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WEEKLY UPDATES – (14 MAY – 21 MAY)

Contents

INTERNATIONAL RELATIONS

6th India-Canada Ministerial Dialogue

Context:- Recently, the **6th India-Canada Ministerial Dialogue on Trade and Investment (MDTI)** was held in **Ottawa, Canada.**

Major Outcomes of the MDTI

Support for India as G20 Chair:	o The Canadian Minister expressed her support for India as the **G20 Chair and its priorities in the G20 Trade and Investment Working Group.**
Enhanced Cooperation:	o The Ministers highlighted the importance of cooperation in sectors such as **clean technologies for infrastructure development, critical minerals, electric vehicles and batteries**, renewable energy/hydrogen, and **artificial intelligence (AI).**
Critical Mineral Supply Chain Resiliency:	o The Ministers emphasised the importance of **government-to-government coordination** to promote critical mineral supply chain resiliency.
Canada-India CEO Forum:	o The Ministers agreed to **rework and relaunch the Canada-India CEO Forum** with renewed focus and priorities.

Key agreements at fifth India-Canada Ministerial Dialogue on Trade & Investment

- **Finalizing India-Canada CEPA**: Ministers agreed to formally re-launch the negotiations for India-Canada Comprehensive Economic Partnership Agreement (CEPA).
- **Interim Agreement**: They will also consider an Interim Agreement or Early Progress Trade Agreement (EPTA) that could bring early commercial gains to both countries. The Interim Agreement would include-

- High-level commitments in goods, services, rules of origin, sanitary and phytosanitary measures, technical barriers to trade, and dispute settlement, and May also cover any other areas mutually agreed upon.
- **Promoting Agricultural exports**: Both countries agreed to undertake intensified work with respect to the recognition of Canada's systems approach to pest risk management in pulses and market access for Indian agriculture goods such as sweet corn, baby corn and banana etc.
- **Facilitating Organic Exports**: Canada agreed to examine expeditiously the request for Conformity Verification Body (CVB) status to APEDA (Agricultural and Processed Food Products Export Development Authority) for facilitating Indian organic export products.
- **Establishing Resilient Supply Chains**: They acknowledged the significance of establishing resilient supply chains in critical sectors and exchanged views on collaboration in this area.
- **People to People Cooperation**: They also noted the role of strong people-to-people ties between the two countries, including the movement of professionals and skilled workers, students, and business travellers, in strengthening the bilateral economic partnership.

Significance of India-Canada Comprehensive Economic Partnership Agreement (CEPA)

- India-Canada Comprehensive trade agreement would help in expanding bilateral trade in goods and services through unlocking the potential across sectors.
- India-Canada cooperation across sectors will help in harnessing the full potential of the trade and investment relationship between India and Canada

6th Indian Ocean Conference

Context:-The 6thedition of the Indian Ocean Conference (IOC) is being held by India Foundation in association with the Ministry of Foreign Affairs, Bangladesh and S. Rajaratnam School of International Studies.

- The two-day Indian Ocean Conference — with the theme "Peace Prosperity and Partnership for a Resilient Future" — is being held in Dhaka.

Major Highlights of the Conference

| Connectivity | •India, being a significant player in the **Indian Ocean region**, faces distinct challenges in achieving enhanced connectivity |

| Upholding Legal Obligations and Agreements | •Disregarding legal obligations or violating long-standing agreements can **undermine trust and confidence among member nations**. Taking a long-term view of cooperation is essential to ensure sustained progress. |

| Sustainable Projects and Debt | •Unsustainable debt generated by unviable projects is a concern for countries in the region. **(Example-Sri Lanka).** |

| Shared Responsibility and Focus | •The Indian Ocean region requires shared responsibility and focused efforts to ensure its stability and prosperity |

Indian Ocean Region (IOR)

- IOR is a geographical region that encompasses the Indian Ocean and its surrounding areas, including the littoral states and islands.
- The region spans from:
  - the African coast in the west to the Australian coast in the east, and
  - the Arabian Peninsula and the Persian Gulf in the north to the southern coast of Sri Lanka and Australia in the south.
- The Indian Ocean is the world's third-largest ocean, covering an area of approximately 70.6 million square kilometres.
- It is home to several important sea lanes of communication, including the Strait of Malacca, the Suez Canal, and the Bab-el-Mandeb strait, which connect Asia, Europe, and Africa.
- Significance of Indian Ocean Region (IOR)

Geopolitical Importance:

- Due to its geographical location, it serves as a major transit route for global trade, including oil and gas shipments.
- It is home to several important chokepoints, such as the Strait of Malacca and the Bab-el-Mandeb strait.

Economic Importance:

- The IOR is home to several fast-growing economies, including India, China, and several Southeast Asian nations.
- The region is rich in natural resources, including oil, natural gas, and fisheries, and is a major destination for foreign investment.
- It shares 64% of the global population and 60% of the global GDP.

Security Importance:

- The IOR is also a region of great security importance, with several countries in the region facing threats from terrorism, piracy, and maritime security challenges.
- The region has seen increased military activity in recent years, with major powers such as the US, India, and China increasing their presence in the region.

Environmental Importance:

- The IOR is home to several important marine ecosystems, including coral reefs and mangrove forests that are vital for maintaining biodiversity and supporting local communities.
- The region is also vulnerable to the impacts of climate change, including rising sea levels and increased frequency of extreme weather events.

Indian Ocean Conference (IOC)

- IOC is an annual international conference that focuses on the geopolitical, economic, and strategic importance of the Indian Ocean region.
- The conference brings together policymakers, scholars, business leaders, and civil society representatives to discuss issues related to security, trade, and cooperation in the Indian Ocean region.
- The first edition of the Conference was held in Singapore in 2016. The fifth edition of IOC was held in 2021 in Abu Dhabi, UAE.

- **Organised by** - India Foundation in partnership with other organizations in the region.

SCO Adopts India's Proposal to Support DPI

Context:-The **Shanghai Cooperation Organisation (SCO)** has recently adopted India's proposal to support the development and adoption of the country's **digital public infrastructure(DPI).**

What is DPI?

- DPI refers to blocks or **platforms such as digital identification, payment infrastructure and data exchange solutions** that help countries deliver essential services to their people, empowering citizens and improving lives by enabling digital inclusion.

- India, through **India Stack,** became the first country to develop **all three foundational DPIs, Digital identity (Aadhar), Real-time fast payment (UPI)** and **Account Aggregator** built on the **Data Empowerment Protection Architecture (DEPA).**

Goal:- Empower citizen, promote inclusion, and improve lives by leveraging digital technology to provide accessible and efficient public service

Pillars of India's DPI Ecosystem

Aadhaar:	○ Aadhaar is a strategic policy tool for **social and financial inclusion**, public sector delivery reforms, managing fiscal budgets, increasing convenience and promoting hassle-free people-centric governance. ○ Aadhaar holders can voluntarily use their Aadhaar for private sector purposes, and private sector entities need not seek special permission for such usage.
DigiYatra:	○ **DigiYatra** is a **Biometric Enabled Seamless Travel (BEST)** experience based on a **Facial Recognition System (FRS).** • Air passenger traffic in India was estimated to be over 188 million in airports across India in the financial year 2022, out of whom over 22 million were international passengers.
DigiLocker:	○ **DigiLocker** has 150 million users, six billion stored documents, and done with a tiny budget of RS 50 crore over seven years. ○ The users can store their documents such as insurance, medical reports, PAN card, passport, marriage certificate, school certificate and other documents in the digital format.
UPI:	○ **UPI (Unified Payment Interface)** has crossed **eight billion transactions per month** and transacts a value of USD 180 billion a month, or about a staggering 65% of India's GDP per annum. ○ UPI is currently the biggest among the **National Payments Corporation of India (NPCI)** operated systems including National Automated Clearing House (NACH), Immediate Payment Service (IMPS), Aadhaar enabled Payment System (AePS), Bharat Bill Payment System (BBPS), RuPay etc.

Benefits of DPI:

- Aadhaar enables the direct transfer of social safety net payments, reducing leakages and corruption
- Digital payments expanded smaller merchants' customer base and improved access to financial services.
- Digitalization formalized the economy, with nearly 9 million new GST taxpayers CoWIN platform scaled India's vaccine delivery services.

India Stack

- IndiaStack is a set of APIs (Application programming interface) that allows governments, businesses, start-ups and developers to utilize a unique digital Infrastructure to solve **India's hard problems towards presence-less,** paperless, and cashless service delivery.

- It aims to unlock the economic primitives of identity, data, and payments at population scale.

- The vision of India Stack is not limited to one country; it can be applied to any nation, be it a developed one or an emerging one.

- This project was conceptualized and first implemented in India, where its rapid adoption by billions of individuals and businesses has helped promote financial and social inclusion and positioned the country for the Internet Age.

What is India's Digital Public Infrastructure(DPI)?

- India has developed DPI consisting of Aadhaar, United Payments Interface (UPI) and DigiLocker to ensure the convenient availability of services to the public.

- During the meeting of the SCO Digital Ministers, India's DPI proposal was unanimously adopted as the right way for deploying digital technology among member states.

- India emphasized the significance of DPI in promoting technological inclusivity, democratization and overall growth among member states.

- Furthermore, India's DPI proposal also entails collaborating with the SCO members on various aspects of digital public infrastructure such as design, development, implementation, evaluation, and governance.

- To address this, an organization will be established to establish common standards for the interoperability of digital systems within the SCO.

How does India's DPI proposal benefit the SCO members?

- This proposal can help the SCO members to achieve their common goals of enhancing connectivity, trade, tourism, education, health care, and security in the region.

- It can also help the SCO members to address their common challenges of the digital divide, cyber threats, data protection and privacy in the digital era.

Rasht-Astara Railway and INSTC

Context:- In a significant development, Russia and Iran have recently signed a Memorandum of Understanding (MoU) to construct a rail link that will bolster the International North-South Transport Corridor (INSTC) and facilitate the expansion of trade between India and Russia. This rail link holds immense potential in enhancing connectivity and promoting economic cooperation.

Rasht-Astara Railway Link

- The Rash Astra Railway is a 162-kilometer railway connecting Rasht (Iran) and Astara (Azerbaijan) on the border.
- It is part of the International North-South Transport Corridor (INSTC) and will significantly diversify global traffic flows.
- The railway will facilitate connections between Russian ports on the Baltic Sea and Iranian ports in the Indian Ocean and the Gulf.

About INSTC

- The INSTC is a 7,200-kilometer Multi-Mode Transit System connecting India, Iran, Azerbaijan, Russia, Central Asia, and Europe.
- It promotes transportation cooperation among member states and includes ship, rail, and road routes.
- Membership has expanded to include additional countries, and observer states and Baltic countries have expressed interest in joining.

Significance of INSTC for India

- **Central Asia trade:** India has invested in the Chabahar Port in Iran, which serves as a doorway for trade with Central Asian countries.
- **Extended connection:** INSTC offers potential connections to the Baltic, Nordic, and Arctic regions.
- **Bypassing Pakistan:** INSTC provides an alternate route for India to connect with Central Asia, bypassing obstacles in Pakistan.
- **Fastest freight:** It reduces transit time by 40% and freight costs by 30% compared to the Suez Canal route.

- **Alternative to Suez:** Russia claims the project could ultimately rival the Suez Canal in terms of trade flows.

Challenges of INSTC

- Challenges include limited financial support from major international institutions due to US sanctions on Iran.
- Harmonization of tariffs and customs, increased private sector involvement, and improved informational connectivity are necessary for success.

POLITY

Default Bail

Context:-The supreme court of India recently recalled its own decision in the Ritu Chhabaria vs Union of India in favour of the investigating agencies as argued by the Solicitor General of India.

- The Supreme Court made it clear that judges might set default bail without consulting or relying on the Ritu Chhabaria ruling.
- However, the Court's decision to suspend defendants' rights in criminal proceedings would cause further erosion of the accused's constitutional rights and depart from key norms of the criminal process.

What is a Default bail?

- Also known as statutory bail, this is a right to bail that accrues when the police fail to complete investigation within a specified period in respect of a person in judicial custody.
- This is enshrined in Section 167(2) of the Code of Criminal Procedure (CrPC) where it is not possible for the police to complete an investigation in 24 hours, the police produce the suspect in court and seek orders for either police or judicial custody.
- Under Section 167(2) of the Code, a Magistrate can order an accused person to be detained in the custody of the police for 15 days. Beyond the police custody period of 15 days, the Magistrate can authorize the detention of the accused person in judicial custody i.e., jail if necessary. However, the accused cannot be detained for more than:
  - o ninety days, when an authority is investigating an offense punishable with death, life imprisonment or imprisonment for at least ten years; or
  - o sixty days, when the authority is investigating any other offense.
  - o In some other special laws like Narcotic Drugs and Psychotropic Substances Act, this period may vary. For e.g.: In Narcotic Drugs and Psychotropic Substances Act, the period is 180 days.
- At the end of this period, if the investigation is not complete, the court shall release the person "if he is prepared to and does furnish bail". This is known as default bail.

Other Types of Bail in India?

Regular Bail:
- It is a direction given by the Court (any Court within the country) to release a **person who is already under arrest and kept in police custody**. For such Bail, a person can file an application under **Section 437 and 439 of the CrPC.**

Interim Bail:
- Bail granted for a temporary and short period by the Court till the application seeking Anticipatory Bail or Regular Bail is pending before a Court

Anticipatory Bail:
- A direction issued **to release a person on Bail even before the person is arrested**. In this situation, there is apprehension of arrest and the person is not arrested before the Bail is granted.
  - For such Bail, a person can file an application under **Sec. 438 of the CrPC**. It is issued only by the Sessions Court and High Court.

Constitutional Provisions Related to Arrest?

- **Article 22 grants protection to persons who are arrested or detained.** Detention is of two types, namely, punitive and preventive.

  - Punitive detention is to punish a person for an offence committed by him after trial and conviction in a court.

  - Preventive detention, on the other hand, means detention of a person without trial and conviction by a court.

- **Article 22 has Two Parts:** The first part deals with the **cases of ordinary law** and the second part deals with the cases of **preventive detention law.**

Rights Given Under Punitive Detention

- Right to be informed of the grounds of arrest.

  - Right to consult and be defended by a legal practitioner.

  - Right to be produced before a magistrate within 24 hours, excluding the journey time.

  - Right to be released after 24 hours unless the magistrate authorises further detention.

- These safeguards are not available to an enemy alien.

Rights Given Under Preventive Detention

- The detention of a person cannot exceed three months unless an advisory board reports sufficient cause for extended detention.

- The board is to consist of judges of a high court.

  - The grounds of detention should be communicated to the detenu.

  - However, the facts considered to be against the public interest need not be disclosed.

  - The detenu should be afforded an opportunity to make a representation against the detention order.

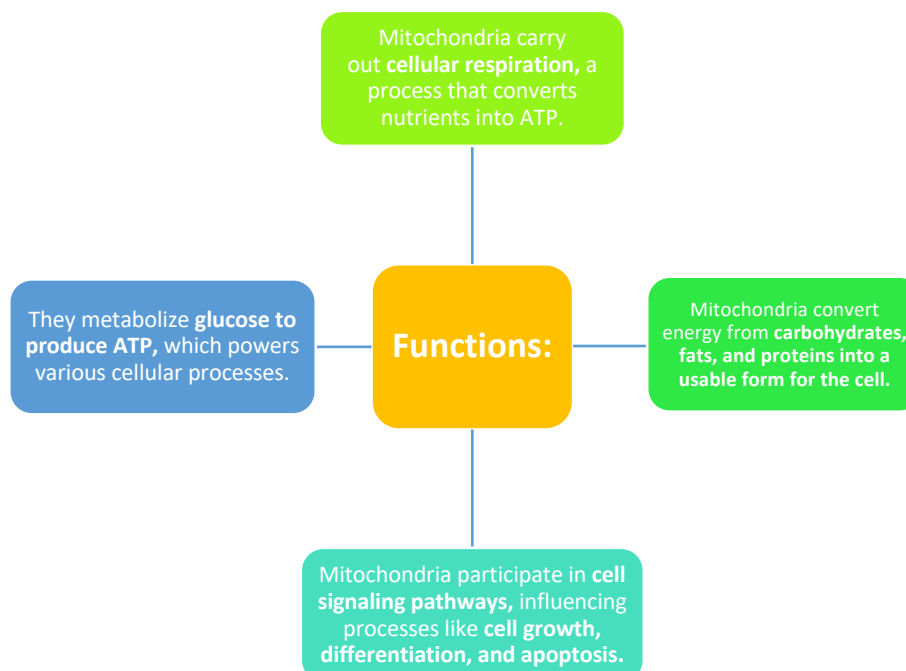 - This protection is available to both citizens as well as aliens.

BIOTECHNOLOGY

Mitochondrial Replacement Therapy

Context:-The recent news of **a baby born in the UK with three parents' DNA** has sparked curiosity and discussions about the scientific breakthrough behind this remarkable achievement.

- This revolutionary technique, known as **mitochondrial replacement therapy (MRT) or three-parent IVF**, aims to prevent the **inheritance of mitochondrial diseases.**

What is Mitochondria?

- Mitochondria are **membrane-bound organelles** found in the cells of most **eukaryotic organisms.**

- They are often referred to as the **"powerhouses" of cells** because they generate the **majority of the cell's energy** in the form of **adenosine triphosphate (ATP).**

  - **Functions:**

Mitochondria carry out **cellular respiration,** a process that converts nutrients into ATP.

They metabolize **glucose to produce ATP,** which powers various cellular processes.

Functions:

Mitochondria convert energy from **carbohydrates, fats, and proteins into a usable form for the cell.**

Mitochondria participate in **cell signaling pathways,** influencing processes like **cell growth, differentiation, and apoptosis.**

Inheritance:

- Mitochondria have their own DNA, known as **mitochondrial DNA (mtDNA),** which encodes a **small number of essential proteins.**

- In most animals, **mtDNA is inherited solely from the mother.**

- Mutations in mtDNA can lead to **mitochondrial disorders** and various health conditions.

Mitochondrial Diseases:

- Certain mutations in mitochondria can lead to mitochondrial diseases, **affecting energy production and impacting various organs**, including the brain, nerves, muscles, kidneys, heart, and liver.

- These diseases can result in severe symptoms, such as **organ failure, muscle wastage, and even brain damage.** Unfortunately, there is **no cure for mitochondrial diseases,** but they can be managed to some extent.

- Few examples of mitochondrial diseases are **Leigh Syndrome, Kearns-Sayre syndrome (KSS)**, Mitochondrial Myopathy and Mitochondrial DNA Depletion Syndrome.

Mitochondrial replacement therapy (MRT)

- Mitochondrial replacement therapy (MRT), sometimes called mitochondrial donation, **is the replacement of defective mitochondria in one or more cells to prevent or ameliorate disease.**
- MRT **originated as a special form of in vitro fertilization** in which some or all of the future **baby's mitochondrial DNA (mtDNA) comes from a third party.**
- This technique is **used in cases when mothers carry genes for mitochondrial diseases**.
- The therapy is approved for use in the United Kingdom.
- In short, **Mitochondrial replacement therapy (MRT) is a new form of reproductive invitro fertilization (IVF) which works on the principle of replacing a women's abnormal mitochondrial DNA (mt-DNA) with the donor's healthy one.**
- Such diseases are rare, yet can be severely debilitating, progressive, and often fatal in infancy or childhood.

Mitochondrial Replacement Therapy: How it is done

The procedure involves several steps including:

1. **Egg retrieval:** The donor and recipient egg cells are obtained from two different women. The donor egg is typically from a young and healthy woman with no history of mitochondrial disease, while the recipient egg cell is from a woman with mitochondrial disease.
2. **Nuclear transfer:** The nucleus of the donor egg cell, which contains all of the genetic material except the mitochondrial DNA, is removed and transferred to the cytoplasm of the recipient egg cell, which contains healthy mitochondria.
3. **Fertilisation:** The reconstructed egg cell is then fertilised with sperm either through in vitro fertilisation (IVF) or intracytoplasmic sperm injection (ICSI).
4. **Embryo transfer**: The resulting embryo is then transferred to the uterus of the recipient mother, where it will develop into a foetus.

Benefits of MRT

- MRT offers new possibilities for **overcoming fertility challenges due to mitochondrial disease** and could have a significant impact on the lives of couples struggling with infertility.
- MRT provides a way to prevent the transmission of these diseases without resorting to alternative options such as egg or embryo donation.
- It allows parents to maintain a biological relationship with their child, which can be an essential factor for many couples.
- **Ethical Controversy**
- Many experts have expressed **concerns about safety of the technique as well.**
- There has been very little animal testing, much fewer human tests, and only 5 babies have been born from MRT.
- **Most scientists don't want unregulated MRT**, and view the regulatory approach in the U.K. to be a model for safely exploring the treatment. Last year, Australia became the second country to approve this therapy.

Carbon Dating

Context:-Recently, the Allahabad High Court allowed the **Archaeological Survey of India (ASI)** to conduct **Carbon Dating** of a 'Shivling' inside the **Gyanvapi Mosque** in Varanasi, Uttar Pradesh.

- The petitioners have claimed the object inside the Gyanvapi mosque to be a "Shivling". The claim was disputed by the Muslim side, which said the object was part of a "fountain".

- It set aside an order of the **Varanasi District Court** that rejected a plea for scientific investigation, including carbon dating, of the structure.
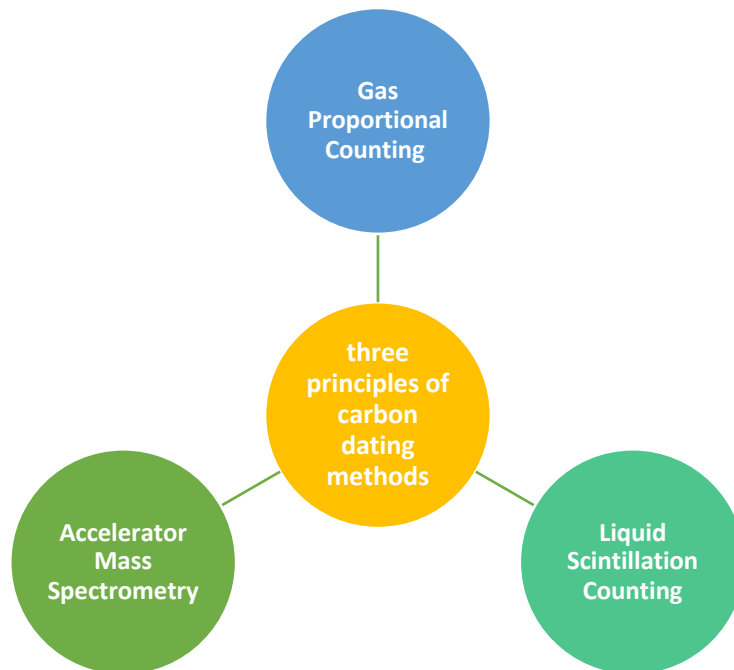
What is Carbon Dating ?

- Carbon dating is a method to determine the age or date of organic materials that were once living. Archaeologists, palaeontologists and scientists use carbon dating to estimate the age of fossils and archaeological artefacts from ancient sites.

- Living things have carbon in them in various forms. The carbon dating method makes use of the fact that a particular isotope of carbon called C-14, with an atomic mass of 14, is radioactive and decays at a rate that is well known. When living things such as plants and animals die, the radioactive carbon that they have accumulated begins to change. Carbon dating uses the decay of carbon-14 to estimate how long something has been dead.

How does Carbon Dating Work?

Carbon-14 is a weakly radioactive isotope of carbon (also known as radiocarbon).

- Carbon-14 is applicable only to organic and a few inorganic materials as living beings absorb carbon-14 from the atmosphere and food sources around them. Therefore, it is not applicable to most inorganic materials.
- There are three principles of carbon dating methods:

Carbon Dating Limitations

In this section, the limitations of the carbon dating method are mentioned.

- **Limited to Organic Materials:** Carbon dating is only applicable to organic materials. It cannot be used to determine the age of rocks, metals, or other inorganic materials.

- **Sample Size:** The sample size used for carbon dating is relatively small, usually only a few grams of material. This means that the sample may not be representative of the entire object being dated.

- **Contamination:** Carbon dating can be affected by contamination from outside sources. This can occur during the collection or preparation of the sample, or during the dating process itself.

- **Age Limitations:** Carbon dating is only accurate up to a certain age. Beyond a certain point, the amount of carbon-14 remaining in a sample is too small to measure accurately, resulting in a maximum age limit of around 50,000 years.

- **Calibration:** Carbon dating relies on the assumption that the ratio of carbon-14 to carbon-12 in the atmosphere has remained constant over time. However, changes in the atmosphere's composition can lead to inaccuracies in the dating process. Calibration is required to account for these changes.

- **Interpreting Results:** Carbon dating provides a range of possible ages for a sample, rather than a precise date. Interpreting the results requires knowledge of the sample's context and potential sources of error.
- **Limited Applicability:** Carbon dating is only applicable to materials that were once alive and have carbon-based structures. This limits its usefulness for dating certain types of objects, such as ceramics or metal artefacts.

Limitations of Determining Age of Gyanvapi Shivling?

- There are specific limitations in the case that **prevent disruptive methods or uprooting** of the structure, as directed by the SC.

- Therefore, traditional methods like carbon dating, which involve analysing trapped organic material beneath the structure, **may not be feasible in this particular situation.**

What is the Gyanvapi Dispute?

- The Gyanvapi dispute revolves around the **Gyanvapi Mosque complex in Varanasi.** Hindu petitioners claim that the mosque was built on the site of an ancient Hindu temple. They argue that the presence of a **"Shivling" serves as evidence of the temple's existence.** The Petitioners have sought the **right to worship Maa Shringar Gauri** on the outer wall of the mosque complex.

- The management committee of the mosque, however, maintains that the land is Waqf property and argues that **The Places of Worship Act of 1991 prohibits** any changes to the character of the mosque.

- Historically, the Gyanvapi Mosque was built in **1669 during the reign of Mughal emperor Aurangzeb.** It was constructed after the demolition of the existing Vishweshwar temple. The plinth of the temple was **left intact and served as the courtyard of the mosque,** while one wall was preserved as the qibla wall facing Mecca. The present Kashi Vishwanath Temple, dedicated to Lord Shiva, was later built adjacent to the mosque by Rani Ahilyabai Holkar in the 18th century.

- Various claims have been made over the years, with some asserting that the mosque remains the original sacred place of Hindu worship.

GEOGRAPHY

Cyclone Mocha

Context:-Cyclone Mocha that made landfall recently in Myanmar has been categorized as an **Extremely Severe Cyclonic Storm** by the **IMD (Indian Meteorological Department)** and as a 'Super Cyclone' by global weather website Zoom Earth.

- It became the strongest cyclone on earth so far in 2023 according to Typhoon Research Center in South Korea's Jeju National University.

- There have been 16 cyclones so far this year in **both Northern and Southern Hemispheres.**

    - Yemen suggested the name **'Mocha', which is supposed to be pronounced as Mokha.**

    - The cyclone has been named after a **Red Sea port city known for its coffee production.** The city also gave its name to the popular beverage, café Mocha

Origin: It originated in the **Bay of Bengal.**

Intensity: With a recorded wind speed of 277 kmph, Mocha became the strongest cyclone for all seasons in both **Arabian Sea and Bay of Bengal,** since 1982, in the North Indian Ocean, tying with **Cyclone Fani in terms of speed and intensity.**

- **Amphan,** witnessed in 2020, was 268 kmph while **Tauktae** in 2021 it was 222 kmph and Gonu in 2007 recorded a speed of 268 kmph.

What is a cyclone?

- Cyclones are caused by atmospheric disturbances around a low-pressure area distinguished by swift and often disruptive air circulation.
- The formation of cyclones takes place in low-pressure areas.

    o Ample amount of warm temperature at the surface of the sea.
    o Instability in the atmosphere.
    o How the Coriolis force is impacting the area so that a low-pressure area can be created.
    o When the humidity is high in the lower to middle levels of the troposphere.

- o Disturbance in the pre-existing low-level area.
- o When the vertical wind shear is low.

Why are cyclones named?

- It helps the scientific community, media, disaster managers, and common people to **identify the cyclone, create awareness about its development, remove confusion if another tropical cyclone is developed in the region, and rapidly and effectively disseminate warnings to a wider audience.**

The Palghat Gap

Context: The Palghat Gap in the Western Ghats is a significant break in the mountain range, measuring about 40 km wide.

What is Palghat Gap?

- The Palghat Gap is a 40 km wide corridor in the Western Ghats, known for its steep hills and serving as a gateway to Kerala.
- It is a crucial passage for roads and railways connecting Coimbatore and Palakkad.
- The Bharathappuzha River flows through the Palghat Gap.
- The vegetation in the gap is classified as dry evergreen forest, different from the tropical rainforests of the Western Ghats.
- The Palghat Gap marks a distinct divide in the flora and fauna of the region.

Geological origin of the Palghat Gap

- The Palghat Gap is a geological shear zone running from east to west.
- Shear zones are weak regions in the Earth's crust, occasionally causing tremors in the Coimbatore region.
- The formation of the Palghat Gap occurred when the continental shelves shifted after the separation of Australia and Africa from the Gondwana landmass.
- India and Madagascar were connected until volcanic activity led to their split, with a similar gap called the **Ranotsara Gap** in Madagascar.

Other Gaps:

Thalghat (Mumbai and Nashik)   **Bhorghat(Mumbai and Pune)**

GOVERNANCE

4th Positive Indigenisation List

Context:- Defence Ministry approves 4th Positive Indigenisation List for Defence Public Sector Undertakings (DPSU).

About

- Continuing the efforts to minimise imports by DPSU, Defence Ministry has approved the 4th Positive Indigenisation List (PIL) of 928 strategically-important Line Replacement Units (LRUs), sub-systems, spares and components etc with import substitution value worth ₹715 crore.
- This fourth list is in continuation to the previous three PILs, involving LRUs, sub-systems, assemblies, sub-assemblies, spares and components, which were published in December 2021, March 2022 and August 2022, respectively.

What is Positive Indigenisation List?

- The positive indigenisation list essentially lists items that the armed forces — Army, Navy, and Air Force — will procure only from domestic manufacturers.
- These manufacturers could be from the private sector or Defense Public Sector Undertakings (DPSUs).
- The Government has introduced a comprehensive revamped 'Make and Innovation' procedure to reduce dependency on arms and promote indigenous manufacturing of defence equipment.
- The 'Make and Innovation' procedure has been introduced in DAP-20 to facilitate indigenous design and development of defence equipment through private participation with both government funding and industry funding.

Status of Indigenisation of the Defence Sector in India?

- **Need for Indigenization:**

  o India's arms **imports fell 11% between 2013-17 and 2018-22,** the country is still the **world's top importer of military hardware in 2022 highlighted by a report by the Stockholm International Peace Research Institute (SIPRI).**

Current Estimates and Targets:

o Current estimates place India's **defensive capital expenditure at USD 130 billion** over the next five years.

o The defence ministry has set a **USD 25 billion (Rs 1.75 lakh crore)** turnover goal in defence manufacturing in the next **five years,** including an export target of USD 5 billion worth of military hardware.

Government Initiatives:

o **Priority Procurement: The Defense Acquisition Procedure (DAP)-2020** gives priority to the procurement of capital items from domestic sources under the Buy Indian (IDDM) category.

o **Liberalised Foreign Direct Investment (FDI) Policy:** The FDI policy allows for **74% FDI under the automatic route in the defence industry,** and **up to 100% through Government route** wherever it is likely to result in access to modern technology.

o **Mission DefSpace:** The **Mission DefSpace** has been launched to promote defence-related innovations and developments in the space sector.

o **Innovations for Defense Excellence (iDEX) Scheme:** The **iDEX scheme** involves startups and MSMEs in defence innovation projects, fostering their participation and contribution.

o **Defense Industrial Corridors:** Two **Defense Industrial Corridors** have been established in **Uttar Pradesh and Tamil Nadu,** focusing on developing defence manufacturing ecosystems and attracting investments.

Examples of Indigenous Defense Arsenal in India:

o **Tejas Aircraft:** The **Tejas** is a lightweight, multi-role supersonic aircraft designed and developed indigenously in India.

o **Arjun Tank:** Developed by the **Defense Research and Development Organization (DRDO),** the Arjun Tank is a 3rd generation main battle tank that showcases India's expertise in armored vehicle technology.

o **NETRA:** The **NETRA** is an airborne early warning and control system developed domestically, providing crucial surveillance and reconnaissance capabilities.

o **ASTRA:** India has successfully developed the **ASTRA**, an **all-weather beyond-visual-range air-to-air missile,** enhancing the country's air defence capabilities.

- o **LCH 'Prachand':** It is the first indigenous **Multi-Role Combat Helicopter** which has potent ground attack and aerial combat capability.

- o **ICG ALH Squadrons:** In a major boost to further strengthen the capabilities of the **Indian Coast Guard, ALH Mk-III squadrons** were commissioned in Porbandar and Chennai in June and December 2022.

Challenges

- o **Technological Gap:** Developing **cutting-edge defence technologies** and acquiring advanced capabilities is a significant challenge for India.

  - The country has traditionally relied on foreign suppliers for critical defence technologies, and **bridging the technological gap requires substantial investments in research and development (R&D), as well as collaboration with industry and academia.**

- o **Infrastructure and Manufacturing Base: Building a robust defence industrial base and infrastructure to support indigenous production is a major challenge.**

  - The defence manufacturing ecosystem in India needs to be modernized, with improvements in infrastructure, technology transfer, skilled workforce development, and streamlined procurement processes.

- o **Testing and Certification:** Ensuring the quality, reliability, and safety of indigenously developed defence systems through rigorous testing and certification processes is crucial.

  - Developing **robust testing facilities and establishing effective quality control mechanisms are essential for gaining** the confidence of users and export markets.

Way Forward

- ▪ **Create a Defense Innovation Ecosystem:** There is a need to establish a dedicated **defence innovation ecosystem** that brings together defence organizations, research institutions, startups, and technology companies.

  - o This ecosystem should promote **collaboration, knowledge sharing, and technology transfer** to drive indigenous defence capabilities.

- ▪ **Defense Technology Accelerators:** Establish **defence technology accelerators that provide mentorship, funding, and resources to startups and small and medium-sized enterprises (SMEs)** working on cutting-edge defence technologies.

- These accelerators should facilitate connections with defence organizations, offer access to test facilities, and help navigate regulatory processes.

- **Defence Skilling and Training Programs:** There is a need to develop skilling and training programs to bridge the gap between **academia and industry in defence-related disciplines.**

  - Collaborating with universities and technical institutes to design specialized courses and **certifications that align with defence technology requirements will be a significant step in this direction.**

Gaps in AePS Exploited by Cybercriminals

Context:-Cybercriminals are now using silicone thumbs to operate biometric POS devices and biometric ATMs to drain users' bank accounts.

Recently, a popular YouTube shared how his mother's bank account was drained using an Aadhaar-linked fingerprint without needing two-factor authentication.
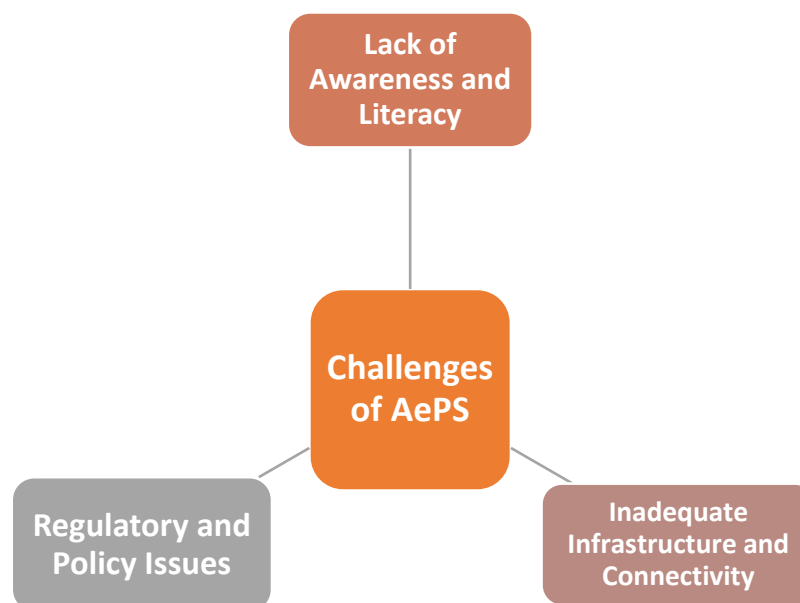
About AePS:

- Aadhaar-enabled Payment Services (AePS) is a **bank-led model** which allows online financial transactions at Point-of-Sale (PoS) and Micro ATMs through the business correspondent of any bank using Aadhaar authentication.
- It was **taken up by the National Payments Corporation of India (NPCI),** a joint initiative of Reserve Bank of India (RBI) and Indian Banks' Association (IBA).
- The model **removes the need for OTPs, bank account details, and other financial details**. It allows fund transfers using only bank name, Aadhaar number, & fingerprint captured during Aadhaar enrolment.

Vulnerabilities of AePS:

- **AePS does not require any activation**, with the only requirement being that the user's bank account should be linked with their Aadhaar number.
- **Data breaches** in Aadhaar have been reported in 2018, 2019, and 2022, but UIDAI has denied any such breach. However Aadhaar numbers are readily available in the form of photocopies, and soft copies, which are targeted by criminals.
- **Lack of Transaction Notifications** to the AePS victims from banks regarding unauthorised transactions

Measures to prevent AePS fraud:

- **Lock the Aadhaar information** using the UIDAI website or mobile app.
- UIDAI has also implemented a **new two-factor authentication mechanism** that uses a machine-learning-based security system, combining **finger minutiae and finger image capture** to check the liveness of a fingerprint.
- **Awareness and education programmes** for safe and secure usage of Aadhaar details.

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Supreme Court Upholds Laws Allowing Jallikattu

Context:- A five-judge Bench of the Supreme Court upheld the amendments made by the legislatures of Tamil Nadu, Maharashtra, and Karnataka to The Prevention of Cruelty to Animals (PCA) Act, 1960.

- The amendments allowed bull-taming sports like jallikattu, kambala, and bullock-cart races.

Court's Judgement?

- The SC held that the **state amendments (Prevention of Cruelty to Animals (Tamil Nadu Amendment) Act of 2017** and **Prevention of Cruelty to Animals (Conduct of Jallikattu) Rules of 2017) did not violate the Constitution** and the Supreme Court's 2014 ruling banning Jallikattu.

- The court said the Amendment Act **"substantially reduced pain and cruelty" to the participating animals.**

- The judgment holds that the 2017 Amendment Act and Rules on Jallikattu are in time with Entry 17 (prevention of cruelty to animals) of the Concurrent List, Article 51A(g) (compassion to loving creatures) of the Constitution.

  - The Supreme Court banned Jallikattu through a judgment in May 2014 in the **Animal Welfare Board of India vs A. Nagaraja case** on the grounds of cruelty to animals.

- The court said the **Act was also not "relatable" to Article 48 of the Constitution which deals with the duty of the State** to "organise agriculture and animal husbandry".

- It also stated that any **violation of the law in the name of cultural tradition would be punishable.**

- The court decided that determining Jallikattu's cultural heritage status is **best left to the State's legislative assembly** and not a court of law.

ECONOMY

E-Invoicing and Curbing Tax Evasion

Context:-Recently, the Government has lowered the threshold for businesses to generate **e-Invoice for Business-to-Business (B2B) transactions,** from Rs 10 crore to Rs 5 crore with the aim to curb **Tax Evasion** and increase compliance under the **Goods and Services Tax (GST) Regime.**

▪ The government has also rolled out the **Automated Return Scrutiny Module (ARSM)** for GST returns in a backend application for central tax officers.

Automated return scrutiny module?

- It aims to enhance tax compliance, reduce manual intervention and increase tax administration efficiency by using data analytics.

- The **Automated Return Scrutiny Module, integrated into the ACES-GST backend application, leverages data analytics to identify risks and discrepancies in GST returns**.

- Tax officers can scrutinize GST returns of Centre Administered Taxpayers selected based on data analytics and risks detected by the system. The module automatically generates alerts in cases of non-compliance.

- The Automated Return Scrutiny Module's implementation has begun with the scrutiny of GST returns for the financial year 2019-20

- It was implemented by **The Central Board of Indirect Taxes and Customs (CBIC)**

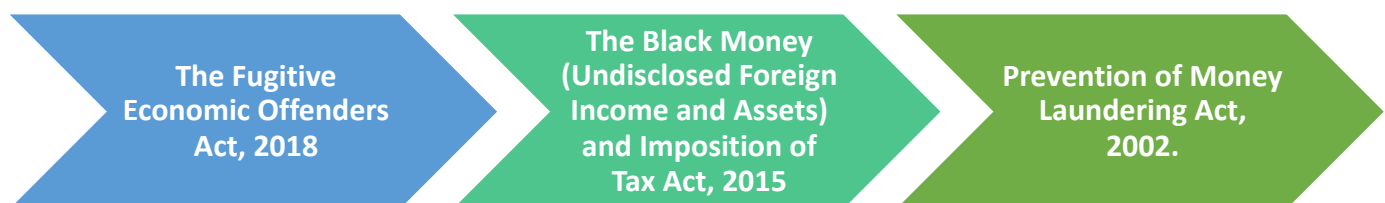## What are the changes for e-invoicing and its impacts?

- The government lowered the threshold for businesses to **generate e-invoice for business-to-business (B2B) transactions to Rs 5 crore from Rs 10 crore under GST**. The changes will come into effect from August 1

- **e-Invoicing' or 'electronic invoicing' is a system in which B2B invoices and a few other documents are authenticated electronically by GSTN** for further use on the common GST portal.

- Reduction in the e-invoicing threshold helps to **boosting GST revenue collections and checking frauds, it will also increase compliance requirements for smaller businesses**

- For companies, **e-invoicing-compliant result in proper flow of input tax credit** and reduce the credit issues.

Goods and Service Tax:

- The GST **aims to streamline the taxation structure** in the country and **replace a gamut of indirect taxes with a singular GST** to simplify the taxation procedure.

- It has been established by **the 101st Constitutional Amendment Act.**

- It is an indirect tax for the whole country on the **lines of "One Nation One Tax"** to make India a unified market.

- The Goods and Services Tax (GST), rolled out in July 2017, **marked a major shift from the traditional production-linked tax to a consumption-based tax**.

- The new regime **subsumed state levies** such as VAT, sales tax, octroi/entry tax together with central levies such as central excise and service tax.

- **States gave up some of their taxation rights in lieu of the Centre** passing on their revenue share under GST and **also compensating them for potential revenue losses in the first five years**.

- It is **levied on the value addition** and provides set offs. As a result, it **avoids the cascading effect or tax on tax** which increases the tax burden on the end consumer

Other Measures to Curb Tax Evasion?

The Fugitive Economic Offenders Act, 2018 → The Black Money (Undisclosed Foreign Income and Assets) and Imposition of Tax Act, 2015 → Prevention of Money Laundering Act, 2002.

Wholesale Price Index

Context:-The latest data released by the **Ministry of Commerce and Industry** reveals that the **Wholesale Price Index (WPI) in India fell to a near three-year low** with **deflation rate of (-) 0.92% in April,** marking its entry into **negative territory** after 33 months.
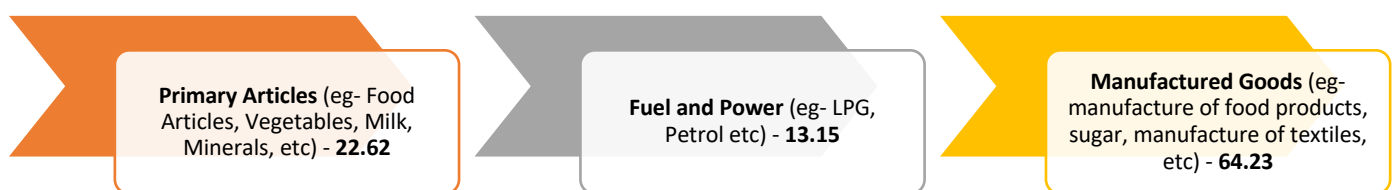
- The decline in the rate of inflation in April 2023 is **primarily contributed by fall in prices of basic metals, food products, mineral oils, textiles, non-food articles,** chemical & chemical products, rubber & plastic products, and paper & paper products.

Wholesale Price Index

o   It measures the changes in the **prices of goods sold and traded in bulk by wholesale businesses to other businesses.**

o   Published by the Office of **Economic Adviser, Ministry of Commerce and Industry.**

o   It is the most widely used **inflation indicator** in India.

o   Major criticism for this index is that the **general public does not buy products at wholesale price.**

o   The **base year of All-India WPI** has been revised from **2004-05 to 2011-12 in 2017.**

Components of Wholesale Price Index (WPI)

The WPI is divided into three sections. The different sections along with their weightage are:

Primary Articles (eg- Food Articles, Vegetables, Milk, Minerals, etc) - **22.62**

Fuel and Power (eg- LPG, Petrol etc) - **13.15**

Manufactured Goods (eg-manufacture of food products, sugar, manufacture of textiles, etc) - **64.23**

Factors Influencing WPI Inflation:

High Base Effect:	• Experts suggest that WPI inflation is expected to remain moderate due to the high base effect.
Easing Global Commodity Prices:	• The decline in global commodity prices is anticipated to help keep inflation of manufactured products at a lower level.
Food Inflation and Monsoon Prospects:	• The prices of **wheat**, affected by market conditions, need to be monitored. • Additionally, the monsoon's impact on the inflation of **Kharif crops** is a concern

BIODIVERSITY & ENVIRONMENT

United Nations Forum on Forests

Context:-The **eighteenth session of the United Nations Forum on Forests (UNFF18),** held in New York from **May 8-12, 2023,** brought together delegates from around the world to discuss the relationship between **sustainable forest management (SFM), energy, and the achievement of the United Nations-mandated Sustainable Development Goals (SDGs).**

Major Highlights of UNFF18

Sustainable Forest Management (SFM) in Tropical Region:
- In a recent development, experts have underscored the significance of practicing **SFM in tropical regions**. With the surge in bioenergy consumption since 2013, there has been a **mounting strain on forests, making the need for sustainable sourcing of tropical timber even more crucial.**

Forest Ecosystems and Energy:
- Forestry director of the **Food and Agriculture Organization (FAO),** highlighted the significant **contribution of forest ecosystems to renewable energy requirements.**

Forests and Climate Change Mitigation:
- The **Emissions Gap Report's findings** underscore the immense climate mitigation potential that forests hold. Through processes such as **carbon sequestration, forests act as carbon sinks, absorbing and storing substantial amounts of carbon dioxide from the atmosphere.**

United Nations Forum on Forests

- The UNFF is an intergovernmental policy forum which promotes "management, conservation and sustainable development of all types of forests and to strengthen long-term political commitment to this end.
- UNFF was established in 2000 by the UN Economic and Social Council. The Forum has universal membership, and is composed of all Member States of the United Nations.

UNFF Functions and Activities

- **Policy Development:** It facilitates the development of international policies, agreements, and instruments related to forests, including the promotion of sustainable forest management and the conservation of forest biodiversity.
- **Reporting and Assessment:** It monitors and assesses the progress made by member states in implementing sustainable forest management practices and achieving forest-related goals.
- **Capacity-Building:** It supports capacity-building initiatives to enhance the skills and knowledge of countries in managing their forests sustainably.
- **International Cooperation:** It promotes international cooperation, partnerships, and collaboration among countries and stakeholders to address forest-related challenges.
- **Resource Mobilization:** It facilitates the mobilization of financial resources, technology transfer, and other forms of support for sustainable forest management.

Phase Out Methane Emissions By 2030

Context: COP28 president-designate urges oil industry to phase out methane emissions by 2030, eliminate carbon intensity.

About

- COP28 (UAE) President Designate Sultan Ahmed Al Jaber called upon the oil and gas industry to phase out methane emissions by 2030 and align **in favour of comprehensive net-zero emission plans by or before 2050**. He said that the world continues to use hydrocarbons, and everything possible must be done to "reduce and eventually eliminate its carbon intensity".
- Methane emissions are among the top causes of global warming and according to International Energy Agency (IEA), **fossil fuel operations generate over one-third of all methane emissions** from human activity. Thus, **action on methane is seen as one of the most** effective measures the energy sector can take to mitigate climate change.

About Methane

- Methane is the **second biggest contributor** to global warming after carbon dioxide. It **is 84 times more potent than carbon** but it does not last as long in the atmosphere before it breaks down. This **makes it a critical target for reducing global**

warming more quickly while simultaneously working to reduce other greenhouse gases (GHGs).

Role of Hydrocarbons in Energy Transition from Methane

- **Transition Role:** Hydrocarbons can play a transitional role during the shift to new energy systems by providing a reliable and readily available source of energy.
- **Existing Infrastructure:** The infrastructure for extracting, processing, and distributing hydrocarbons is already established, allowing for a smoother transition to new energy systems.
- **Carbon Intensity Reduction:** Efforts should focus on minimizing the carbon footprint of hydrocarbons by implementing cleaner technologies and practices throughout the production and consumption processes.
- **Bridge Fuel:** They can serve as a bridge fuel between high-carbon fossil fuels and cleaner alternatives, helping to meet energy demand while reducing carbon emissions.
- **Energy System Stability:** Hydrocarbons contribute to maintaining energy system stability during the initial phases of integrating intermittent renewable energy sources.

What is the Role of Climate Technologies in Climate Mitigation?

- **Renewable Energy Technologies:**

  o Climate technologies encompass a wide range of renewable energy sources such as **solar**, **wind**, **hydro**, and **geothermal power.**

  o These technologies enable the generation of clean and sustainable energy, reducing reliance on fossil fuels and lowering carbon emissions.

- **Energy Efficiency Technologies:**

  o Climate technologies focus on enhancing energy efficiency in various sectors, including buildings, transportation, and industries.

  - Building technologies such as **smart meters, energy-efficient appliances, and insulation** that improve energy performance.

  - **Batteries and energy storage** enable the integration of variable renewables and provide backup power for grid stability and reliability.

  o These technologies aim to reduce energy consumption and minimize wastage, leading to significant emissions reductions.

- **Carbon Capture, Utilization, and Storage (CCUS):**

  o **CCUS** technologies capture **carbon dioxide emissions** from power plants and industrial facilities, preventing them from being released into the atmosphere.

    - The captured carbon is then stored underground or utilized in other applications, effectively reducing greenhouse gas emissions.

- **Sustainable Transportation Technologies:**

  o Climate technologies promote the development and adoption of low-carbon transportation solutions such as **electric vehicles (EVs)**, **hydrogen fuel cells**, **and advanced biofuels.**

  o These technologies help reduce emissions from the **transportation sector**, which is a significant contributor to greenhouse gas emissions.

- **Circular Economy Technologies:**

  o Optimizes resource use and minimizes waste by designing products and systems that can be reused, repaired, recycled, or biodegraded.

Initiatives to Tackle Methane Emissions

Indian:

'Harit Dhara' (HD):

Indian Council of Agricultural Research (ICAR) has developed an anti-methanogenic feed supplement **'Harit Dhara' (HD)**, which can cut down cattle methane emissions by 17-20% and can also result in higher milk production.

India Greenhouse Gas Program:

- The India GHG Program led by WRI India (non-profit organization), Confederation of Indian Industry (CII) and **The Energy and Resources Institute (TERI)** is an industry-led voluntary framework to measure and manage greenhouse gas emissions.
- The programme builds comprehensive measurement and management strategies to reduce emissions and drive more profitable, competitive and sustainable businesses and organisations in India.

National Action Plan on Climate Change (NAPCC):

NAPCC was launched in 2008 which aims at creating awareness among the representatives of the public, different agencies of the government, scientists, industry and the communities on the threat posed by climate change and the steps to counter it.

Bharat Stage-VI Norms:

India shifted from **Bharat Stage-IV (BS-IV) to Bharat Stage-VI (BS-VI)** emission norms.

Global:

Methane Alert and Response System (MARS):
MARS will integrate data from a large number of existing and future satellites that have the ability to detect methane emission events anywhere in the world, send out notifications to the relevant stakeholders to act on it.

Global Methane Pledge:
At the **Glasgow climate conference (UNFCCC COP 26)** in 2021, **nearly 100 countries had come together in a voluntary pledge,** referred to as the Global Methane Pledge, to cut methane emissions by at least 30% by 2030 from the 2020 levels.
India is not a part of Global Methane Pledge.

Global Methane Initiative (GMI):
It is an international public-private partnership focused on reducing barriers to the recovery and use of methane as a clean energy source.

Meri LiFE App

Context: Ministry of Environment, Forest and Climate Change (MoEF&CC) launched the **"Meri LiFE" (My Life) mobile application** to empower youth and encourage their participation in addressing climate change.

- **LiFE Themes** Save Energy, Save Water, Reduce Single-Use Plastic, Adopt Sustainable Food Systems, and Adopt Healthy Lifestyles

Goal of the Meri LiFE App?

- The Meri LiFE app aims to showcase the power of citizens, especially young people, in **saving the environment by emphasizing the impact of simple actions in daily lives.**

  o The app is intended to catalyse a national movement for **LiFE(Lifestyle for Environment)** by creating a structured way to track the progress being made on **Mission LiFE.**

- It encourages users to participate in a series of LiFE-related tasks under five themes: **Save Energy, Save Water, Reduce Single Use Plastic, Adopt Sustainable Food Systems, and Adopt Healthy Lifestyle.**

- Upon successful sign-up, users are guided through a gamified experience to take the 5 for 5 challenge and take **five LiFE actions towards June 5th, 2023.**

Thawing permafrost in the Arctic

Context: Thawing permafrost in the Arctic could unlock toxic waste buried for decades: New study highlights risks.

What is permafrost?

- Permafrost is essentially **any ground that stays frozen — 0 degree Celsius or lower —** for at **least two years straight**. These permanently frozen grounds are often found in Arctic regions such as Greenland, Alaska (the United States), Canada, Russia and Eastern Europe.

- According to the National Aeronautics and Space Administration (**NASA**), permafrost is composed of "a **combination of soil, rocks and sand that are held together by ice.** The soil and ice in permafrost stay frozen all year long." However, although the ground remains perennially frozen, permafrost regions aren't always covered with snow.

What are the findings of the study?

- It was because of these characteristics that countries and corporations began building infrastructure on the Arctic's permafrost. The region witnessed a further **expansion of industrial and economic development during the Cold War** — it became a **centre for resource extraction and military activities**. This led to the accumulation of industrial and toxic waste on or in permafrost which was never removed.

- But as the **Arctic is getting warmer nearly four times** as fast as the rest of the planet due to climate change, **permafrost is thawing rapidly**, which **could destabilise** not only the industrial sites but also the contaminated areas. And once the destabilisation takes place, **toxic substances would be unleashed across the region**, threatening numerous species living there and the health of people who depend on them.

- Using the data, **team extrapolated where industrial contamination and permafrost might coexist across the entirety of the Arctic** and found that the 4,500 industrial facilities in the permafrost regions have most likely produced between 13,000 and 20,000 contaminated sites. The team then used computer simulations to find out the impact of climate change on these sites.

- According to the study, as of now, around 1,000 of the known industrial sites and **2,200 to 4,800 of the known contaminated sites are already at risk of destabilising** due to thawing permafrost.

- These numbers will jump to more than 2,100 industrial sites and 5,600 to 10,000 contaminated sites by the end of the century under the low emissions scenario consistent with the 2-**degree Celsius global warming target**. And if the world continues to get warmer at present levels, **almost all of the known industrial and contaminated sites would be affected.**

What are the other consequences of thawing permafrost?

- According to experts, thawing permafrost can severely impact the planet. One of its most **dangerous consequences is the release of greenhouse gases** into the atmosphere. A 2022 report by NASA said, "Arctic permafrost **alone holds an estimated 1,700 billion metric tons of carbon**, including **methane and carbon dioxide**. That's roughly 51 times the amount of carbon the world released as fossil fuel emissions in 2019."

- Moreover, "Plant matter frozen in permafrost doesn't decay, but when permafrost thaws, **microbes within the dead plant material start to break the matter down**, releasing carbon into the atmosphere,"

Groundwater Extraction and Land Subsidence

Context:-Cracks in **buildings and 'sinking' land in Joshimath, Uttarakhand** a hill town in Uttarakhand, made the headlines earlier in 2023.

- A similar phenomenon has been playing out for years in the plains of **Punjab, Haryana, Delhi and Faridabad**. According to the data gathered for years by the **Central Ground Water Board (CGWB)**, **excessive groundwater extraction** is identified as the underlying cause of these alarming incidents

Groundwater situation in India:

- It is India's most used water resource, accounting for a quarter of total global groundwater extraction.
- According to the 2021 CAG report, groundwater extraction in India (annual use – ~433 billion cubic metres) has exceeded the recharge rate, threatening 80% of potable water over the next two decades.

What is Land Subsidence?

- Land subsidence refers to the **gradual sinking or settling of the Earth's surface,** usually due to the compaction of underground layers of **soil, rock, or other materials.**

- It occurs when the **support structures beneath the land**, such as **aquifers, underground mines, or natural gas extraction**, are depleted or when certain geological processes take place.

Impact:

o In urban areas, it can **damage infrastructure, including roads, buildings, and underground utilities.**

o It can also increase the **risk of flooding in coastal regions by reducing the elevation of the land relative to sea level.**

o In agricultural areas, subsidence can affect irrigation systems, disrupt the flow of water in rivers and canals, and cause **permanent damage to farmland.**

How groundwater extraction is linked to sinking land?

- When the underlying aquifers – deep water channels that are stores of percolated water, aren't recharged, they run dry. Hence, the layers of soil and rock above them start to sink and the issue is not specific to north India alone.

Government Initiatives Related to Groundwater Conservation

Pradhan Mantri Krishi Sinchayee Yojana → Atal Bhujal Yojana → Jal Shakti Abhiyan-Catch the Rain Campaign → Atal Mission for Rejuvenation and Urban Transformation (AMRUT)