scientists analyse the reflected light from exoplanets and determine whether they would **qualify for habitability.**

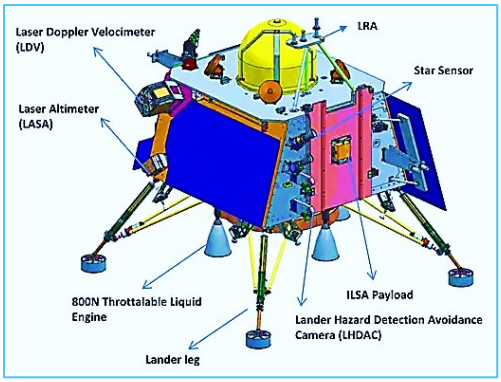
- Besides the SHAPE payload, it contains payloads such **as RAMBHA-LP (**Radio Anatomy of Moon Bound Hypersensitive ionosphere and Atmosphere- Langmuir Probe**)**, which is **tasked with measuring the density of near-surface plasma ions and electrons** as well as monitoring any oscillations in their levels.
- The lander module houses two critical payloads: **ChaSTE (**Chandra's Surface Thermo Physical Experiment), which measures the **thermal properties of the lunar surface in the near-polar region,** and **ILSA (Instrument for Lunar Seismic Activity),** which **detects and analyses seismic activity** around the landing site**,** providing information about the **structure of the lunar crust and mantle.**
- An **Alpha Particle X-ray Spectrometer (APXS) and a Laser Induced Breakdown Spectroscope (LIBS)** will be aboard the Pragyan rover **to explore the local surface elemental composition.**

Upgradations in Chandrayaan 3

During the **Chandrayaan-2 mission**, the lander and rover crash-landed on the Moon due to **the lander's engines generating slightly higher thrust than expected.** This caused instability during the descent, leading to errors and a **higher velocity impact** upon landing. To ensure a stable landing, Chandrayaan-3 has incorporated various improvements and measures to **control the velocity** during the landing process.

- The **central thruster has been removed**, reducing the number of thrusters from five to four.
- The **legs have been reinforced** to withstand higher landing velocities.
- The legs contain **solar panels** on all four sides, as opposed to only two on the Chandrayaan-2 Lander. This is to ensure that the Lander continues to **draw solar power even if it crashes or flips over**. At least one or two of its sides would constantly be **active and facing the Sun**. These enhancements aim to increase the chances of a successful landing and data collection for Chandrayaan-3.

- Unlike the previous landing spot which was a small patch of **500 m x 500 m,** the landing area has been expanded to a **4km x 2.4km region**, providing more flexibility for a safe landing.



- The Chandrayaan-3 Lander **carries more fuel** than the Chandrayaan-2 Lander. This was done to ensure that the Lander can make a **last-minute modification** to its landing place if necessary. Instead of relying solely on its own pictures during descent, the lander now **utilizes high-resolution images from the Chandrayaan-2 orbiter** to confirm its correct location.
- **Additional navigation and guidance devices** are on board Chandrayaan-3 to continuously monitor and correct the Lander's speed. This features a **Laser Doppler Velocimeter,** which will send laser beams to the lunar surface to calculate the speed of the Lander. **There are also new sensors and cameras.**
- **The hazard recognition and avoidance camera,** along with its processing algorithm, has been upgraded. Multiple layers of redundancy have been added to ensure **backup systems** are in place in case of failure.

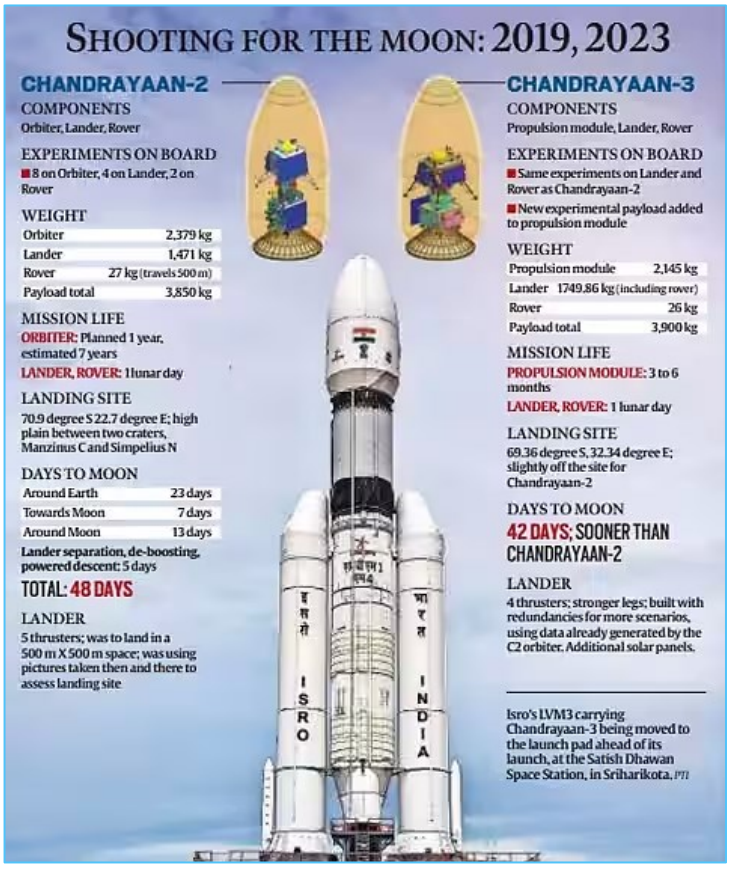
Previous Indian Missions to the Moon

What is Chandrayaan 1 mission?

- India's **Chandrayaan-1 mission**, launched in **2008**, aimed to explore the Moon and achieve specific scientific objectives.
- It sought to create a **comprehensive three-dimensional map of both the near and far sides (face towards and away from the Earth)** of the Moon**, alongside conducting high-resolution chemical and mineralogical mapping** of the entire lunar surface.
- A notable achievement of the mission was the utilization of **indigenous technology.** In November 2008, the **Moon Impact Probe (MIP)** was released from the spacecraft and purposefully crashed into the lunar South Pole. This strategic move led to significant **discoveries related to the presence of water (H2O) and hydroxyl (OH)** on the lunar surface, **with higher concentrations found around the polar region.** Moreover, **Chandrayaan-1's findings confirmed the existence of ice in the North polar area of the Moon**.
- Unfortunately, **the mission encountered a setback when radio contact with the spacecraft was lost on August 29, 2009, after completing over 3,400 orbits around the Moon and being operational for at least 312 days.**
- Despite this, Chandrayaan-1 provided valuable insights into the Moon's characteristics and enhanced India's position in space exploration.

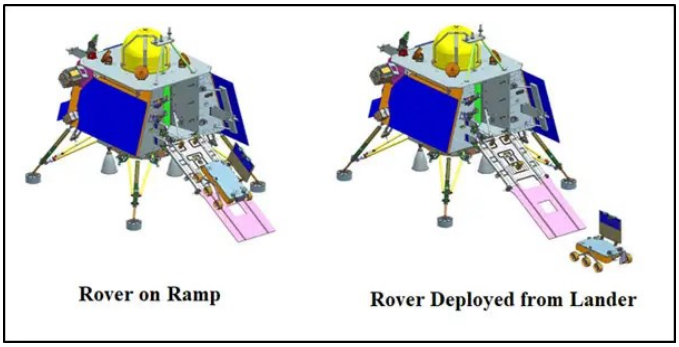
What happened with Chandrayaan-2?

- **Chandrayaan-2, launched in July 2019,** was a mission designed to explore the Moon's south pole and consisted of an **Orbiter, Lander, and Rover.** Unfortunately, the mission experienced **partial success** as the Lander, Vikram, and Rover, Pragyaan, crashed on the Moon's surface during the landing in September 2019.
- **The Lander, Vikram,** faced system errors that resulted in a **higher velocity than expected** during descent, leading to the crash. Despite this setback, the Orbiter functioned well and continued to gather valuable data**. It confirmed the presence of water at all latitudes,** building upon the discovery made by Chandrayaan-1.
- One of the significant instruments on the Orbiter, **the Large Area Soft X-Ray Spectrometer (CLASS),** made a groundbreaking discovery by remotely sensing **minor elements chromium and manganese** for the first time on the Moon. This data collection added to the scientific knowledge about the Moon's composition.



Various Kinds of Moon Mission

- **Flyby missions:** These are missions in which the **spacecraft passes near the Moon without entering lunar orbit.** These missions have a variety of purposes, including studying the Moon from afar or as part of their path to other planetary bodies or deep space research. Early flyby missions include the **United States' Pioneer 3 and 4, as well as the Soviet Union's Luna 3.**
- **Orbiters:** Orbiters are spacecraft built **specifically to enter lunar orbit and perform comprehensive research on the Moon's surface and atmosphere.** One such Orbiter was India's **Chandrayaan-1,** and this strategy has been used by 46 subsequent moon missions from various countries. **Planetary bodies are most commonly studied with orbiters.** Landings, for example, have only been accomplished on the Moon, Mars, and Venus, while all other planetary planets have been investigated by orbiter or flyby missions. The **Chandrayaan-2** mission also contained an orbiter, which is **still operating and continues to orbit** the Moon at a height of about 100 kms.
- **Impact missions:** Impact missions are **extensions of Orbiter missions in which the main spacecraft continues to orbit the Moon while one or more instruments on board land on the lunar surface uncontrollably.** Although these instruments get destroyed upon impact, they still manage to transmit valuable information about the Moon during their journey. The **Moon Impact Probe (MIP) instrument** on **Chandrayaan-1** took a similar method by crash landing on the Moon's surface. The data sent by MIP, according to ISRO, offered additional proof of water existing on the Moon. However, due to calibration issues, these findings could not be reported.
- **Landers:** Landers are missions **that aim to softly land spacecraft on the surface of the Moon. These missions are more difficult to complete than Orbiter missions.** The first 11 attempted lander missions on moon failed. On January 31, 1966, however, the then-USSR conducted **the first successful lunar landing with the Luna 9 spacecraft**, which also sent the first-ever image acquired from the Moon's surface.
- **Rovers:** Rovers **serve as an extension of lander missions,** solving the limits of stationary landers. While landers are **hefty and immovable** after landing, their instruments can view and collect data from a **fixed point without interacting directly** with the Moon's surface. **Rovers are the specialised wheeled payloads** which may detach from the lander and explore the Moon's surface independently, providing crucial information that stationary lander equipment. **In the Chandrayaan 2 and 3 mission, the rover onboard the Vikram lander was named Pragyaan.**


Rover on Ramp

Rover Deployed from Lander

- **Human missions:** Human missions include **the momentous landing of humans on the surface of the Moon. Only NASA** of USA has accomplished this feat to date. Six missions successfully landed twelve men on the lunar surface between 1969 and 1972. However, no additional attempts to land humans on the Moon have been conducted since then. Nonetheless, with **NASA's planned Artemis III mission in 2025**, humans will be able to return to the lunar surface for the first time in nearly 50 years.

GREEN HYDROGEN SUPERPOWER

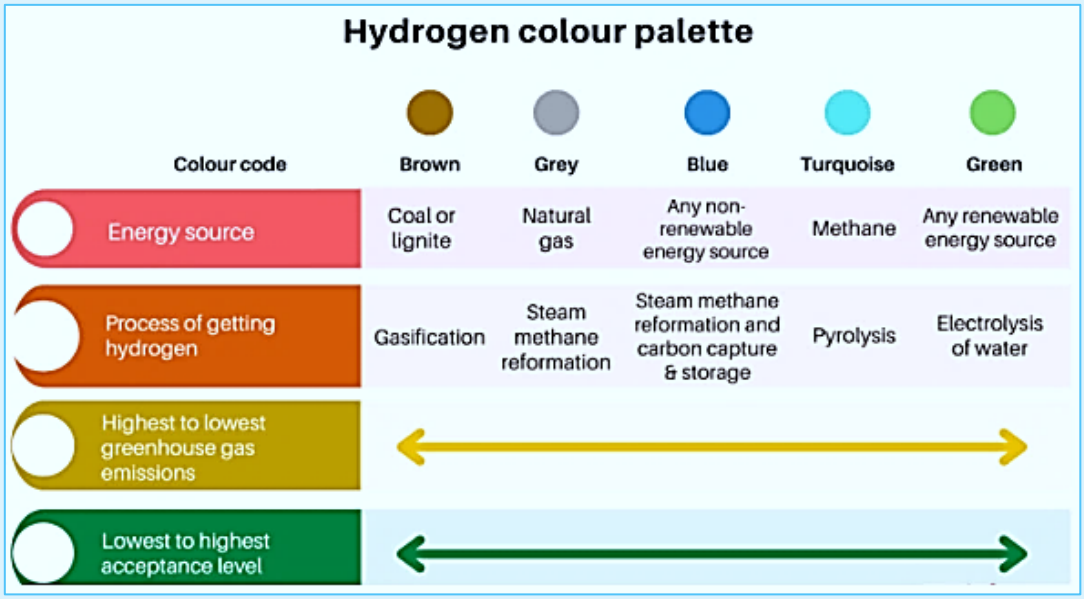
In News: Recently, the **International Energy Agency (IEA)** chief said India should not miss the opportunity to become a **green hydrogen superpower.**

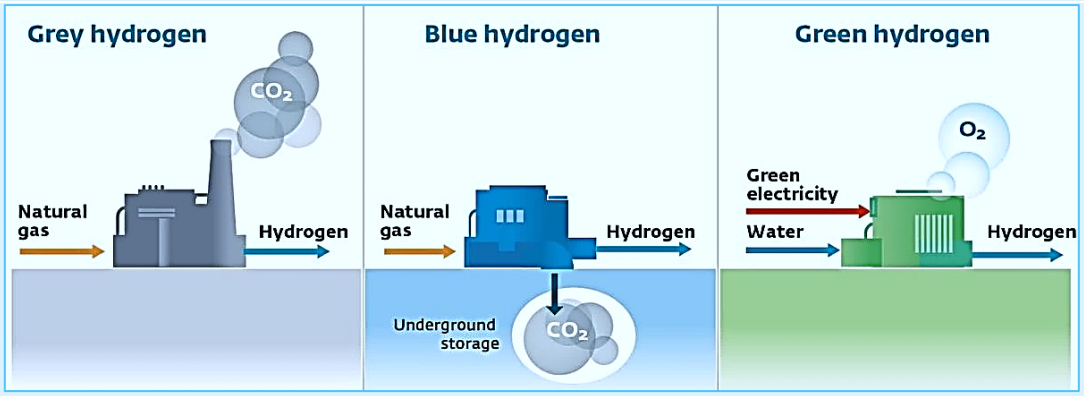
- India has set its sight on becoming **energy independent by 2047, 50% electricity capacity** from **non-fossil sources** by 2030. and achieving **Net Zero by 2070**. To achieve this target, increasing renewable energy use across all economic spheres is central to **India's Energy Transition**.
- The hydrogen produced by **electrolysis** of water using **renewable or green energy** is called as **Green Hydrogen** and is considered a promising alternative for enabling this transition.

- Hydrogen can be utilised for **long-duration storage of renewable energy, heavy and power dependent industry (refinery, fertilizer, steel, etc.), clean transportation (aviation and marine), decentralised power generation** along with **replacement of fossil fuels in industry.**
- With the **cost of renewable power,** particularly solar, having fallen considerably over the past few years, India could use green hydrogen for production of clean energy.

Green Hydrogen

- Green hydrogen is hydrogen gas that is produced by **splitting water molecules using electricity from renewable sources** such as solar, wind, or hydro.
- Green hydrogen holds the promise of fuelling industrial growth while simultaneously reducing industrial emissions





Challenges of green hydrogen production and consumption in India

- **Traditional energy modes:** no production in **commercial** scale, reliance on **grey or blue hydrogen** from fossil fuel.
- **Capital intensive:** high **cost of production**, lack of **infrastructure**, regulatory **barriers**, and low **awareness** and demand, dependence on **govt subsidies**.
- **Safety:** hydrogen is **inflammable and corrosive**, causing issues in transportation and storage.
- Most **investments** in research & **production of scale** focused in advanced economies and China.

Opportunities for green hydrogen for India

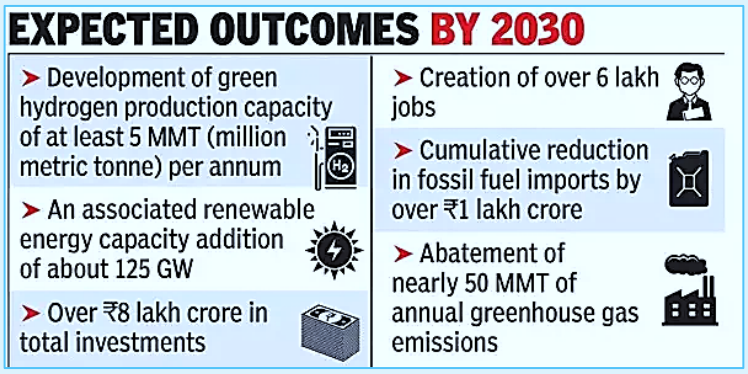
- Achieve **nationally determined contributions** and climate targets.
- Enhance energy security and **self-reliance**: reduction in import bill.
- Enable **grid integration** with higher shares of variable renewable energy
- Provide **long-duration storage** and flexibility solutions.
- Create **new opportunities** for economic growth, employment, innovation, and **exports** in various sectors such as steel, chemicals, cement, mobility, power, etc.

Initiatives and policies by the Government

- Union Budget 2023 has allocated **₹19,700 crore** for the **National Green Hydrogen Mission.**
- **Production Linked Incentive (PLI) schemes for Green Hydrogen production and Electrolyser manufacturing** by **Ministry of New & Renewable Energy (MNRE)** under the flagship **Strategic Interventions for Green Hydrogen Transition (SIGHT) programme**.
- Setting up separate **manufacturing zones, green hydrogen hubs** and waiving **inter-state transmission charges** for green hydrogen and ammonia producers.
- Facilitating public-private partnership framework for R&D under the **Strategic Hydrogen Innovation Partnership (SHIP) Programme**
- Supporting **single window** clearance for industry set up/pilot projects with **goal oriented and time bound** projects.

National Green Hydrogen Mission

- To make India a leading **producer and supplier of green hydrogen** in the world and to reduce its dependence on imported fossil fuels and feedstock.
- Facilitate **indigenous manufacturing**, reduce **import dependence** and create **export opportunities** around green hydrogen energy ecosystem.
- The Mission has four main components: **Strategic Interventions for Green Hydrogen Transition (SIGHT) programme, pilot projects, R&D projects,** and **skill development.**



Private sector efforts

- Reliance Industries Ltd. has announced plans to build an integrated green hydrogen-giga factory with an investment of $10 billion over the next three years.
- Adani Group has announced plans to produce 1.3 GW of green hydrogen by 2025-26, and to set up a green ammonia plant in Mundra with an investment of $2.5 billion.
- Tata Group has announced plans to invest $15 billion over the next decade in renewable energy and green hydrogen projects.
- NTPC Ltd. has announced plans to set up India's first green hydrogen mobility project in Ladakh with an investment of $200 million.
- India's target of producing **5 million tonnes of green hydrogen per annum by 2030** is half of that of the EU, comparable to that of China under its Hydrogen Energy Industry Development Plan, and higher than that of the US under its Hydrogen Shot initiative.

International Energy Agency (IEA)

- The IEA is an intergovernmental organisation that provides policy advice and analysis on energy issues, including climate change and clean energy transitions.
- Formed in the year 1974 and earlier a representative of OECD/ advanced countries, the IEA family presently represents over 80% of global energy consumption with new associate membership.

Need of the hour

- **Create domestic demand:** through mandated procurement (renewable purchase obligation), blending mandates (with natural gas), etc.
- **R&D:** in high value critical components like electrolyzer.
- **Initiate resilient bilateral supply chain:** through demands in Japan, Germany, etc.
- **Launch international rules on green hydrogen transactions:** through G20 leadership.

Conclusion

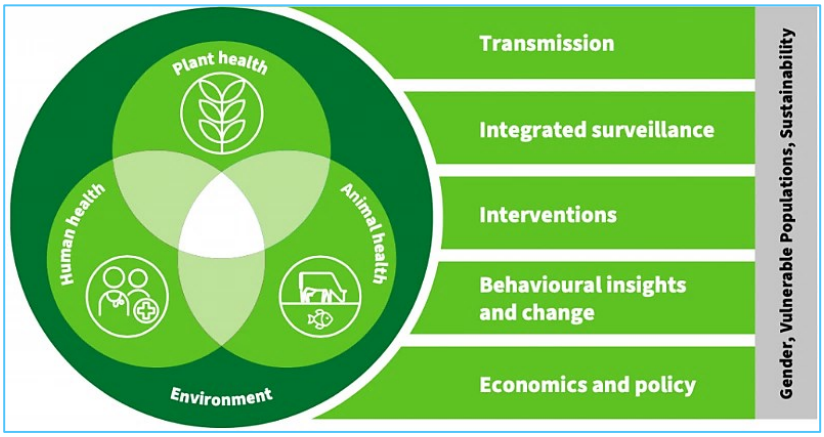
- Green hydrogen is crucial for **India's transition to clean energy** and its goal of becoming a green hydrogen superpower. The **National Green Hydrogen Mission** sets ambitious targets and policies to increase the production and use of green hydrogen in various sectors.
- India can leverage its strengths such as **low-cost renewable energy, large domestic market, strong manufacturing base**, and strategic partnerships to become a global leader in green hydrogen production and export and seize the benefits of green hydrogen for its **energy security, economic growth, and climate action.**

ANTIMICROBIAL RESISTANCE

In News: Four multilateral agencies United Nations (UN) Food and Agriculture Organization (FAO), UN Environment Programme (UNEP), the World Health Organization (WHO) and the World Organisation for Animal Health (WOAH) have launched **priority research agenda** to better advocate for increased research and investment in **antimicrobial resistance (AMR).**

- It aims to guide a variety of stakeholders in generating **new evidence to address antimicrobial resistance**, with a focus on low- and middle-income countries (LMICs).

  Photo : One Health Priority Research Agenda on Antimicrobial Resistance
- It will serve as a guide for countries, research institutes and funding bodies to support One Health AMR research and allow policymakers, researchers, and the multidisciplinary scientific community to collaborate across sectors.
- Using a mixed-methods approach, global experts identified **five key pillars** as well as **three cross-cutting themes**, namely **gender, vulnerable populations, and sustainability**.
  - **Transmission:** How AMR moves across different sectors and what causes it.
  - **Integrated surveillance:** How to monitor and share data on AMR among One Health stakeholders, especially in LMICs.
  - **Interventions:** How to prevent or reduce AMR using vaccines and other measures.
  - **Behavioural insights and change:** How to understand and influence human behaviour related to AMR at the One Health interface.
  - **Economics and policy:** How to invest and act on AMR prevention and control, considering costs, benefits, and long-term effects.

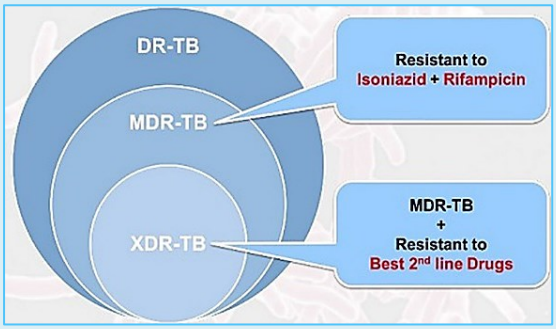


One Health

- An **integrated, unifying approach** that aims to sustainably balance and optimise the health of **people, animals and ecosystems**.
- It acknowledges the health of humans, domestic and wild animals, plants, and the larger environment, including ecosystems, are **inextricably linked and interdependent.**
- Some 60% of emerging infectious diseases that are reported globally come from animals, both wild and domestic. Over 30 **new human pathogens** have been detected in the last 3 decades, **75% of which have originated in animals**.
- **Human activities and stressed ecosystems** have created new opportunities for diseases to emerge and spread.
- These stressors include **animal trade**, agriculture, livestock farming, urbanization, extractive industries, **climate change**, habitat fragmentation and **encroachment** into wild areas.

Antimicrobial Resistance (AMR)

- The **ability** of microorganisms, such as bacteria, viruses & fungi **to resist the effects of antimicrobial drugs** that were previously effective in treating infections.
- Occurs due to **overuse, misuse of antibiotics & other antimicrobial drugs**, also due to **natural ability** of microorganisms to evolve & adapt.
- Can cause longer **illness duration, higher healthcare costs and increased mortality** rates.



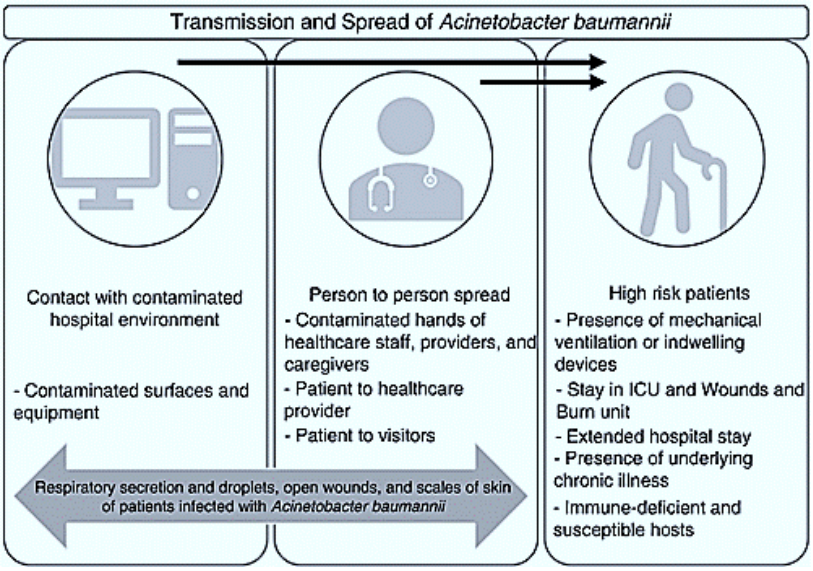
- WHO has declared that AMR is one of the top **10 global public health threats** facing humanity and it released the Global Antimicrobial Resistance and Use Surveillance Report (GLASS).

- **Multidrug resistant tuberculosis** (MDR-TB): A strain of tuberculosis bacteria that is resistant to multiple drugs used to treat the disease.
- Can lead to "**superbugs**" that are difficult or even impossible to treat with existing drugs.

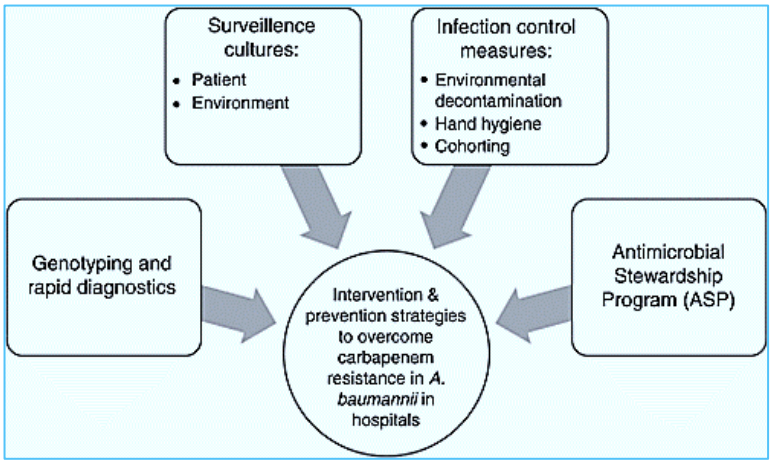
- **Policy initiatives: National action plan on AMR**, **Red Line Campaign** to discourage the over the counter sale of antibiotics, **without prescription**.

ACINETOBACTER BAUMANNII

In News: The researchers of the Indian Institute of Science Education and Research (IISER) in Pune, and Council of Scientific & Industrial Research-Central Drug Research Institute (CSIR-CDRI), Lucknow discovered a new **antibiotic** that can treat infections caused by **Acinetobacter baumannii**, a bacterium that frequently causes **hospital-acquired infections (HAI).**



- The discovery of novel antibiotics targeting **multidrug-resistant (MDR) pathogens A. baumannii,** top on the **critical priority pathogen list released by the WHO**, has proven effective to treat such pathogens.
- **Acinetobacter baumannii** is gram-negative bacterium that is widely found in the environment, such as **soil and water**, it is an opportunistic pathogen in humans, affecting people with **compromised immune systems,** especially in hospitals.
- It causes a **range of infections** including pneumonia, meningitis, wound and surgical site infections, and urinary tract infections.
- It is extremely challenging to treat, with outbreaks especially common among critically ill and immunocompromised population, and is compounded by rampant **multidrug resistance (MDR)** with rapidly declining treatment options.



- Multidrug-resistant Acinetobacter baumannii (MDR-AB) is an important cause of HAI.

Antimicrobial Resistance (AMR)

- AMR is the ability of microorganisms, such as bacteria, viruses, fungi, and parasites, **to resist the effects of drugs** that are used to treat them.
- AMR is a **global health problem** rendering the current arsenal of **antibiotics ineffective** in treating infections caused by drug-resistant pathogens, thus leading to increased death and disability worldwide. It is projected that treating even routine infections will become challenging in the coming decades.
- The most common and serious **MDR pathogens** have been encompassed within the acronym "**ESKAPE**," standing for Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa and Enterobacter spp.
- AMR is driven by various factors, such as **misuse and overuse of antibiotics, lack of infection prevention and control measures, poor sanitation and hygiene, and inadequate surveillance and regulation of antimicrobial use and quality**.

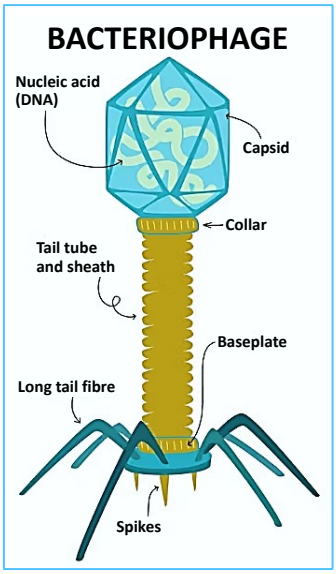
- Antimicrobial resistance (AMR) is a **silent pandemic** that poses a complex global public health problem.
- The WHO has acknowledged the **severity of the issue** and called for a multipronged strategy to address the AMR challenge.
- The World Health Organization (WHO) published a list of **antibiotic-resistant "priority pathogens"** in 2017, a catalogue of 12 families of bacteria that pose the greatest threat to human health.

Hospital-Acquired Infections (HAIs)

- Hospital-acquired infections (HAIs) are infections that **patients contract while receiving medical treatment** in a healthcare facility.
- HAIs can be caused by various factors, such as **exposure to infectious agents, use of invasive medical devices, and compromised immune systems**.
- Patients with severe **burn injuries**, **serious wounds**, or infectious diseases like pneumonia are particularly vulnerable to HAIs.
- According to a report, about **1 in 10 people admitted** to a hospital contract a hospital-acquired infection. HAIs can lead to increased **morbidity, mortality, and treatment costs**, as well as **prolonged hospital stays** and reduced quality of life.
- There are **limitations** when it comes to treating HAIs, as they often involve multidrug-resistant pathogens that are difficult to eradicate.
- Efforts to prevent and control HAIs involve implementing **evidence-based infection prevention and control practices**, **hygiene** and effective AMR stewardship.

PHAGE THERAPY

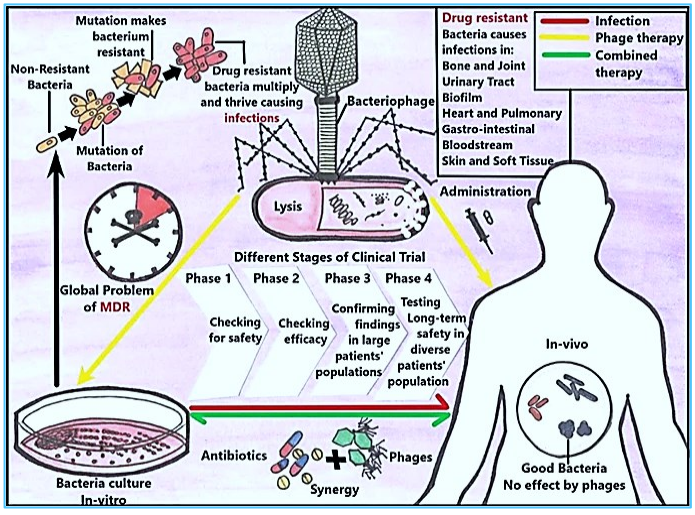
In News: Bacteriophage or phage therapy may be poised to become an important treatment option to **fight bacterial infection** caused by **antibiotic-resistant bacteria, or superbugs** thus combating **Antimicrobial Resistance (AMR).**



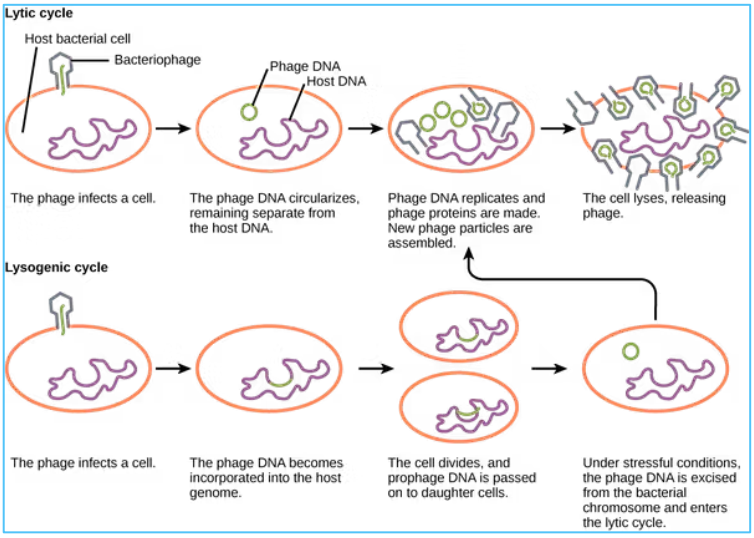
- Bacteriophage has been used as a treatment for **multidrug-resistant pathogens** such as **Acinetobacter baumannii** and **Pseudomonas aeruginosa,** which are associated with **Hospital-Acquired Infections** (HAI).
- Clinical trials are underway to evaluate the efficacy and safety of **bacteriophage therapy** for various bacterial infections.
- The rise in **multi-drug resistant bacteria** and the inability to develop **novel antibacterial agents** pushes the researchers to develop **alternative modes of therapy.**

What is bacteriophage?

- Bacteriophage is a virus that **infects and replicates within bacteria**.
- The word bacteriophage literally means **'bacteria eater',** because bacteriophages destroy their host cells.
- It was discovered by Félix d'Hérelle in the early 20th century.
- Bacteriophage is **host specific** and only affects its **target bacteria**, unlike broad-spectrum antibiotics.
- It injects its DNA into the bacteria, hijacking and destroying it from within.
- All bacteriophages have a **spider-like appearance** with a head that contains their genetic material and a tail that injects it into the bacteria.
- There are 2 types of phages: **lytic and temperate or lysogenic.**
  - Strictly lytic phages **infect** their host cell and cause it to **burst**, thus killing the bacterium.
  - Temperate or lysogenic phages don't kill their bacterial prey outright. They **integrate their genome** (which may harbour AMR or toxin genes) into the host cell.

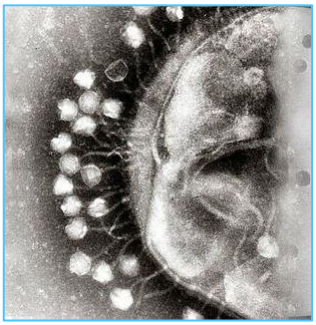


- Phages can be said to be virulent or temperate depending on their development cycles: lytic (destruction of the bacterial cell by the phage) or lysogenic (insertion of the genetic material of the phage into the bacterial DNA, which then gives the bacterium immunity to infection by an identical phage). In the context of **therapeutic use**, **only virulent phages**, i.e. phages that can only perform lytic cycles, are therefore relevant.
- Bacteriophage has been used as a treatment option in **Eastern medicine**. However, it was largely **forgotten by western medicine** due to the development of **antibiotics**.



- Phages are found in large numbers in the environment, including in soil, water, and the human body. They play an important role in **regulating bacterial populations** and maintaining balance in ecosystems.

How does bacteriophage work?



- The phage **attaches** to the surface of the bacteria and **injects its genetic material** into the cell.
- The phage DNA then takes over the **bacterial cell's machinery**, using it to **produce more phages**. Once the new phages are produced, they **burst out** of the bacterial cell, killing it in the process. This process is known as the **lytic cycle.**

How is bacteriophage different from antibiotics?

- Phages are **very specific** and only affect their target bacteria, unlike broad-spectrum antibiotics which can kill a **wide range of bacteria**, including **beneficial ones.**
- Phage therapy has the potential to be **more targeted** and have **fewer side effects** than antibiotic treatment.
- Phages are **self-replicating**, meaning that they can continue to kill bacteria even after the initial dose has been administered. Antibiotics, on the other hand, need to be taken in **multiple doses** to be effective.
- While antibiotics are **chemical substances**, phages are **strict parasites** of bacteria, biological entities that have complex and co-evolving relationships with them.
- Phage therapy offers many opportunities, such as **combating superbugs** that are resistant to antibiotics, enhancing the effectiveness of existing antibiotics, and reducing the environmental impact of antibiotic use.
- Phage therapy has already shown promising results in some cases, such as a patient who recovered from a life-threatening infection with Pseudomonas aeruginosa after receiving phages and antibiotics together.

Antimicrobial Resistance (AMR): It is the ability of microorganisms to resist the effects of antimicrobial agents.

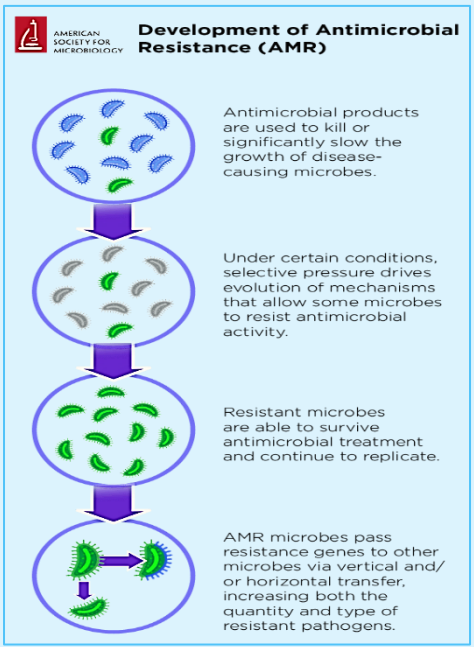
Key Causes of AMR:

- Over-prescription of antimicrobials
- Shortened courses or incomplete compliance with antimicrobial treatment
- Antimicrobial overuse in livestock and fish farming
- Poor infection control in health care settings
- Poor hygiene and sanitation
- Limited discovery of new antimicrobials

Antibiotics: Drugs that kill or inhibit the growth of bacteria.

Bacteriophage: A virus that infects and kills bacteria.

Lytic cycle: The process by which a bacteriophage replicates inside a bacterial cell and causes it to burst.



Conclusion

- Bacteriophage therapy is an **emerging alternative to antibiotics** for treating bacterial infections, especially those caused by **multidrug-resistant pathogens**. It has several advantages over antibiotics, such as **specificity, self-replication and low toxicity**.
- Bacteriophage therapy is **still under development** and requires more clinical trials and regulatory approval before it can be widely used.

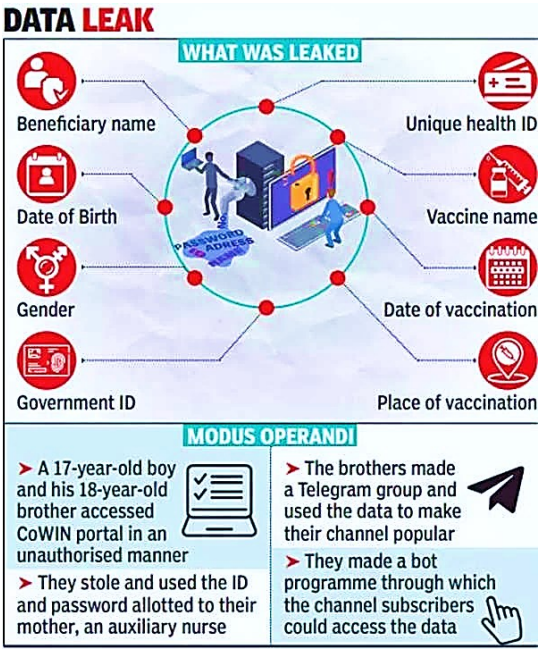
GLOBAL VACCINE RESEARCH COLLABORATIVE

In News: The Indian government is collaborating with two global non-profits, Program for Appropriate Technology in Health (PATH) and Coalition for Epidemic Preparedness Innovations (CEPI), to **propose a Global Vaccine Research Collaborative.**

- The collaboration aims to convene and build **consensus among G-20 member States** and special invitee countries for **equitable vaccine development and access**.
- It seeks to address the **acute vaccine inequity** highlighted by the COVID-19 pandemic, where some countries received vaccines 18 months after others.
- The initiative will **optimise resources and avoid duplication** in vaccine research and development.
- Major goals include **bridging gaps in vaccine R&D** before the next pandemic, establishing principles for **better preparedness**, and fostering an enabling environment for vaccine R&D.
- India has taken measures to ensure equitable vaccine access domestically by providing **financial incentives and streamlining regulatory processes** for increased production capacity.
- The government also ensures **vaccine availability in rural areas** by leveraging existing healthcare infrastructure.

COWIN DATA LEAK

In News: Reports emerged that a bot on the messaging platform Telegram was allegedly **returning personal data** of Indian citizens who registered with the **COVID-19 vaccine intelligence network (CoWIN)** portal for vaccination purposes.



- The bot spewed out personal details like **name, Aadhaar and passport numbers** upon entry of phone numbers.
- The Minister of State for Electronics and IT said the **Indian Computer Emergency Response Team (CERT-In),** the **nodal cyber security agency**, had reviewed the alleged breach and has found that the CoWIN portal was **not directly breached.**
- The Ministry of Health press release lays out the **three ways** in which **data** on CoWIN **can be accessed:**
  - **Users can log in** to the portal by receiving a **one-time password (OTP)** on their mobile number.
  - A **vaccinator can access data** of a person, and the CoWIN system tracks and records each time an "authorised" user accesses the system, and
  - **Third party applications** that have been **provided authorised access** of CoWIN APIs can access personal level data of vaccinated people **after OTP authentication.**
- Ministry claims tha t **without an OTP, data cannot be shared** with the Telegram bot.
- Also, CoWIN only collects the year of birth while the **telegram bot shares uncollected information** like date of birth along with the person's address on the platform.

What is a bot?

Bots are **software applications** that perform tasks through **Robotic Process Automation (RPA),** executing instructions quickly and accurately. Bots can handle various tasks, such as **answering FAQs, converting file types, or setting reminders for users.**

Computer Emergency Response Team- India (CERT-In): It is the **national nodal agency** to respond to **computer security incidences**. Operating since 2004, it is a functional organisation of **Ministry of Electronics and Information Technology**, Government of India, with the objective of **securing Indian cyber space**. CERT-In provides incident **prevention and response services** as well as **security quality management** services. Its **objectives** are:

Preventing cyber-attacks against the country's cyber space.

Responding to cyber-attacks and minimizing damage and recovery time reducing national vulnerability to cyber-attacks.

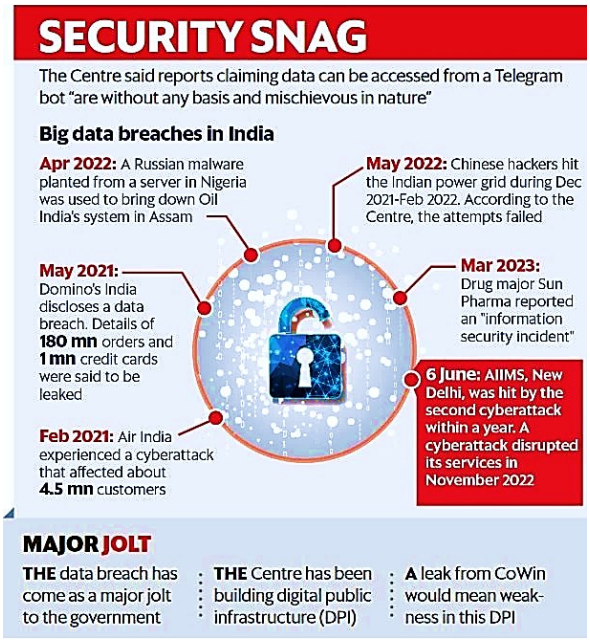
Enhancing **security awareness among common citizens.**

What is CoWIN and how does it work?

- CoWIN, which stands for **COVID-19 Vaccine Intelligence Network**, is a govt-owned, web-based portal, set up in 2021 to administer and manage India's **COVID-19 vaccine rollout**.
- The platform utilizes **existing public digital infrastructure**, including:
  - **Evin (Electronic Vaccine Intelligence Network):** Provides data on **vaccine cold chains** in the country.
  - **DIVOC (Digital Infrastructure for Verifiable Open Credentialing):** Issues **vaccine certificates** with verifiable credentials.
  - **SAFE-VAC (Surveillance and Action for Events Following Vaccination):** Tracks vaccine **adverse events**.
- The platform, on a **real-time basis**, **tracks** vaccines and beneficiaries at the **national, State, and district levels.** It monitors vaccine **utilisation and wastage** and **maintains an inventory** of the vials.
  - For citizens, CoWIN verifies **identity**, helps schedule **vaccine appointments**, and issues a **vaccine certificate.**
- The database captures data from four separate input streams: **citizen registration, health centres, vaccine inventory, and vaccine certificates.** Each stream operates independently while exchanging data **to minimize redundancies.**
- The platform is a **microservices-based, cloud-native architecture** developed from the ground up on Amazon Web Services (AWS).
  - A microservice architecture is a pattern that arranges an application as a **collection of loosely linked**, fine-grained services. These services interact with each other through certain set protocols.

Background to the data breach

- In January 2022, another alleged data leak occurred in India, where personal data of thousands was exposed, including **COVID-19 test results, phone numbers, names, and addresses.** The data was accessible through online searches.
  - In 2022, an organization in India faced an average of **1,866 cyber-attacks per week,** with the **health care sector** being **the most targeted,** according to **Check Point Research**, an American-Israeli cyber threat intelligence analyst.



How did the Telegram bot get access to CoWIN data?

- Cloud service providers (e.g., AWS, Azure, Google Cloud) secure the **underlying infrastructure**, **not applications and databases**. Customers are responsible for their own data security in the cloud.
- Cloud is **more secure** than traditional data centres, but legacy systems in **virtual servers** can be **vulnerable entry points** for hackers into databases.
  - **CoWIN's use of legacy software** tools created a potential **entry point for the bot** operators, possibly through an old connected system.

But was there a breach?

- The Ministry has **not clarified** any recent or past breaches of the CoWIN database, as entire explanation hinges on the fact that the **only way to access** CoWIN's system is either **through an OTP** or through a vaccinator whose access is logged.

- The Ministry claims CoWIN has **adequate security**, and the Telegram bot **might have scraped** previously gathered **compromised credentials**.
- The Ministry admits **one API doesn't require OTP,** while this API only accepts requests from a "trusted API" that has been **"whitelisted"** by the **CoWIN system.** No explanation has been provided for why this API bypasses the OTP mechanism.
- **CloudSEK's (Artificial Intelligence Company)** analysis on June 12 following the news of the CoWIN data breach revealed a **threat actor** advertising a **Telegram bot selling PII (personally identifiable information) data of Indian citizens** registered on CoWIN. However, they concluded that **hackers lack access** to the entire CoWIN portal or the backend database.

API (Application Programming Interface)

- APIs are mechanisms that **enable two software components** (usually in a server-client relationship) to communicate **with each other** using a set of definitions and protocols.
- For example, the weather bureau's software system contains daily weather data. The weather app on an individual's phone interacts with this system via APIs and shows daily weather updates on individual phone.

The larger Picture

- Millions of Indian citizens' sensitive personal data is at risk of being mis-utilized as stolen health data (terminal patients/sexual issues) remains the **money-making business** for hackers.
- Supreme Court recognized **privacy as a fundamental right in 2017 through Puttaswamy judgement** and the country in 2023 **awaits** a digital personal data protection law**.**
- There is a need to create awareness regarding **end point security measures** around personal data sharing, as leakages create **uncertainty and trust deficit**.

  Today's need is to create a policy and standard implementation of **multifactor authentication**, **data-minimalisation**, **right to be forgotten** through legal framework of data protection law.

OPEN RAN

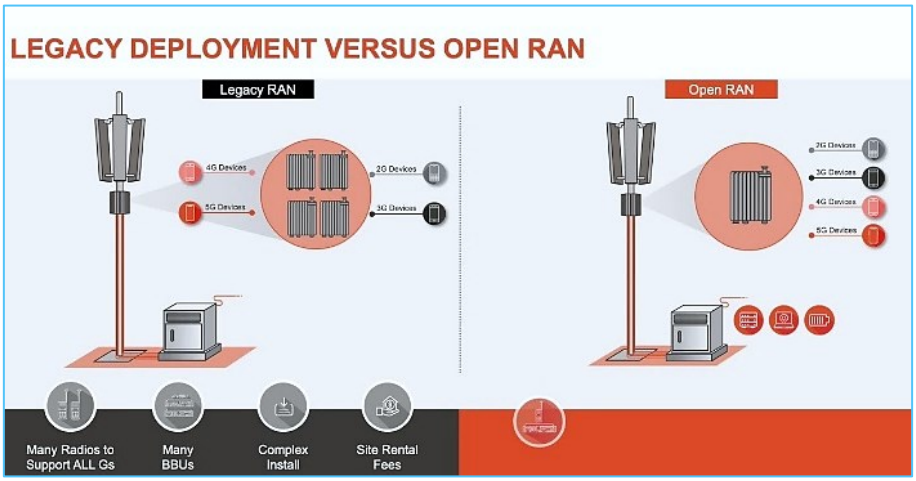
In News: India and the US launched **two Joint Task Forces** on advanced telecommunications, focused on **Open RAN (Radio Access Network)** and research and development in **5G/6G technologies.**

- Open RAN has the potential to reduce deployment costs by up to 30%, as it enables **interoperability, competition, and innovation** in the RAN market.
- Additionally, both India and USA share a vision of **creating secure and trusted telecommunications, resilient supply chains**, and **enabling global digital inclusion.**
- In order to develop sophisticated, interconnected networks, several stakeholders **pool their resources** under the O-RAN model.
- Open RAN technology will act as a **bulwark against the meteoric rise of Chinese telecommunication network equipment** suppliers like **ZTE and Huawei.**
- Public-private cooperation between vendors and operators will be led by India's **Bharat 6G Alliance** and the **U.S. Next G Alliance.**

What is Open RAN

- O-RAN (Open Radio Access Network) refers to a concept and initiative within the telecommunications industry that aims to **transform traditional, proprietary radio access networks** (RAN) into **open and interoperable systems.**
- RAN is a critical part of the **mobile network infrastructure** that **connects user devices, such as smartphones and tablets, to the core network.**
- Open RAN allows telcos to **source** network components **from various vendors**, preventing vendor lock-in and **promoting diversity**.
- It is about disaggregated RAN functionality built using **open interface specifications** between elements.
- It can be implemented in **vendor-neutral hardware** and **software-defined technology** based on open interfaces and community-developed standards.
- Open RAN aims to provide operating expenses (OPEX) and capital expenditure (CAPEX) savings while fostering innovation.

How is O-RAN different from traditional RAN



- Traditional RAN is **proprietary, expensive, not quickly scalable, not reconfigurable for network operators' unique needs** without the help of vendors, not easily integrable and interoperable with other vendor equipment, and not designed to enable automation through intelligent networks.
- Open RAN overcomes these limitations by **enabling interoperability through multi-vendor deployments**, healthy competition, and a **vibrant supplier ecosystem** by allowing smaller vendors participation.
- Open RAN has two core principles: **open interfaces and the ability for operators to customise the network as needed.**
- However, implementing Open RAN technology poses **security challenges** with multiple vendors and **diffused responsibility** for network elements.

Benefits

- Open RAN can **lower the barriers to entry for new players** and increase the **diversity of suppliers** in the RAN market.
- It can **enhance network performance, security, and reliability by leveraging cloud computing, virtualization, and artificial intelligence.**
- It can accelerate the **deployment of 5G/6G** and beyond services and use cases by enabling **network slicing, edge computing, and dynamic spectrum sharing.**

Conclusion

- Open RAN is a disruptive technology that can transform the mobile network landscape by creating a more **open, flexible, and efficient RAN architecture**.
- It can benefit operators, vendors, consumers, and society by **reducing costs, improving quality, and enabling innovation**.
- It can foster **greater collaboration and cooperation** between countries and regions in advancing the development and deployment of next-generation mobile networks.

Network Slicing

Network slicing is a **virtual network architecture** that allows **multiple independent networks** to exist on the same physical network, using different "slices" of the same spectrum band. This enables organisations to accommodate different application requirements for **security, reliability, and performance** on the same network.

Edge Computing

Edge computing is a **distributed computing paradigm** that brings **computation and data storage closer to the sources** of data. This is expected to **improve response times and save bandwidth**. In simpler terms, edge computing is a framework that allows IoT devices to quickly process and act on data at the edge of the network.

e-Cigarette

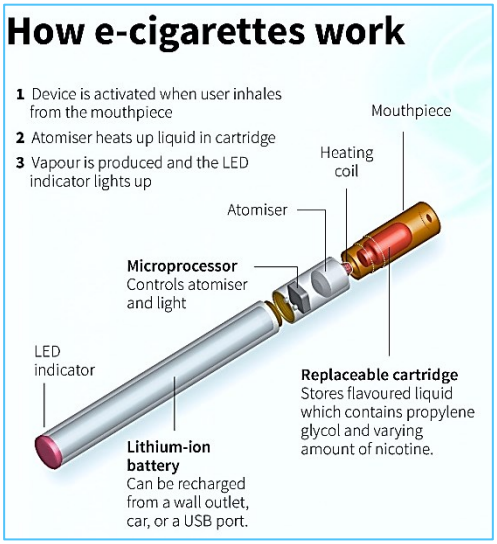
In News: The govt has announced a **ban on e-cigarettes,** saying they pose health risks to the youth and their **addiction** is increasing.

- Prior to this announcement, **15 states and one Union territory** had already banned e-cigarettes.
- E-cigarette use has rapidly increased among **current and former smokers** as well as youth who have never smoked.
- Once the ban comes into force, **consumption, production, manufacturing, import, export, transport, sale, distribution, storage and advertisement** of e-cigarettes would become illegal in India.
- E-cigarettes were **promoted** as a way **to get people out of their smoking habits** but reports have shown that many people are **not using it as a weaning mechanism** but are rather addicted to it.

What is an e-Cigarette?

- e-cigarettes are the most common form of **Electronic Nicotine Delivery Systems (ENDS).**
- These are devices that **do not burn or use tobacco leaves**. Instead, they **vaporise a solution** using a battery, which is then inhaled by the user.

- The common constituents of the solution, in addition to **nicotine**, are **propylene glycol**, **with or without glycerol** and **flavouring agents.**
- Since their initial introduction in the market in 2007, there are now **four generations of e-cigarettes:**
    - **First generation:** "Cig-a-like" resembles traditional cigarettes in appearance and feel.
    - **Second generation: "Clearomizers"** have larger fluid reservoirs and allow for refillable fluids.
    - **Third generation: "Mods"** feature batteries that offer adjustable power settings.
    - **Fourth generation: "Pod or Pod-Mods"** are the latest type with **temperature control**, **variable voltage, and enhanced aerosol production** due to lower electrical resistance.



How does it work?

- E-cigarettes contain a **liquid** that can include **flavours, solvents, and nicotine.** Heating this liquid generates an aerosol that is **inhaled into the lungs through vaping.**
    - Some e-cigarette devices can also accommodate **cannabis-based** products, such as **tetrahydrocannabinol (THC),** the psychoactive compound found in **marijuana.**
- To produce an **aerosol**, an e-cigarette user takes a puff through the mouthpiece which activates an air-flow sensor, causing the **atomizer to heat the e-liquid** and to form an aerosol for inhalation to the lungs.
    - Instead of an airflow sensor, some types of e-cigarettes use a **push-button** to activate the battery and to heat the atomizer.
    - The battery's voltage and circuit strength are crucial components in e-cigarettes. **Stronger the voltage and circuit**, faster will the solution heat up and vaporise, and more **effective will be the product.**
- According to **WHO's 2014 report**, **differences in battery voltage and unit circuitry** can affect e-cigarettes' ability to heat the solution, impacting nicotine delivery and potentially **forming toxicants in emissions.**
    - Report further explains that factors such as **"length of puffs, depth of inhalation and frequency of use"** may affect how nicotine is consumed using e-cigarettes.
    - While a faster, deeper puff increases nicotine delivery from a conventional cigarette, it might **diminish with the use of e-cigarettes** due to the **cooling of the heating element.**

One of the main ingredients in e-liquids is **nicotine**. Nicotine is the principal alkaloid of tobacco that occurs throughout the tobacco plant, acting as a **botanical insecticide**. It is the **main addictive ingredient in tobacco**. Nicotine was **named after** the French Ambassador to **Portugal Jean Nicot,** who introduced tobacco seeds in Paris in 1550.

Vaping is the **inhalation of the vapour or aerosol** produced by an e-cigarette. It aims to simulate smoking without the harmful effects of tobacco combustion, which releases numerous toxicants, including carcinogens.

Associated Health Risk

- The health risks of e-cigarettes depend on their **nicotine delivery power**. If the delivery is quick and powerful, e-cigarettes can be as dangerous as **conventional cigarettes.**
- According to WHO, it can have **negative impacts** during **pregnancy** and may contribute to **cardiovascular disease.**
- Multiple respiratory tract symptoms, including **acute cough, sore throat, and dry mouth** have been reported after use of e-cigarette.
- When compared to cigarette smoking, the consequences of vaping on lung function are not well studied.
- There has been an outbreak of an **acute respiratory illness** associated with **counterfeit vaping product use**. (Vaping Associated Lung Injury)
- Although **nicotine itself is not a carcinogen**, it may function as a **tumour promoter**, as it seems involved in fundamental aspects of the biology of malignant diseases, as well as of **neurodegeneration.**

A **carcinogen** is any substance that **can cause cancer.** It may occur naturally in the environment (such as **ultraviolet rays in sunlight and certain viruses**) or may be generated by humans (such as **automobile exhaust fumes and cigarette smoke**). Most carcinogens work by interacting with a **cell's DNA to produce mutations.**

MAGNETITE

In News: The Bihar government will sign an MoU with **Geological Survey of India** for conducting remote sensing and aerial survey of the southern part of the state to identify **magnetite-bearing rocks** & **ultramafic rocks.**

- The survey will identify the **magnetic anomaly** on the surface, representing the presence of rocks having a **higher content of ferrous mineral**s (representing iron with **Vanadium-Titanium mineralisation**).
- The survey will help in enhancing the mineral resource potentiality also through the ultramafic rocks which usually host **Chromite, Nickel, Platinum** Group of Elements and **gold**.
- The Bihar state government is preparing to amend its **industrial promotion policy** to encourage **private** participation in the **mining sector**.
- The exploration and exploitation of mineral resources will **generate employment opportunities** and attract **investments** in the state.

Bihar Mineral Wealth

- Bihar holds the highest share of **India's gold reserves**, with 222.885 million tonnes of ore containing 37.6 tonnes of metal.
- Bihar is also the principal holder of the country's **pyrite** (fool's gold, contains Iron Suphide) resources, possessing 95% of the total.
- Other important mineral resources in Bihar include **limestone, mica, silica sand, quartzite and talc**.
- Bihar has sufficient mineral resources to boost its economy, despite losing some of its mineral wealth following the creation of Jharkhand in 2000.

Magnetite

- Magnetite is a mineral whose primary component is an iron oxide.
- Its empirical formula is Fe_3O_4, and is often expressed as iron(II,III) oxide. In the past, it has been called ferrous–ferric oxide and triiron tetraoxide.
- Occurrence: igneous and metamorphic rocks, meteorites, sediments
- Properties: attracted to **magnet**, can be magnetised
- Uses: catalyst, pigment, magnetic micro- and nanoparticles.

Ultramafic rocks

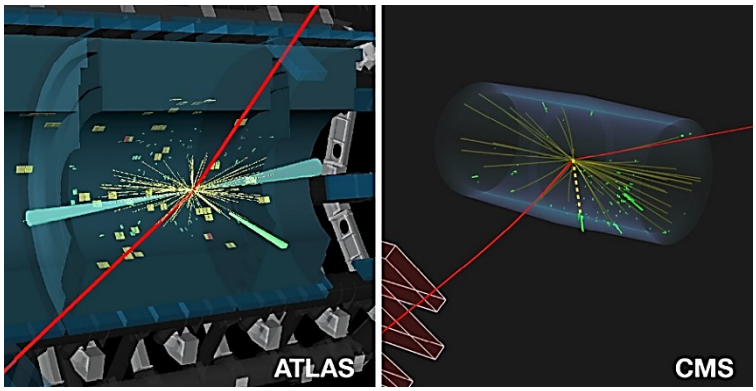
- Type of igneous rock with very low silica and very high magnesium and iron
- **Silica** content: less than 45%, **Magnesium** and **iron** content: very high
- Occurrence: Rare on Earth's surface, abundant in Earth's mantle, some meteorites and sediments
- **Formation**: Partial melting of mantle or **magmatic differentiation**
- Valuable minerals: chromite, nickel, platinum group elements, diamonds.

Geological Survey of India (GSI)

- It is a scientific agency of India that **conducts geological surveys and studies** of India, and provides basic earth science information to the government, industry and general public.
- The GSI was founded in **1851** by the East India Company primarily to find **coal deposits** for the Railways, and is one of the oldest of such organisations in the world and the second oldest surveyer in India after the **Survey of India.**
- It conducts **geological surveys and mapping, mineral exploration and assessment, geoscientific research and studies, geoinformatics, geohazards management, geotourism, and geoscience education and outreach.**
- It explores (through **ground, airborne, satellite, and marine** surveys) and scientifically assess mineral, energy and water resources for the country and facilitate their optimal exploration through proactive information dissemination.
- It also participates in geology, study of tectonics, global warming and climate change and polar studies.

HIGGS BOSON DECAY

In News: The **European Organization for Nuclear Research (CERN)** announced that it found the **first evidence of the rare Higgs boson decay** into a **Z boson and a photon,** two fundamental particles of particle physics.



- The discovery, reported by the **ATLAS (A Toroidal LHC Apparatus) and CMS (Compact Muon Solenoid) experiments** at the **Large Hadron Collider (LHC),** could provide **indirect evidence of the existence of particles beyond the Standard Model.**
- The Higgs boson, also known as the **"god particle"**, was discovered in **2012** and is crucial for understanding the properties and interactions of other particles.
- This rare decay process observed, involves an **"intermediate loop of virtual particles"** that come into and out of existence but cannot be directly detected. These virtual particles could include **new and unknown particles** that interact with the Higgs boson.
- This Higgs boson decay could provide indirect evidence of the **existence of particles beyond those predicted** by the **Standard Model of Particle Physics.**
- The Standard Model is the best theory that describes the **behaviour and interactions of all elementary particles**. However, it has some limitations and cannot explain some phenomena, such as **gravity, dark matter and dark energy**.
- Scientists are looking for something **beyond this model** that could change the paradigm of physics. They are looking for signs of new particles or forces that could interact with the Higgs boson or modify its properties. For example, there could be a fifth force that is not yet known, or a family of Higgs bosons with different masses and charges.

Higgs Boson

- The Higgs boson is a **force-carrying subatomic particle** also known as the "**god particle**".
- The bosons are the particles that **carry/transmit the forces**. The particles are arranged in three generations, each with different properties such as **mass, charge, and spin.**
- They give mass to other particles through the Higgs field, which fills the entire universe.
- Higgs boson is very **rare and unstable**, so it **decays** into various combinations of particles that can be detected by experiments.
- It was **discovered in 2012** at the Large Hadron Collider, confirming the existence of the Higgs field and the mechanism of mass generation.
- It is a scalar boson with **zero spin**, zero electric charge, and zero colour charge that couples to mass.
- After its discovery, it completed the Standard Model of particle physics, which had been missing this key piece for decades.
- It led to the **2013 Nobel Prize in Physics** for Peter Higgs and François Englert, who were among the first to propose the theory of the Higgs boson in 1964.
- The **Higgs field** is a universal energy field that gives mass to some particles by interacting with them and is associated with a particle called the Higgs boson.
- It is not well known that the term **Boson**, owes its name to the pioneering work of the late Indian physicist **SN Bose** (father of the Boson particle) in the field of particle physics.

Z Boson

- The Z boson is a fundamental particle that is an electrically neutral carrier of the **weak force**, which is responsible for **radioactive decay and nuclear fusion**.
- The Z boson has a very large mass, it can decay into pairs of electrons or muons.
- It was predicted by the electroweak theory, which unified the weak and electromagnetic forces.
- The **photon** is the carrier of the electromagnetic force, which governs light and electricity. It has no mass and travels at the speed of light.

Standard Model of Particle Physics

- A theoretical framework in particle physics that **describes the fundamental particles and their interactions** via three of the four fundamental forces: the electromagnetic, weak, and strong nuclear interactions.
- The **strong force** binds quarks together to form protons and neutrons, and also holds the nuclei together.
- The **weak force** is responsible for some types of radioactive decay, such as beta decay.
- The **electromagnetic force** acts between charged particles, such as electrons and protons, and produces light and other electromagnetic waves.

THE FOUR FUNDAMENTAL FORCES OF NATURE

The four fundamental forces differ in their messenger particles, the elementary particles that they affect, their relative strengths (calculated here at a range of 10^{-18}m), and the range over which they operate.

FORCE OR INTERACTION	ELEMENTARY PARTICLES AFFECTED	MESSENGER PARTICLES	RELATIVE STRENGTH	RANGE IN METERS
GRAVITY	All particles with mass	Gravitons (hypothetical)	10^{-41}	Infinite
STRONG	Quarks, gluons	Gluons	25	10^{-15}
ELECTRO-MAGNETIC	All electrically charged particles	Photons	1	Infinite
WEAK	Quarks, leptons	W and Z bosons	0.8	10^{-18}

- The **gravitational force** attracts all objects with mass, but it is very weak compared to the other forces.
- The elementary particles: the **quarks and leptons** are the basic constituents of matter.
- The bosons are the particles that **carry/transmit the forces**. The particles are arranged in three generations, each with different properties such as **mass, charge, and spin.**
- **Quarks** are the constituents of protons and neutrons, which make up the atomic nuclei.
- **Leptons** include electrons, which orbit around the nuclei, and neutrinos, which are very light and rarely interact with other matter.
- There are six kinds of quarks and six kinds of leptons, each with different properties such as mass, charge, and spin.

Large Hadron Collider (LHC)

- LHC is the **world's largest and most powerful particle accelerator**, which **collides protons or ions** at very high energies, creating conditions similar to those of the **early universe** to create new particles and study their properties.
- Accelerated to a **speed close to that of light**, they collide with other protons. These collisions produce massive particles, such as the **Higgs boson or the top quark**.
- It first started up on 10 September **2008**, and remains the latest addition to **CERN's accelerator complex, near Geneva**, Switzerland.
- The LHC consists of **a 27-kilometre ring of superconducting magnets** with a number of accelerating structures to boost the energy of the particles along the way.

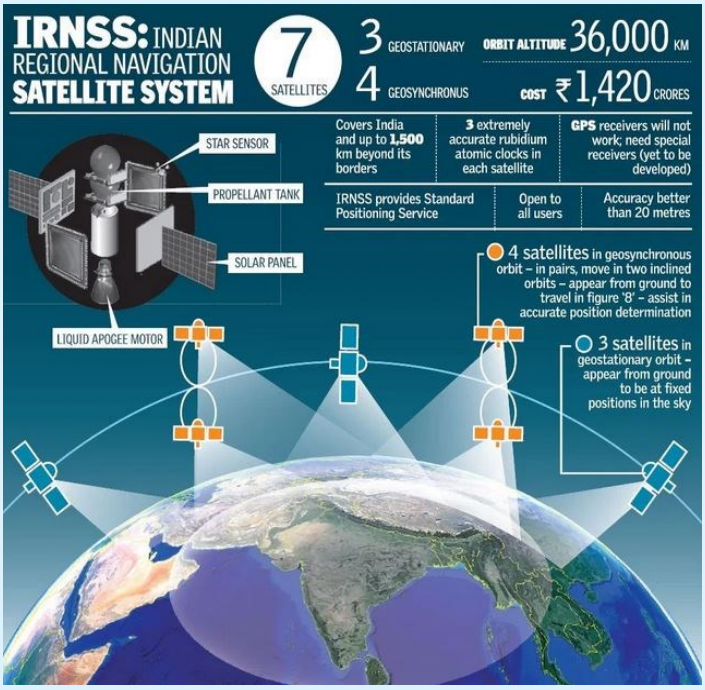
NavIC SATELLITE

In News: ISRO successfully launched **NVS-01, a navigation satellite** into the Geosynchronous Transfer Orbit (GTO) with GSLV launcher from the launch pad at SDSC-SHAR, Sriharikota.

- The 2232 kg NVS-01 enhances India's **regional navigation system** with accurate and real-time navigation.
- NVS-01 is the first satellite in the **second-generation** series for NavIC services. It aims to enhance and sustain the NavIC system with **additional L1 band signals** (operation with GPS navigation) and an **indigenously developed rubidium atomic clock**.
- **Need for second-generation satellites:**
  - IRNSS, the earlier navigation satellite system, was limited to using **only L5 and S frequencies**, which **restricted its interoperability** with other global navigation satellite systems (GNSS).
  - First generation IRNSS have a **lifetime of around 10 years** and 3 of them are about to be defunct.
  - The **failure of the onboard atomic clock**, which led to the discontinuation of accurate location data provision.

- **Benefits of second-generation satellite:**
  - **Interoperability:** with L1 signals.
  - **Utilising indigenous atomic clock** for the **first time**.
  - **Increased mission life:** over 12 years.
  - **Expanded utility:** in low-power, single-frequency chips for wearable devices and personal trackers.

Navigation with Indian Constellation (NavIC)



- ISRO established NavIC (formerly known as IRNSS) as a regional navigation satellite system to fulfil **the positioning, navigation, and timing needs** over the Indian landmass and surrounding region **extending upto 1500 kms.**
- NavIC consists of a constellation of **7 satellites and a network of ground stations**.
  - The constellation includes **3** satellites in **geostationary orbit** and **4** satellites in **inclined geosynchronous orbit**.
  - The ground network comprises control centres, timing facilities, monitoring stations, and ranging stations.
- NavIC offers two services: **Standard Position Service** (**SPS**) for **civilian users** and **Restricted Service** (**RS**) for **strategic users**.
- These two services are provided in both L5 (1176.45 MHz) and S band (2498.028 MHz).
- A **new civilian signal** is being introduced in the L1 band (1575.42 MHz). The NavIC L1 signal is interoperable with the other GNSS signals.
- All forthcoming (2023 onwards) NavIC satellites will broadcast **SPS (Standard Positioning Services) signals** in L1, L5 and S bands.

Applications of NavIC:

- Navigation (terrestrial, aerial and marine)
- Location based services
- Personal mobility
- Resource monitoring
- Surveying and geodesy (study of Earth and its properties like shape, orientation in space and gravity)
- Scientific research
- Time dissemination and synchronisation
- Safety-of-life alert dissemination

Need for promotion of NavIC:

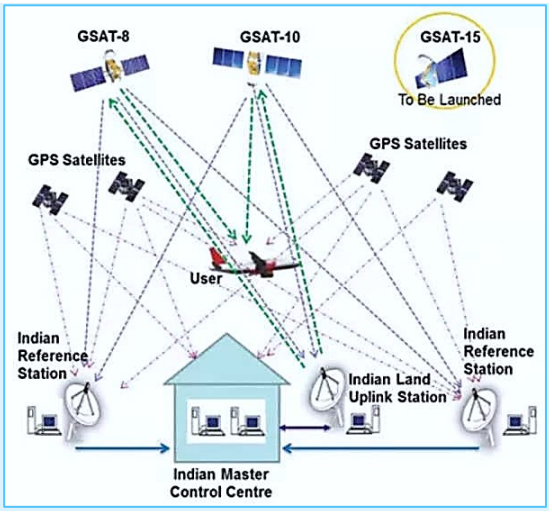
- **Reduce dependence** on GPS: increased self-reliance/Aatmanirbhar Bharat
- Enable **better control** of homeland and international border security.
- Offer **improved navigation security** to fishermen, police, military, and air/water transport, especially during cyclones.
- Implementation of **GATI Shakti Plan** and **National Logistics Policy**: utilizing digital infrastructure for efficient logistical services.

- The four popular global satellite-based navigation systems include **GPS (USA), GLONASS (Russia), Galileo (Europe), and Beidou (China).**
- Similar to India's GAGAN, Japan has developed a four-satellite system that can enhance GPS signals within its territory.

- Encourage **drone usage** for logistics.
- **Expand footprint** in Asian and global geographies.

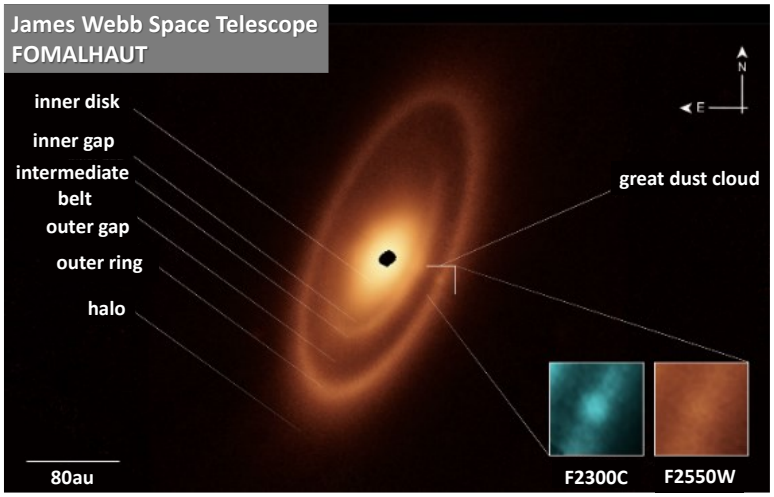
GPS Aided Geo Augmented Navigation (GAGAN)

- It is an **Space-Based Augmentation System (SBAS)** designed to enhance **navigational services** within the **Indian FIR (Flight Information Region)** and potentially extend to neighbouring regions.
- GAGAN enhances accuracy, availability, and integrity for **qualified airports** during **all flight phases** within its service volume.
- GAGAN is a joint project of **ISRO and AAI** (Airport Authority of India).
- GAGAN system is **interoperable** with other international SBAS systems like US WAAS, European EGNOS, Japanese MSAS etc.
- GAGAN has been certified by the Directorate General of Civil Aviation (DGCA).



FOMALHAUT'S ASTEROID BELT

In News: The James Webb Space Telescope has discovered an asteroid belt surrounding the Fomalhaut star.



About the Fomalhaut

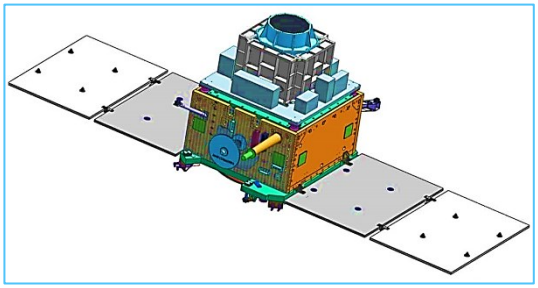
- **One of the brightest stars** in the night sky.
- Brightest star in the **southern Piscis Austrinus constellation.**
- Age: **440 million years**.
- Distance from Earth: **25 light years.**

Significance of the findings

- Discovery of an asteroid belt around Fomalhaut star aids in **understanding planet formation.**
- Planets form within the **primordial disks surrounding young stars.**

XPoSat

In News: ISRO is partnering with Raman Research Institute to develop and launch the **X-Ray Polarimeter Satellite (XpoSat)** later this year.



- XpoSat is India's inaugural mission focused on **polarimetry**, aimed at studying the behaviour and characteristics of intense astronomical X-ray sources.
- **XpoSat** aims to tackle the challenges of **understanding complex emission mechanisms from astronomical sources** such as black holes, neutron stars, and active galactic nuclei.
- XpoSat will be equipped with two scientific payloads, **POLIX** and **XSPECT**, designed to measure polarimetry parameters and provide spectroscopic information, respectively.
  - **POLIX:** Focus on measuring the **degree and angle of polarisation** in the medium X-ray energy range of 8-30 keV.
  - **XSPECT:** It will provide **spectroscopic data** in the energy range of 0.8-15 keV.
- By combining spectroscopic and polarimetric measurements, XpoSat will provide valuable insights to decipher the nature of **emission processes**.

- **Polarimetry** is the study of polarisation in waves like radio or light waves. The polarized light waves tend to vibrate in a particular plane only.
- Spectroscopy is the **analysis of matter and its chemical composition** by studying the **absorption and emission of light** and other radiation by matter.

JAPAN'S PRIVATE MOON LANDER

In News: Japan's Ispace reported the failure of its private moon landing mission, Hakuto-R Mission 1 (M1), after losing contact with the spacecraft.

- The **Hakuto-R Mission 1** lander aimed to touch down at the Atlas crater in the **Moon's northern hemisphere**, specifically in Mare Frigoris, also known as the **Sea of Cold**.
- To date, the **United States, Russia, and China** are the only countries that have successfully landed spacecraft on the lunar surface.
- In 2016, India's attempt to land a spacecraft on the Moon ended in a crash, and in 2019, **Israel's lander** also experienced a crash landing.

GOVIND SWARUP LIFETIME ACHIEVEMENT AWARD

In News: Prof. Jayant Vishnu Narlikar receives the first Govind Swarup Lifetime Achievement Award from Astronomical Society of India (ASI).

- The award was established in 2022 during **ASI's golden jubilee** to honour eminent Indian astronomers.
- Prof. Govind Swarup (1929-2020) was the **founder of Indian radio astronomy**.
- He contributed to the construction of the **Ooty Radio Telescope (ORT) and the Giant Metrewave Radio Telescope (GMRT).**

Astronomical Society of India (ASI)

- Established in **1972,** ASI has grown to become the **prime association of professional astronomers** in India. The objectives of the society are the **promotion of Astronomy** and related branches of science in India. The society organizes **scientific meetings** and supports the popularization of Astronomy and other similar activities.

IRAN HYPERSONIC MISSILE

In News: Iran has displayed a new **hypersonic ballistic missile called Fattah,** claiming it can move at up to **Mach 15 (5.1 km per second)** and has a **range of 1,400km** before hitting its target.

- Iran claims the missile can **evade any defence system** and provides a **new level of deterrence** against its enemies.
- It features a moveable secondary nozzle and employs solid propellants that allow for **high manoeuvrability** within and outside the atmosphere.
- **Iran** joins **Russia and China** as the only countries with hypersonic weaponry, amid ongoing tensions over its **nuclear deal & regional role**.
- The missile unveiling comes amid political and military developments in the region, such as the **nuclear deal impasse, the Iran-Russia alliance, the Iran-Saudi rapprochement.**

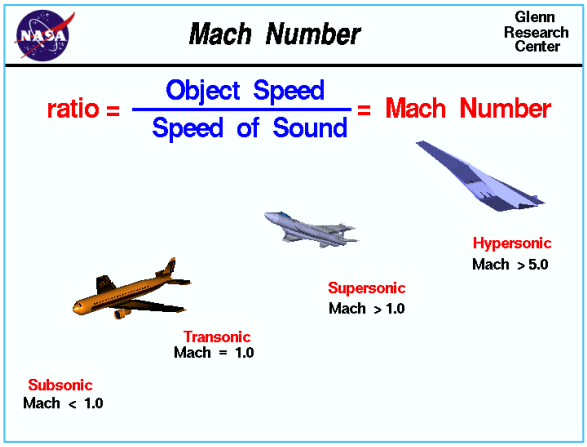
Hypersonic Missile

- Hypersonic missiles are projectiles that can **move at least 5 times the speed of sound (Mach 5)** and manoeuvre in flight, making it difficult to detect and intercept.
- Two main types of hypersonic missiles: **Hypersonic Glide Vehicles (HGV)** & **Hypersonic Cruise Missiles.**
- A **hypersonic cruise missile** is powered by **engines** throughout its flight, using **air-breathing technology** such as scramjets.
- A **scramjet** is a type of jet engine that **compresses and ignites the air and fuel mixture** as it enters the engine at supersonic speeds, creating a supersonic exhaust that propels the missile.
- A **hypersonic glide vehicle (HGV)** missile is launched by a **rocket or a ballistic missile** and then glides through the atmosphere at hypersonic speeds, using the lift generated by the airflow to stay aloft and manoeuvre. A HGV relies on the **initial boost** to reach high altitudes and velocities. For instance, DF-ZF of China and Avangard of Russia
- Hypersonic missiles are considered a **new threat to global security** because they can travel **faster, farther, and more unpredictably** than conventional missiles, potentially carrying nuclear or conventional **warheads**.
- Russia, China, and USA are among the countries that are developing and testing hypersonic weapons.
- India successfully flight tested Hypersonic Technology Demonstrator Vehicle (HSTDV), an unmanned scramjet aircraft that can fly at hypersonic speeds of up to Mach 6.

Challenges of hypersonic missiles

- Hypersonic projectiles need to overcome the **high drag and heat** generated by flying at such high speeds in the atmosphere. This requires **special materials, coatings, and insulation** to protect the weapon's surface and internal components.
- Hypersonic missiles need to have **reliable communication and guidance systems** that can operate in the plasma sheath that surrounds the weapon at hypersonic speeds, which can block or distort radio signals.
- Hypersonic weapons need to **balance** the trade-offs between **speed**, **range**, **payload**, and **manoeuvrability**, as increasing one factor may reduce another.
- Hypersonic weapons also need to address **the legal, ethical, and strategic implications** of deploying such weapons, such as the **risk of escalation, miscalculation, or accidental war.**

- In aerodynamics, the speed of objects is generally calculated with respect to **the speed of sound**, and different prefixes like **sub, super, hyper** are used for specific speed ranges. Flight regimes are defined based on the **Mach number** (M or Ma).
- **Subsonic** means Ma < 1 (approx 1250 Kmph), **transonic** means Ma= 1, the speed range between Mach 1 and Mach 5 is **supersonic**, and the speed above Mach 5 is called **hypersonic**.
- The **conventional intercontinental ballistic missiles** are capable of hypersonic speeds, but they follow a **predictable parabolic trajectory** and are easier to **track and intercept**. On the other hand, typical hypersonic missiles **approach very rapidly at low altitudes**, and so are much more difficult to track and so are very difficult to take down.



EUCLID TELESCOPE

In News: The **European Space Agency's** newest observatory, Euclid has captured its first glimpses of the cosmos.

- The 4-foot-diameter telescope will remain at the **sun-Earth Lagrangian point L2,** also home to **NASA's James Webb Space Telescope**.
  - **Lagrange Points** are positions in space where gravitational forces of a two body system like Sun and Earth produce **enhanced regions of attraction and repulsion**.
  - The opposing forces balance each other out, and these point are used as **parking spots**, thus **reduceing fuel consumption** needed to remain in position.
- It is designed to create the largest and most accurate **three-dimensional map** of the universe.
- Euclid's primary goal is to observe the cosmic mysteries of the universe, including **dark matter and dark energy.**
- This mission will **observe billions of galaxies**, revealing how **dark energy** might have **stretched and pulled matter** over billions of years, revealing the universe's evolution over the **past 10 billion years.**
- Euclid was a **Greek Mathematician** (300 BC) who is considered as the **'Father of Geometry'.**

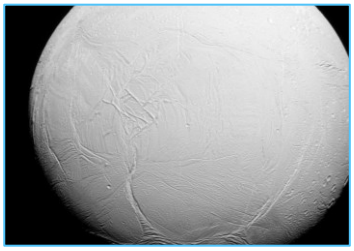
Dark matter is the **invisible and mysterious substance** which comprises of 27% of universe, which **does not emit, reflect or absorb** any electromagnetic radiation including X rays and radio waves. It **deflects light** because of its **gravitational pull** and **deforms the shape** of the galaxies as seen by the observer. This effect is called **gravitational weak lensing.**
Dark energy is a **mysterious energy field** that is **accelerating the expansion** of the **cosmos** and accounts for about **68% of all the mass and energy** in the universe. The remaining 5% are planets, stars, nebulas, people and galaxies.

ENCELADUS

In News: A team of researchers, based on NASA's **Cassini spacecraft** data, finds high concentrations of **phosphorus** in **ice crystals** spewed from the interior ocean of **Saturn's moon Enceladus**, adding to its potential to harbour life.

- The same team previously confirmed that Enceladus' ice grains contain a **rich assortment of minerals** and **complex organic compounds,** including the **ingredients for amino acids,** associated with **life**.

- Phosphorus is the **least abundant** of six chemical elements, considered necessary to all living things (other are carbon, oxygen, hydrogen, nitrogen and sulphur).
    - Phosphorus is fundamental to the **structure of DNA** and a vital part of **cell membranes** and **energy-carrying molecules** existing in all forms of life on Earth.



About Enceladus

- Enceladus is the **second nearest** of the major **regular moons** of Saturn and the brightest of all its moons.
- It is a **geologically active moon & most reflective body** in the solar system that hides a global ocean of **liquid salty water** beneath its crust.
- The Cassini spacecraft mission was **launched by NASA** in **1997** and orbited gaseous giant Saturn for 13-year from 2004 to 2017.

AI WATERMARK

In News: Open AI, Google, others pledge to **watermark AI content for intellectual property authenticity and safety.**

- The **watermarking AI-generated** content will help to make the **technology safer**.
- This watermark embedded in the content will help users to **spot deep-fake images** or audios that may, for example, show violence that has not occurred.
- The **U.S government** is considering a bill that would require **political ads** to disclose whether AI was used to create imagery or other content.

Generative AI: It is a **type of Artificial Intelligence** that can create a wide variety of data, such as images, videos, audio, text, and 3D models.

- It is capable of producing **highly realistic and complex content** that **mimics human creativity.**
- Example: **Chat GPT and DALL-E**, which is developed by an OPEN AI uses various AI algorithms to create new content.

ASPARTAME

In News: A WHO committee categorized artificial sweetener **aspartame** as **"possibly carcinogenic to humans".**

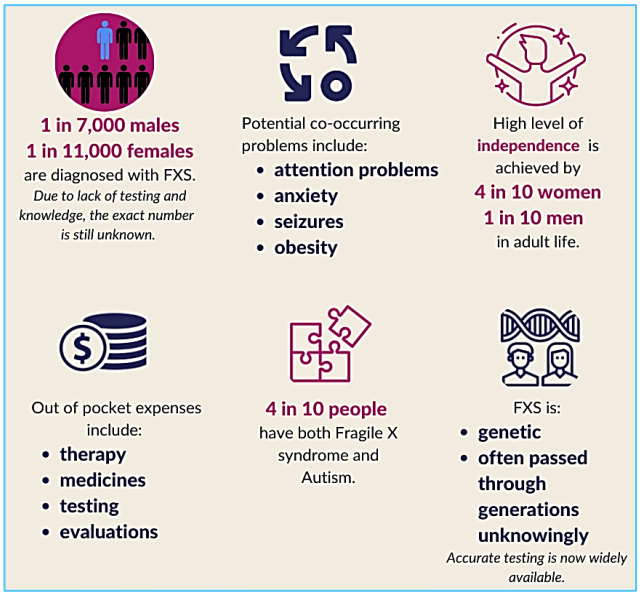
- Health Experts are worried about hidden aspartame in products like diet soft drinks, pharmaceutical preparations, fruit drinks, ice cream, chewing gum, etc.
    - Aspartame is **200 times sweeter** than sucrose (table sugar)
    - Though being far less sweet than other artificial sweeteners like **advantame and neotame**, aspartame has **high sweetness intensity.**
    - 1 gram of aspartame has the sweetness intensity of roughly 2 teaspoons (about 8 g) of sugar.
- According to, **Joint FAO/WHO Expert Committee on Food Additives (JECFA)**, ideal consumption of aspartame is **40 mg/kg of body weight per day**.

WORLD FRAGILE X DAY

In News: The communities around the world raise awareness about a **rare genetic condition called Fragile X Syndrome** on 'World Fragile X Awareness Day' on July 22.

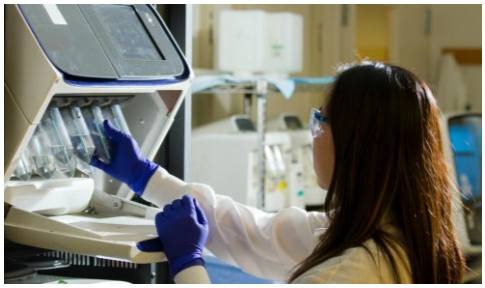
- **Fragile X Syndrome** also known as, **'Martin-Bell Syndrome' or 'Escalanate Syndrome'** is one of those conditions where a person develops an **abnormal facial structure** along with many other types of **physical** and **mental diseases** and **intellectual disability.**

- It is a **genetic condition or hereditary syndrome** that causes **intellectual disability or autism.**
- The disorder is caused by a genetic mutation of the **FMR1 gene** (**Fragile X Messenger Ribonucleoprotein 1**) on the **X chromosome,** the gene essential for brain development.
- This genetic disorder can be inherited from **either of the parents:**
  - If it is inherited by the **father**, then it will **only** affect the **daughter.**
  - If inherited by the **mother**, it can affect **both the genders.**
  - Apart from intellectual disability, **other symptoms** could be: relatively longer face or ears, vision problems, lack of balance in body, etc.
- There is **no cure** for Fragile X syndrome, but early treatment, training, and management can assist children in developing essential skills like walking, talking, and performing tasks.



NEWBORN GENOME-SEQUENCING

In News: Advances in Rapid **Whole Genome Sequencing** for **newborns** with **rare genetic diseases** can allow their early diagnosis for effective treatments and save an infant from death or disability.



- **Whole Genome sequencing** can provide a **faster and more comprehensive diagnosis** than standard newborn-screening programmes, which cover only a limited number of diseases.
- **Whole-genome sequencing** can also detect unanticipated risks of genetic diseases in healthy newborns and enable better **medical surveillance and intervention.**

Need of Newborn Genome Sequencing

- Genetic diseases are **difficult to document and understand** due to their **rarity**, **narrow opportunities** to detect health conditions before their development, **lengthy diagnostic** timelines, and the unfortunate death of the affected newborns.
- Population genome sequencing offers an impartial insight into diseases, leading to swift diagnoses and decreased treatment expenses, and bringing improvement in the health condition of diagnosed children.
- **India's IndiGen Project** aims to undertake whole genome sequencing of a thousand Indian individuals representing diverse ethnic groups from India.
- The **BabySeq project** in the U.S. explores the potential benefits of sequencing newborns for routine care. U.K. National Health Services recently launched a nationwide programme to sequence 100,000 sick newborns.

Ethical and Social Challenges

- Disclosure and management of incidental and secondary findings
  - **Privacy:** How to protect the personal and sensitive information of the newborns and their families from **unauthorised access or misuse**.
  - **Psychological impact:** How to inform the parents about the sequencing results and their implications.
  - **Informed consent:** How to obtain a **valid and voluntary consent** from the parents before performing sequencing on their **newborns**.
- Equitable distribution of benefits and burdens
  - **Equitable provisioning:** How to ensure **equal access to sequencing** and its benefits for all newborns.
  - **Distributive justice:** How to **allocate the limited resources** for sequencing in a fair and efficient way, considering the costs, benefits, and trade-offs involved.
  - **Public health:** How to balance the individual interests of the newborns and their families with the collective interests of the society and the public health system.

Gene: A **unit of DNA** that **encodes** a specific function or trait in an organism. A gene can direct the synthesis of a protein or regulate the expression of other genes.

Genome: The **complete set** of DNA in an organism. It comprises all the genes and non-coding sequences that regulate gene activity. The human genome has about **3 billion DNA bases**. The genome reflects the evolutionary history and diversity of an organism.

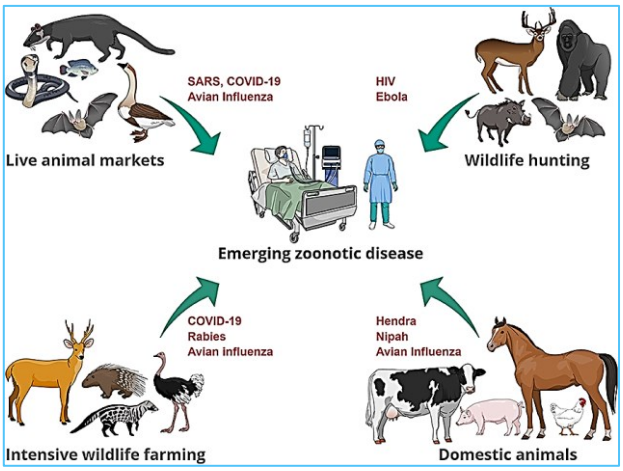
Genomic sequence: It reads and interprets genetic information found within DNA or RNA to decipher the order of base pairs and decode the **genetic fingerprint of a human**. It is useful for disease screening and public health management. The genomic sequence can also show the similarities and differences between organisms.

Whole-genome sequencing: A technique that can analyse the **entire DNA of a person or an organism**. It can detect mutations or variations in genes that cause or increase the risk of genetic diseases. It can also provide information about the **inheritance and recurrence** of genetic diseases in families.

Genetic disease: A disease that is caused by a change in the DNA sequence of a gene or a chromosome. A genetic disease can be inherited from parents or occur spontaneously during development. Ex: cystic fibrosis, sickle cell anaemia, and down syndrome.

LEPTOSPIROSIS

In News: Millions of people are affected by **leptospirosis** every year, and its burden is expected to increase in the future.



About leptospirosis

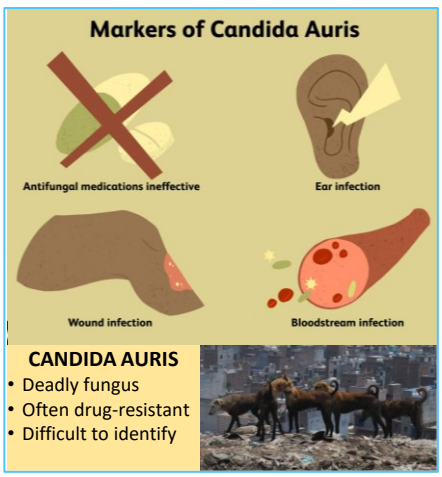
- Leptospirosis is a **zoonotic bacterial disease** caused by the **bacterium Leptospira interrogans.**
- It is more prevalent in **warm, humid** countries and poses a significant global health threat, especially in the aftermath of **heavy rainfall or flooding**.
- It is primarily transmitted from infected animals to humans through **direct contact with animal urine** or indirectly through **contaminated soil and water.**
- Both wild and domestic animals, including cattle, pigs, rodents and dogs can act as carriers of the disease and transmit it to humans.
- It has symptoms ranging from **mild flu-like illness** to severe conditions that can be life-threatening, affecting multiple organs. The symptoms are similar to those of other diseases such as **dengue, malaria,** and **hepatitis**, often leading to **underreporting of cases** and limited awareness of the disease.

Zoonotic Disease (Zoonosis)

- An **infectious disease** that can be transmitted from animals to humans or vice versa.
- There are many types of zoonotic diseases, caused by different kinds of pathogens such as bacteria, viruses, parasites, or fungi.
- Examples of zoonotic diseases are Rabies, Lyme disease, Malaria, Ebola, and COVID-19.

DRUG-RESISTANT FUNGUS

In News: A deadly **fungus Candida auris** that can **resist most antifungal drugs** has been found in stray dogs in Delhi.

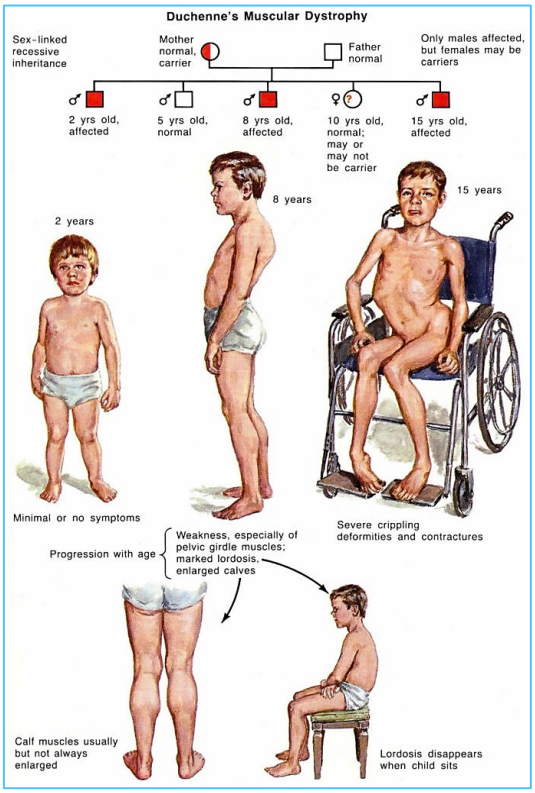


- Candida auris is an emerging **multidrug-resistant fungus** that was first reported in **Japan** in **2009** and has since caused outbreaks in hospitals across five continents.
- Candida-caused disease, **Candidiasis**, is often acquired in hospitals by patients with **weakened immune systems**.
- The fungus, which **grows as yeast**, is difficult to identify and treat, as it is often **misdiagnosed** as other Candida species and can survive on surfaces for weeks. To prevent its spread, there is a need for more awareness, testing, and diagnostics.

- It is **resistant** to most common antifungal drugs, and some strains are resistant to all three main classes of **antifungals** and has **high mortality rates**.
- India has take various steps to prevent the spread of the disease:
  - Scientists in Bengaluru are working on the genome sequence of Candida auris, a global health threat.
  - Live C. auris cultures have been isolated from an animal source documented in the ear canals of hospitalised stray dogs for the first time.

DUCHENNE'S MUSCULAR DYSTROPHY

In News: A new treatment for **Duchenne muscular dystrophy (DMD)**, a **rare and fatal genetic disease** that affects **muscle strength and function**, has been developed by a joint effort of doctors from **Tamil Nadu** and scientists from **Japan**.



- The treatment involves using **beta-glucan,** a food additive derived from a fungus called Aureobasidium pullulans, as a supplement to the regular therapy for DMD patients who are older than three years.
- The treatment has shown **promising results** in reducing muscle weakness and damage, improving muscle strength, and having **no side effects** or **adverse reactions** on the liver or kidney functions of the patients.
- The treatment is based on the hypothesis that **beta-glucan can modulate the immune system** and **reduce inflammation and fibrosis** in the muscles affected by DMD.
- There is a need for developing an affordable treatment for a rare and incurable genetic disorder of **DMD.**

Duchenne Muscular Dystrophy

- It is the rare genetic disorder and most common and fatal type of muscular dystrophy, marked by **progressive muscle degeneration** and **weakness** due to **alterations of a protein** called "**dystrophin**" that helps keep muscle cells intact.
- Muscles need lubricant. Dystrophin, an enzyme secreted in the muscles, helps in wear and tear and regeneration of muscles. Because of the genetic disorder, muscles cannot produce dystrophin.
- According to scientists, **muscle weakness** is the principal symptom of DMD. It can begin as early as age 2 or 3, first affecting the proximal muscles (those close to the core of the body) and later affecting the distal limb muscles (those close to the extremities).
- Other symptoms include **enlargement of calves, a waddling gait, and lumbar lordosis** (an inward curve of the spine). Later on, heart and respiratory muscles are affected as well.
- The condition is **predominantly seen in boys,** but in rare cases, it can also affect girls.
- **Prevalence:** Global DMD prevalence: 7.1/100,000 males, 2.8/100,000 in general population. Approximately 5,000 patients in Japan, 80,000 in India.
- **Current Treatments: No cure**. Focus on symptom control and quality of life. Gene therapy, anti-inflammatory meds.

ENTAMOEBA MOSHKOVSKII

In News: A team of scientists from the **Indian Council of Medical Research (ICMR)** have researched on a new **amoeba pathogen, Entamoeba moshkovskii,** which causes **diarrhoea** in humans.

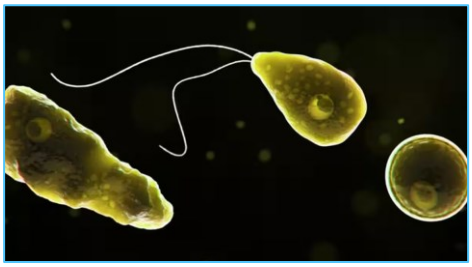
- The team published their findings in the journal PLOS **Neglected Tropical Diseases** after conducting a three-year surveillance study from 2019 to 2021.
- This parasite was diagnosed for the first time in **Moscow in 1941** and has been seen in other countries afterwards. But, India does not have any data on this parasite.
- The team collected over 6000 **clinical specimens** from two hospitals in Kolkata and tested them with molecular and microscopic methods to find out how common the parasite is in India.

- The pathogen was previously considered to be **non-pathogenic and free-living**, but has now become the leading cause of **amoebic infections**, surpassing **E. histolytica.**
- The pathogen is morphologically indistinguishable from **E. histolytica** (the cause of invasive amebiasis) and **E. dispar** (a common noninvasive parasite), and can only be identified by molecular tools.
- ICMR team also found that E. moshkovskii had a **unique seasonal pattern** of infection, with two peaks in summer and post-fall season and speculated that the parasite may have acquired some mutations that allow it to **adapt to the human gut** environment and infect the host.

- **E. histolytica** and **E. dispar** are two species of amoeba that can **infect** the **human intestine**.
- They are **morphologically identical**, which means they look the same under the microscope, but they have different genetic and biochemical characteristics.
- E. histolytica is the cause of **amebiasis**, a **disease** that can cause and cause symptoms such as diarrhoea, abdominal pain, and blood in the stool and causes diarrhoea, dysentery, and liver abscesses.
- **E. dispar** is not pathogenic, which means it does not cause any symptoms or harm to the host.

BRAIN-EATING AMOEBA

In News: A **rare and fatal infection** caused by a **brain-eating amoeba** called **Naegleria fowleri,** first identified in 1965 in Australia, has been reported for the **first time** in **Kerala, India.**

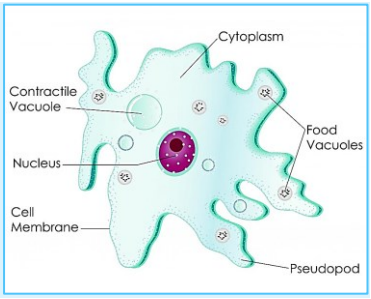


About Naegleria

- The **Naegleria fowleri** amoeba is a **single-celled organism** that can enter the human brain through the nose and cause primary **amebic meningoencephalitis,** a condition that **destroys brain tissues.**
- This is usually found in **warm freshwater sources** such as lakes, rivers, and hot springs, as well as in soil. It cannot survive in saltwater or seawater.
- The infection is very uncommon and occurs mostly in tropical and developing countries where **sanitation and hygiene** are poor.
- The **symptoms** may appear after two to fifteen days of exposure and include headache, fever, nausea, vomiting, and confusion.
- There is **no rapid test** to diagnose a brain-eating amoeba infection and most patients die within a **week** of **symptom onset.**

Amoeba

- An amoeba, sometimes written as "ameba", is a term generally used to describe a **single celled eukaryotic organism**.
- It has **no definite shape** and moves by extending and retracting parts of its cell membrane called **pseudopodia**.
- Pseudopodia or pseudopods are temporary projections of the cell and the word literally means "**false feet**".



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INTERNATIONAL RELATIONS & SECURITY

IMT TRILATERAL HIGHWAY

In News: Union Minister of Road Transport and Highways reported that construction on the ambitious **India-Myanmar-Thailand (IMT) Trilateral Highway** is 70% complete.

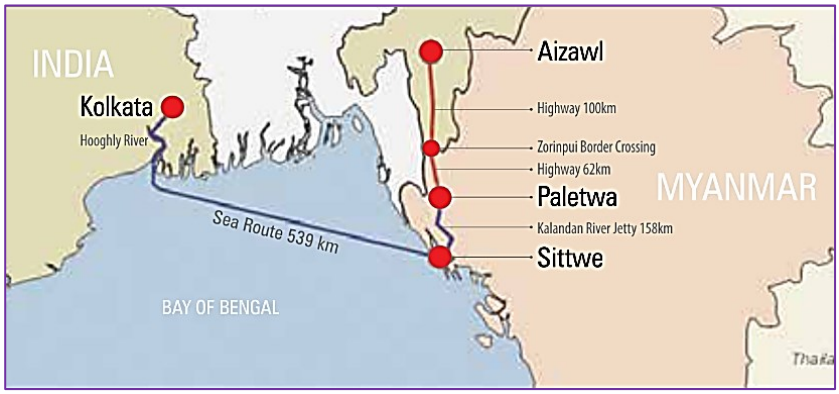
- The India-Myanmar-Thailand Trilateral Highway is a nearly **1,400-km long four lane road** project that will connect **Moreh in Manipur, India with Mae Sot in Thailand via Myanmar.**
- The IMT highway is part of India's **Act East Policy** which will solidify its relationship with Southeast Asian countries and increase its **strategic influence**.
- The road is expected to **boost trade and commerce** (business, health, education and tourism) in the **ASEAN–India Free Trade Area.**
- The project has **already been delayed** and no timeline for completion and operationalisation has been given.
- For the speedy completion of the project, India has provided funds for the **construction and renovation of bridges in Myanmar.**
- India has also proposed **extending the highway to Cambodia, Laos and Vietnam**.
- There are discussions ongoing for the **IMT Motor Vehicle Agreement** that aims to ease the cross-border movement of goods, vehicles and people between and among the participating countries, and enhance trade by helping goods cross borders faster and at less cost.

Moreh

- It is an **international border town** located on the India–Myanmar border in Tengnoupal district of the Indian state of **Manipur**.
- It is a rapidly developing international trade point with the **integrated customs and international immigration checkpoint**.
- It plays a very important role in India's Look East Policy.

KALADAN MULTIMODAL TRANSPORT PROJECT

In News: First commercial cargo movement carrying cement starting from Kolkata was received at India built **deep water Sittwe port in Myanmar** as part of **Kaladan Multimodal Transit Transport project (KMTTP).**



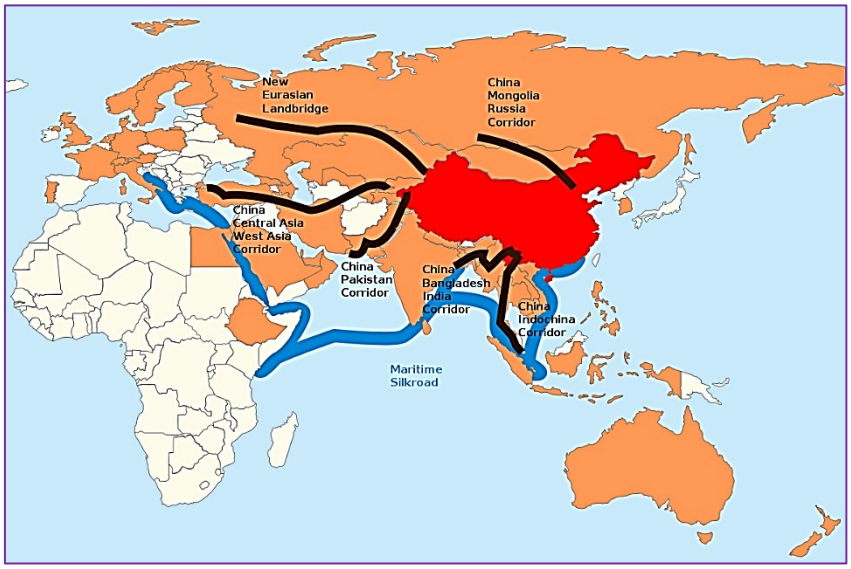
- Developed by India, Sittwe port at the mouth of the Kaladan river in Myanmar's Rakhine state can handle vessels with a maximum capacity of 20,000 DWT.
- The project will give **Northeast India access** to an **international sea route** and cut down the **cost and time** of transporting goods by more than **50%.**
- It also serves as a **gateway for trade** with other South Asian and East Asian countries.
- The project will also provide **an alternate outlet** to the **landlocked North East** which is heavily dependent on the narrow **'Chicken's Neck'** at Siliguri.

- The project was initially identified in 2008 to create a **multi-modal transport system** for cargo shipment from eastern India to Myanmar and Northeast India.
- The project is being piloted and funded by **the Ministry of External Affairs (India).**
- The project has several sections combining multi-modes of transport:
  - Kolkata-Sittwe **shipping route**
  - Sittwe seaport to Paletwa inland jetty **river boat route**
  - Paletwa inland jetty to Zorinpui **road route** in Myanmar
  - Zorinpui to Aizawl **road route** in India
- India has built a **deep water port** at Sittwe and a **river terminal** at Paletwa,and dredged the **Kaladan river.**
- The road from Paletwa to Zorinpui faces **security challenges** due to the **conflict in Chin and Rakhine state** involving the Arakan Army.

BCIM CORRIDOR

In News: The **BCIM (Bangladesh, China, India, Myanmar) Economic Corridor** is a **2,800-km**-long sub-regional initiative to promote **cooperation and development** among the four countries.

- It aims to connect **Kolkata with Kunming** through a corridor that crosses Bangladesh and Myanmar.
- The BCIM forum has potential benefits for **trade, tourism, energy, and poverty reduction** in the underdeveloped regions of the member countries.
- It was initally established as a **Track II dialogue in 1999** to create **a sub-regional 'cooperation zone' or 'growth zone'** that would **link the relatively backward regions** stretching from **landlocked areas** of Southwest China to North-eastern India along with the adjoining countries, Bangladesh and Myanmar.



- The BCIM Economic Corridor (EC) is expected to facilitate **connectivity and trade linkages between the underdeveloped and landlocked areas** of India's North-eastern region and South-western region of China.
- It can help **boost India's Act East Policy** and its engagement with Southeast Asia and China.
- **India's reluctance and refusal to join** China-led Belt and Road Initiative **(BRI)** has led to the **exclusion** of the Bangladesh- China- India- Myanmar (BCIM) Economic corridor from the list of projects covered by the China-led Belt and Road Initiative (BRI) umbrella.
- Hence, the BCIM forum seems to have been **overshadowed** by the BRI.

Belt and Road Initiative

- The BRI (Belt and Road Initiative) is a **Chinese-led initiative** to build a **network of infrastructure and trade routes** across Asia, Africa, and Europe.
- South Asia is covered by three major undertakings—the China-Myanmar Economic Corridor (CMEC), the Nepal-China Trans-Himalayan Multi-dimensional Connectivity Network, including Nepal-China cross-border railway, as well as the China Pakistan Economic Corridor (CPEC).

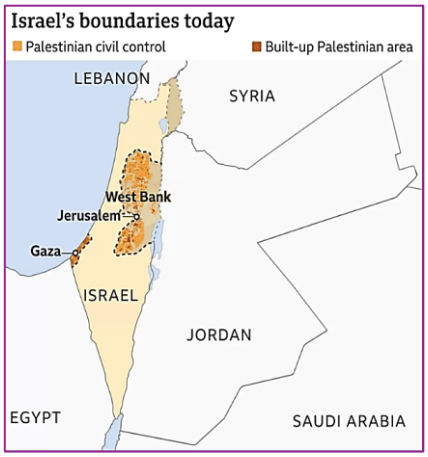
- India has refused to join the BRI as the CPEC project that passes **through Pakistan-occupied Kashmir (PoK) and Gilgit-Baltistan region**. India considers this as a **violation of its sovereignty and territorial integrity**.
- India also views the BRI as **a strategic threat** that could undermine its interests and influence in its neighbourhood and beyond.

ISRAEL-PALESTINE CONFLICT

In News: A fresh outbreak of violence in the Israel occupied West Bank led to the death of at least 18 people.

Brief history of Israel-Palestine Conflict

- After the **defeat of the Ottoman Empire** in World War I, Britain assumed control over Palestine in the Middle East.
- Tensions escalated between the Jewish minority and Arab majority in Palestine when Britain was assigned the responsibility of establishing a **"national home" for Jewish people** in the region.
- **Jewish immigration** to Palestine increased in the 1920s-1940s, driven by **persecution** and the aftermath of the Holocaust of World War II. This led to escalation of violence between Jews and Arabs.
- In 1947, the UN voted for the partition of Palestine into separate Jewish and Arab states, with Jerusalem designated as an international city. While Jewish leaders accepted the plan, it was **rejected by the Arab side** and never put into effect.
- The rejection by Arab states resulted in the declaration of the **State of Israel in 1948**, followed by the first Arab-Israeli War.
- This armistice after the war was mediated by the **UN's first peacekeeping mission**, the 'UN Truce Supervision Organization'.
- After the ceasefire, **Jordan** occupied the West Bank, **Egypt** occupied Gaza, and Jerusalem was divided between Israel and Jordan.
- In the **6-day 1967 War**, Israel captured East Jerusalem, the West Bank, the majority of the Syrian Golan Heights, Gaza, and the Egyptian Sinai Peninsula.
- **Palestinian refugees** and their descendants predominantly reside in Gaza, the West Bank, and neighbouring countries like Jordan, Syria, and Lebanon.

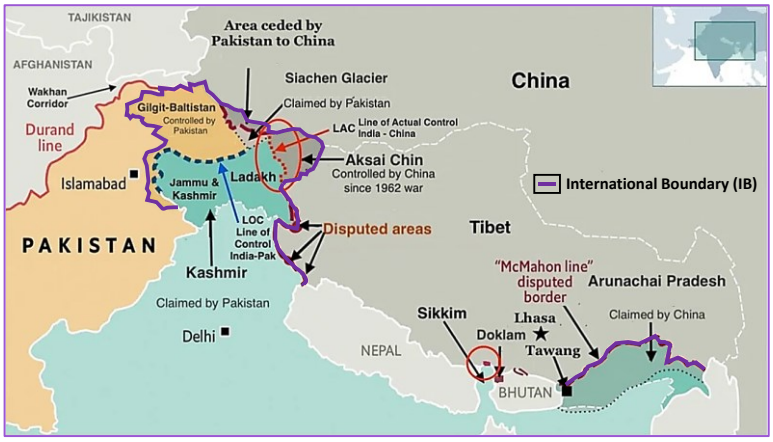


- Israel asserts **Jerusalem as its capital** in its entirety, while Palestinians claim East Jerusalem as the capital for a future Palestinian state.
- Tensions persist between Israel and Palestinians residing in East Jerusalem, Gaza, and the West Bank over the **ownership of Jerusalem, construction in West Bank, status of refugees and future existence of Palestine state**.
- The holy land of Jerusalem happens to be among **top religious sites** for 3 semitic religions: **Judaism, Islam and Christianity**.
- The religious sites are **Western Wall** (Judaism), **Al-Aqsa mosque and Dome of the Rock** (Islam) and **Church of Holy Sepulchre** (Christianity).

STAPLED VISA

In News: China has been issuing **stapled visas** to **Indian nationals** from **Arunachal Pradesh and Jammu & Kashmir.**

- China says the visas are **valid** documents, but the Government of India has consistently refused to accept this position.
- **Stapled Visa is** an **unstamped** piece of paper that is **attached by a pin or staples** to a page of the passport and **can be torn off or detached at will.**
- This is different from a regular visa that is affixed to the passport by the **issuing authority** and stamped.



Why does China do this?

- Passports, visas, and other kinds of immigration controls reiterate the idea of a **nation-state and its sovereignty** which is **inalienable and inviolable.**
  - Passports certify **identity and citizenship**.
  - They enable **legal and protected international travel**, upholding border regulation rights of nation-states.
- China disputes India's unequivocal and internationally accepted sovereignty over Arunachal Pradesh, and challenges the **legal status of the McMohan line.**

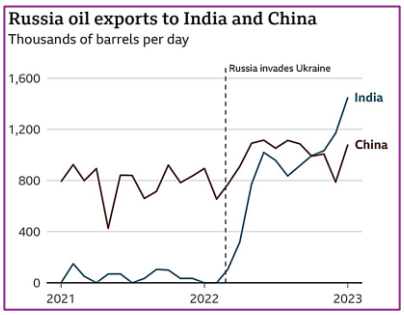
McMahon Line

Boundary between **Tibet and British India**. It specifically represents the boundary between **Arunachal Pradesh and Tibet**, from **Bhutan in the west to Myanmar in the east**. Agreed at the Convention Between Great Britain, China, and Tibet at the **Simla Convention of 1914.**

- Claims over the position of the Line of Actual Control (LAC) and Arunachal Pradesh as part of the **Tibetan Autonomous Region (TAR).**
- China claims some **90,000 sq km** of Arunachal Pradesh as its territory. It calls the area **"Zangnan"** in the Chinese language and makes repeated references to **"South Tibet".**

RUSSIAN OIL PAYMENTS

In News: Aiming to evade Western sanctions, the **Chinese Yuan** is being used by Indian refiners to pay for Russian oil imports.



- **Indian Oil Corporation (IOC)**, the biggest buyer of Russian crude, is the first state refiner to pay for Russian oil purchases using **Chinese currency yuan**.
- Indian refiners pay in yuan or other currencies for Russian oil based on **sellers preferences**, when dollar/euro transactions are blocked by sanctions.
- The increase in yuan payments has contributed to China's efforts to promote the **international use** of its currency, especially in the Russian oil trade.
- India's large purchase of Russian oil, paid in yuan inadvertently promotes **yuan internalisation** efforts, instead of **rupee** which **Russia is reluctant to accept** due to large accumulation of rupee balances which it can't use effectively.
- This is a global shift to lessen reliance on the US dollar (**De-dollarisation**) being actively pursued by countries especially when facing US sanctions.

NOMADIC ELEPHANT-23

In News: 15th **Indo-Mongolia bilateral joint military exercise Nomadic Elephant 23** was conducted in **Ulaanbaatar, Capital** of **Mongolia**


Military Diplomacy in Action: The Nomadic Elephant-23 Exercise

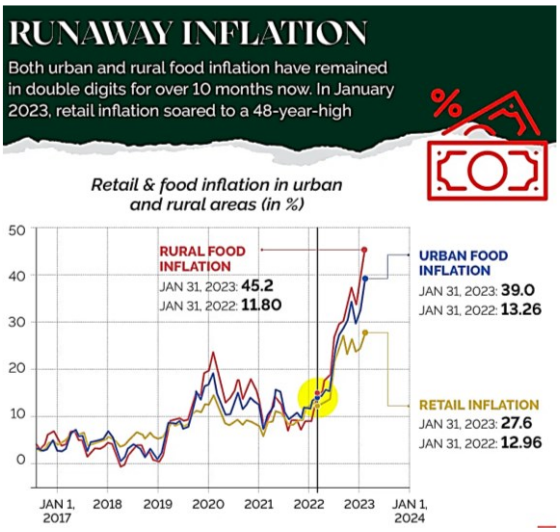
- It is an **annual training event** with Mongolia which is **conducted alternatively** in Mongolia and India.
- The aim of this exercise is to build **positive military relations, exchange best practices, develop interoperability, bonhomie, camaraderie** and **friendship** between the two armies
- The primary focus is on **counter-terrorism operations** in **mountainous terrain** under a United Nations mandate.
- It is designed to enhance the **skills and capabilities** of troops through diverse activities,which include **endurance training, reflex firing, room intervention, small team tactics** and **rock craft training.**
- The exercise promotes **mutual learning** and **operational exchange,** contributing to regional security and bilateral defence cooperation.

IMF'S BAILOUT

In News: IMF board has given its approval for a **$3bn (£2.3bn) bailout** for **Pakistan**.

- Pakistan was on the brink of **defaulting on its debts** and had barely enough in foreign currencies to pay for a month of imports.
- A bailout means **extending support** to an entity facing a threat of **bankruptcy**. Countries seek IMF bailouts when they are facing **macroeconomic risks, currency crises** and need assistance to meet **external debt obligations**, to **buy essential imports** and push the exchange value of their currencies.

Pakistan's Economy



- The **cost of living** has been soaring in Pakistan.
- The official **annual rate of inflation** currently stands at **almost 30%.**
- Its central bank raised the **main interest rate** to a record high of **22%**.
- **Reserves at $3.5bn.**
- **Credit rating:** Standard & Poor's rating for Pakistan stands at **CCC+,** Moody's at **Caa3** and Fitch at **CCC-.**

IMF's conditions

- IMF emphasizes **timely rebasing of tariff** in Pakistan's **power sector** to ensure cost recovery.
- Rebasing of tariff means that the tariff is **adjusted** to a **new base year**. This is done to account for changes in the **economy and inflation.**
- **Withdraw import restrictions** put in place to control external payments in the face of fast-depleting foreign exchange reserves.
- Commit fully to a **market determined exchange rate, remove controls and eliminate multiple exchange rate** practices in different markets.

CLUSTER MUNITIONS

In News: The US has been providing Ukraine with **cluster munitions,** a controversial type of weapon that is banned by over 100 countries, to be used against Russia in the ongoing conflict.

What are cluster munitions?

- Cluster munitions are weapons that release or eject **many small explosives,** called **submunitions** or **bomblets**, over a wide area.
- They can be delivered by aircraft, missiles, artillery, or rockets and are designed to kill or destroy multiple targets at once, such as personnel, vehicles, runways, or power lines.
- The **international Convention on Cluster Munitions** defines cluster munition as **"a conventional munition that is designed to disperse or release explosive submunitions, each weighing less than 20 kilograms."**

Why are cluster munitions of humanitarian concern?

- Cluster munitions pose **serious risks** to civilians both during and after the conflict. They are an immediate threat to civilians during conflict by **randomly scattering** submunitions or bomblets over a wide area.
- Many submunitions **fail to explode** on impact and **remain hidden** and unexploded for years and act like **landmines** and can harm anyone who comes into contact with them.
- They are often **inaccurate** and **indiscriminate**, and can affect civilians who live or work near the target area.

How are cluster munitions regulated?

- The **Convention on Cluster Munitions** is a **United Nations-adopted legal instrument** that **prohibits** the **use, production, transfer,** and **stockpiling** of **cluster munitions.**
- The convention also establishes a **framework** for **cooperation** and **assistance** to support the **victims of cluster munitions, clear the contaminated areas, provide risk education,** and **destroy the stockpiles.**
- The convention was **adopted in Dublin in 2008** and **entered into force in 2010**. It has 110 State Parties and 13 Signatory States as of February 2022.
- **India**, along with the **US**, **Russia**, **China**, **Pakistan**, and **Israel**, among others, has not signed or joined the convention.
- Human Rights Watch is a founding member of the **Cluster Munition Coalition** and contributes to its **annual Cluster Munition Monitor report.**

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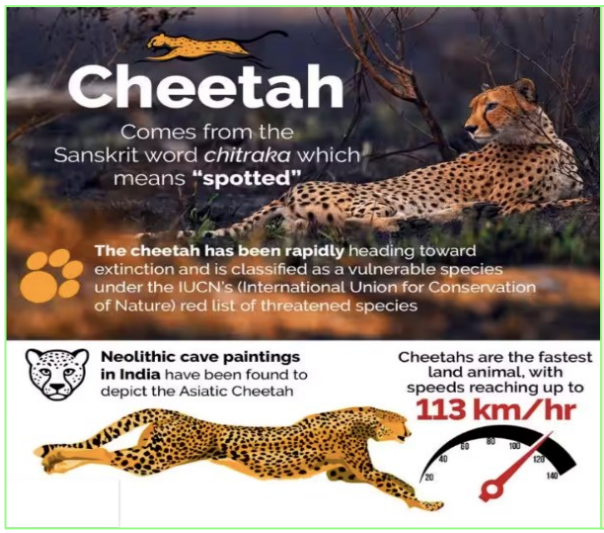
GEOGRAPHY, ENVIRONMENT & DISASTER MANAGEMENT

CHEETAH PROJECT IN INDIA

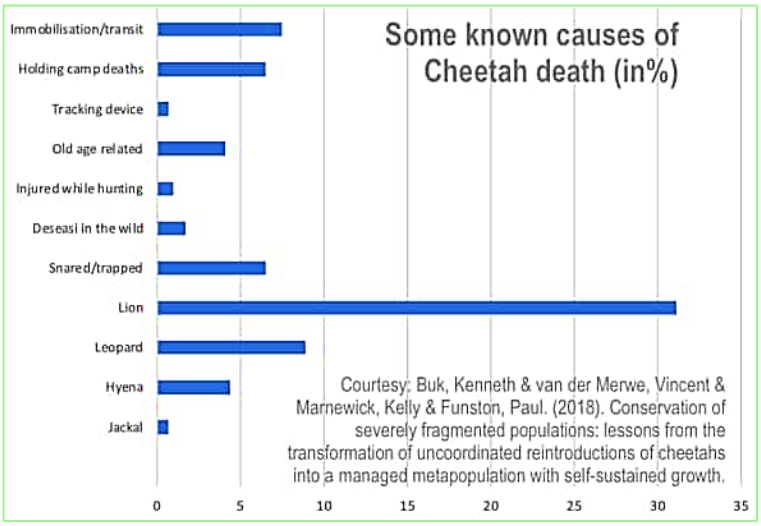
In News: Three more cheetahs have been found to have similar **maggot-infested wounds** as did the two cheetahs that died recently in Madhya Pradesh's Kuno National Park.

- **20 Cheetahs** (8 from Namibia and 12 from South Africa) were **translocated** to India, and **4 cubs were born** to a Cheetah in India.
- At present, **5 of Cheetahs and 3 cubs are dead** due to **various circumstances** related to **disease, intra-species fighting, heat, malnutrition**, etc.
- Other possible causes being indicated towards the death: **stress**, **diet** in new relocated location, longer duration of **quarantine/confinement**, **botulism**, **radio collar abrasion**, inability as a **free ranging** animal, etc.
- According to previous assessment, the government mentions that **50% deaths** of Cheetahs during the **1st year of their translocation** is **normal/not alarming.**
- Media reports mention that there has been a lack of **transparent, accurate and timely flow of data** around the issue, the provision of which could have avoided some of the deaths.
- At present, 11 of the surviving Cheetahs are **free ranging** and 5 of them are in **quarantine bomas** (surveillance enclosures).
- Cheetah, the world's fastest animal on terrestrial ecosystem, is considered as a **keystone species** in **grassland and dry forest** ecosystem.



Bomas: these are specially designed one-square-kilometre **enclosures** to help the animals **acclimatise** to Indian conditions.

Keystone Species: those organisms that have a **large impact** on the ecosystem in proportion to their population and help **define the ecosystem** they live in.



Possible Factors behind Cheetah Deaths

- **Infection** caused due to **chafing** of radio collars
- Prolonged **wet conditions** in India and **thick fur** of African Cheetahs lead to **sustained moisture** around neck region
- Possible attack by **local pathogens**
- Reduction in **prey base** (carrying capacity of Kuno) and likely being **fed by forest officials**

- **Served meat** (bufallo, goat) is not the natural meat
- **Extended quarantine:** long ranging animal, i.e. can't sustain in localized area

Natural Factors behind Cheetah Deaths

- Less **grooming**, leads to faster spread of infection
- **Delicate** animal, considered weakest among the big cats
- **10% survival of cubs** in wild
- **Psychological adjustment** in new habitat

IUCN status of Cheetah

- **African Cheetah: Vulnerable** (in African region)
- **Asiatic Cheetah: Critically endangered** (in Iran)

Steps to conserve Cheetah for future

- **Drones** to monitor Cheetah movement, authorities to **take off collars** during rainy season and keep them in bomas (leave them in wild with radio collars after the rainy season)
- Possible creation of **alternative habitat** in **GandhiSagar** Wildlife Sanctuary (MP) and **Mukundra Hills** Tiger Reserve (Rajasthan).
- Need for **fenced-in reserves** (like those in South Africa)

Caution for Future Translocation Projects in Changing Landscape

- Need **rigour and consensus** before carrying out translocation programs
- Carnivore conservation in human-dominated landscapes requires **more than expertise of wildlife biologists**
- Evolving anthropocentric activities like agriculture, mining and diversion of forest lands
- Conserve **local species**
- **Preserve the land use** by not classifying it as wasteland, diverting for mining or agriculture

Project Cheetah

- India plans to carry out the **world's first and ambitious intercontinental translocation** program of Cheetahs through Project Cheetah.
- The Cheetah Reintroduction Project aims to **restore the cheetah population** in India after 70+ years of extinction.
- India has signed an **MoU with South Africa** for planned introduction of approx. 100 Cheetahs (12 cheetah per year in a span of 8-10 years), to be able to nurture a **self-sustaining population base** of 35 Cheetahs.
- **Objective**: Restore India's evolutionary balance and contribute to global cheetah conservation through the development of a **cheetah metapopulation**.
- Cheetahs have been translocated from **Namibia and South Africa**.
- New home to translocated Cheetahs: **Kuno National Park**, Madhya Pradesh

GAMBUSIA (MOSQUITO FISH)

In News: After encountering the **rising dengue and malaria cases**, **Andhra Pradesh** government decided to release approximately 10 million Gambusia fish into the state's water bodies to combat these mosquito-borne diseases.

- **Gambusia Affins fish**, also called as **mosquito fish**, is widely used as a **biological agent** to control **mosquito larvae**.
- The mosquito fish are **invasive alien species**, native to the waters of the southeastern **United States** and according to authorities, a single full-grown fish eats approx. **100-300 mosquito larvae per day**.
- Mosquito fish has been part of various malaria control strategies in Kerala, Odisha, Chandigarh, etc. in India since 1928. But **studies haven't been conclusive** about the effectiveness of Gambusia in mosquito control program.
- Studies question the **predatory efficacy** of Gambusia in **running water, water bodies with high insecticide levels and those with thick vegetation**.
- Gambusia also preyed on other **mosquito larvae predators like zooplanktons**, which indirectly leads results in **local ecosystem imbalance** since these zooplanktons feed on algae. A lack of zooplankton can lead to **harmful algal blooms**.

- Specifically in India, there has been a question on efficacy in the program because of possible introduction of a **sister variety G holbrooki**, which is invasive but ineffective for mosquito control. Also, Gambusia fish has a **high breeding capacity**.
- A single female may produce between **900 and 1,200 offsprings during its lifespan**. To add to it, it has wide ecosystem **adaptability**.
- Such studies have made the International Union for Conservation of Nature declare Gambusia **one of the 100 worst invasive alien species** in the world.
- Thus, WHO suggests the use of Gambusia as a larval control **method only in man-made breeding habitats**, like swimming pools and garden ponds, with no access to the natural environment.
- In natural environment, public health practitioners recommend an integrated approach that involves various other methods like **chemical spraying, source reduction, clearing vegetation, open puddles/drainage**, etc.
- Traditional techniques also involve **pouring crude oil** into water bodies to stop mosquitoes breeding but it contaminates the well and it is difficult to clean.
- The Gambusia breeding program is a part of India's plan to being **malaria free by 2027 and elimination by 2030**.
- WHO's global targets for 2030 are to reduce malaria **incidence cases by 90%, reduce malaria mortality by 90%**, eliminate malaria in at **least 35 countries** and **prevent resurgence** of malaria that are malaria free.
- India also plans **to prevent dengue transmission and reduce dengue related morbidity and mortality**.
- It is only the female **aedes aegypti mosquitoes** spread the **dengue virus**. Only female **anopheles mosquitoes** can transmit **malaria protozoa**, which is a single-celled parasite.

UNEP REPORT

In News: A new report by the **UN Environment Programme (UNEP)** suggests that by 2040, plastic pollution could be **reduced by 80%,** with the initial focus on eliminating problematic and unnecessary plastics to reduce the size of the problem.

- The report titled **"Turning off the Tap: How the world can end plastic pollution and Create a circular economy"** provides practical solutions, market shifts, and policy recommendations to guide governments and businesses in combating plastic pollution and transitioning to a **circular economy.**
- A **circular economy** entails markets that **incentivise reusing products**, rather than scrapping them and then extracting new resources. In such an economy, all forms of waste, such as clothes, scrap metal and obsolete electronics, are **returned to the economy** or used more efficiently.
- Walter Stahel, a circular economy pioneer, quotes **"The goods of today are the resources of tomorrow at yesterday's resource prices".**

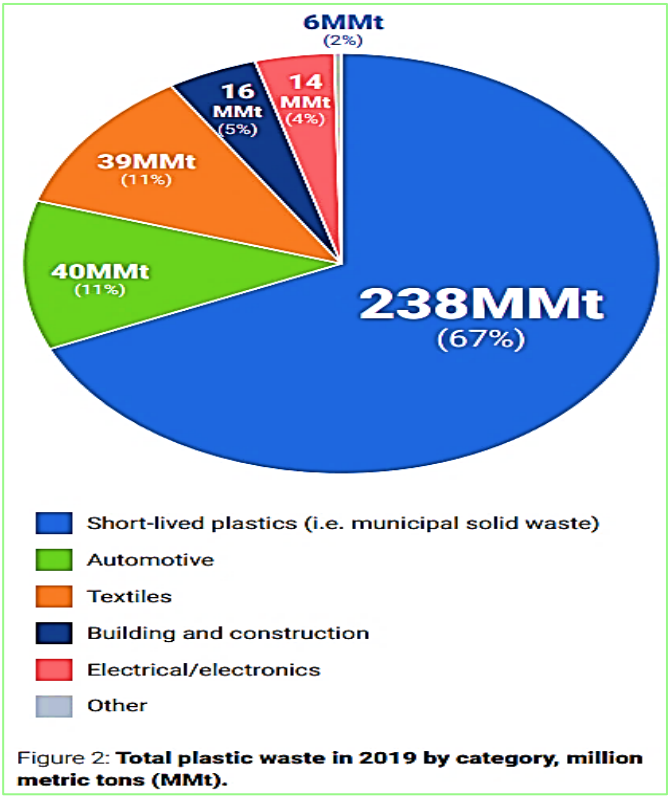
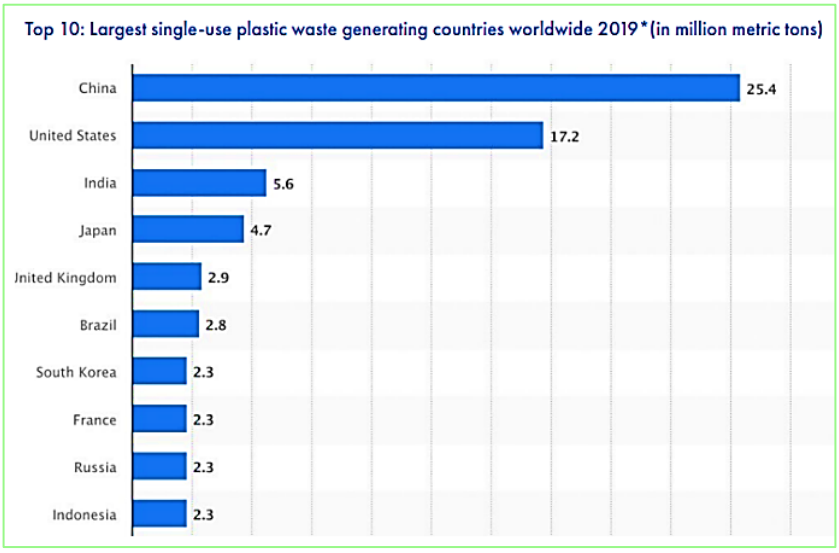


Figure 2: **Total plastic waste in 2019 by category, million metric tons (MMt).**

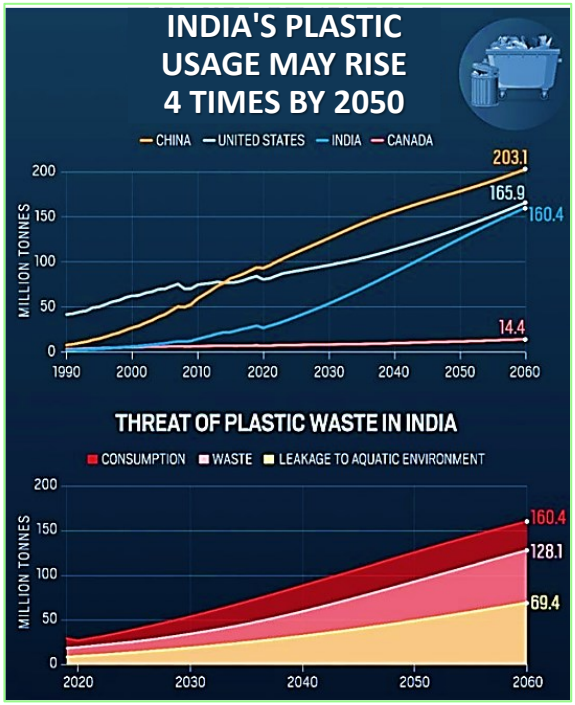
Key Takeaways

- Plastic pollution occurs when plastic has **gathered** in an area and has begun to **negatively impact the natural environment** creating problems for plants, wildlife, and even the human population.
- The report calls for **three market shifts: reuse, recycle and reorient and diversify products:**

- **Reuse:** Promoting reusable options like **refillable bottles**, bulk dispensers, deposit-return schemes, and packaging take-back schemes can lead to a **30% reduction in plastic pollution.**
- **Recycle:** Increasing recycling efforts can further **reduce plastic pollution by 20%,** by **eliminating fossil fuel** subsidies, and implementing design guidelines to improve recyclability.
- **Reorient and diversify:** An additional **17% of the decrease** in plastic pollution can be achieved by replacing products such a s plastic wrappers, sachets, and takeaway items from compostable materials.



- Currently, the world produces **430 million metric tons of plastics each year**, of which over **two-thirds are short-lived products.** (plastic ballpoint pens, too thbrushes, disposable lighters and disposable razors, etc.)
- If the **"business as usual"** approach continues, **plastic production** is projected to **triple by 2060**, which could result in plastic emitting **19% of the global greenhouse gas (GHG)** emissions permitted under a **1.5°C scenario by 2040**, essentially making the goal out of reach.
- **Reducing** plastics by **80% annually** would result in the saving of **0.5 billion tons of carbon** pollution and could lead to the creation of 700,000 **new jobs** in developing countries by the year **2040**.
- **Extended Producer Responsibility (EPR)** schemes for plastics involve industry players **paying fees** for the packaging or plastics they introduce into the market. These fees are then utilized to fund the **collection, sorting, and recycling of the materials.**



Initiatives taken by India:

India has taken initiatives to improve its waste management practices and policies, such as:

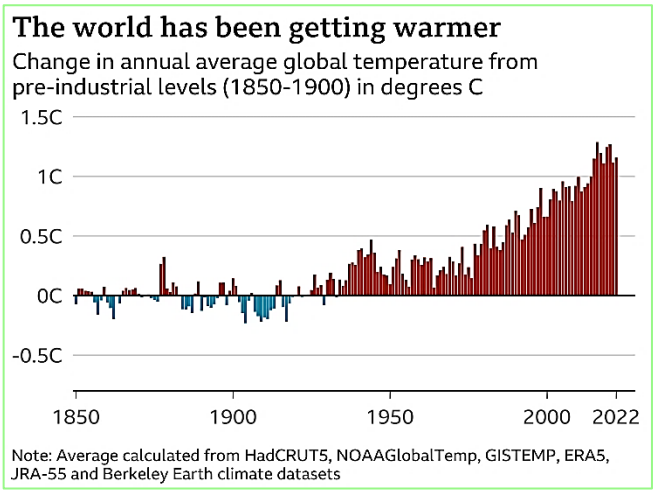
- **Swachh Bharat Mission:** A flagship programme launched by the Government of India in 2014 to achieve a **clean and open defecation-free India by 2019.**
- **Waste to Wealth Mission:** Initiative by the **Office of the Principal Scientific Advisor** to the Government of India that aims to address the issues of **waste disposal**, **deteriorating air** quality and increasing pollution of **water bodies**.
- **E-Waste Management Rules 2022 and Plastic Waste Management (Amendment) Rules 2022:** Under the **Ministry of Environment, Forest and Climate Change**, Government of India plans to regulate the generation, collection, storage, transportation, treatment, and disposal of e-waste and plastic waste. The rules introduced recycling targets in the **Extended Producer Responsibility (EPR)** plan of the producers of e-waste and plastic waste.

United Nations Environment Programme (UNEP)

- UNEP is the leading global authority on the environment.
- It is driving transformational change by drilling down on the root causes of the **triple planetary crisis** of **climate change, nature and biodiversity loss** and **pollution**.
- With its headquarter in **Nairobi, Kenya**, it was established in **1972** to guide and coordinate environmental activities within the United Nations (UN) system.
- Its most widely recognized activity is **Earthwatch,** an international monitoring system designed to **facilitate the exchange of environmental information among governments.**

BREACH OF 1.5°C THRESHOLD

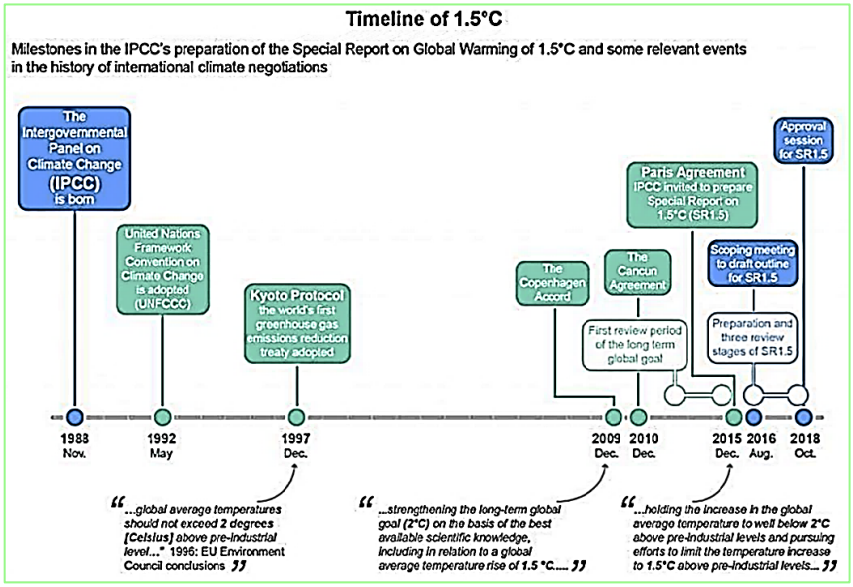
In News: Scientists warn global warming is now more likely to breach the 1.5°C threshold set by the Paris Agreement based on the latest report **'Global Annual to Decadal Climate Update'** by **World Meteorological Organization (WMO).**



- The WMO report predicts a **98% chance** that one of the next five years will be the **hottest on record,** surpassing 2016 which saw global temperature rise by about 1.3°C (2.3°F) of warming.
- The report found out there was **66% likelihood** of **exceeding the 1.5°C threshold** in at least one year between 2023 and 2027.
- The **hottest eight years ever recorded were all between 2015 and 2022**, with 2016 the warmest (an El Nino year), but temperatures are forecast to increase further as climate change accelerates.
- The global mean temperature in 2022 was 1.15°C above the **1850-1900 average,** despite the cooling influence of La Niña conditions. Temperatures are now rising by about 0.2°C per decade.
- Two factors, continuing **high levels of carbon emissions** from human activities and appearance of **El Niño** will likely push the global temperature to a new high.

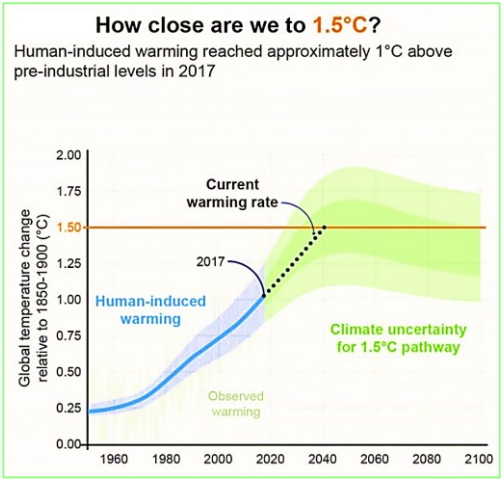
1.5°C Threshold as the Tipping Point

- The **1.5°C threshold** is a key goal of the **2015 Paris Agreement**, which aims to limit the rise in global average temperature to **well below 2°C above pre-industrial levels** and pursue efforts to keep it to 1.5°C.
- Scientists have warned that exceeding 1.5°C of warming would increase the **frequency, intensity, variability and unpredictability of heat waves, droughts, heavy precipitation, floods, storms, sea level rise, biodiversity loss, food insecurity, and health risks.**



Causes of Global Warming

- The WMO report attributes the rising temperatures to both **human-induced climate change and natural variability.**
- Human activities such as **burning fossil fuels, deforestation**, and **agriculture** have increased the concentration of greenhouse gases in the atmosphere, which traps heat and warms the planet.
- Natural phenomena such as **El Nino** warm waters in the tropical Pacific, heat the atmosphere above, thus spiking global temperatures.

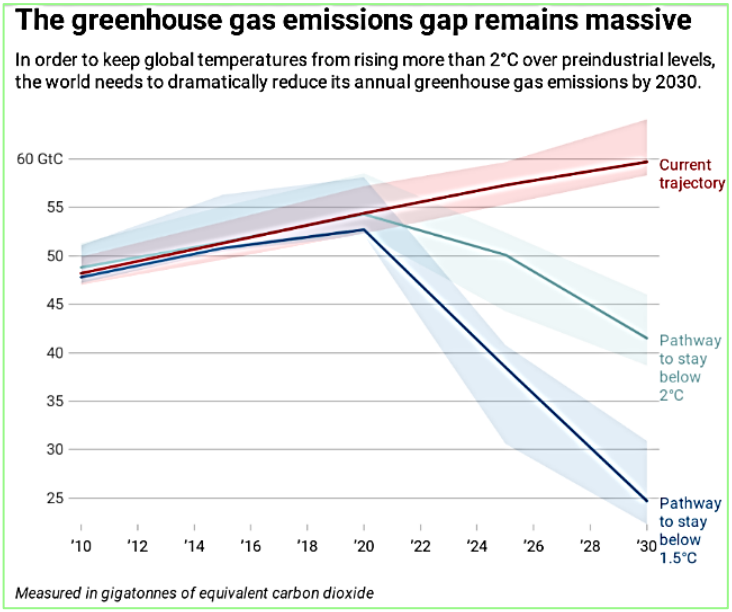


Limiting Global Warming to 1.5°C

- Limiting global warming to 1.5°C is still possible but **requires rapid, unprecedented and urgent action** from all stakeholders, However, current efforts are far from sufficient to meet this challenge.
- The **IPCC report and UN Environment Programme's Emission Gap Report 2022** states that to achieve this goal, global net human-caused emissions of carbon dioxide (CO_2) would **need to fall by about 45% from 2010 levels by 2030 and reach net zero by 2050.**

Barriers to effective action and cooperation

- Lack of **political will and leadership**: to implement ambitious and transformative policies
- Lack of adequate **finance and technology transfer**: to support low-carbon development and adaptation in developing countries
- Lack of **public awareness and engagement**: on the causes and consequences of climate change and the benefits of action
- Lack of **coordination and collaboration**: among different actors and sectors at various levels (global, regional, national, local)



Possible solutions

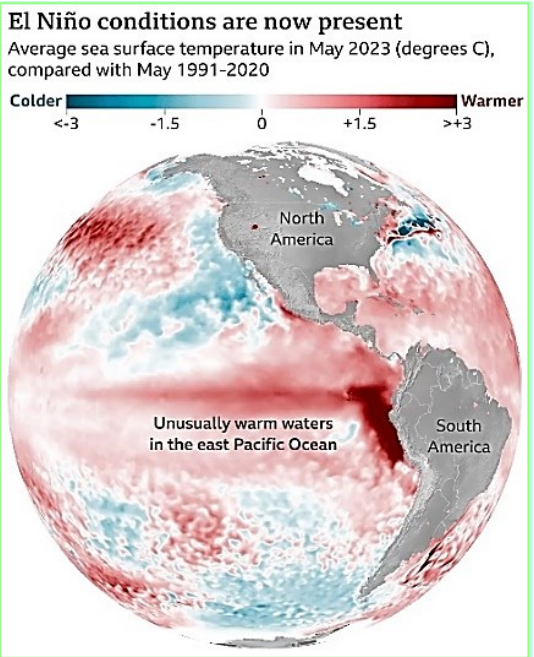
- Strengthening the implementation and ambition of **Nationally Determined Contributions** under the Paris Agreement through regular reviews and updates
- Mobilising finance for **mitigation and adaptation**, especially for developing countries
- Enhancing **technology development, innovation**, and **diffusion for low-carbon and climate-resilient solutions**
- Fostering **multi-stakeholder partnerships and networks** for sharing best practices, experiences, and resources
- Integrating climate change considerations into **policies, plans, and decisions** across all sectors and levels.

Paris Agreement

- The Paris Agreement is a **legally binding international treaty** on climate change. It was adopted by 196 Parties at the UN Climate Change Conference (COP21) in Paris, France, It entered into force on 4 November 2016.
- Its overarching goal is to hold "**the increase in the global average temperature to well below 2°C above pre-industrial levels**" and **pursue efforts "to limit the temperature increase to 1.5°C above pre-industrial levels**."
- To limit global warming to 1.5°C, greenhouse gas emissions **must peak before 2025** at the latest.
- The Paris Agreement requires parties to **submit nationally determined contributions** (NDCs) that outline their plans and targets for reducing greenhouse gas emissions and adapting to climate change, and to **update them every five years** with increasing ambition.

El Nino and impact on temperature

- El Niño is part of a **natural climate phenomenon** called the **El Niño Southern Oscillation (ENSO)**. It has two opposite states - El Niño and La Niña - both of which **significantly alter global weather**.
- During El Niño warmer water spreads further and stays closer to the surface. This releases **more heat into the atmosphere**, creating **wetter and warmer air**.
- Global temperatures typically increase during an El Niño episode and fall during La Niña.
- Between 2020 and 2022, the **Northern Hemisphere had three La Niña (rare triple dip)** episodes in a row, which stopped global temperatures from increasing as much as they otherwise would have, as a result of human-caused climate change.



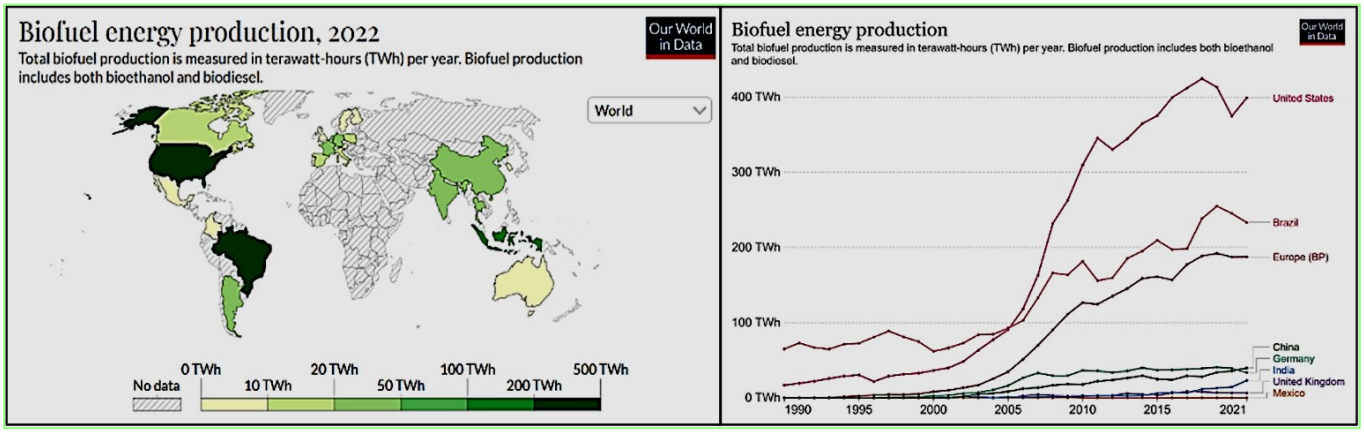
Intergovernmental Panel on Climate Change (IPCC)

- The IPCC is the United Nations body for **assessing the science related to climate change.**
- It was created in **1988** by the **World Meteorological Organization** (WMO) and the United Nations Environment Programme (UNEP) and currently has 195 members.
- It provides regular assessments of the **scientific basis** of climate change, its **impacts and future risks**, and options for **adaptation and mitigation**.
- It prepares comprehensive **Assessment Reports** about knowledge on climate change, its causes, potential impacts and response options.
- The IPCC is divided into three Working Groups and a Task Force.
  - Working Group I deals with The **Physical Science Basis** of Climate Change,
  - Working Group II deals with Climate Change **Impacts, Adaptation and Vulnerability**
  - Working Group III deals with **Mitigation** of Climate Change.
- IPCC also develops a **methodology for calculation and reporting of national greenhouse gas emissions and removal** through its Task Force on National Greenhouse Gas Inventories.

ETHANOL BLENDING IN INDIA

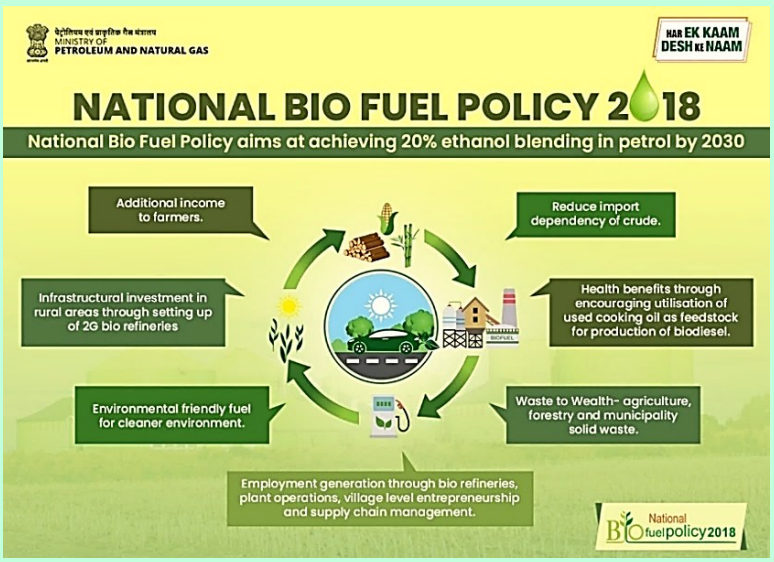
In News: International Energy Agency (IEA) in its Renewable Energy Market update for June 2023 predicts ethanol demand growth in India to meet the updated **20% blending target.**

- Accordingly, **India, Brazil and Indonesia** will account for almost two-thirds of **biofuel demand growth** in 2023-24.
- IEA said all three countries have ample **domestic feedstocks**, additional **production capacity**, relatively **low production costs** and a package of **policies** they can leverage to increase demand.
- The government of India had recently **amended** the National Policy on Biofuels to spur the growth of biofuel energy in India's energy mix.



National Policy on Biofuels, 2018

- Aimed at reducing **dependence** on petroleum imports by **encouraging fuel blending**, the **Ministry of Petroleum and Natural Gas** released the **"National Policy on Biofuels"** in 2018.
- The policy envisages a **biofuel led revolution**, which aims to **reduce imported fuel dependence, promote environment friendly fuel (HC, COx, NOx, GHG reduction), provide additional income to farmers** and generate **employment** through refineries and plant operations.
- The amendment in 2022 advanced the blending target of **20% bioethanol in petrol to FY26** from 2030 and made additional **feedstocks available** for the production of biofuels.



- An indicative target of **5% blending of biodiesel** in diesel is proposed by 2030.
- With **bioethanol, biodiesel and bioCNG** in focus, national biofuel policy includes **Ethanol Blending Programme (EPB)**, **production of 2nd generation ethanol through refineries (derived from forest and agricultural residues), new feedstock**, increasing capacity for **production of fuel additives**, and **R&D in feedstock** for integration with other fuel.

Roadmap for Ethanol Blending in India 2020-25

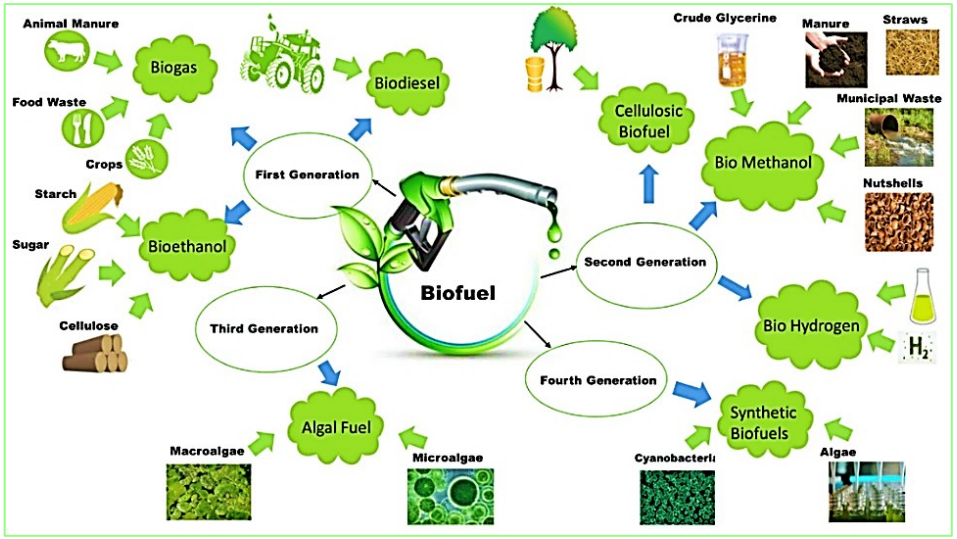
- Under Ethanol Blended Petrol (EBP) programme, a target was set up by the government i.e. 10% ethanol blending by 2022 and 20% blending (**E20: petrol with 20% ethanol**) by 2030. **E20 target has now been advanced to 2025-2026**.
- Further, the procurement price of ethanol by oil marketing companies (OMCs) is fixed by the government and **OMCs** can procure it **from domestic sources**.
- Automobile manufacturers have been mandated to roll out **new flex fuel engines** that accommodate an ethanol blend of up to 40% to 50%.
- Gradual diversification into **water-efficient maize and non-sugar food grains** to produce ethanol.
- A successful E20 programme can save India **$4 billion** (Rs 30,000 crore) annually, according to Niti Aayog.
- The EBP program is being implemented by **Ministry of Petroleum & Natural Gas** and is supported by **Ministry of Consumer Affairs, Food and Public Distribution**.

Bioethanol is ethanol produced from biomass such as

- **Sugar** containing materials, like sugar cane, sugar beet, sweet sorghum, etc.
- **Starch** contains materials such as corn, cassava, rotten potatoes, agro-food/pulp industry waste, algae, etc.
- Cellulosic materials such as **bagasse, wood waste**, agricultural and forestry **residues**
- Other renewable resources like **industrial waste, vegetable wastes**, industrial waste off gases or any mix combination of above feedstock.

Biofuels and its Generation

- Biofuel is a type of fuel that is **made from organic matter**, such as plants or animals, that can be used instead of or along with fossil fuels, such as coal, oil or gas, for various purposes.
- Biofuels can be classified into four categories based on the **feedstock and the technology** used for their production:
  - **First generation biofuels:** Made from **food sources** such as sugar, starch, vegetable oil, or animal fats using conventional technology.
  - **Second generation biofuels:** Produced from **non-food crops** or portions of food crops that are **not edible** and considered as **wastes**, such as **stems, husks, wood chips, and fruit skins.** Examples include cellulosic ethanol, biodiesel, etc.
  - **Third generation biofuels:** Produced from **micro-organisms like algae**. Example: butanol.
  - **Fourth generation biofuels:** Produced from **genetically engineered crops** that can absorb more carbon dioxide than conventional crops. Example: Synthetic Biofuels.



Issues with biofuel sector

- **Compete with food crops for land and water** resources (Food versus Fuel dilemma)
- **Impact the inflationary tendencies in food prices and hunger/malnutrition**
- Cause **environmental pollution and biodiversity loss**
- Require **high investment and technological support** to move to **diversification** in 2G, 3G and 4G biofuels.
- **Harmonized policy and regulatory framework**: export promotion, food security, RnD, OMC demand for biofuel to be in synchrony.
- **Reluctance in financing** of sugar mills/molasses-based distilleries with weak financials for production of ethanol.

Pradhan Mantri JI-VAN (Jaiv Indhan-Vatavaran Anukool fasal awashesh Nivaran) Yojana: A scheme to provide financial assistance to **integrated bioethanol projects** using lignocellulosic biomass and other renewable feedstock, like bagasse wastes, rice wastes, corn wastes, spent grains**,** crop residue, etc. (implemented by **Ministry of Petroleum and Natural Gas** since 2019)

SATAT (Sustainable Alternative Towards Affordable Transportation) Scheme: A scheme to promote **Compressed Biogas** (CBG) production from various waste/biomass sources such as agricultural residue, municipal solid waste, etc. (implemented **by Ministry of Petroleum and Natural Gas** since 2018)

National Biodiesel Mission: A mission to promote biodiesel production from short gestation **non-edible oilseeds** such as jatropha, karanja, etc., **used cooking oil** (UCO), **animal tallow**, etc. (implemented **by Ministry of New and Renewable Energy).**

GOBARdhan (Galvanizing Organic Bio-Agro Resources Dhan)

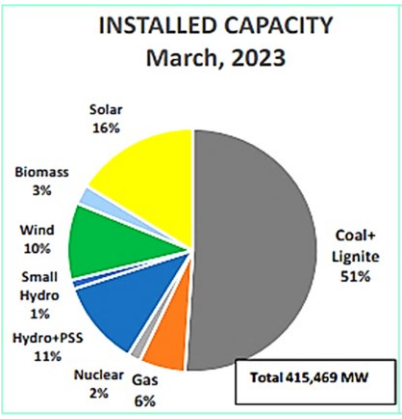
- The scheme aims to convert cattle and organic waste into biogas and manure, increase rural income and employment, and promote village cleanliness and environmental sustainability.
- This waste-to-wealth program provides a common platform to the Ministry of New and Renewable Energy, Ministry of Petroleum and Natural Gas, Department of Animal Husbandry and Dairying, Department of Agriculture, Cooperation and Farmers Welfare, Department of Rural Development, and Department of Drinking Water and Sanitation.
- It was initiated by the Department of Drinking Water and Sanitation under the **Jal Shakti Ministry** under Swachh Bharat Mission (Gramin), 2018.

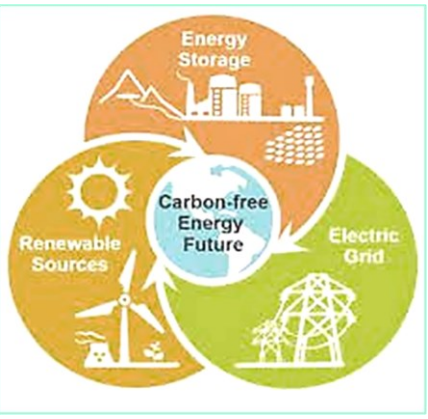
Conclusion

- Biofuels are an important **alternative source of energy** that can contribute to India's **energy security, environmental sustainability, rural development and economic growth**.
- Adoption of biofuel policy in letter and spirit could lead to **integrated and inclusive development** of Indian subcontinent.

41 GW BATTERY ENERGY STORAGE SYSTEMS

In News: Accordig to Power Ministry report, India would be equipped with **41.65 GW/208.25 GWh of Battery Energy Storage Systems (BESS)** by 2030 to meet its electricity demand.

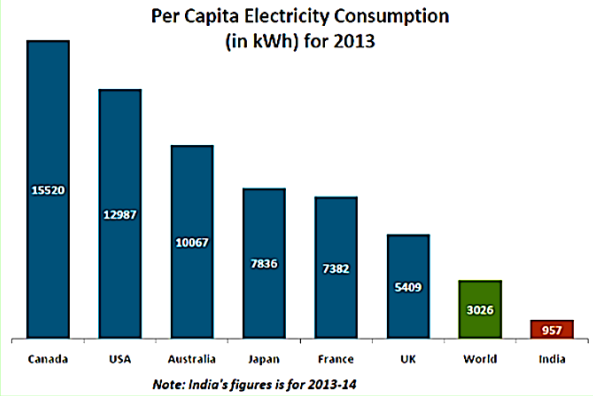


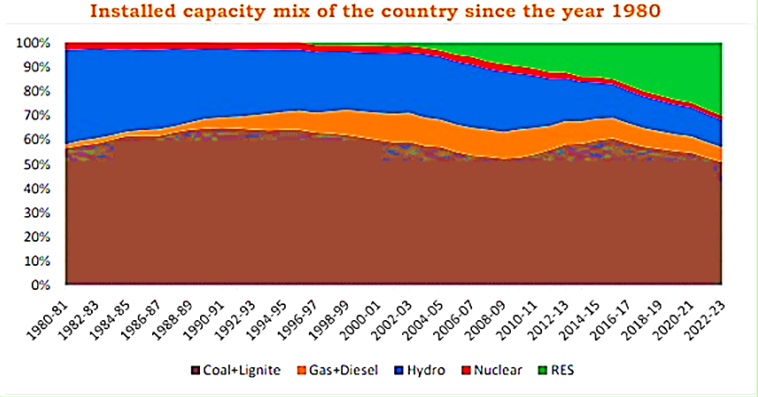


- India is projected to have 41 GW of energy storage capacity along with **777GW of total installed power** capacity by 2029-30, according to a report by **Central Electricity Authority.**
- The report projects a rise of electricity **generation** from **non-fossil fuels** (including large hydro) from **25**% in 2022-23 to **44**% by 2030.
- In terms of **capacity**, **non-fossil fuel-based** sources would increase from **42**% now to **64**% in the total installed power of 777GW by 2030.
- Energy systems considered for the studies:
  - Conventional Sources: Coal and Lignite, Large Hydro, Nuclear, Natural gas.
  - Renewable Energy Sources: Solar, Wind, Biomass, Small Hydro, etc.

- Storage Technologies: **Grid scale battery energy storage systems, Green Hydrogen based storage cells**, etc.

- The report says with high renewables penetration in the system, India can comfortably meet its **Nationally Determined Contribution target of 50%** non-fossil fuel capacity.
- **Per capita electricity consumption** doubled from **631 units to 1255 units** in India between 2005 and 2022.





Battery Energy Storage Systems (BESS)

- Battery storage, or battery energy storage systems (BESS), are **rechargeable batteries** that enable energy storage from **renewables**, like solar and wind, to be stored and then released when the power is needed most.
- Battery storage systems will play an increasingly pivotal role between **green energy** supplies and responding to **electricity demands** and are essential to speeding up the **replacement of fossil fuels** with renewable energy.
- Storage of renewable energy **requires** low-cost technologies that have long lives, charging and discharging thousands of times, are safe and can store enough energy cost effectively to match demand.
- Recently, the government of India has invited expression of interest for installation of **1000 MWh BESS as a pilot project** to support the development of renewable energy in the country.

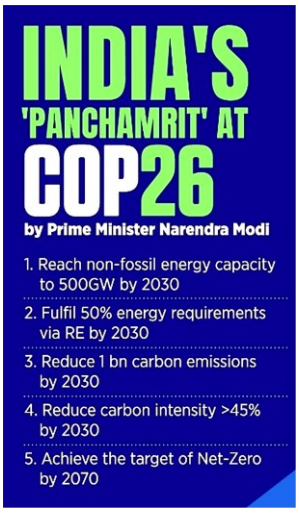
Central Electricity Authority

- The Central Electricity Authority (CEA) is a **statutory** organisation which advises the government on matters relating to the **National Electricity Policy** and **formulates short-term and prospective plans** for the development of the electricity system.
- It functions under the **Ministry of Power** and is governed by the Electricity Act, 2003.

CLEAN ENERGY TRANSITION

In News: Ministry of Petroleum and Natural Gas (MoP&NG) emphasised the need for India's energy transition and highlighted various pathways to achieve a low-carbon future as India is committed to zero emission by 2070.

- **Energy Transition Advisory Committee's** (ETAC) '**The Green Shift**' report provides recommendations for PSUs on gas and oil use to achieve India's net zero emissions target.
- **The key recommendations are as follows:**
  - Use **biogas blended** with LPG
  - Promote **solar and electric based cooking** (25% household by 2030).
  - Incentivising **green hydrogen usage** and green surface transport.
  - **Green surface transport**: reduce carbon footprints in by eliminating diesel based four wheelers, and IC engines in 2/3 wheelers.
  - **Standardize Electric Vehicle (EV) policy**: with charging infrastructure and battery swapping policy



- Increase share of **railway in cargo** from 25% to 50%.
- Discourage **single use plastic** usage.

- **PSU to utilize strategy built on 4 pillars: Operational Decarbonisation, Energy Transition, Carbon Capture Utilization and Storage, and Offsetting** with strong governance.
  - Reduce emissions through **Environmental Social Governance** (ESG) norms: **FGRU** (Flare gas recovery unit) installation, **leak detection** systems, promoting **green buildings, paperless office**, usage of **hybrid/electric vehicles**, **sensitisation** of its employees, etc.

CORSIA

In News: At a meeting of the Parliament's Consultative Committee of the Ministry of Civil Aviation, it was announced that India will participate in the **International Civil Aviation Organisation's** (ICAO) **Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA)** and the **Long-Term Aspirational Goals (LTAG)** from 2027.

- The ICAO, tasked to **reduce carbon emissions from international civil aviation,** aims to curb aviation's **carbon footprint** and its impact on climate change, by adopting several key ambitious goals.
- The ICAO's goals include a **2% annual fuel efficiency improvement, carbon neutral growth and net zero by 2050.**
- **CORSIA** is a scheme to implement the ICAO's goals in three phases, with **financial implications** for individual airlines.
- CORSIA's carbon offsetting requirements will begin to apply to **international flights**, i.e. originating from one country and destined to another.
- India has already committed to **net zero by 2070** at the 26th Conference of Parties (COP26) in Glasgow, Scotland in 2021, under the United Nations Framework Convention on Climate Change (UNFCCC).

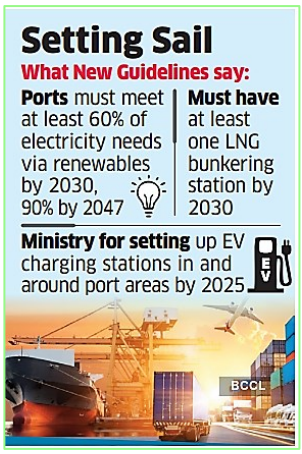
International Civil Aviation Organization (ICAO)

- It is a **United Nations specialised agency**, established to help countries share their skies to their mutual benefit.
- Its mission is to serve as the **global forum** of states for international civil aviation.
- ICAO develops policies and standards, undertakes compliance audits, performs studies and analyses, provides assistance and builds aviation capacity through many other activities and the cooperation of its Member States and stakeholders.

- ICAO's **strategic objectives** include:
  - Enhance global civil aviation **safety**
  - Increase the **capacity** and improve the **efficiency** of the global civil aviation system
  - Enhance global civil aviation **security** and facilitation
  - Foster the development of a **sound and economically-viable** civil aviation system
  - Minimise the adverse **environmental effects** of civil aviation activities
- The **Convention on International Civil Aviation (Chicago Convention)**, drafted in 1944 by 54 nations, established the core principles for the formation of the specialised agency ICAO.

HARIT SAGAR GUIDELINES

In News: The **Ministry of Ports, Shipping & Waterways** has launched **'Harit Sagar' Green Port Guidelines** to meet the larger vision of achieving the **Zero Carbon Emission Goal.**



- The guidelines aim to envisage **ecosystem dynamics** in **port development, operation and maintenance** while aligning with the **'Working with Nature'** concept and minimising impact on biotic components of the harbour ecosystem.
- The objective of the guidelines is to **minimise waste through reduce, reuse, repurpose and recycle to attain zero waste discharge** from port operations and promote monitoring, based on **Environmental Performance Indicators**.
- It lays emphasis on use of **Clean/Green energy in Port operation, offshore wind energy, developing Port capabilities for storage, handling and bunkering Greener Fuels** viz. Green Hydrogen, Green Ammonia, Green Methanol/Ethanol, etc.

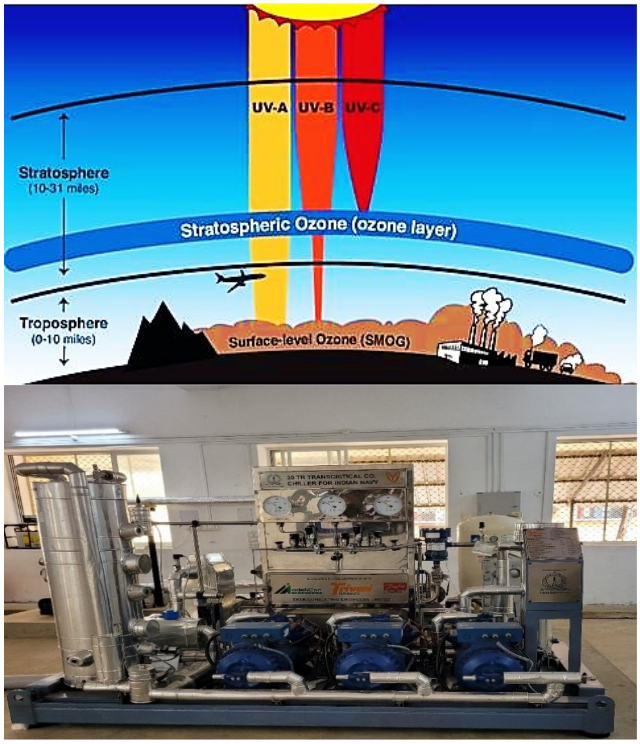
- The guidelines provide a comprehensive framework for ports to create a **comprehensive action plan** aimed at achieving **quantifiable reductions in carbon emissions** over defined timelines through focused implementation and close monitoring of **Green Reporting Initiative** (GRI standards).
- The **'Sagar Shreshtha Samman'** awards were also conferred to major ports for their exceptional achievements in various operational parameters.
    - Best port was conferred to **Paradip Port** on overall annual performance based upon **cargo handling, average turnaround time, ship berth day output and idle time at berth, operating ratio (expense/revenue) and pre berthing detention.**

- **GRI Standards** are frameworks for reporting on sustainability which enable any organisation to understand and **report** on their **impacts on the economy, environment and people** in a comparable and credible way, thereby increasing transparency on their **contribution to sustainable development**.

AIR CONDITIONING WITH NATURAL CO_2

In News: Indian Navy in collaboration with IISc (Bengaluru) has successfully run a 100 KW capacity AC plant based on **natural refrigerant carbon dioxide** (CO_2) for 850 hours.

- The plant has been installed at the Centre of Excellence (Marine Engineering), INS Shivaji, Maharashtra for trials and exploitation.
- This aligns with India's 2016 **Kigali Agreement** by using natural CO_2, a low **global warming potential (GWP)** refrigerant, instead of conventional HCFCs (High GWP).
- Carbon dioxide (CO_2) is a natural refrigerant with many advantages over other refrigerants (CFC, HFC, HCFC), including:
    - Zero Ozone Depletion Potential (ODP)
    - Low Global Warming Potential (GWP)
    - Abundant and inexpensive
    - Safe and non-toxic
    - Efficient and energy-saving
    - CO_2 has a good heat transfer coefficient, very low viscosity, but it's a high-pressure refrigerant.
- HFCs have a global warming potential (GWP) that is hundreds to thousands of times greater than carbon dioxide, which makes CO_2 a promising refrigerant for use in air conditioning and other cooling applications.



Global warming potential (GWP)

- GWP is a measure of how much a greenhouse gas **contributes to global warming** compared to carbon dioxide (CO_2) which has a GWP value of 1.
- GWP is calculated over a specific time period, typically **100 years**. The higher the GWP, the more a gas contributes to global warming.
- **Methane** has a GWP of **28** over 100 years, which means that it is 28 times more effective at trapping heat than CO_2 over that time period. **Nitrous oxide** has a GWP of **265** over 100 years, which means that it is 265 times more effective at trapping heat than CO_2 over that time period.

Ozone Depletion Potential (ODP)

- The ODP of a chemical compound is a relative measure of its **ability to deplete the ozone layer** in the **stratosphere**.
- It is a dimensionless number that is calculated by comparing the amount of ozone depletion caused by a given compound to the amount of ozone depletion caused by a reference compound, typically **trichlorofluoromethane** (CFC-11), which has an ODP of 1.0.

Kigali Agreement

- The **Kigali Agreement** (signed in 2016 and effective from 2019) is an amendment to the **Montreal Protocol,** an international treaty that was originally **created to protect the ozone layer.**
- It is the first international treaty **to specifically target HFCs** and it aims to **phase down the production and consumption of hydrofluorocarbons (HFCs),** which are potent greenhouse gases that contribute to climate change.
- By 2047, **developed** countries will have to reduce their **HFC emissions by 85%,** and **developing** countries will have to reduce their HFC emissions **by 80%.**

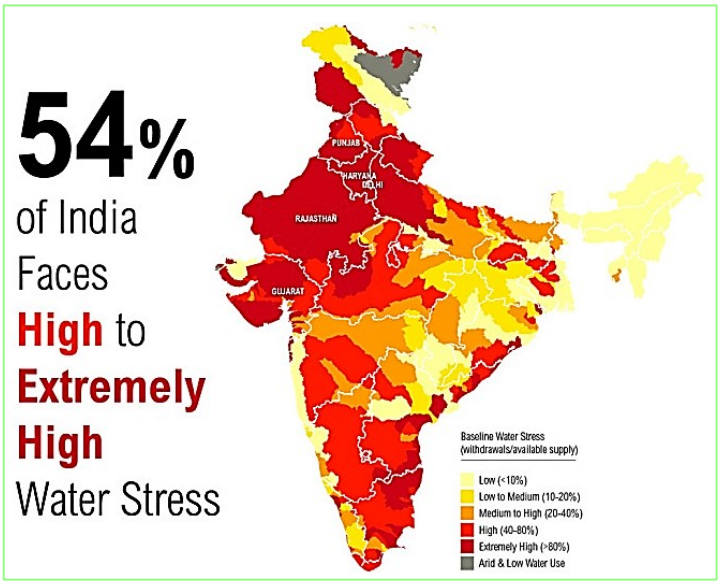
Montreal Protocol

- An international treaty entered into force on 1 January 1989 for **protection of the Ozone Layer** by **phasing out the production and consumption of man-made chemicals** referred to as **ozone depleting substances (ODS).**
- The stratospheric ozone/layer protects humans and the environment from **harmful levels of ultraviolet radiation from the sun.**
- It sets binding progressive phase out obligations for developed and developing countries for all the major ozone depleting substances, including **chlorofluorocarbons** (CFCs), **halons** and less damaging transitional chemicals such as **hydrochlorofluorocarbons** (HCFCs).
- It has been ratified by 197 countries, and is deemed as one of the **most successful international environmental agreements** ever negotiated which helped to reduce the production of ozone-depleting substances, thus **helping us recover ozone layer** as a result.

ATAL BHUJAL YOJANA

In News: The **Atal Bhujal Yojana (Atal Jal)**, India's **central sector water conservation scheme**, will continue for an additional two years beyond its original mandated 2025 end date to make up for implementation delays due to covid-19 and to further community behaviour change initiatives.

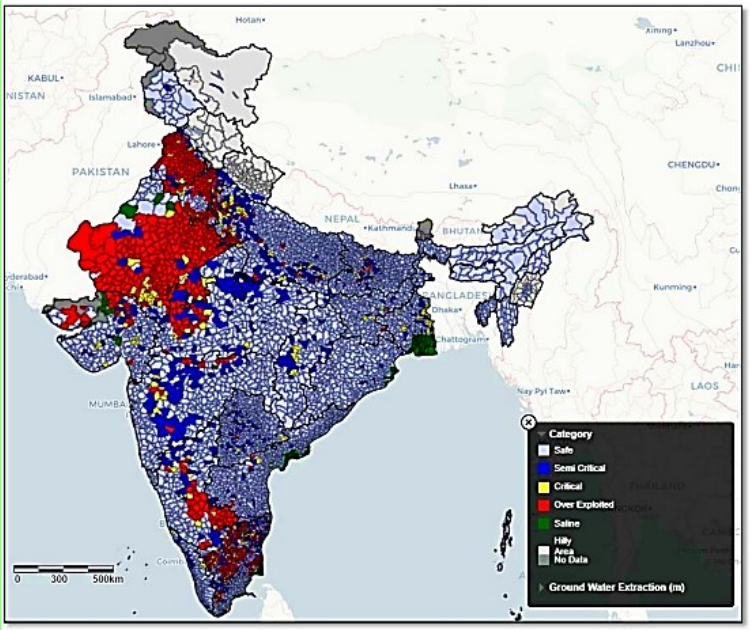
- Atal Bhujal Yojana (Atal Jal) is a **Central Sector Scheme** of the **Ministry of Jal Shakti launched in 2020** to improve **ground water management** through community participation.
- The scheme aims to improve the management of groundwater resources in select **water stressed areas** in **seven states** viz. **Gujarat, Haryana, Karnataka, Madhya Pradesh, Maharashtra, Rajasthan** and **Uttar Pradesh** which have the highest rates of groundwater depletion.
- A total of **8,551 Gram Panchayats (GP) of 224 blocks from 80 districts across 7 states** are in the ambit of this programme.
- The core segment of the programme is the preparation and implementation of a Gram Panchayat level **community-led Water Security Plan (WSP).**



- The scheme adopts a **mix of 'top down' and 'bottom up' approaches** in identified ground water stressed blocks and involves various stakeholders at different levels.
- The scheme has the principal objective of strengthening the institutional framework for **participatory groundwater management** and bringing about behavioural changes at the community level for **sustainable groundwater resource management.**
- The scheme is helping **improve rural livelihoods** and **build resilience** in 7 Indian states which have the **highest rates of groundwater depletion**.
- The scheme undertakes various interventions, including **awareness programmes, capacity building, convergence of ongoing/new schemes** and **improved agricultural practices** etc.

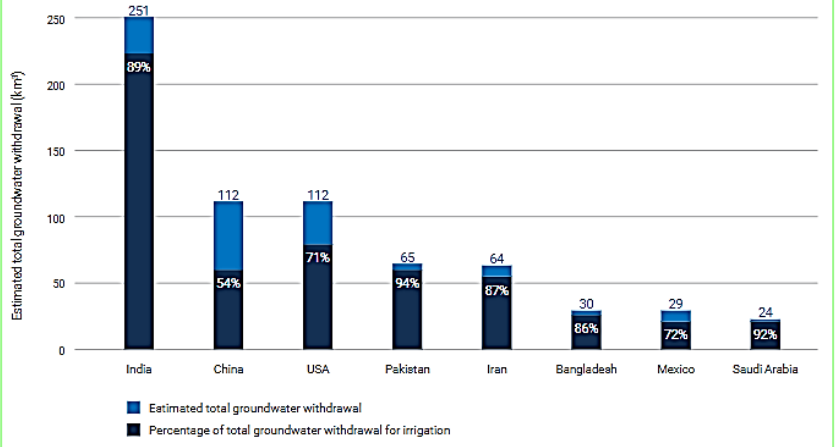
- The scheme plans to bring 450,000 hectares of **irrigated area** under **efficient water techniques** like **drip irrigation and crop diversification** to enhance water efficiency.
- The scheme has an outlay of **INR 6000 crores** out of which INR 3,000 crores will be loan from the World Bank and INR 3,000 crores as matching contribution from the Government of India (GoI).
- The scheme also envisages **improved source sustainability for Jal Jeevan Mission,** positive contribution to the Government's goal of **doubling farmers income** and **inculcating behavioural changes** in the community to facilitate optimal water use.
- Funds under the scheme shall be provided to the states as **grants-in-aid.** The World Bank financing will be done under a new lending instrument, **Program for Results (PforR)**, wherein funds will be disbursed to participating states **based on achievement of pre-agreed results**.
- The Scheme has two components, viz.
  - **Institutional Strengthening & Capacity Building component**: for strengthening **institutional arrangements** for **ground water governance** by facilitating **strong data base, scientific approach and community participation** in ground water sector in the participating states to enable them to sustainably manage their resources.
  - **Incentive Component:** incentivizing the states for **achievement of pre-defined results** with emphasis on community participation, demand management and convergence among various on-going schemes of the Central and State Governments and consequent improvement in ground water regime.
- **Disbursement Linked Indicators (DLIs)** have been identified on the basis of which the incentive amount will be disbursed. The five DLIs considered are
  - **Public disclosure** of groundwater data/ information and reports
  - Preparation of Community-led **Water Security Plans**
  - **Public financing** of interventions through convergence of on-going schemes
  - **Adoption of practices** for efficient water use
  - **Improvement** in the rate of decline of groundwater levels

Dynamic Ground Water Resources Assessment of India-2022

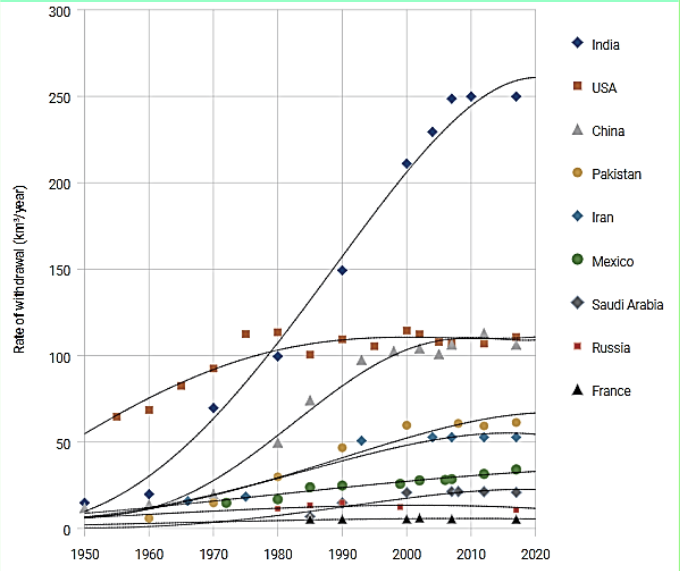


Categorization of Assessment Units

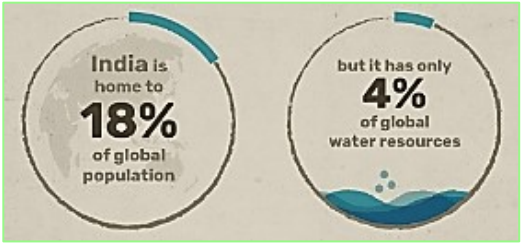
Estimated total groundwater withdrawal and the percentage for irrigation for selected countries in 2010



Evolution of total groundwater withdrawal in selected countries, 1950-2020



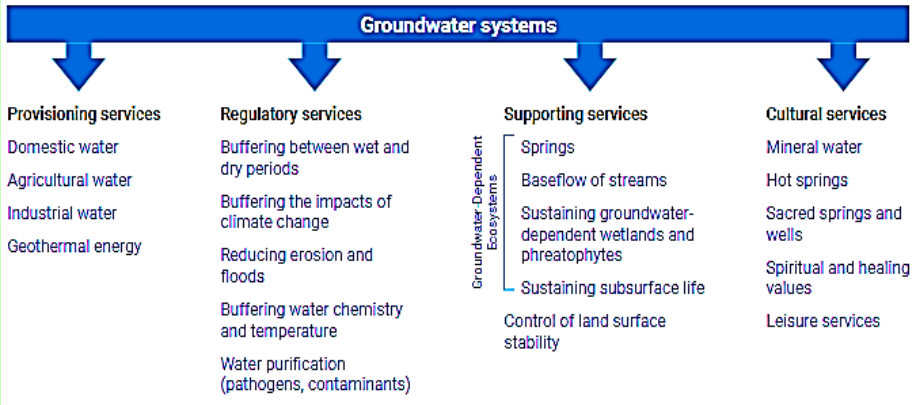
India's Water stress



- India is among the most water-stressed countries in the world, with **only 4% of fresh water resources for 18% of global population.**
- The biggest share of **drinking, domestic and agricultural water** needs of India is fed by groundwater.
- India's average annual per capita water availability in the years **2001 and 2011** was assessed as **1816** cubic meters and **1545** cubic meters respectively which further reduced to **1486** cubic meters in the year **2021** and has been assessed to reach **1367** cubic meter by **2031** (PIB).
- India is also the **largest net exporter of virtual water** (the amount of water required to produce the products that India exports) and has one of the most **water-intensive economies**.
- Groundwater currently provides approximately **60% of irrigation water**. Over **80% of the rural and urban domestic water supplies** in India are served by groundwater making India the world's largest user of groundwater.
- Groundwater irrigation has expanded due to **cheap or free electricity** and **guaranteed crop purchase** by the government.
- This has encouraged farmers to **cultivate water-intensive crops** such as **sugarcane and rice** in regions with low natural recharge, depleting groundwater rapidly.

- **Water stress:** it is said to occurs **when the demand for water exceeds the available amount during a certain period or** when poor quality restricts its use.
- Annual per-capita water availability of less than 1700 cubic meters is considered as **water stressed condition**, whereas annual per-capita water availability below 1000 cubic meters is considered as a **water scarcity condition**.

The multiple services offered by groundwater systems



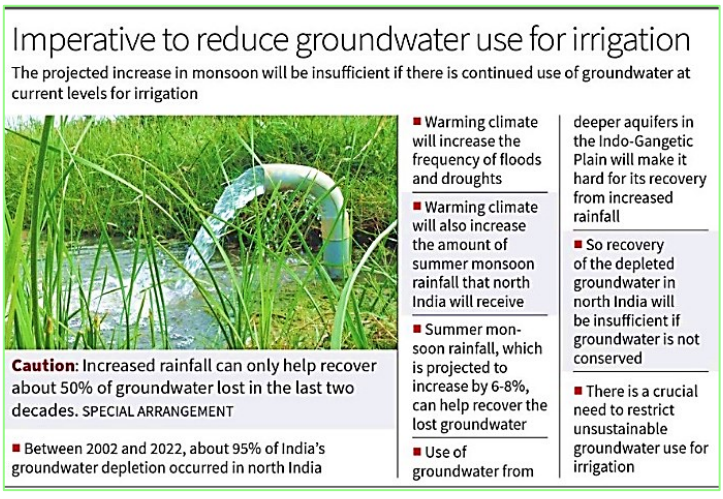
Conclusion

- Fresh water is an essential source to provide various **provisioning, regulatory, supporting and cultural services** to the ecosystem.
- A broader **water–energy–food nexus** perspective is needed for finding solutions.

GROUNDWATER DEPLETION IN INDIA

In News: A study by IIT Gandhinagar published in the journal One Earth says the combined effects of **climate change** and **excessive groundwater extraction for agriculture** threaten groundwater sustainability, especially in North India.

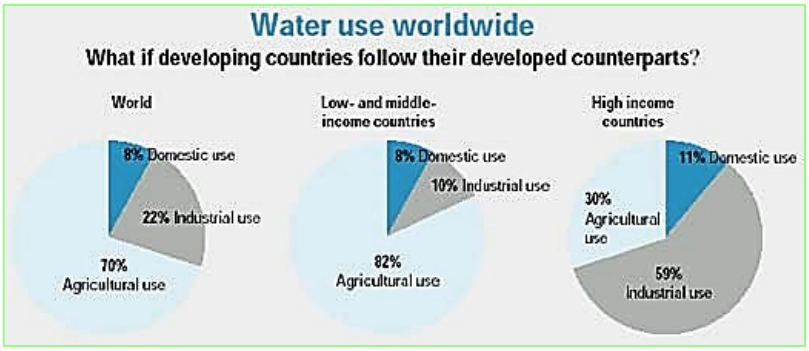
- The study found that the projected increase in **summer monsoon rainfall** due to climate change will **not be sufficient** to recover the depleted groundwater in north India, if there is continued use of groundwater at current levels for **irrigation**.
- It also highlighted the role of **evapotranspiration**, which will limit water availability for groundwater recharge, and the possibility of **increased frequency of droughts,** which will affect groundwater storage adversely.



- The study recommends the need **to restrict groundwater use for irrigation, promotion of groundwater conservation, to make irrigation more efficient,** and **shift crop growing and crop procurement areas** to ensure long-term sustainability of groundwater resources.
- The study used observational **groundwater well data**, satellite observations from the Gravity Recovery and Climate Experiment **(GRACE), NASA** and **hydrological model** simulations under future emission scenarios to understand the variability of groundwater storage under the warming climate.

Groundwater Depletion in India

- **Groundwater use and summer monsoon rainfall variability** are the two main drivers of groundwater storage.
- Between 2002 and 2022, about **95% of India's groundwater depletion** occurred in north India.
- Groundwater resources serve about **85% of domestic water supply in rural areas, 45% in urban areas**, and **over 60% of irrigated agriculture.**



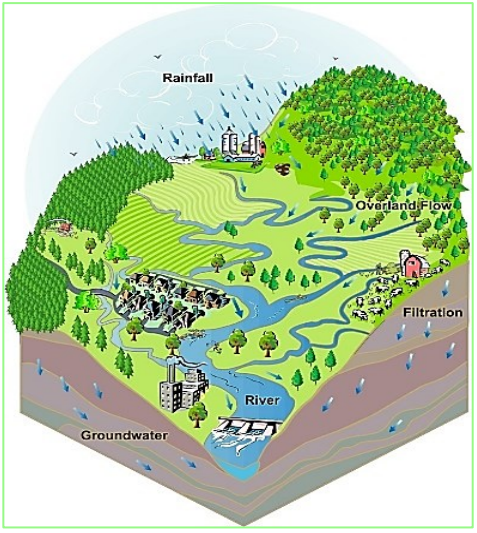
- Groundwater depletion poses threats to **livelihoods, food security, climate-driven migration, sustainable poverty reduction** and **urban development.**

Factors Responsible for Groundwater Depletion

- **Over-extraction** of groundwater for irrigation, especially for water-intensive or cash crops.
- **Energy subsidies and cheap power** that encourage more groundwater pumping.
- **Inadequate regulation** and enforcement of groundwater law and private ownership of groundwater.
- **Green revolution** promoted the cultivation of crops that required a lot of water in areas that were **prone to drought and water shortages**.
- **Groundwater pollution** from industrial, agricultural and domestic sources.
- **Climate change** increases the frequency of hydroclimatic extremities such as floods and droughts, and evapotranspiration losses.

Measures to Control Groundwater Depletion

- **Integrated demand and supply side solutions** that combine **watershed management programs, aquifer recharging, tank rehabilitation, surface water harvesting, water-efficient irrigation systems, and less water intensive crops**.
- **Strengthening regulatory action** to limit demand for groundwater and prevent over-exploitation of deeper aquifers.
- **Enhancing groundwater monitoring and data sharing** using modern technologies such as remote sensing and GIS.
- **Raising awareness and capacity building** among stakeholders on the importance and benefits of groundwater conservation.
- **Promoting participatory groundwater management** involving local communities, farmers, NGOs and government agencies.



Govt Measures

- **Central Ground Water Board** (CGWB) issued 'Guidelines to regulate and control ground water extraction in India' with an aim to promote **efficient use of groundwater** resources including **controlling the drilling of wells** by various consumers including industries, infrastructure projects and mining projects.
- The guidelines advise states for **reviewing the free/subsidised electricity policy** to farmers (wherever applicable), bringing suitable **water pricing policy** and working towards **crop rotation/diversification** to reduce over dependence on groundwater.
- The Central govt is implementing **Atal Bhujal Yojana**, a Rs. 6000 crore scheme with World Bank assistance, for sustainable management of ground water resources with community participation in select areas of seven States.
- The Government launched **Jal Shakti Abhiyan (JSA)** in 2019 and 2021 in 256 water stressed districts to improve water availability with special emphasis given on **creation of recharge structures, rejuvenation of traditional water bodies, intensive afforestation** etc.

- A number of States have done notable work in the field of water conservation/harvesting such as **'Mukhyamantri Jal Swavlamban Abhiyan'** in Rajasthan, '**Jalyukt Shivar**' in Maharashtra, '**Sujalam Sufalam Abhiyan**' in Gujarat, '**Mission Kakatiya**' in Telangana, '**Neeru Chettu**' in Andhra Pradesh, **Jal Jeevan Hariyali** in Bihar, '**Jal Hi Jeevan**' in Haryana, and **Kudimaramath scheme** in Tamil Nadu etc.

Conclusion

- Groundwater is a **vital resource** for India's **socio-economic development and environmental sustainability**. However, it is facing **severe challenges** due to overuse, depletion and contamination.
- There is an urgent need to adopt a **holistic and integrated approach** to manage groundwater resources in a sustainable manner. This will require **coordinated action** from various actors at different levels, as well as **adaptation** to the changing climate scenarios.

RIVER CITIES ALLIANCE

In News: The **National Mission for Clean Ganga (NMCG)** in association with the **National Institute of Urban Affairs (NIUA)** organised the **'River-Cities Alliance (RCA) Global Seminar: Partnership for Building International River-Sensitive Cities'.**

- The seminar provided a platform for officials of member cities and international stakeholders to **discuss and learn good practices** with **Jan Bhagidari** (people participation) for managing **urban rivers.**
- The global seminar's intent is to **facilitate knowledge exchange** for **Indian cities** to learn new practices and approaches for **urban river management** from international cities and vice versa.
- RCA was a significant initiative at NMCG's Side Event during the **'UN 2023 Water Conference: Water Action Agenda'** on March 23, 2023.

River Cities Alliance (RCA)

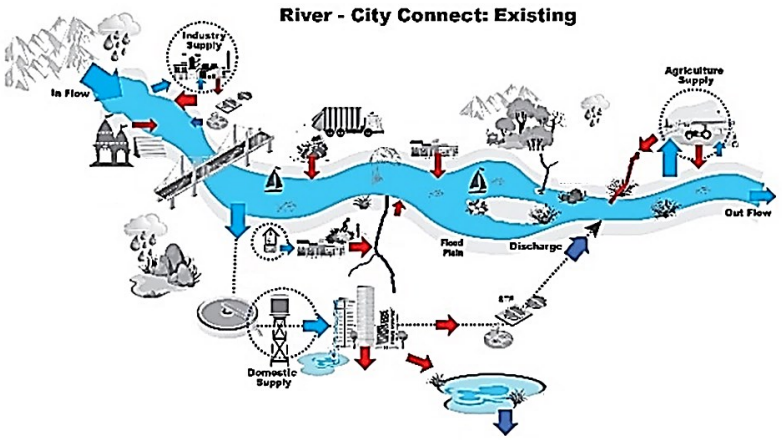
- With a vision to **connect river cities** and focus on sustainable **river centric development**, River Cities Alliance (RCA) is a joint initiative of the **Department of Water Resources, River Development & Ganga Rejuvenation** under the **Ministry of Jal Shakti (MoJS)** & the **Ministry of Housing and Urban Affairs (MoHUA)**,
- **River Cities Alliance (RCA)** currently has **110 river cities across India** with one international member city 'the city of **Aarhus** from Denmark'.
- RCA's objective is to provide the member cities with **a platform to discuss and exchange information** on aspects that are vital for **sustainable management of urban rivers**, **sharing best practices**, **supporting innovation** and river-sensitive planning and development.
- Recently the RCA annual meet was held Feb 2023, in Pune under the programme **Driving Holistic Action for Urban Rivers (DHARA) 2023.** It included discussion on:
  - Best practices involving **waterbody rejuvenation, de-centralized used-water management, enhancing river-related economy, groundwater management,** and **flood management**
  - Innovative **river-related practices** in countries like Denmark, **reuse of used water** in Israel, **floodplain management** in the Netherlands, **river health monitoring** in the USA, **pollution control** in Japan, and **water sensitive city design** in Australia.

National Mission for Clean Ganga (NMCG)

- NMCG is the **implementing agency** for Namami Ganga Mission. In 2022, **Namami Gange II** was approved for Rs 22,500 Cr for the period 2021- 2026.
- NMCG was also the implementation arm of **National Ganga River Basin Authority(NGRBA)** under **Environment Protection Act (EPA), 1986.**
- After the initiation of Namami Gange Mission in 2014, NGRBA was dissolved and **National Council for Rejuvenation, Protection and Management of River Ganga (referred as National Ganga Council)** was created**.**
- The Ganga River is India's national river, with its basin spread across **26% of the country's land mass,** constituting **28% of its water resources** and supporting about **43% of its population.**
- The **Namami Gange II Mission** comprises of five strategic areas of intervention
  - **Nirmal Ganga** with a focus on **pollution** abatement,
  - **Aviral Ganga** with a focus on ecology and **flow** of river Ganga,
  - **Jan Ganga** with an aim of **people river connect**

- **Gyan Ganga** with a focus on research, policy and **knowledge** management.
- **Arth Ganga** is a self sustainable **economic model** based on the symbiotic relationship between nature and society.

- The six verticals of intervention are **zero budget natural farming, monetization of reuse of sludge and treated wastewater, promotion of livelihood generation opportunities, increased public participation, revival of cultural heritage and tourism and institutional building.**
- Recently, the decade of **2021 – 2030** has been declared as the **Decade on Ecosystem Restoration by the United Nation General Assembly**, which positions restoration of ecosystems as a major nature-based solution for achieving Sustainable Development Goals and other national priorities.
- The United Nations (UN) has recognized **Namami Gange initiative to rejuvenate India's sacred River Ganga** as **one of the top 10 World Restoration Flagships** to revive the natural world.



UN 2023 Water Conference - Water Action Agenda

- The **UN 2023 Water Conference** was convened by the UN General Assembly in March 2023, co-hosted by Tajikistan and the Netherlands, to accelerate the implementation of water-related goals and targets in the 2030 Agenda for Sustainable Development.
- Outcome: **Water Action Agenda** and **voluntary commitments** of participating nations to enhance cooperation, resilience and sustainability in the field of **SDG 6 (clean water and sanitation for all)**
- The theme of the UN 2023 Water Conference is **"Our watershed moment: uniting the world for water".**

DIRECT SOWING OF RICE

In News: Farmers shun **Direct Sowing of Rice (DSR)** method despite Punjab government Rs 1,500 per acre incentive for adopting the DSR method.

- Punjab has failed to achieve its target of Direct Sowing of Rice (DSR) for this year.
- It has seen an **85.7% decline in the DSR area** from the last season despite offering incentives to farmers.
- DSR is a method of sowing rice that **does not require flooded fields and saves groundwater**.

Direct seeded rice crop

Transplanted crop

- DSR can **save 15% to 20% of water** compared to the conventional method of puddled transplanting. This helps in groundwater **recharge and conservation**.
- DSR **does not require nursery** preparation, or **transplanting** of seedlings, which reduces the labour and power costs for farmers.
- The reasons for the low adoption of DSR include **yield uncertainty**, **erratic power cuts, canal water shortage, soil types**, and preference for **traditional method** of **Puddled Transplanting of Rice (PTR).**
- PTR requires **more water and labour** than DSR, but farmers find it **more reliable and assured.**

Rice Cultivation in Punjab

- **Paddy and basmati crops** covered over **3.1 million hectares** of land in Punjab in Kharif season (2021-22), in the **ratio 5:1.**
- Punjab Agriculture University (PAU), Ludhiana, studies show that **one kg of rice** requires around **3,600 to 4,125 litres** of water to grow, depending on the paddy variety.
- **Overexploitation** of groundwater has put 116 of the state's 138 agricultural blocks under **critical/semi-critical zone** of groundwater extraction.

Direct Sowing of Rice

- DSR is a method of sowing rice that **does not require flooded fields** and saves groundwater.
- Seeds are **directly drilled** into the fields in this method, eliminating the laborious process of planting seedlings by hand.
- DSR **reduces the crop's water requirements** and it **needs** several sprays of **weedicides** to control weeds, which in turn increases farmer's cost and labour.
- **Conventional rice production** (PTR flood irrigation) **requires standing water**, which prevents weed growth but also consumes a lot of water.

DESICCATION-TOLERANT VASCULAR PLANTS

In News: Indian researchers from Agharkar Research Institute (ARI) Pune, an autonomous institute of the Department of Science and Technology (DST) have found 62 **desiccation-tolerant(DT) vascular plant** species in the **Western Ghats**, a global **biodiversity hotspot** and a **UNESCO World Heritage Site.**

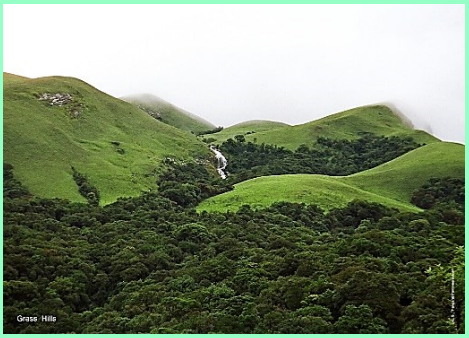
Desiccation-tolerant Vascular Plants

- Desiccation-tolerant (DT) vascular plants are rare plant species that can **survive extreme dehydration and revive** when water is available.
- They can **lose up to 95% of their water content** and stay **dormant** for months or years, without damaging their cells or organs.
- The study provides new insights into the diversity and distribution of DT vascular plant species in the Western Ghats, which were **previously overlooked or underestimated**.
- The study also found that **tree trunks in the partially shaded forests** were **crucial habitats** for DT species, besides rock outcrops.
- It also highlights the **importance of rock outcrops** as unique habitats that support specialised plant communities that have evolved remarkable adaptations to cope with environmental stress.
- There is need for conservation and management of **rock outcrops and desiccation-tolerant vascular plant species**, which are threatened by habitat loss, fragmentation, mining, grazing and climate change.
- They have potential applications in **agriculture and conservation**, as they can cope with drought, and **temperature stress**, and can be used for **restoring degraded lands**.
- Most vascular plants (which have specialised tissues for conducting water and nutrients) **die** if they lose more than 10 to 15% of their water content. But these discovered plants are **rare among vascular plants**.

Desiccation is the process or state of **extreme drying** that affects living organisms or non-living materials.

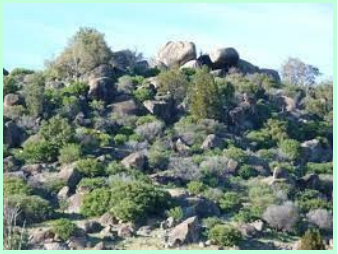
- Desiccation tolerance is **more common among non-vascular plants**, such as mosses, liverworts, and hornworts, which lack specialised tissues and rely on diffusion for water transport.

Western Ghats



- The Western Ghats are a mountain range along the western coast of India, spanning six states: Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.
- They are one of the **eight "hottest hotspots" of biological diversity in the world**, hosting more than 30% of India's plant, animal, bird, and fish species, many of which are endemic (found nowhere else).
- It has an exceptionally high level of **biological diversity and endemism**; at least 325 globally **threatened** (IUCN Red Data List) species occur in the Western Ghats.
- They are also a UNESCO World Heritage Site, recognized as a region of immense **global importance for the conservation of biological diversity**, besides containing areas of high geological, cultural and aesthetic values.

Rock outcrop is a portion of naturally formed bedrock or other landform **protruding through the soil level**. It supports **unique vegetation** and has specialised plant communities that have adapted to these conditions. It has harsh habitats that experience **extreme fluctuations** in temperature, humidity, and radiation.



Vascular Plant

- Vascular plants (**tracheophytes**) differ from the nonvascular bryophytes in that they **possess specialised supporting and water-conducting tissue** called **xylem**, and **food-conducting tissue called phloem**.
- **Xylem and phloem** are collectively called vascular tissue.
- Vascular plants have a **root system, a shoot system and a vascular system**.

Non-Vascular Plant

- Informally known as **bryophytes**, nonvascular plants lack specialised vascular tissue (xylem and phloem) for internal water and food conduction and support.
- They rely on **diffusion and osmosis** for water and nutrient transport. They also **need moist environments** to survive.
- Some examples of nonvascular plants are mosses, liverworts, hornworts, algae, lichens, and fungi, etc.

REVERSE BORING

In News: Central Pollution Control Board (CPCB) suspects a private liquor factory in Ferozepur of **injecting contaminated water** into the ground via reverse boring.

CPCB Investigation

- Field survey of CPCB & Central Groundwater Board revealed **high concentrations of heavy metals and chemicals** in water from two **borewells** on the factory premises.
- The liquor factory possibly led to ecological degradation by dumping toxic waste through borewells, prompting the investigation.

Reverse Boring

- Reverse Boring involves **drilling deep trenches** in the ground not to draw water but to **dispose off the waste** in the same trench. It is used to get rid of wastewater rather than extracting water.

Pollution from Reverse Boring

- Reverse boring **connects soak pits** with the borewell, leading to the disposal of wastewater into the ground.
- The **wastewater mixes** with underground water, causing groundwater pollution and contamination.

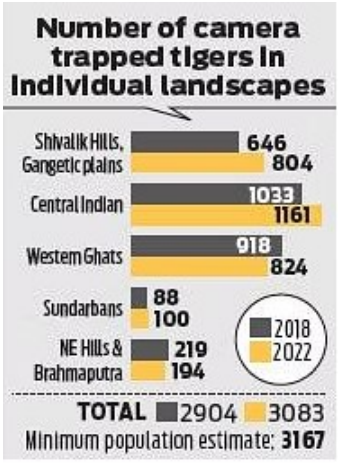
Central Pollution Control Board (CPCB)

- CPCB promotes **cleanliness of water bodies** and controls water pollution.
- It works to improve **air quality** and prevent air pollution in the country.
- It administers the **National Air Monitoring Programme** (NAMP) established to determine air quality status, trends, and regulate pollution from industries and other sources.
- **Automatic monitoring station** at ITO Intersection in New Delhi and other places tracks Respirable Suspended Particulate Matter (RSPM), Carbon Monoxide (CO), Ozone (O3), Sulphur Dioxide (SO2), Nitrogen Dioxide (NO2), and Suspended Particulate Matter (SPM) regularly.
- CPCB was constituted in September 1974 under the Water (Prevention and Control of Pollution) Act, 1974.

TIGER POPULATION

In News: The total number of **tigers in Odisha** has **dropped** from 45 in 2006 to 20 in 2022- a **55% fall.**

- In Odisha's **Satkosia Tiger Reserve**, there are no tigers left.
  - **Location**- Nayagarh district; adjacent to Baisipalli Wildlife Sanctuary
  - **River**- Mahanadi
  - **Fauna**- Asian Elephants,leopard, indian wild dog, striped hyena, sloth bear
- Though Odisha has tiger habitats, there's a necessity to enhance the prey base, **chital, sambhar, and deer**, to support the tiger population effectively.
- According to **All India Tiger Estimation -2022**: number of tigers in **India** has increased from 2,967 in 2018 to 3,682 in 2022, an **annual rise of 6%.**
- **Madhya Pradesh** has the most number **(785)** of tigers, followed by **Karnataka (563), Uttarakhand (560), and Maharashtra (444).**
- In **Similipal Tiger Reserve**: number has doubled from 8 in 2018 to 16 in 2022.
  - **Location**: Part of the **Mayurbhanj Elephant Reserve**
  - **Rivers:** Budhabalang, **Baitarani and Subarnarekha.**
  - **Fauna**: Bengal tiger, Asian elephant, gaur, Chausingha
  - **Tribes:** Erenga Kharias and Mankirdias, Ho, Gonda and Munda.



PALEOCLIMATOLOGY

In News: Scientists from IIT Kharagpur and Academia Sinica have found **evidence of high annual rainfall** in the **Deccan Traps** region**, 66 million years ago**, using a technique called **NanoSIMS.**

- NanoSIMS is a **high-resolution imaging and analysis tool** that can measure the composition and distribution of elements and isotopes at the microscale level.
- The scientists used NanoSIMS to analyse **paleoclimatology and isotopic composition of fossil tree rings** and **ancient lake water** from the **intertrappean beds,** which are **sedimentary layers** between the lava flows of the Deccan Traps.
- The study revealed that the **intertrappean fossil woods** had a distinct **triple oxygen isotopic signature,** indicating exceptionally high rainfall of about **1600 mm per year** during the terminal **Cretaceous period.**
- The terminal Cretaceous period was marked by a **massive volcanic eruption** of the Deccan Traps, which is considered to be one of the major causes of the **mass extinction event** that wiped out nearly 80% of all animal species, including the dinosaurs.
- The study also compared the ancient climate scenario with the present-day situation, where the **atmospheric CO_2 concentration** has reached around **420 ppm in 2023** due to fossil fuel emissions.
- The study warned that such high CO_2 levels could lead to **extreme warming scenarios.**
  - Under a high-emissions scenario, the IPCC finds the world may warm by **4.4°C by 2100** with catastrophic results.

Deccan Traps

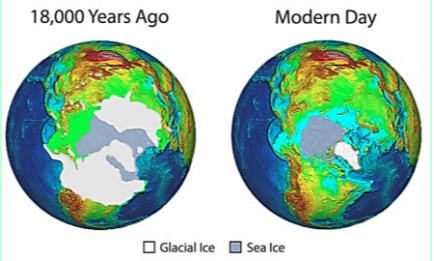
- These are a large volcanic province in west-central India and are composed of layers of **basaltic lava flows** that erupted about **66 million years ago**, at the end of the Cretaceous period.
- They are one of the largest volcanic features on Earth, and have been linked to climate change and mass extinction events in the past.

Cretaceous period

- It was the last and longest period of the **Mesozoic era,** lasting from about **145 to 66 million years ago**.
- The Cretaceous period witnessed the diversification of flowering plants, the rise of mammals and birds, and the **dominance of dinosaurs** on land.
- It ended with a massive extinction event, known as the **Cretaceous-Paleogene (K-Pg) boundary**, that wiped out most of the life forms on Earth, including the non-avian dinosaurs.

Paleoclimatology

- It is the **scientific study** of the Earth's climate history, using various **natural archives** such as **ice cores, tree rings, speleothems**, etc.
- These natural archives preserve information about **past climate conditions** and changes over different timescales.
- Paleoclimatology helps people better understand the climate of Earth in the past and how it relates to the present and future climate on the plane.

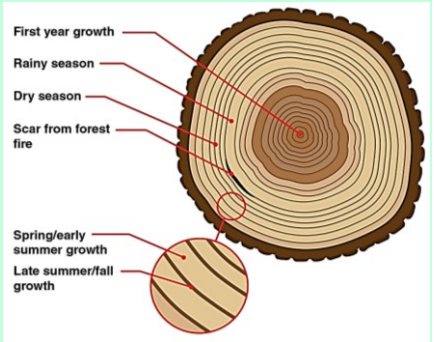


Paleoclimate proxies

- Paleoclimate proxies are the **physical, chemical, or biological materials** that are **preserved** in different types of climate archives, such as ice cores, tree rings, sediment cores, corals, speleothems, and fossils.
- They are **natural records of past climate** conditions that can be used to reconstruct and understand the changes and variations in **Earth's climate history**.
- They can provide valuable information about the **natural variability** and **drivers of climate change** over different timescales.
- They are essential for improving our knowledge and prediction of **future climate scenarios** under **anthropogenic influences.**

Ice cores

- They are **cylinders of ice drilled from ice sheets** and glaciers. They are essentially **frozen time capsules** that allow scientists to **reconstruct climate** far into the past.
- **Layers in ice cores** correspond to years and seasons, with the youngest ice at the top and the oldest ice at the bottom of the core.
- It can provide information about ancient temperatures, atmospheric gases, volcanic eruptions, and solar activity by analysing the physical and chemical properties of the ice and the air bubbles trapped within it.

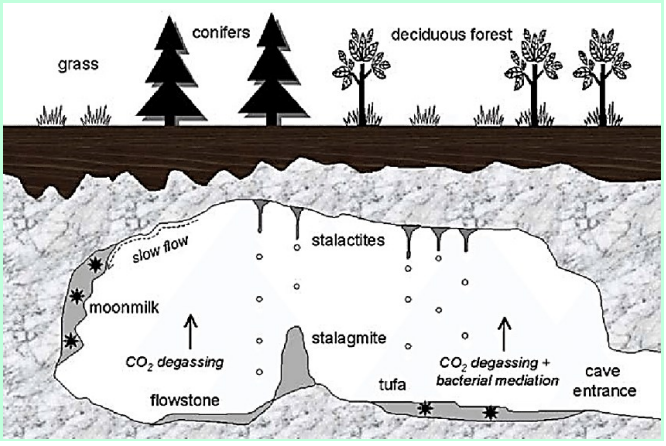


Tree Rings

- Tree rings can tell us the **age of the tree** and can also reveal the **fluctuations in the growth of trees** due to changes in climate and environmental conditions.
- Tree rings can be used as **indicators** of either temperature or rainfall, depending on the location and type of tree.

Speleothem

- They are **mineral deposits** formed from groundwater within **underground caverns**.
- Most common speleothem are **stalactites** and **stalagmites**, which contain compounds that can be measured using radioisotope dating.
- Speleothems are mostly composed of **calcium carbonate or calcium sulphate minerals**, which are translucent and colourless. The presence of other elements or impurities can create different colours and shapes.



- The thickness of these depositional layers or isotopic records can provide information about past **climate conditions, atmospheric circulation and past vegetation** by analysis of the chemical composition, crystal structure, and luminescence of the minerals.

Lake Sediments

- The **accumulated sediments** at the bottom of lakes act as archives of past climate and environmental change containing a variety of **physical, geochemical, and biological proxy indicators** that can be used to gain a multi-faceted understanding of past conditions.
- It provides continuous records of climate and environmental change over thousands of years or longer.

MHADEI SANCTUARY

In News: High Court directs Goa to notify Mhadei Wildlife Sanctuary **as Tiger Reserve.**

- The formation of this sanctuary makes **Goa** the **only state** in the country that protects the entire area of the Western Ghats that **falls within the state.**
- The court held that the provisions of Section 38-V (1) of the **Wildlife Protection Act are mandatory** and thus **recommendations of NTCA is binding** on the state.
- Under Section 38-V, the **State Government shall**, on the recommendation of the National Tiger Conservation Authority, **notify** an area as a tiger reserve.
- **The State Board for Wildlife** had recently **rejected** the proposal to set up a tiger reserve, contending that **"the declaration of a tiger reserve at the current stage would be premature"** and **"not feasible".**
- **Tiger population in India:**
  - As per the **2023 Tiger Census**, it is estimated at **3,167.**
  - In 1947, the tiger population was estimated at 40,000; showing a decline of 92%.

About Mhadei Wildlife Sanctuary:

- **Flora:** One of the most **unusual trees** found here is an evergreen variety of the **Ashoka tree** with peculiar saffron coloured flowers.
- **Fauna: Bengal Tiger,** Black Panther, etc.
- **Topography: Vagheri Hills and Chorla Ghat**, some of the highest mountains in Goa
- **River: Mhadei River** and Vazra Sakla Water Falls (nesting ground of the **critically endangered Long-billed vultures**) and the Virdi Falls.

FAUNA AND FLORA DATABASE

In News: India added **664 animal species** and **339 plant taxa** to its faunal and floral database in 2022.

- The new discoveries include new species and new records of mammals, birds, reptiles, fish, insects, fungi, lichen, algae, and microbes etc.
- The maximum new discoveries of both animals and plants were from **Kerala**.

Sela Macaque, Calanthe lamellosa (orchid), Ficedula zanthopygia (Yellow rumped flycatcher), Glischropus meghalayanus (Bamboo dwelling bat)

Faunal discoveries

- **Key Fauna additions**
  - **2 species of bats**, both from Meghalaya
  - **2 species of macaque,** discovered in Arunachal Pradesh
  - A **flycatcher bird** found in A&N Islands
- The faunal discoveries have been compiled in a publication by **Zoological Survey of India (ZSI)** titled **Animal Discoveries - New Species and New Records 2023**.

Floral discoveries

- The plant discoveries include **wild relatives** of many potential horticultural, agricultural, medicinal, and ornamental plants.

- **Key flora addition**
  - **Calanthe lamellosa,** an orchid species from Kohima, Nagaland.
  - **Nandadevia Pusalkar,** found in Uttarakhand Himalayas.
  - **Nilgiriella Pusalkar**, endemic to southern Western Ghats
- The floral discoveries are contained in **Plant Discoveries 2022** published by the **Botanical Survey of India (BSI)**.

- **Zoological Survey of India** (**ZSI)** was established in **1916** and traces its origin to the Zoological Section of the Indian Museum at **Calcutta** in 1875. It undertakes exploring, naming, describing, classifying and documenting **animals** from all over India.
- **Botanical Survey of India (BSI)** is the apex taxonomic research organisation of the country, established in **1890** with the objectives of **exploring the plant resources** and identifying **plant species with economic virtue**.
- Both ZSI and BSI work under the **Ministry of Environment, Forest & Climate Change.**

HOOLOCK GIBBONS

In News: Global Gibbon Network (GGN) at its first meeting highlights current **conservation status** of **gibbon species,** as all 20 species are at **high risk of extinction.**

- GGN was established to protect **Asia's distinct natural heritage**, the **singing gibbon** and its habitats, through active conservation policies, laws, and engagement.
- Gibbons, the **fastest and smallest apes**, live in **tropical and subtropical forests of Southeast Asia** and exhibit high intelligence, distinct personalities, and strong family bonds.
- All species of gibbons are **endemic to South and South-East Asia.**
- The **Hoolock gibbon** (**India's sole ape species**), unique to India's Northeast, is one of 20 species of gibbons on Earth.
- It inhabits Eastern Bangladesh, Northeast India, Myanmar, and Southwest China.
- It is classified into **Western and Eastern Hoolock Gibbons.**
- **Western Hoolock Gibbon:**
  - Found in northeastern states, between Brahmaputra's south and Dibang's east.
  - Also in eastern Bangladesh and northwest Myanmar.
  - **IUCN Red List: Endangered**
- **Eastern Hoolock Gibbon:**
  - Lives in Arunachal Pradesh, Assam, southern China, and northeast Myanmar.
  - **IUCN Red List: Vulnerable**

SEED BALL PROJECT

In News: Uttarakhand Forest Department's Research Wing uses **drones** for **Seed Ball Broadcasting** in **Landslide-Affected Areas.**

- The **broadcast seeding method** involves scattering seeds by hand or mechanically, over a relatively large area.
- It will help in **checking soil erosion** and increase the slope stability of the heavily landslide affected area in Manora Range of **Nainital Forest Division**.
- This innovative initiative aims to **restore and revitalise** the vegetation in the affected region impacted by landslides, where such seeds germinate and grow, with their roots holding onto soil.
- This method will help in maintaining the **ecological balance of the region**, aid in **preventing soil erosion** and accelerate the **natural regeneration process**.
- It serves as a model for **ecological restoration** and **sustainable conservation practices** that can solve the issue of plantation in **remote** and **inaccessible areas**, thus promoting biodiversity and the overall health of the forest ecosystem.

Seed ball

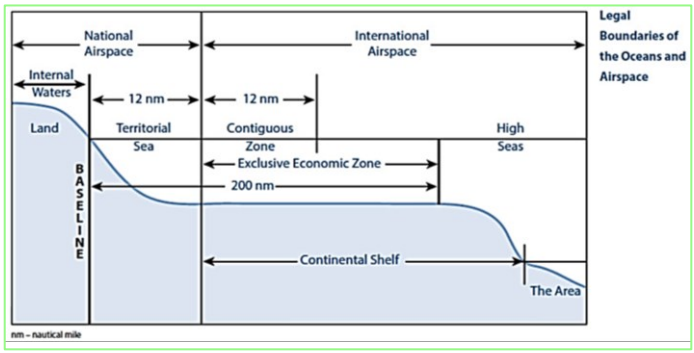
- Seed balls are created from a **mixture** of **clay** and **manure** with a seed in its core.
- The seed ball provides necessary **moisture and nutrients** required for germination of the seed and protects seeds from being washed away or blown away by erosional forces.

- Other states are also launching pilot projects using **drone-based plantations** for spreading seedball on barren lands. A seed ball project is currently being implemented in the Khellong Forest Division in Arunachal Pradesh.
- Such projects provide **employment** for making the seed balls to members of communities living in project implementation areas.

HIGH SEAS TREATY

In News: The UN's 193 Member States adopted a landmark **legally binding marine biodiversity agreement.**

- The treaty adopted by the **Intergovernmental Conference on Marine Biodiversity of Areas Beyond National Jurisdiction (BBNJ)** , aims at protecting the oceans in line with the **Convention on the Law of the Sea**.
- The treaty aims to address critical issues such as the **increasing sea surface temperatures,** overexploitation of **marine biodiversity**, **overfishing**, coastal pollution, and unsustainable practices **beyond national jurisdiction.**
- It became the **third agreement** to be approved under UNCLOS, after the 1994 and 1995 treaties, which established the **International Seabed Authority** and the **Fish Stocks agreement**.



Importance

- **Fresh protection beyond borders:** The ocean is the **lifeblood of our planet**, and it will **pump new life and hope** to give the ocean a fighting chance
- **Cleaner oceans:** According to UN estimates, by 2050, there could be **more plastic** in the sea **than fish** unless action is taken.
  - The treaty aims at strengthening resilience and contains provisions based on the **polluter-pays principle** as well as mechanisms for disputes, as parties **must assess** potential environmental impacts of any planned activities beyond their jurisdictions.
- **Sustainably managing fish stocks:** According to the UN, more than **one third** of global fish **stocks are over-exploited.**
  - The treaty emphasises **capacity building, transfer of marine technology**, and institutional strengthening. It encourages collaboration among regional seas and fisheries management organisations.

High Sea

- The high seas are defined by international law as all parts of the ocean that **aren't included in the exclusive economic zone,** the territorial sea, or the internal waters of a country, or in the archipelagic waters of an archipelagic country.
- **High seas** make up more than half of the surface of the Earth and **61% of all oceans**, only **1% of international waters** are under protection.

Polluter Pays Principle

- It is the commonly accepted practice that those who **produce pollution** should **bear the costs** of managing it to prevent damage to human health or the environment.

- **Lowering temperatures:** Global heating is pushing ocean temperatures to new heights, fueling more frequent and intense storms, rising sea levels, and the salinization of coastal lands and aquifers.
  - The treaty provides guidance for **integrated ocean management**, enhancing resilience against climate change and **maintaining ecosystem integrity**. It acknowledges indigenous rights, supports scientific research, and promotes fair benefit sharing.
- **Vital for realising 2030 Agenda:** Sustainable Development Goal (SDG) 14, which aims at, preventing and significantly **reducing marine pollution** of all kinds by 2025.
  - The treaty also considers the special circumstances facing **small-island and landlocked developing nations.**

SEAGRASS RESTORATION

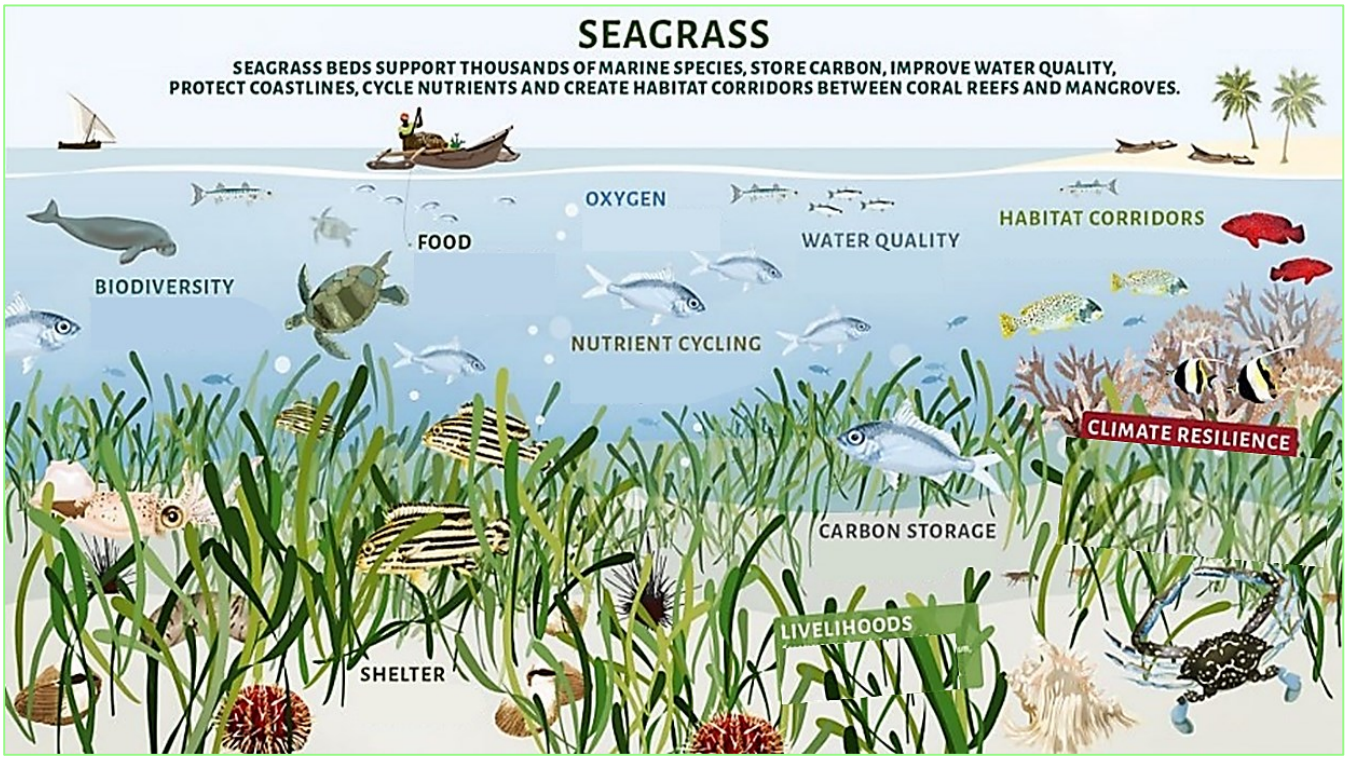
In News- In **Baltic Sea, citizen divers** attempt to restore seagrass to fight **climate change**.

- Amidst declining seagrass due to **human activities and environmental factors**, a novel project in Germany seeks to rejuvenate seagrass meadows in the Baltic Sea by training citizen divers to plant seagrass shoots in **barren areas**.

About Seagrass

- Seagrass is a type of **marine angiosperm** that is found on the seabed and is often referred to as an "**ecosystem engineer**" because it provides various ecosystem services.

- Seagrasses **store over twice the carbon per area** compared to forests.
  - They can capture atmospheric carbon up to **35 times faster** than tropical rainforests.
  - Even though seagrasses occupy **only 0.1% of the ocean floor**, they sequester up to 11% of the organic carbon buried in the ocean.



- It is typically found in **shallow areas** with **abundant light**, such as **bays** and lagoons.
- Seagrasses, the pale green flowering plants that form meadows on the ocean floor, are **home to all manner of life**: turtles, fish, squid, seahorses, anemones, crab, dugongs, and often serve as **foraging grounds for sea turtles.**
- Seagrasses **improve water quality** by trapping sediments and suspended particles, enhancing water clarity.
- It is referred to as the "**lungs of the sea**" as they **release oxygen** into the water through photosynthesis.
- In India, seagrass can be found in the lagoons of the **Andaman and Nicobar** Islands, the Gulf of **Mannar** and Palki on the eastern coast, and the Gulf of **Kachchh**.

Brackish water is water that is **saltier than fresh water**, but **not as salty as seawater**. It may result from **mixing of seawater with freshwater**, as in **estuaries**, but also certain human activities can produce brackish water.

Baltic sea

- The Baltic Sea, the **largest brackish water** body in the world, is a semi-enclosed and relatively shallow sea located in northern Europe.
- Considered an **arm of the Atlantic** Ocean, it is connected to it via the **Kattegat Strait, Skagerrak Strait, and the North Sea.**

❑ ❑ ❑

SOCIETY

SAL SEEDS

In News: The **Tribal Development Co-operative Corporation of Odisha Ltd (TDCCOL)** has planned to **procure sal seeds** from nine Odisha districts after three years to prevent tribal people distress sale of the minor forest produce.

- Sal seeds of the **sal tree (Shorea robusta),** a **deciduous tree** native to India and neighbouring countries have various benefits, such as extracting **oil, starch, fodder and medicinal** properties.
- Sal seeds are one of the **Minor Forest Produce (MFPs)** that are recognized under the **Forest Rights Act 2006,** which grants ownership and access rights to forest dwelling Scheduled Tribes and other traditional forest dwellers over forest land and resources.
- TDCCOL will buy sal seeds at Rs 20/kg at MSP from nine districts to **give fair price and income** to tribal people.
- Sal seeds are a **significant source of income** for 40% of the tribal population in Odisha.
- Some of the leading global brands of **chocolates** have used the butter obtained from sal-seeds gathered by the tribes in Chhattisgarh, Odisha and Jharkhand.
- Sal trees are important for the **ecology, economy, culture and religion** of the local people. They provide **habitat and food** for many wildlife species, such as elephants, tigers, leopards, deer and birds.

Minimum Support Price (MSP) for Minor Forest Produces (MFP)

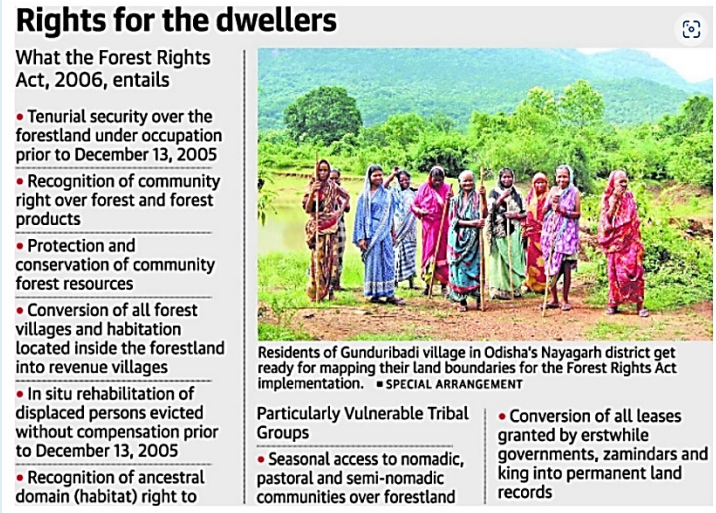
- The scheme called **"Mechanism for marketing of Minor Forest Produce (MFP) through Minimum Support Price (MSP) and Development of Value Chain for MFP"** was implemented in 2013 by **Ministry of Tribal Affairs** and covers 87 MFP items as of 2020.
- The scheme aims to provide a **fair price, enhance income, and ensure sustainability** of MFPs.
- The government has **revised the minimum support prices** for MFP items and has advised the state governments to undertake procurement under MSP.
- The ministry has also released funds to the state procuring agencies for **working capital and infrastructure development.**
- The **Scheduled Tribes population** in India is **10.43 Cr. i.e. 8.6%** of the national population based on census 2011.
- **About 50%** of the tribal population is estimated to be **residing in forested areas** and are dependent on **Minor Forest Produce** for sustainable livelihood and income generation.
- Almost 60-70% income of the forest dwellers depends on collection and sale of minor forest produce (MFP) which is part of their **subsistence level income**.
- **TRIFED**, (Tribal Cooperative Marketing Development Federation of India) as the apex national organisation involved in the improvement of the livelihood and empowerment of these tribal people, is the **nodal agency** for the implementation of the scheme.

Minor Forest Produce (MFP)

All **non-timber forest produce** of **plant origin**, such as bamboo, brush wood, stumps, cane, tussar, cocoons, honey, wax, lac, tendu or kendu leaves, medicinal plants and herbs, roots, tubers and the like, are included in the **"minor forest produce"** under **Forest Rights Act, 2006.**

The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006

- It gives the "right of ownership, access to **collect, use and dispose** minor forest produce which has been traditionally collected within or outside village boundaries".
- It was enacted to **protect the marginalised socio-economic class** of citizens and balance the right to **environment** with their right to **life and livelihood**.



Tribal Cooperative Marketing Development Federation of India (TRIFED)

- It is an organisation under the Ministry of Tribal Affairs that works for the development of **minor forest produce (MFPs) and tribal handicrafts**.
- Its objective is socio-economic development of tribal people in the country by way of **marketing development of the tribal products**.

ट्राईफेड
TRIFED
Tribal Co-operative Marketing Development Federation of India Limited
Ministry of Tribal Affairs, Govt. of India

- TRIFED implements various schemes and programs for the procurement, processing, marketing and value addition of MFPs, such as **Van Dhan Vikas Kendras**, **MSP for MFPs,** Mechanism for Marketing of MFPs through MSP and Development of Value Chain for MFPs.
- TRIFED also promotes **tribal art and craft** through its **Tribes India** outlets and e-commerce platforms.

Van Dhan Yojana

- It is a scheme launched by the **Ministry of Tribal Affairs** in 2018, to improve the livelihood of tribal communities by **developing value chains for forest-based products.**
- It aims to set up tribal community-owned **Van Dhan Vikas Kendras (VDVKs)** in predominantly forested tribal districts, where tribal gatherers and artisans can **process and market** their forest produce.
- It provides necessary **infrastructure, training, and market linkages** to the tribal communities for value addition and entrepreneurship.
- The scheme has a target of establishing **50,000 Van Dhan Vikas Kendras** across the country, which will benefit around **10 lakh tribal entrepreneurs.**

CHILD MALNUTRITION

In News: The new Joint Child Malnutrition Estimates (JME) of 2023 have been released by **UNICEF, WHO and the World Bank Group.**

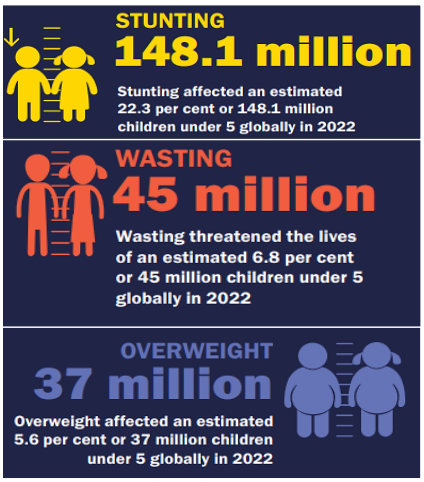
- It reveals insufficient progress to reach the **2025 World Health Assembly (WHA) global nutrition targets** and the **2030 Sustainable Development Goal (SDG) 2 targets.**
- Only about **a third of all countries** are 'on track' to halve the number of children affected by stunting by 2030.

Malnutrition refers to **deficiencies or excesses** in nutrient intake, imbalance of essential nutrients or impaired nutrient utilization.

Key Takeaways

- **India** had a stunting rate of **31.7 % in 2022**, down from **41.6 % in 2012**, a decade ago.
- The majority of these children, with **52 %, live in Asia, while 43 % were in Africa.**
  - **Stunting** refers to a child with **low height to age ratio.**

- The overall prevalence of wasting in 2022 was 18.7% in India, with a share of 49% in the global burden of this malnutrition indicator.
  - **Wasting** refers to a child with **low weight to height ratio.**
  - Stunting and wasting are the result of **poor in-utero and early childhood nutrition, poor maternal health, frequent illness of the new-born and inappropriate feeding**.
- **India** had an overweight percentage of **2.8% in 2022**, compared to 2.2% in 2012.
  - **Overweight** refers to a child who is **has high weight to height ratio**.
  - It results when children's **calorie intake** from food and beverages **exceeds their energy requirements** due to factors like **failing food system with poor affordability, no physical activity, ultra-processed food, etc.**



Steps taken by Indian Government to tackle malnutrition:

- **Integrated Child Development Services (ICDS):** Flagship programme providing supplementary nutrition, **health care, and preschool education** to **children under 6 years**, **pregnant and lactating women, and adolescent girls** at anganwadi centres, etc**.**
- **POSHAN Abhiyaan:** This is a multi-sectoral convergence mission that aims to reduce **stunting, undernutrition, anaemia, and low birth weight**.
- **Pradhan Mantri Matru Vandana Yojana (PMMVY):** Maternity benefit programme providing **cash incentives of 5000 Rupees to pregnant and lactating women** for the **first live birth** to meet their nutritional needs and **partially compensate for wage loss** so that the woman can take adequate rest before and after delivery.
- **Anaemia Mukt Bharat:** Strategy to **reduce the prevalence of anaemia** among **children, adolescents, women of reproductive age, and pregnant and lactating women** by providing **iron and folic acid.**
- **National Food Security Act (NFSA):** Legal entitlement that guarantees **subsidized food** grains to **75% of the rural population and 50% of the urban population**. It also covers pregnant and lactating women, children under 6 years, and school-going children under the **mid-day meal scheme.**
- **Mission Poshan 2.0** to enhance nutrition by improving content, delivery, outreach, and outcomes through **supplementary nutrition program**. It aims to develop practices that promote health, wellness, and immunity against disease and malnutrition with the help of **nature wellness (Poshan vatika), technology and digitization (Poshan tracker**).

CHILD MARRIAGE

In News: UNICEF says that the present **global poly-crisis** has been creating uphill battle to end **child marriage**.

- The global poly-crisis, which includes the **COVID-19 pandemic, conflicts, climate change, and economic downturns**, are threatening to reverse hard-earned gains in ending child marriage.
- Child marriage refers to any **formal marriage** or **informal union** between a **child (girl less than 18 years, boy less than 21 years)** and an adult or another child.
- An estimated **640 million girls** and women alive today were married in childhood, or **12 million girls per year**, according to the latest global estimate.
- Despite progress made in recent years, child marriage rates remain high, with **1 in 5 women aged 20-24** globally being **married before the age of 18.**
- Despite a decline in the share of young women married in childhood from **21% to 19%** since the last estimates, global efforts to end child marriage need to accelerate **20 times faster** to meet the **Sustainable Development Goal by 2030.**
- **South Asia** is **leading global reductions** in child marriage and is expected to **eliminate** it in approximately **55 years**, but the region still has the highest concentration of child brides, with **India** alone accounting for **one-third of the global total.**
- The **UNFPA-UNICEF Global Programme to End Child Marriage** promotes the rights of adolescent girls to avert marriage and pregnancy and enables them to achieve their aspirations through **education** and alternative pathways (vocation, awareness, campaigns, etc).

What is Indian Government doing to prevent child marriage?

Child Marriage Restraint Act, 1923	Dowry Prohibition Act, 1961	1978	Prohibition of Child Marriage Act, 2006	Cash Incentives
•This act prohibited marriage involving girls below 18. But the government did nothing to propagate awareness of it, especially in smaller towns and villages of India.	•Dowry was prohibited in 1961 by the Dowry Prohibition Act, with a fine up to INR 15,000 or the dowry amount, whichever is higher, and imprisonment for between six months and five years	•In 1978, the law was amended to make it more effective and raise the minimum age of marriage by three years: from 15 to 18 years in case of girls and from 18 to 21 years in case of boys.	•It was notified to overcome the constraints of the former legislations in effectively dealing with the problem of child marriages in India and to put in place a comprehensive machanism.	•For every daughter that was born, a family that enrolled in the programme would receive approximately $400, on the condition that they remained unmarried until the age of 18.

Reasons for Child Marriage	Impact of Child Marriage
Rising **poverty**, **income shocks, gender inequality**, social norms, lack of education/**school dropouts**, tradition and culture, lack of enforcement of **legal protection, social pressure and dowry**.	Early pregnancy leads to child and maternal **health complications and mortality**, **isolation** from family and friends, **domestic violence** (intimate partner violence) and abuse resulting in mental health and well-being.

POSHAN BHI, PADHAI BHI (PBPB)

In News: Union Minister for Women and Child Development launched the Centre's flagship programme 'Poshan Bhi, Padhai Bhi' Scheme.

- It is a pathbreaking **Early Childhood Care and Education** (ECCE) program to ensure that India has the **world's largest, universal, high-quality pre-school network**, as suggested by the National Education Policy, 2020.
- In addition to the previously covered objectives through anganwadi centres, the government, under PBPB, has prioritised focus on '**foundational literacy and numeracy**' as **85% of a child's brain development** occurs before the age of 6 years.

About PBPB

- Poshan bhi Padhai bhi will focus on **promoting holistic and quality early stimulation** and **pre-primary education** for children, ensuring the use of developmentally appropriate pedagogies and emphasizing the links with primary education as well as early childhood health and nutrition services.
- It will focus on ECCE at anganwadis across the country, where every child would be provided with **at least two hours of high-quality pre-school instruction** on a daily basis.
- It will target children's development in **mother tongue** in domain such as **visual, auditory, kinesthenics, cognitive development**, etc.
- Anganwadi centres will be reimagined and recalibrated to focus not only on the nutritional aspect of children and mothers but also on the early learning of children **under 6 years**, **particularly those under 3 years**.
- The plan envisages to **upgrade** anganwadi centres (14 lakh in number) with better **infrastructure** and **services**, **rebrand** anganwadi centres with **creche/day care centres**, train anganwadi workers, etc.
- The intervention targets to have an **outreach beyond** the nurturing **private pre-primary schools** with poor quality education and reduce the **financial burden** on parents.

ECCE Program

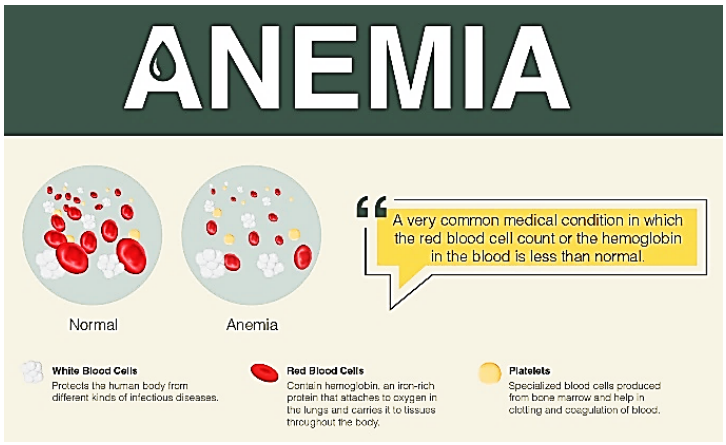
- The programme aims to support the **holistic development** of children, promote **gender equality and social cohesion**, and **prepare children** for lifelong learning.
- The main delivery platform for pre-school education is the **Integrated Child Development Services** (ICDS), which provides six basic services to children under six years of age, including pre-school education, through Anganwadi centres.
- It is an important component of **Mission Saksham Anganwadi and Poshan 2.0 (Mission Poshan 2.0)** and envisaged under the National Education Policy.

Anganwadi Centres

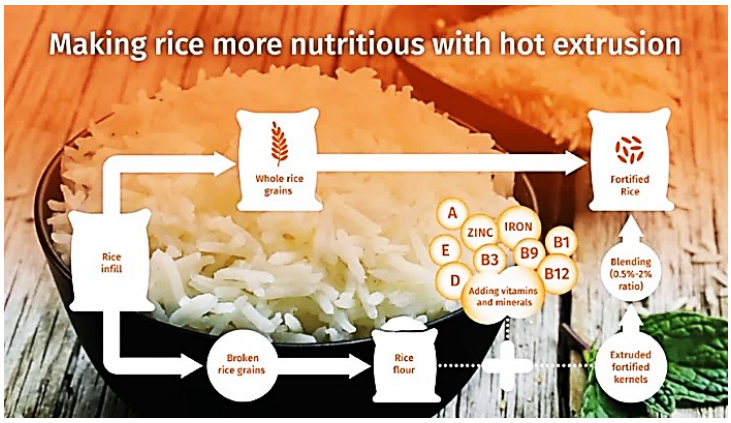
- Anganwadi centres are part of the Integrated Child Development Services (ICDS) programme, which was launched by the Government of India in **1975** to **combat child hunger and malnutrition.**
- Anganwadi Centres (AWCs) offer six services: **Supplementary Nutrition, Health & Nutrition Education, Pre-school Education, Immunization, Referral Services, and Health Check-ups**. The scheme benefits children aged 0-6 years, as well as pregnant women and lactating mothers.
- It is Centrally Sponsored Scheme by **Ministry of Women and Child Development** and is implemented by the States/UTs.

RICE FORTIFICATION

In News: India's pilot studies on rice fortification showed that **nutritional anaemia** could be reduced, with a significant drop in the prevalence of **anaemia among schoolchildren,** according to a United Nations report.



- After witnessing the success and feasibility of the pilots, the central government announced the supply of **Fortified Rice** in **every scheme** of the Government of India throughout the country **by 2024**, through the **three food-based social assistance programmes** (**Mid-day Meal, Integrated Child Development Services (ICDS) and Public Distribution System).**
- Four large-scale pilots in different parts of the country were done - **three in the school lunch** and **one in the Integrated Child Development Scheme.**



- Fortification is the practice of deliberately **increasing the content** of **one or more micronutrients** (i.e., vitamins and minerals) in food or condiment to **improve the nutritional quality of the food supply** and provide a public health benefit with minimal risk to health.
    - In Rice fortification, **Fortified Rice Kernels (FRK),** containing FSSAI-prescribed micronutrients (**Iron, Folic Acid, Vitamin B12**) are **added to normal rice** (Custom Milled Rice) in a ratio of **1:100** (Mixing 1 Kg of FRK with 100 Kg custom milled rice).
    - Fortified rice is **nearly identical** to traditional rice in **aroma, taste, and texture.** This process is done in the rice mills at the time of milling of rice.
    - Fortifying rice is a **cost-effective and time-efficient strategy** to increase **vitamin and mineral content in diets**, promoting **nutritional security** and **combating anaemia** and malnutrition effectively.
    - **FSSAI** is the **regulatory/licensing authority** for food fortification.

Why does Rice need to be fortified?

- Since rice is a staple food for about **two-thirds of the Indian population,** fortifying it with essential nutrients is an effective way to **fight malnutrition.**
- India has **very high levels of malnutrition** among women and children, as every **second woman in the country is anaemic** and **every third child is stunted.**

Rice Fortification Technology

- There are three main technologies available to produce fortified rice: **Coating, Extrusion, and Dusting.**
- In India, rice is fortified using **extrusion technology** in which milled rice is pulverized and mixed with a premix containing **vitamins and minerals.**
- **All varieties of rice** can be fortified, however, this will require tailoring of fortified kernels accordingly.

- Fortified rice are packed in jute bags with the **logo ('+F')** and the line **"Fortified with Iron, Folic Acid, and Vitamin B12",** in comparison to regular rice.

Benefits of Fortified Rice

- Fortified rice helps **prevent cretinism, goitre, thyrotoxicosis, brain damage** and improves **foetal and neonatal health.**
- It can help prevent and **treat anaemia**, especially among women and children, by providing iron, folic acid and vitamin B12.
- It is a **cost-effective supplement food** and does not require any changes in eating patterns or food habits of people.

Concerns Associated with Fortified Rice

- Jharkhand has large tribal populations that suffer from **sickle-cell anaemia** and **thalassemia**, both of which result in an **excess of iron in the body.** The consumption of iron-fortified foods by such patients can **reduce immunity and affect organs.**
- Men may experience various negative effects, as an **elevation in serum ferritin (a protein that stores iron in the body)** levels is linked to an **increased risk of chronic diseases** such as **diabetes and hypertension.**
- FSSAI has issued a mandatory warning for all food packets fortified with iron, stating: "People with **thalassemia** may consume under medical supervision, while individuals with sickle cell anaemia are advised **against consuming iron-fortified food products."**

AWW ASHA ANM

In News: Anganwadi Workers (AWW) in Delhi stage protest, demanding the reversal of termination of employment.

- **Anganwadi**: Rural child care centres in India established by the government in **1975** as part of the **Integrated Child Development Services (ICDS)** program for **early childhood care**, benefiting children (0-6 years), **pregnant women, and lactating mothers**.
- The Anganwadi workers provide for **health checkups, immunization, supplementary nutrition, health education, etc.** among other services to the target group.
- The scheme is covered under **Ministry of Women and Child Development**.

ASHA: Accredited Social Health Activist

- **All-female cadre of community health workers.**
- **First point of contact** for **health-related issues**, esp. primary health **among women and children** of poor communities.
- Constituted by the **Ministry of Health and Family Welfare** under National Rural Health Mission in **2006**.
- Selected from the **village** and **accountable** to it.
- Trained to serve as a **link between the community and public health system.**
- Preferred age group: 25 to 45 years, literate women with a preference for those educated up to 10th standard.

ANMs: Auxiliary Nurse Midwives

- Auxiliary Nurse Midwives (ANMs) are **female health workers** stationed at **health sub-centers or Primary Health Centers**.
- They are **essential frontline workers** under the National Rural Health Mission.
- The ANM cadre was established in the **1950s** to address **basic maternal health**, including **midwifery and child health** under Ministry of
- Over time, ANMs were designated as **Multipurpose Workers** (MPW) with expanded responsibilities.
- ANMs' roles expanded to include **family planning, immunisation, infectious disease prevention, and care alongside** maternal health and childbirth.

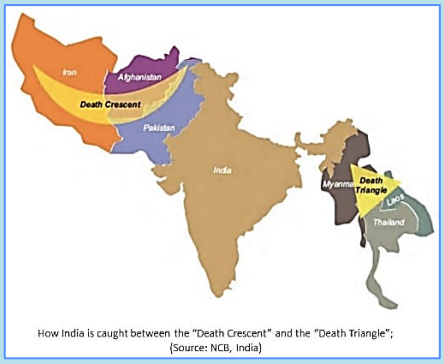
DRUG MENACE IN INDIA

In News: Indian authorities seized ₹15,000 crore worth of methamphetamine from a Pakistani mother ship, detaining a man of suspected Pakistani origin.

- The seizure is part of **Operation Samudragupta**, an initiative targeting maritime drug trafficking to ensure a narcotics-free Indian Ocean region.

What is methamphetamine?

- Methamphetamine is a powerful, **highly addictive stimulant** that affects the central nervous system.
- It is used to **treat** attention-deficit hyperactivity disorder (ADHD) and narcolepsy, a sleep disorder.
- **Crystal methamphetamine**, or crystal meth, resembles glass fragments and is chemically similar to amphetamine.
- Methamphetamine can cause heart attacks, strokes, and kidney damage. It can significantly increase blood pressure and is extremely dangerous in cases of overdose.



How India is caught between the "Death Crescent" and the "Death Triangle"; (Source: NCB, India)

Narcotics Control Bureau

- It was established by the Government of India in 1986 under the Narcotic Drugs and Psychotropic Substances Act, 1985.
- It works under the **Ministry of Home Affairs**.
- The National Policy on Narcotic Drugs and Psychotropic Substances is based on **Article 47** of the Indian Constitution, which seeks to prohibit the **consumption of harmful drugs, except for medicinal use**.
- India is a signatory to the Single **Convention on Narcotic Drugs 1961** (amended by the 1972 Protocol), the **Conventions on Psychotropic Substances 1971**, and the **United Nations Convention** against **Illicit Traffic in Narcotic Drugs and Psychotropic Substances 1988**.
- Under NCB Director General, **Operation Samudragupta** aimed to gather actionable intelligence for intercepting ships carrying illegal drugs.

TRANS-FAT

In News: WHO's **trans-fat elimination** validation program is now open for country applications.

- The WHO Validation Programme for Trans Fat Elimination will recognize Member States having a normative framework in place to eliminate **industrially produced TFA** (Trans Fatty Acids) from national food supplies by granting them a **WHO Validation certificate** of Trans Fat Elimination.
  - **44 countries including India** have best-practice policies in effect, covering 2.8 billion people (37% of the world population).
  - In 2003, **Denmark** became the **first country** to **ban trans fats** in foods.
- **Trans fat, or trans-fatty acids**, are **unsaturated fatty acids** that come from either **natural or industrial sources.**
  - **Naturally-occurring trans-fat** comes from **ruminants (cows and sheep).**
  - **Industrially-produced trans-fat** are formed in an industrial process that adds **hydrogen to vegetable oil** converting the **liquid into a solid,** resulting in **"partially hydrogenated" oil (PHO).**
  - Introduces in the 20th century as a **replacement for butter and lard**, Partially Hydrogenated oils (PHO) are **solid at room temperature** that **prolongs the shelf life** of products, and are primarily used for **deep frying** and as an ingredient in **baked goods.**
  - Trans fats **raise bad (low-density lipoproteins, LDL) cholesterol levels** and **lower good (high-density lipoproteins, HDL) cholesterol levels.** Eating trans fats increases the risk of developing **heart disease and stroke**. It is also associated with a higher risk of developing **type 2 diabetes.**
  - Experts and public health authorities recommend limiting consumption of trans fat (industrially-produced and ruminant) to **less than 1% of total energy intake.**

Best Practices in Trans-Fat Removal

- Mandatory national limit of **2% of trans-fat** or **two grams** of industrially produced trans-fat **per 100 grams** of total fat in all foods.

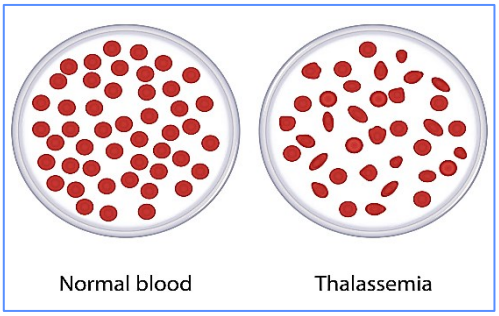
- Mandatory **national ban on the production or use of partially hydrogenated oils** (a major source of trans fat) as an ingredient in all foods.
- In 2018, WHO called for the **global elimination** of industrially produced trans fat by 2023 and released the **REPLACE action framework** to support countries in implementing best practice policies.

REPLACE					
REVIEW	**PROMOTE**	**LEGISLATE**	**ASSESS**	**CREATE**	**ENFORCE**
dietary sources of industrially produced TFA and the landscape for required policy change	the replacement of industrially produced TFA with healthier oils and fats	or enact regulatory actions to eliminate industrially produced TFA	and monitor TFA content in the food supply and changes in TFA consumption in the population	awareness of the negative health impact of TFA among policy-makers, producers, suppliers and the public	compliance with policies and regulations

- The **Food Safety and Standards Authority of India (FSSAI)** is committed to eliminate industrially-produced trans-fat by the year 2022, through **Eat Right India Movement.**
- FSSAI has initiated a campaign **"Trans Fat-Free India** (Heart Attack Rewind: a 30 second audio–visual Public Service Announcement)" which focuses on the elimination of trans fat through **consumer awareness**.

THALASSEMIA & APLASTIC ANAEMIA

In News: A Total of 20 underprivileged thalassemic children got a new lease of life with life-saving **bone-marrow transplants** done at free of cost under the Centre's pan-India programme **'Thalassemia and Aplastic Anaemia Bal Sewa Yojna (TBSY)'.**



- The Union Health Ministry has been implementing the TBSY since 2017 under the National Health Mission (NHM).
- **Thalassemia Bal Seva Yojana (TBSY)** is a flagship CSR scheme of Coal India Limited (Maharatna Company) since 2017. Later, **aplastic anaemia** was also added to it in 2020.
- Permanent cure of these ailments lies in **Stem Cell Transplant** also known as **Bone Marrow Transplant (BMT).** Further, it is found that the treatment is more successful if BMT is done at an early age.
- But the initiative, run by **Union Health Ministry** under National Health Mission, does not have many takers despite the scarcity of pro bono **bone marrow transplant centres**, due to **lack of knowledge and sensitisation.**

What is Thalassemia and Aplastic Anaemia Bal Sewa Yojna?

- It is a scheme by the Centre that provides **free bone marrow transplants** to underprivileged children **below 12 years of age** who suffer from thalassemia or aplastic anaemia and belong to families with **annual income** below Rs 5 lakh.
- It has empanelled 10 hospitals across India for conducting the transplants.
- The third phase of the TBSY will provide **financial assistance** for a package cost of 10 lakhs per Hematopoietic Stem Cell Transplant (HSCT) funded by CIL to the institutions performing HSCT.

Thalassemia

- It is a life-threatening **inherited blood disorder** that causes a body to have **less haemoglobin** (which carries oxygen in the blood) than normal, and the patient is **unable to generate** their own red blood cells.
- It causes anaemia, fatigue, weakness, infections, and organ damage. It requires regular **blood transfusions and medication** to manage.
- It is projected that more than **10,000 thalassemic children** are born in India every year, making the country the **Thalassemia capital of the world** and putting a significant strain on healthcare resources.

Aplastic Anaemia

- It is a condition that occurs when the body/bone marrow **stops producing enough new blood cells.**
- It causes bleeding, bruising, infections and fatigue.
- It can be caused by **genetic factors, infections, drugs, radiation or immune disorders.**
- An estimated, **nearly 9,400 people** are diagnosed with aplastic anaemia annually in India.

Bone marrow transplant

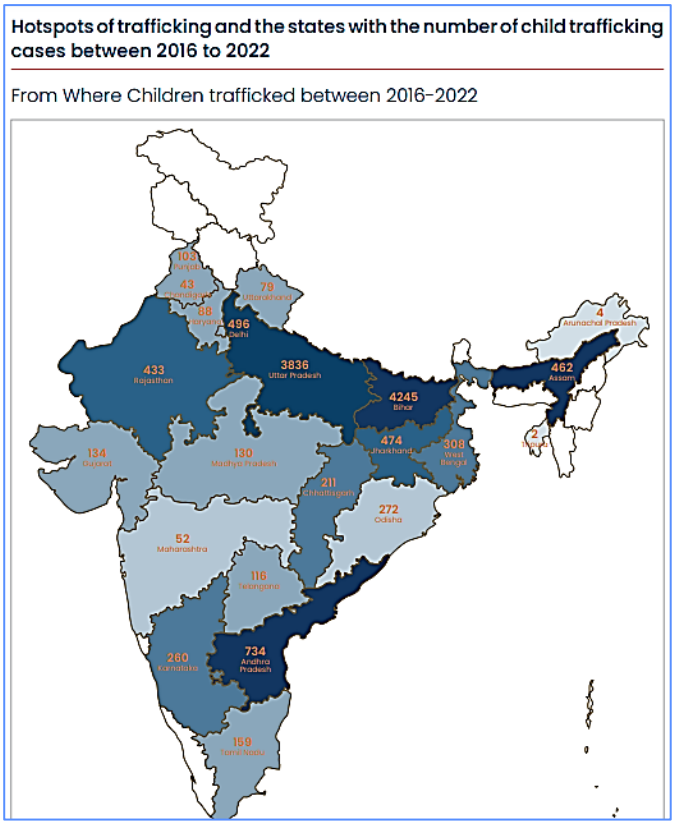
- It is a procedure where **healthy stem cells from a donor** are infused into the patient's bloodstream.
- These stem cells then migrate to the **patient's bone marrow** and start producing healthy blood cells.
- Bone marrow transplant can cure thalassemia or aplastic anaemia if there is a **matched donor** available. It can reduce the dependence on blood transfusions and medication.

CHILD TRAFFICKING

In News: A report on Child Trafficking was released by Games 24x7 and the **Kailash Satyarthi Children's Foundation (KSCF)** on World Day Against Trafficking in Persons (July 30).

Insights from the Report:

- **Jaipur and Delhi** have emerged to be the **most prominent destinations** for trafficked children.
- **Uttar Pradesh** saw the maximum number of children trafficked on an average per year followed by **Bihar and Andhra Pradesh.**
- **Karnataka** saw a **staggering rise** in the number of children trafficked on an average per year.
- **No case** of child trafficking has been reported in **Kerala** since Covid pandemic.
- **MHA Report on Missing Women:**
  - **Between 2019 and 2021,** over 13.13 lakh girls and women went missing in the country.
  - **Madhya Pradesh recorded** the **highest** cases with nearly two lakhs, followed by **West Bengal.**
  - Among the UTs, **Delhi** recorded the highest number of such cases, followed by **Jammu & Kashmir.**
- **World Day Against Trafficking in Persons 2023:** It aims to raise awareness of disturbing developments and trends identified by the latest **UNODC (United Nations Office on Drugs and Crime) Global Report on Trafficking in Persons.**



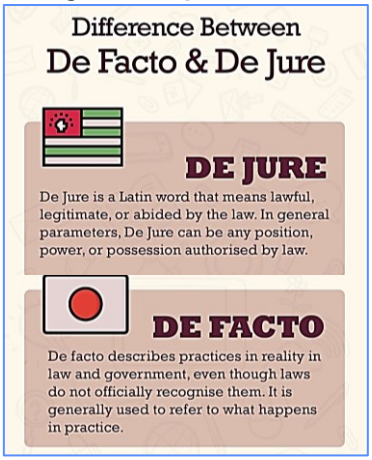
MAXIMUM CASES IN MP

STATE	WOMEN	GIRLS
Madhya Pradesh	1,60,180	38,234
West Bengal	1,56,905	36,606
Maharashtra	1,78,400	13,033
Odisha	70,222	16,649
Delhi	61,054	22,919

SARPANCH-PATISM

In News: NGO (Mundona Rural Development Foundation) requested SC to take action against **Sarpanch-Patism**.

- Sarpanch-pati or pradhan-pati term implies that women are elected **de jure**, but their **husband de facto** run the local state violating constitutional rights and dignity of women.
- It can also be referred to as **proxy politics**.
- It is a **distorted version of representative politics** where an elected official **lacks the capacity or willingness** to fulfil their duties, prompting someone else to step in on their behalf.
- This practice undermines the **73rd amendment of the Constitution**, which mandates **at least one-third reservation for women in PRIs.**
- The 73rd amendment boosted women's **political role, sparking resistance** and **patriarchal control**, while also reshaping families through cooperation, but adding complexity.



- The Ex-Women and Child Development Minister proposed punitive measures for **non-participating women pradhans**, advocating imprisonment and banning 'pradhan pati' from decisions.
- 'Panchayat', being **'Local Government'**, is a **State subject** and part of **Seventh Schedule** of the Constitution. Accordingly, all Panchayat related matters, including representation of women in Panchayat systems, are governed by the respective **State Panchayati Raj Acts and rules**

Challenges	Strategies for Empowerment
• Patriarchal norms hindering women's public participation.	• Education, awareness campaigns, women's leadership promotion.
• Political interference, violence by dominant groups.	• Legal safeguards, reporting mechanisms, support networks.
• Socio-economic barriers (poverty, illiteracy) limiting access.	• Economic empowerment, education, healthcare initiatives.
• Balancing domestic, public roles for women's well-being.	• Flexible work, shared duties, healthcare support.

GARO TRIBE

In News: Garo tribe settled in Uttar Panialguri of West Bengal feel deprived of the development in the state.

- Garo community are one of the **immigrant tribes** in Tripura with their **original home land at Meghalaya** (Garo Hills), Kamrup, Goalpara etc. places of **Assam** and **Mymansing of Bangladesh.**
- Ethnically Garos are a tribe of **Tibeto-Burman linguistic family** under **Mongoloid racial stock.**
- **Wangala festival** of the Garos has great importance in their life during **harvest** of new crops.
- Garo have their **traditional social council**. The **village chief** is empowered to look after the social taboos and customs and he settles all sorts of social disputes among the community members.
- **Jhum cultivation** is the main **occupation** of the Garo tribe. The hills in this region are suitable only for Jhum cultivation where **paddy**, **cotton**, **maize**, **millet and pulses** are grown.
- The economic life of the Garo tribes revolves around **agriculture** and **farming**.
- **Religion of Garo Tribes:** huge section of Garo populace have followed **Baptism and Roman Catholicism**.

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HISTORY & CULTURE

PM MODI'S GIFT DURING US TRIP

In News: During **state visit** to USA PM Modi presented several gifts to US President Biden and first lady of Jill Biden

- The gifts included first edition copy of **'The Ten Principal Upanishads'** translated by WB Yeats, a **sandalwood box** containing **das danam** (10 donations), idol of Lord Ganesh, diya and a copper plate to the US President.
- The first lady was presented a 7.5 carat **lab-grown green diamond** in a **Kashmiri papier mache box** called as **kar-e-kalamdani.**
- Ancient Indian text **Krishna Yajurveda** mentions a significant milestone in the Hindu way of life known as "**Drishta Sahasrachandro**". One attains this milestone at the age of **80 years and 8 months** (nearly the age of US president at present), symbolising the experience of having **witnessed 1000 full moons**. The occasion is marked by celebrations called as **Sahasra Poorna Chandrodayam** and custom of offering **Das Danam**, a donation of ten different kinds.
- The exquisite diamond not only reflects the **chemical and optical properties** of earth-mined diamonds but also embodies **eco-friendliness**, as it was crafted using sustainable resources like **solar and wind power**.
- The green diamond is a hallmark of excellence through its 4C's: **Cut, Color, Carat, and Clarity.** The art of kar-e-kalamdani involves **sakthsazi**, a meticulous preparation of paper pulp and **naqqashi**, where skilled artisans paint elaborate designs from Kashmir. This age-old tradition exudes grace, simplicity, and intricate motifs, making each piece a timeless masterpiece.
- The sandlewood was sourced from Karnataka, sandalwood box was crafted by a master craftsman from Jaipur,
- PM Modi's gifts to US President Joe Biden and First Lady Jill Biden symbolise India's **cultural tapestry, blending innovation, sustainability and traditional craftsmanship** into a remarkable expression of luxury.
- The LGD gift holds significance as the government had earlier approved a five-year research grant and establishment of **India Centre for LGD (InCent-LGD)** at the Indian Institutes of Technology, Madras to encourage the **indigenous production** of LGD **machinery, seeds and recipe.**
- The govt also announced **elimination of customs duty** on LGD seeds. As per industry estimates, India's **share in its global trade** in the financial year 2021-22 was **25.8%.**
- Besides the **jewellery industry**, lab-grown diamonds are used **in computer chips, satellites, and 5G networks** as they can be used in extreme environments due to their potential to **operate at higher speeds while using less power** than silicon-based chips.
- LGD has a vast application in the field of **defence, optics, jewellery, thermal and medical industry.**
- President Biden and First Lady Jill Biden gifted PM Modi an **antique book galley, vintage American camera**, **signed first edition** copy of 'Collected Poems Of Robert Frost' and **archival facsimile print** of George Eastman's Patent of the first Kodak camera.

NATIONAL MARITIME HERITAGE COMPLEX (NMHC), LOTHAL

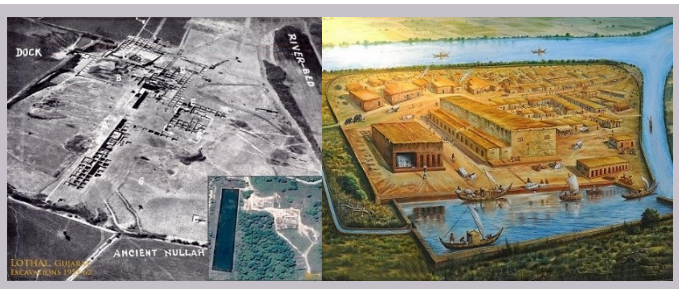
In News: Ministry of Ports, Shipping and Waterways is developing the **National Maritime Heritage Complex** at Lothal, Gujarat.

- NMHC is one of the major projects of the **Sagarmala Programme** under the **Ministry of Ports, Shipping and Waterways** (**MoPSW**) and will be the **World's biggest Maritime Museum complex.**
- NMHC is the first of its kind in the country dedicated to the **legacy of Maritime Heritage of India.**

- Advantages through the creation of NMHC:
  - Showcase India's **rich and diverse maritime glory**.
  - **World class international tourist destination** (maritime museum, lighthouse museum, maritime theme parks, and amusement parks, etc)
  - Attract **private investments and create employment opportunities** for the people of the region.
  - **Each coastal state and UT** of India will showcase its **vivid cultural identities** and maritime heritage at NMHC representing India's cultural diversity at international level.

- NMHC would be developed in an area of about 400 acres, with a total cost of the project of ₹3,500 crore.

Lothal



- It was an ancient **only port town** of the **Harappan civilization (Indus Valley Civilization)** dating to 2400 BC, located in Gujarat.
- Archaeological excavations have discovered the **oldest man-made dockyard**, over 5000 years old, in Lothal.
- Other features include the acropolis, the lower town, the bead factory, the warehouses, and the drainage system
- NMHC at Lothal fits the **historical importance** of Lothal and helps it become an area of **extraordinary and unparalleled** maritime heritage.
- The availability of **antiquities** whose **origin is traceable** to the Persian Gulf and Mesopotamia and the presence of what is identified as a **bead making industry** further attributes Lothal as an industrial port town of the Harappan culture.

GONGADI SHAWLS

In News: Telangana's woollen **gongadi shawls** have been repurposed into **all-weather shoes** for farmers by alumni of the **National Institute of Design, Ahmedabad.**

- Gongadi, (known also as **Kambal**) is the traditional woollen blanket woven by the **indigenous Kuruma** (known as **Kuruba in Karnataka and Dhangar in Maharashtra**) pastoralist communities.
  - It is handwoven out of the yarn obtained from the **rare Deccani sheep** (locally known as **Nalla gorrae**, and the **only pure black wool breed** of the sheep in the country) found in the Deccan Plateau region including the Indian state of Telangana.
- The coarse woollen blanket is famous for its **durability, versatility and waterproof nature**, as it can last for more than a decade while exhibiting a unique characteristic of growing **darker over time** instead of fading.
- The traditional gongadi is **prod uced organically**, without using any dyes either natural or synthetic.
- With the collapse of wool-based economy and decline in the population of Deccani sheep breed, the art and craft of weaving the traditional gongada had become a dying tradition.
- Few civil society organizations, notably **Anthra** and alliances like the **Food Sovereignty Alliance, India (FSA)** have worked extensively on the conservation of the Deccani sheep breed and reviving the gongadi and local wool-based economy.

- With this ecological innovation, the farmers will have shoes to wear in farm fields, as against being barefoot, running the risk of **cracked feet, fungal infections and snake bites**.

TUNGNATH TEMPLE

In News: The **Archaeological Survey of India** (ASI) revealed that the **Tungnath shrine** in Uttarakhand is **tilting five to six degrees**, and the smaller structures inside the complex have leaned about 10 degrees, suggesting Central government to declare it as a **monument of national importance.**

- ASI officials have not ruled out the **possibility of subsidence**, owing to which the alignment of the temple may shift.
- Previously, the land subsidence in **Joshimath** brought attention to the risks faced by Uttarakhand and its **delicate mountain ecology** due to factors such as the **proliferation of dams, deforestation, forest fires**, and the implementation of million-dollar **road projects**.
- Tungnath situated at an altitude of 12,800 feet in the **Rudraprayag district of the Garhwal Himalayas** is regarded as the **world's highest Shiva temple** and is believed to be almost **1000 years old.**
- The temple is also referred to as **"Tritiya Kedar",** since it is part of the **"Panch Kedar"** with **Lord Shiva as the presiding deity.** Other four temples include **Kedarnath, Madhmaheshwar, Rudranath and Kalpeshwar.**
- As the myths have it, the foundation of this temple was laid down by **Arjuna,** the third of the Pandava brothers and it is built in the **North Indian style of architecture.** The temple features a dozen shrines dedicated to various other Gods, which surround the main temple structure.
- It was built by the **Katyuri rulers** in the **8th century** and is under the administration of the Badri Kedar Temple Committee (BKTC).

KAKATIYA ERA RAMAYANA FRESCO

In News: The unique Ramayana fresco from the Kakatiya-era drown in a natural rock shelter in the Rudragiri hillock, Guntur, AP, boasts a fascinating mix of prehistoric rock paintings & Kakatiya dynasty artwork.

- A one-of-a-kind Ramayana painting from the **Kakatiya period** which depicts the Vanara brothers **Vali and Sugriva** engaged in a furious battle in a **natural rock shelter** on the **Rudragiri mountain**. Rudragiri hilltop, located at Eastern Ghats in **Guntur district** of Andhra Pradesh, is a remarkable representation of Andhra Pradesh's **rich historical and artistic culture.**
- Rudragiri has **five naturally formed rock shelters** at its foothills. These shelters were used as **human living quarters** throughout the **Mesolithic period**, around **5000 B.C.**, and they bore evidence to the dazzling rock drawings of those time. These are the same sites of Katatiya period paintings as well.
- **Three natural caves** near the hillock's southern end have **remarkable murals** from the famed Kakatiya empire.
- The **first cave,** which **begins at the southern end of the mound,** features a narrative painting **depicting the epic fight between the Vanara brothers, Vali and Sugriva**.
- Both individuals are standing on the battlefield with maces in their hands, their faces filled with furious intent. Rama sets up an arrow at Vali hiding behind Sugriva.
- Though the colours of this magnificent scene have faded with time, the surviving outlines reveal significant information about its origin and chronology.
- The second cave depicts a **huge sketch of Hanuman, accompanied by religious symbols of the conch (Sankha) and the fire altar (Yagna Vedi)** (shown in image)**,** draws visitors' attention.
- Hanuman is shown with his right hand holding the Sanjivani hill, symbolising his goal to save Lakshmana's life.
- **The third cave houses Mesolithic prehistoric rock drawings.** Remarkably, the Kakatiya artist chose the same rock shelter to superimpose the exquisite figure of Hanuman, who is shown in a unique 'Anjali' posture, folding his hands in a magnificent offering.

The connection between Rudragiri Hillock and Telangana

- The remarkable similarity between the magnificent frescoes found on Rudragiri's rock shelters and those discovered in **Muppavaram and Pandavulagutta,** located in the neighbouring Telangana's Warangal district, implies that the Ramayana scenes depicted at Rudragiri might have been influenced by the artwork seen at Muppavaram.
- It is probable that the renowned **Ganapati Deva Maharaja (1199-1262 AD),** who was a prominent figure of the Kakatiya dynasty and **the founder of the Muppavaram temple,** played a significant role in supporting and promoting the abundant ancient mural heritage discovered at Rudragiri.

About Kakatiya Dynasty

- The Kakatiya kingdom was a medieval dynasty that ruled over a large portion of **present-day Telangana and Andhra Pradesh.** The dynasty was established in the **early 12th century by Prola II** and reached its pinnacle under the leadership of **Ganapati Deva Maharaja.**
- The Kakatiya dynasty, under kings like **Ganapati Deva and Rudrama Devi,** built remarkable Hindu temples like the **Thousand Pillar Temple and Ramappa Temple in Telangana.** They also constructed the impressive **Golconda Fort in Hyderabad.**

YUGE YUGEEN BHARAT

In News: Yuge Yugeen Bharat in Delhi is set to be **World's largest Museum**

- The Museum showcases eight thematic segments recounting **India's 5,000-year journey.**
- The thematic sections are:
  - **Ancient Indian knowledge:** ancient town planning systems, ancient medical knowledge, **the Vedas, Upanishads**
  - **Ancient to medieval**: **Mauryan to Gupta Empires, Vijayanagara Empire, Mughal Empire**
  - **Medieval**: Maratha, Delhi Sultanate
  - **Medieval to transition phase**: insights into significant cultural shifts including various empires
  - **Modern India**: British empire 18th century onwards
  - **Colonial rule:** Effects of colonial rule on India and the subsequent freedom struggle
  - **Freedom struggle:** Story of independent India
  - **100 years from 1947 onwards**: Vision for the future
- The museum is touted as a **'forward-looking'** institution, aiming to inspire by showcasing India's potential and future vision, not just dwelling on the past.

PERFUME CAPITAL OF INDIA

In News: The perfume-makers of **perfume capital of India Kannauj** still follow the traditional method of hydro-distillation, with their secret formula of **flowers, herbs and spices.**

- The **capital of emperor Harsha** (590 to 647 CE) **Kannauj,** Uttar Pradesh has been known for its **exquisite perfumes and attars**(also known as 'itra' or 'ittar') for centuries.
- The most famous is **mitti-attar**, where the perfume-makers of Kannauj distil the fragrance (this particular aroma is called **petrichor**) of fresh rain as it falls on dry soil.
- Pure and natural attars are derived from different kinds of **flowers (rose, kewra, chameli, bela, marigold, jasmine, lavender** and so on), from **grasses** such as **vetiver**, and **herbs** and **spices** (cardamom, cloves, saffron, juniper berry, jatamansi a nd the like) by the traditional approach of **steam distillation in a copper vessel.**
- Most of the attar manufacturers here have been in the business for generations and they keep their **specific formula** a **well-guarded secret.**
- Kannauj Perfumes got the **Geographical Indication (GI) tag in 2014,** but more needs to be done on a large scale to make it like the French town, **Grasse** d ubbed as the **'perfume capital of the world'.**
- Uttar Pradesh government would host the first **International Perfume Festival** in February 2024 with the aim of promoting the perfume of Kannauj in the global market under the **One District One Product (ODOP) scheme.** Govt is also constructing a perfume park in an area of 57 acres in Kannauj.

BHADOHI CARPETS

In News: The exquisite **carpets** adorning the floors of **Lok Sabha and Rajya Sabha halls** in the new Parliament were **hand-knotted** by 900 skilled artisans i**n Uttar Pradesh's Bhadohi** for over 10 lakh man hours.

- These carpets are the lotus and peacock motifs adorning the new houses of the Parliament.

About Bhadohi Carpets

- It is manufactured on a **vertical wooden loom** and are made using the **knot-by-knot technique.**
- Designs depicting **flowers, animals, gardens, trees and trellises** are used in various hues.
- In 2009, Bhadohi carpets earned the **GI tag.**
- The carpet industry in the **Mirzapur-Bhadohi** region engages nearly 32 lakh people and Bhadohi district alone employs **22 lakh rural artisans.**
- **Carpet making** in India started in the mediaeval times during the reign of **Mughal emperor Akbar.**

MERA GAON MERI DHAROHAR

In News: It is a pan-India initiative of **Ministry of Culture** launched under **National Mission** on **Cultural Mapping.**

Objective

- To culturally map India's **6.5 lakh villages,** spanning 29 States and 7 UTs, on a comprehensive **virtual platform.**
- The villages are categorized into **7-8 groups** based on their **ecological, developmental, and scholastic importance**, as well as their association with famous **textiles, historical events** like the **independence struggle**, or **mythological connections** like the Mahabharata**.**
- To encourage appreciation for India's culture and traditions, paving the way for **economic growth, social harmony, and artistic development** in rural communities.
- Also includes **Projection Mapping Show** on **Qutub Minar**, narrating different themes of some of India's handpicked villages.

National Mission for Cultural Mapping

- Aims to create a strong **"Cultural Vibrancy"** throughout the nation.
- Identification and map the **cultural assets** and art repositories of the nation
- Launched by the **Ministry of Culture in 2017.**

STOLEN ANTIQUITIES

In News: ASI verified return of some **105 antiquities** from abroad, many of which belong to the period of **1st century BC** to the **15th century AD**.

- Prominent antiquities to be returned:
  - **Mahishasur Mardini** sculpture.
  - **Terracota Yakshi** plaque: 1st century BC - Eastern India
  - Red sandstone **Dancing Ganesha:** 9th century - Central India
  - Kubera: 10th century - Central India
- In India, the Union List, State List, and Concurrent List of the Constitution protect the country's heritage.
  - The **Antiquities and Art Treasures Act (AATA), 1972 of India** defines antiquity as such **Manuscripts, records, or other documents** with scientific, historical, literary, or aesthetic value must have been in existence **for at least 75 years** to be considered antiquity. It regulates export trade, prevents smuggling and fraud in antiquities and art treasures.

- The Act mandates **only Central Govterment or any agency authorized by** it to **export** any antiquity or art treasure.
- The **Antiquities (Export Control) Act** was passed in **1947** to prevent antiquities from being **exported without a license**, while the **Ancient Monuments and Archaeological Sites and Remains Act of 1958** was enacted to **safeguard ancient monuments and archaeological sites** from destruction and misuse.

What is Antiquity?

Antiquity refers to any object or **work of art** that has been in existence for **at least 100 years** (commonly accepted timeline) and **reflects** science, art, literature, religion, customs, morals, or politics from a **bygone era**. This can include **coins, sculptures, paintings, epigraphs, detached articles**, and other items.

QILA RAI PITHORA

In News: LG directed DDA and ASI to put in place a restoration plan for **Prithiviraj Chauhan's Qila Rai Pithora** in South Delhi.

About Qila Rai Pithora or Lal Kot

- It is a fortified complex in present-day Delhi, which includes the Qutb Minar complex.
- The complex earlier included various **Hindu and Jain temples** as well.
- Lal Kot and Qila Rai Pithora in Mehrauli together comprised the mediaeval city of **Dhillika.**
- Lal Kot, Delhi's first Red Fort, was built in the **11th century** by the Tomar dynasty.
- Later, the king **Prithviraj Chauhan- III** built the 'Qila Rai Pithora,' a new fort that encircled the citadel of Lal Kot on three sides.

The city of Dhillika

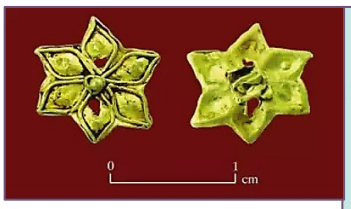
- The **Bijolia inscription** from **1170 CE** documents the Chauhan king **Vighararaja-IV's conquest of Delhi**, referred to as **"Dhillkagrahana."**
- The architectural evidence of **8th-9th** century suggests that this area was known as **Yoginipura** during the **Gupta, post-Gupta and Pratihara** periods.
- Later, it came to be as known as Dhilli or Dhillika when **Anang Pal II**, the **Tomar ruler** inhabited the city between **1052 and 1060 CE** and constructed Lal Kot.

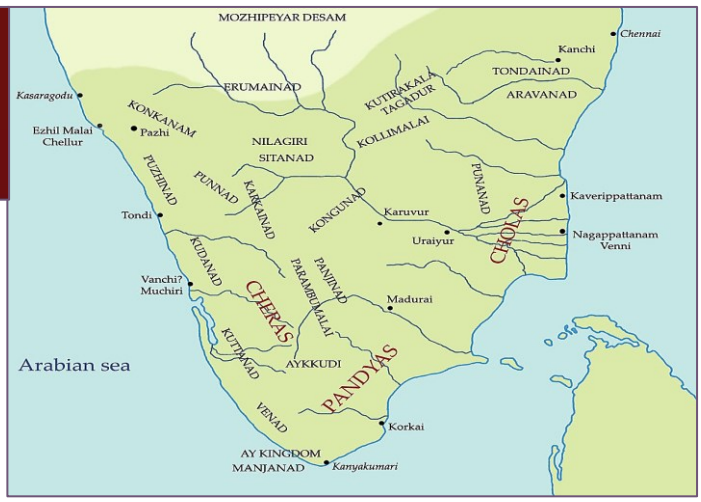
Other Restoration work

- **Tomb of Sultan Ghiyasuddin Balban:** Built in **1287 CE- in Mehrauli**, Delhi- From here on, **true arches** become a common feature of the **Indo-Islamic architecture** of Delhi.

SANGAM AGE EXCAVATIONS

In News: Tamil Nadu Archaeology Department excavated a fort of **Sangam-age.**





- Archaeologists discovered a golden nose stud or earring, a bone point and a fragment of carnelian bead.
- Studies carried out at the site using **Light Detection And Ranging (LIDAR)**, a remote sensing method, had indicated that a fort had existed at Porpanaikottai.
- Sangam age refers to the period of ancient Tamil Nadu, Kerala, from **6th century BCE to 3rd century CE.**

What does it reveal

- **Carnelian beads**, common in the north, have been uncovered at Kodumanal, Keeladi, and Porpanaikottai sites, indicating cross-country trade links.
- The excavation site indicated a **burial site**, and the fort area showed **signs of water bodies** inside the site.
- The discovery of **bone point tools** indicated that Porpanaikottai was a site of the **weaving industry.**

NERO'S THEATRE

In News: The ruins of Nero's Theatre, an imperial theatre referred to in **ancient Roman texts** but never found, have been **discovered**.

- The ruins are believed to be where the **infamous emperor Nero**, who reigned from **54 to 68 AD**, would **practice music and write poetry.**
- Nero was known for his **notoriety, cruelty and debauchery.**
- He ruled at a time of great social and political change, overseeing momentous events such as the **Great Fire of Rome.**
- The eagerness with which he rebuilt led many to believe that he was responsible for the fire. He tried to shift the **blame to the Christians**, beginning the **Roman persecution** of that young religion.

About Nero's Theatre

- Nero's Theatre remains are located in the courtyard of the frescoed renaissance building **Palazzo dei Penitenzieri.**
- It is situated on the right bank of **Tiber river**.
- The theatre has been mentioned by **Pliny the Elder**, an ancient Roman author and philosopher.
- The theatre was mentioned last in the middle of the **12th century in the Mirabilia Urbis Romae**, a pilgrims' guide of the city.

MUHARRAM

In News: The **first month** of the Muslim calendar is marked by the event of Muharram, which is also the start of the **new Islamic year.**

- The word Muharram means **'not permitted' or 'forbidden'** hence, Muslims are prohibited from taking part in activities like **warfare** during this period, and use it as a period of **prayer and reflection.**

Significance

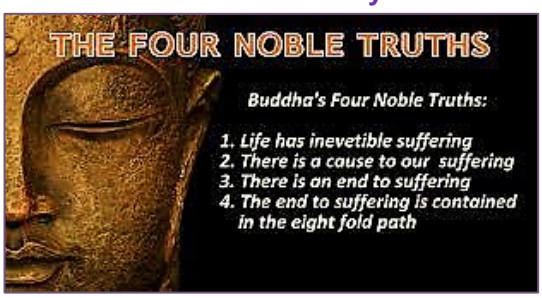
- The sacred month is also known as the **Hijri and the 'Month of Allah'**.
- The event commemorates the death of **Prophet Muhammed's grandson**, **Hussein Ibn Ali**, who was martyred during the **Battle of Karbala (680 CE)** on the **tenth day** of Muharram, known as the **Day of Ashura.**
- Ashura remains a significant day of **reflection, remembrance and religious observance** for both **Sunni and Shia Muslims** worldwide.
- Muharram is the **first month of the Islamic calendar,** which is **ten or twelve days** shorter than the **Gregorian calendar** followed by the West.
- It marks the **hijrah (emigration)** of the Muslims to **Medina** and the establishment of the first Islamic state in **622 CE.**

BUDDHA PURNIMA

In News: Buddha Purnima or Vesak holds a great significance among Hindus as this day is celebrated to mark the birth anniversary of Gautam Buddha.

- Majorly celebrated in **East Asia and South Asia,** this year's event marked the **2585th anniversary** of the event.

Significance



- Buddha is believed to be an **incarnation of Lord Vishnu**.
- The event is marked on a **full moon day** in the **month of Vaisakh.**
- This full moon day is auspicious for Buddhists as **3 major events** of Buddha's life took place on the same astronomical day.
  - Buddha's birth at **Lumbini, Nepal in 563 BCE**
  - **Enlightenment under Bodhi tree** at **Bodh Gaya**
  - **Nibbana/Nirvana (**release from the **cycle of rebirth)** at **Kusinagar in 483 BCE**

SHAKAMBARI FESTIVAL

In News: **Shakambari** festival was celebrated at Kanaka Durga temple, located in **Vijayawada, Andhra Pradesh** atop **Indrakeeladri Hills** on the **banks of Krishna River.**

- The deity **'Shakambari Ma'** was decorated with **vegetables and fruits** for the Shakambari festival celebrated every year.
- **'Shakambari Ma',** considered as an incarnation of goddess Durga, is known as **'the bearer of the greens'**, **'Shaka'** means **vegetables** and **'Ambari'** means **who bears**.
- She is believed to feed hungry people with vegetarian food and **eliminate famine & severe food crisis.**
- Festival signifies people's **ecological awareness** and **reverence for nature** rooted in their **cultural practice**.

BHARAT MANDAPAM

In News: The Bharat Mandapam in the **Pragati Maidan** complex, inaugurated by PM, will host this year's **G20 Summit in New Delhi**.

- This **international-level convention centre** will support large exhibitors from India and abroad, serving as a significant hub for **conference tourism** in the country and promoting India as a **global business destination.**
- It will serve as an important platform to showcase the **hard work** of local **artisan and craftsmen**, contributing to the Atmanirbhar Bharat and **'vocal for local'** campaigns.

Art and Architecture

- 'Bharat Mandapam' is inspired by **Bhagwan Basaveshwara's 'Anubhava Mantapa'** (often referred to as the **first Parliament of the world**), which represents a **democratic platform** for debates, discussions, and the expression of ideas.
- The shape of **Mandapam** is derived from **'Shankha' (conch shell).**
- **32 "essential yoga asanas"**, curated from the text of the **Gheranda Samhita** (late 17th century) adorn the arrival area.
- Different walls and facades depict several elements of **traditional art and culture**, including:
  - **'Surya Shakti':** highlighting the country's efforts in harnessing solar energy;
  - **'Zero to ISRO':** achievements in technology and space;
  - **'Pancha Mahabhuta':** signifying the building blocks of a universal foundation; 'aakash' (sky); 'vayu' (air); 'agni' (fire); 'jal' (water); 'prithvi' (earth), among others.

NEW PARLIAMENT BUILDING

In News: In phase 2 of Art project of the new Parliament, focus on Indian traditions and freedom movement.

- This **upcoming phase** will include around eight new galleries, split equally between the **Lok Sabha and Rajya Sabha Foyers.**
- Different galleries will be dedicated towards:
  - Role of **women** in the nation's development, role of **tribal leaders** in the freedom movement, India's **"fight for esteem, pre-1857",**
  - India's **knowledge** and **Bhakti** traditions and Indian connection with **nature and traditional sports.**
- Another major galleries are: **Jan Janani Janmabhoomi** representing 28 states and eight UTs and **Shilp Deergha** having 250 craft pieces.

MIHIR BHOJ

In News: Controversy has emerged in Haryana over Mihir Bhoj's lineage, with various communities asserting their affiliation with him.

Who was Mihir Bhoj?

- Mihir Bhoj, a prominent figure from the Gurjara-Pratihara dynasty, was a remarkable ninth-century Indian leader, renowned for his military prowess and empire-building alongside Dhruva Dharavarsha and Dharmapala. He succeeded his father Ramabhadra.
- In the **ninth century (836-885 CE),** the Gurjara-Pratiharas were ruling from Kashmir to Gujarat.
- During this time, the major political struggle was for control over **Kannauj** between the **Gurjara-Pratihara, the Rashtrakutas of Deccan and the Palas of Bengal.**
- Mihir Bhoj conquered areas of **Gujarat and Malwa** from the **Gujarat-Rashtrakutas** and **Gorakhpur from the Palas of Bengal.**
- He made **Kannauj his capital** which was referred to as **Panchala.**
- He was a **devotee of Vishnu** and adopted the **title of Ādivarāha**, which is inscribed on some of his coins.
- Mihir Bhoj's **Daulatpura-Dausa inscription (843 AD**) confirms his rule in the Dausa region.

ALLURI SITHARAMA RAJU

In News: On his **125th birth anniversary** celebrations in Hyderabad, Alluri Sitarama Raju, the freedom fighter, was honoured by the President of India.

- He was **born on 04 July 1897**, in a village called Mogallu near Bhimavaram in **Andhra Pradesh**.
- By the age of 18, he renounced all worldly pleasures and became an ascetic/sanyasi.
- He used **guerrilla warfare** to fight against the British. Along with his army of tribal people, he launched attacks and raided numerous police stations, killed many British officers, and stole arms and ammunition for their battle.
- He became involved in anti-British activities due to the restrictions imposed by the 1882 **Madras Forest Act**, as colonial rule posed a threat to the tribals **traditional podu cultivation**.
- In August 1922, he launched the **Rampa Rebellion** against the British, which coincided with **Mahatma Gandhi's Non-Cooperation Movement.**
- He **encouraged** people to **wear khadi** and **abstain from drinking**.
- However, he believed that India could only be liberated through the **use of force**, not non-violence.
- He earned the nickname "**Manyam Veerudu**" **(Hero of the Jungle)** from local villagers for his heroic acts.
- In 1924, he was captured by the police and **executed in public**, making him a folk hero for lifetime.

Rampa Rebellion of 1922

- Also known as the **Manyam Rebellion**, it was a tribal uprising in the **Rampa region** of Godavari Agency, located in the hills of the present-day Andhra Pradesh, India.
- The Rampa region was inhabited by tribal people who relied on the **Podu system** for their food. The British authorities passed the **Madras Forest Act in 1882** to take control of the **forest land for commercial purposes**, which restricted the tribal communities from engaging in their **traditional agricultural system (Podu system)**, leading to discontent and objection to British laws.
- The **Muttadars**, who were hereditary tax collectors and de facto rulers, also faced dissatisfaction after being subsumed into the colonial administration. The **common foe** of the tribal and Muttadar communities led to the Rampa Rebellion.

❑ ❑ ❑

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49/100

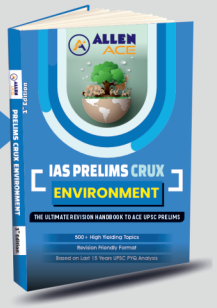
Direct Hits from IAS Prelims Crux in UPSC Prelims 2023

Ques. Consider the following statements:

1. In India, the Biodiversity Management Committees are key to the realization of the objectives of the Nagoya Protocol.
2. The Biodiversity Management Committees have important functions in determining access and benefit sharing, including the power to levy collection fees on the access of biological resources within its jurisdiction.

Which of the statements given above is/are correct?

a) 1 only b) 2 only
c) Both 1 and 2 d) Neither 1 nor 2



Source: Prelims Crux Environment Page No. - 55

Biodiversity Act, 2002	• 3 tiered Hierarchy: NBA>SBB (state biodiversity Boards)>Local BMCs (Biodiversity Management Committee). Main function of BMCis to maintain the "People's Biodiversity Register (PBR)" in consultation with local people. The PBR contains information on availability and knowledge on local biological resources. • Benefit sharing: can be monetary or non-monetary • The act is in close synergy with the Nagoya Protocol of UNCBD. • Also, deals with Genetic modified organisms etc. • Section 6(1) of the act- If a patent application is based on information or research of biological resources obtained from India, no person shall apply for such patent without approval of NBA. • Biodiversity Heritage Site (BHS):- Under section 37 of Biodiversity Act. State government declares BHS in consultation with local bodies.

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