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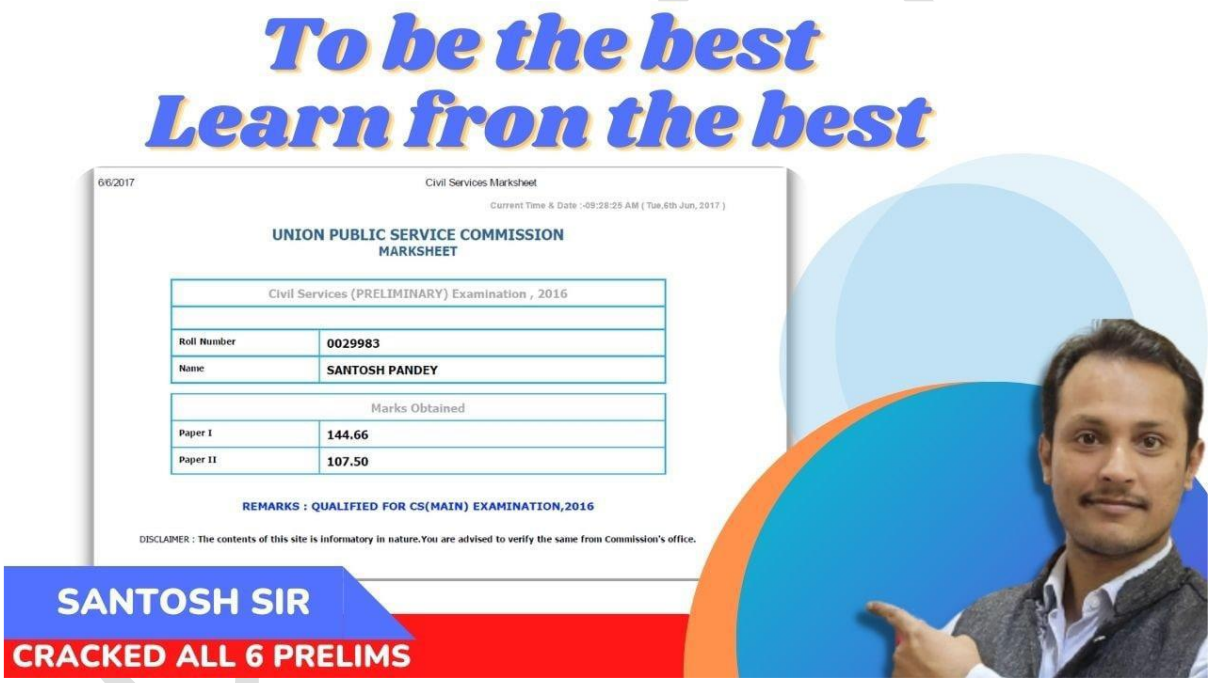


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## HISTORY

**1. Tana Bhagat Movement (1914-1920)**

**Concept:**

- It was a movement in **Chhotanagpur area of British India** against the policies of the local British authorities and exploitative business practices of local zamindars, mostly by Oraon peaople.
- The Tana Bhagats opposed the taxes imposed on them by the British colonial administration, staging a **Satyagrah**a (civil disobedience movement) years before Mahatma Gandhi's similar movement against British rule.
- It was Organised by **Jatra Bhagat, Turia Bhagat** and other participants **were Tana Bhagats, Oraon, Munda**

**2. The first fully solar village**

- The village of Modhera in **western India's Gujarat** state is declared as **first fully solar village.**
- Modhera the first village in India to become a net renewable energy generator.
- The village has a total geographical area of around 2,436 hectares and is located on the banks of the **Pushpavati river in the state**. It will be the country's first solar-powered village.
- The village has a ground-mounted solar power plant, and over 1,300 rooftop solar systems with 1kW capacity have been installed on houses to generate electricity. All of these solar systems are linked to a battery energy storage system (BESS).
- During the day, solar panels will provide power to the village, while in the evening, BESS, India's first grid-connected megawatt hour scale battery energy storage system, will provide power to the houses.
- The project in Modhera, is financed by the central and state government at nearly $10 million, involved setting up over 1,300 rooftop panels on residential and government buildings that were connected to a power plant.
- The government buys excess energy produced here from residents if they do not use all of the capacity allotted to the households.

**3. Rashtriya Ekta Diwas**

**Context:** The Prime Minister, Shri Narendra Modi paid homage to Sardar Patel at the Statue of Unity and participated in the Rashtriya Ekta Diwas.

**Concept:**

- Vallabhbhai Patel was born on 31st October 1875 in Nadiad, Gujarat.
- A successful lawyer by profession, his life encountered a turning point when Mahatma Gandhi chose him as his deputy commander to lead the **Kheda Satyagraha in 1918**.
- Thus, as the leader of a peasants' protest, Vallabhbhai Patel found the trajectory of his life turning towards a path of public service.
- In 1924, Patel was elected P**resident of the Ahmedabad Municipal Board.**
- Vallabhbhai Patel became increasingly involved with the struggle for independence. It was his role in the **Bardoli Satyagraha of 1928** that elevated him to a new pinnacle of national glory.
- It was here that he earned the title of '**Sardar'**, the fond epithet by which he continues to be remembered and revered.
- In 1931, he was elected President of the **Indian Nation Congress** at its **Karachi Session.**
- At a time when the nation was in tumult over the execution of Bhagat Singh, Sukhdev and Rajguru, he made a sombre speech that reflected the sentiment of the hour.
- At the time of Independence, there were 17 British-Indian provinces, and the Princely States– comprising about two fifths of the geographic territory of the country- numbered more than 560.
- Sardar Patel stepped in to ensure the accession of the princely states and integrate them into the Union of India.
- On 25 June 1947, the **States Department** was formed under Sardar Patel. VP Menon was appointed its secretary.
- These two individuals made a formidable team whose tact and diplomacy made it possible to overcome apparently insurmountable hurdles.
- On 15 August 1947, Sardar Patel took oath as **the first Deputy Prime Minister**, as well as the first Home Minister of independent India. He also took charge of the **Information and Broadcasting Ministry.**
- He earned the reputation of '**Iron Man'** because of the manner in which he brought about and maintained internal stability as **Home Minister** in the wake of the partition of the country.
- Another illustrious contribution made by Sardar Patel was the creation of **All India Services**. He had envisioned these services as the '**Steel frame of India'** that would further safeguard the country's unity and integrity.
- On 15 December 1950, the Iron Man of India breathed his last. He had successfully accomplished the task of integrating 565 Princely States into the Union of India within a remarkably short span of time- a feat unprecedented in history.
- On 31 October 2018, Prime Minister Narendra Modi dedicated the world's tallest statue – the 'Statue of Unity' to the nation.

**Note –**With Operation Vijay, Goa, Daman and Diu were annexed, from Portuguese control, into the Indian union and made into a centrally administered Union Territory of India.

**His political philosophy**

4. **Who was Nadaprabhu Kempegowda?**

**Context:**

**Nadaprabhu Kempegowda**, a 16th century chieftain of the **Vijayanagara empire**, is credited as the **founder of Bengaluru**. It is said that he conceived the idea of a new city while hunting with his **minister**, and later marked its territory by **erecting towers** in four corners of the proposed city.
He was from the dominant agricultural **Vokkaliga community** in **south Karnataka**.
**His Achievements:**

- Against Social Evils: Nadaprabhu Kempegowda abolished the practice of cutting the fingers of the left hand of an unmarried woman during a custom known as Bandi Devaru.
- Infrastructure: Kempegowda is also known to have developed around 1,000 lakes in the city to cater to drinking and agricultural needs.
- Literature: The ruler knew multiple languages, besides Kannada, and even authored a Yakshagana play in Telugu named Gangagaurivilasa.

The **old Mysuru region in south Karnataka** consists of areas that were part of the **erstwhile Kingdom** of **Mysore** — Mysuru, Mandya, Chamarajanagar, Tumkur, Hassan, Chikmagalur, Kolar, Bengaluru and excludes coastal areas and Kodagu.

5. **Tirupati's megalithic burial sites in a state of neglect**

**Context:**

- **Anthropomorphic sites** are those marked by a representation of **human form above the megalithic Tirupati district** is dotted with **anthropomorphic burial sites**, said to be the largest as a collection **in Andhra Pradesh.**
- Among these, the most prominent one is the '**pillared dolmen'** of the **megalithic era**, found at **Mallayyagaripalle**, nestling on a hillock between **Chandragiri and Dornakambala**, 20 km from Tirupati. The structure locally referred to as '**Pandava Gullu'** or '**Pandavula Banda'** in memory of the **Pandavas**, is estimated to be 2,500 years old.
- This could be an indication to the **presence of humans** living in groups during the **megalithic period** (300–500 BC) in this region.
- The **pillared dolmen** with rock art beneath the **capstone** at **Mallayyagaripalle** came under threat owing to **granite mining in the vicinity.** The **Mallayyagaripalle structure** is a cist burial chamber. Such chambers are **built by arranging slabs** neatly broken from huge stones at a time when there were **no proper tools**.
- There is another **endangered megalith monument** in Palem village near Kallur, which resembles **a bull's horn**. Called locally as '**Devara Yeddhu'**
- Yet another **type of a megalithic burial** site is the '**stone circle'**, where the **tomb** is surrounded by **round stones** arranged in a **circle**. One such site in **Venkatapuram**, 15 km east of Tirupati near **Karakambadi**,
- The megalithic people's staunch belief in life after death and the travel embarked by soul to other worlds. the megalithic people used to keep food and tools inside the chamber for use by the dead person.

While "**megalith**" is often used to describe a **single piece of stone**, it also can be used to denote one or more rocks hewn in a definite **shape for special purposes**. It has been used to describe structures built by people from many parts of the **world living in many different periods**.
Some types of **Megalith structures** are given below:

- **Menhir**: Menhir is the name used in Western Europe for a single upright stone erected in prehistoric times; sometimes called a "standing stone". a tall or grand structure erected in memory of a dead person.
- **Monolith**: Any single standing stone erected in prehistoric times. Sometimes synonymous with "megalith" and "menhir"; for later periods, the word monolith is more likely to be used to describe single stones.
- **Capstone style**: Single megaliths placed horizontally, often over burial chambers, without the use of support stones.
- **Stone circles**: In most languages, stone circles are called "cromlechs" (a word in the Welch language); the word "cromlech" is sometimes used with that meaning in English.
- **Dolmen**: A Dolmen is a megalithic form created by placing a large capstone on two or more support stones creating a chamber below, sometimes closed in on one or more sides. Often used as a tomb or burial chamber.
- **Cist**: Cist is a small stone-built coffin-like box or ossuary used to hold the bodies of the dead. Burials are megalithic forms very similar to dolmens in structure. These types of burials were completely underground. There were single- and multiple-chambered cists.

6. **Rajasthans's Jalliawalan Tragedy: Mangarh Massacre**

**Context:**

- On November 17, 1913, six years before the Jallianwala Bagh massacre of April 13, 1919, a horrifying tragedy occurred in Mangarh (Banswada, Rajasthan). While 379 lives were lost in Jallianwala, British cannons and machine guns are known to have killed more than 1,500 tribals in Mangarh.
- A noteworthy name in these lost pages of history is that of Govind Guru, a revolutionary leader of the tribals of the region that included present-day Udaipur, Dungarpur and Banswara in Rajasthan, Gujarat's Idar and Malwa in Madhya Pradesh.
- Guru was a living legend among the Bhil and Garasiya tribal communities, a man who united thousands of tribals with his voice.
- Before Govind Guru became a leader in India's freedom struggle, he played an important role in India's renaissance movement. At the age of 25, he impressed Swami Dayanand Saraswati, a central figure of that movement in north India. Those days, Dayanand Saraswati was in Udaipur; a sanyasi, he was raising issues related to swaraj, swabhasha and

swadeshi (self-rule, self-language, and self-reliance) in the country and was spearheading social reforms in the Rajputana. These two figures together initiated a wave of social reforms in the tribal areas.

- In 1903, Govind Guru pledged not to drink alcohol, shifting his focus to eradicating social evils, boycotting foreign goods, ending forced labour, educating girls, and resolving mutual disputes among tribes instead of taking them to the courts. This led to the creation of a Sump (Unity) Sabha, whose first meeting was held on the hilltop in Mangarh. This historical event solidified Mangarh's significance in Indian history as it became central to the tribal movement in this area. Like the Jallianwala Bagh massacre, this incident worried the British government and the local princely states. While the British were worried about their participation in the freedom struggle, the princely states were more concerned about social reform that could lead to the tribes demanding an independent Bhil state.
- Consequently, there were many attempts to suppress the movement that started in 1883 but had spread like wildfire by 1903. Called the Bhagat movement, the gathering of tribals around the fire to reaffirm their oath was seen by the British as a threat. By 1913, the movement had turned into a revolution that made British officers even more wary as the tribals pledged to fight against suppression.
- In November 1917, thousands of tribals gathered on the call of Govind Guru to decide on a decisive action against the suppression being faced by them in the form of forced labour, bonded system, and taxes on farmers during the famine.
- In what is today known as the Mangarh massacre, British soldiers fired cannons and machine guns at a large crowd of unarmed tribals who had gathered in an open space on the hilltop of Mangarh. More than 1,500 tribals were killed in the massacre and hundreds were injured.
- The consequence of the Mangarh massacre was cruel. Unlike in the Jallianwala Bagh case, no Dyer was held responsible or punished here. Rather, Govind Guru was given a death sentence, and his wife was arrested. But fearing that the movement of tribal Bhils would turn violent, the British postponed his execution and sentenced him to 20 years of imprisonment on an isolated island. When he was released from jail, all the princely states came together to exile him. He lived his last years in Kamboi, Gujarat, where he died on October 30, 1931.

7. **Afzal Khan (general) and Shivaji**

**Context:**

THE Supreme Court on Friday sought reports from officials of Maharasthra's Satara district on the demolition drive conducted around the tomb of Afzal Khan, the 17thcentury commander of the Adil Shahi dynasty of Bijapur.

**Concept**:

**Afzal Khan** (died 20 November 1659) was a general who served the **Adil Shahi dynasty of Bijapur Sultanate** in India. He played an important role in the **southern expansion** of the **Bijapur Sultanate** by subjugating the **Nayaka** chiefs who had taken control of the **former Vijayanagara territory.**

In 1659, the Bijapur government sent **Afzal Khan to subjugate Chatrapati Shivaji Maharaj**, a former vassal who had started acting independently. He was killed at a truce negotiation meeting with Chatrapati Shivaji Maharaj, and his army was defeated at the **Battle of Pratapgad.**

**Shivaji**

- Shivaji was born in Shivner near Junnar. He was the son of **Shahji Bhonsle** by his first wife Shahji was a descendant of the Y**adava** rulers of Devagiri from his mother's side and the Sisodias of Mewar on his father's side
- On 6 June 1674, Shivaji was crowned at He assumed the title of "Chhatrapathi" (metaphor for "supreme king")
- The relentless campaigns affected Shivaji's health. He died in 1680 at the age of 53. At the time of his death, Shivaji's kingdom comprised the Western Ghats and the Konkan between Kalyan and Goa. The provinces in the south included western Karnataka extending from Belgaum to the bank of Tungabhadra.
- **Contemporaries: Tuka Ram** was a contemporary of Maratha Shivaji and saints like **Eknath** and Ramdas was regarded by Shivaji as his guru. He had conflict with the Mughals (1670) at **Aurangazeb reign.**

**Administration**

- Shivaji divided the kingdom into four provinces, each under a viceroy. The provinces were divided into a number of Pranths.
- This council of eight ministers was known as **Ashta Pradhan**. Its functions were advisory. **Mukhya Pradhan or Peshwa** or prime minister, The **Amatya or finance minister**, The **Walkia-Nawis or Mantri,Summant or Dabir**or foreign secretary, **Sachiv or ShuruNawis** or **home secretary,Pandit Rao** or **Danadhyaksha or Sadar** and **Muhtasib or ecclesiastical head**, **Nyayadhish or chief justice**, **Sari Naubat or commander-in-chief**
- Shivaji collected two taxes, **Chauth and Sardeshmukhi**, from the adjoining territories of his empire, the Mughal provinces and the territories of the Sultan of Bijapur. Chauth was one-fourth of the revenue of the district conquered by the Marthas. Sardeshmukhi was an additional 10% of the revenue which Shivaji collected by virtue of his position as Sardeshmukh.
- The infantry was divided into regiments, brigades. The smallest unit with nine soldiers was headed by a Naik (corporal). Each unit with 25 horsemen was placed under one havildar (equivalent to the rank of a sergeant). Over five havildars were placed under one jamaladar and over ten jamaladars under one hazari. Sari Naubat was the supreme commander of cavalry.
- The cavalry was divided into two classes: the bargirs (soldiers whose horses were given by the state) and the shiledars (mercenary horsemen who had to find their own horses). There were water-carriers and farriers too

**8. Baliyatra**

**Context:** During the G20 Summit, PM Modi mentioned Baliyatra, literally 'voyage to Bali', one of the country's largest open-air fairs that commemorates the 2,000-year-old maritime and cultural links between ancient Kalinga and Southeast Asia.

**Concept:**

- Baliyatra, literally 'voyage to Bali', is one of the country's largest open-air fairs, which is organised every year to c**ommemorate the 2,000-year-old maritime and cultural links between ancient Kalinga (today's Odisha) and Bali and other South and Southeast Asian regions** like Java, Sumatra, Borneo, Burma (Myanmar) and Ceylon (Sri Lanka).
- The popular items of trade between Kalinga and Southeast Asia were **pepper, cinnamon, cardamom, silk, camphor, gold, and jewellery**.
- This year's Baliyatra also found a place in the **Guinness World Records** for achieving an impressive feat of origami, the **creation of beautiful paper sculptures.**

**About Baliyatra Festival**

- Bali Jatra is also known as Bali Yatra and Boita Bandaṇa which means 'A Voyage to Bali'.
- This festival is held in Odisha, in the **city of Cuttack** at Gadagadia Ghata of the **Mahanadi river.**
- The festival is **celebrated every year from the day of Kartika Purnima** according to the Odia Calendar, which comes around the end of October and November.
- It is celebrated to mark the day when ancient Sadhabas (Odia mariners) would set sail to distant lands of Bali, as well as Java, Sumatra and Sri Lanka for trade and cultural expansion.
- People of Odisha gather near banks of Mahanadi, Brahmani river, other river banks, ponds to float miniature toy boats, made of coloured paper as a symbolic gesture of their ancestors' voyage.
- In Cuttack, **Bali Jatra is celebrated annually as a large open fair** near the Barabati Fort area with several cultural programs, toy stalls, different games and food stalls selling Odia delicacies.

9. **Ancient link between Kashi and Tami Nadu**

**Concept:**

**Linkages between Kashi and Kanchi**

- The connection between the two centers of knowledge (Kashi and Kanchi) is evident in the similar themes in literature, and the presence of the name Kashi in every village in Tamil Nadu.
- Since ancient times, higher education in Southern India was not considered complete without a visit by the scholar to Kashi.
- Besides the **Kasi Viswanathar temple in Tenkasi,** there are hundreds of Shiva temples in Tamil Nadu that bear the name of Kashi — there are some 18 of them in the area around Chennai alone.
- People from Rameswaram would take a dip in the Koti teertha (in the temple) before visiting Kashi for darshan; and they would bring back (Ganga) water from Kashi for abhiseka at the temple in Rameswaram.

**History of ties between Kashi and Tamil**

**King Parakrama Pandya:**

- He ruled over the r**egion around Madurai in the 15th century**
- Legend has it that he wanted to build a temple to Lord Shiva, and traveled to Kashi to bring back a lingam.
- While returning, the king stopped to rest under a tree — but when he tried to continue his journey, the cow carrying the lingam refused to move.
- Then he installed the lingam there, a place that came to be known as Sivakasi.
- For devotees who could not visit Kashi, the **Pandyas had built the Kasi Viswanathar Temple in what is today Tenkasi in southwestern Tamil**

**Adhivir Ram Pandyan:**

- Much later, another king, Adhivir Ram Pandyan, after returning from a pilgrimage to Kashi, constructed another Shiva temple in Tenkasi in the 19th century

**Sant Kumara Gurupara:**

- He was from Thoothukudi district and had negotiated with the princely state of Kashi to get a place for the consecration of Kedarghat and Vishvesvaralingam in Varanasi.
- He also composed **Kashi Kalambagam, a collection of grammar poems on Kashi.**

10. **400th anniversary of Lachit Barphukan**

Context: Assam CM launched Launched an event for the 400th birth anniversary celebration of the Lachit Barphukan.

**Concept:**

- **Lachit Borphukan**, born on November 24, 1622, was a commander and Bophukan (councillor) in the **Ahom Kingdom,** which reigned present-day Assam for o**ver 600 years while successfully resisting the Mughal Empire**.

**Battle of Alaboi (1669):**

- In 1669, Aurangzeb dispatched the Rajput Raja Ram Singh I to recapture territories won back by the Ahoms.
- The battle of Alaboi was fought between the Ahom armed force and Mughals trespassers on August 5, 1969 in the Alaboi Hills near Dadara in North Guwahati.

**Battle of Saraighat (1671):**

- The battle of Sarai Ghat was one of the most significant warfares in medieval India.
- The Battle of Saraighat was a naval battle fought in 1671 between the Mughal Empire (led by the **Kachwaha king, Raja Ram Singh I)**, and the Ahom Kingdom (led by **Lachit Borphukan)** on the Brahmaputra river at Saraighat, Guwahati, Assam.

- Although weaker, the **Ahom Army defeated the Mughal Army** by brilliant uses of the terrain, clever diplomatic negotiations to buy time, guerrilla tactics, psychological warfare, military intelligence and by exploiting the sole weakness of the Mughal forces (navy).
- The **Battle of Saraighat was the last battle in the last major attempt by the Mughals** to **extend their empire into Assam**.
- Though the Mughals managed to regain Guwahati briefly later after a Borphukan deserted it, the Ahoms wrested control in the Battle of Itakhuli in 1682 and maintained it till the end of their rule.

**Ahom Kingdom**

- The **Ahom dynasty (1228–1826)** ruled the present-day Assam, India for nearly 598 years.
- The dynasty was **established by Sukaphaa,** a Shan prince of Mong Mao who came to Assam after crossing the Patkai Mountains.
- The **rule of this dynasty ended with the Burmese invasion of Assam** and the subsequent annexation by the British East India Company following the Treaty of Yandabo in 1826.
- In external medieval chronicles the kings of this dynasty were called Asam Raja, whereas the subjects of the kingdom called them Chaopha, or Swargadeo

11. **Telangana scores double win at UNESCO heritage awards**

**Context:**

- **Telangana** scored a double win at the **UNESCO Asia-Pacific Awards for Cultural Heritage Conservation** with a **Distinction of Merit** for the restoration of the **17th century stepwells inside the Qutb Shahi Tombs Complex in Hyderabad** and an **Award of Merit** for the conservation work on the **Domakonda Fort**, built in the **18th century in Kamareddy district**.

**About the Qutb Shahi Tombs Complex-**

- Located in the **Ibrahim Bagh (garden precinct),** close to the **famous Golconda Fort** in **Hyderabad, India.**
- **Qutb Shahi Tombs are built in Persian, Hindu and Pathani styles of architecture.**
- They contain the tombs and mosques built by the various kings of the Qutub Shahi dynasty ruled during **18th century.**
- The galleries of the smaller tombs are of a single storey while the larger ones are two storied.
- In the centre of each tomb is a **sarcophagus** which overlies the actual burial vault in a crypt below.
- The domes were originally overlaid with blue and green tiles, of which only a few pieces now remain.
- The **complex** was put by **UNESCO** on its **"tentative list"** to become a **World Heritage Site in 2014**, with others in the region, under the name **Monuments and Forts of the Deccan Sultanate** (despite there being a number of different sultanates).
- **Seven Qutub Shahi Tombs**
    1. Sultan Quli Qutb-ul-Mulk
    2. Jamsheed Quli Qutb Shah srival Ibrahim Quli Qutub Shah Wali (1550-1580)
    3. Muhammad Quli Qutb Shah (1580-1612)
    4. Sultan Muhammad Qutb Shah (1612-1626)
    5. Abdullah Qutb Shah (1626-1672)
    6. Hayat Bakshi Begum (Died: 1667) She was the only daughter of Muhammad Quli Qutb Shah.

**Restoration**

- The Telangana State Archaeology and Museums Department, in collaboration with the **Aga Khan Trust for Culture,** has restored the tombs.
- The restoration of the **stepwells** within the complex was **funded by the US Ambassadors Fund for Cultural Preservation.**

**Domakonda Fort-**

- Built in the **18th century** in **Kamareddy district, Telangana.**
- It has an **elevated compound of granite rocks** that forms the fort wall, followed by a wooden door on an entrance door to the beautiful two-storied fort structure, which consists of great stuccowork.
- This fort is also called **"Gadi Domakonda"** or **"Killa Domakonda"** as it houses a palatial mahal inside and popularly called **"Addhala Meda" (Glass house).**

12. **How must of a wild elephant hit tourism prospects in Athirappally-Vazhachal corridor**

**Context:**

- A **wild elephant in musth** has literally paralysed the tourism prospects of the **Athirappilly-Vazhachal-Malakkappara sector,** a popular tourist corridor in **central Kerala.**
- Kabali, otherwise a reasonably calm elephant, is behaving violently as it is at the peak of its **musth** (a periodic state of the **bull elephant** characterized especially by aggressive behavior and usually connected with the **rutting season**).
- The elephant has been spotted in the **Parambikulam, Vazhachal, Sholayar** and **Malayattur forest areas**.

**Chalakudy River-**

- It originates in the **Anamalai region** of **Tamil Nadu** and is joined by its major tributaries **Parambikulam, Kuriyarkutti, Sholayar, Karapara** and **Anakayam in Kerala.**
- The river flows through **Palakkad, Thrissur** and **Ernakulam districts of Kerala.**

- It is the **4th longest river in Kerala** and one of very few rivers of Kerala, which is having **relics of riparian vegetation in substantial level.**
- A **riparian zone** is the interface between land and a river or stream. Plant habitats and communities along the river margins and banks are called riparian vegetation, characterized by hydrophilic plants.
- It is the **richest river in fish diversity** perhaps in India as it contains **85 species of freshwater fishes** out of the **152 species known from Kerala only.**
- The famous waterfalls, **Athirappilly Falls** and **Vazhachal Falls,** are situated on this river.
- It merges with the **Periyar River** near **Puthenvelikkara** in **Ernakulam district.**

**13. Chinar Trees**

- It is a **deciduous tree** that belongs to the cold regions of the world, mainly in the Kashmir valley of India. Their real beauty unfurls in fall when the foliage turns to a blood-red and mauve color. The leaves eventually turn yellow and amber. The name **'***Chinar* 'comes from the Persian word, which means- **"***What a fire***"**
- Chinar trees characteristically grow in Eastern Himalayas. Their botanical name is *Platanus orientalis.*
- **Type**: It is a large, deciduous tree known for its longevity and spreading crown.
- These trees have survived for ages because Chinar is basically a long-living tree. It spreads wide across a region of cool climate with sufficient water. In autumn, its deep green leaves may change to blood red, amber, and yellow.

**History of Chinar**

- In fact, the oldest Chinar in Kashmir is said to have been planted in 1374 and is almost 600 years old.
- It is 14.78 meters tall and is located in Kashmir's Budgam district. The tree was adored by Mughal Emperors such as Akbar, Nur-ud-Din Muhammad Jahangir, and even Aurangzeb.
- It has even been dubbed the "**royal tree."** Following his conquest of Kashmir in 1586, the great Emperor Akbar is supposed to have planted over 1,200 Chinar trees. On Dal Lake, there is a small Chinar Island called 'Char Chinar'. The island's name comes from the fact that it has four Chinar trees planted on it. Emperor Jahangir erected these four trees in such a way that they will always cast a shadow on the island. They are among Kashmir's most popular tourist destinations.
- The Chinar tree is locally known as **'Bouin'** in Kashmir. The name comes from the Sanskrit term **'Bhawani**,' which means Goddess. The Chinar trees, a religious emblem, can be found in the Kheer Bhawani temple as well as at other Goddess Bhawani shrines throughout Kashmir. These lovely trees can also be seen at Kashmir's most famous mosques and shrines, such as Sultan-ul-Arifeen and Hazratbal.

**Application of Chinar tree**:

- **Leaves and bark** – medicine
- **Wood** – It is known as **lacewood** and used for delicate furniture
- **Twigs and roots** – used for making dyes

**14. Dhabari Quruvi**

**Concept:**

- "Dhabari Quruvi" portrays the tempestuous journey of a tribal girl who battles convention and seeks to free herself from the chains with which society and community had tied down those like her.
- Distinguished as the **first film in the history of Indian cinema to star only people from indigenous communities,** "Dhabari Quruvi" had its world premiere in the Indian Panorama section today at 53rd International Film Festival of India in Goa.
- The film also has the distinction of having been shot completely in the tribal language of Irula.

**IRULA**

- Irula resides in just two southwestern countries - Tamil Nadu and Kerala. In Tamil Nadu, they reside in the Nilgiris, Coimbatore, Erode, Namakkal, Salem, and Dharmapuri. Back in Kerala, they reside in the Palakkad district and Attapady and Walayar panchayats.
- Individuals of Irula ethnicity are known as Irular and talk Irula, which belongs to the Dravidian family.
- They speak Irula language that is closely related to Dravidian language like Kannada and Tamil.
- Irulas are among the Particularly vulnerable tribal group
- The main occupation of the Irulas has been snake, rat catching and honey collection. They also work as labourers (coolies) in the fields of the landlords during the sowing and harvesting seasons or in the rice mills.

## GEOGRAPHY

### 1. Saffron festival

**Concept:**

Saffron is one of the world's most costly spices by weight. Around 75,000 saffron blossoms produce a single pound of saffron spice and the cost varies between ₹2 and ₹3 lakh per kilogram. It grown in areas having karewas.

**Karewas:**

- In the Kashmiri dialect, the term Karewa means "elevated table land".
- **Karewas are lacustrine deposits (deposits in lake) in the Valley of Kashmir and in Bhadarwah Valley of the Jammu Division.**
- **Karewas are the thick deposits of glacial clay and other materials embedded with moraines.**
- Firstly, this term was used by Godwin Austin in 1859 and later on by Lydekker in 1878 for unconsolidated to semi-consolidated sand clay conglomerate sequence.
- "Vudr" is the local name for Karewas in Kashmiri language.
- **Karewas were formed during the Pleistocene Period** (1 million years ago), when the entire Valley of Kashmir was under water.
- Due to the rise of Pirpanjal, the drainage was impounded and a lake of about 5000 sq. km area was developed and thus a basin was formed.
- Subsequently, the lake was drained through Bramulla gorge. The deposits left in the process are known as karewas.
- This is ideal for **cultivation of saffron, almonds, apples and several other cash crops.**

**Significance of Karewas:**

- Karewa deposits have different soil and sediments such as sand, clay, silt, shale, mud, lignite and losses. Hence, these are very useful for agricultural and horticulture activities.
- Kashmir saffron, which received a Geographical Indication (GI) tag in 2020 for its longer and thicker stigmas, deep-red colour, high aroma and bitter flavour, is grown on these karewas.
- **Karewa formations are useful for the cultivation of Zafran is a local variety of Saffron in Kashmir valley.**

**Karewas Formation:**

- The fertility of these patches is believed to be the result of their long history of formation.
- **Kashmir valley resides between the Great Himalayas and the Pir Panjal ranges of the Kashmir Himalayas.** In earlier times, when the upliftment of the Pir Panjal ranges happened, the flow of the river had stopped.
- The Kashmir valley is an oval-shaped basin, 140 km long and 40 km wide, trending in the NW–SE direction.
- It is an **intermountain valley** fill, comprising of unconsolidated gravel and mud.
- A succession of plateaus is present above the Plains of Jhelum and its tributaries. These **plateau-like terraces are called 'Karewas' or 'Vudr'** in the local language.
- Despite continuous erosion since millions of years, more than half of the valley is still occupied by the **Karewa.**
- As a result, the whole of Kashmir valley became a large lake. Slowly, the glacial deposits have accumulated here in this lake. Thus, creating a large lacustrine plain.
- Later on, the water drained away and these unconsolidated deposits remained there. These unconsolidated gravel and mud deposits are known as Karewa formation.
- It formed during the Pleistocene period (2.6 million years to 11,700 years ago).

**Threats to Karewas:**

- Despite its agricultural and archaeological importance, Karewas are now being excavated to be **used in construction.**
- Between 1995 and 2005, massive portions of karewas in Pulwama, Budgam and Baramulla districts were razed to the ground for clay for the 125-km-long Qazigund-Baramulla rail line.
- The Srinagar airport is built on the Damodarkarewa in Budgam.

### 2. A new drought monitoring tool gives hope of better preparation and mitigation at the farmer level

**Context-**

- A new **satellite-based drought-monitoring tool** will be able to indicate the **presence of drought** and its **level of severity,** providing authorities with the maximum possible lead time to put mitigation strategies into place in **India** and **across South Asia.**

**About the South Asia Drought Monitoring System (SADMS)-**

- In India, the **South Asia Drought Monitoring System (SADMS)** was developed by the **International Water Management Institute (IWMI)** and the **Indian Council of Agricultural Research (ICAR),** the country's premier agricultural research institution.
- It has been tested in **India, Pakistan, Bangladesh, Sri Lanka, Nepal, Maldives, Afghanistan** and **Bhutan.**
- The system will not just monitor the drought conditions but also incorporate this information of **real-time weather updates** and **open-access satellite data,** and provide extension workers as well as agriculture and water resources authorities with all the information needed to **forecast, monitor and manage drought** on a **weekly basis.**
- **IWMI** has been testing **SADMS** by validating it at the **district level.**
- The input data comes into the platform from the **India Meteorological Department (IMD)** and the **Indian Institute of Tropical Meteorology (IITM).**

- This includes soil moisture, precipitation, temperature, wind speed and available cloud ratio. The scientists will also factor in historical droughts and their conditions.

**How will it help the farmers?**

- It will help the farmers to decide which crops to grow.
- During the drought seasons, they can choose to grow **drought-tolerant crops** like **millet** over **water-intensive crops** like **rice.**
- The platform is already in operation in the state of **Telangana.**
- From **2017, ICAR** used **SADMS** to implement **real-time contingency measures.**
- It helped farmers in three districts of **Andhra Pradesh** and **Maharashtra** to obtain **drought-tolerant seeds, develop supplementary irrigation and apply potassium nitrate** (which helps seedlings cope better with dry conditions).
- As a result, crop yields for soybean increased by 7–8 quintals (700–800 kilograms) per 0.4 hectares, pigeon pea by 5–6 quintals per acre and cotton by 12 to 14 quintals per acre.

**Drought conditions in India and South Asia region-**

- India featured as one of the **severely drought-impacted countries** in the **United Nation's latest drought assessment** released May 11, 2022.
- Nearly **two-thirds of the country** suffered drought during **2020-2022.**
- **Severe droughts** have reduced **India's gross domestic product by 2-5 per cent** over the 20 years from 1998-2017.
- Not only **India**, but the whole of **South Asia** also faced **several droughts** in recent decades and **50 major droughts** have been reported **since 1990,** affecting over **750 million people** with economic damages estimated at **$7 billion.**
- There was previously **no integrated end-to-end drought monitoring and management system** available for **South Asia**.
- The data from the **drought-monitoring system** is available at the **grid level** and can be visualised up to the **taluk level.**

**3. Verinag: A Spring in Kashmir**

- **Verinag** is the **massive pond** from where the **great Jhelum River begins** its long journey through the Valley, Pakistan and finally into the Arabian sea.
- **Location-** Anantnag district of the UT of Jammu and Kashmir.
- There is an **octagonal stone basin** at **Verinag Spring** and an arcade surrounding it which were built by **Mughal emperor Jahangir in 1620 A.D.**
- Later, a beautiful garden next to this spring was laid out by his son **Shah Jahan.**
- This spring is known to **never dry up or overflow.**
- Verinag Spring is also the **major source of river Jhelum.**
- Verinag Spring and Mughal Arcade surrounding it are **officially recognized** by the **Archaeological Survey of India** as a **Monument of National Importance.**

**Jhelum river-**

- It originates at **Verinag** and flows through the **Indian-administered territory of Jammu and Kashmir**, to the **Pakistani-administered territory of Kashmir**, and then into the **Pakistani province of Punjab.**
- It is the **westernmost** of the **five rivers of the Punjab region**, and flows through the **Kashmir Valley.**
- It is a **tributary of the Chenab River** and has a total length of about **725 kilometres.**
- The **river Jhelum** is called **Hydaspes** by the **ancient Greeks.**

**Monuments of National Importance-**

- **Nodal Authority:** Monuments of National Importance are designated by the **Archaeological Survey of India (ASI).**
- **What is an Ancient Monument?**
  - 'Ancient Monument' is defined under the **Ancient Monument and Archaeological Sites and Remains Act,1958.**
  - The Act defines **Ancient Monument** as any structure or monument or any cave, rock-sculpture, an inscription that is of historical, or archaeological interest. Further, Ancient Monument has to be in **existence for not less than 100 years.**
- **Maintained by:** The **Central Government** is authorised to maintain, protect and promote Monuments of National Importance.
- **Sites:** Currently, **3,691 monuments nationwide** are protected by the **Archaeological Survey of India (ASI).**
  - The **highest** number of them were in **Uttar Pradesh (745)** followed by **Karnataka (506)** and **Tamil Nadu (413).**

4. **Indian sailors held hostage in Equatorial Guinea**

**Context:**

- Kerala Chief Minister Pinarayi Vijayan on Tuesday sought Prime Minister Narendra Modi's help in facilitating the **release of 16 Indian seafarer held hostage In the central African country of Equatorial Guinea**

**What is the issue:**

- A Norwegian vessel**, 'MV Heroic Idun'**, was stopped by a naval ship of Equatorial Guinea in **international waters** on 12 August and been held **unlawfully 16 Indians** who are **among 26 sailors aboard 'MV Heroic Idun**

**Where is Equatorial Guinea:**

- **Equatorial Guinea** is a **small country** on the **west coast of Africa.**
- It is **bounded by Cameroon** to the **north** and **Gabon** to the **east and south**.
- It consists of **two parts, an insular and a mainland region**.
- The **insular region** consists of the **islands of Bioko** in the **Gulf of Guinea** and **Annobón, a small volcanic island** which is the **only part of the country south of the equator**
- Equatorial Guinea is the **only sovereign African state in which Spanish is an official language.**
- The **capital Malabo** is located on **Bioko Island.**

5. **World population set to cross 8-billion mark**

**Context-**

- The number of human beings inhabiting the earth is **set to cross the 8-billion mark today**, **November 15, 2022.** The population growth has been led by **Asian countries,** especially **India** and **China,** in recent years.

**Historical trend of Global Population-**

- The **global population** hit the **one billion** mark in **1804.** It took another **126 years** to hit the **second billion** in **1930**, and **another 30 years** to hit the **third.** The **fourth billion** just took **14 years**, while the **fifth billion** was even faster at **13 years.**
- In **less than 100 years** since **1930,** the world population has grown **four times** and will **cross 8 billion** in a few hours.

**Global Population growth rate-**

- The **annual population growth rate** was the **highest** between **1963** and **1972**, at over **2 per cent.**
- The **growth rate** has **declined** since then and has **fallen below 1 per** cent since **2021.**
- It is further projected to **decline till 2050,** according to **World Bank data.**

**Population share-**

- In **2022 China** and **India** account for over **a third of the world's population,** with **China's** share at **18.2 per cent** and **India's at 17.7 per cent.**
- The **US** and **Indonesia** follow with **4.2 per cent** and **3.5 per cent** share of the global population.

**Projected populations by 2050-**

- This is expected to change by **2050,** with **India** having the **world's highest population share at 16.8 per cent,** while **China's population share** would have **declined by over 4.2 per cent.**
- **India's fast-growing population** will see it **surpass China** as the most populated country in the world in **2023.** India is projected to add over **2.3 billion people by 2050,** while **China's population** is projected to **shrink from 2030 onwards.**
- The population of the **US, Indonesia** and **Pakistan** is also expected to grow with the addition of **41 million, 51 million** and **108 million** people, respectively, by **2050.**

**Median age-**

While **Asia** has the largest share of the world's population, **Africa** is home to the **youngest population** with a **median age of just 20**, and **Europe** has the **oldest population** with a **median age of around 43.**

**India's Demography-**

- **Period of Stagnant population (1901-1921)**
  - The **census of 1921** recorded a **negative growth rate of -0.31%,** which happened **only once** throughout the demographic history of India, so the year **1921** is called the **'Demographic Divide'** in the demographic history of India.
- **Period of Steady Growth (1921-1951)**
  - Population growth during this period is called the **mortality induced growth**
- **Period of Rapid High Growth (1951-81)**
  - This period experienced **very high rate of population growth** and is often referred to as the **Period of Population explosion.**
- **Period of High Growth Rate with definite signs of slowing down (1981-2011)**

**Spatial-Temporal Variations in Population growth-**

- The phenomenon of **low growth** has spread beyond the boundaries of the **southern states during 2001-11,** where in addition to **Andhra Pradesh, Tamil Nadu and Karnataka** in the south, **Himachal Pradesh** and **Punjab** in the north, **West Bengal** and **Odisha** in the east and **Maharashtra** in the west have registered **growth rate** between **11-16%** in **2001-11**
- Among **smaller states** and **Union territories**, Dadar and Nagar Haveli, Daman & Diu registered the **highest growth rate of 55.5%** and **53.54%** respectively, between **2001-11**
- A glaring down trend in the **growth rate** has been observed in **Nagaland,** where there has been a **steep fall in growth rate** from **64.53% in 1991-2001,** to **negative growth rate** of **-0.47% in 2011 census**
- The **second minimum growth rate** of **4.86%** has been recorded in **Kerala**
  - This state has reached **high level of demographic transition** and can be compare to the advanced countries of Europe and America
- States which have registered **very high growth rate of over 20%** include – Bihar (25%), Jammu & Kashmir (23%), Chhattisgarh (22%) and Jharkhand (22%)
- Other **small states** with **higher growth rate** are Meghalaya (27%) and Arunachal Pradesh (25%)

6. **Odisha govt approves new port policy to attract Pvt. investment**

**Context-**

- The **Odisha state cabinet** approved a **new port policy** on Friday.

**Details of the policy-**

- The new policy **aims** to facilitate **private sector investments in the maritime sector** and the development of ports and port-related industries.
- According to the policy, the **Odisha Maritime Board (OMB)** will prepare an **Odisha maritime perspective plan** encompassing the **key strengths** and challenges in maritime development.
- The plan will also study the **maritime ecosystem involving ports, hinterland potential, cargo evacuation, port connectivity, environmental enhancement and development of the coastal communities.**
- The **policy also promotes** other **maritime ventures** like coastal shipping, the promotion of marine tourism, the development of multipurpose harbours, the introduction of sea-plane connectivity, promotion of facilities and the creation of infrastructure for shipbuilding, ship breaking and related activities in the state.
- Earlier the state had formulated a port policy in 2004.

**Ports in Odisha-**

- With a vast coastline of **480 kilometres, Odisha** has **three operational ports** at **Paradip, Dhamra and Gopalpur.**
- **12 potential sites** have been identified for the development of **non-major ports** in different districts and a **riverine port on Mahanadi.**

**Policy for children**

- The cabinet also approved a **policy for children** in the state called **PRARAMBH.**
- The **policy envisions** a blueprint which focuses on children's right to survival, protection, physical health, including mental health, upholding the right to education, participation and other milestones required to achieve their optimal development.

**Major Sea Ports in India**

- India has **13 major seaports** (12 Government-owned and one private) and **205 notified minor and intermediate ports** that handle a huge volume of traffic.
- About **95 per cent by volume** and **70 per cent by value** of India's total international trade are carried on through maritime transportation.
- All ports in India are situated in the **9 coastal states** of India namely **Kerala, Karnataka, Maharashtra, Goa, Gujarat, West Bengal, Odisha, Andhra Pradesh**, and **Tamil Nadu.**
- **Thirteen major ports** in the country handle a lot of volume of container and cargo traffic.
- On the **west coast,** there are the **ports of Mumbai, Kandla, Mangalore, JNPT, Vadhavan, Mormugao, and Cochin.**
- On the **east coast** are the **ports at Chennai, Tuticorin, Visakhapatnam, Paradip, Kolkata, and Ennore.**
- **Ennore** is a registered public company with the government owning a **68% stake.**
- In **Andaman and Nicobar Islands,** there is **Port Blair** (a minor port)**.**
- **Mumbai** is the **largest natural port** in India.
- The Indian government has a **federal structure,** and according to its constitution, **maritime transport** is to be **administered by both the Central and the State governments.**
- While the **central government's shipping ministry** administers the **major ports**, the **minor and intermediate ports** are **administered by the relevant departments or ministries in the nine coastal states** – Andhra Pradesh, Goa, Gujarat, Karnataka, Kerala, Maharashtra, Odisha, Tamil Nadu and West Bengal.

**What is Landlord Port?**

- In this model, the **publicly governed port authority** acts as a regulatory body and as a landlord, while **private companies** carry out port operations—mainly cargo-handling activities.
- Here, the **port authority** maintains ownership of the port while the infrastructure is leased to private firms that provide and maintain their own superstructure and install their own equipment to handle cargo.
- In return, the landlord port gets a share of the revenue from the private entity.

**Service Port Model?**

- In service ports, the **port authority** does the administration and operation of port activities.
- The port operation includes providing navigational services, warehouse facilities, cranes, and skilled employees/labourers. the construction of infrastructure, superstructure, and providing employees, becomes the responsibility of the port authority.
- Even if the port authority act in the public interest full ownership of the port remains with the state or the government.

7. **INCOIS keeps watch on Barren Island volcano**

**Context-**

- The volcano on the **Barren Island of the Andaman & Nicobar Islands** is being closely watched by the **Indian Tsunami Early Warning Centre (ITEWC)** of the **Indian National Centre for Ocean Information Services (INCOIS),** to check for signs of an eruption which could lead to a **tsunami or a monstrous undersea landslide** akin to what had happened in **Indonesia in 2018.**

**Volcano emitting smoke**

- The volcano about **140 km northeast of Port Blair** has been **emitting smoke** and is **not capable** of causing major destruction but there could be a **localised tsunami.**

**Early warning system to track movements-**

- The organisation already has **seven tide gauges** in the **Indian Ocean** and there is a plan to put a **seismic sensor** and **another tide gauge** to catch any movement generated underwater.
- Recent tsunamis, including one in **Tonga** this year, have brought to the fore the **challenge of tsunamis triggered by non-earthquake sources** such as **submarine landslides** and **volcanic eruptions**.

**Note- Tsunami already covered**

8. **Bihar to bring Ganga water to parched town by taping flood water**

**Context:**

- The **Ganga water supply** scheme at **Rajgir** will be **inaugurated on November 27** while the **one in Gaya and Bodh Gaya** will be inaugurated on **November 28**

**More about the project:**

- The Ganga water supply scheme at **Rajgir, Gaya and Bodh Gaya** were under the ambitious **Ganga Jal Apoorti Yojana or the Ganga water supply scheme** (GWSS) under the state's **Jal-Jeevan-Hariyali initiative.**
- This was the **country's first-of-its-kind Gangajal Aapurti Yojana** in which the **floodwater** received in the four **monsoon** months was **stored in huge reservoirs.**
- The stored water will then be processed and made safe for human consumption before being supplied to the homes of people.
- This will be the second major water project in the region after inaugurating **India's longest rubber dam 'Gayaji Dam'.**

9. **Millets in the mainstream? How Odisha's Kutia Kondh tribe rediscovered a palate for the 'poor man's food'?**

**Context**

- Centre is looking to replicate the "Model of the survival and promotion of millet crop" of **Kutia Kondh tribals** of Kandhamal district in Odisha.

**Why millet lost its presence-**

- Paddy and other grain's inclusion in the **public distribution system** replaced millet.
- Millet became a subsistence crop, and tribals started growing is to consume only and not to sell.
- Tribals, especially from the younger generation, perceived millet as the **poor man's food.**
- It was not easy to harvest the crop. The **de-husking of millet** involved **strenuous labour.**
- Since there was **no market available for the crop,** people did not produce more than what they required for their own consumption.

**Revival model-**

- Volunteers identified the **Burlang Yatra** as the occasion around which they could strategise the revival of millets.
- The **Burlang Yatra** is a **traditional annual festival** of the **Kutia Kondh tribe** where the community, especially the women, worship and exchange seeds through a celebratory mode of songs and dances at the village level.
- **NIRMAN** (an NGO), in collaboration with **Millet Network of India (MINI),** a forum founded for promotion of millet, started celebrating the **Burlang Yatra** on a large scale in order to increase awareness about millets.
- The exchange of millet seeds was taken up more vigorously.
- In a few years, millets staged a comeback to our crop field.
- Through this little-known movement, the tribals also managed to revive pulses, oilseed and tubers which are regarded as companion crops.
- Two species of the mint family, supposed to belong to the Himalayan belt, have also been identified as traditional crops cultivated by tribals of Kandhamal district.

**Odisha government initiative-**

- In **2017,** the Odisha government launched **Millet Mission in 2017**.
- In 2022, almost two lakh farmers in 19 districts are involved in millet cultivation.
- About 3.23 lakh quintals of millets have been procured.
- The Odisha government has also started celebrating **Mandia Dibas (Millet Day)** on **November 10** to popularise the crop.

**About Millet**

- It is a **common term** to categorise **small-seeded grasses** that are often termed **Nutri-cereals** or **dryland-cereals** and includes **sorghum, pearl millet, ragi, small millet, foxtail millet, proso millet, barnyard millet and Kodo millet,** among others.
- They are also **hardier** and **drought-resistant crops.**
- **Millets** can grow in **poor soil conditions** with **less water, fertiliser** and **pesticides.**
- They can withstand **higher temperatures,** making them the perfect choice as **'climate-smart cereals.**

**Distribution -**

- **India, Nigeria** and **China** are the **largest producers of millets** in the world, accounting for **more than 55%** of the global production.
- For many years, **India** was a major producer of millets.

- However, in recent years, millet production has increased dramatically in **Africa.**
- **In India, pearl millet** is the **fourth-most widely cultivated food crop** after **rice, wheat** and **maize.**
- Millets are available almost across India.

**Benefits -**

- Millets can also help in tackling health challenges such as **obesity, diabetes** and **lifestyle problems** as they are **gluten-free,** have a **low glycemic index** and are **high in dietary fibre** and **antioxidants.**
- Millets are **Nutri-cereals** that are **highly nutritious** and known to have **high nutrient content** which includes **protein, essential fatty acids, dietary fibre, B-Vitamins** and **minerals** such as **calcium, iron, zinc, potassium** and **magnesium.**
- It can provide **nutritional security** and protect against **nutritional deficiency,** especially among children and women.
- It will also be **critical for climate change measures in drylands** and important for smallholder and marginal farmers.

**Concerns /Challenges**

- The **awareness** of the benefits of millets is still low and this is the reason for the lesser number of players working on value-added millet products in India.
- The main reasons behind the decline are low remuneration, lack of input subsidies and price incentives, subsidised supply of fine cereals through the **public distribution system (PDS)** and change in consumer preferences and lower demand
- The lower demand also means limited supply and higher prices.
- In the absence of proper market linkages for forest and agricultural produce, **millet consumption is restricted to rural haats, bazaars, tourist spots and festivals.**

**Government Efforts to Promote Millets Production**

- Millets are being promoted through **technology dissemination, quality seeds** through **millet seed hubs, awareness generation, minimum support price** and inclusion in **PDS.**
- Efforts are now being done to include the n**utrient-rich smaller millets** in the **mid-day meal** schemes in government and government-aided schools in Karnataka and Telangana.
- **Millet awareness** is catching up fast in the urban centres such as **Kolkata, Mumbai** and **Delhi** among others.
- The **Union Agriculture Ministry, in April 2018**, declared millets as **"Nutri-Cereals",** considering their **"high nutritive value"** and also **"anti-diabetic properties".**
- **2018** was observed as the **'National Year of Millets"** and The **UN General Assembly** adopted an **India-sponsored resolution** to mark **2023** as the **"International Year of Millets".**
- The Government of India's **Millet Mission** comes under the **National Food Security Mission (NFSM),** launched in October 2007.
- The **Centre's Millet Mission** will focus on developing **farm-gate processing** and empowering farmers through collectives while focusing on value-addition and aggregation of the produce.

**10. Indian team in Argentina to scout for lithium deals**

**Context**

- **India** has sent a team of three geologists to **Argentina "to assess potential lithium deposits"** and possible acquisition opportunities in the Latin American nation.

**The team consists of-**

- The **team comprising one geologist** each from **Mineral Exploration Corporation Ltd (MECL)**, **KABIL (Khanij Bidesh India Ltd)** and the **Geological Survey of India (GSI)** has been sent to the **Argentinian province of Catamarca**.
- Based on their feasibility report, another team would be sent to the province for carrying out possible commercial negotiations.
- Feasibility study would cover aspects-
    - determination of lithium resource,
    - deciding on whether mining would be commercially viable or not.
    - to find out if the resources are worth investing or not at all.

**Properties of Lithium:**

- It is a chemical element with the symbol **Li.**
- It is a **soft, silvery-white metal.**
- Under standard conditions, it is the **lightest metal** and the **lightest solid element.**
- It is **highly reactive** and **flammable,** and **must be stored in mineral oil.**
- It is an **alkali metal** and a **rare metal.**
- The **alkali metals** consist of the chemical element's **lithium, sodium, potassium, rubidium, caesium, and francium.**
- Together with hydrogen they constitute **group 1,** which lies in the **s-block of the periodic table**.
- **Rare Metals (RM)** include Niobium (Nb), Tantalum (Ta), Lithium (Li), Beryllium (Be), Cesium (Cs) etc. and Rare Earths (RE) include Lanthanum (La) to Lutetium (Lu) besides Scandium (Sc) and Yttrium (Y).
- These metals are **strategic in nature** with wide application in the **nuclear** and **other high tech industries** such as electronics, telecommunication, information technology, space, defense etc.

**Uses:**

- Lithium metal is used to make useful alloys.

- For example, with lead to make **'white metal'** bearings for motor engines, with **aluminium** to make aircraft parts, and with **magnesium** to make armour plates.
- In **Thermonuclear reactions.**
- To make electrochemical cells. Lithium is an important component in Electric Vehicles, Laptops etc.

**Countries with Largest Reserves:**

- Chile> Australia> Argentina

**Lithium in India:**

- Researchers at the **Atomic Minerals Directorate** (under India's Atomic Energy Commission) have **estimated lithium reserves of 14,100 tonnes** in a small patch of land surveyed in **Southern Karnataka's Mandya district** recently.
- Also, to be India's first ever Lithium deposit site found.

**Other Potential Sites in India:**

- The **major mica belts** in **Rajasthan, Bihar**, and **Andhra Pradesh.**
- **Pegmatite (igneous rocks) belts** in **Odisha** and **Chhattisgarh.**
- **Brines of Sambhar** and **Pachpadra in Rajasthan,** and **Rann of Kachchh** in Gujarat.

**Lithium Production in Stars:**

- Scientists from the **Indian Institute of Astrophysics (IIA)** have provided evidence for the first time that **Lithium (Li)** production is common among **low mass Sun-like stars** during their **Helium (He) core burning phase.**

**Lithium demand-**

- While **Australia** is among the **top six producers** on the mineral globally. The **other five** are **Bolivia, Argentina, Chile, the USA and China.**
- **Demand** – globally as well as in India — is being driven by a shift towards **electric vehicles (EVs).**
- Globally, consumption is **expected to rise** from 500,000 tonnes in 2021 to 3-4 million tonnes as per various trade reports.

**Boom in Argentina**

- **Lithium** is found in **cedemine rock formation** and in **brine** form which is called **salar** in **Argentina, Bolivia and Chile.**
- The other alternative is **liquid form.**
- Last year, Argentina and Chile produced about **30 per cent of the world's lithium.**
- The three nations, considered as the **'lithium trinity',** together **account for over 50 per cent of the world's resource.**
- In **South America**, **lithium** is typically **extracted** from the **salt flats** by **pumping brine into ponds** and **processing the lithium salts** that **crystallise once the water has evaporated.**
- It requires time and investment to set up, but thereafter production is cheaper than the hard-rock mining practiced in **Australia**.

**11. Regenerative agriculture**

- Regenerative agriculture is a system of farming principles and practices that **seeks to rehabilitate and enhance the entire ecosystem of the farm** by placing a heavy premium on **soil health** with attention also paid to **water management, fertilizer use**, and more.
- It is a method of farming that **improves the resources it uses,** rather than destroying or depleting them.

**Benefits:**

- Regenerative agriculture practices **increase soil biodiversity and organic matter,** leading to more **resilient soils** that can better **withstand climate change impacts** like flooding and drought.
- Healthy soils lead to **strong yields** and **nutrient-rich crops.**
- It also **diminishes erosion and runoff,** leading to **improved water quality** on and off the farm.
- Importantly, regenerative agriculture practices also **help fight the climate crisis** by **pulling carbon from the atmosphere** and **sequestering it in the ground.**

**12. Biodynamic farming**

- **Biodynamic agriculture** is a form of alternative agriculture based on **pseudo-scientific and esoteric concepts** initially developed in **1924** by **Rudolf Steiner** (1861–1925).
- It was the **first of the organic farming movements.**
- It treats **soil fertility, plant growth, and livestock care** as ecologically interrelated tasks, emphasizing spiritual and mystical perspectives.
- It emphasizes the **use of manures and composts** and **excludes the use of synthetic (artificial) fertilizers, pesticides** and **herbicides on soil and plants.**
- Methods unique to the biodynamic approach include its t**reatment of animals, crops**, and **soil** as a single system, an emphasis from its beginnings on local production and distribution systems, its u**se of traditional and development of new local breeds and varieties.**
- Some methods use an astrological sowing and planting calendar.
- Biodynamic agriculture **uses various herbal and mineral additives for compost additives and field sprays.**
- **No difference in beneficial outcomes** has been scientifically established between certified biodynamic agricultural techniques and similar organic and integrated farming practices. Biodynamic agriculture is a **pseudoscience as it lacks scientific evidence for its efficacy** because of its reliance upon esoteric knowledge and mystical beliefs.

- As of **2020,** biodynamic techniques were **used on 251,842 hectares in 55 countries,** led by Germany, Australia and France. Germany accounts for 41.8% of the global total; the remainder average **1,750 ha per country.**
- Biodynamic methods of cultivating grapevines have been taken up by several notable vineyards.
- There are certification agencies for biodynamic products, most of which are members of the international biodynamics standards group Demeter International.

**13. Agroecology or Agroecological farming**

- Agroecology is the **study of ecological processes applied to agricultural production systems.**
    - Application of **ecological principles to agroecosystems** can help in developing novel management approaches and techniques in agriculture systems.
    - The field of agroecology is not associated with any one particular method of farming, whether it be organic, integrated, or conventional, intensive or extensive. However, it has much more in common with organic and integrated farming.
- **Agroecology is not against the use of technology in agriculture** but assesses how, when, and if technology can be used in conjunction with natural, social and human assets.
    - It recognizes that there is **no universal formula or recipe for the success and maximum well-being of an agroecosystem** and is **context- or site-specific.**
- Agroecology is not defined by certain management practices, instead, its studies questions related to the four system properties of agroecosystems:
    1. productivity,
    2. stability,
    3. sustainability and
    4. equitability.
- Agroecologists see **all four properties as interconnected and integral to the success of an agroecosystem** and study them through an interdisciplinary lens,
    - **using natural sciences** to understand elements of agroecosystems as well as
    - **using social sciences** to understand the effects of farming practices on rural communities, economic constraints to developing new production methods, or cultural factors determining farming practices.
- Agroecologists do not limit themselves to the study of agroecosystems at any one scale: gene- organism- population- community- ecosystem- landscape- biome, field- farm- community- region- state- country- continent- global.

**Agroecological farming has been shown to-**

- **Increase ecological resilience,** especially with respect to volatile weather conditions;
- **Improve health and nutrition** through more diverse, nutritious and fresh diets and reduced incidence of pesticide poisonings and pesticide-related diseases;
- **Conserve biodiversity and natural resources** such as soil organic matter, water, crop genetic diversity and natural enemies of pests;
- **Improve economic stability** with more diverse sources of income, the spread of labour needs and production over time, and reduced vulnerability to commodity price swings; and
- **Mitigate effects of climate change** through reduced reliance on fossil fuels and fossil fuel-based agricultural inputs, increased carbon sequestration and water capture in soil.

14. **Industry urges govt. to establish 'India Rare Earths Mission' to reduce reliance on China**

**In the news-**

- To counter India's reliance on China for imports of **critical rare earth minerals,** industry has urged the government to **encourage private sector mining** in the sector and diversify sources of supply for these **strategic raw materials.**

**India Rare Earths Mission-**

- **CII** has suggested to set up an **'India Rare Earths Mission',** manned by professionals, like the **India Semiconductor Mission** and make their exploration a critical component of the Deep Ocean Mission plan of the government.
- Though India has **6% of the world's rare earth reserves,** it **only produces 1% of global output,** and meets most of its requirements of such minerals from **China.**

**'Broad-base supply'**

- In **2018-19,** for instance, **92% of rare earth metal imports** by **value** and **97% by quantity** were sourced from China.
- CII has recommended the public sector firm **Indian Rare Earths Limited (IREL),** administered by the **Department of Atomic Energy,** should be split into two entities.
- While **IREL** primarily focuses on **Thorium mining,** the second entity could pursue other minerals.

**Rare earth elements:**

- The **17 rare earth elements (REE)** include the **15 Lanthanides** (atomic numbers 57 — which is Lanthanum — to 71 in the periodic table) plus **Scandium** (atomic number 21) and **Yttrium** (39). **REEs** are classified as **light RE elements (LREE)** and **heavy RE elements (HREE).**
- Some **REEs** are **available in India** — such as **Lanthanum, Cerium, Neodymium, Praseodymium and Samarium, etc.**
- Others such as **Dysprosium, Terbium**, and **Europium,** which are classified as **HREEs**, are not available in Indian deposits in extractable quantities.

- Hence, there is a dependence on countries such as China for HREEs, which is one of the leading producers of REEs, with an estimated 70 per cent share of the global production.

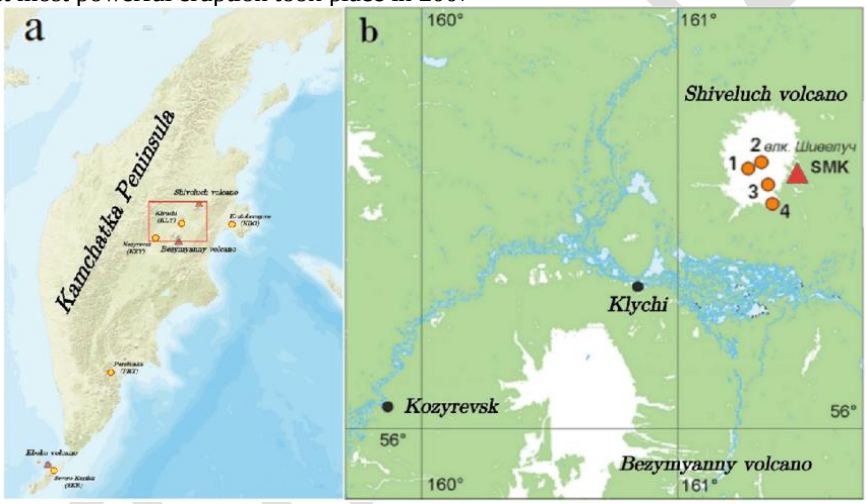
**Why are these minerals important?**

- Minerals like **Cobalt, Nickel,** and **Lithium** are required for **batteries** used in **electric vehicles.**
- REEs are an **essential** — although often tiny — **component** of more than **200 consumer products,** including **mobile phones, computer hard drives, electric and hybrid vehicles, semiconductors, flat screen TVs and monitors,** and **high-end electronics.**
- India is seen as a late mover in attempts to enter the lithium value chain, coming at a time when EVs are predicted to be a sector ripe for disruption.
- According to the plan, 80 percent of the country's two- and three-wheeler fleet, 40 percent of buses, and 30 to 70 per cent of cars will be **EVs by 2030.**

15. **Russia's Shivulech volcano extremely active, threatens eruption, scientists say**

**Context-**

- The **Shiveluch volcano** on the **Kamchatka Peninsula** in the **Russian Far East** has become extremely active, threatening a powerful eruption, the **Kamchatka Volcanic Eruption Response Team** said.
- A growth of the **lava dome continues**, a strong **fumaroles activity,** an incandescence of the lava dome, explosions, and hot avalanches accompanies this process.
- Ash explosions up to **10-15 kilometres (9.32 miles)** could occur at any time.
- Ongoing activity could affect international and low-flying aircraft.
- The volcano last most powerful eruption took place in 2007




**About-**

- **Shiveluch** is the **northernmost active volcano** in **Kamchatka Krai, Russia.**
- It and **Karymsky** are **Kamchatka's largest, most active** and **most continuously erupting volcanoes.**
- The summit reaches 3,283 metres (10,771 feet)
- An estimated 60 substantial eruptions in the past 10,000 years.
- On **February 27, 2015 Shiveluch** erupted shooting ash into the atmosphere about **30,000 feet** crossing the **Bering Sea** and into Alaska.
- The Kamchatka Krai is a part of **Pacific ring of fire.**

**Characteristics-**

- **Shiveluch** belongs to the **Kliuchevskaya volcano group.**
- There are **three elements** of the volcano:
- the **stratovolcano Old Shiveluch**;
- an **ancient caldera,** and
- the **active Young Shiveluch** with an elevation of about 2,800 metres (9,186 ft).
- Shiveluch is one of **Kamchatka's largest and most active volcanic structures.**
- It is a **stratovolcano composed of alternating layers of solidified ash, hardened lava** and **volcanic rocks**.
- The **nearest settlement** from the volcano is **Klyuchi,** situated 50 km from the mountain.
- The settlement is small enough to evacuate rapidly in case of a major eruption.

**16. Choking lake: Nainital gets some HC relief but finger crossed**

**About Sukhtal lake-**

- Sukhatal is a **freshwater lake** having a length of 150m and 10m deep.
- Surrounded by the dense pine and oak forests.
- Sukhatal is a major source of water recharge for Nainital lake.

- Earlier known as **Khudaiya tal**
- Renamed as Sukhatal because the entire water from this lake was drained in the extreme region of the Nainital lake.
- These verdant forests are home to migratory birds.

**Important Manmade lakes in India-**

| Manmade Lakes | Description |
|---|---|
| **Bhojtal lake** | • **Bhojtal,** formerly known as **'Upper Lake,'** is **Asia's largest manmade lake**, located in Bhopal, **Madhya Pradesh.**<br>• The **Kolans River** was once a **tributary** of the **Halali River**, but with the construction of the lake via an earthen dam and a diversion canal, the upper course of the Kolans River and Bada Talab now flow into the Kaliasot River. |
| **Gobind Sagar Lake** | • Gobind Sagar Lake is a **reservoir in the Himachal Pradesh** districts of **Una** and **Bilaspur.**<br>• The **Bhakra Dam** is responsible for its formation.<br>• The reservoir is named after **Guru Gobind Singh,** the eleventh Sikh guru, and is located on the **Sutlej River.** The Bhakra Dam is one of the world's highest gravity dams.<br>• The lake was designated as a **'waterfowl sanctuary'** in **1962.**<br>• Even now, the Gobind sagar lake is home to several bird and animal species, including the Panther, Wolf, Chausinga, Sambar, Hyena, Sloth bear, Nilgai, Chinkara, and wild boar.<br>• The water level at Gobind Sagar Lake is constantly changing. In the reservoir, one may participate in a variety of sports. |
| **Jaisamand Lake** | • **Dhebar Lake**, also known as **Jaisamand Lake,** is **India's first** and **world's oldest historical lake**, as well as the **country's second-biggest man-made freshwater lake.**<br>• It is in the **Rajasthan** state of western India, in the **Udaipur** District.<br>• The tribe of **Bhil Minas** occupies all three islands in Jaisamand Lake.<br>• Jaisamand Lake was built in the **17th century** by **Maharaja Jai Singh** using the waters of the **Gomti River.**<br>• On the lake, there are eleven islands, some of which serve as a haven for numerous species of migratory birds. |
| **Hussain Sagar Lake** | • **Hussain Sagar lake** is a **heart-shaped lake** in **Hyderabad, Telangana,** is situated on the **Musi** river that was established in **1563** by **Ibrahim Quli Qutb Shah.**<br>• The lake was named after **Hussain Shah Wali,** the Kingdom's Master of Architecture.<br>• It is a **man-made lake** that is perpetually supplied by canals from the Musi River. |
| **Chembarambakkam Lake** | • **Chembarambakkam Lake** is a lake in **Chennai, Tamil Nadu, India,** around 25 kilometers from the city center.<br>• It is **one of two rain-fed reservoirs** that draw water for delivery to Chennai City, the other being **Puzhal Lake.**<br>• This lake is the source of the **Adyar River.** This lake serves as a source of water for Chennai city.<br>• **Puliyur Kottam** is another name for Chembarambakkam Lake. Its **turquoise waters** contrast well with the many plant types. |
| **Kodaikanal Lake,** | • **Kodaikanal Lake,** also known as **Kodai Lake,** is a manmade lake located in **Kodaikanal city in the Dindigul district in Tamil Nadu, India.**<br>• **Sir Vere Henry Levinge,** the then Collector of Madurai, was instrumental in creating the lake in **1863,** amidst the Kodaikanal town which was developed by the British and early missionaries from USA.<br>• The lake is said to be Kodaikanal's most popular geographic landmark and tourist attraction. |
| **Govind Ballabh Pant Sagar** | • Constructed on Rihand dam (The largest dam of India by volume)<br>• Located in the **Sonbhadra district of U.P.**<br>• It is located on the **Rihand River,** a tributary of the **Son River.** |
| **Narayan Sarovar** | • Located in the **Kutch region of Gujrat.**<br>• Place of pilgrimage for Hindus on the Kori Creek.<br>• Lake is located near the Koteswar temple |

| | |
|---|---|
| **Kankaria lake** | • Located in **Ahmedabad, Gujrat**<br>• Second largest lake of **Gujrat**<br>• It was completed in **1451** during the reign of **Sultan Qutb-ud-Din Ahmad Shah II** though its origin is placed in the **Chaulukya period sometimes.** |
| **Hamirsar lake** | • Located in **Bhuj** in the **Kutch region of Gujrat**<br>• It is a **450-year-old lake** named after **Jadeja ruler Rao Hamir** (1472-1524), the founder of **Bhuj**.<br>• The lake was **built during** the reign of **Rao Khengarji I** (1548–1585), the **founder of Jadeja dynasty** in **Cutch**, who named it after his father **Rao Hamir.** |

17. **Scientists discover new drought-resilient wheat gene, suitable for drier soil conditions**

**About the newly developed wheat variety-**

- Scientists at the **John Innes Centre,** in collaboration with an international team of researchers, discovered the **new 'reduced height'** or a **semi-dwarf gene** called **Rht13,** which is **drought-resilient** and can be grown in **drier soil conditions.**
- **Reduced height gene** means that seeds can be **planted deeper in the soil**, giving access to moisture, without the adverse effect on seedling emergence seen with existing wheat varieties.
- Since the **1960s** and the **Green Revolution**, reduced height genes have **increased global wheat yields** because the **short-stemmed wheat** they produce puts more investment into the grains rather than into the stems and has improved standing ability.
- However, these genes bred into wheat also have the **significant disadvantage** of not working in **drought-like conditions.**
- When these varieties are planted deeper to access moisture in water-limited environments, they can fail to reach the surface of the soil.
- The **newly discovered gene** overcomes this problem of seedling emergence because the gene acts in tissues higher up in the wheat stem.
- So, the **dwarfing mechanism** only takes effect once the seedling has fully emerged. This gives farmers a significant advantage when planting deeper in dry conditions.

**18. Shared water resources can be used as weapon by any nation: Murmu**

**Context-**

- Emphasising the significance of **limited freshwater supply** for a growing global population and rising industrialisation, President Droupadi Murmu said that a **vast quantity** of this available freshwater is spread across **international borders**, and this **"water resource"** can be used as a **"weapon"** by any country and take the form of an international conflict.

**Transboundary rivers in India-**

- India, Pakistan, Bangladesh, Bhutan, Nepal, and Afghanistan share **twenty major rivers** among them.
- The Indus basin (consisting of the Indus, Ravi, Beas, Sutlej, Jhelum and Chenab rivers) inter-links **India, Pakistan and China.**
- **Brahmaputra** and **the Ganges basins** inter-link **China with India, Nepal, Bangladesh, and Bhutan.**
- The **Kosi, Gandaki,** and **Mahakali** rivers join **Nepal with India.**
- Major rivers shared between **India and Bangladesh** are the **Brahmaputra, Ganges, and Teesta.**
- Pakistan and Afghanistan share the Kabul river basin.

| **India's neighbouring country** | **Shared rivers** |
|---|---|
| **India- Bangladesh** | Shares **54 rivers** with India. Majors among them are- Ganga, Brahmaputra, Mahananda, Teesta, Meghna, Feni River |
| **India-Nepal** | Kosi, Gandak, Karnali or Mahakali, Ghaghara, Arun, Rapti, Trishuli, Burhi Gandak, Tamur rivers |
| **India- Bhutan** | Manas, Torse and Beki rivers |
| **India- China** | Brahmaputra, Indus, Gandak, Ghaghara, Manas, Sutlej and Torsa rivers |
| **India-Pakistan** | Indus, Jhelum, chenab, Rabi, beas, sutlej, Shyok, Gilgit, Kabul, Kurram, and Gomal rivers. |

## POLITY

### 1. Two finger tests are banned

**Context:**

- Recently, the Supreme Court has declared that **any person conducting the invasive 'two-finger'** or **vaginal test on rape or sexual assault** survivors will be **found guilty of misconduct**.
- A **Bench of Justices D Y Chandrachud and Hima Kohli** made this comment in its order restoring the conviction and sentencing of a man for the rape and murder of a minor girl in Jharkhand in November 2004.

**What is two finger tests?**

- The **'two-finger test'** is a **regressive procedure** that involves the **insertion of two fingers into a person's vagina** to **gauge the laxity** of **vaginal muscles,** thereby determining her 'virginity'.
- It **includes** an **inspection of the hymen.** The hymen is **inspected as it can be torn only** if the woman has had any sexual intercourse.

**What are the norms for medical examinations of Rape Victims:**

- In terms of **Section 53A** in the **Indian Evidence Act,** the **evidence of a victim's character or her previous sexual experience** with any person **shall not be relevant** to the **issue of consent or the quality of consent** in the prosecution of sexual offenses.

**What is Supreme Court's take on the issue:**

- In **May 2013**, the **Supreme Court banned the two-finger test** on rape victims on the grounds that it **violated their right to privacy**.
- The court had asked the government to provide **better medical procedures in order to confirm sexual assault.**
- The test is **medically unnecessary,** oftentimes **painful, humiliating and a traumatic** practice that must end.

**What did the Verma Committee say on the two-finger test:**

- The committee had recommended tougher laws for such cases and **ban of the two-finger test** as this **test has no bearing on a case of sexual assault**.
- Moreover, on the basis of this **test observations** such as '**habituated to sexual intercourse' should not be made and this is forbidden by law**.

### 2. Enabling NRI, Migrants to vote

**Context:**

- Recently in the context of a **petition filed in SC**, the union government has replied suggesting that it is **considering ways to facilitate non-resident Indians and migrant laborers** to cast their **votes remotely.**
- A bench of **Chief Justice of India UU Lalit and Justice Bela M Trivedi** was hearing the plea.

**Who are Non-Resident Indians (NRI):**

- NRI means a person **resident outside India** who is a **citizen of India** or is a **person of Indian origin**.
- An Indian citizen **residing outside India** for a combined **total of at least 183 days** in a **financial year** is considered to be an **NRI**.
- NRIs **enjoy voting rights** and are **required to pay** and **file the income tax return on their Indian income like resident Indians.**

**Who qualifies as an NRI voter:**

- A citizen of India, who is absent from the country owing to employment, education etc and has **not acquired citizenship of any other country** and is otherwise **eligible to be registered as a voter** in the **address mentioned in its passport** qualifies as **a NRI voter.**
- According to the provisions of **Section 20A of the Representation of People Act, 1950**, a **NRI settled in a foreign land can become an elector** in the **electoral roll in India.**

**What is the Current Voting Process for Overseas Voters in Indian elections:**

- **Voting rights for NRIs** were **introduced only in 2011**, through an **amendment to the Representation of the People Act 1950.**
- It is after this amendment that the **eligible NRIs were allowed to vote**, but **only in person at the polling station** where they have **been enrolled as an overseas elector.**
- An **NRI can vote** in the constituency in his **place of residence**, as **mentioned in the passport.**
- He **can only vote in person** and **will have to produce her passport in original** at the **polling station** for establishing identity.

**What are the recent steps taken by Government:**

- In the **Winter Session of the Parliament in 2017**, the government **proposed to remove the restriction imposed by Section 20A** of the Representation of the People Act.
- The Bill was **later passed in 2018** but **lapsed with the dissolution of the 16th Lok Sabha.**
- The Bill **provided for overseas voters to be able to appoint a proxy** to **cast their votes on their behalf,** subject to **conditions laid down in the Conduct of Election Rules, 1961.**
- **Section 20A** of the Representation of the People Act **required them to be physically present to vote in their constituencies.** The **ECI then approached** the government **to permit NRIs** to **vote via postal ballots.**

### 3. Posco act override Muslim personal law

**Context:** The Karnataka High Court has observed that special enactments like the Protection of Children from Sexual Offences Act (POCSO) and the Indian Penal
Code prevailed personal laws when it came to cases related to sexual activities.

- **What is Muslim personal law:**
  a. **All the Muslims** in India are governed by the **Muslim Personal Law (Shariat) Application Act, 1937.**
  b. This law deals with **marriage, succession, inheritance and charities** among Muslims.
  c. The **Dissolution of Muslim Marriages Act, 1939** deals with the **circumstances in which Muslim women can obtain divorce** and the **rights of Muslim women who have been divorced** by their husband.
- **In what ways is Muslim Law Applied in India:**
  a. In **1937**, the **Muslim Personal Law (Shariat) Application Act** was **created by Britisher** with the intention of **creating an Islamic legal system** for Muslims in India.
  b. In deciding which **laws applied to Hindus and which applied to Muslims,** clear **proof of usage will outweigh the written content of the law** in the **case of Hindus.** On the other hand, the **writings in the Quran would be of utmost significance to Muslims.**
- **What are the Personal Laws of Other Religions:**
  a. The **Hindu Succession Act of 1956** lays out **guidelines for property inheritance among Hindus, Buddhists, Jains and Sikhs.**
  b. **The Parsi Marriage and Divorce Act of 1936** lays out **rules to be followed by the Parsis according to their religious traditions.**
  c. **The Hindu Marriage Act of 1955** had **codified laws related to marriage among Hindus.**

**4. Hindus as minority**

**Context: Govt seek time in SC**

**Background:**

There is a petition in the SC which has relied on the Supreme Court's landmark 2002 decision in the **TMA Pai case**, have cast doubts on the legal sanctity of the consultation process, saying that after the ruling in the case, the Centre cannot notify anyone as minority anymore and, therefore, whatever deliberations it may be holding under the National Commission for Minorities Act, 1992 **"cannot confirm minority status to anybody in a state".**

- **1993** Government notification issued under **Section 2(c) of the National Minorities Commission (NCM) Act** declared **Muslims, Christians, Sikhs, Buddhists and Parsis as 'minority'**. **Jains** were also **added to the list in 2014**.
- **A petition was moved** by an advocate Ashwini Upadhyay in the SC in 2017 which said **Hindus**, though they **are minority in six states (Punjab, Mizoram, Nagaland, Meghalaya, Manipur, Arunachal Pradesh) and two UTs (J & K, Lakshadweep)**, as per 2011 Census were **not added in the list**.
- The SC asked him to approach the NCM which took the stand that it "does not have the jurisdiction to deal with the prayer…"and that under Section 2(c) of the NCM Act, **only the centre can declare a community as a 'minority'**.
- The **petitioner contended** that **minority status should be on the basis of state wise population** and **decision must be made at the state level** and not at the national level because this is not letting the Hindus to avail welfare schemes meant for minorities in these states.
- However, the Supreme Court ruled that **languages are restricted state wise but religion is beyond all borders,** especially political borders. Thus, **religion needs to be considered on a pan-India basis** and not state-wise.
- The case was again moved in 2019 by the advocate but the new CJI assumed the office. So, the matter is due for listening to once more on March 28 2022.

**What have courts said on the subject?**

- **TMA PAI:** In 'TMA Pai', an 11-judge bench of the Supreme Court **dealt with the question of the scope of right of minorities** to establish and administer educational institutions of their choice under the Constitution.
  a. A majority ruling by six judges in 2002 referred to two other cases pertaining to the DAV College in Punjab, in which the SC had to consider whether Hindus were a religious minority in the State of Punjab. It said, "**In DAV College v. State of Punjab [1971]**…the question posed was as to what constituted a religious or linguistic minority, and how it was to be determined. After examining the opinion of this Court in the Kerala Education Bill case [1958], the Court held that the Arya Samajis, who **were Hindus, were a religious minority in the State of Punjab, even though they may not have been so in relation to the entire country.**
  b. "In another case, DAV College Bhatinda v. State of Punjab [1971]…the observations in the first DAV College case were explained, and at page 681, it was stated that **"what constitutes a linguistic or religious minority must be judged in relation to the State in as much as the impugned Act was a State Act and not in relation to the whole of India**."
  c. "This Court rejected the contention that since Hindus were a majority in India, they could not be a religious minority in the State of Punjab, as it took the State as the unit to determine whether the Hindus were a minority community. There can, therefore, be little doubt that this Court has consistently held that the unit to determine a religious or linguistic minority can only be the State."
- **BAL PATIL:** In 2005, the SC in its judgment in 'Bal Patil' referred to the TMA Pai ruling, and said: "After the verdict in the eleven judges' Bench in TMA Pai Foundation case (supra), the legal position stands **clarified that henceforth the unit for determining status of both linguistic and religious minorities would be 'state'**….If, therefore, the State has to be regarded

as the unit for determining "linguistic minority" vis-a-vis Article 30, then with "religious minority" being on the same footing, it is the State in relation to which the majority or minority status will have to be determined.

a. "The minority for the purpose of Article 30 cannot have different meanings depending upon who is legislating. **Language being the basis for the establishment of different States for the purposes of Article 30, a "linguistic minority" will have to be determined in relation to the State** in which the educational institution is sought to be established. The position with regard to the religious minority is similar, since both religious and linguistic minorities have been put on a par in Article 30."

**Concept:**

- Currently, the **linguistic minorities** are identified on a state-wise basis thus **determined by the state government** whereas **religious minorities** are determined by the **Central Government.**
- A **linguistic minority** is a group of people whose mother tongue is different from that of the majority in the state or part of a state.

**What are the Constitutional Provisions for Minority?**

- **Article 29:**
    a. It provides that any section of the citizens residing in any part of India having a distinct language, script or culture of its own, **shall have the right to conserve the same.**
    b. It grants **protection to both religious minorities as well as linguistic minorities.**
    c. However, the SC held that the scope of this article is not necessarily restricted to minorities only, as use of the word **'section of citizens' in the Article includes minorities as well as the majority.**
- **Article 30:**
    d. All minorities shall have the **right to establish and administer educational institutions** of their choice.
    e. The protection **under Article 30 is confined only to minorities** (religious or linguistic) and does not extend to any section of citizens (as under Article 29).
- **Article 350-B:**
    a. The **7th Constitutional (Amendment) Act 1956** inserted this article which provides for a **Special Officer for Linguistic Minorities appointed by the President of India.**
    b. It would be the duty of the **Special Officer to investigate all matters relating to the safeguards provided for linguistic minorities** under the Constitution.
    c. He would **report to the President upon those matters at such intervals as the President may direct**. The President should **place all such reports before each House of Parliament and send them to the governments** of the states concerned
    d. The Constitution **does not specify the qualifications, tenure, salaries and allowances, service conditions and procedure for removal of the Special Officer for Linguistic Minorities**

**5. Consent of accused is must to get password Delhi HC**

**Context-**

- Recently the Delhi court had ordered the CBI not to compel the accused to provide a computer password.
- **What is the issue:**
    - Special Judge **Naresh Kumar Laka** had **dismissed the CBI application,** observing that the man is **protected by Article 20(3)** of the Constitution of India as well as **Section 161(2) of CrPC**
    - An investigating officer in a CBI case **has no right to be provided with the computer password** of the accused **without his consent** since it may interfere with his right to privacy.
- **What are the legal aspects?**
    - **Article 20(3)** of the **Constitution** provides that **no person accused of any offence shall be compelled to be a witness against himself.**
    - **Section 161 (2)** of the **CrPC** stipulates that **no person shall answer questions which would** tend to **expose him to a criminal charge or to a penalty or forfeiture.**
- **What is the difference between the laws governing obtaining of evidence in the US and India?**
    - In India, the law on the **point of appreciation of evidence**, which **has been obtained illegally, is different from the US**.
    - In the USA, **if an evidence is obtained by illegal means**,it **cannot be relied on in court of law** based on the **doctrine of 'fruit of the poisoned tree'.**
    - Whereas in **India** if an **evidence is obtained by resorting to illegal means or by not following the established procedure of law**, it can **still be used** in certain circumstances.
- **What is the Criminal Procedure (Identification) Act 2022?**
    - The Act replaces the colonial-era **Identification of Prisoners Act, 1920.**
    - The new law **allows investigators** to **collect certain identifiable information of convicts and other persons** for purposes of identification and investigation in criminal matters.
    - It provides for a **legal sanction** to the police **to take physical and biological samples** of convicts as well as those accused of crimes.
    - It **empowers police to collect Finger-impressions, Palm-Print** impressions, **Footprint** impressions, **Photographs, Iris and Retina scan, Physical, Biological** samples and their analysis, **Behavioural Attributes** including **signatures, Handwriting** or any other examination

- The law also **empowers the National Crime Records Bureau** to **store, preserve, share with any law enforcement agency** and destroy the record of measurements at the national level.
- The **records** can be stored up to a **period of 75 years.**
- Under the act, **a Magistrate may direct** a **person** to **give details** for the purpose of an **investigation** or proceeding under the CrPC.

**6. Ela Bhatt and the SEWA movement**

**Context-** Elaben Bhatt, The Gandhian, SEWA founder, and women's empowerment activist dies.

- **Who was Ela Bhatt:**
  - She was known as the **"Gentle Revolutionary"** who changed the lives of lakhs of women through her organisation, providing **them with microloans** for five decades.
  - She **founded** the **Self-Employed Women's Association (SEWA)** in **1972**
  - She also **headed** the **women's wing** of **Majoor Mahajan Sangh**-the **Textile Labour Association founded by Anasuya Sarabhai and Mahatma Gandhi.**
  - She was the **chairperson of the Sabarmati Ashram Memorial and Preservation Trust,** also **co-founded** the **Women's World Banking,** a global **network of microfinance organisations**,of which **she was chairperson from 1984 to 1988.**
  - She was also **nominated to Rajya Sabha,** and was a **member of the Planning Commission**.
  - She had also acted as an **advisor** to organisations like the **World Bank.**
  - In **2007,** she joined the **Elders**, a **group of world leaders founded by Nelson Mandela** to promote human rights and peace.
  - She was a prodigious wri**ter who penned in Anasuya, our Gujarati newsletter,** a play on street vendors. One of her famous books was **We are Poor but We are Many.**
  - She was a **recipient of the Padma Bhushan, Ramon Magsaysay Award and Indira Gandhi International Prize for Peace** among many other awards.

**What is SEWA:**

- The full form of SEWA is **the Self-Employed Women's Association**.
- It was founded by Ela Bhatt **in 1972** as a b**ranch of Textile Labour Association** a labour union **founded by Gandhi in 1918**
- It is a **trade union based** in **Ahmedabad** India, that **promotes the rights of low-income, independently employed female workers** and is one of the **largest organizations** of informal workers in the world.

**7. Unified District Information System for Education Plus (UDISE) 2021-22 Report**

**Context:** The Ministry of Education has released a detailed report recently on Unified District Information System for Education Plus (UDISE+) 2021-22 on school education of India.

**What is UDISE+:**

- It is one of the **largest Management Information Systems** on **school education and** was **launched in 2018-2019** to **speed up data entry, reduce errors, improve data quality and ease its verification.**
- It is an **application to collect the school details** about factors related to a school and its resources.
- It is an updated and **improved version of UDISE**, which was **initiated in 2012-13** by the Ministry of Education.
- It covers more than **1.49 million schools, more than 9.5 million teachers** and more than **265 million children.**
- It helps **measure the education parameters** from **classes 1 to 12** in government and private schools across India.
- In **UDISE+ 2021-22**, **additional data** on important indicators like **digital library, peer learning, hard spot identification, number of books available in school library,** etc have been **collected for the first time** to align with the National Education Policy 2020 initiatives.

**What UDISE+ School Data Capture:**

- UDISE+ has the **mandate of collecting information** from **all schools imparting formal education from Classes I to XII.**
- In UDISE+ **school acts as the unit of data collection and district as the unit of data distribution.**
- It collects **information on school profile, physical infrastructure, teachers, enrolments, examination results** through an **online Data Collection Form (DCF).**
- The **DCF is divided into eleven sections** and each section contains multiple questions to capture various performance indicators of the school.

**What is in the latest report:**

- According to the report, **Gross Enrolment Ratio** has **improved at primary, upper primary, and higher secondary levels** of school education in 2021-22 as compared to 2020-21.
- **GER in higher secondary schools** has made a **significant improvement** from **53.8 percent in 2021-21 to 57.6 percent in 2021-22.**
- In **2021-22**, the **Pupil Teacher Ratio** stood at **26 for primary, 19 for upper primary, 18 for secondary, and 27 for higher secondary** showing an **improvement** since 2018-19.
- In 2021-22, over **12.29 crore girls are enrolled in primary to higher secondary** showing an in**crease of 8.19 lakh** as compared to the enrolment of girls in 2020-21.

- More than **20,000 schools were closed across** the country **during 2020-21 while** the **number of teachers** also **declined by 1.95%** in comparison to the previous year.
- It pointed out that only **44.85% of schools** had **computer facilities** while nearly **34% had internet connection.**
- While **only 27% schools** have **special toilets for children** with special needs while more than **49% of them have ramps with handrails**

**8. Performance Grading Index (PGI) for 2020-21**

**Context:**

- The **Ministry of Education** has recently **released** the **Performance Grading Index** for **States and Union Territories for 2020-21.**

**What is Performance Grading Index (PGI)?**

- The Performance Grading Index (PGI) is a **unique index for evidence-based comprehensive analysis** of the school education system in India.
- **The Department of School Education and Literacy,** Ministry of Education has **initiated** this index to **promote evidence-based policymaking and highlight course correction to ensure quality education for all.**
- It **assesses states** performance in school education **based on data drawn** from several sources including the –
  - **Unified District Information System for Education Plus,**
  - **National Achievement Survey,**
  - **Mid-Day Meal.**
- The Education Ministry released the **first PGI in 2019** for the **reference year 2017-18.**

**What is the methodology used?**

- PGI 2020-21 **classified the States and UTs** into **ten grades** of which the **highest achievable Grade is Level 1** for the **states scoring more than 950 points out of a total of 1000 points.**
- The **lowest grade is Level 10** which is for a **score below 551.**
- The PGI structure **comprises 1000 points** across **70 indicators grouped into 2 categories** viz.,
  - Outcomes,
  - Governance Management
- These categories are **further divided into 5 domains**, viz.,
  - Learning Outcomes
  - Access
  - Infrastructure and Facilities
  - Equity
  - Governance Process.

**About Performance Grading Index (PGI) 2020-2021?**

- As per the report, **no state or union territory** managed to attain the **highest achievable grade of level I** as a score **above 950** was required.
- **Punjab shared top honours with Kerala and Maharashtra** as all three states have **scored 928 out of a total of 1,000 points** to make it to **Level II (901-950)** of the annual grading index.
- Apart from the above three states, f**our new states have been listed in Level II of the index for the first time.** These **four states and UTs are Gujarat, Chandigarh, Rajasthan and Andhra Pradesh.**
- The **newly formed UT Ladakh** has made **significant improvement** in PGI from **Level 8 to Level 4** in 2020-21 and **improved its score by 299 points** in 2020-21 as compared to 2019-20 resulting in the **highest ever improvement in a single year.**
- The **inter-state disparity in school education** in India has **reduced** in the last four years.

**9. Remote voting: On postal ballot for NRIs**

**Context:**

1. India has the largest diaspora population, with nearly 1.35 crore non-resident Indians spread across the globe.
2. They work in another country thus they miss out on voting in India.
3. Currently, the **Election Commission of India (ECI)** allows **enrolled overseas citizens** to vote in person at the **polling station** in the constituency where the person is **registered as an overseas elector.**
4. So, if you want to vote you have to come in person and vote. This is a disincentive. For e.g. in the 2019 Lok Sabha election — only 25,606 came forward to vote out of 99,844 registered electors.
5. In 2014, a committee constituted by the ECI to probe **methods to enable overseas voters'** concluded that **proxy voting** was the most viable, though some political parties objected to the idea.
6. In 2020, the ECI approached the Government to **permit NRIs to vote via postal ballots**, similar to the system already **used by service voters**, i.e**., the Electronically Transmitted Postal Ballot System (ETPBS),** which allows registering their mandate on a **downloaded ETPB** and **sending it to the returning officer of the constituency.**

**What is postal voting?**

Postal voting is voting in an election where ballot papers are distributed to electors (and typically returned) by post, in contrast to electors voting in person at a polling station or electronically via an electronic voting system.

**Electronically Transmitted Postal Ballot System (ETPBS)**

The Electronically Transmitted Postal Ballot System (ETPBS) is a secured system for Service Voters to cast their vote on an electronically received postal ballot, from anywhere outside their constituency, thus reducing the chances of losing the voting opportunity.

It was developed for the convenience of Service voters

**Who is a Service Voter?**

Persons working in Central Forces under Arms Act and Government officials deployed in Embassies outside the country are classified as Service Voters and are provisioned for online enrolment.

**10. Redact sensitive portion': Supreme Court gives a way out of sealed cover affidavits**

**Context and issue:**

**Issue**: Government regularly files for sealed cover material in the Supreme court without showing it to the general public, particularly the petitioner.

- In matters **involving national security**, the Supreme Court has recommended an alternative to habitually filing documents in sealed covers.
- The court ruled that the government might redact the **private information and provide the petitioners with the rest**. This would take care of the petitioners' "**right to know**" as well as the state's worries about "**national security**."
- In the recent case SC was hearing the **appeal of the telecast ban** against **Kerala-based Media One TV**. The **government desired** to transmit its **confidential documents behind a sealed cover**. It refused to divulge the information to the media organisation whose security clearance was terminated in January for **reasons of "national security and public order**," without providing any other information.
- The media company **contended** that submitting information to the court under secrecy would force the **judges to accept the state's account**, even in situations **where** the petitioners' fundamental rights are at risk and the **government's story is being contested**.
- The court has previously **allowed sealed covers**, despite efforts to **adopt the idea of "open court"** through live-streaming hearings.
    - In situations including the procurement of **Rafale jets**, **the Bhima Koregaon** case, the **Assam National Register of Citizens**, the Board of Control for Cricket in India, and P. Chidambaram's anticipatory bail request, sealed covers were without hesitation allowed and **even requested**. In certain instances, sealed cover even attained the **stature of due procedure**.
- The habitual handing on of sealed coverings, according to **the opposing viewpoint**, is an **affront to natural justice**. Numerous judgments stress the importance of the right to information as a component of the freedom of speech and expression. A democracy that pledges openness and accountability must unavoidably recognise the right of the person to information. The state cannot be allowed to "take away these rights impliedly or in a careless or cavalier manner."

**Supreme Court Cases:**

1. **In Anuradha Bhasin**, the court said **sensitive portions** in government records "**can be redacted or such** material can be claimed as **privileged**, if the state justifies such redaction on the grounds, as allowed under the law".
2. In **the Ram Jethmalani case judgment**, the court said the state is **obliged to disclose information** in cases in which petitioners seek the **protection of fundamental rights.**
3. In the **P. Chidambaram case,** the court **held** that "it would be **against the concept of fair trial** if in every case the prosecution presents documents in sealed cover.

**What are Open Courts?**

- The Open court principle requires that court proceedings presumptively be open and **accessible to the public and to the media.**
- Open courts are normal court where proceedings of the court are conducted where every person is allowed to watch the proceedings of the court.
- There are instances where it is **not practical to accommodate persons** other than parties to the proceedings. Therefore, such proceedings are **held in camera.**
- This means that the proceedings are held in a **closed room** where the public will not have access to watch the proceedings.
- In criminal **cases like rape,** it is necessary to protect the identity and modesty of the victim.

**Article 142 of the Indian Constitution**

- Article 142 allows the Supreme Court to pass any order necessary to do "complete justice" in any case.
- It supplements the powers already conferred upon the Supreme Court under the Constitution to guarantee that justice is done and in doing so the Court is not restrained by lack of jurisdiction or authority of law.
- The phrase 'complete justice' engrafted in Article 142(1) is the word of wide interpretation to meet situations created by legal errors or result of operation of statute law or law.
- Thus Article 142 is conceived to give the apex court the powers to meet the situations which cannot be effectively tackled by existing provisions of law.

**CONCEPT OF NATURAL JUSTICE**

Natural Justice implies fairness, reasonableness, equity and equality. Natural Justice is a concept of Common Law and it is the Common Law world counterpart of the American concept of 'procedural due process'. Natural Justice represents higher procedural principles developed by judges which every administrative agency must follow in taking any decision adversely affecting the rights of a private individual.

**Two Principles of Natural Justice**

There are mainly two Principles of Natural Justice. These two Principles are:

1. '**Nemo judex in causa sua'**. No one should be made **a judge in his own** cause, and the rule against bias.
2. '**Audi alteram partem'** means to hear the other party, or no one should be condemned unheard.

**11. Election Commission proposal for reducing cash expenditure limit for candidates from ₹10,000 to ₹2,000**

**Context:**

- Recently the Election Commission has **proposed reducing** the amount a candidate contesting polls can **pay in cash** for **campaign-related expenditure** from the **existing Rs 10,000 to Rs 2,000** to make their transactions more transparent.

**What is the proposal of the Election Commission?**

- In the proposal submitted to the government recently, **the poll panel recommended** that the **Conduct of Election Rules** should be **amended** to **ensure that all cash payments** in **excess of ₹2,000** made to a person or entity **for election-related expenses** are made **either through account payee cheques or online and digital means.**

**What was the method followed till now?**

- As of now, **the candidates** have to **ensure that** all payments in **excess of ₹10,000** are **made by cheque, draft or bank transfer** through a **bank account opened exclusively** for the purpose of **election expenditure.**
- Candidates have to **open a separate bank** account **exclusively for election expenditure purposes**, at **least one day before filing of nomination.**
- Candidates **also have to maintain day-to-day accounts, cash book and bank book from the date of filing of nomination to the date of declaration of results (both dates inclusive).**
- They have to **include all expenses incurred** on the **date of filing of nomination as well.**
- A **candidate** has to **submit the election expenditure account to the District Election Officer** (DEO) **within 30 days** of the **declaration of the poll results**.

**What is election expenditure limit and rules regarding it?**

- It is the **amount an election candidat**e can **legally spend** for their election campaign and **has to account** for, which **includes expenses on public meetings, rallies, advertisements, posters, banners, vehicles and advertisements**.
- The **expenditure limit** for **candidates for Lok Sabha** constituencies had been **increased** from **Rs 54 lakh-Rs 70 lakh** to **Rs 70 lakh-Rs 95 lakh**, the limit for **Assembly constituencies** was hiked from **Rs 20 lakh-Rs 28 lakh to Rs 28 lakh- Rs 40 lakh.**
- Under **Section 77 of the Representation of the People Act 1951**, every **candidate shall keep a separate** and c**orrect account of all expenditure incurred** between the date on which they have been nominated and the date of declaration of the result and are required to **submit their expenditure statement to the ECI within 30 days** of the completion of the elections.
- An **incorrect account or expenditure beyond the cap** can lead to **disqualification of the candidate by the ECI** for up to **three years, under Section 10A of RPA, 1951.**

There is **no cap on a political party's expenditure**. However, **all registered political parties** have to **submit a statement of their election expenditure** to **the ECI within 90 days** of the completion of the elections.

**12. Quota for general poor gets court seal**

**Context:** A **five-judge** constitution bench of the **Supreme Court**, by a **3-2 majority,** upheld the **validity of 103rd Constitutional Amendment Act, 2019.**

**What were the major issues in front of the apex court:**

There were **three main issues** in the case:

- Whether the **103rd Constitution Amendment is violative of basic structure** for providing reservation solely on the basis of economic criteria.
- Whether the **amendment is violative of basic structure for excluding the poor among the SC/ST/OBC** categories from EWS Quota.
- Whether the **amendment is violative of the basic structure for breaching the 50% ceiling limit.**

**What is EWS Reservation?**

- **Reservation for Economically Weaker Sections** (EWS) of the society was granted based on the recommendations of a commission **headed by Major General (retd) S R Sinho.**
- The **Commissio**n was **constituted** by the then **Union government in 2005, and submitted its report in 2010.**
- The 103rd Constitutional Amendment Act, 2019 **added Clause (6) to Article 15** of the Constitution to give the **government the authority to make special provisions for the EWS** among citizens **who are not already eligible for reservation.**
- It was **enacted to promote the welfare of the poor not covered by the 50% reservation policy** for Scheduled Castes (SCs), Scheduled Tribes (STs) and Other Backward Classes (OBCs).

- The Act **allows up to 10 per cent reservation in public and private educational institutions,** whether **aided or unaided**, with the **exception of minority-run institutions.**
- The Act also **added Clause (6) to Article 16** of the Constitution to make **employment reservations easier.**
    - Article 16 of the Indian Constitution **guarantees equal opportunity to all** citizens in matters related to employment in the public sector.

**What are the eligibility criteria for EWS reservation?**

- Candidate's **annual family income** must be **less than Rs. 8 lakhs** per annum,
- Their family must **not own more than 5 acres of agriculture land**,
- The **residential flat area should be below 1000 sq. ft.,**
- The **residential plot's area** should be **below 100 square yards** if in a **notified municipality sector,**
- The residential plot's area should be **below 200 square yards** if in a **non-notified municipality sector.**

**What is Supreme court judgement:**

- By a majority of **3:2**, a **five-judge Bench of the Supreme Court** has **upheld** the **validity of the 103rd Constitution Amendment**.
- The amendment was challenged, based on the argument that the **103rd amendment violated the "basic structure" of the Constitution.**
- Three judges, **Justices Dinesh Maheshwari, Bela Trivedi, and S B Pardiwala, have upheld the validity** of the **103rd amendment**.
- **Justice Dinesh Maheshwari** has ruled that **reservation based only on economic criteria does not violate the basic structure** of the Constitution.He also **added** that the **exclusion of classes covered in Article 15(4) and 16(4)** that is OBCs and SC/STs in the **103rd amendment does not damage the basic structure.**
- **Justice Bela Trivedi** ruled that treating **EWS as a separate class** would be a reasonable classification, and that **treating unequal equally would violate the principle of equality under the Constitution.75 years after independence**, it was **time to revisit the system of reservation** in the larger interest of society.
- **Justice S B Pardiwala** observed that **"Reservation is not an end, it is means, it should not be allowed to become a vested interest"**.
- The **dissenting judgement** has come from **Justice S Ravindra Bhat and Chief Justice of India U U Lalit.**
- **Justice Bhat** has ruled that **while reservation on economic criteria is per se not violative of the Constitution, excluding SC/ST/OBC from the purview of EWS is violative of basic structure** and has **struck down Articles 15(6) and 16(6) for being discriminatory** and violative of the equality code.
- **CJI U U Lalit** said he **concurs entirely** with the **judgment** of Justice Bhat.

**13. Guidelines for Uplinking and Downlinking of Television Channels in India, 2022**

**Context:** Recently, the Union Cabinet has **approved the new guidelines for the up-linking and downlinking of television** channels in India.

**What are the highlights of the Order:**

- It has been **directed to all the Telecast stations** holding permission to **broadcast content on issues** of **national importance and social relevance for at least 30 minutes every day.**
- The provision has been **introduced as 'airwaves/frequencies' are public property** and need to be used in the best interest of society.
- The **eight listed themes** include;
    - Education and spread of literacy,
    - Agriculture and rural development,
    - Health and family welfare,
    - Science and technology,
    - The welfare of women,
    - The welfare of the weaker sections of society,
    - Protection of the environment and of cultural heritage,
    - National integration.

**What are the exceptions:**

- For the **foreign channels**,
- The **channels include those related to sports,** where it would not be feasible to broadcast such content.

**Who will be the Decision-making Authority**:

- As and when required, the Centre would issue general advisories to the channels in this regard.

**What does Up linking-downlinking mean:**

- In satellite telecommunication, **a downlink is a link from a satellite down to one or more ground stations** or receivers, and **an uplink is a link from a ground station up to a satellite.**

**14. Why has ESMA derecognised six Indian central counterparties**

**Context:**

The EU's financial markets regulator and supervisor, the **European Securities and Markets Authority (ESMA**), had de-recognised **six of India's central counterparties (CCPs)** in accordance with the **European Market Infrastructure Regulation.**

**Who are the six of India's central counterparties (CCPs)?**

- Clearing Corporation of India (CCIL)
- Indian Clearing Corporation Ltd (ICCL)
- NSE Clearing Ltd (NSCCL)
- Multi Commodity Exchange Clearing (MCXCCL)
- India International Clearing Corporation (IFSC) Ltd (IICC)
- NSE IFSC Clearing Corporation (NICCL)

**What's the role of CCP:**

- CCPs perform **two main functions as the intermediary** in a market transaction
    1. **Clearing and settlement**
    2. **Guarantee** the terms of a trade.
- CCP is a **system provider,** who by way of novation **interposes between system participants in the transactions** admitted for settlement, thereby becoming the **buyer to every seller and the seller to every buyer,** for the purpose of effecting settlement of their transactions.
- A CCP is **authorised by the RBI** to **operate in India under Payment and Settlement Systems Act, 2007.**

**What's the reason for derecognition:**

- The **decision to derecognise Indian CCPs** came due to **'no cooperation arrangements' between the ESMA and Indian regulators** i.e. **the Reserve Bank of India (RBI), the Securities and Exchange Board of India (SEBI) and the International Financial Services Centres Authority (IFSCA).**
- As per the **European Market Infrastructure Regulations (EMIR)**, a CCP in a third country **can provide clearing services to European banks only if it is recognized by the ESMA.**
- The **ESMA wants to supervise these CCPs**, which the **Indian regulators are not in favour.**

**What timeline has ESMA given:**

- The EU regulator will **defer the application** of the withdrawal decisions **until April 30, 2023** to **mitigate the adverse impact of the move on EU market participants.**

**How will the derecognition impact European banks:**

- **Third country CCPs (TC-CCPs)** will **no longer be able to provide services** to **clearing members and trading venues established in the EU**.
- Some of the **major European banks** dealing in the domestic forex, forward, swap and equities and commodities markets include **Societe Generale, Deutsche Bank and BNP Paribas** will **not be able to provide clearing and settlement facilities to their clients.**

They will **also have to set aside additional capital to trade** in the domestic market. Of the **total foreign portfolio investors (FPI) registered in India**, close to **20 per cent are from Europe.**

**15. Jharkhand Assembly raises quota to 77%.**

**Context:**

- Jharkhand Assembly Passes Bill to Use 1932 Land Records to Determine Domicile Status
- Moreover, a bill to raise the total reservation to various categories to 77% was also passed.

**What is the issue:**

- The **Jharkhand Assembly,** at a **special session** on Friday, **unanimously cleared two Bills,**
    1. One increasing reservation in vacant government posts and services in the state to **77%**.
    2. Second, using **land records with 1932 as the cut-off year to determine domicile status** and who among the people fit the definition of local residents.
- The Bills will come into force **only after the Centre carries out amendments** to include these in the **Ninth Schedule**, putting it beyond judicial scrutiny.
- The **first Bill**, '**Jharkhand Reservation of Vacancies in Posts and Services (Amendment) Bill, 2022',** raised reservation **from 60% to 77%**. Within the reserved category, the **Scheduled Castes will get a quota of 12%**, up from 10%; **27% for OBCs,** up from 14%; **28% for Scheduled Tribes,** a 2% increase; and **10% for Economically Weaker Sections.**
- The reservation will **not apply to admissions in government-run universities or colleges.**
- The **second Bill**, **'Jharkhand Definition of Local Persons** and **for Extending the Consequential, Social, Cultural and Other Benefits to Such Local Persons Bill, 2022',** is aimed at **granting local residents "certain rights, benefits, and preferential treatment" over their land;** in their stake in local development of rivers, lakes, fisheries; in local traditional and cultural and commercial enterprises; in rights over agricultural indebtedness or availing agricultural loans; in maintenance and protection of land records; for their social security; in employment in private and public sector; and, for trade and commerce in the state.
- The Bill states that the **definition of local persons, on the basis of the '1932 khatiyan',** is based on **"living conditions, customs and the traditions and social development"** of the **"Moolvasis and people from tribal community"**

**What is some Constitutional provision involved?**

- **Article 15(4) - Empowers the state** to make **special laws for Scheduled Castes, Scheduled Tribes and Other Backward Classes.**
- **Article 16(4A)** - Reservation in **matters of promotion to any class** or classes of posts in the **services under the State in favour of SCs/STs, which are not adequately represented** in the services under the State.

- **Article 46** - The State shall **promote with special care the educational and economic interests of the weaker sections of the people,** and, in particular, of the Scheduled Castes and the Scheduled Tribes, and to **protect them from social injustice and all forms of exploitation.**
- **Article 335** -The claims of the members of the **Scheduled Castes and the Scheduled Tribes shall be taken into consideration**, consistently with the maintenance of **efficiency of administration,** in the making of appointments to services and posts in connection with the affairs of the Union or of a State.
- **Article 341 and 342-** Define as to **who would be Scheduled Castes and Scheduled Tribes with respect to any State or Union Territory**
- **Some famous Supreme Court Judgements.**
  - **State of Madras v. Champakam Dorairajan (1951):** -Court ruled that **caste-based reservations as per Communal Award violate Article 15(1)** of the constitution
  - **Indra Sawhney & Others v. Union of India (1993):** - The Supreme Court in a **9 judge bench verdict while upholding the 27 % quota for backward classes**, **struck down the government notification reserving 10% governmen**t jobs for **economically backward** classes among the higher castes. The court also **upheld the principle that the combined reservation beneficiaries should not exceed 50%**. Moreover, the **concept of 'creamy layer' was introduced in the obc reservation.**
  - **M. Nagraj & Others v. Union of India and Others (2006)**: - Upheld the **77th constitutional amendments which inserted Articles 16(4A) and 16(4B),**
  - **Jarnail Singh vs Lachhmi Narain Gupta (2018):** - Supreme Court holds that **reservation in promotions does not require the state to collect quantifiable data** on the backwardness of the Scheduled Castes and the Scheduled Tribes.

**Adherence of the Limit by the States**:

- Many states have **passed the law breaching the limit of 50%** as set by Indra Sawhney judgement such as **Maharashtra, Telangana, Tamil Nadu, Haryana and Chhattisgarh Rajasthan and Madhya Pradesh.**
- The apex court has **decided to look into Tamil Nadu's 69% quota law**.But the **69% quota in the state pre-dates the Indra Sawhney judgement.**

**16. Higher Education Commission of India (HECI)**

- It will subsume the **University Grants Commission (UGC)** and All India Council for Technical Education (**AICTE)**, is likely to have **extensive penal powers**, with the government considering to authorise it to **impose fine of up to Rs 5 crore** and also proceed against the heads of institutions found to have committed violations.
- **the UGC,** which is the **apex regulatory body** on **higher education (non-technical),** can impose a maximum fine of Rs 1,000 for violations, including setting up of fake universities, under an Act which was **drawn up in 1956**
- **HECI Bill is being drafted by the Ministry of Education for tabling during the Winter Session of Parliament.**
- HECI will have the proposed 15-member body apart from the chairperson and the vice-chairperson, it is likely to include a vice-chancellor of a central university, higher education secretary, finance secretary, a legal expert, and a reputed individual from the industry.
- It is also likely to stipulate the presence of at **least one state university vice-chancello**r and two professors from the state higher education councils.
- The 2018 **draft Bill had no provision** for representation from the **states in the commission,** which was criticised by many.
- **the new Bill has** a clause, like its old version, which gives the Centre powers to remove the chairperson, vice-chairperson or any other member of the commission even on **grounds of "moral turpitude",** However the new bill also added that the removals can be effected only after an inquiry **by a sitting Supreme Court Judge.**
- The provisions in the Bill are being aligned with the National Education Policy, 2020, which had recommended that medical and legal education be kept out of the proposed HECI's ambit under which general, technical, teacher, vocational and other professional education will come.
- The commission will have **four independent verticals** — National Higher Education Regulatory Council, National Accreditation Council, Higher Education Grants Council and General Education Council, which will be headed by **one president each**.

- the HECI will be entrusted with developing an **integrated roadmap** for the future of **higher education in India** and transforming existing higher education institutions into **large multidisciplinary units and research universities.**

**The National Higher Education Regulatory Council**

- shall handle action against institutions that do not meet accreditation standards and violate other norms, monitor financial, administrative impropriety, and tackle grievances of stakeholders.

**The National Accreditation Council**:

- will develop the **process of accreditation**.

**The Higher Education Grants Council**

- will develop a **transparent criterion** for funding the **higher educational institutions**, take charge of grants, scholarships etc.

**17. 2021 Census of India**

The 2021 Census of India, also the **16th Indian Census**, is intended to be carried **out in 2023**. In April 2019, a data user conference was held and it was announced that 330,000 enumerators would be enlisted and that they would be encouraged **to use their own smart phones**, although a paper option will also be available, which the enumerators will then need to submit electronically.

**The 15th Indian Census** taken in 2011, attempted to estimate the population based on Socio-Economic and Caste Status for the first time since 1931. However, as the enumeration was based on recording the respondents' declaration, it led to creation of hundreds of thousands of caste/subcaste categories.

**For the 16th Indian census**, the government is instead considering enumeration based on a list of **educationally or socially disadvantaged castes** (known as Other Backward Class) reported by each state. However, in February 2020, the Indian government rejected the **demand for OBC data** as part **of the 2021 census.**

**History**

- The first Census in India was conducted during a span of 8 years, starting from 1865 and ending in 1872. This was done non-synchronously in various parts of India. As the process reached its final point in 1872, this year has been labelled as the first Indian population census year. However, in India, the first synchronous population census was held in the year 1881.
- The last Census in India was held in 2011. This happened to be the 15th Indian Census. This included two phases, namely, the house listing and the population enumeration. According to the 2011 census, Uttar Pradesh was found to be the most populated state in India. It had a population count of 199,812,341, covering 16.51% of the overall Indian population.
- In this Census, Sikkim was found to be the least populated state in India, with a population count of 610,577, covering 0.05% of the overall Indian population.

**Caste Census: The Need for More data for better targeted welfare policy**

- While in the case of the Dalits and the STs, the quotas are **proportionate to their population** as gathered in census exercises conducted every 10 years, **the reservation for OBCs is not** based on their share in the population of India.
- **OBC quota was fixed at 27** per cent as it was the available space to keep the reservation cap at 50 per cent. The Mandal Commission had estimated the OBC population at 52 per cent.
- The parties demanding **caste census claim** that **so-called upper castes** have occupied disproportionate share in **jobs** and **access** to higher education.
- India is a parliamentary democracy which means a form of government in which political control is exercised **by all the people**, either directly or through their **elected representatives**.
- When we Say **all the people** it should include **so far as possible** all the section of society reflecting the **social reality of a country**. If a democracy is being run by only few homogenous groups of people, then it is not a democracy rather it is an oligarchy.
- The last caste census data gathered and published corresponds to Census 1931. The last census conducted by the British colonial government in 1941 collected caste data but did not publish the figures. After Independence, Census 1951, the government collected and published caste data of only SCs and STs.
- the Narendra Modi government told the supreme court that the **policy of caste census** was reversed in **1951** by the first government of Independent India headed by Jawaharlal Nehru.
- However, the **Manmohan Singh government** decided to collect **caste date in Census 2011** as part of **Socio-Economic Caste Census (SECC) but the data was never released**.

**WHY CASTE CENSUS IS IMPORTANT?**

- The absence of fresh caste census data means that the caste estimates of 1931 are being projected for formulating welfare policies in 2021. A caste census is likely to table a fresh and updated data set for policymaking.
- The NSSO (National Sample Survey Organisation) surveys have provided different estimates between 1999 and 2007, varying from about 36 per cent to 45 per cent for OBCs.

**18. Next door to Delhi, a 'bank' to store the country's digitised biological data**

**Context-**

- The government has for the **first time set up a digitised repository** where **Indian researchers will store biological data from publicly funded research,** reducing their dependency on American and European data banks.

**About 'Indian Biological Data Bank'-**

- It has come up at the **Regional Centre for Biotechnology** in **Faridabad.**
- It will be **stored on a four-petabyte [A petabyte equals 10,00,000 gigabytes (GB)] supercomputer** called **'Brahm'.**
- The government has mandated that **data from all publicly funded research** should be stored in this central repository.
- The **bio-bank,** which costs about **Rs 85 crore** to set up, **currently accepts nucleotide sequences** — the **digitised genetic makeup of humans, plants, animals, and microbes.**
- The biobank also has a **backup data 'Disaster Recovery' site** at **National Informatics Centre (NIC)-Bhubaneshwar.**

**Types of data stored in the Bio-Bank-**

- The database currently **offers two mechanisms for data submission** to researchers.
- One, **open access** where the data uploaded can be immediately used by other researchers from across the country and two, **controlled access** where the data will not be openly shared for a number of years before being opened up to all.
- There are now **200 billion base pair data** in the **bio-bank**, including **200 human genomes sequenced under the '1,000 Genome Project'**, which is an **international effort to map the genetic variations** in people.

- The project will also focus on populations that are predisposed to certain diseases.
- The **database** contains-
    - most of the **2.6 lakh Sars-Cov-2 genomes sequenced** by the Indian **Sars-CoV-2 Genomic Consortium (INSACOG).**
        - The government learnt from this data that the **Omicron sub-variant BA.2.75** was being overtaken by a **recombinant variant XBB** — which is a combination of **two Omicron sub-lineages, BJ.1 and BA.2.75.**
    - **25,000 sequences of mycobacterium tuberculosis** that another national consortium is trying to sequence.
    - **Genomic sequences of crops** such as **rice, onion, tomatoes and mustard,** among others.
    - With genomes of **humans, animals,** and **microbes** present in the same database, it will also help researchers in **studying zoonotic diseases**.
- Although the database currently only accepts such **genomic sequences**, it is likely to expand later to the **storage of protein sequences** – strings of amino acids that join together to form various proteins found in these organisms – and **imaging data** such as **copies of Ultrasound and MRI.**

**Significance-**

- Such databases have traditionally played a key role in determining the genetic basis of various diseases and finding targets for vaccines and therapeutics.
- It will provide a platform for researchers to securely store their data within the country
- It will also provide access to a large database of **indigenous sequences for analyses.**
- At present, most Indian researchers **depend on the European Molecular Biology Laboratory (EMBL)** and **National Center for Biotechnology Information databases** for storing biological data.
- There are **other smaller datasets** available with some institutes, but those are not accessible to all.
- The **Indian phenotype** is very **different** and solutions based on others' data might not be optimal.
- Moreover, India can even provide our data to Western countries.

**19. Forced conversions dangerous, may affect nation's security**

**Context:**

- The **Supreme Court** in its judgement on a **petition filed** by **Advocate Ashwini Upadhyay** seeking directions to the Centre and states to take **stringent steps to check such conversions** said that **"forced" religious conversions are "very dangerous" and may "affect the security of the nation** and **freedom of religion and conscience"** and asked the Centre to step in and make "very serious and sincere efforts" to tackle the issue.

**What is the issue:**

- A **petition was filed** by **Advocate Ashwini Upadhyay** seeking directions to the Centre and states to take **stringent steps to check forced conversions.**
- In response to the petition, the Supreme Court **instructed the Center** to file a response by November 22, and posted the matter for hearing on November 28.
- The **plea pointed** out that in the **1977** ruling in the **Rev Stainislaus versus State of Madhya Pradesh** case, the **Supreme Court had said** "It has to be remembered that Article 25(1) guarantees 'freedom of conscience' to every citizen, and not merely to the followers of one particular religion and that, in turn, postulates that **there is no fundamental right to convert another person to one's own religion.**

**Did India have anti-conversion laws in the past:**

- Princely states **headed by Hindu royal families** were the **first to introduce laws restricting religious conversions** during the British colonial era, especially during the latter half of the 1930s and 1940s.
- These laws were **enacted to preserve Hindu religious identity** amid British's domination.
- There were **over dozens of Princely** states with such laws, including **Kota, Bikaner, Jodhpur, Raigarh, Patna, Surguja, Udaipur and Kalahandi.**
- **Independent India** also **witnessed the introduction of anti-conversion bills** in the Parliament, though **none was implemented** due to the lack of political support.
- In **2015**, the **Union law ministry** stated that a law against forced and fraudulent conversions cannot be created at the national level since **law and order is a state subject under the Indian Constitution.**
- This means that the **state governments have the power to enact such laws**.

**What is the Status of Anti-Conversion Laws in India:**

- **Constitutional Provision:** The Indian Constitution under **Article 25** guarantees the **freedom to profess, propagate, and practise religion**, and allows all religious sections to manage their own affairs in matters of religion; subject to public order, morality, and health. However, **no person shall force their religious beliefs** and consequently, **no person should be forced to practice any religion against their wishes.**
- **Existing Laws:** There has been **no central legislation restricting** or regulating religious conversions. However, **since 1954**, on multiple occasions, Private Member Bills have been introduced in (but never approved by) the Parliament, to regulate religious conversions. Over the years, **several states** have enacted **'Freedom of Religion'** legislation to **restrict religious conversions** carried out by force, fraud, or inducements.

**Which are the states that currently have anti-conversion laws:**

- Freedom of Religion laws are currently enforced in ten states i.e. **Odisha, Madhya Pradesh, Arunachal Pradesh, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Uttarakhand, Uttar Pradesh and Jharkhand.**

**What are some Supreme Court Judgements on Marriage and Conversion:**

- **Hadiya Judgement 2017:**
  - Matters of **dress and of food, of ideas and ideologies,** of love and partnership, are within the central aspects of identity.
  - **Neither the State nor the law** can dictate a **choice of partners** or limit the free ability of every person to decide on these matters.
  - The principle that the **right to marry a person of one's choice is integral to Article 21.**
- The Supreme Court of India, in both the **Lily Thomas and Sarla Mudgal cases**, has confirmed that **religious conversions carried out without a bonafide belief** and for the sole purpose of deriving some legal benefits **do not hold water.**
- **Salamat Ansari-Priyanka Kharwar case** of **Allahabad High Court 2020:** The **right to choose a partner** or live with a person of choice was **part of a citizen's fundamental right to life and liberty** (Article 21).
- **Puttaswamy or 'privacy' Judgment 2017: Autonomy of the individual** was the ability to **make decisions** in vital matters of concern to life.

**20. SC issues notice to HCs on plea for setting up of 'Gram Nyayalayas'**

**Context:**

- The Supreme Court has recently sought a **response from all high courts** on a **2019 plea** seeking a **direction to the Centre and all states** for **taking steps to set up 'Gram Nyayalayas'** under the **supervision** of the top court.

**What is the issue:**

- The petition was filed by NGO **National Federation of Societies for Fast Justice** in 2019 said **sections 5 and 6 of the 2008 Act** provided that the **state government in consultation with the high court will appoint** a **'Nyayadhikari' for each 'Gram Nyayalaya',** who will be a **person eligible to be appointed as a judicial magistrate of the First Class.**
- The top **court had in 2020 directed the states**, which **had not notified** 'Gram Nyayalayas', to do so in four weeks, and **asked high courts to expedite the process of consultation with state governments** on the issue.
- Despite a direction from the t**op court in 2020, many states have yet not taken any action.**

**What is Gram Nyayalaya?**

- Gram Nyayalayas or **village courts** are established under the **Gram Nyayalayas Act, 2008** for speedy and easy access to the justice system in the rural areas of India.
- The Act came into **force from 2nd October 2009.**

**What is the Jurisdiction of Gram Nyayalaya?**

- A Gram Nyayalaya has jurisdiction **over an area specified by a notification by the State Government** in **consultation** with the **respective High Court**.
- The Court can function as a **mobile court** at any place within the jurisdiction of such Gram Nyayalaya, after giving wide publicity to that regard.
- The Gram Nyayalaya shall be **established for every Panchayat** at the intermediate level or a **group of contiguous Panchayats** at the intermediate level in a district.
- The **seat of the Gram Nyayalaya will be located at the headquarters of the intermediate Panchayat,** they will go to villages, work there and dispose of the cases.
- They have both **civil and criminal jurisdiction** over the offences.
- The Gram Nyayalayas have been given **power to accept certain evidence** which would **otherwise not be acceptable under Indian Evidence Act.**
- Gram Nyayalayas **allow for conciliation** of the dispute and settlement of the same in the **first instance**.

**What is the process of appeal?**

- Appeal in **criminal cases shall lie to the Court of Session**, which shall be heard and **disposed of within a period of six months** from the **date of filing** of such appeal.
- Appeal in **civil cases shall lie to the District Court,** which shall be heard and **disposed of within a period of six months** from the date of filing of the appeal.

**21. People in public office should not blabber disparaging things**

**Context:**

- The Supreme Court reserved its **judgment** on **whether free speech by public functionaries, including inter alia ministers, MLAs, MPs**, should have **greater restrictions** than those imposed by **Article 19 (2).**
- The Five-Judge Constitution Bench consisting of Justices **S A Nazeer, B R Gavai, A S Bopanna, V Ramasubramanian and B V Nagarathna** gave this verdict.

**What was the verdict of the bench:**

- People holding public office should **exercise self-restriction** and **not blabber things** which are **disparaging or insulting to other countrymen.**
- There is **no need to formulate a separate code of conduct for public functionaries.**
- There is always a **civil remedy available to citizens** on account of a public functionary making a speech that affects someone.

- Irrespective of what **Article 19(2) may say**, there is a **constitutional culture in the country** where there is an **inherent limitation** or a **restriction on what people holding responsible positions say.**

**What is Article 19(2) of the constitution:**

- **Article 19 (2)** relates to the **powers of the State to make laws imposing reasonable restrictions** on the exercise of the **right to freedom of speech and expression in the interest of sovereignty** and integrity of the country, public order, decency, morality etc.

**What are some important Judgements on Freedom of Speech vs. Hate comments:**

- **Rangila Rasool case:**
- Rangila Rasool was a tract **brought out by a Hindu publisher** that had made **disparaging remarks about the Prophet's private life**.
- Cases against the **first pamphlet, filed under Section 153A,** were **dismissed by the Punjab and Haryana High Court,** which examined the question whether **targeting religious figures is different from targeting religions.**
- This debate in interpretation **prompted the colonial government to enact Section 295A** with a wider scope to address these issues.

**Ramji Lal Modi v State of Uttar Pradesh:**

- The Supreme Court **upheld the law on the grounds that it was brought in to preserve "public order"**. The constitutionality of **Section 295A** was challenged.
- **Public order is an exemption to the fundamental right** to freedom of speech and expression and the right to religion recognised by the Constitution.

**Ramlal Puri v State of Madhya Pradesh:**

- In **1973,** the Supreme Court said the **test to be applied is whether the speech in question offends the "ordinary man of common sense" and not the "hypersensitive man".**
- However, these **determinations are made by the court** and the distinction can often be vague and vary from one judge to the other.

**Baragur Ramachandrappa v State of Karnataka:**

- A **2007** decision of the **Supreme Court, "a pragmatic approach" was invoked in interpreting Section 295A.**
- The **state government had issued a notification** banning **Dharmakaarana, a Kannada novel** on the **ground that it was hate speech,** invoking a gamut of provisions including Section 295A.

**22. India abstains from UN vote against Russia**

**Context:**

- India **abstained in the UN General Assembly** on a **draft resolution** seeking to **hold Russia accountable** for **violations of international law** by its invasion of Ukraine and requiring it to **pay reparations for damage, loss and injury resulting from the war.**

**What was the resolution all about;**

- The draft resolution, **"Furtherance of remedy and reparation for aggression against Ukraine" was introduced by Ukraine**, was **adopted** on in the **193-member UN General Assembly**.
- **94 voted in favour, 14 against and 73 remain absent,** including **India, Bangladesh, Bhutan, Brazil, Egypt, Indonesia, Israel, Nepal, Pakistan, South Africa and Sri Lanka.**
- **Belarus, China, Cuba, North Korea, Iran, Russia and Syria voted against the resolution**.

**What was India Explanation:**

- India, in its explanation of the vote, **questioned whether reparations would contribute towards efforts at resolving the conflict** and **cautioned against**

**precedents.**

- Moreover, th**e legal validity of such a process by a General Assembly resolution remains unclear.**

**Are UNGA resolution binding on the members:**

- **Except concerning UN budgetary matters** and **instructions to lower UN bodies**, General Assembly **resolutions are non-binding**.
- The resolutions are the **expression of member states' views, and are not legally binding upon member states**.

**23. Immunity against action for MP and MLA SC appoints amicus Curiae**

**Context:**

- The Supreme Court on Tuesday appointed senior advocate P S Patwalia as amicus curiae to assist it in examining whether an MP or MLA can claim immunity from criminal prosecution for taking bribe to make a speech or vote in the Legislative Assembly or Parliament

**What is the issue:**

- In **2019**, a **bench headed by** then chief justice **Ranjan Gogoi** and comprising **Justices S. Abdul Nazeer and Sanjiv Khanna** had **referred this question to a five-judge bench, the crucial question**, noting it had "**wide ramification" and was of "substantial public importance".**
- The three-judge bench had then **said it will revisit its 24-year-old verdict in the sensational Jharkhand Mukti Morcha (JMM) bribery cas**e on an **appeal filed by Sita Soren**, a JMM MLA from **Jama constituency in Jharkhand**.

- The **top court, in its 1998 five-judge constitution bench verdict** delivered in the **V. Narasimha Rao versus CBI case,** had held that **parliamentarians had immunity under the Constitution against criminal prosecution for any speech made and vote cast inside the house.**

**What are the privileges of Members of Parliament?**

- Parliamentary privileges are **special rights, immunities and exemptions enjoyed by the two Houses of Parliament,** their committees and their members.
- These privileges are **defined in Article 105** of the **Indian Constitution.**
- Under these privileges, **the members of Parliament are exempted from any civil liability but not criminal liability for any statement made or act done in the course of their duties.**
- The privileges are **claimed only when the person is a member of the house**.
- As soon as the **membership ends** the **privileges are said to be called off.**
- **Parliament has not made any special law** to **exhaustively codify** all the privileges. They are rather **based on five sources**:
    - Constitutional provisions
    - Various laws made by Parliament
    - Rules of both the Houses
    - Parliamentary conventions
    - Judicial interpretations

**What are some privileges enjoying the member of Parliament?**

- **Freedom of Speech in Parliament:**
    - It has been **guaranteed under Article 105(1)** of the Indian constitution. But **freedom is subject to rules and orders** which regulate the proceedings of the parliament.
    - Freedom of speech **should be in accordance with the constitutional provisions** and **subject to rules and procedures of the parliament**, as stated under **Article 118** of the Constitution.
    - Under **Article 121** of the Constitution, the **members of the parliament are restricted from discussing the conduct of the judges of the Supreme Court and the High Court.**
- **Freedom from Arrest:**
    - The members **enjoy freedom from arrest in any civil case 40 days before and after the adjournment of the house** and **also when the house is in session.**
    - **No membe**r can be **arrested from the limits of the parliament without the permission of the house** to which he/she belongs so that there is no hindrance in performing their duties.
    - If the **detention of any members of the parliament is made, the chairman or the speaker should be informed** by the concerned authority, of the **reason for the arrest.**
    - But a **member can be arrested outside the limits of the house on criminal charges** against him under the **Preventive Detention act, the Essential Services Maintenance Act , the National Security Act ,** or any such act.
- **Right to Prohibit the Publication of Proceedings:**
    - **Article 105(2)** of the Constitution states that **no person shall be held liable for publishing any reports, discussions etc. of the house** under the authority of the member of the house.
    - For **paramount and national importance,** it is essential that the proceedings should be **communicated to the public to make them aware** of what is going on in the parliament.
- **Right to Exclude Strangers:**
    - The **members of the house** have the **power and right to exclude strangers** who are **not members of the house** from the proceedings.
- **What are some key rulings on the privileges:**
    - **Dr Zakir Hussain case (1966)**: In 1966 by Dr Zakir Hussain it **mentioned that Members of Parliament do enjoy certain privileges so that they can perform their duties.**
    - **K Anandan Nambiar and another:** The Supreme Court of India held that the **true Constitutional position is that so far as a valid order of detention** is **concerned,** a **Member of Parliament can claim no special status higher than that of an ordinary citizen** and is as **much liable to be arrested, detained or questioned even during the Session.**
    - **State of Kerala Vs K. Ajith and Others:** The Supreme Court observed that **"privileges and immunities are not gateways to claim exemptions from the general law of the land**, particularly as in this case, **the criminal law which governs the action of every citizen.**

**24. Assam police open fire near Meghalaya border**

**Context:**

- Recently, **Five Meghalaya villagers were among six people killed** in a clash between a mob and a contingent of police and forest guards from Assam in pursuit of a truck allegedly smuggling timber across the inter-state border.

**What is Assam-Meghalaya border dispute?**

- During British rule, **undivided Assam included present-day Nagaland, Arunachal Pradesh, Meghalaya and Mizoram.**
- **Meghalaya** was **carved out of Assam** under the **North-Eastern Areas (Reorganization) Act, 1971.**

- Due to **different interpretations of this act**, it was challenged by both the parties which led to the boundary dispute between these two states.
- As a result, both sides have a **longstanding dispute in 12 stretches of the 884-km-long shared border.**
- The Assam-Meghalaya border dispute are the areas of **Upper Tarabari, Gazang reserve forest, Hahim, Langpih, Borduar, Boklapara, Nongwah, Matamur, Khanapara-Pilangkata, Deshdemoreah Block I and Block II, Khanduli and Retacherra.**
- A **major point of contention** between Assam and Meghalaya is the **district of Langpih in West Garo Hills bordering the Kamrup district of Assam**.
- **Langpih** was part of the **Kamrup district** during the **British colonial period** but post-Independence, it **became part of the Garo Hills and Meghalaya.**
- **Assam considers** it to be part of the **Mikir Hills in Assam**.
- **Meghalaya has questioned Blocks I and II of the Mikir Hills** now Karbi Anglong region being part of Assam. **Meghalaya says** these were parts of **erstwhile United Khasi and Jaintia Hills districts**.

**What are the efforts to resolve the dispute?**

- The two States had in June 2021 adopted a give-and-take policy to start the process of resolving the boundary dispute.
- For this, they constituted **three regional committees** each.
- The **draft resolution, released in March 2022**, was prepared on the basis of the recommendations of these regional panels.

**What was Assam-Meghalaya Border Pact?**

- In March 2022, Assam and Meghalaya **partially resolved** a 50-year-old border dispute in **six of the 12 sectors** along their **884-km boundary.**
- The two governments had **taken up six of 12 disputed sectors in the first phase of discussions.**
- As per the agreement, **out of the disputed 36.79 sq. km land**, **Assam will get 18.51 sq. km of the disputed areas and Meghalaya will get the remaining 18.28 sq. km.**
- The **70% of the inter-State boundary** became dispute-free with the signing of the agreement.
- The **problem in the six other areas** will be resolved in the near future.
- In August, both the States **decided to form regional committees**.
- The **second round of discussions** was set to commence by the **end of this month**.

**25. State Support Mission**

**Context:**

States have approached the NITI Aayog to set up their own public policy institutions to boost development and drive inclusive growth.

**Details:**

- Rajasthan, Odisha, Chhattisgarh, Andhra Pradesh, Uttar Pradesh, Karnataka, Madhya Pradesh, Assam and Maharashtra -- have made requests to constitute state institutions for transformation, or SITs, along the lines of the National Institution for Transforming India (NITI) Aayog.

**State Support Mission**

- In July, NITI Aayog started a State Support Mission to **assist states prepare development strategies.**
- Under the mission, the **central body will be supporting states** to set up SITs or help the governments reform the role of planning departments.
- Initially, it aims for 8-10 states to set up such bodies, before reaching out to all by March 2023.
- As part of this, the **Maharashtra Institution for Transformation, or Mitra,** was set up along the lines of NITI Aayog.
- The move is in recognition of the fact that except for sectors like defence, railways and highways, the national gross domestic product (GDP) growth is an aggregation of states' rates of growth.
- SITs would prepare **States' development strategies.**
    - It would reorient state planning boards, prepare a blueprint to guide states in policy formulation, take up monitoring and evaluation of government policies and programmes, and suggest better technology or models for delivery of schemes.
- **Lateral entry of professionals** will be encouraged in SITs to undertake high-quality analytical work and policy recommendations.

**What is NITI Aayog:**

- NITI Aayog is a premiere policy think tank of the Government of India. It was established with the aim to achieve sustainable development goals by active involvement of state government in the planning process
- It was established in 2015 via an executive resolution by replacing the Planning Commission of India

**What is the composition of the NITI Aayog:**

- **Chairperson**: Prime Minister
- **Vice-Chairperson**: To be appointed by Prime-Minister.Equivalent to cabinet minister.
- **Governing Council**: Chief Ministers of all states and Governors of Union Territories.
- **Regional Council**: To address specific regional issues, Comprising Chief Ministers and Lt. Governors Chaired by the Prime Minister or his nominee.
- **Adhoc Membership:** 2 members in ex-officio capacity from leading Research institutions on rotational basis.

- **Ex-Officio membership**: Maximum four from the Union council of ministers to be nominated by the Prime minister.
- **Chief Executive Officer**: Appointed by Prime-minister for a fixed tenure, in rank of Secretary to Government of India.
- **Special Invitees:** Experts, Specialists with domain knowledge nominated by the Prime-minister

The Planning Commission was replaced with the NITI Aayog in January 2015, mainly as a think-tank for forging a national vision on development.
The Centre has since given the plan fund allocation powers to the Finance Ministry.

**26. Frame rules for fixing electricity tariff Supreme Court to state**
**Context:**

- The Supreme Court on Wednesday directed all the state electricity regulatory commissions to frame within three months rules under the Electricity Act-2003 on the terms and conditions for determination of tariff.

**What was the issue:**

- The order came as the court dismissed the appeal of Tata Power Company Limited Transmission, challenging the award of ₹7,000 crore Maharashtra Electricity Regulatory Commission transmission (MERC) contract to Adani Electricity Mumbai Infra Limited (AEMIL).
- The power company under Tata Group had **challenged the awarding of the infrastructure project without a tariff-based competitive bidding**.
- Tata Power was in the Supreme Court in **appeal against an order of the Appellate Tribunal for Electricity (APTEL).**
- The APTEL had on February 18 **dismissed the plea of TPC-T against the grant of electricity transmission license to AEMIL by MERC** in March 2021.
- The **MERC** had granted the **transmission license to AEMIL** for setting up a 1000 MW high voltage direct current link **between Kudus and Aarey station in Mumbai.**

**27. Supreme Court tweaks case listing process**
**Context:**

- The Supreme court had decided to tweak the listing process of cases.

**What is the new listing process:**

- Under the new scheme,**10 transfer petitions**, in which **notice has already been issued,** will be **listed at the top of the board** before the court on **all five days of the week**. This will be **followed by 10 bail matters.**
- Moreover, aroun**d seven fresh matters** will also be **listed on Tuesday, Wednesday and Thursday.**
- **Regular hearing matters** will now be **listed on Wednesday and Thursday**.
- **No regular hearing** matters will be **listed on Tuesday**.
- The **changes will come into effect** from **November 28**

**28. Civil Aviation Ministry notifies draft Aircraft Security Rules, 2022**
**Context:** The Ministry of Civil Aviation has notified the draft Aircraft Security Rules, 2022.
**What was the need for change:**

- The new rules will **supersede the Aircraft Security Rules, 2011** after **Parliament passed the Aircraft Amendment Act, 2020** in September 2020, **giving statutory powers to the Bureau of Civil Aviation Security (BCAS).**
- The primary **responsibilities of BCAS** include **laying down standards and measures** with respect to the **security of civil flights at international and domestic airports in India.**
- The **amendment in Parliament** was required after the **United Nations aviation watchdog, International Civil Aviation Organisation (ICAO), raised questions** about the **regulator's functioning without statutory powers.**
- **The Directorate General of Civil Aviation** is the **regulatory body** in the **field of Civil Aviation,** primarily dealing with **safety issues**. It is responsible for the **regulation of air transport.**

**29. Constitution Day**
**Context:** November 26 is the Constitution Day and India's Constitution has now endured for 73 years.
**Background:**

- The Constituent Assembly of India **adopted** the Indian Constitution on **November 26, 1949**, and it **came into effect on 26 January 1950**.
- India's Constitution making project took about 3 years from 1946 to 1949.
- The Government of India declared 26 November as Constitution Day in 2015 by a gazette notification.
- **2015** was the **125$^{th}$ birth anniversary of Ambedkar**, who played a key role in the drafting of the constitution. Previously this day was celebrated as **National Law Day**.
- **Sources of Inspiration** for our Constitution (as per **Rohit De, Legal Historian**) include:
    - **Tilak's Swaraj Bill of 1895**: Right to Free Speech, Free Press, Equality before Law
    - **Declaration of Rights of 1918**: INC demanded that civil and political rights to include the Right to Life and Liberty, Freedom of Press and Association.

- **Fundamental Rights and Economic Changes, Karachi Session of INC, 1931**: Political freedom must include economic freedom, ending of bonded and child labour, free primary education, labour welfare, protection of labour unions, women workers, minority rights, redistribution of resources etc.

- **Article 394** of the Constitution states that **Articles 5, 6, 7, 8, 9, 60, 324, 367, 379** and 394 came into force since the adoption of the Constitution on 26th November 1949 and the rest of the provisions on 26th January 1950.

**Constitution and Constitutionalism:**

- A constitution is a **body of fundamental principles** according to which **a state is constituted or governed**. It is the **document or set of documents** that has a set of rules and principles which as the basis of society is accepted by all. It **reflects the ideals of a society** shared by all and defines nature of social, legal and political system in a "STATE".

**What is a State?**
The state is a territorial society, the people living on a particular tract of land organized under a common governing body which has, if not a complete at any rate, a very special degree of authority over people.
**Components of State**:
1. Population
2. Territory
3. Government
4. Sovereignty

- On the other hand, the **Constitutionalism is an idea**. It is an idea which is traced generally to Political philosopher John Locke and it talks of **government can and should be legally limited in its powers**, and that its authority or legitimacy depends on it observing these limitations
- The significant difference between the Constitution and Constitutionalism is that the **limitation envisaged under the Constitutionalism is provided by the Constitution**. This means the **Constitution is just a document and it is the idea of Constitutionalism which enforces the true meaning, values of the Constitution.**
- Even an authoritarian state generally has some sort the Constitution. However, what is missing in these states is the Constitutionalism.

**Fundamental Values of the Constitution:**

The values expressed in the Preamble are expressed as objectives of the Constitution. These are: **sovereignty, socialism, secularism, democracy, republican character of Indian State, justice, liberty, equality, fraternity, human dignity and the unity and integrity of the Nation.**

**30. President and Prime Minister lauds women's role in drafting constitution**

**Context:** President says the Constitution gave a map for good governance and one of its most crucial features is separation of powers; Prime Minister says it is open, futuristic and visionary at the constitution day celebrations.

**Concept:**

- The Constitution Day celebration was organized by the **Supreme Court of India.**
- **November 26 is observed as Constitution Day**.
- It was the day on which the **Constituent Assembly adopted the Constitution in the year 1949.**
- The day has been c**elebrated as Constitution day since 2015**.
- Earlier it was observed as Law Day.
- President Droupadi Murmu urged the executive, judiciary, and legislature to evolve an effective dispute-resolution mechanism and mitigate the common man's plight.
- During the event, the Chief Justice of India highlighted the significance of technology in justice administration. He further stressed the need to have more representation from marginalized communities in the legal profession.

**Role of Women in drafting the constitution**

- The Constituent Assembly had fifteen women members.
- **Dakshayini Velayudhan** belonged to a marginalized community and made important interventions for protecting the rights of the oppressed classes.
- **Other Women members i**ncluded Durgabai Deshmukh, Hansa Mehta, Rajkumari Amrit Kaur,Kamla Chaudhary, Leela Roy, Malati Choudhary, Purnima Bannerjee, Renuka Roy, Sarojini Naidu, Sucheta Kriplani, Vijaylakshmi Pandit, and Annie Mascaren etc.
- **Hansaben Mehta,** one of them, also made a critical contribution to the drafting of the Universal Declaration of Human Rights.
- **Sarojini Naidu, Sucheta Kripalani, Durgabai Deshmukh** are the other women members who were already seasoned human rights campaigners at the international and national level.

**31. Unsolicited commercial communication (UCC)**

**Context:** The Telecom Regulatory Authority of India (Trai) said it is working on various technologies to detect pesky calls and messages along with a joint action plan with other regulators to curb financial fraud.

**Concept:**

**Unsolicited commercial communication (UCC) or pesky communication**

- UCC means any commercial communication that is **neither as per the consent nor as per registered preference of the recipient.**
- It does not include-any transactional message or transactional voice call; any service message or service voice call; any message or voice calls transmitted on the directions of the Central Government or the State Government or bodies established under the Constitution, when such communication is in Public Interest.
- It is a major source of inconvenience to the public and impinges on the privacy of individuals,
- In case **a consumer uses his/her telephone connection to send promotional messages, his telephone connection will be liable for disconnection** on the first complaint and his/her name and address may be blacklisted for a period of two years

**Telecom Commercial Communications Customer Preference Regulations 2018-**

- It replaced the Telecom Commercial Communications Customer Preference Regulations, 2010 .
- It was issued by the TRAI to provide a revised regulatory framework aimed at regulating 'unsolicited commercial communication' (UCC) in India.
- It aims to **create an ecosystem based on blockchain–to curb the menace of pesky calls and messages.**
- The regulation **mandates registration of all commercial promoters and telemarketers on a distributed ledger technology (DLT) platform** and seeks customer consent for promotional messages at a time and day of their choice.
- The new regulatory framework has devolved control and regulatory powers to access providers, who are now required to establish their own codes of practice (CoPs) to deal with UCC.
- It also provides for the use of cloud-based solutions for handling complaints, the registration of headers and preferences, and use of smart contracts for automated allocation of roles between entities in the commercial communication ecosystem.
- The technology-based solutions are required to be tested in regulatory sandboxes under the oversight of the TRAI.

**The Telecom Regulatory Authority of India (TRAI)**

- It was established on 20th February, 1997 by the Telecom Regulatory Authority of India Act, 1997.
- **Objectives of TRAI:**
    - TRAI's mission is to create and nurture conditions for growth of telecommunications in the country.
    - TRAI regulates telecom services including fixation/revision of tariffs for telecom services which were earlier vested in the Central Government.
    - It also aims to provide a fair and transparent policy environment which promotes a level playing field and facilitates fair competition.
- **Headquarters:** The head office of the Telecom Regulatory Authority of India (TRAI) is located at New Delhi.
- **Composition of TRAI**–The TRAI consists of a Chairperson, two whole-time members and two part-time members, all of which are appointed by the Government of India.
    - **Tenure of Members:** The Chairperson and other members shall hold their office for a term of three years or till the age of 65 years, whichever is earlier.
    - The Central Government may appoint one of the members of the Authority as the Vice-Chairperson of TRAI.
- **Functions:**
- The function of the TRAI is to make **recommendations on the following matters:**
    - Need for introduction of new service provider.
    - Revocation of license for non-compliance of terms and conditions of licence.
    - Measures to facilitate competition and promote efficiency in the operation of telecommunication services to facilitate their growth.
    - Technological improvements in the services provided by the service providers.
- The TRAI is also **responsible for discharging the following functions:**
    - Ensuring the compliance of terms and conditions of licence.
    - Ensuring the technical compatibility and effective interconnection between different service providers.
    - Laying down the standards of quality of service to be provided by the service providers.
    - Ensuring the quality of service and conducting the periodical surveys of such services.
    - Timely and officially notifying the rates at which the telecommunication services within India and outside India shall be provided under the TRAI Act, 1997.
- The **recommendations of the TRAI are not binding upon the Central Government.**
    - If the Central Government does not accept any recommendation of the TRAI or needs modifications, it refers the recommendation back to the Authority for its reconsideration.

**32. Sena name and symbol dispute**

**Context:** The Election Commission (EC) will hold its first hearing the Shiv Sena factions' dispute on December 12.

**What was the issue?**

- The **Election Commission of India (ECI) froze the well-known 'bow and arrow' election symbol of the Shiv Sena** until the competing claims for recognition by the two rival factions is decided.
- This was done to place **both the group on same level** for the purposes of the bye-elections,

**Source of ECI power with respect to symbol allotment:**

- **The Election Symbols (Reservation and Allotment) Order, 1968** empowers the Election Commission **to recognise political parties and allot symbols.**

- **Under Paragraph 15** of the Order, **it can decide disputes among rival group**s or sections of a recognised political party staking claim to its name and symbol.
- As per th**e Election Symbols (Reservation and Allotment) (Amendment) Order, 2017**, there are **two types of party symbols**
    - **Reserved**: -**Eight national parties and 64 state parties** across the country **have reserved symbols.**
    - **Free:** The Election Commission **also has a pool of nearly 200 free symbols** that are allotted to the **thousands of unrecognized regional parties** that pop up before elections

**How ECI Decides:**

- When there is **split** in a political party **outside the legislature**, then by **Para 15 of the Symbols Order, 1968,** when the **Commission is satisfied** that there are rival sections or groups of a recognised political party each of whom claims to be that party, then the Commission may decide that one such rival section or group or none of such rival sections or groups is that recognised political party.The **decision of the Commission shall be binding on all such rival sections or groups.**
- **For splits in registered but unrecognized parties**, the **EC usually advises the warring** factions to **resolve their differences internally or to approach the court.**
- **In 1997** a **new rule was introduced by ECI** under which **the splinter group of the party other than the group that got the party symbol had to register itself as a separate party, and could lay claim to national or state party status only on the basis of its performance in state or central elections after registration.**

**What used to happen before 1968:**

- Before 1968, the **EC issued notifications** and executive orders **under the Conduct of Election Rules, 1961.**

**Facts:**

- The **first case decided under the 1968 Order** was the **Congress split of 1969.**The party splited into the **Old Congress led by Nijalingappa** and the **New Congress led by Indira.**
- The **Old Congress retained the party symbol** of a **pair of bullocks carrying a yoke** the **breakaway faction** was given the **symbol of a cow with its calf**.

**33. Adani wins Dharavi slum redevelopment bid**

**Context:**

- The Adani Group emerged as the **highest bidder** for a project to **redevelop the slum cluster of Dharavi in Mumbai.**

**More about Dharavi:**

- Dharavi is famous as **one of the world's largest slums and is located** in the heart of India's financial capital Mumbai.
- The Dharavi slum came into **being in 1884**.
- It was originally **inhabited by fisherfolk** when the area was still creeks and swamps.
- A city within a city, is one unending stretch of narrow dirty lanes, open sewers and cramped huts.
- It became **attractive to migrant workers from South Mumbai** and others when the swamp began to fill in due to natural and artificial causes.

**What is Dharavi Redevelopment Project?**

- The state had **envisaged** this sprawl be transformed into a **cluster of high-rises** with **improved urban infrastructure.**
- It entailed **resettling 68,000 people**, including slum dwellers and those with commercial establishments.
- The **state was to provide 300-sqft houses for free** to residents with proof that their **slum structure was in existence before January 1, 2000**.
- The project was **initially mooted in 2004**, but never got off the ground due to various reasons.

**More about Slum Rehabilitation Authority:**

- The Government of Maharashtra has **launched a comprehensive slum rehabilitation scheme** by introducing an **innovative concept of using land as a resource and allowing incentive floor space index (FSI)** in the form of tenements **for sale in the open market,** for cross-subsidization of the slum rehabilitation tenements which are to be provided free to the slum-dwellers.

**What is the jurisdiction of Slum Rehabilitation Authority:**

- As per the provision **3A (1) of Chapter I-A of Maharashtra Slum Areas** (Improvement, Clearance and Redevelopment) **Act, 1971** State Government of Maharashtra and through necessary **statutory amendments has established Slum Rehabilitation Authority (SRA),** Mumbai to **serve as Planning Authority for all Slum areas in the jurisdiction of Municipal Corporation of Greater Mumbai**.
- Subsequently the area of the **Thane Municipal Corporation has been added in the jurisdiction of SRA.**

**What are different government initiative to manage slums:**

- **National Slum Development Programme (NSDP)**: Initiated in **1996**, NSDP provided **both loans and subsidies** to **states for slum rehabilitation projects** on the **basis of their urban slum population**.
- **Valmiki Ambedkar Malina Basti Awas Yozana (VAMBAY)**: Introduced in **2001**, it **focused on shelter for the urban poor**, with **20% of total allocation for community sanitation facilities under the Nirmal Bharat Abhiyan** program
- **Basic Services to the Urban Poor (BSUP):** BSUP was an important **component** of **Jawaharlal Nehru National Urban Renewal Mission**. BSUP aimed to **provide basic services to urban poor in 63 of the largest cities in India by population**

- **Integrated Housing & Slum Development Programme (IHSDP)**: Integrated Housing & Slum Development Programme (IHSDP) was **launched by GoI** by **merging the schemes of NSDP and VAMBAY**. The objective of the scheme is **to provide adequate Shelter and basic infrastructure facilities** to the slum dwellers in urban areas.
- **Interest Subsidy Scheme for Housing the Urban Poor (ISHUP):** The Scheme envisages the **provision of interest subsidy** to economically weak section and Low-income groups to enable them to buy or construct houses.
- **Rajiv Awas Yojana (RAY)**: Launched in **2013**, the scheme focussed on bringing **existing slums within the formal system** and **enabling them to avail of the same level of basic amenities as the rest of the town;** redressing the failures of the formal system that lie behind the creation of slums and tackling the shortages of urban land and housing that keep shelter out of reach of the urban poor.
- **Pradhan Mantri Awas Yojana- "Housing for All (Urban)**: Launched in **2015,** the scheme seeks to **provide central assistance to implementing agencies through States and UTs** for providing **houses to all beneficiaries by 2022**. It incorporates the following:
    - **In-situ slum rehabilitation** with **participation of private developers** using l**and as a resource**. This approach **aims to leverage the locked potential of land under slums** to provide **houses to the eligible slum dwellers** bringing them into the formal urban settlement.
    - **Promotion of Affordable Housing** for weaker section through credit linked subsidy
    - Affordable Housing in **Partnership with Public & Private Sectors**
    - **Subsidy for beneficiary** led individual house construction/enhancement
- **Slum areas (Improvement and Clearance) Act, in the year 1956**: The act **aimed at mechanical improvement or complete eradication of slums.** It **empowers the competent authority** to **declare any slum area in accordance with the definition, look into possibilities** of improvement or eradicate slums.

**34. SC junks PIL seeking doubling of judges' numbers in HCs, district courts**

**Context:**

- The Supreme Court **refused to entertain a PIL** seeking **doubling of the number of judges in all the 25 high courts and subordinate courts** across India, saying getting more judges was not the panacea for all evils.

**What was the judgement of the Supreme Court:**

- A Bench led by Chief Justice of India DY Chandrachud noted tha**t populist measures and simplistic solutions were unlikely to resolve such issues**.
- The court **permitted Upadhyay** to withdraw th**e PIL with a liberty to file a fresh one with proper research on statistics on recruitment, vacancies,** etc in the **lower judiciary.**

**Who has the power to increase the strength of judges in various high courts.**

- The **Parliament** is **competent authority to increase the number of judges** if it deems necessary.
- In **2019** the **Parliament** increased the **strength of the Supreme Court of India from 31 to 34** through **The Supreme Court (Number of Judges) Amendment Bill, 2019.**
- The **Supreme Court (Number of Judges) Act, 1956** was **amended in 2009 to increase the judge's strength from 25 to 31 (including the CJI).**
- As per the **Article 124(1)** of the Constitution of India, **the strength of the Supreme Court is fixed by the law made by the Parliament.**

## INTERNATIONAL RELATIONS

### 1. Ethiopia and Tigray agree to end Civil war

**Context-**

Recently the **parties in the conflict in Ethiopia's northern region of Tigray have agreed to cease hostilities** and **end civil war**. The Mediation was led by the **African Union Mediator Olusegun Obasanjo.**

**Some facts about Ethiopia:**

- It is a **landlocked country** located in the **Horn of Africa**, officially known as the **Federal Democratic Republic of Ethiopia.**
- The country **lies completely within the tropical latitude**s and is relatively compact, with similar north-south and east-west dimensions.
- The capital of Ethiopia is **Addis Ababa.**
- It is the **tenth-largest country** in **Africa** in terms of area.
- It is the **most populous landlocked country in the world.**
- The neighbouring countries of Ethiopia are Sudan in the southeast, Eritrea to the south, Djibouti and Somalia to the west, Kenya to the north, and South Sudan to the east.
- Ethiopia has more than **70 ethnic groups** which major are **Oromo** (34.5%), **Amhara** (26.91%), **Somali** (6.20%), **Tigre (**6.07%)

**What was the Conflict in Ethiopia?**

- Ethiopia's northernmost region is Tigray which is ahome to the majority of Eritrea's estimated 7 million ethnic Tigrayans, who have disproportionate power in national affairs.
- The provincial administration, **commanded by the Tigray People's Liberation Front (TPLF)**, a **Marxist political organisation**, mounted a full-scale siege of a vital Ethiopian military post at **Sero in early November,** employing tanks, heavy artillery, and mortars.

Ethiopian Prime Minister **Abiy Ahmed declared the TPLF assault a treason** and **authorised a federal onslaught** against the area, sparking the conflict.

**Tigray Region:**

- The Tigray Region is the northernmost of the nine regions (kililat) of Ethiopia.
- Tigray is the homeland of the Tigrayan, Irob and Kunama peoples.
- Tigray is also known as Region 1 according to the federal constitution.
- Its capital and largest city is Mekelle.
- Tigray is bordered by Eritrea to the north, Sudan to the west, the Amhara Region to the south and the Afar Region to the east and south east.

### 2. India abstains in UNSC on Russian motion on Ukraine 'bio weapons'

**Context:** India abstained on **Russia-sponsored draft resolution** at UNSC **for probe on Ukraine's alleged bio weapons.**

**What was the motion all about?**

- The motion sponsored by Russia sought to **establish a commission to investigate claims by Moscow** that the **US and Ukraine** are **carrying out military biological activities** in laboratories in Ukraine in **violation of the biological weapons convention.**
- The **resolution failed** to get adopted as **only two Council members Russia and China** voted in **its favour**, while the **US, the UK and France voted against it** and the **other Council members including India abstained** from voting.

**What was India stand:**

- The Counsellor **A. Amarnath from India's** Permanent Mission to the UN said that **India attaches high importance to the Biological Weapons Convention** which is the **first non-discriminatory disarmament treaty banning a complete category of weapons of mass destruction.**
- India also **reiterated the need to negotiate** a **comprehensive legally binding protocol** providing for an **effective, universal and non-discriminatory verification mechanism** to strengthen the implementation of the Convention.

**What is Biological Weapons Convention:**

- It was the **first multilateral disarmament treaty** banning an **entire category of weapons of mass destruction**.
- The Convention came **into force in 1975** and the Convention **was negotiated by the Conference of the Committee on Disarmament** in **Geneva,** Switzerland.
- The treaty **prohibits the development, production, acquisition, transfer, stockpiling and use of biological weapons.**
- It has **183 signatories**, including the **United States, Russia, and Ukraine.**
- **Ten states** have **neither signed nor ratified** the BWC i.e **Chad, Comoros, Djibouti, Eritrea, Israel, Kiribati, Micronesia, Namibia, South Sudan, and Tuvalu.**

**What are the Obligations of the treaty:**

- The treaty **prohibits the development, stockpile, production, or transfer of biological agents and toxins** of types and quantities that have **no justification for protective or peaceful use.**
- Furthermore, **the treaty bans** the **development of weapons, equipment** or delivery systems to disseminate such agents or toxins.
- The convention **stipulates that states shall cooperate bilaterally or multilaterally to solve compliance issues**.

### 3. What is the Black Sea Grain Initiative?

**Context:** Since **Russia's invasion** of Ukraine began, **exports of grain** from Ukraine, as well as food and fertilizers from Russia, have been **significantly hit**. The disruption in supplies pushed soaring prices even higher and contributed to a **global food crisis.** The **Black Sea Grain Initiative**, brokered by the **United Nations and Turkey**, was set up to reintroduce **vital food and fertilizer exports** from Ukraine to the **rest of the world**. Here are some key points to understand.

**A deal to get vital supplies moving again**

Ukraine, one of the **world's largest grain exporters (also called as breadbasket)**, normally supplies around **45 million tonnes of grain** to the global market every year but, following Russia's invasion of the country, in **late February 2022**, mountains of grains built up in silos, with ships unable to secure safe passage to and from **Ukrainian ports**, and land routes unable to compensate.

This contributed to a **jump in the price of staple foods** around the world. Combined with increases in the cost of energy, developing countries were **pushed to the brink of debt default** and increasing numbers of people found themselves on the **brink of famine.**

On 22 July, the **UN, the Russian Federation, Turkey** and **Ukraine** agreed the **Black Sea Grain Initiative**, at a signing ceremony in Turkey's largest city, **Istanbul**.

The deal allowed exports from Ukraine of grain, other foodstuffs, and fertilizer, including ammonia, to resume through a **safe maritime humanitarian corridor** from **three** *key Ukrainian ports*: **Chornomorsk**, **Odesa**, and **Yuzhny/Pivdennyi**, to the rest of the world.

To implement the deal, a **Joint Coordination Centre (JCC)** was established in Istanbul, comprising senior representatives from the Russian Federation, Turkey, Ukraine, and the United Nations.

**Supplies to World** –

- About **44% of the shipments**, which include corn, wheat, rapeseed, and sunflower oil among others, **reached high-income countries** (including Spain, Netherlands and Italy among others),
- **28% reached low and middle-income** countries (Egypt, Iran, Sudan and Kenya among others) and
- **27% reached upper-middle income** countries (Turkey, China and Bulgaria among others).

**Prelims Facts –**

1. Ukraine is among the **largest exporters of wheat**, maize, rapeseed, sunflower seeds and sunflower oil, globally.
2. The UN Food and Agricultural Organisation's (FAO)'s **Food Price Index**, assesses the monthly change in international prices of a basket of food commodities.

**International Food Policy and Research Institute (IFPRI)** –

The International Food Policy Research Institute (IFPRI) is an international agricultural research center founded in the **early 1970s** to improve the understanding of national agricultural and food policies to promote the adoption of **innovations in agricultural technology**.

- The **Global Food Policy Report** is one of IFPRI's flagship publications.
- In 1993 IFPRI introduced the **2020 Vision Initiative**, which aims at coordinating and supporting a debate among national governments, nongovernmental organizations, the private sector, international development institutions, and other elements of civil society to reach food security for all by 2020.
- IFPRI **produces the Global Hunger Index** (GHI) yearly measuring the progress and failure of individual countries and regions in the fight against hunger. The GHI is a collaboration **of IFPRI, the Welthungerhilfe, and Concern Worldwide.**
- IFPRI has produced the related **Hunger Index for the States of India (ISHI**) (2008) and the Sub-National Hunger Index for Ethiopia (2009)

### 4. Matera Declaration

In the Matera Declaration, the G20 ministers recognised that **poverty alleviation**, food security and sustainable food systems, are key to ending hunger.

On June 29 2021, the G20 foreign affairs and development ministers **signed** the Matera Declaration (named for the town in **southern Italy** where they met), which outlines an agenda for a**ddressing global food insecurity** and putting the world back on track to end hunger within the decade.

**What is PM-GKAY? - Pradhan Mantri Garib Kalyan Anna Yojana**

PMGKAY is a part of the **Pradhan Mantri Garib Kalyan Package (PMGKP)** to help the poor fight the battle against Covid-19.

- The scheme aimed at providing each person who is covered under the National Food Security Act 2013 with an additional 5 kg grains (wheat or rice) for free, in addition to the 5 kg of subsidised food grain already provided through the Public Distribution System (PDS).
- It was initially announced for a three-month period (April, May and June 2020), covering 80 crore ration cardholders. Later it was extended till September 2022.
- Its **nodal Ministry is the Ministry of Finance**.
- The benefit of the free ration can be availed through portability by any migrant labour or beneficiary under the **One Nation One Ration Card (ONORC)** plan from nearly 5 lakh ration shops across the country.

5. **PM Narendra Modi unveils logo, theme, site of G-20 presidency**

**Context:**

- India has unveiled **the logo, theme and website** for its **presidency of the G20,** which **reflects the country's message** and overarching priorities to the world.
- **India** will **assume the presidency** of the powerful **G20** grouping **from the current chair, Indonesia**, on **December 1,** and hold the **post for a year**.

**More about the logo:**

- The **G20 logo** created with the **four colors of India's national flag, comprises earth sitting atop a lotus.**
- The **seven petals in the logo signify the seven seas** and the **coming together of seven continents at G20 India 2023.**
- **The theme-'Vasudhaiva Kutumbakam: One Earth, One Family, and One Future'** reflects **India's pro-planet approach** to life and **from this and derives the theme of G20 India 2023**

**What is G20 Summit:**

- **G-20** was a **group of finance ministers** and **central bank governors from 19 individual countries and the European Union**.
- It was **established in 1999 and** was **elevated to a forum of Heads of Government in 2008** to effectively **respond to the global financial crisis of 2008.**
- G-20 is a forum, **not a legislative body** and its **agreements and decisions have no legal impact,** but they do influence countries' policies and global cooperation.
- G20 **does not have any permanent secretariat** or headquarters.
- The **G20 Summit** is formally known as the **"Summit on Financial Markets and the World Economy".**

**How G20 works:**

- Since the G20 **has no permanent secretariat**.The **agenda and work are coordinated by** representatives of the G20 countries, known as **'Sherpas**'.
- The **presidency of the G20 rotates every year among members**, and the country holding the presidency, together with the previous and next presidency-holder, forms the '**Troika'.**
- Troika **ensures continuity of the G20 agenda**.
- **During India's presidency**, **India, Indonesia and Brazil will form the troika.**

This would be the **first time when the troika would consist of three developing countries** and emerging economies.

**6. Defence agent Sanjay Bhandari's extradition cleared by a London court**

**Context:** A London court on Monday ordered extradition of businessman Sanjay Bhandari to India to face charges of tax evasion and money laundering.

**About extradition**

- Extradition is the **legal process** to transfer person from **one country to another who requires him/her to deal with for crimes of which they have been accused or convicted and are justifiable in the Courts** of the other State.
- In India it is governed under the **Indian Extradition Act, 1962**. This is for both extraditing of persons to India and from India to foreign countries.
- The **Consular, Passport & Visa (CPV) Division, Ministry of External Affairs**, Government of India is the Central/Nodal Authority that administers the Extradition Act and it processes incoming and outgoing Extradition Requests.
- The basis of extradition is **treaty between two countries.**
- In the absence of a treaty, a country can still make a request, which the other country will decide in accordance with its laws.

**Procedure of extradition**

- Information about the fugitive criminals is shared with the country of extradition through Interpol (in India CBI has an Interpol wing who does it for request from other countries), who passes to the police departments of that country.
- The information is passed to the immigration authorities.
- Post this action can be initiated for the extradition.
- In between the alleged criminal can utilize the appeal procedure against the extradition in country from where extradition is supposed to be done.

**Most treaties generally follow at least five principles:**

- Extradition applies only to offences stipulated as extraditable
- The offences must be covered under the national laws of both countries
- The requested country must be satisfied of a prima facie case
- The person must be tried only for the offence specified in extradition
- There must be a fair trial.

An alleged offender may not be extradited to the requesting state in the following cases:

- **No treaty** – In absence of a treaty, States are not obligated to extradite aliens/nationals.
- **No treaty crime** – Extradition is generally limited to crimes identified in the treaty which may vary in relation to one State from another, as provided by the treaty.

- **Military and Political Offences** – Extradition may be denied for purely military and political offences. Terrorist offences and violent crimes are excluded from the definition of political offences for the purposes of extradition treaties.
- **Want of Dual Criminality** – Dual criminality exists when conduct constituting the offence amounts to a criminal offence in both India and the foreign country.
- **Procedural considerations** – Extradition may be denied when due procedure as required by the Extradition Act of 1962 is not followed.

7. **G20 meet in Bali**

**Context:** Recently PM heads to **Bali** for G-20 meet

**What is G20 Summit:**

- **G-20** was a **group of finance ministers** and **central bank governors from 19 individual countries and the European Union**.
- It was **established in 1999 and** was **elevated to a forum of Heads of Government in 2008** to effectively **respond to the global financial crisis of 2008.**
- G-20 is a forum, **not a legislative body** and its **agreements and decisions have no legal impact,** but they do influence countries' policies and global cooperation.
- The G20 members includes **USA, Canada, Mexico,Argentina, Brazil,EU, Germany, France, UK, Italy,South Africa, Saudi Arabia and Turkey,India; Indonesia; Australia,Russia, China, South Korea and Japan**
- The G20 membership **accounts for: Two-thirds** of the **world's population,85%** of global **gross domestic product**,**80%** of **global investment,75%** of **global trade**,Contribute **79% of the world carbon emissions**
- G20 **does not have any permanent secretariat** or headquarters.
- The **G20 Summit** is formally known as the **"Summit on Financial Markets and the World Economy".**
- **How G20 works:**
- Since the G20 **has no permanent secretariat**. The **agenda and work are coordinated by** representatives of the G20 countries, known as **'Sherpas**'.
- The **presidency of the G20 rotates every year among members**, and the country holding the presidency, together with the previous and next presidency-holder, forms the '**Troika'.**
- Troika **ensures continuity of the G20 agenda**.
- **During India's presidency**, **India, Indonesia and Brazil will form the troika.**

8. **Why has France ended its military operations in Sahel?**

**Context:**

- On November 9, **French President Emmanuel Macron** announced the **end** of the decade long **Operation Barkhane in Africa q3**

**What is Operation Barkhane?**

- Operation Barkhane was an **anti-insurgent operation** that started on 1 August 2014 and was **led by the French military** against Islamist groups in **Africa's Sahel region.**
- The operation was led in **cooperation with five countries**, all of which are **former French colonies** that span the **Sahel: Burkina Faso, Chad, Mali Mauritania and Niger.**
- The countries are **collectively referred** to as the "**G5 Sahel"**.
- The operation was **named after a crescent-shaped dune** type that is common in the Sahara desert.
- The French military initially **intervened in Mali in early 2013** as part of **Operation Serval,** which successfully regained the northern half of the country from Islamist groups.
- However, in 2014, the mission was scaled up, renamed Operation Barkhane and was aimed at counterterrorism.
- The objective was to assist local armed forces to prevent the resurgence of non-state armed groups across the Sahel region.

**What is G5 Sahel?**

- It Is an **institutional framework** for coordination of regional cooperation in development policies and security matters in **west Africa**.
- It was **formed on 16 February 2014 in Nouakchott, Mauritania**,at a summit of **five Sahel countries: Burkina Faso, Chad, Mali, Mauritania, and Niger.**
- It **adopted a convention** of establishment on **19 December 2014**, and is **permanently seated in Mauritania**.
- The coordination is organised on different levels. The military aspect is coordinated **by the respective countries' Chiefs of Staff**.
- The **purpose of G5 Sahel** is to **strengthen the bond between economic development and security, and together battle the threat of jihadist organizations operating in the region like AQIM, MUJWA, Al-Mourabitoun, Boko Haram**

**What is Sahel Region?**

- The Sahel is the **ecoclimatic and biogeographic realm of transition in Africa between the Sahara to the north and the Sudanian savanna to the south.**
- Having a **semi-arid climate,** it stretches **across the south-central latitudes of Northern Africa between the Atlantic Ocean and the Red Sea**.

- The **name is derived from** the Arabic term for **"coast, shore"**; this is explained as being used in a figurative sense in reference to the **southern edge of the vast Sahara.**
- The Sahel **part includes from west to east parts of northern Senegal, southern Mauritania, central Mali, northern Burkina Faso, the extreme south of Algeria, Niger, the extreme north of Nigeria, the extreme north of Cameroon and the Central African Republic, central Chad, central and southern Sudan, the extreme north of South Sudan, Eritrea and the extreme north of Ethiopia.**

9. **One in every 100 women has undiagnosed cervical cancer in Maharashtra: Experts call for vaccination**

**Context-**

- A recent **state-wide health screening programme** revealed that **for every 100 women examined, one was detected with undiagnosed cervical cancer in Maharashtra.**

**More on the news-**

- Despite this, the long-pending demand to include **Human papillomavirus (HPV)** — a vaccine for cervical cancer — in the **national immunisation programme** remains unfulfilled.
- In the state, a total of 73,554 women above the age of 30 years were examined, of which 925 were detected with undiagnosed cervical cancer.

**About Cervical cancer-**

- **Cervical cancer** is a **common sexually transmitted infection.**
- Long-lasting infection with certain types of **HPV** is the main cause of **cervical cancer.**
- Even after getting infected, the virus can sometimes take years before it causes any symptoms.
- Cervical cancer is considered the **most common type of cancer** witnessed among women which also has a **high mortality rate** due to **late detection.**
- According to a study globally, **27 per cent of total cervical cancer cases are from India,** which is home to **16-17 per cent** of the **world's women population.**
- The existing vaccines have proven helpful in preventing cervical cancer globally.
- So, if it is included in the **national immunisation programme** in which it would be **given free of cost to girls**, it would help reduce the burden.
- It can be prevented to a large extent with the **administration of HPV immunisation** among girl children before they turn 14 years.
- Although **HPV vaccination** was introduced in **2008**, it has yet to be included in the national immunisation programme.

**Vaccine against Cervical Cancer-**

- Currently, **two vaccines** licensed globally are available in India — a **quadrivalent vaccine** (Gardasil, from Merck) and a **bivalent vaccine** (Cervarix, from GlaxoSmithKline).
- Each dose **costs Rs 2,800** (Gardasil) or **Rs 3,299** (Cervarix).
- These vaccines are expensive because of less demand.
- But once it is included in the immunisation programme and with mass awareness programmes, its demand will increase which might help bring down its price.
- The **Indian Academy of Paediatrics Committee on Immunisation (IAPCOI)** recommends that **HPV vaccines** be given as a **two-dose regimen,** six months apart for girls below the age of 14 years.
- For those who are **15 and older,** the vaccine is given in a **three-dose regimen.**
- In July, the **Serum Institute of India (SII)'s vaccine Cervavac — India's first quadrivalent human papillomavirus vaccine (qHPV)** against cervical cancer — received the **Drugs Controller General of India's (DGCI)** approval for market authorisation.

10. **Can't fly drone without passport: Rule dampens Gujarat's dream to be drone hub**

**Drone policy of Gujarat-**

- Amid the **Gujarat government's** push to **promote the use of drones** in several sectors including **forestry, agriculture, geology, mining** and **disaster management,** the state is facing a shortage of certified drone pilots.

**Drone regulation in India:**

- The **ministry of civil aviation** had notified the **Drone Rules, 2021** that **eased the regulation of drone operations in India** by reducing the number of forms that need to be filled to operate them from 25 to five and decreasing the types of fees charged by the operator from 72 to four.
- As per **Drone Rules, 2021**, any person who intends to obtain the authorisation to establish a **Remote Pilot Training Organisation (RPTO)** shall apply to the **Director General of Civil Aviation** in Form D5 on the **Digital Sky Platform,** along with the specified fees.

**New drone rules:**

- The **digital sky platform** shall be developed as a **business-friendly single-window online system.**
- No flight permission is required up to **400 feet in green zones** and **up to 200 feet in the area between 8 and 12 km** from the airport perimeter.
- No **pilot licence** is required for **micro drones** (for non-commercial use), **nano drones and for R&D organisations.**
- No restriction on drone operations by **foreign-owned companies** registered in India.
- Import of drones and drone components to be regulated by **DGFT.**

- No security clearance is required before any registration or licence issuance.
- No requirement for a **certificate of airworthiness, unique identification number, prior permission and remote pilot licence for R&D entities.**
- Coverage of drones under **Drone Rules, 2021** increased from **300 kg to 500 kg.** This will cover **drone taxis** also.
- Issuance of **Certificate of Airworthiness** delegated to **Quality Council of India** and certification entities authorised by it.
- The manufacturer may generate their **drone's unique identification number** on the digital sky platform through the self-certification route.
- The **maximum penalty** under **Drone Rules, 2021 r**educed to **INR 1 lakh**. This shall, however, not apply to penalties in respect of violation of other laws.
- Drone corridors will be developed for cargo deliveries.
- Drone promotion council to be set up to facilitate a business-friendly regulatory regime.

11. **'No Money for Terror' Conference (NMFT)**

**Context:**

- The **Ministry of Home Affairs** will be organising the **Third Ministerial 'No Money for Terror' Conference** next week where **participants from around 75 countries** are expected to attend.

**What is the NMFT conference?**

- The **Ministerial No Money for Terror (NMFT) Conference** aims to create **platform for international discussions** on countering terror financing.
- The" No Money for Terror" conference is **organised by Financial Intelligence Units (FIUs)** of over **100 countries**, jointly called **The Egmont Group.**
- Recognising the importance of international cooperation in the fight against money laundering and financing of terrorism, **a group of FIUs met a few years ago at the Egmont Arenberg Palace in Brussels, Belgium, and decided to establish an informal network of FIUs** for the stimulation of international co-operation.
- **The Egmont Group was created to provide FIUs** around the **world a forum to exchange information confidentially** to combat money-laundering, the financing of terrorism and other predicate offences.
- The conference **includes discussions on technical, legal, regulatory and cooperative aspects** of the terrorism financing.
- It aims to set pace for other high-level official and political discussions focusing on terror finance.
- The **inaugural edition** of this conference was held in **Paris, France, in 2018**. The **second edition** of the NMFT took place in **Melbourne, Australia, in 2019.**
- The **third edition** was set to take place in **India in 2020** but was **postponed because of COVID-19** pandemic that caused the global-level restrictions on travel.

**What are the focus areas of the 3rd NMFT conference?**

- Discussions at the **3rd NMFT conference** will focus on **global trends of terrorism** and terrorist financing, emerging technologies' role in terrorism financing and importance of global cooperation to address related challenges.
- The meeting will **seek global cooperation** in addressing the challenges in countering **terror funding** obtained via **formal and informal channels.**
- It will focus on the **role of cryptocurrency in funding terrorist activities**. It will deliberate on the concerns **related to the decentralized nature and the lack of regulation of cryptocurrencies.**
- The focus will **also be given to dark web's role** in promoting **transfer or crowdsourcing of funds for terrorism.**
- It also **aims to strengthen the role of Financial Action Task Force (FATF)** in setting global standards that can create an effective mechanism to combat terror funding.

12. **N. Korea's ICBM, with range to strike entire U.S., lands near Japan's waters**

**Context:** North Korea has fired an Intercontinental Ballistic Missile (ICMB) that landed close to Japanese waters recently which is the second major weapons test within a one-month duration that showcases the capability to launch nuclear strikes on all of the U.S. mainland.

**Concept:**

- As per the experts, the recent launch involved the longest-range missile (Hwasong-**17 missile**,), which is still under development and is designed to carry multiple nuclear warheads to overcome U.S. missile defence systems.
- North Korea's recent tests aim to advance its nuclear arsenal and win greater concessions in future diplomacy and the tests have been conducted at a time when China and Russia have criticised the U.S. moves to toughen UN sanctions on curbing the North's nuclear programme.
- The U.S. has condemned the launch and has assured to take all measures to guarantee the safety of its territory and its allies South Korea and Japan.

**About Hwasong 17 missile**

- The Hwasong-17 is nuclear-armed North Korea's biggest missile yet.
- It is the largest road-mobile, liquid-fuelled ICBM in the world.

- Its diameter is estimated to be between 2.4 and 2.5 metres, and its total mass, when fully fuelled, is likely somewhere between 80,000 and 110,000 kg.
- Unlike North Korea's earlier ICBMs, the Hwasong-17 is launched directly from a transporter, erector, launcher (TEL) vehicle with 11 axles.

**Intercontinental ballistic missile**

- An intercontinental ballistic missile (ICBM) is a **missile with a minimum range of 5,500 kilometres** primarily designed for nuclear weapons delivery.
- Conventional, chemical, and biological weapons can also be delivered with varying effectiveness, but have never been deployed on ICBMs.
- Countries that have ICBMs: I**ndia, Russia, the United States, North Korea, China, Israel, the United Kingdom and France.**
- ICBMs are d**ifferentiated by having greater range and speed than other ballistic missiles.**
- Short and medium-range ballistic missiles are known collectively as the theatre ballistic missiles.

**Types of ballistic missiles based on the range**

- **Short-range (tactical) ballistic missile** (SRBM): Range between 300 km and 1,000 km.
- **Medium-range (theatre) ballistic missile** (MRBM): 1,000 km to 3,500 km.
- **Intermediate-range (Long-Range) ballistic missile** (IRBM or LRBM): 3,500 km and 5,500 km.
- **Intercontinental ballistic missile** (ICBM): 5,500 km +.
- **Ballistic missiles of India**: Agni, K-4 (SLBM), Prahaar, Dhanush, Prithvi and Trishul.

13. **Asia-Pacific Economic Cooperation (APEC)**

**Context:**

US Vice President Kamala Harris spoke briefly with Chinese leader Xi Jinping while heading into a closed-door meeting at the Asia-Pacific Economic Cooperation forum's summit in Bangkok.

**Concept:**

**Asia-Pacific Economic Cooperation (APEC)**

- APEC is an **inter-governmental forum for 21-member economies** in the Pacific Rim that **promotes free trade throughout the Asia-Pacific region.**
- **APEC started in 1989,** in response to the growing interdependence of Asia-Pacific economies.
    - APEC's member economies are home to more than 2.9 billion people and make up over 60 per cent of global GDP.
    - APEC partners make up more than 75 per cent of Australia's total trade in goods and services.
- APEC was formed to **encourage a growing and prosperous regional economy through:**
    - trade and investment liberalisation and facilitation – at the border, across the border and behind the border
    - reduced costs of cross-border trade to assist businesses
    - economic and technical cooperation
    - exchanges of best practice information on trade and investment
    - simplified regulatory and administrative processes
    - improved institutional capacity to implement and take advantage of the benefits of trade and investment reform.
- APEC's **work is guided by the APEC Putrajaya Vision 2040,** which is for an open, dynamic, resilient and peaceful Asia-Pacific community by 2040. This will be achieved by pursuing three economic drivers:
    - trade and investment
    - innovation and digitalisation
    - strong, balanced, secure, sustainable and inclusive growth.
- APEC **decisions are reached by consensus,** and commitments are made on a voluntary basis.
- **APEC has three official observers-**the Association of Southeast Asian Nations Secretariat, the Pacific Economic Cooperation Council and the Pacific Islands Forum Secretariat.
- **Hosting APEC-**Each year a different member economy hosts the major APEC meetings. This year's and future hosting economies are:
    - 2022 – Thailand
    - 2023 – United States of America
- **APEC members-**
    - Australia, Brunei, Canada, Chile, China, Hong Kong, Indonesia, Japan, South Korea, Malaysia, Mexico, New Zealand, Papua New Guinea, Peru, Philippines, Russia, Singapore, Chinese Taipei, Thailand, Vietnam and the United States.
    - **India is not a Member.**

14. **Qatar and FIFA World Cup**

**Context:**

- Qatar will host the **2022 FIFA World Cup.**
- This will be the **22nd edition** of the football world cup.
- This will be the **first World Cup to be held in the Arab world,** and the **second World Cup to be held fully in Asia,** following the **2002** tournament in South **Korea and Japan.**

**What is the emblem of Qatar 2022:**

- This year's emblem design resembles the **traditional woollen shawl** that **men and women wear across the Arab world** during the winter months.

**What is the Official Mascot:**

- **La'eeb** is the **Official Mascot** of FIFA **World Cup Qatar 2022**.
- La'eeb is an **Arabic word** meaning **super-skilled player**

**Some facts about FIFA World Cup 2022**

- The **official ball** for the **World Cup** in Qatar is the **Adidas Al Rihla**.
- The **FIFA World cup Qatar 2022** will be the **first tournament to witness the participation of female referees**
- **Brazil** has won the **most titles** of FIFA World Cup Winner Men's. It has won the FIFA Men's World Cup **5 times.**
- In the **women's category**, The **United States** leads the most with **4 titles** in FIFA Women's WC.
- The **country that won the First FIFA WC Men's tournament was Uruguay against Argentina in the year 1930.**
- The country that **won the First FIFA WC Women's tournament was the United States against Norway in 1991.**
- The **FIFA WC 2026** will be jointly hosted by **Canada, the United States, and Mexico,** which will give **Mexico the distinction of being the first country to host games in three WCs.**
- **France** is the **current World Cup champion**

**15. Russia nuclear icebreaker and militarisation of the Arctic**

**Context:**

- Recently, President Vladimir Putin touted Russia's Arctic power at a flag-raising ceremony and dock launch for **two nuclear-powered icebreakers** that **will ensure year-round navigation in the Western Arctic.**

**About the new nuclear-powered icebreakers:**

- **Yakutia:** It is **173.3-metre long** with a **displacement of up to 33,540 tonnes**. It can smash through the ice of u**p to three metres**. It will **enter service in 2024.**
- **Rossiya:** It is a super-powerful nuclear **209-metre icebreaker**. It has a displacement of up to **71,380 tonnes** which would be **completed by 2027**. It will be able to **break through ice four metres thick**.
- Two other icebreakers in the same series, **the Arktika and the Sibir,** are already in service. Another icebreaker, **Chukotka,** is scheduled for **2026.**
- These are **part of Russia's large-scale**, systematic work to **re-equip and replenish the domestic icebreaker fleet**, to strengthen Russia's status as a great Arctic power.

**Where does India stand with respect to the Arctic:**

- India's **engagement with the Arctic** dates back to **1920** with the **signing of the Svalbard Treaty in Paris.**
- India is one of the very few countries to **set up a permanent station** in the Arctic for the purposes of scientific research.
- It launched its **first scientific expedition to the Arctic** in the first week of **August, 2007.**
- Subsequently, India has been sending scientific teams every summer and winter to carry out studies in the Arctic.
- Indian **studies are primarily focused in the fields of glaciology, hydrochemistry, microbiology, and atmospheric sciences.**
- **The Himadri research station**, located in **Ny Alesund, Svalbard** in **Norway**, was started in **July 2008**.
- In **2014, India deployed IndArc**, a **multisensory observatory in Kongsfjorden**.
- In **2016**, India's **northernmost atmospheric laboratory was established at Gruvebadet.**
- It was established **to study clouds, precipitation, long-range pollutants**, and other background atmospheric parameters.
- India has been an **observer in the Arctic Council** since **2013**. Its **membership as an observer was renewed in 2019** for another five years.

**What is Arctic Council:**

- The Arctic Council is the leading **intergovernmental forum** promoting cooperation on common Arctic Established by the **eight Arctic States** i.e the countries whose territories fall in the Arctic region through the **Ottawa Declaration of 1996**.
- **Member** Nations of the Council - **Canada, Kingdom of Denmark, Finland, Iceland, Norway, Russian Federation, Sweden and the United States**.

**What is India's Arctic Policy:**

- In **March 2022,** the Indian government unveiled an Arctic policy.
- It envisages India's **engagement in the Arctic region** for climate research, environmental monitoring, maritime cooperation and energy security.
- The **National Centre for Polar and Ocean Research** under the **Ministry of Earth Sciences** will serve as the **nodal agency** in **implementing the Arctic Policy**.

16. **International Day for the Elimination of Violence against Women**

**Context:**

- The **International Day for the Elimination of Violence Against Women** will mark the **launch of the UNiTE campaign** (**Nov 25- Dec 10)** an **initiative of 16 days of activism** concluding on the **day that commemorates the International Human Rights Day (10 December).**

**More about International Day for the Elimination of Violence against Women**

- The **theme** for **International Day for the Elimination of Violence against Women 2022** is **'UNITE! Activism to end violence against women and girls.'**
- This day is **commemorated** in memory of **Mirabal sisters** who were **three political activists from the Dominican Republic.** They were **brutally assassinated during the Rafael Trujillo dictatorship** (1930-1961) in **1960**

**History of International Day for the Elimination of Violence against Women:**

- **Women Rights Activists** have been observing **25 November** as a day against **gender-based violence since 1981.**
- **The Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW)** was **established by The United Nations General Assembly in 1979.**
- **"Declaration on the Elimination of Violence against Women"** was adopted by passing the **Resolution 48/104 on 20th December 1993**.
- International Day for the Elimination of Violence against Women was **instituted by United Nations General Assembly (UNGA) in December 1999.**

17. **France adopts bill to add abortion rights to its constitution**

**Context:**

- Lawmakers of the **lower house of parliament in France** adopted a bill to **inculcate abortion rights** to the **country's constitution**.

**More about the issue:**

- Lawmakers in France's lower house of parliament on Thursday **adopted a bill to enshrine abortion rights in the country's constitution,** the **first step** in a lengthy and uncertain legislative battle
- To be **added into the constitution**, any measure must be **first approved by majorities in the National Assembly and the upper house**, **the Senate, and then in a nationwide referendum.**
- **Abortion in France was decriminalized under a key 1975 law**, but there is nothing in the constitution that would guarantee abortion rights

**What is the abortion law in India?**

- Abortions in India are **regulated by the Medical Termination of Pregnancy (MTP) Act, 1971.**
- Under the law **section 3 of the MTP Act 1971**, the doctor can perform an abortion in the following conditions:
    - If the **pregnancy would be harmful to the life of the patient** or **affects her physical or mental health.** The doctor **will need to consider the circumstances of the patien**t to figure out if the pregnancy will harm her mental health, on a case to case basis.
    - If there is a **good chance that the child would suffer from physical or mental abnormalities** which would leave him or her seriously handicapped.
    - If **pregnancy occurred as a result of a failure of contraception** only **applicable to married women.**
    - If **pregnancy is a result of sexual assault or rape**.

  **Termination of Pregnancy:**
    - If the **pregnancy has not exceeded 12 weeks**, **only one doctor is needed to sign-off.**
    - If the **pregnancy has exceeded 12 weeks** and is **below 24 weeks, two doctors** are needed.
    - The **gestation period does not matter** if a doctor feels that an **immediate abortion must be conducted** to save the life of the patient.
    - The doctor who determines if it is necessary to perform an abortion and performs it needs to be a **'registered medical practitioner'** under the law.
- In **January 2020,** the Union Cabinet approved **amendments to the MTP Act,** allowing women to seek abortions as part of the reproductive right and gender justice.
- The amendment **raised the upper limit of MTP from 20 weeks to 24 weeks** for women including **rape survivors, victims of incest, differently-abled women and minors.**

**18. UNHRC deplores protest crackdown in Iran**

**Context:**

- India abstained on a **resolution adopted by the United Nations Human Rights Council (UNHRC)** to **set up a fact-finding mission** into **alleged human rights violations in Iran** committed on protesters in the country by state authorities.

**More about the resolution:**

- The resolution was sponsored by **Germany and the Netherlands**
- The Resolution was for setting up a **fact-finding mission** into **alleged human rights violations** in **Iran** committed on protesters in the country by state authorities.
- The **resolution in the UNHRC was passed,** with 25 votes in favour, seven against and 16 abstentions, at a special session of the 47-member human rights body.

**More about UNHRC:**

- **The Human Rights Council is an inter-governmental body** within the United Nations system responsible **for strengthening the promotion and protection of human rights around the globe** and for addressing situations of human rights violations and making recommendations on them.
- The **Council is made up of 47 United Nations Member States** which are **elected by the UN General Assembly.** The Human Rights Council **replaced the former United Nations Commission on Human Rights.**

- **The Council was created by the United Nations General Assembly on 15 March 2006 by resolution 60/251**. Its **first session took place from 19 to 30 June 2006**.
- **India** gets **re-elected to the UNHRC for 2022-24 for a 6th term from the Asia Pacific region along with Kazakhstan, Malaysia, Qatar and the United Arab Emirates.**
- The **Office of the High Commissioner for Human Rights (OHCHR)** serves as the **Secretariat of the Human Rights Council.**
- OHCHR is **headquartered in Geneva**, Switzerland

19. **China Indian Ocean meet**

**Context:**

- Recently, the **China International Development Cooperation Agency** (CIDCA), held a **meeting of the China-Indian Ocean Region Forum** in which **19 countries** took part
- India was not invited to the meet.
- **CIDCA** is an organisation connected with the **Chinese Foreign Ministry.**

**More about the meet:**

- **Theme:** ***Shared Development: Theory and Practice from the Perspective of the Blue Economy.***
- **Participating Countries: Indonesia, Pakistan, Myanmar, Sri Lanka, Bangladesh, Maldives, Nepal, Afghanistan, Iran, Oman, South Africa, Kenya, Mozambique, Tanzania, Seychelles, Madagascar, Mauritius, Djibouti, Australia** and representatives of **3 international organisations** were present.
- **India** was reportedly **not invited**.

**What Has Been Proposed:**

- China proposed to **establish a marine disaster prevention and mitigation cooperation mechanism** between China and countries in the Indian Ocean region.
- China expressed its **willingness to provide necessary financial,** material, and technical support to countries in need.

**What is Indian Ocean Rim Association (IORA):**

- The Indian Ocean Rim Association is an **inter-governmental organisation** aimed at strengthening regional cooperation and sustainable development within the Indian Ocean region.
- It was **formed in 1997** by an **initiative** of **India and South Africa.**
- The IORA has **23 members and ten dialogue partners**.
- The **members** include **Australia, Bangladesh, Comoros, India, Indonesia, Iran, Kenya, Madagascar, Malaysia, Mauritius, Mozambique, Oman, Seychelles, Singapore, Somalia, South-Africa, SriLanka, Tanzania, Thailand, United Arab Emirates, Maldives and Yemen.**
- The **ten dialogue partners** are **China, Egypt, Germany, Italy, Japan, Russia, Turkey, the Republic of Korea, the United Kingdom and the United States of America**

20. **Gandhi Bust to come up at UN headquarter**

**Context:**

- A bust of **Mahatma Gandhi** will be inaugurated as a **gift from India to the United Nations** during **India's presidency of the Security Council** next month,
- This will be the **first sculpture of the Mahatma** to be installed at the world body's headquarters.
- It will be placed in the **North Lawn**,

**Who had designed the current bust?**

- The bust, is made by **renowned Indian sculptor** Padma Shree awardee **Ram Sutar,** who has **also designed** the **'Statue of Unity'** in Gujarat,

**What is some other notable works of art at the U.N. headquarters?**

- A **section of the Berlin wall** donated by **Germany**,
- **Soviet sculpture 'Let us Beat Swords into Ploughshares'**,
- Life-size **bronze statue of Nelson Mandela** gifted by South Africa
- The **'Guernica' tapestry** after the painting Guernica by **Pablo Picasso.**

**What is the other gift of India on display?**

- The **11th century black-stone statue of 'Surya'**, the Sun God, was donated on **July 26, 1982**.
- The statue, dating from the **late Pala period** and which is currently displayed in the **Conference Building**, was presented as a **gift by then Prime Minister late Indira Gandhi to the UN.**
- Then **Secretary-General Javier Perez de Cuellar** had **accepted the sculpture on behalf of the United Nations.**

21. **India first Buddhist Varsity to come up in South Tripura**

**Context:**

- **Shakya Gasan, chief monk** of the **World Buddhist Pope Association of South Korea,** will lay the foundation stone for the **International Buddhist University at Manu Bankul in Sabroom of South Tripura district.**

**More about Dhamma Dipa International Buddhist University (DDIBU):**

- The **Dhamma Dipa International Buddhist Universit**y (DDIBU) is expected to become the **first Buddhist-run university in India** to **offer Buddhist education** along with **courses in other disciplines of modern education** as well.

- This university will **set a precedent in the history of Indian-Buddhism** in promoting and reviving Buddhist culture in India, the birthplace of Buddhism.
- It will be the **first Buddhist University in India to be headed by Buddhist monastics** and run and monitored by Buddhists.
- The **word, Dhammadipa, describes both a core principle and a guiding force, which seeks the light of Dharma,** its international scope and measure.
- DDIBU hopes to **better engage the contemporary world through** the **insight and depth of Buddhist words.**
- At the same time, it is **keen to prepare students and youth with knowledge and skills**, so that they can live healthy, peaceful and contented lives, able to lead the way of life.
- Besides, there is also a **plan to establish medical, technical and general degree colleges on the campus**

**Students from 31 countries** will get a **chance to study** as well as carry out **research on Buddhist literature**, culture and tradition in the proposed varsity.

**Concept** –

- Nalanda, the ruins of one of the world's most prestigious seats of learning, is located 95 kilometres from Patna, the capital of Bihar, and 110 km from Bodh Gaya, the site of the Buddha's enlightenment.
- Declared a Word Heritage Site in 2016, Nalanda is seen as the world's most ancient university, flourishing much before Europe's oldest university, Bologna, came into being in the 11th-12th century.
- Contemporary sources, however, describe the site as a *mahavihara*, a great monastery.
- Nalanda, therefore, functioned as a premier monastic-cum-scholastic establishment in ancient and early medieval India.
- Today, one can see there the remains of temples, monastic dwellings, votive structures and art works in stucco, bronze and stone dating from the 5th century C.E. to the 12th century C.E.

**Literary Sources** –

- As far as literary sources are concerned, most of the information on the history, functioning and, sometimes, the layout of the mahavihara comes from the accounts of Chinese Buddhist monks such as **Xuanzang**(also known as Hiuen Tsang) and **Yijing** (also known as I Tsing), primarily the former.
    - Both travelled to India and stayed in the great monastery complex in the 7th century.
    - Xuanzang's account links both the Buddha (6th century BCE) and the Mauryan king Asoka (c. 268-232 BCE) with Nalanda.
    - The Chinese monk likewise credits Asoka with the construction of a stupa/temple in honour of Sariputra, one of the Buddha's closest disciples.
- Further, the archaeological findings—the material remains at Nalanda belong to the Gupta period/5th century C.E. onwards—do not support Xuanzang's pre-Gupta history of the site.
- The rulers of the Gupta dynasty (c. 300-600 C.E.) were usually known for patronising Brahmanical cults, but some of them also supported Buddhism.
- Buddhist sources indicate that the Gupta King Vikramaditya sent his queen and son Baladitya to study under the famous Buddhist scholar Vasubandhu, who was based at Nalanda.
- Some texts mention that King Narasimhagupta became a Buddhist monk and gave up his life through meditation. Xuanzang also talks about the Guptas' royal connection with Nalanda. He reports that shortly after the Buddha's demise, a king called Shakraditya built a monastery at the site.
    - Scholar Heras identifies Shakraditya with Kumaragupta I, Buddhagupta with Skandagupta, Tathagatagupta with Puragupta and Baladitya with Narasimhagupta.
- Nalanda seemingly continued to enjoy royal patronage in post-Gupta times as well: during the reign of Harshavardana (606-648 C.E.), the King of Kannauj (in Uttar Pradesh); and the Palas, who ruled over modern Bihar, West Bengal and Bangladesh from the 8th through 12th centuries. Xuangzang visited Nalanda during Harshavardana's reign.

**The Palas**

- The Palas were known to be Buddhists.
- Dharmapala (c. 781-821 C.E.), the second Pala king, is known to have supported the establishment of two monasteries: Somapura (better known as Paharpur, now in Bangladesh) and Vikramshila (in Bhagalpur in Bihar).
- An inscription from Nalanda records his gifting of a village for the upkeep of the great monastery.
- Another inscription from the site describes Devapala (c. 821 to 861 C.E.), Dharmapala's successor, as helping the ruler of Suvarnadvipa (Sumatra), Balaputra, build a monastery at Nalanda and acquire five villages to support its maintenance.
- It is also known for several gifts to the mahavihara, again independent of the Pala kings.
- It is widely held that Nalanda started declining in the late-Pala period and was given a death blow around 1200 C.E by the invasion of BakhtiyarKhalji, the Afghan military commander of Delhi's Turkish ruler QutbuddinAibek.

**The mahavihara as a university**

- Most of the information on the functioning of Nalanda as a university—its student strength, curriculum and buildings—comes from Chinese and Tibetan texts, which also emphasise the purity of its monastic discipline.
- Nalanda attracted students from China, Japan, Korea and from countries in South-East and Central Asia.
- Some scholars argue, though not on the basis of any direct evidence, that Nalanda's curriculum went beyond religious texts to include literature, theology, logic, grammar, medicine, philosophy, the arts and metaphysics.

**Decline of Nalanda**

- The two major theories that explain the decline of Nalanda both talk about a possible destruction of the mahavihara and of a somewhat sudden or cataclysmic decline.
- The most common theory for the decline of Nalanda says the site was ransacked and destroyed by BakhtiyarKhalji.
    - This theory is entirely based on a Persian work by Minhaj al-SirajJuzjani (1193-1260) called Tabaqat-iNasiri, which forms an elaborate history of the Islamic world during the reign of the Delhi sultan Nasiruddin Mahmud Shah (1246-66).
    - It is important to note that the word "Nalanda" is mentioned nowhere in Minhaj's account.
- The second theory broadly locates the decline in the context of the animosity between Brahmins and Buddhists. It finds expression in the writings of historians such as D.N. Jha, B.N.S. Yadava, R.K. Mookerji and SukumarDutt.

## ECONOMY

### 1. EPFO Norms

**Context:**

EPFO relaxes withdrawal norms for EPS-95 subscribers.

**Details–various changes approved**

- It allowed withdrawal of accumulations in Employees' Pension Scheme 1995 for those subscribers who have only less than six months of service left.
    a. Earlier, subscribers who have less than six months of service left were allowed to withdraw the accumulations in their employees' provident fund account only.
- A redemption policy for its investments in Exchange traded fund (ETF) units .
- The Audited Annual Account, in respect of the EPF Scheme 1952, EPS Scheme 1995 and Employees' Deposit Linked Insurance (EDLI) Scheme 1976.
- 11 proposals for surrender/cancellation of exemption from EPF Scheme.
- Information Security Policy of the EPFO.

### 2. RBI e-rupi

**Context:**

The Reserve Bank of India (RBI) announced that the first pilot in the Digital Rupee, or e-rupee, will commence in government securities from November 1, 2022.

**Details:**

**It will make the inter-bank market more efficient**–Settlement in central bank money would reduce transaction costs by preventing the need for settlement guarantee infrastructure or for collateral to mitigate settlement risk.

**Concept:**

**Central Bank Digital Currency/e-Rupee:**

- RBI defines the Central Bank Digital Currency as the **digital form of currency notes issued by a central bank.**
- It is a **sovereign or entirely independent currency** issued by the central bank (in this case, RBI), in accordance with the country's monetary policy.
- Since it is issued by the central bank, it will appear as a **'liability'(or debt owed) on the bank's balance sheet.**
- CBDC will be considered as a **medium of payment and legal tender by all three parties - citizens, government bodies, and enterprises.**
- Being **government-recognised**, it can be **freely converted to any commercial bank's money or notes.** So, individuals can own CBDC without opening a separate account.
- Further it **can be exchanged with fiat currency** (paper money) in a 1:1 ratio

**How does CBDC differ from existing digital money?**

A common form of **digital money exists in bank accounts** and is recorded as book entries on ledgers of commercial banks', another form of digital currency, will **directly be on the ledger of RBI.**

**Forms of CBDC Under Consideration**

Digital currency can either be **token-based or account-based.**

- The **token-based** will be similar to bank notes i.e a person holding tokens at any given point would presumably be owing the digital currency. The individual token owner will have to verify the legitimacy of his owning the tokens. Such a digital currency will be referred to as **CBDC-R.**
- **Account-based** will be similar to owning a bank account i.e., RBI expected to hold an account of all transactions and balances of all CBDC holders. The central bank would also have to maintain a record of ownership of monetary balances. In the case of an account -holder, an intermediary will be responsible for verifying the identity of the account-holder. This digital currency will be called **CBDC-W.**

**Utilization of CBDC-R and CBDC-W**

- The **R in CBDC-R** stands for 'retail' or 'general purpose'- it will potentially be utilised by the private sector, non-financial businesses and consumers. It will be an electronic form of cash, predominantly meant for retail-related transactions.
- The **W in CBDC** stands for 'wholesale', utilised for interbank and other wholesale-related transactions. Its use is likely to be restricted to specific financial institutions.

**Technology to be used:**

The two technologies under consideration are - and

There are two models for issuance and management of CBDCs under the RBI's consideration:

- **Direct model (single tier model) -I**n the direct model, the central bank will be responsible for managing all aspects of the digital rupee system such as issuance, account-keeping and transaction verification.it is also called the **Centrally-controlled databases**
- Indirect model (two-tier model). -In this model, the central bank will issue CBDC to consumers indirectly through intermediaries and any claim by consumers will be managed by the intermediary. It is also called Distributed Ledger Technology.

**In India, the key motivations to introduce CBDC have been stated as follows -**

- Reduction in cost associated with physical cash management
- To further the cause of digitisation to achieve a less cash economy.

- Supporting competition, efficiency and innovation in payments. To explore the use of CBDC for improvement in cross - border transactions
- Support financial inclusion
- Safeguard the trust of the common man in the national currency vis-à-vis proliferation of crypto assets

3. **Fifty Years of Indian Banking Through the Lens of Basic Statistical Returns' – 'BSR@50'**

**Context:**

In order to reduce the reporting burden on banks, they will soon be required to submit only two quarterly BSR (Basic Statistical Return) reports on credit and deposits effective March 2023, according to the Reserve Bank of India Deputy Governor.

**Details:**

- This will leave us with only **two BSRs, viz., BSR 1 on credit and BSR 2 on deposits,** both of quarterly frequency.

**Basic Statistical Return:**

- Given the need for more determined effort at systematizing the reporting of comprehensive banking data with a minimum time lag, the RBI constituted the **Committee on Banking Statistics in April 1972 to look into various aspects of statistical reporting** of data by banks and suggest appropriate steps.
- **The BSR system** is a sound and comprehensive reporting system, generating useful statistics, and has supported the post-nationalisation expansion of the banking system.
- **BSR Code**--Basic Statistical Return Code (BSR Code) is a seven-digit code given by the Reserve Bank of India to all the registered banks in India. The first three digits out of the seven represent the bank whereas the remaining four digits represent the branch.
- BSR Codes are used mainly when filing Tax Deduction at Source (TDS) and Tax Collected at Source (TCS) returns. This code is used to maintain records of the online payments and alerts the Income Tax department about the payment through banks.
- **Classification of Codes**
    a. **BSR 1**-This is applicable to the half-yearly Returns on Advances from all branches of the bank on the last Friday of June and December. It is in two parts; Part I is for accounts with limits over Rs.10,000 and Part II is for accounts with limits below Rs.10,000.
    b. **BSR 2**-This is applicable to the half-yearly Return Deposits to all bank branches on the last Friday of June and December.
    c. **BSR 3**-This is applicable to the monthly Return Advances against the Security of Selected Sensitive Commodities from Head Offices on last Friday of every month.
    d. **BSR 4**-This is applicable once in every two months for the Return on Ownership of Bank Deposits from all branches on the last Friday of March.
    e. **BSR 5**-This is applicable to the annual Return on Bank Investments from the Head Office on the last day of March.
    f. **BSR 6** -This is applicable for the Quinquennial Survey on Debits to Deposits Accounts from April to March.
    g. **BSR 7**-This is done quarterly and is applicable for the Survey on Aggregate Deposits and Gross Bank Credit by head offices of the bank on the last Friday of June, September, and December, and on March 31.

**Uses of BSR Codes**

There are **three important merits of BSR Codes and they are as follows.**

- BSR Codes assists the international tax authorities to track the payment made by an individual to a foreign country.
- BSR Codes enables the senior citizens to receive pensions earlier and also gathers all details of a bank branch.
- BSR codes are used by the Income Tax Department to receive and gather information and record taxes that are paid through the banks and upload the challan details.

**Other terms:**

**What is a Challan Identification Number?**

- A serial number given by the Reserve Bank of India will be applied for all challans which will be tendered in cash, transfer cheques and clearing cheques as well.
- The Challan Identification Number is a part of the BSR code given by the Reserve Bank of India to all registered banks in the country. The CIN is a 20-digit unique code which is given on the counterfoil of the taxpayer. The BSR code comes with the CIN number and is used as a unique combination along with the challan number and the payment deposited date.

**What is the difference between IFSC code and BSR code?**

The only difference between the IFSC code and the BSR code is that the IFSC code is an 11-digit code whereas a BSR code consists of only 7 digits. However, their major purpose is the same as giving a unique identity to the bank.

4. **Record GST collection**

**Context:**

Gross Goods and Services Tax (GST) collections rose to Rs 1,51,718 crore for October, the second highest level since the roll-out of the indirect tax regime in July 201.

**Details:**

- Monthly GST revenues have been above the Rs 1.4 lakh crore mark for the last eight months in a row.
- Revenue growth is **crucial for fiscal arithmetic** this year as the government tackles additional spending needs on account of fertilizer, food and fuel subsidies.

**Causes:**

- **High inflation rate**-increase in retail prices of many consumption goods,
- The **festive season demand**–increased spending on account of the festive season
- Actions taken to ensure compliance-**introduction of e-invoicing system,e-way bills coupled with the crackdown on fake invoicing.** Also linking the customs portal with GST portal

**Note – E-way Bill already covered in June and July DPN.**

5. **CBDC**

**Context:**

Government securities worth ₹275 crore were traded using the central bank digital currency (CBDC), on the first day of a pilot project in the wholesale segment according to the data published by the Clearing Corp. of India (CCIL)

**Details:**

RBI opened a new platform called **'Negotiated Dealing System-Order Matching (NDS-OM) CBDC'** for the 9 banks (authorized to deal in CBDC) to conduct the transactions, which they used to buy and sell government securities among themselves.

**Concept:**

**Negotiated Dealing System-Order Matching (NDS-OM) CBDC**

Banks can sell or buy securities at the available price on the normal NDS-OM platform, where secondary market transactions are executed.

**How?**

- Banks send a request to RBI to **convert the cash lying in the cash reserve ratio** (CRR) account into digital rupee which is then stored in the CBDC digital rupee account opened by each bank with RBI.
- The transactions were **settled instantly by RBI**, without the help of any third party.
    a. Normal trades are settled on a T+1 basis through CCIL, meaning the settlement happens one business day after the trade is executed.
- The securities were then credited to the banks' **SGL (subsidiary general ledger) account** maintained with the Reserve Bank.

**Benefit?**

- There is no intermediary risk -transactions are settled with the central bank directly.
- Banks are also able to monitor their digital rupee account and convert the remaining CBDC to CRR at any time.
- CBDC wholesale transactions are free as it is settled with the RBI directly, unlike regular transactions where banks pay transaction charges to CCIL.
- It will make the interbank market efficient-Settlement in central bank money would cut transaction costs by doing away with the need for settlement guarantee infrastructure or collateral to mitigate risks.

**NDS-OM?**

- The RBI introduced the NDS-OM i**n August 2005**. It is an **electronic, screen based, anonymous, order driven trading system for dealing in G-secs.**
- NDS-OM is a screen based electronic anonymous order matching system for **secondary market trading in Government securities** owned by RBI.
- Presently the membership of the system is open to entities like Banks, Primary Dealers, Insurance Companies, Mutual Funds etc. i.e entities who maintain SGL accounts with RBI. These are Primary Members (PM) of NDS and are permitted by RBI to become members of NDS-OM.
- Gilt Account Holders which have a gilt account with the PMs are permitted to have indirect access to the NDS-OM system i.e they can request their Primary Members to place orders on their behalf on the NDS-OM system.

**A Subsidiary General Ledger (SGL) Account**

- It is an account opened and held with the Bank for holding or/and transacting in Government Securities.
- The entities mentioned below are eligible to open and maintain an SGL account with the Bank:
    a. A licensed bank
    b. A Primary Dealer
    c. A Financial Institution as defined in terms of Section 45-I (c) (ii) of the Reserve Bank of India Act, 1934 (2 of 1934).
    d. Provided that the above entities obtain a no-objection certificate from the concerned regulatory department of the Bank, to the effect that they meet the eligibility criteria (as applicable) and that the Bank has no regulatory/supervisory discomfort.
    e. Central Government.
        a. State Governments.
        b. Insurance Companies regulated by the Insurance Regulatory and Development Authority.
        c. Mutual Funds regulated by the Securities & Exchange Board of India.
        d. Provident and Pension Funds having investment of ` 500 crore or more in Government securities.
        e. Foreign Central Banks with prior approval of the Bank.
        f. Pension Fund Managers regulated by the Pension Fund Regulatory and Development Authority.
- In addition, the entities mentioned below can open and maintain an SGL account with the Bank.
    a. National Securities Depository Limited (NSDL).
    b. Central Depository Services (India) Limited (CDSL).

c. Stock Holding Corporation of India Limited (SHCIL).
d. Such other entities may be approved by the Bank from time to time.

6. **FAR bonds**

**Context:**

Foreign investors have sold Indian government debt worth nearly $500 million in the past two sessions, with the so-called FAR bonds bearing the brunt of a selloff.

**Details:**

**Causes:**

- Market participants linked the sudden move to the Fed's policy decision due on Wednesday.
- Disappointment that Indian government bonds would not be included in major global bond indexes.

**Concept:**

**FAR securities:**

- To attract capital flows to the bond market, Budget 2020 announced a programme that allows foreign investors to buy unlimited amounts of select government bonds via the fully accessible route (FAR).
- This was a major policy shift through which the government sowed the seeds for India's inclusion in the global index
- It created a separate channel called Fully Accessible Route (FAR) to enable non-residents to invest in specified Government of India dated securities.
    a. 'Specified securities shall mean Government Securities as periodically notified by the Reserve Bank for investment under the FAR route.
    b. The RBI has said that all new issuances of Government securities (G-secs) of 5-year, 10-year, and 30-year tenors will be eligible for investment as specified securities.
- Thus, **Non-Resident investors can invest in specified government securities without being subject to any investment ceilings.**
- **Existing routes apart from FAR:**
    **a. The Medium-Term Framework (MTF)** for Foreign Portfolio Investment (FPI) in Central Government Securities (G-secs) and State Government Securities (SDLs) was introduced in October 2015.
    **b. The Voluntary Retention Route (VRR)** encourages Foreign Portfolio Investors to undertake long-term investments in Indian debt markets.
        - The aggregate investment limit shall be ₹ 40,000 crores for VRR-Govt and ₹ 35,000 crores for VRR-Corp.
        - The minimum retention period shall be three years. During this period, FPIs shall maintain a minimum of 75% of the allocated amount in India.
        - Investment limits shall be available on tap for investments and shall be allotted by Clearing Corporation of India Ltd. (CCIL) on 'first come first served' basis.

**Emerging Markets Bond Index (EMBI):**

- The emerging markets bond index (EMBI) is a benchmark index for measuring the total return performance of international government and corporate bonds issued by emerging market countries that meet specific liquidity and structural requirements.
- The emerging markets bond index (EMBI) tracks the performance of emerging market bonds and was **first published by investment bank JP Morgan.**
    a. **Emerging market bonds** are debt instruments issued by developing countries, which tend to carry higher yields than government or corporate bonds of developed countries.
- Most of the benchmark EMBI index tracks emerging sovereign debt, with the rest in regional corporate bonds.
- **Need** –Despite their increased riskiness relative to developed markets, emerging market bonds offer several potential benefits such as portfolio diversity as their returns are not closely correlated to traditional asset classes.Thus, **Global bond indices help investors track the movement in bonds in multiple jurisdictions and aid in relative comparisons.**
- **What basic criteria is required for index inclusion?**
    a. The countries must meet parameters on liquidity, safety, and returns. The main parameters include
        - The size of the market
        - The country rating
        - Ease of access
        - Country-level criteria for index inclusion includes
            - Absence of restrictive laws on movement of capital
            - Availability of forex
            - Adequate hedging mechanism
            - Tax laws
            - Settlement of trade

**Example-The JPMorgan Emerging Market Bond Index (EMBI)** are a set of three bond indices to track bonds in emerging markets operated by J P Morgan. The indices are the Emerging Markets Bond Index Plus, the Emerging Markets Bond Index Global and the Emerging Markets Bond Global Diversified Index. An external debt version, the **EMBI+ is the JPMorgan EMBI Global Index.**

7. **Sovereign Green Bonds**

**Context:**

The Indian government is all set to debut in the green bonds market soon, as laid out in the Union Budget.

**Details:**

- The Finance Minister in her Budget 2022 speech promised to issue sovereign green bonds.
- Indian companies have already been tapping into the international green bond market through segments beyond green bonds, among which **sustainability linked bonds (SLBs)** .

**What is the Significance of Sovereign Guarantee to Green Bonds?**

- Sovereign green issuance sends a **powerful signal of intent around climate action and sustainable development** to governments and regulators.
- It will catalyse domestic market development and provide impetus to institutional investors.Thus, bring in a **new set of investors to India's debt market**
- It will provide **benchmark pricing, liquidity and a demonstration effect for local issuers,** helping to support the growth of a local market.
- Sovereign green bonds can support the proliferation of electric buses and allied charging infrastructure in India by providing cost-effective financing options. Thus**, bring in much needed capital for its green transition.**

**Concept:**

- Corporates have been issuing green bonds in India but the country's global share stood at just 1% in the first half of 2022.
- It is a type of **fixed-income instrument that is specifically earmarked to raise money for climate and environmental projects.**
- The first green bond was issued in **2007 by the European Investment Bank,** the EU's lending arm. This was followed a year later by the World Bank. Since then, many governments and corporations have entered the market to finance green projects.
- These bonds are typically **asset-linked and backed by the issuing entity's balance sheet**, so they usually carry the same credit rating as their issuers' other debt obligations.
- They are designated bonds intended to encourage sustainability and to support climate-related or other types of special environmental projects.
- **Aims and Objectives:**
    a. They are aimed at energy efficiency, pollution prevention, sustainable agriculture, fishery and forestry, the protection of aquatic and terrestrial ecosystems, clean transportation, clean water, and sustainable water management.
    b. They also finance the cultivation of environmentally friendly technologies and the mitigation of climate change.

**Countries that have issued sovereign green bonds:**

Belgium, Chile, Denmark, Egypt, Fiji, France, Germany, Hong Kong, Hungary,Indonesia,Ireland, Italy, Lithuania, Mexico, Netherlands, Nigeria, Philippines, Poland, Serbia, Seychelles, South Korea, Spain, Sweden and UK

**A Sustainability-linked bond (SLB)**

- It is a **fixed income instrument (Bond) where its financial and/or structural characteristics are tied to predefined Sustainability/ESG objectives.**
    a. The objectives are measured through predefined Key Performance Indicators (KPIs) and evaluated against predefined Sustainability Performance Targets (SPTs).
- SLBs can be used to finance **any corporate activity** and their proceeds do not need to be allocated to specific projects. Yet, the issuer **commits to reaching ambitious, science-based and measurable Sustainability Performance Targets (SPTs)** around pre-determined KPIs, and to having these reviewed by an external party.
- Bonds where the proceeds are used to finance or refinance green projects, social projects or a combination of both are called **Green, social and Sustainability bonds respectively, and should not be confused with SLBs.**

SLBs are bonds whereby the proceeds from the issuance are not ring-fenced to green or sustainable purposes (**unlike "use of proceeds" green bonds or sustainable bonds**) and may be used for general corporate purposes or other purposes.

8. **SEBI-recovery of dues**

**Context:**

The Securities and Exchange Board of India (Sebi) has segregated dues to the tune of ₹67,228 crore under the **"difficult to recover"** category at the end of March 2022.

**Details:**

- It includes –those who failed to pay the fine and fees due to the markets watchdog, and those who did not comply with SEBI's direction to refund investors' money.
- A huge portion of the total pertains to **Collective Investment Scheme (CIS)** and those due to the parallel proceedings before various courts and court-appointed committees.

**Concept:**

**Recovery and Refund by SEBI:**

- DTR dues are ones that could not be recovered even after exhausting all the modes of recovery
- Segregation of dues as DTR is purely an administrative act and this will not preclude the recovery officers from recovering the amount.
- **Sebi is empowered to recover penalties imposed by the adjudicating officer**, the amount directed to be disgorged, and the money ordered to be refunded to the regulator.

a. The **Recovery and Refund Department** deals with recovery proceedings against the defaulters who have failed to pay the penalty, fees, disgorgement amount or monies directed to be refunded to investors and refund of such monies.
b. **Recovery Division 1**-The Division handles work related to:
    - Policy matters related to recovery and refund
    - recovery cases where the principal amount exceeds one crore and refund related work
    - litigation related to recovery
    - coordination with the Recovery Officers (ROs) posted at regional offices and maintaining centralized databases.
**c.** **Recovery Division 2**-The Division handles work related to:
    - Recovery cases where the principal amount due is up to Rupees one crore.
    - Litigation related to recovery;
    - Wadhwa committee related refund work in IPO matters..
d. **Recovery Division 3**-The Division handles work related to:
    - Certain assigned recovery cases where the principal due amount exceeds Rupees one crore and refund related work;
    - Recovery cases where the principal amount due is up to Rupees one crore;
    - Litigation related to recovery.
e. **Special Enforcement Cell**-The Division handles work related to refund and litigation of Sahara Matter.

**Collective Investment Scheme (CIS):**

- Under the Securities Laws (Amendment) Act 2014, when a corpus amount of Rs 100 crore or more is gathered from investors, it is referred to as a **Collective Investment Scheme.**
- A collective investment scheme is one in which **a group of people pool their money and invest it in an asset.**
- The asset's returns are then shared among the group based on their share of the total investment.
- According to **Section 11AA of the SEBI Ac**t, CIS is any scheme or arrangement that meets the following criteria:
    a. the contributions or payments made by the investors, by whatever name called, are pooled and used solely for the purposes of the scheme or arrangement;
    b. the contributions or payments are made to such scheme or arrangement by the investors with the intention of receiving profits, income, produce, or property, whether movable or immovable, from such scheme or arrangement;
    c. the property, contribution, or investment that forms part of the scheme or arrangement is handled on behalf of the investors, whether identifiable or not.
- **A Collective Investment Management Company** is a business entity formed under the Companies Act of 1956 and registered with SEBI under the SEBI (Collective Investment Schemes) Regulations of 1999 with the purpose of organizing, operating, and managing a Collective Investment Scheme.
    a. A copy of the scheme's offer document must be filed with SEBI, and if no changes are proposed by SEBI within 21 days after filing, the Collective Investment Management Company may disseminate the offer document to the general public for the purpose of raising money.

**Structure of a CIS**

- **Trustee**
    a. According to the Collective Investment Scheme Regulations of 1999, the CIS must be set up as a trust.
    b. The Trustee follows the established laws and regulations and works for the interest of the unitholders, safeguarding the assets and ensuring compliance.
    c. The Collective Investment Management Company appoints the Trustee who is in charge of the CIS's assets.
- **Fund Manager**
    a. The fund manager, as the name implies, is in charge of the CIS's funds and oversees and controls all of the CIS's investment decisions.
    b. The fund manager is also responsible for the following tasks:
    c. scheme unit pricing
    d. valuing the scheme
    e. managing the scheme's portfolio
- **Shareholder**
    a. Individuals that combine their money into the plan are referred to as shareholders.
    b. As a result, individuals have a right to collect the investment returns as well as a right to the asset to the amount of their share and on the basis of the agreement signed when they joined the scheme.

**Schemes that are not treated as CIS**

- any scheme or arrangement developed or offered by a co-operative society;
- any scheme or arrangement under which non-banking financial companies accept deposits;
- any scheme or arrangement providing for any Scheme, Pension Scheme, or Insurance Scheme framed under the Employees Provident Fund and Miscellaneous Provisions Act, 1952;
- any scheme or arrangement in which deposits are accepted under section 58A of the Companies Act, 1956;
- any scheme or arrangement in which deposits are accepted by a company declared as a Nidhi or a mutual benefit society under section 620A of the Companies Act, 1956.
- any scheme or arrangement falling within the meaning of Chit business as defined in the Chit Fund Act, 1982.

- any scheme or arrangement under which contributions made are in the nature of subscription to a mutual fund.

**9. The Bank of England raised its key interest rate**

**Context**

The Bank of England raised its key interest rate by 0.75 percentage point on Thursday, its largest rise since 1989, as it fights a surge in inflation from rising energy prices even as the UK economy slides into an expected recession.

**Implication**

- Higher borrowing costs will hurt an already weak economy as consumers brace for falling real incomes and rising prices.
- It led to bond sell out and bond yield rose.

**What is monetary policy?**

Monetary policy is an action that a country's central bank or government can take to influence how much money is in the economy and how much it costs to borrow.

**Monetary policy of England:**

- Low and stable inflation is good for the UK's economy and its main monetary policy aim.It also supports the Government's other economic aims for growth and employment.
- The UK's central bank uses two main monetary policy tools.
    - **Bank Rate-**The BoE's primary monetary policy tool is the bank rate, the interest rate it pays on reserve deposits to domestic banks
    - **Quantitative easing (QE)**-The BoE has also provided economic stimulus through asset purchases, a policy known as quantitative easing (QE).
- The BoE's **Monetary Policy Committee (MPC) pursues its primary mandate of price stability by targeting an annual inflation rate determined by the government** to be most consistent with that objective.
    - The Monetary Policy Committee (MPC) decides what monetary policy action to take. The MPC sets and announces policy eight times a year (roughly once every six weeks).

**Impact of rise in interest rate on bonds: -**Bond yields are significantly affected by monetary policy—specifically, the course of interest rates.

- **A bond's yield** is based on the **bond's coupon payments divided by its market price**; as **bond prices increase, bond yields fall.**
    - **Example-**Let's say you have a $1,000 bond that has an annual coupon payment of $100, and it's selling near par, for $1,010. Its yield is 9.9% ($100 / 1010). Now, let's say the bond's price jumps to $1,210. Its yield falls to 8.3% (100 / 1210).
- **Falling interest rates** make **bond prices rise and bond yields fall.** Conversely, **rising interest rates cause bond prices to fall, and bond yields to rise.**

**Example-** When the risk-free rate of return rises, money moves from financial assets to the safety of guaranteed returns i.e., if the **interest rate rises from 2% to 4%, a bond yielding 5% would become less attractive.** The extra yield would not be worth taking on the risk. **Demand for the bond would decline given supply. Thus, bond price falls and the yield would rise** until supply and demand reached a new equilibrium.

**10. Captive mines**

**Context:**

Captive mines producing major minerals may soon be allowed to sell half their output in the open market.

**Concept:**

- **Captive Mines:** Captive mines are the mines that are owned by companies. The coal or mineral produced from these mines is for the exclusive use of the owner company of the mines. The company cannot sell coal or minerals outside. Some electricity generation companies used to have captive mines.
- **Example-** Other than coal, captive mines produce minerals such as iron ore, bauxite, limestone, copper, potash, lead and zinc.
- **Mines and Minerals (Development and Regulation) Act, 1957** empowered central to reserve any mine for the particular end-use. These were the captive mines.
    - The government **amended the MMDR Actin 2021** giving permission for open market sale of 50% of annual production from captive mines with restrictions and after payment of additional amount to state governments as royalty
- **Currently, captive mine operators can sell 50% of the annual output from their mines** but only after meeting the entire needs of the end-use plant for which a mineral block was originally allocated by the government.

**Non- Captive Mines:** Non-captive Mines are mines from which the produced coals of minerals could be used for its own consumption and as well as for selling it.

**11. India's central counterparties**

**Context:**

The EU's financial markets regulator and supervisor--the European Securities and Markets Authority (ESMA), said **six of India's central counterparties (CCPs) would be de-recognised** in accordance with the European Market Infrastructure Regulation.

**Details:**

The six institutions on ESMA's list are The Clearing Corporation of India (CCIL), Indian Clearing Corporation (ICCL), Multi Commodity Exchange Clearing (MCXCCL), and NSE Clearing (NSCCL), India International Clearing Corporation (IFSC) (IICC) and the NSE IFSC Clearing Corporation (NICCL)

**Concept:**

**A counterparty** (sometimes contra party) is a legal entity, unincorporated entity, or collection of entities to which an exposure of financial risk may exist.

**Within the financial services sector,** the term market counterparty is used to refer to governments, national banks, national monetary authorities and international monetary organisations such as the World Bank Group that act as the ultimate guarantor for loans and indemnities.

**Also, within financial services,** counterparty can refer to brokers, investment banks, and other securities dealers that serve as the contracting party when completing "over the counter" securities transactions.

**Example:**

- **The Clearing Corporation of India (CCIL),** supervised by RBI,
- **Indian Clearing Corporation (ICCL), Multi Commodity Exchange Clearing (MCXCCL), and NSE Clearing (NSCCL)**, supervised by Sebi;
- **India International Clearing Corporation and the NSE IFSC Clearing Corporation (NICCL),** supervised by the International Financial Services Centre Authority (IFSCA).

**Clearing Corporation of India Limited (CCIL)**

- CCIL was set up in April 2001 by banks, financial institutions and primary dealers, to **function as an industry service organisation for clearing and settlement of trades in money market, government securities and foreign exchange markets.**
- The Clearing Corporation plays the crucial role of a Central CounterParty (CCP) in:
    - The government securities,
    - USD –INR forex exchange (both spot and forward segments) and
    - Collaterised Borrowing and Lending Obligation (CBLO) markets.
    - CCIL plays the role of a central counterparty whereby the contract between buyer and seller gets replaced by two new contracts - between CCIL and each of the two parties. This process is known as 'Novation'.
        - Through novation, the counterparty credit risk between the buyer and seller is eliminated with CCIL subsuming all counterparty and credit risks.
    - In addition to the guaranteed settlement, CCIL also **provides non-guaranteed settlement services for National Financial Switch (Inter bank ATM transactions) and for rupee derivatives such as Interest Rate Swap**s.
    - CCIL is also providing a **reporting platform and acts as a repository for Over the Counter (OTC) products.**

**Indian Clearing Corporation Limited**

It was incorporated in 2007 as a wholly owned subsidiary of BSE Ltd. ("BSE"). ICCL carries out the functions of clearing, settlement, collateral management and risk management for various segments of BSE. ICCL undertakes to act as the central counterparty to all the trades it provides clearing and settlement services for.

**Multi Commodity Exchange Clearing Corporation Limited** (MCXCCL) has entered into an agreement with Multi Commodity Exchange of India Ltd (MCX), for providing Clearing and Settlement services to MCX.

**NSE Clearing Limited (National Clearing)** formerly known as National Securities Clearing Corporation Limited (NSCCL), a wholly owned subsidiary of NSE, was incorporated in August 1995. It was the first clearing corporation to be established in the country and also the first clearing corporation in the country to introduce settlement guarantee.

12. **India Infrastructure Project Development Fund Scheme**

**Context:**

The Finance Ministry has come out with a scheme to extend financial support for project development expenses of Public Private Partnership (PPP) projects in the infrastructure sector.

**India Infrastructure Project Development Fund Scheme**

- It is a scheme for **Financial Support for Project Development Expenses of PPP Projects.**
- It **aims** at improving the quality and pace of infrastructure development in the country by encouraging private sector participation in the infrastructure sector.
- Its Central **Sector Scheme** which will aid development of quality PPP projects by providing necessary **funding support to the project sponsoring authorities**, both in the Central and State Governments, for creating a shelf of bankable viable PPP projects for achieving the vision of modern infrastructure for the country.
- Under the scheme-'**India Infrastructure Project Development Fund'** (IIPDF), **Project Sponsoring Authorities (PSA) will get assistance up to Rs 5 crore.**
- **Funding will be given for meeting project development costs**–expenses incurred by PSA in respect of feasibility studies, environment impact studies, financial structuring, legal reviews and development of project documentation, including concession agreement, commercial assessment studies, grading of projects, etc

- The government can **also use funding under the IIPDF Scheme** to engage consultants/TAs for specific assignments of professional services, including providing support to States/UTs.
- It will not include expenses incurred by the PSA on its own staff, but could be spent on consultant and transaction advisors.
- Funding under IIPDF Scheme is in **addition to the already operational Scheme for Financial Support to PPPs in Infrastructure (VGF Scheme).**
- Funding under the IIPDF Scheme shall **not be recovered**

**VGF Scheme**

- Infrastructure projects undertaken in the PPP mode that are economically justified but commercially unviable, are supported.
- Under this scheme, PPP in areas like wastewater treatment, solid waste management, health, water supply and education, could get 30% of the total project cost from the Centre.
- Separately, pilot projects in health and education, with at least 50% operational cost recovery, can get as much as 40% of the total project cost from the central government.

The Centre and States would together bear 80% of the capital cost of the project and 50% of operation and maintenance costs of such projects for the first five years.

13. **RBI liquidity withdraw**

**Context**

The Reserve Bank of India (RBI) withdrew $66.73 billion from overseas during the six-month period ended September 2022 according to the RBI's half-yearly report on 'Management of foreign exchange reserves'.

**Details of the Report:**

- As of September 2022, out of the total foreign currency assets of $472.81 billion:
  - $361.84 billion was invested in securities,
  - $81.64 billion was deposited with other central banks and the BIS
  - $29.33 billion comprised deposits with commercial banks overseas.
- The RBI pulled out $58.9 billion from its deposits in other central banks and Bank of International Settlements.
- India's deposits in other overseas commercial banks also declined by $7.83 billion to $29.32 billion.
- The share of gold in the total foreign exchange reserves increased marginally from about 7.01 per cent as at end-March 2022 to about 7.06 per cent as at end-September 2022.
- Foreign exchange reserves cover of imports declined to 10.4 months in June 2022.
- The ratio of short-term debt (original maturity) to reserves increased to 22.0 per cent at end-June 2022.
- The ratio of volatile capital flows to reserves increased to 67.6 percent at end-June 2022.

**Why withdraw overseas deposits?**

- To appreciate the rupee which has been under pressure due to the appreciation of the dollar.
  - It will increase domestic supply of dollars relative to the rupee thus appreciate the rupee.

**Concept**

**Forex management:**

- The Reserve Bank of India, is the custodian of the country's foreign exchange reserves and is vested with the responsibility of managing their investment.
  - The legal provisions governing management of foreign exchange reserves are laid down in the Reserve Bank of India Act, 1934.
- **The Reserve Bank of India Act permits the Reserve Bank to invest the reserves** in the following types of instruments:
  - Deposits with Bank for International Settlements and other central banks
  - Deposits with foreign commercial banks
  - Debt instruments representing sovereign or sovereign-guaranteed liability of not more than 10 years of residual maturity
  - Other instruments and institutions as approved by the Central Board of the Reserve Bank in accordance with the provisions of the Act
    - The central bank has the mandate to invest up to $5 billion in the bonds issued by the India Infrastructure Finance Company (UK) Limited.
  - Certain types of derivatives

**The foreign currency assets**

- It comprises multi-currency assets that are held in multi-asset portfolios as per the existing norms, which conform to the best international practices followed in this regard.
- According to the RBI, except fixed deposits with the BIS, commercial banks overseas, central banks and securities issued by supranational, almost all other types of investments are highly liquid instruments which could be converted into cash at short notice.
- The Reserve Bank closely monitors the portion of the reserves, which could be converted into cash at a very short notice, to meet any unforeseen/ emergency needs

14. **Polycrisis**

**Context**

A new word,'polycrisis', has entered the academic and policy lexicon to describe the multiple anxieties that have enveloped the world over the past 30 months.

**Concept**

**Polycrisis:**

- It was **first used by former European Commission president Jean-Claude Junker** to describe Europe's combustible situation in 2016 which combined indebtedness with Brexit, climate change and a refugee crisis.
- Economic historian and Columbia University professor **Adam Tooze has been popularizing the term 'polycrisis'** according to whom–
    - "**Polycrisis** is not just a situation where you face multiple crises. It is a situation where the whole is even more dangerous than the sum of the parts."
    - A global polycrisis **occurs when** crises in multiple global systems become causally entangled in ways that significantly degrade humanity's prospects. These interacting crises produce harms greater than the sum of those the crises would produce in isolation, were their host systems not so deeply interconnected.
- The **interesting thing about polycrisis is perhaps its dualistic structure:** a set of common crises which afflicts the world today with an additional layer unique to each country or region.
    - **For example**-EU–everything else remaining the same, the region faces an urgent energy crisis. government.
    - **India**–Apart from the global factors that have adversely affected inflation, interest rates and currency values, India will have to address a unique set of challenges in the domestic economy–growing joblessness, a relatively stagnant economy and heightened sectarian tensions.
- **Interconnected Stressors-**Multiple anxieties that have enveloped the world over the past 30 months:
    - Climate change to aggravating all the above problems
    - Global lockdowns breaking down well-established supply chains
    - Raised protectionist walls higher, putting global trade and globalization in jeopardy
    - Russia-Ukraine crisis causing deep geopolitical crisis including re-ignition of nuclear threats, indebtedness of poor nations for energy and food grains
    - Slow burn USA-China cold war
    - Inflationary trends causing central banks increasing interest rates
    - Further dampening business sentiments and economic growth prospects

15. **End of lock-in period**

**Context**

The share price of India's 11 new-age tech companies, including Nykaa, Paytm is likely to be under pressure as $14 billion worth of locked-in shares in these companies will be available to be sold in the market.

**Details:**

Leading investors who had made pre-IPO bets are expected to exit or sell part of their holdings as they have lost appeal among investors due to the Fed interest rate tightening.

**Lock-in period**

- Lock in period or lock up period refers to that period for which investments cannot be sold or redeemed.
- Lock-in periods are commonly used for hedge funds, IPOs of private equity, start-ups and few mutual funds.
- A lock in period does not define the tenure of investment.
- It is not just a restriction on investment but also an opportunity for new investors to grow.
- **Lock in periods for different investment**
    - Hedge Funds are usually kept for 30 to 90 days.
    - Public Provident Funds are kept for 15 years.
    - ELSS mutual funds are usually kept for 3 years.
    - Tax saving Fixed Deposits are locked in for 5 years.
    - 8% Government of India bonds are locked up for 6 years.

**Importance of Lock in Period**

- It will help the investors stick to the investment for some time and reap the benefits of long-term investing.
- Mutual funds have lock-in periods to induce stability in the mutual fund while preserving liquidity.
- Lock in periods can also come handy when one wishes to claim deductions in the income from these investments from income tax.
- For hedge funds, the lock up period gives the hedge fund manager time to exit investments that may be illiquid or otherwise unbalance their portfolio of investments too rapidly.
- For start-ups or companies issuing an IPO, the lock in period helps the company build a business model on a solid footing and show market resilience. The lock-up period post IPO prevents stock from being sold immediately when the share prices may be artificially high and susceptible to extreme price volatility.
- Having a lock in period for goal-based investment is good.

**Lock-in period and pre-IPO investment**

- Rules in India required a 1-year lock-in period for pre-IPO investors when these companies got listed.

- **SEBI (DIP) Guidelines** have stipulated lock-in requirements on shares of promoters mainly to ensure that the promoters or main persons who are controlling the company, shall continue to hold some minimum percentage in the company after the public issue.

**Initial Public Offering (IPO)** is when an unlisted company makes either a fresh issue of securities or an offer for sale of its existing securities or both for the first time to the public. This paves way for listing and trading of the issuer's securities.

16. **A peek into India's Toshakhana**

**Context**

In the last few years, the number of items that Toshakhana received has been going down.

**Details:**

As per the Ministry of External Affairs-between January 2019 and April 2022, Toshakhana received 2,036 items, that cumulatively have a value of ₹7.76 crore.

The repository received around 768 items in 2018 which came down to 127 in 2021.

**Concept:**

**Toshkhana**

- Toshakhana-the treasure trove of the government, is **governed by** various 'gift acceptance policies' and also by the Central Civil Services Conduct Rules.
- It is a r**epository of articles or gifts received** by ministers, diplomats and heads of armed forces while discharging their official duties, from foreign sources.
- As per **a June 1978 gazette notification,** every gift received by a person during an official visit should be deposited in the Toshakhana within 30 days of his return.
    - The Toshakhana officials are then **required to assess the worth of the gift in the Indian market.**
    - Recipients are allowed to keep items that are valued less than ₹5,000. If it exceeds the limit, they can retain it by paying extra.
    - Presents which are not purchased by recipients will remain at the disposal of the government.
- **What can be done to the gifts left unpurchased?**
    - The MEA may **donate** artifacts of cultural value to public museums in the country.
    - Articles from the Toshakhana are also **used** in Rashtrapati Bhawan, Rashtrapati Niwas (Simla), the prime minister's official residence, Indian embassies abroad and various government departments.
    - Some articles, like jewellery or items that are not likely to be required for presentation are **auctioned** off by the government.
        - The l**ast auction** of items in the toshakhana was held in 1983 only central government officials posted in Delhi were allowed to bid.
        - The auction was a closed-door affair and many articles were sold well below their assessed value.
    - Gold coins or government mintage are made over to the **treasury.**
    - **Animals** presented are sent to the nearest army service corps for early sale or handed over to zoological gardens.

17. **How bond yield in US affect India**

**Context**

With the US Federal Reserve increasing interest rates aggressively to curb inflationary pressures, the yield on US 10-year bonds surged to 4.163%.

**Concept:**

**What is yield in the context of a bond?**

- Yields are the returns from investing in a bond.
- **A bond's yield** is based on the **bond's coupon payments divided by its market price**; as **bond prices increase, bond yields fall.**
    - **Example**-Let's say you have a $1,000 bond that has an annual coupon payment of $100, and it's selling near par, for $1,010. Its yield is 9.9% ($100 / 1010). Now, let's say the bond's price jumps to $1,210. Its yield falls to 8.3% (100 / 1210).
- **Government bond yields are indicative** of a country's inflation and interest rate expectations.
    - During periods of **high inflation**, newer debt issuances are compelled to offer **higher yields**-Rising inflation pushes bond prices down, thereby pushing yields higher.
        - As inflation rises, central banks will increase short-term interest rates in an effort to cool down the economy. Additionally, rising inflation expectations lead to an increase in long-term rates, which are largely determined by market activity. The inverse relationship between interest rates and bond prices means that higher rates equal lower bond prices
    - As **interest rates rise, bond yields rise**– When the risk-free rate of return rises, money moves from financial assets to the safety of guaranteed returns i.e., if the interest rate rises from 2% to 4%, a bond yielding 5% would become less attractive. The extra yield would not be worth taking on the risk. Demand for the bond would decline given supply. Thus, **bond price falls and the yield would rise** until supply and demand reached a new equilibrium.

**What is fuelling the rise in US bond yields?**

- **Quantitative tightening**–Inflation in the US has been on a steady rise– to counter this, the US Federal Reserve has been raising interest rates aggressively has resulted in the bond

**Impact on India?**

- **Capital outflows** -The comparative improvements in the US capital markets lead to foreign portfolio investors (FPIs) withdrawing from the Indian capital markets.Higher bond yields reduce the attractiveness of equity markets as against fixed income securities.
- **Currency depreciation**-The net outflow of dollars leads to the rupee depreciation.
- **Imported inflation**-Rupee depreciation has also led to landed costs of crucial imports rising and leading to cost-push inflation in the country.
- **Rise in domestic bond yield**-Given the capital outflows demand for the bond would decline given supply. Thus, bond price falls and the yield would rise until supply and demand reached a new equilibrium.

**What is the way out of this situation?**

- To limit rupee depreciation, the RBI continues selling dollars in the foreign exchange market.

18. **Why a strong rupee is good?**

**Context:**

India has moved to the fifth largest economy in dollar terms, despite the rupee depreciation.

**Details:**

India's trade deficit is perennially negative and therefore the rupee will be weak

**What if the rupee appreciates**—What if the rupee was trading at ₹60 to the dollar and not at ₹80+?

- The reduction in the **import bill** of oil.
- **Fall in fuel price**-If the price benefit is passed on to the consumer it will cause reduction in the price of fuel.
- **Fall in inflation**-The high fuel cost has a cascading inflationary effect on the entire economy, and that can be moderated.
- **Rise in the purchasing power of money**-due to fall in inflation, saved money can be used in the consumption of other goods.
- Reduction in exports.
- **Capital inflows**-If the rupee is expected to strengthen, then immediately dollars start to flow into the country fast as no one wants to lose with lower exchange rates at a future date.
    - **Note-** Here expected appreciation in the future will cause capital inflows in the present. However, a current appreciation will cause capital outflows as no one wants to lose with lower exchange rates if rupee appreciates.

**Concept:**

- **Currency appreciation** refers to the increase in value of one currency relative to another in the forex markets.
- The value of a currency is not measured in absolute terms. It is always measured relative to the currency being measured against it.
- Appreciation is **directly linked to demand and supply.**
    - If the value appreciates (or goes up), demand for the currency also rises or supply falls.
- **Effects of Currency Appreciation**
    - **Export costs rise**- If the Indian rupee appreciates to the US $, foreigners will find Indian goods more expensive because they have to spend more for those goods in the US $. That means that with the higher price, the number of Indian goods being exported will likely drop. This eventually leads to a **reduction in gross domestic product (GDP).**
    - **Cheaper imports**-If Indian goods become more expensive on the foreign market, **foreign goods or imports will become cheaper in India.** That translates to a benefit of lower prices, leading to **lower overall inflation due to lower imported inflation.**
    - **Rise in current account deficit**- as import rises and export falls.
    - **Monetary policy**- It is possible that an appreciation in the exchange rate may make the Central Bank more willing to cut interest rates.
        - An appreciation reduces inflationary pressure so interest rates can be lower.

**The relationship between balance of payments and exchange rates** under a floating-rate exchange system will be driven by the supply and demand for the country's currency and all transactions taking place with other countries.

- Suppose there is **surplus in the balance of payments**-It means money inflows are greater than the money outflows due to the net positive international transactions leading to appreciation **of domestic currency.**
- **Example**-Let initial exchange rate be Rs. 40 = $1. An increase in demand for India's exportables means an increase in the demand for Indian rupee relative to the demand of the US$ and decrease in the supply of the Indian rupee relative to the supply of the US$. Consequently, the dollar depreciates while the Indian rupee appreciates.

**Can artificial appreciation of rupee help be solving the present rupee value crisis?**

**Yes!! Only if following measures are accompanied:**

- **Clear signal that there is a plan to strengthen the rupee**-If the rupee is expected to strengthen, then immediately dollars start to flow into the country fast as no one wants to lose with lower exchange rates at a future date.
- **Reduction in oil consumption and wasteful imports.**
- **Encourage non-dollar sources of oil.**

- **Launch a PM Build-India-Bonds-that offer decent returns to encourage capital inflows.**

19. **Farmer Producer Organisations (FPOs)**

**Context:**

Govt moves to set up fodder-centric farmer producer organisations.

**Details:**

- The government has designated the **National Dairy Development Board (NDDB)** as the **implementing agency,** setting a target of **100 such FPOs in 2022-23.**
- It will be set up under the scheme of formation and promotion of **10,000 Farmer Producer Organisations (FPOs)**
- It aims to form and promote FPOs–primarily fodder centric, and animal husbandry activities as a secondary activity (fodder plus model).
- The idea of setting up fodder-centric FPOs was first mooted by the Ministry of Fisheries, Animal Husbandry and Dairying in 2020, with the aim to **address the fodder deficit situation in the country.**
    - The high fodder inflation has a direct impact on rural livelihoods.

**National Dairy Development Board (NDDB)**

- It was founded in **1965** to replace exploitation with empowerment, tradition with modernity, stagnation with growth, transforming dairying into an instrument for the development of India's rural people.
- The **National Dairy Development Board**, initially registered as a society under the **Societies Act 1860,** was merged with the erstwhile Indian Dairy Corporation, a company formed and **registered under the Companies Act 1956, by the NDDB Act 1987, with effect from 12 October, 1987.**
- The NDDB is an institute of **national importanc**e established by an act of the Indian Parliament and thus is a statutory body.
- National Dairy Development Board located at– **Anand, Gujarat (HQ)**
- It is under the **Ministry of Animal Husbandry, Dairying and Fisheries**
- It was f**ounded by Dr Verghese Kurien,** often called 'India's milkman'.
- It was set up to **replicate the success of Amul to the whole of India.**
- NDDB was created to **boost, finance and support producer-owned and controlled organisations in the dairy industry.**
- Its activities and programmes are aimed at augmenting farmer-owned institutions and it also supports national policies that are inclined towards the growth of such organisations.
- Its major **success is Operation Flood**-which ran from 1970 to 1996 (26 years) and transformed India into the largest producer of milk in the world. This is also called the White Revolution.
- The Board has **integrated more than 1 lakh dairy cooperatives in the 'Anand Pattern'.**
    - Under this, the village-level society is linked to the state dairy federation in a three-tier structure.
- The NDDB also implementing the **National Dairy Plan (NDP)**
- **NDDB's subsidiaries** include Mother Dairy, Indian Immunological Ltd., Hyderabad (IIL), Indian Dairy Machinery Company Ltd, Anand (IDMC) and NDDB Dairy Services.

**What are Farmer Producer Organisations (FPOs)?**

- It is a **type of Producer Organization (PO)** where the members are farmers.
    - A Producer Organization (PO) is a **legal entity formed by primary producers**, viz. farmers, milk producers, fishermen, weavers, rural artisans, craftsmen. A PO can be a producer company, a cooperative society or any other legal form which provides for sharing of profits/benefits among the members. In some forms like producer companies, institutions of primary producers can also become members of PO.
- FPOs are **voluntary organizations controlled by their farmer-members who actively participate in setting their policies and making decisions.**
- They are **open to all persons** able to use their services and willing to accept the responsibilities of membership, without gender, social, racial, political or religious discrimination.
- FPOs operatives provide education and training for their farmer-members, elected representatives, managers, and employees so that they can contribute effectively to the development of their FPOs.

**Government's Effort for Promotion of FPO**

- **Since 2011,** it has intensively promoted FPOs **under the Small Farmers' Agri-Business Consortium (SFAC), NABARD, state governments and NGOs.**
- The ongoing **support** for FPOs is mainly in the form of
    - **Equity Grant Scheme–**The Scheme is operated by the Small Farmers' Agri-Business Consortium (SFAC). It aims to extend support to the equity base of Farmer Producer Companies (FPCs) by providing matching equity grants up to a maximum of Rs 15 lakh in two tranches.
    - **Credit Guarantee Scheme**-The scheme provides risk cover to banks that advance collateral-free loans to FPCs up to Rs 1 crore. Only about 1% of registered producer companies have been able to avail the benefits.
- **Central Sector Scheme of Formation and Promotion of 10,000 FPOs**-The scheme was launched by the Ministry of Agriculture & Farmers Welfare to form and promote 10,000 new FPOs till 2027-28. The scheme is being implemented by the SFAC, National Cooperative Development Corporation (NCDC), NABARD, NAFED among others.

While adopting a cluster-based approach, the formation of FPOs will be focussed on **"One District One Product"** for the development of product specialization.

20. **Compulsory convertible preferred shares (CCPS) & equity shares**

**Context:**

IRDAI has rejected a proposal to convert a company's holdings in compulsory convertible preferred shares (CCPS) into equity shares.

**Details:**

- In June 2022, Digit Insurance and Fairfax Financial Holdings applied to the IRDAI for approval to convert the company's holdings in compulsory convertible preferred shares issued by Go Digit Info works into equity shares of Go Digit Info works.
- The conversion of the Digit CCPS would result in Digit (currently classified as an Indian promoter of Digit Insurance) becoming a subsidiary of the company, which is currently prohibited for Indian promoters.

**Compulsory convertible preferred shares (CCPS)**

- These are **types of Preference Shares** being issued by the Company
    - Preference shares (preferred stock) are company stock with dividends that are paid to shareholders before common stock dividends are paid out.
    - There are **four types of preferred stock** - cumulative (guaranteed), non-cumulative, participating and convertible.
- CCPS o**ffer fixed income to the investors** and **compulsorily convert into Equity Shares** of the issuing company after a predetermined period. The **terms of conversion are also pre-decided at the time of issue.**
- These offer investors the opportunity to participate in the growth of companies while mitigating the risk of lower valuation of companies that underachieve the targets.
- Issuing CCPS further benefits the Company's promoters to raise funds without diluting the ownership at the initial period.
- Following are the steps required to followed for the **Conversion of Compulsory Convertible Preference Shares into Equity Shares:**
    - Call Board Meeting of the Board of Directors of the Company
    - Hold the Board Meeting and pass Board Resolution f
    - E-forms Filing with the Registrar of the Companies-for intimation of redemption of preference shares which are converted into equity shares
    - Issue of Share Certificates-To all allottees within a period of 2 months from the date of allotment of Equity Shares
    - Maintenance of Statutory Registers
- It is crucial not only for the start-up founders but also for the investors to find the best way to become a part of the company so that not only both benefit out of it but also safeguard their interests.

21. **Market infrastructure institutions (MIIs)**

**Context**

The Securities and Exchange Board of India sought public comments on a report submitted by one of its working committees on strengthening the governance of market infrastructure institutions (MIIs).

**Details:**

- In April, the market regulator formed a **committee under G. Mahalingam** to strengthen governance norms at the MIIs.
- Functional classification, board independence, widening the definition of key managerial person and capping their compensation, and tightening the net worth criteria are some of the key proposals put forth by the 13-member committee formed by SEBI.

**Market Infrastructure Institutes:**

- MIIs are institutions providing infrastructure of trading, settlement and record keeping and include stock exchanges, clearing corporations and depositories.
- **Stock exchanges, depositories and clearing houses** are all Market Infrastructure Institutions and constitute a key part of the nation's vital economic infrastructure.
- MIIs helps in optimal use of money in the economy and fostered economic development.
- They constitute the nucleus of the capital allocation system and are indispensable for economic growth and have a net positive effect on society like any other infrastructure institution.
- **That MIIs are systemically important in India** is clear from the phenomenal growth of these institutions in terms of market capitalization of listed companies, capital raised and the number of investor accounts with brokers and depositories and the value of assets held in the depositories' account.
- Currently, MIIs are required to have a minimum net worth of not less than Rs 100 crore on a continuous basis.
- **What are the specific institutions in India that qualify as MIIs?**
    - Among **stock exchanges,** the SEBI lists seven, including the BSE, the NSE, the Multi Commodity Exchange of India and the Metropolitan Stock Exchange of India.
    - There are **two depositories** — charged with the safekeeping of securities and enabling their trading and transfer — that are tagged MIIs: The Central Depository Services Ltd. and the National Securities Depository Ltd.
    - The regulator also lists **seven clearing houses** including the Multi Commodity Exchange Clearing Corporation.

- Clearing houses, for their part, help validate and finalise securities trades and ensure that both buyers and sellers honour their obligations.

**22. Export transaction in rupee eligible for sops**

**Context:**

Exporters settling trade in rupee terms will now be able to access export incentives or duty rebates.

**Details:**

- Earlier incentives to exporters like– **duty drawbacks, export promotion capital goods (EPCG) incentives, and advance authorization scheme** were available only if payments or export realization came in **freely convertible currencies—the US dollar, British pound, euro and Japanese yen.**
- The mechanism is aimed at facilitating trade with countries under sanctions, like Iran and Russia and help eliminate depreciation of rupee.

**Concept:**

- The RBI in July introduced a **rupee settlement system for international trade,** where the invoicing, payment and settlement of exports and imports to all countries, if approved by RBI, can be in the Indian rupee through special Vostro account linked to the correspondent bank of the partner country for receipts and payments denominated in rupees.
- **Benefits given:**
  - **Duty drawback** is the refund of Customs duties, taxes and fees paid on imported items that are matched with subsequently exported or destroyed items.
    - Essentially, duty drawback is an export promotion program intended to eliminate or recover the costs of duties, taxes and fees on merchandise sold on international markets.
    - It is one of the few export incentive programs acceptable under World Trade Organization rules.
  - **Export promotion capital goods (EPCG) incentives**
    - It allows importation of capital goods required for the manufacturing of export-oriented products specified in the Export Promotion Capital Goods Authorization at concessional/nil rate of duty.
    - The Export Promotion Capital Goods Scheme allows exporters to import capital goods, such as spares for pre-production, manufacturing, and post-production, for zero Customs tax. IGST on capital goods imports under EPCG is also free till March 31, 2022.
    - However, the scheme is subject to an export value equivalent to 6 times of duty saved on the importation of such capital goods within 6 years
    - In cases where the license holder under the EPCG scheme fails to fulfil the stipulated export obligation then the licensee shall be liable to pay the customs dues along with 15% interest per annum to the customs authority.
    - Where the exporter as per his export obligation meets the deadline then only this business can sell the goods in the Domestic Tariff Area.
  - **The Advance Authorization Scheme**
    - It is a scheme where the import of inputs will be allowed to be made duty-free (after making normal allowance for wastage) if they are physically incorporated in a product which is going to be exported. An export obligation is usually set as a condition for issuing Advance Authorization.
    - The inputs imported are exempt from duties like Basic Customs Duty, Additional Customs Duty, Education Cess, Anti-dumping duty, Safeguard Duty and Transition Product-Specific Safeguard duty, Integrated tax, and Compensation Cess, wherever applicable, subject to certain conditions.

23. **Why India buying Russian oil?**

**Context:**

In FY22, India bought around 2.4% of its overall oil imports in volume terms from Russia which was just 1.7% in FY21.

**Causes:**

- **Rise in oil prices post Ukraine War**
  - With oil prices going up, more dollars are needed to buy oil. This increases the demand for the dollar and **leads to rupee depreciation and widening current account deficit.**
  - **Higher Inflation**-A weaker rupee, along with higher prices for petroleum products (imported inflation) --feeds into retail inflation.

**Concept:**

- The Ukraine conflict and the consequent economic sanctions on Russia by the West have improved trade prospects between India and Russia.
- India's imports from Russia in April-September period surged 410 per cent to $21.34 billion and its exports declined 18.8 per cent to $1.3 billion.
  - This a big hurdle for trade in rupee between India and Russia-With such a large trade deficit, Russia may be left with a huge rupee surplus that it receives for its exports.
- **Russia, which is now India's third largest import partner when it comes to crude oil**, behind Saudi Arabia and Iraq, has displaced the UAE from the third position.

**G7 price cap:**

- The G7 wealthy nations – the United States, Japan, Germany, Britain, France, Italy and Canada – and the EU are hammering out details of the plan.

- Russian crude is priced at a discount to the international Brent benchmark and the G7 wants to keep that spread wide, to keep down Russian oil revenue.
- G7 and EU countries will decide a 'price' for Russian Oil and petroleum buyers would make "attestations" to providers saying they bought Russian petroleum at or below the cap. If they don't adhere to it, they will be denied services including insurance, finance, brokering and navigation to oil cargoes priced above the cap.
    - London-based International Group of Protection & Indemnity Clubs provides marine liability cover for about 95% of the global oil shipping fleet
    - The G7 is a group of wealthy nations – the United States, Japan, Germany, Britain, France, Italy and Canada.

24. **ATI bond case-SAT**

**Context**

The Securities Appellate Tribunal (SAT) has granted the Securities and Exchange Board of India (Sebi) three weeks to file its response in a case related to its order on mis-selling additional tier-1 (AT1) bonds.

**Concept**

**AT1 bonds**

- AT-1 bonds are a type of **unsecured, perpetual bonds** that banks issue to shore up their core capital base to meet the Basel-III norms.
- These bonds were introduced by the Basel accord after the global financial crisis to protect depositors.
- There are **two routes through which these bonds can be acquired:**
    - Initial private placement offers of AT-1 bonds by banks seeking to raise money.
    - Secondary market buys of already-traded AT-1 bond.
- These bonds are **also listed and traded on the exchanges**. So, if an AT-1 bondholder needs money, he can sell it in the secondary market.
- **Investors cannot return these bonds** to the issuing bank and get the money. i.e there is no put option available to its holders.
- The **issuing banks have the option to recall AT-1 bonds** issued by them (termed call options that allow banks to redeem them after 5 or 10 years).
- Banks issuing AT-1 bonds **can skip interest pay-outs for a particular year or even reduce the bonds' face value.**
- These bonds are perpetual in nature — they do not carry any maturity date.
- They offer **higher returns to investors** but compared with other vanilla debt products, these instruments carry a **higher risk as well.**
- These bonds are **subordinate to all other debt and senior only to equity.**
- Basel-III-compliant AT 1 bonds **come with a built-in 'loss absorbency' clause** which means that in case of stress, banks can write off such investments or convert them into equity.
    - The principal loss absorption (through write-down or conversion into equity shares) can be triggered by pre-specified trigger of CET1 falling below 5.5 per cent before March 2019 and 6.125 per cent thereafter.
- At the instance of the RBI, bonds can also be **written down upon a point of non-viability (PONV) event happening.**
    - The PONV trigger event is the earlier of a) decision that a conversion or write-off, without which the firm would become non-viable, is necessary, b) decision to make a public sector injection of capital, or equivalent support, without which the firm would have become non-viable.
    - The norms also state that if the **authorities decide to reconstitute a bank or amalgamate a bank** with any other bank under Section 45 of BR Act, 1949, then such a bank will be **deemed as non-viable or approaching non-viability.**
    - If the bank reaches the point of non-viability, **AT1 bonds are the first part of debt that will be written down.**

**Securities Appellate Tribunal (SAT)**

- It is a **statutory body** created under the provisions of the **SEBI Act, 1992.**
- The Securities Appellate Tribunal has **only one bench which sits in Mumbai.**
- **Jurisdiction**: It has jurisdiction over the whole of India.
- **Composition of the SAT:** It consists of a Presiding Officer and two other members.
    - Appointment of the Presiding Officer: by the Central Government in consultation with the Chief Justice of India or his nominee.
- **Powers**: SAT has powers similar to a civil court. Appeals from its orders can be challenged in the Supreme Court.
- **Key Functions:**
    - To hear and dispose of appeals against orders passed by the Securities and Exchange Board of India (SEBI) or by an adjudicating authority under the Act.
    - To exercise jurisdiction, authority and powers conferred on the SAT by or under this Act or any other law for the time being in force.
    - To hear and dispose of appeals against orders passed by the Pension Fund Regulatory and Development Authority (PFRDA).
    - To hear and dispose of appeals against orders passed by the Insurance Regulatory Development Authority of India (IRDAI).

25. **Various Debt instruments**

**Context:**

Should retail investors park their money in debt instruments and funds for the medium term, or should they wait for rates to peak.

**Details:**

- Returns on debt funds and instruments like non-convertible debentures (NCDs) are showing signs of improvement due to rise in repo rate, reverse repo rate and Standing Deposit Facility.
    - The yield on the benchmark 10-year government bonds is also rising.
- **Optimal options amidst uncertain interest rate changes-**Floating rate funds and low-maturity funds are likely to be sound investments.
    - As fixed income yields have improved significantly and are likely to rise further, one can look at funds with maturities up to 3 years, which invest in high-quality papers like government bonds, PSU and bank bonds, AAA rated corporate bonds, credit risk funds, gilt fund and **Dynamic bond funds.**

**Concept:**

- **A debt fund** is a mutual fund scheme that invests in fixed income instruments, such as Corporate and Government Bonds, corporate debt securities, and money market instruments etc. that offer capital appreciation.
    - Debt funds are also referred to as Income Funds or Bond Funds.
- **Credit risk funds** are debt funds that lend at least 65% of their money to not-so-highly rated companies. The borrowers pay higher interest charges as a way to compensate for their lower credit rating, which translates into a higher risk for the lender due to an increased possibility of default. Although these funds lend mostly for short duration, they are still one of the riskiest in the category.
- **Gilt funds** are debt funds that invest primarily in government securities. These funds have no risk of non-payment of interest or principal amount but get affected by interest rate movements as the Government borrowing typically happens to be for a longer duration.
- **Dynamic bond funds** are debt funds which invest in debt and money market instruments like Government Securities, corporate bonds etc of different durations**.** These funds are constructed in a way that allows fund managers to use interest rates movements in the economy as an opportunity to generate higher returns.
    - If the fund manager expects interest rates to go down in the future, he / she will invest in longer term (longer duration) bonds with a view to earning profits from price appreciation.
    - If the fund manager expects interest rates to go up in the future, he / she will invest in shorter term bonds to reduce interest rate risks and also re-invest maturity proceeds of the bonds at higher interest rates in the future.
- **Debentures** are long-term financial instruments which acknowledge a debt obligation towards the issuer. Some debentures have a feature of convertibility into shares after a certain point of time at the discretion of the owner. The debentures which can't be converted into shares or equities are called **non-convertible debentures (or NCDs).**
    - **Non-convertible debentures** are used as tools to raise long-term funds by companies through a public issue. To compensate for this drawback of non-convertibility, lenders are usually given a higher rate of return compared to convertible debentures.
    - An NCD can either be **secured or unsecured**.
        - A secured NCD is backed by the issuing company's assets. This means that the company has to fulfill its debt obligation whatsoever. However, that's not the case for unsecured NCDs. This makes secured NCDs safer since they have a lower default risk.
- **Public Sector Undertaking Bonds (PSU Bonds)** are the bonds in which the government shareholding is generally more than 51%.
    - It is a medium and long-term debt instrument issued by public sector companies.
    - **PSU Banks, power sector companies, railways, and other organisations** issue PSU bonds as they have 51% of the government shareholding with them. These entities could be held by the central or state government.
    - PSU Bonds are considered a secure option for investment.
- **A government bond** is a debt instrument issued by the country's central and state governments to finance their needs while also regulating the money supply.
    - At the bond's maturity date, the government will repay the principal and interest in accordance with the terms of the bond. The Reserve Bank of India supervises the issuance of government bonds.
    - **Types:**
        - **Treasury Bills**: Treasury bills (also known as T-bills) are short-term government bonds. They are issued with a one-year maturity date. These bonds are issued by the government in three categories: 91 days, 182 days, and 364 days. The difference between the face value and the discounted value is the profit for the investors.
        - **Cash Management Bills**: These are short-term bonds with a high degree of flexibility. They are issued in response to the government's funding requirements. They must usually be less than 91 days. It's similar to treasury bills.
        - **Dated Government Securities:** This type of bond has variable interest rates. Dated Government securities are so-called because they have a predetermined maturity date. These bonds are auctioned off by the Reserve Bank of India.
        - **Fixed-Rate Bonds**: These government bonds have a fixed coupon rate for the duration of the bond. In other words, regardless of market rates, the interest rate remains constant for the duration of the investment.

- **Floating Rate Bonds:** The interest rate on these bonds fluctuates throughout the investment period. Interest rates are changed at predetermined intervals before the bond is issued.
- **Zero-Coupon Bonds**: Bonds with no coupon payments are known as zero-coupon bonds. Profits from these bonds are generated by the difference between the issue price and the redemption value.
- **Capital Index Bonds**: These are bonds in which the principal amount is linked to an accepted inflation index. This bond is issued to protect investors' principal from inflation.
- **Inflation-Indexed Bonds**: Inflation-Indexed Bonds (IIBs) are bonds in which the principal and interest payments are linked to an inflation index. The Consumer Price Index (CPI) or the Wholesale Price Index (WPI) may be used to calculate inflation (WPI).
- Bonds with a Call or Put Option: These bonds have an option that allows the issuer to buy back the bond (call option).
- **Sovereign Gold Bonds (SGBs):** The prices of Sovereign Gold Bonds are linked to the price of gold (commodity price). The bond's nominal value is based on the previous week's simple average closing price of 99.99% purity gold.

26. **Municipal Bonds**

**Context:**

Listing of municipal bonds in the stock exchanges can pave the way for developing the much-needed secondary market for municipal bonds in India, according to the Reserve Bank of India's report on municipal finances.

**Details of the report:**

- The r**evenue generation capacity of municipal corporations is declining** over time, dependence on the devolution of taxes and grants from the upper tiers has risen.
- The availability and quality of **essential service**s for the urban population in India have consequently remained **poor**.
- The rapid rise in urban population density, calls for better urban infrastructure, and **greater flow of financial resources to local governments.**
- **Over-reliance on property tax** has constrained exploiting other avenues of funding by MCs, such as trade licences, entertainment taxes, taxes from mobile towers, solid waste user charges, water charges, and value capture financing.
- **Property tax reform and development of a vibrant municipal bond marke**t can provide a boost to the municipal finances.
    - It (urban local bodies) needs to improve collection efficiencies in respect of property tax, user charges, lease rentals, advertisement tax and parking fees
- **ULBs in India are amongst the weakest globally in terms of fiscal autonomy** with elaborate State government controls on their authority to levy taxes and user charges, setting of rates, granting of exemptions, and borrowing of funds as well as on the design, quantum and timing of inter-governmental transfers.
- **Municipal revenues/expenditures i**n India have stagnated at around 1 percent of GDP for over a decade. In contrast, for 7.4 per cent of GDP in Brazil and 6 percent of GDP in South Africa.

**Concept:**

**Municipal Bond:**

- A **municipal bond (muni) is a debt security** issued by a state, municipality or counties to finance its capital expenditures, including the construction of highways, bridges or schools.
- A municipal bond **can also be issued** by a nonprofit organization, a private-sector corporation, or another public entity using the loan for public projects, such as constructing schools, hospitals, and highways.
- Through muni bonds, a municipal corporation raises money from individuals or institutions and promises to pay a specified amount of interest and returns the principal amount on a specific maturity date.
- These are **mostly exempt from federal taxes and from most state and local taxes,** making them especially attractive to people in high income tax brackets.
- **Types:**
    - **A general obligation bond (GO)** is issued by governmental entities and not backed by revenue from a specific project, such as a toll road. Some GO bonds are backed by dedicated property taxes; others are payable from general funds.
    - **A revenue bond** secures principal and interest payments through the issuer or via sales, fuel, hotel occupancy, or other taxes. When a municipality is a conduit issuer of bonds, a third party covers interest and principal payments.
- **As a fixed-income security, the market price of a municipal bond fluctuates with changes in interest rates:**
    - When interest rates rise, bond prices decline; when interest rates decline, bond prices rise.
    - In addition, a bond with a longer maturity is more susceptible to interest rate changes than a bond with a shorter maturity, causing even greater changes in the municipal bond investor's income.
- **Many municipal bonds carry call provisions**, allowing the issuer to redeem the bond prior to the maturity date. An issuer typically calls a bond when interest rates drop and reissues municipal bonds at a lower interest rate.
- Furthermore, the majority of municipal bonds **are illiquid**; an investor needing immediate cash has to sell other securities instead.
- **History of Municipal Bonds Issuance in India:**
    - Municipal bonds were first issued in India in 1997.

- Between 1997 and 2010, the city corporations of Bengaluru, Ahmedabad and Nashik experimented with bond issues but barely managed to raise Rs. 1,400 crores.
- The poor investor response was due to the fact that these **bonds were not tradable and lacked regulatory clarity.**
- **Securities and Exchange Board of India (SEBI)'s detailed guidelines** for the issue and listing of municipal bonds in March **2015**, clarified their regulatory status and rendered them safer for investors.
- In 2017, Pune Municipal Corporation had raised Rs. 200 crores through muni bonds at an interest of 7.59% to finance its 24x7 water supply project.

27. **RE, BE, Actuals**

**Context:**

The Revised Estimate will be made public along with the Budget Estimate (BE) for Fiscal Year 2023-24 (FY24).

**Details:**

- Normally **RE for a fiscal year is finalised on the basis of expenditure made in the first six months of that year,** while **BE for next fiscal year is prepared on the basis of expenditure made in the first nine months of the current year.**
  - **First indication of RE** is reflected in the first set of Supplementary Demands for Grants
- **Data released by the Controller General of Accounts (CGA)** has shown that the Centre has spent nearly 12.15 per cent more during the first six months (April-September) period of FY23, than the corresponding period of FY22 and 46.2 percent of the total allocation.
- The trends in expenditure during the first six months indicate that there will not be any major cut in the budget allocation and indicates **savings with the 'just-in-time' release of funds mechanism.**
  - This ensures money goes to various institutions only when they are ready to spend and after achieving certain milestones and not automatically transferred to their account.

**Concept:**

**Office of Controller General of Accounts**

- The **Comptroller and Auditor General's (Duties, Powers, and Conditions of Service) Act of 1971** established the need for accounting and audit to be separated.
  - **Section 10** of the Act gave the President the authority, after consulting with the CAG, to relieve the Comptroller and Auditor General of the responsibility of compiling the accounts of any Union Government department.
  - In June 1975, the Government of India approved a scheme for accounting and audit separation.
  - The President issued an ordinance, which was followed by the passage of an Act amending the Comptroller and Auditor General's (DPC) Act 1971, relieving him of the responsibility of compiling accounts for Ministries/Departments of the Government of India.
- The Controller General of Accounts (CGA) in the Ministry of Finance leads the organization and is in charge of the administration of the Management Accounting System.
- Through an integrated government-wide financial information system, t**he goal is to provide reliable information that promotes transparency in the use and reporting of public funds.**
- The Office of the CGA **prepares monthly and annual analyses of the Union Government's expenditure, revenues, borrowings, and various fiscal indicators.**
- **The mandate of the Controller General of Accounts** is derived from Article 150 of the Constitution.
- **The duties and responsibilities of CGA** are outlined in this statutory mandate, which is incorporated in the Allocation of Business Rules 1961.
  - General principles of Government accounting relating to Union or State Governments and accounting forms, as well as the development or revision of rules and manuals relating to them.
  - Reconciliation of the Union Government's cash balance with the Reserve Bank in general, and, in particular, Reserve Deposits pertaining to Civil Ministries or Departments.
  - Supervising the maintenance of adequate accounting standards by Central Civil Accounts Offices.
  - Consolidation of monthly accounts, preparation of review of trends in revenue realisation and significant features of expenditure, and preparation of annual accounts (including summary, Civil Appropriation Accounts) showing under the respective heads,the annual receipts and disbursements for the Union Government.
  - Administration of Central Treasuries Rules and Central Government Account (Receipt and Payment Rules 1983).
  - Coordination and assistance in the implementation of management accounting systems in Civil Ministries or Departments.
  - Cadre management of Group 'A' (Indian Civil Accounts Service) and Group 'B' Officers of the Central Civil Accounts Offices.
  - Matters pertaining to Central Civil Accounts staff belonging to Groups 'C' and 'D'; I Pension disbursement through Public Sector Banks (PSBs) in respect of Central Civil Pensioners, Freedom Fighter, High Court Judges, Ex-MPs and Ex-Presidents.

**BE, RE and actuals**

- Every year, the finance ministry estimates the revenues and expenditures for the following year.

- **Revenues** are projected based on the estimated tax collection and income from the sale of assets (such as from public sector companies). Based on the revenue, the budget for different sectors, such as health, education and police, is determined.
- **Expenditures** can exceed revenue, and the difference between expenditure and revenue is called the **revenue deficit,** which can be met through borrowing from the Reserve Bank of India, provident funds or external agencies like the World Bank.

- On February 1 this year, the budget presented will have estimates for the next fiscal year, that is, 2022-23.
  - The finance ministry allocates an amount to each ministry, scheme and department for the next financial year. This is the **budget estimate (BE).**
    - BE represents the "intention to spend" of the government and **are not legally binding**
  - The BE can be changed if the funds are insufficient or exceed the needs of the ministry or scheme. The department/ministry has to ask for a supplementary grant in November if they need more, based on which the finance ministry allocates more money.This amount is called the **revised estimate (RE).**
    - The RE numbers presented are for the current year. Therefore, this budget will have the RE of 2021-22.
    - Revised estimates or RE, which will tell how much the budget was revised from the BE.
  - **Actual expenditure,** as the name suggests, is the amount actually spent by the ministry/department/scheme. Since this is derived after auditing receipts, they are available only after the money has been spent. This year, the actual expenditures in the budget documents will be from 2020-21.
    - Actual amount spent, or expenditure, which will be available only until 2020-21, as actual expenditure is published after two years.
  - Some **variation between BE, RE and actuals** is inevitable given that the expenditures are projections made at the start of the year. However, if there are vast differences and revisions, it reduces the credibility of the numbers and affects the implementation of government schemes.

28. **Project m-Bridge: Connecting economies through CBDC**

**Context:**

The payment system underpinning cross-border financial flows needs recalibration with the launch of CBDC by various countries.

**Details:**

Multiple CBDC (multi-CBDC) arrangements that directly connect jurisdictional digital currencies in a single common technical infrastructure offer significant potential to improve the current system and allow cross-border payments to be immediate, cheap and universally accessible with secure settlement.

**Project m-Bridge**

- **It is a multi-CBDC platform, known as m-Bridge.**
- It is a joint effort co-led by -The Bank of International Settlement Innovation Hub Hong Kong Centre, the Hong Kong Monetary Authority, the Bank of Thailand, the Digital Currency Institute of the People's Bank of China and the Central Bank of the United Arab Emirates.
- A platform based on a new blockchain – the m-Bridge Ledger – was built by central banks to **support real-time, peer-to-peer, cross-border payments and foreign exchange transactions using CBDCs.**
- It **also ensures compliance with jurisdiction-specific policy and legal requirements, regulations and governance needs.**
- A pilot involving real corporate transactions centred around international trade was conducted on the platform among participating central banks, selected commercial banks and their customers in four jurisdictions.

29. **World Uncertainty Index**

**Context:**

The World Uncertainty Index and the Economic Policy Uncertainty (EPU) index indicate periods of high uncertainty.

**Concept:**

**The World Uncertainty Index**

- It is a quarterly measure of uncertainty—by the **International Monetary Fund.**
- It is a measure that tracks uncertainty across the globe by text mining the country reports of the **Economist Intelligence Unit.**
  - These reports cover the **economy, policies, and politics** of each country.
  - The WUI is computed by counting the percent of word "uncertain" (or its variant) in the Economist Intelligence Unit country reports.
  - The WUI is then rescaled by multiplying by 1,000,000. A higher number means higher uncertainty and vice versa.
- The index is available for 143 countries-all countries in the world with a population of at least 2 million.
- It captures **uncertainty related to economic and political events,**
- IMF also computes –**World Trade Uncertainty (WTU) index-**that measures uncertainty related to trade for 143 individual countries on a quarterly basis from 1996 onwards, using the Economist Intelligence Unit (EIU) country reports

**The Global Economic Policy Uncertainty Index**

- The monthly Economic Policy Uncertainty (EPU) index run **by a group of academics in the US** is available both **globally and for several countries including India.**
- It **is** a **GDP-weighted average of national EPU indices for 20 countries:** Australia, Brazil, Canada, Chile, China, France, Germany, Greece, India, Ireland, Italy, Japan, Mexico, the Netherlands, Russia, South Korea, Spain, Sweden, the United Kingdom, and the United States.
- **Each national EPU index reflects** the relative frequency of own-country newspaper articles that contain a trio of terms pertaining to the economy (E), policy (P) and uncertainty (U).

30. **General Network Access (GNA)**

**Context:**

The regulatory framework — called General Network Access (GNA) regulations — seeks to do away with predetermined point-to-point transmission access.

Details:

- On December 16, the Central Electricity Regulatory Commission came out with a draft proposal to facilitate a regulatory framework for General Network Access (GNA) .
- It aims to tide up the problem of transmission constraints and foster open access to help develop a seamlessly integrated electricity market.
    - At present, a power generator has to work out how the electricity will be wheeled to the consumer under the point-to-point access concept.
    - GNA will enable them to supply from any point, as long as the quantum contracted for is met.
- The concern is that these connectivity regulations could potentially end up favouring the bigger players in the sector.

**Concept:**

**General Network Access (GNA)?**

- GNA means **open access to the inter-State transmission system.**
- Technically speaking, GNA is a non-discriminatory access to the inter-State transmission system for an estimated maximum injection and for a consumer to draw for a specified period. This is in keeping with the concept of "one nation, one grid".
- If the concept becomes a reality, then it will ensure that a generator focuses only on producing power and the consumer on buying it. How it will be transmitted will no longer be a restriction or a challenge.
- Today a power generator has to also work out how the supply will be done due to the point-to-point access concept which, according to the producers, is restrictive. GNA will allow them to supply from any point, as long as the quantum contracted for is met.

**Eligibility criteria-**According to the draft, the following entities shall be eligible as applicants for grant of GNA or for enhancement of the quantum of GNA:

- State Transmission Utility on behalf of distribution licencees connected to intra-State transmission system and other intra-State entities;
- A buying entity connected to intra-State transmission system; Draft Central Electricity Regulatory Commission (Connectivity and General Network Access to the inter-State transmission System) Regulations, 2021;
- A distribution licensee or a bulk consumer, seeking to connect to ISTS, directly, with a load of 50 MW and above;
- Trading licensees engaged in cross-border trade of electricity in terms of the Cross-Border Regulations;
- Transmission licensee connected to ISTS for drawl of auxiliary power.
- Entities not covered here, but as on the date of coming into force of these regulations, are connected to the inter-State Transmission or for whom Connectivity granted under Connectivity regulations has become effective, shall be eligible for applying for grant of GNA to the inter-State transmission system for the quantum equal to the quantum of connectivity.

**How is GNA different from the point-to-point access concept?**

Conceptually GNA does away with pre-determined specific point-to-point access and allows access or drawal on the entire beltway, thus providing generators and procurers the choice of injection and drawal.

**What is the reason for replacing the existing regulations?**

- proper planning of transmission system and
- assured recovery of transmission charges from the applicant.

31. **SEBI proposes to half disclosure time**

**Context:** Securities and Exchange Board of India (Sebi) has amended NCS (Issue and Listing of Non-Convertible Securities) Regulations and in another notification, notified rules reducing the minimum holding requirement of Real Estate Investment Trust (REITs)

**Details:**

- No person would act as an **online bond platform provider** without obtaining registration certificate as a stock broker from Sebi.
- A person acting as an online bond platform provider without registration certificate can continue to do so for a period of three months.
    - The move will also enhance the confidence among investors, particularly non-institutional investors, as the platforms would be provided by Sebi-regulated intermediaries.

- **Another notification r**educed the minimum holding requirement of Real Estate Investment Trust (REITs) units by sponsors to 15 per cent from 25 per cent at present.
    - The sponsor(s) and sponsor group(s) shall collectively hold a minimum of 15 percent of the total units of the REIT for a period of at least three years from the date of listing of such units pursuant to initial offer on a post-issue basis.
- **In another notification,** the regulator has discontinued a separate regulatory framework for unlisted Infrastructure Investment Trust (InvIT).

**Concept:**

**Online bond platform**

- Sebi has defined **online bond platform** as any electronic system, other than a recognised stock exchange or an electronic book provider platform, on which the debt securities which are listed or proposed to be listed, are offered and transacted.
- Further, an online bond platform provider means any person operating or providing such a platform.
- Online Bond Platform Providers (OBPPs) would be **companies incorporated in India** and they should **register themselves as stock brokers** in the debt segment of the stock exchange
- OBPPs **cannot offer products or services on its platform except listed debt securities and debt securities proposed to be listed** through a public offering.
- After obtaining registration as a stock broker in the debt segment of a stock exchange, an entity would have to apply to the bourse (stock market) to act as an OBPP.
- In its application, the entity will have to ensure that roles and obligations, technology, operating framework — access and participation, Know Your Client (KYC) for on-boarding investors and sellers and risk profiling of investors — are complied with.

**Debt securities vs equity:**

- Debt securities are financial assets that entitle their owners to a stream of interest payments. Unlike equity securities, debt securities require the borrower to **repay the principal borrowed.**
- Equity securities indicate **ownership** in the company whereas debt securities indicate a loan to the company.
- Equity securities do not have a **maturity** date whereas debt securities typically have a maturity date.
- Equity securities have variable **returns** in the form of dividends and capital gains whereas debt securities have a predefined return in the form of interest payments.
    - The interest rate for a debt security will depend on the perceived creditworthiness of the borrower.
- Both securities are issued at **face value** and trade at market value, which may be higher or lower than the face value.
- Equity shareholders are entitled to **voting rights** whereas debt securities do not hold such rights.
- Treasury bills, commercial paper, bonds such as government bonds, corporate bonds, municipal bonds etc. are common types of debt security. On the other hand, common stocks, common shares, preferred stock are examples of equity securities.

32. **Permacrisis**

**Context:**

The Collins Dictionary's word of the year for 2022 is "permacrisis".

**Details:**

In April 2021, policy analysts in Europe saw it as defining the era in which we live.

**Concept:**

- Permacrisis, which became Britain's word of the year for 2022, is a term that **describes the extended period of instability and insecurity.**
- According to –David Shariatmadari –
    - **"Permacrisis"** is a term that perfectly embodies the dizzying sense of lurching from one unprecedented event to another, as we wonder bleakly what new horrors might be around the corner."
- 'Permacrisis' is a word that **describes living in an age of continued upheaval;**
- It became a **commonly used word in Britain,** reflecting the instability caused by Brexit, COVID-19 pandemic, extreme weather conditions, war in Ukraine, political instability in the UK and the cost of living crisis.
- Morin uses the **word "polycrisis" to describe this situation**——accumulation of problems the world currently faces – from conflict and the climate crisis to the pandemic and rising inflation.
- The **shift from "polycrisis" to "permacrisis" implies that we now see our crises as situations that can only be managed, not resolved**. Indeed, "permacrisis" suggests that every decision to accelerate a difficult situation in order to come out on the other side of it risks something far worse.
- This word **tops the list of 10 words that represent 2022.**Other vocabularies included in the Collins's annual compilation of 10 words that represent our times are:
    - **Carolean:** The Latin form of the name Charles, signifying the current British monarch's reign
    - **Kyiv:** Capital of Ukraine. Kyiv is the preferred variant to the Russian spelling of Kiev. Its usage signifies Britain's support for Ukraine amid the Russian invasion.
    - **Lawfare:** Strategic use of legal proceedings to intimidate or thwart a rival
    - **Partygate:** A political scandal in Britain that involved organizing social gatherings in government offices during 2020 and 2021.
    - **Quiet Quitting:** The practice of not doing additional works that are not mentioned in the contract.

- **Splooting:** The act of lying flat on the stomach with legs stretched out.
- **Sportswashing:** Act of sponsoring or promoting sporting events to improve an adversely affected reputation or to distract the public's attention from a controversy.
- **Vibe shift:** A notable change in the current cultural atmosphere or trend.

**Warm bank:** A heated building for people who cannot afford to heat their own homes because of high energy prices.

33. **India needs to increase urban infrastructure investments to $55 billion a year: World Bank**

**Context-**

- The **World Bank** report, titled **'Financing India's Infrastructure Needs: Constraints to Commercial Financing and Prospects for Policy Action'**, estimated that India would need **$840 billion over the next 15 years.**

**India's Urbanization requirements-**

- India needs to increase its **annual investment in city infrastructure from an average of $10.6 billion a year** in the past decade to an **average of $55 billion a year** for the next **15 years.**
- By **2036, 600 million people** will be living in **urban cities in India,** representing **40% of the population.**
- Currently, the **central** and **state governments** finance over **75%** of **city infrastructure**, while **urban local bodies (ULB)** finance **15%** through their own surplus revenues.
- Currently, **only 5 per cent** of the urban infrastructure investments were coming from the **private sector.**
- Government's current (2018) **annual urban infrastructure investments** is **$16 billion.**

**Urbanisation prospects-**

- As per the **World Urbanization Prospects, 2018 report** produced by the **UN Department of Economic and Social Affairs (UN DESA)** together, **India, China** and **Nigeria** will account for **35% of the projected growth** of the **world's urban population** between **2018** and **2050.**
- By **2050**, it is projected that India will have added **416 million urban dwellers.**
- Currently, India's population stood at **1210 million in 2011,** with an **urbanisation level of 31.1%** (Census of India **2011**).

**State-wise Scenario:**

- Over **75%** of the **urban population** of the country is in **10 States:** Maharashtra, Uttar Pradesh, Tamil Nadu, West Bengal, Andhra Pradesh, Gujarat, Karnataka, Madhya Pradesh, Rajasthan, and Kerala.
- **Maharashtra** leads with **50.8 million persons** (**13.5%** of the total urban population of the country).
- **Uttar Pradesh** accounts for about **44.4 million,** followed by **Tamil Nadu** at **34.9 million.**
- **Goa** is the **most urbanised State** with **62.2% urban population.**
- **Tamil Nadu, Kerala, Maharashtra,** and **Gujarat** have attained over **40% urbanisation.**
- Among the **North-Eastern States, Mizoram** is the most urbanised with **51.5% urban population.**
- **Low-Scoring States: Bihar (11.6%), Assam (14.1%), Odisha (16.68%)** and **Uttar Pradesh (22.3%)** continue to be at a **lower level of urbanisation** than the national average.
- Among Union Territories the **NCT of Delhi** and the **UT of Chandigarh** are most urbanized with **97.5%** and **97.25%** urban population respectively, followed by **Daman and Diu** and **Lakshadweep**.

**India's Global Commitments regarding Urban Development:**

- The **SDGs Goal 11** promotes urban planning as one of the recommended methods for achieving sustainable development.
- The **UN-Habitat's New Urban Agenda** was adopted at **Habitat III** in **2016.**
- It puts forth principles for the planning, construction, development, management, and improvement of urban areas.
- The **UN-Habitat (2020)** suggests that the spatial conditions of a city can enhance its power to generate social, economic and environmental value and well-being.
- **Paris Agreement:** India's **National Determined Contributions (NDCs)** includes the goals to **reduce the emission intensity** of the country's **GDP** by **33** to **35% by 2030** from 2005 level.

**UN-Habitat**

- The **United Nations Human Settlements Programme** is the United Nations programme for human settlements and sustainable urban development.
- **Established** in **1978** as an outcome of the **First UN Conference on Human Settlements and Sustainable Urban Development (Habitat I)** held in **Vancouver, Canada,** in **1976.**
- **Headquarters** at the **United Nations Office** at **Nairobi, Kenya.**
- It is mandated by the **United Nations General Assembly** to promote socially and environmentally sustainable towns and cities with the goal of providing adequate shelter for all.
- It is a **member** of the **United Nations Development Group.**
- The mandate of **UN-Habitat** derives from the **Habitat Agenda,** adopted by the **United Nations Conference on Human Settlements (Habitat II)** in **Istanbul, Turkey, in 1996.**
- The **twin goals** of the Habitat Agenda are:
  - Adequate shelter for all.
  - The development of sustainable human settlements in an urbanizing world.

**India's Initiatives for Urbanisation:**

- **Schemes/Programmes Related to Urban Development:**

- Smart Cities
- AMRUT (Atal Mission for Rejuvenation and Urban Transformation) Mission
- Swachh Bharat Mission-Urban
- HRIDAY (Heritage City Development and Augmentation Yojana)
- Pradhan Mantri Awas Yojana-Urban

- **Government Initiatives for Slum Dwellers/Urban Poor:**
  - Pradhan Mantri Garib Kalyan Yojana
  - Atmanirbhar Bharat Abhiyan (self-reliant India)
  - Affordable Rental Housing complexes (ARHC)

34. **Bulk drug park**

**Context:**

The department of pharmaceuticals has set up a high-level committee to monitor the progress of bulk drug parks.

**Concept:**

**Bulk drug:**

- A bulk drug, also called an **active pharmaceutical ingredient (API)**
- It is the key ingredient of a drug or medicine, which lends it the desired therapeutic effect or produces the intended pharmacological activity.
  - **For example**, paracetamol-acts against pain-mixed with binding agents or solvents to prepare the finished pharmaceutical product, i.e. a paracetamol tablet, capsule or syrup.
- The primary chemical or the basic raw material which undergoes reactions to form an API is called the **key starting material, or KSM.**
- Chemical compounds formed during the intermediate stages during these reactions are called **drug intermediates or DIs.**
- **Types:**
  - **Chemical Synthetic Drugs**
    - Inorganic – Examples – **Aluminum hydroxide and Magnesium trisilicate**
    - Organic – Examples – **Aspirin, Chloramphenicol, Caffeine**, etc.
  - **Natural Chemical Drugs**
    - Biochemical – Examples – **Antibiotics**
    - Phytochemical – Examples – **Paclitaxel (taxol), Resveratrol**

**What are bulk drug parks?**

- The **department of pharmaceuticals** announced a scheme for the promotion of three bulk drug parks in the country.
- A bulk drug park will have a designated **contiguous area of land with common infrastructure facilities for the exclusive manufacture of APIs, DIs or KSMs**, and **also a common waste management system.**
- It will provide financial **assistance to three States** for establishing Bulk Drug Parks and aims to bring down the **cost of manufacturing of bulk drugs** by creation of world class common infrastructure facilities thereby increasing the competitiveness of the domestic bulk drug industry.
- It is a Central Sector Scheme
- **State Implementing Agencies (SIAs)** will implement the scheme.
- The Centre will provide a **one-time grant-in-aid** for the creation of common infrastructure facilities.
  - The grant-in-aid will be **70 percent** of the cost of the common facilities but in the case of Himachal Pradesh and other hill states, it will be **90 per cent**.
  - The Centre will provide a **maximum of Rs 1,000 crore per park.**
- **Selected states**-Gujarat, Himachal Pradesh and Andhra Pradesh

**How strong is Himachal's case?**

According to the state government, Himachal already has **Asia's largest pharma manufacturing hub, that is the Baddi-Barotiwala-Nalagarh industrial belt,** and the state produces around **half of India's total drug formulations.**

**About Pharmaceutical Industry:**

- The Indian pharmaceutical industry is the third largest in the world by volume and It is the 14th largest in terms of value.
- India exported pharmaceuticals worth **Rs. 1,75,040 crores** in the financial year 2021-22, including Bulk Drugs/ Drug Intermediates.
- Also, India is one of the major producers of Active Pharma Ingredients (API) or bulk drugs in the world. However, the country also imports various Bulk Drugs/ APIs for producing medicines from various countries.

35. **Vostro Account**

**Why in the news?**

The government announced that nine special Vostro accounts have been opened with two Indian banks after permission from the RBI.

**Details:**

It aims to facilitate trade in rupee in the wake of sanctions on Russia.

**Vostro account?**

- A Vostro account is an account that a **domestic bank holds for a foreign bank in the domestic bank's currency** — rupee.
- In the case of **trade with Russia**, payments in **rupee for the export and import of goods will go to these Vostro accounts.**
    - A vostro account is established to **enable a foreign correspondent bank to act as an agent** or provide services as an intermediary for a domestic bank.
- The owners and beneficiaries of this money will be the exporters and importers in both the countries.
- The banks will keep the record of money transferred.
- **Vostro account services** include executing wire transfers, performing foreign exchange transactions, enabling deposits and withdrawals, and expediting international trade.
    - For example, if a Spanish life insurance company approaches a U.S. bank to manage funds on the Spanish life insurer's behalf, the account is deemed by the holding bank as a vostro account of the insurance company.

**Nostro account?**

- Both Vostro and Nostro are technically the same type of account, with the difference being who opens the account and where.
- So, if an Indian bank like the **SBI wants to open an account in the United States**, it will get in touch with a bank in the US, which will **open a Nostro account** and **accept payments for SBI in dollars.**
- It will be a Nostro **account for the Indian bank,** while **for the US bank**, the account will be considered a **Vostro account.**
    - Nostro means 'ours' and Vostro means 'yours' in Latin.

**What led to creation of the Vostro accounts?**

- The RBI has recently put a **mechanism to settle international trade in rupees**–promote growth of global trade and exports from India in the rupee.
- According to which –for settlement of trade in rupee with any country, an **Authorised Dealer bank in India may open special rupee Vostro accounts of correspondent banks of the partner trading country.**

36. **Registered Investment Advisor**

**Context:** SEBI will soon come out with guidelines for financial influencers, usually referred to as fin-fluencers–who give stock advice on social media platforms.

**Details:**

SEBI will make it mandatory for social media influencers to register and make them follow most of the other norms that are applicable to the registered financial advisors.

**Concept:**

- In India, the **Securities and Exchange Board of India (SEBI)** is a financial services regulator and market regulator.
- **Investment advisors** who are registered with SEBI can only provide financial advice to investors and clients with respect to various financial products.

**Who needs to register as an Investment Advisor?**

- Any individual, sole proprietor, partnership firm, company or body corporate can apply to be a **Registered Investment Advisor (RIA) in India.**
- If the number of clients exceeds 150 members, then it is mandatory for an advisor to register with SEBI. However, the following are **exempted from SEBI registration:**
    - Insurance agents or brokers registered with IRDAI
    - Pension advisors registered with PFRDA
    - Mutual fund distributors registered with AMFI who can provide basic advice to clients incidental to distribution activity
    - Members of Institute of Company Secretaries of India, Institute of Cost and Works Accountants of India, and Institute of Chartered Accountants of India who can provide advice to clients incidental to their services.
- **SEBI Investment Advisers Regulation, 2013** regulates investment advisors in India.

**Eligibility criteria**

- For individual RIAs, partnership firms, companies and LLPs to be eligible to be an investment advisor, they **need to meet the net worth requirements.**
    - For an individual, the net worth requirement is INR 5 lakhs. Before the amendment, the net worth requirements were INR 1 lakh.
    - A partnership firm has a net worth requirement of INR 50 lakhs. Prior to the amendment, the net worth requirements were INR 1 lakh.
    - For companies, body corporate and LLPs, the net worth requirement is INR 50 lakhs. Before the amendment, it was INR 25 lakhs.

**Qualification**

- Professional qualification or postgraduate degree or postgraduate diploma in finance, business management, banking, capital market, accountancy, commerce, economics, or insurance with five years of experience.
- Have a NISM level 2 certification.

**What is the difference between an RIA and a financial advisor?**

- An **RIA or Registered Investment Advisor** advises and manages the portfolio of high net worth individuals.

- RIAs are required to be registered with SEBI.

- **Financial advisors** are individuals who offer guidance for investment, tax planning, insurance and retirement planning to investors for a fee.
  - They aren't different from RIAs. However, they offer broader services than RIAs.
  - Stockbrokers, insurance agents, financial planners all can be considered as financial advisors. They do not have a fiduciary obligation, but they are expected to serve the client's best interest and make decisions that will benefit their client

37. **Central Depository Services Ltd**

**Context:**

The settlement of trades at Central Depository Services Ltd was delayed on Friday due to detection of malware in its machines.

**Concept:**

**Depository**

- It is a place where financial securities are held in dematerialised form.
- Depositories act like your bank account. As you store money in your bank account similarly, a depository helps you store securities in your Demat account.
- It is responsible for maintenance of ownership records and facilitation of trading in dematerialised securities.
- There are **two depositories which are functional in India –**
  - **National Securities Depository Ltd (NSDL) -**NSDL is the oldest and largest depository in India. It was established on 12th December 1995 and started its operations in 1996 in Mumbai. It was the first depository to provide trading services in electronic format.
  - **Central Securities Depository Ltd (CDSL)-**CDSL came into existence after NSDL in February 1999. Its goal is to provide convenient, dependable and secured depository services. CDSL is the first depository to reach five crores Demat accounts.
- Apart from above mentioned, **they offer a wide range of services like:**
  - Dematerialisation services
  - Rematerialisation services
  - Transfers between depositories
  - Off-market transfers
  - Lending of securities
  - Nomination services
  - Collateral and mortgage of securities
- They are entrusted with the safekeeping of the following financial securities in the electronic format:
  - Stocks
  - Bonds
  - Debentures
  - Commercial papers
  - Mutual Funds

**Note- CDSL, NDSL and De-mat already covered**

38. **Centre scraps export tax on iron ore, steel**

**In news-**

- **India** scrapped **export taxes** on **low-grade iron ore** and on some **intermediate steel products** beginning 19 nov 2022, after months of complaints from miners and steel makers about loss of foreign sales opportunities.

**Tax imposed-**

- A notification issued reverses the imposition in May of a **50% tax on exports of iron-ore lumps** and **fines** with **less than 58% iron content.**
- The government also reversed a May **increase in export tax on iron ore concentrates** other than **roasted iron pyrites.** That tax returns to 30% from 50%.

**Why the tax was imposed-**

- To **boost domestic supply** of iron ore, a raw ingredient for making steel,
- To hold down inflation.
- India exported less than half as much steel in the seven months to October as it did a year earlier.

**Consequences of imposing tax-**

- Earlier this month India's iron ore exports had dropped to "nearly zero" in October and was further expected to decrease due to **lower demand from China's weak economy.**
- Indian producers of **low-grade ore** depend largely on foreign markets, because most major domestic steel producers use **high-grade iron ore.**

**The iron ore is found in following four types:**

- **Magnetite:**
  - It is the most important and best kind of iron ore.

- It contains about **72% metallic iron** in it. It is found in **Karnataka, Andhra Pradesh, Rajasthan, Tamil Nadu, Goa and Kerala.**

- **Hematite:**
  - It contains about **60-70 percent metallic iron** in it.
  - It is red and brown in colour.
  - It is found in **Odisha, Jharkhand, Chhattisgarh and Andhra Pradesh.** In the western section, **Karnataka, Maharashtra and Goa** have this kind of ore.
- **Limonite:**
  - It contains about **30 to 40 percent metallic iron** in it. It is mostly **yellow in colour.** It is **low-grade iron ore.**
- **Siderite:**
  - It has more **impurities.**
  - It contains about **48 percent metallic iron content** in it.
  - It is brown in colour.
  - It contains a mixture of iron and carbon. It is **low-grade iron ore.** It is self-fluxing due to the presence of lime.

**Reserves and distribution of iron ore**

- About **95%** of total reserves of iron ore are found in the States of Odisha, Jharkhand, Chhattisgarh, Karnataka, Goa, Telangana, Andhra Pradesh, and Tamil Nadu.
- India's leading state that produces iron ore is **Odisha.** It accounts for **more than 55%** of the total production followed by **Chhattisgarh** producing almost **17%,** this is followed by **Karnataka and Jharkhand** producing **14%** and **11%** respectively.

**Export of iron ore from India**

- **India is the fifth largest exporter of iron ore in the world.**
- About **50** to **60** percent of our total iron ore production to countries like **Japan, Korea, European countries, and lately to Gulf countries.**
- **Japan** is the **biggest buyer of Indian iron ore** accounting for about **three-fourths** of our total exports.
- Major ports handling iron ore export are **Vishakhapatnam, Paradip, Marmagao, and Mangalore.**

39. **Andaman seeks GI tag for Nicobari hodi**

**In news-**

- **Tribal Development Council, Andaman & Nicobar Islands** is seeking the **Geographical Indication (GI) tag** for the **Nicobari hodi boat.**
- This is the **first application** from the Union Territory seeking a tag for one its products.

**About Nicobari hodi-**

- The **hodi** is the **Nicobari tribe's traditional craft.**
- It is an **outrigger canoe,** very commonly operated in the **Nicobar group of islands.**
- The technical skills for building a hodi are based on **indigenous knowledge** inherited by the Nicobarese from their forefathers.
- The hodi is built using either **locally available trees** or from nearby islands, and its design varies slightly from island to island.
- Considerations to be considered including the **length of the finished canoe,** which has to be **12 times** that of its width while the length of the undressed tree trunk has to be **15 times** this width.
- Hodis are used for **transporting people** and **goods** from one island to another, for sending coconuts, for fishing and racing purposes.
- The **tuhet,** a group of families under a headman, consider the **hodi an asset.**
- **Hodi races** are held between islands and villages.

**About Geographical Indication (GI) Tag-**

- Geographical Indication (GI) is an indication used to identify goods having special characteristics originating from a definite geographical territory.
- The **Geographical Indications of Goods (Registration and Protection) Act, 1999** seeks to provide for the registration and better protection of geographical indications relating to goods in India.
- It is governed and directed by the **WTO Agreement** on **Trade-Related Aspects of Intellectual Property Rights (TRIPS).**
- It was decided and also stated under **Articles 1 (2)** and **10** of the **Paris Convention** that the protection of industrial Property and Geographical Indication are elements of Intellectual Property.
- It is primarily an **agricultural, natural** or a **manufactured product** (handicrafts and industrial goods).
- This tag is **valid for a period of 10 years** following which it can be **renewed.**

40. **India-Australia trade relations**

**Context:**

The Australian Parliament approved the free trade agreement inked with India in April.

**Details:**

- The pact is expected to come into force from January 2023.

- The agreement is likely to push the bilateral trade to USD 45-50 billion in the next five-six years from the present USD 31 billion.

**Concept:**

**The India-Australia Economic Cooperation and Trade Agreement (ECTA)**

- It would provide **duty-free access to Indian exporters of over 6,000 broad sectors** including textiles, leather, furniture, jewellery and machinery **in the Australian market.**
- Australia is offering zero-duty access to India for about 96.4 per cent of exports (by value) from day one.
    - This covers many products that currently attract 4-5 per cent customs duty in Australia.
- Australia **will open 100 per cent of their lines (products) with no restriction** on even quota.
- This is the first time Australia has done this for any country.
- **Labour-intensive sectors which would gain immensely** include textiles and apparel, few agricultural and fish products, leather, footwear, furniture, sports goods, jewellery, machinery, electrical goods and railway wagons.

**India-Australia trade relations:**

- Australia and India upgraded bilateral relationship from **'Strategic Partnership' in 2009 to Comprehensive Strategic Partnership (CSP) in 2020.**
- India was Australia's **seventh-largest trading partner** and **sixth-largest export market** in 2020, driven by coal and international education. **Currently, India is the 9th largest trading partner of Australia (2021).**
- During 2021, Bilateral trade in goods and services with India was US$ 27.5 billion, with exports of goods and services worth US$ 10.5 billion and imports of goods and services worth US$ 17 billion.
- **Balance of trade is in favour of Australia** by US$ 6.5 billion.
- India's **merchandise exports to Australia** grew 135% between 2019 and 2021.
    - India's main exports to Australia are refined petroleum, medicaments (incl. veterinary), pearls & gems, jewellery, made-up textile articles, women's clothing (excl knitted), other textile clothing, manufactures of base metal, while India's major imports are coal, confidential items of trade, copper ores & concentrates, natural gas, non-ferrous waste & scrap, ferrous waste & scrap and education related services.
    - **Education is Australia's largest service export to India,** valued at $6 billion and accounting for around 88 per cent of the total in 2020.
- The elevation of the Australia-India relationship to a Comprehensive Strategic Partnership (CSP) includes a **commitment to encourage expanded trade and investment** flows to the benefit of both economies.

To support more Australian and Indian business partnerships, the Australian Government has launched the **Australia India Business Exchange (AIBX) program.**

41. **Registered Valuer**

**Context:** Centre issued the Companies (registered valuers and valuation) Amendment Rules 2022 for the valuation entity.

**Details**:

- It seeks to clarify the standards used by the valuers to conduct valuations.
- No partnership entity or company shall be eligible to be a registered valuer if it is not a member of a registered valuer organization
- Entities cannot be registered with more than one valuer organization at a given time.
- A partnership or company registered as a valuer will get six months to comply with the new rules
- Valuers may follow either the internationally accepted valuation standards or valuation standards adopted by a registered valuer organization.
- A registered valuer will not be allowed to take up employment but can hold the designation of whole-time directors.
- Registered valuers have to intimate IBBI about any change in their internal structure and changes in the partners and directors, its charter or partnership agreement.

**Concept:**

What is a **registered valuer?**

- The concept of registered valuer was introduced in the **Companies Act in 2017** and before it, valuation was done in an arbitrary manner, often leading to question marks over the authenticity of the valuation.
- Presently, a registered valuer is an **individual or entity which is registered with the Insolvency and Bankruptcy Board of India (IBIBI)** as a valuer in accordance with the Companies (Registered Valuers and Valuation) Rules, 2017.
    - Under **Section 458 of the Companies Act,** IBBI has been specified as the authority by the central government.
- It regulates the valuation of assets and liabilities linked to a company and to standardize the valuation procedure in line with global valuation standards.
- It **plays an important role in corporate restructuring, mergers and acquisitions, and bankruptcy resolutions.** Such transactions are dependent on the assessment of these assets and liabilities and are key to due diligence.
- **Who can become a registered valuer?**
    - An individual need to clear the Valuation Examination conducted by IBBI.
- **For what assets can a registered valuer undertake valuation?**
    - Registered valuer can get themselves registered for valuation of assets such as land and building; plant and machinery; and securities and financial assets.
    - They can undertake valuation of only the assets for which they have got the registration.

**Registered valuer organizations:**

The organisation conducts following functions:

- conducts **educational courses** in valuation.
- grants **membership or certificate** of practice to individuals, who possess the qualifications and experience in respect of valuation of asset class.
- **conducts training** for the individual members before a certificate of practice is issued to them.
- lays down and enforces a **code of conduct** for valuers who are its members.
- provides for **continuing education** of individuals who are its members.
- **monitors and reviews** the functioning, including quality of service, of valuers who are its members.
- **address grievances and conduct disciplinary proceedings** against valuers who are its members.

**42. Perpetual fund**

The IVCA expert committee asked the government to allow perpetual capital vehicles in order to unlock capital flows from long-term investors.

**Concept:**

**Perpetual fund**

- It is also referred to as an endowment fund
- It consists of a sum of money gifted to a charity by a donor who wishes to provide it with a never-ending source of revenue.
- The fund is usually named in memory of loved ones or after the donors themselves.
- By using only, the interest income and never reducing the capital portion of the fund, a charity is assured that a certain amount of support will come its way year after year.

**A perpetual capital vehicle**

- It is a type of investment where capital available or permanent capital is managed for an unlimited period of time.
- Under it the funds do not come with the drawdowns, capital calls, exit deadlines and other traditional features of the PE-VC funds that have a fixed fund cycle or life.
- **Permanent Capital Structures Example:** Real estate investment trusts**,** Master limited partnerships**,** Companies that operate, own or finance income-producing real estate and are modeled after mutual funds**,** Limited partnerships traded publicly on an exchange**,** Public assets management companies**,** Interval fund ( a type of closed-end fund not trading on the secondary market)**,**Variable funds such as life insurance and annuities.**,** Closed-end funds (a mutual fund type)

43. **Agriculture mandis**

**Context:**

Sahyadri Farmer Producer Company (FPC) has got the license to set up India's first private agricultural mandi (market) at Dindori, in Nashik district.

**Details:**

- It will be a 100-acre dedicated market space integrated with world-class infrastructure, services from banking to storage, processing, and packaging under one roof, options for offline and online trading, field trade, and ownership of farmers.
- Private markets will trigger competition

**Concept:**

**Agriculture produces marketing:**

- Regulated marketing initiated through **Agricultural Produce Marketing Regulation (APMR) Act.**
- This act was passed by various state governments after independence in the 1950s and 60s.
    - Agricultural Produce Market Committee (APMC) is a system operating **under the State Government since agricultural marketing is a State subject.**
    - While intra-state trades fall under the jurisdiction of state governments, inter-state trading comes under Central or Federal Government (including intra-state trading in a few commodities like raw jute, cotton, etc.
- Under the APMC Act, the states can establish agricultural markets, popularly known as mandis.
    - The sale of agricultural commodities can occur only in the mandis through auction.
    - The sales process in mandis is regulated through commission agents (CAs) –arhatiyas, who mediate between the farmers and traders.
    - The arhatiyas are often a moneylender, supplying seeds, fertilisers and pesticides to farmers on credit. They, then, are forced to sell through him and settle their dues in perpetuity.
    - Also, mandi fees range from 0.5% to 5% on the value of the sale, while varying across states and commodities.
- **Agricultural Produce Market Committee (APMC)** is a statutory market committee constituted by a State Government in respect of **trade in certain notified agricultural or horticultural or livestock products,** under the Agricultural Produce Market Committee Act issued by that state government.
- **APMCs are intended to be responsible for:**
    - ensuring transparency in pricing system and transactions taking place in market area;
    - providing market-led extension services to farmers;
    - ensuring payment for agricultural produce sold by farmers on the same day;
    - promoting agricultural processing including activities for value addition in agricultural produce;

- Publicizing data on arrivals and rates of agricultural produce brought into the market area for sale; and
- Setup and promote public private partnership in the management of agricultural markets
- ensure farmers are safeguarded from exploitation by large retailers, as well as ensuring the farm to retail price spread does not reach excessively high levels.
- APMC is also responsible for the regulation of agricultural trading practices.

- **The National Agriculture Market (NAM**) is a pan-India electronic trading portal, which links the existing Agricultural Produce Market Committee (APMC) mandis across the country to form a unified national market for agricultural commodities.

**History:**

- It was in 1886 when India established its **first regulated market,** Karanja.
- In 1887, under the **Hyderabad Residency Order, t**he British government passed their first legislation, the **Berar Cotton and Grain Market Act,** which empowered British residents to declare any place in the assigned district a market for sale and purchase of agricultural produce and constitute a committee to supervise the regulated markets.
- The **first farm produce to attract the attention of the government was raw cotton**– due to the concern of British rulers to make available the supplies of pure cotton at reasonable prices to the textile mills of Manchester (UK).
- The concept of a **mandi system was first introduced in 1928, w**here the Royal Commission on Agriculture wanted regulated markets.
- The **Punjab Agricultural Produce Markets Act,** which sets up APMC in Punjab was initiated in 1939.
- In pursuance, the Government of India prepared a Model Bill in 1938 and circulated it to all states; however, it was not until India's independence in 1947 that any progress was really made.
- In the 1960s, when India was a newly independent country, many Indian citizens were starving due to food shortages.
- The Indian Government decided to go back to the 1928 report and developed a nationwide food marketing system to ensure fair prices, which differs from state to state.
- **Under this mandi system farmers** take their produce to wholesale markets called APMC Mandis to sell their produce to traders through open auctions with transparent pricing.
- Thus, organised agricultural marketing came into existence through regulated markets- otherwise referred to as mandis.

44. **Incremental Capital Output Ratio**

**Context:** Article suggests steps to make our economy attain a high growth path.

**Details:**

- India's Growth post 2011-12:

| **Period** | **Growth rate** |
|---|---|
| First phase till Q3 of 2016-17 | 7.2 |
| Second phase- Q4 of 2016 -17 to Q1 of 2020-21. | 5.7 |
| Third phase-from Q2 of 2021–2022-23 | showed a V-shaped recovery followed by moderation–overall growth in 2022-23 would be around 6.5-7 per cent. |

- Auto regressive integrated moving averages (ARIMA) studies point to a potential output of less than 6 per cent for 2021-26 of India.

**Factors affecting growth in India–both cyclical and structural factors:**

- **Resource intensity**-High resources intensity of consumables has led to the decline in the share of manufacturing value added to output from 25 per cent during 1983-94 to 16.6 per cent in 2019-20 and therefore can't invest in technology, innovation and compensation of skilled workers.
- **Three Es** — buoyant expectations, expansion in expenditure on investment and consumption and efficiency in use of resources.
  - Consumer sentiments in the medium term can be improved through stable policy regime, improving law and order, taking measures for ease of doing business, improving innovation, facilitating openness in the economy, including in trade regime, creating stability and predictability of tax regimes, developing and enhancing efficiency of infrastructure, solving problems of specified sectors improving labour force participation.
- **Labour force participation ratio**-A 5 percentage point increase in labour participation rate would increase GDP growth by 0.71 percent.
- **Structural changes**- like Demonetisation, GST and Covid.
- **Fluctuations in growth patterns for industries**–utilities, manufacturing and construction
- **Service actor**-Relatively stable growth in services partly because most of these are non-traded and hence insulated from global changes.
- **Constrained capital formation-**
  - Non-food credit (NFC) as ratio of GDP declined until Q4 of 2017-18 but increased later.
  - A longer period of growth slowdown from Q1 2016-17 can also be attributed to lower Gross fixed capital formation (GFCF) and Private final consumption expenditure (PFCE).

- Net financing from the household sector increased from 21 per cent of total investment in 2011-12 to 45 per cent in 2020-21.

- **Issues of the informal sector**-difficulty in accessing resources
- **Export growth** in the entire period was less than the GDP growth, though it was volatile.
- **Incremental Capital Output ratio** (ICOR) is a surrogate measure of efficiency of the economy.
  - In the first phase of growth, ICOR was 4.51 and in the second phase, it reached 5.52.
  - Formalisation of the economy and sectoral shift to services in general can lower ICOR.

**Concept:**

**Incremental Capital Output ratio:**

- **Capital output ratio** is the amount of capital needed to produce one unit of output.
- **For example,** suppose that investment in an economy is 32% (of GDP), and the economic growth corresponding to this level of investment is 8%. Here, a Rs 32 investment produces an output of Rs 8. Thus, the **Capital output ratio is 32/8 or 4**
- Another **variant of capital output ratio is Incremental Capital Output Ratio (ICOR) -i**ndicate additional units of capital or investment needed to produce an additional unit of output.
- This ratio is used to **measure the efficiency of an industrial unit or country** as an economic unit. The lesser the ICOR, the more efficient the organization.
  - **Lower ICOR** shows that only a low level of investment is needed to produce a given growth rate in the economy. This is considered as a desirable situation. Lower capital output ratio shows that capital is very productive or efficient.
  - **High ICOR** indicates an inefficient economic environment as a large amount of capital is being used to produce low value goods. The higher the ICOR, the lower the productivity of capital or the marginal efficiency of capital.

**Structural reforms (structural factors):**

- Structural reforms tackle obstacles to the fundamental drivers of growth by liberalising labour, product and service markets, thereby encouraging job creation and investment and improving productivity.
- They are designed to boost an economy's competitiveness, growth potential and adjustment capacity.
- **Typical structural reforms** include policies that:
  - make labour markets more adaptable and responsive
  - liberalise service sectors, boost competition in product and service markets, specific sectors, or improve the overall business environment
  - encourage innovation
  - improve the quality of public taxation systems
  - address the challenges of population ageing on the welfare state.
- **Example**– In order to get out of the macro-economic crisis in 1991, India launched a New Economic Policy, which was based on LPG or Liberalisation, Privatisation and Globalisation model.
  - The broad range of reforms under **the LPG model included:**
    - Liberalising Industrial Policy: Abolition of industrial license permit raj, Reduction in import tariffs, etc.
    - Beginning of Privatisation: Deregulation of markets, Banking reforms, etc.
    - Globalisation: Exchange rate correction, liberalising foreign direct investment and trade policies, Removal of mandatory convertibility cause, etc.

45. **Financial Services Institutions Bureau**

**Context:** A notification was issued to amend the Nationalised Banks (Management and Miscellaneous Provisions) Scheme, 1970.

**Details:**

- The present norms prescribe appointment for three years or till the age of 60 years, whichever is earlier–for the Managing Director and other whole-time directors of the public sector banks.
- The appointment can now be made initially for up to 5 years, which can be extended for the same number of years. Thus, the Central Government may, after consultation with the Reserve Bank, reappoint the Managing Director and other whole-time directors of the public sector banks.

**Concept:**

- **Financial Services Institutions Bureau (FSIB)** is responsible for the selection and appointment of the Board of Directors in Public Sector Banks, MD and CEO and Financial institutions.
- **The Ministry of Finance takes the final decision on the appointments in consultation with the Prime Minister's Office.**
- **The Government appoints** Managing Directors from Whole-time Directors (WTD) of a public sector banks after vigilance clearance, etc.
  - The Names of these WTDs are recommended by the Financial Services Institutions Bureau (FSIB).
- **A MD and CEO has key responsibilities and duties**—required to establish vision, mission and values in consultation with the Board of Directors, to set strategy and structure, to monitor and control and to exercise accountability to shareholders and responsibility towards the stakeholders.

**Mandates of Financial Services Institutions Bureau (Earlier Bank Bureau of India):**

- FSIB is the single entity for making recommendations for appointments of whole-time directors (WTDs) and non-executive chairpersons (NEC) at public sector banks (PSBs), public sector insurers (PSI) and financial institutions (FIs).
- It also advises the government on extension of terms and even termination of services of WTDs and NECs at the financial services institutions.
- The FSIB also recommends a performance appraisal system for WTDs and NECs at PSBs, FIs and PSIs
- FSIB also advises the government on formulation and enforcement of a code of conduct and ethics for WTDs and NECs.
- It builds a database on the performance of PSBs, FIs and PSIs.
- The FSIB helps PSBs, FIs and PSIs develop business strategies and capital raising plans.
- The FSIB advises the government on the desired management structure at PSBs, FIs and PSIs.
- It also advises the government on evolving training and development programmes for management personnel in PSBs, FIs and PSIs.

46. **The Infrastructure and Project Monitoring Division**

**Context:**

The road transport and highways sector have the maximum number of delayed projects, as per the latest flash report on infrastructure projects for October 2022

**Details of the report:**

- In the road transport and highways sector-243 out of 826 projects are delayed
- In railways-114 out of 173 projects are delayed
- In petroleum sector-89 out of 142 projects are delayed
- **The Munirabad-Mahabubnagar rail project** (by 276 months) is the most-delayed project followed by the Udhampur-Srinagar-Baramulla rail project (by 247 months) and Belapur-Seawood-Urban Electrified Double Line (228 months). .

**Concept:**

**The Flash Report for October 2022:**

- It contains information on the status of the 1,521 central sector infrastructure projects costing Rs 150 crore and above.
- **The Infrastructure and Project Monitoring Division (IPMD)** is mandated to monitor central sector infrastructure projects costing Rs 150 crore and above based on the information provided on the **Online Computerised Monitoring System (OCMS)** by the project implementing agencies.
- The IPMD comes under the **Ministry of Statistics and Programme Implementation.**

**The Infrastructure and Project Monitoring Division (IPMD)**

- The Ministry of Statistics and Programme Implementation has **two wings, one relating to Statistics and the other relating to Programme Implementation.**
- The **Programme Implementation Wing** has three Divisions, namely,
  - Twenty Point Programme.
  - Infrastructure and Project Monitoring and
  - Member of Parliament Local Area Development Scheme.
- The I**nfrastructure & Project Monitoring Division (IPMD)** is the **Project Management arm and apex monitoring institution of the Government of India.**
- It performs a triple role in monitoring the implementation status of central sector projects costing more than Rs 150 Crores in 16 infrastructure sectors and performance of key 11 infrastructure sectors.
- The IPMD brings out several analytical reports.
- **The role of IPMD can be summarized as below: –**
  - a monitor of the implementation of projects and infrastructure performance
  - an initiator of systemic improvements and of better project management practices and
  - a facilitator in taking up issues with the relevant authorities in case of individual projects.

**Online Computerized Monitoring System (OCMS)**

- It **is** a **database maintained and operated by IPMD, MoSPI** for collecting, analyzing and distributing data pertaining to all Central Sector Infrastructure projects costing Rs. 150 crore and above.
- All Central Sector project agencies are required to enter monthly project status report in OCMS for all ongoing project costing Rs. 150 crore and more.

47. **Unified tariff structure**

**Context**: Petroleum and Natural Gas Regulatory Board (PNGRB) has brought out amendments in its three regulations namely Natural Gas Pipeline Tariff, Authorisation and Capacity Regulations.

**Details:**

- To simplify the implementation of unified tariff, entity level Integrated natural gas pipeline tariff has been introduced - which will act as a building block for unified tariff at national level.
- Further to protect the overall interest of consumers in different regions, the number of unified tariff zones have been increased from two to three.
- In addition, other amendments like allowing unaccounted gas, moratorium period, ramp up in capacity, etc., have been incorporated.

- The objective of these changes is to provide access of natural gas in the far-flung areas at the competitive and affordable rates to achieve the long-cherished objective of one nation one grid and one tariff.

**Concept:**

**Unified tariff structure:**

- The Petroleum and Natural Gas Regulatory Board (PNGRB) has notified a new tariff structure **for 14 natural gas pipelines**
- It **aims** to reduce the cost of natural gas for users further away from sources of natural gas and LNG terminals on the west coast of the country.
- Under the new unified tariff structure, **buyers will be charged a fixed tariff for the transport of gas within 300 kms** of a source and a **fixed tariff for the transport of gas beyond 300 kms** on a single pipeline network.
- **Multiple pipeline operators** now have to settle dues among themselves as the consumers will pay the transport tariff to the operator at the exit point of gas and the operators will then have to settle dues with the operators of other pipelines used for the delivery of the natural gas.

**Natural gas:**

- During the April-October period in FY23, **India's natural gas production rose** marginally by 1 per cent Y-o-Y to 19,600 million standard cubic meters (MSCM), while i**mports declined** by 11 per cent Y-o-Y to 16,876 MSCM.
- **The major consumers** were fertiliser (37 per cent), CGD (20 per cent), power (13 per cent), refinery (5 per cent) and petrochemicals (2 per cent).
- Around half of the country's **gas demand is sourced from** KG-D6, Mumbai offshore, Cambay Basin, Ravva Offshore, KG Basin, Cauvery basin, while the remaining is imported as liquefied natural gas (LNG).
    - India, the world's **fourth-largest LNG importer** last year, accounting for 7 per cent of global trade.
    - Qatar was the primary source for imports with 42 per cent share, followed by the US (16 per cent) and the UAE (13 per cent).
- The natural gas across the country is **supplied through three major pipelines** by Gas Authority of India (GAIL), Reliance Gas Transportation Infrastructure (RGTIL)/ Reliance Gas Pipelines (RGPL) and Gujarat State Petronet (GSPL). GAIL accounts for 70 per cent of the country's network.

**Current Gas Pricing in India:**

- **Multiple pricing regimes** are existing in the country for Natural gas supplies. This could be broadly divided into three categories:
    - Administrative Price Mechanism (APM) Gas
    - Non-APM Gas
    - LNG
- Further, there is differential pricing **existing for different sectors.**
    - Subsidized sectors such as power and fertilizer get relatively fewer prices as compared to other sectors.
- Also, **region-specific pricing** exists in the country with North Eastern states getting gas at relatively cheaper prices as compared to other parts of the country.
- Currently, **tariffs for transportation of gas are set by the Petroleum and Natural Gas Regulatory Board (PNGRB)** separately for each pipeline based on the assumptions of the volume of gas transported on the pipeline and its operating life aimed at providing the operator a pre-tax return of 18%.
- **Tariffs for pipeline usage are divided into zones of 300km,** with the tariff increasing for zones further away from the point where gas is injected.
- Further, if a buyer needs multiple pipelines even from the same operator, that transport tariff would increase. These tariffs increase the cost for buyers of gas further away from the point of injection of natural gas.
- All of India's imported natural gas arrives at terminals on the west coast leading to costs for buyers increasing, the further east they are located.

48. **Digital Communications Commission**

**Context**: Telecom Regulatory of India (TRAI) has made recommendations to improve the data centre infrastructure in the country.

**Details:**

- TRAI has argued that the policy aspects of data centres, content delivery networks, and Internet exchange points should be handled by the Digital Communication Commission (DCC).
- TRAI also suggested the formation of the Data Digitisation and Monetisation Council (DDMC), an apex body to oversee all issues related to data digitisation, data sharing and data monetisation in the country.

**Concept:**

**Data center infrastructure**

- It refers to the core physical or hardware-based resources and components – including all IT infrastructure devices, equipment and technologies – that comprise a data center. It is modeled and identified in a design plan that includes a complete listing of necessary infrastructure components used to create a data center.
- **A data center infrastructure may include:**
    - Servers
    - Computers
    - Networking equipment, such as routers or switches

  - Security, such as firewall or biometric security system
  - Storage, such as storage area network (SAN) or backup/tape storage
  - Data center management software/applications
- **It can also include non-computing resources**, such as:
  - Power and cooling devices, such as air conditioners or generators
  - Physical server racks/chassis
  - Cables
  - Internet backbone

**Digital Communication:**

- It is also known as **data communication or data transmission.**
- It is the transfer of data or information using digital signals over a point-to-point (P2P) channel. A P2P connection is a mode of communication between two communication endpoints.
- Communicating digitally is a communication technique in which thoughts, data or information are digitally encoded as discrete signals. These signals are electronically transferred to the recipients.
- Digital communication is a popular technology used today in electronics. **It allows us to access video conferencing, digital meetings, online education, etc.** The data can travel upto long distances within a second with the help of the internet and other modes of digital communication.

**Related law:**

As per allocation of business rules, **'data' is allocated to the Department of Telecommunications, but policies related to Digital Communications are being handled by the Ministry of Electronics & IT-MeitY.**

**Digital Communications Commission (Erstwhile Telecom Commission)**

- The Telecom Commission was set up by the Government of India vide the Resolution dated 11th April, 1989 with administrative and financial powers of the Government of India to deal with various aspects of Telecommunications.
- It has been **re-designated as the 'Digital Communications Commission' in 2018 through a government resolution.**
- The Digital Communications Commission consists of a Chairman, four full time members, who are ex-officio Secretaries to the Government of India in the Department of Telecommunications and four part time members who are the Secretaries to the Government of India in the concerned Departments.
- The Digital Communications Commission is **responsible for:**
  - Formulating the policy of Department of Telecommunications for approval of the Government;
  - Preparing the budget for the Department of Telecommunications for each financial year and getting it approved by the Government; &
  - Implementation of Government's policy in all matters concerning telecommunication.

49. **Financial Services Institutions Bureau**

**Context:**

A notification was issued to amend the Nationalised Banks (Management and Miscellaneous Provisions) Scheme, 1970.

**Details:**

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## SCIENCE AND TECHNOLOGY

### 1. How suspension bridges work, and what could have happened in Gujarat's Morbi

**Context-**

- The bridge that collapsed in **Gujarat's Morbi** on Sunday killing at least 134 people, was a **suspension bridge** — a type in which the deck is hung below suspension cables on vertical suspenders.

**About the Morbi Bridge-**

- Also known as **Jhulto Pul** was a **230-metre-long** (750 ft), **1.25-metre-wide** (4.1 ft) pedestrian suspension bridge over the **Machchhu River** in **Gujrat,** built during **British rule in India in the 19th century**.
- It was inaugurated on 20 February 1879.
- The **bridge is owned by Morbi municipality,** which had signed a contract with a trust owned by **private company Oreva** — which makes digital products ranging from Ajanta clocks to battery-operated bikes — for maintenance and operations.
    a) **Machchhu River** is a river in **Gujarat, India,** with its origin in the **Madla hills.**
    b) Its basin has a **maximum length of 130 km** (81 mi).
    c) The total catchment area of the basin is 2,515 km2 (971 sq mi).

**Structure of the Suspension bridges-**

- The **basic structural** components of a **suspension bridge system** include **stiffening girders,** two or more main **suspension cables,** and **towers** and **anchorages for cables** at either end of the bridge.
- The **main cables** are suspended between the towers and are connected to the anchorage or the bridge itself.
- The **vertical suspenders** carry the weight of the deck and the commuter load on it.
- The design ensures that the load on the suspension cables is transferred to the towers at the two ends, which transfer them further by vertical compression to the ground by way of the anchorage cables.
- All of this balancing has to happen within the **permissible weight restrictions for the bridge,** given that the deck is hanging in the air, supported by the two sets of cables.
- Given that the most important **load-bearing members** are the **main suspension cables,** the entire cross-section of the main cable is the mainstay of carrying the load and ensuring that buckling does not happen.
- The buckling is subject to two preconditions: there must be **no overloading** and **no excessive swaying.**
- While **beam bridges** are among the simplest and oldest bridges, the reason for the enduring design of the suspension bridge is that the supporting cables running horizontally between the two far-flung anchorages provide the counterweight and effectively pass on the entire tensional force to the anchorages.
- As a result, **suspension bridges** can easily cross distances of well over **2,000 metres,** beyond the scope of other bridge designs.
- The Morbi bridge was on the smaller side in terms of span and was pedestrian-only.

**Morbi bridge collapse: What could have happened-**

- The weight limit of this **19th-century bridge** is not known, purported video footage from before the incident seems to suggest the bridge was swaying, possibly because of the **large crowd** on it.
- The **sudden collapse**, as seen in the videos, suggests that most or all the suspension cables were weak or corroded.
- This is possible considering that this was a **very old bridge.**
- Visuals from the site appear to suggest that the two towers were unaffected.
- What seems to have given way are the connections securing the vertical cables with the deck, especially on one end of the bridge.

**Robustness of these bridges-**

- The core design of a bridge determines how it distributes the internal forces of tension, compression, torsion, bending, and sheer.
- Suspension bridges are among the most robust structures, starting from the earliest ones made of **twisted grass.**
- The **Golden Gate Bridge** and **Brooklyn Bridge in the US** are examples of **suspension bridges.**
- **India's longest single-lane motorable suspension bridge** — the **725-metre Dobra-Chanti suspension bridge** built over the **Tehri lake** — was inaugurated in **November 2020.**
- Besides the suspension, bridges can be **arch bridges, beam bridges, cantilever bridges, truss bridges and tied-arch bridges.**

### 2. North India first data center in Greater Noida

**Context:**

- Recently **North India's First data centre 'Yotta D1**' in **Greater Noida** was inaugurated by UP CM Adityanath.

**What is data center?**

It is a **dedicated secure space** within a building/centralized location where **computing and networking equipment is concentrated** for the purpose of **collecting, storing, processing, distributing or allowing access to large amounts of data.**

**What is data center park?**

- These are **specialized secure Data Zone**, strategically **located with the most conducive non-IT and IT infrastructure,** and regulatory environment for housing a **mix of small scale/large scale clusters of Data Centres** to serve the high needs of compute, storage, networking and provision of a wide range of data-related services.
- **More about 'Yotta Data Center':**

a) Yotta Data Center Park at **Greater Noida** will have **six Data center buildings** with a total capacity of **30000 racks and IT power capacity of 250 megawatts.**
b) The digital infrastructure will be **supported by renewable power** and **three redundant fiber paths** for enhanced connectivity.
c) This will be **North India's first hyperscale data center park**.
d) Yotta D1 features **Internet peering exchanges** and **direct fibre connectivity** to and from global cloud operators, making it extremely useful for global connectivity.

3. **China launches final space station module 'Mengtian'**

**Context:**

Recently China launched its final space station module 'Mengtian' through the Long March-5BY4 carrier rocket.

**What is "Mengtian" module:**

- The name **"Mengtian" means "dreaming of the heavens"**.
- It is the third and **final module Tiangong space station**
- The module is **expected** to be **operational for 10 years** or more.
- It is the **second of the two modules** that will **host science labs** required for conducting research.
- Mengtian **weighs in at about 23 tons, is 17.9 meters long and has a diameter of 4.2 meters**.
- This module will be **docked on the core module Tianhe** and **will complete the T-shaped structure** of the space station along with the **other module Wentian**.
- Mengtian wil**l have workstations supporting experiments related to microgravity scientific studies and frontier scientific projects** focusing on fluid physics, combustion and materials science and space technologies.
- It will provide a **pressurized environment** required for conducting scientific experiments **in freefall or zero gravity**, which could not be undertaken on Earth for more than a few minutes.
- It will **also support experiments on exposure to the space environment**, **cosmic rays, vacuum and solar winds.**

**What is the Tiangong Space Station:**

- The Tiangong space station is a Chinese space station built in **low Earth orbit between 340 and 450 kilometers above the earth.**
- It is part of **China Manned Space Program** and is the **country's first long-term space station.**
- The three modules of the **Tiangong Space Station are**
    1. **The Tianhe** means **"Harmony of the Heavens"** is the **core module.**
    2. **Wentian** means **"Quest for the Heavens"** is a laboratory cabin module.
    3. **Mengtian** means "Dreaming of the Heavens" is a laboratory module.
- With the fully functioning of the Space station China will become only the **third country in history to have put both astronauts into space and to build a space station**, after **Russia and the US.**
- It is **one-fifth** the **mass** of the International Space Station

4. **Tracking methane emissions for mitigation-**

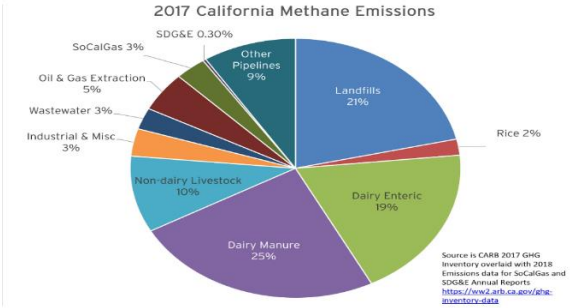
**Context- Methane-monitoring satellites** show that **landfills** contributed to **more than 25%** of **methane emissions in Mumbai** and **6% in Delhi.**

**Methane emission-**

- **Methane** is a **short-lived climate forcer (SLCF),** a compound that warms or cools the Earth's climate over shorter time scales – from days to years – than greenhouse gases like carbon dioxide, whose climatic effect lasts for decades, centuries or more.
- Methane has a lifetime in the atmosphere of about **ten years.** But per molecule, it's a much more potent greenhouse gas over that period.
- So, it's responsible for a large part of the warming that we're experiencing today.
- The **Global Methane Assessment 2021** states that the atmospheric concentration of methane has **more than doubled** since pre-industrial times.
- **Methane is second only to carbon dioxide (CO2)** in driving climate change.
- Limiting warming to **$1.5^0$C** or likely **$2^0$C** requires **deep, rapid, sustained reductions** of other greenhouse gases, such as **methane,** alongside rapid reductions of **carbon dioxide emissions to net zero.**

**Sources of Methane emission-**

- **Methane** is produced by the **breakdown or decay of organic material** and can be introduced into the atmosphere by either **natural processes** – such as the **decay of plant material in wetlands,** the **seepage of gas** from underground deposits or the **digestion of food by cattle** – or **human activities** – such as **oil and gas production, rice farming or waste management.**
- More than half of global **methane emissions** stem from human activities in **three sectors: fossil fuels** (35% of human-caused emissions), **waste** (20%) and **agriculture** (40%).




**Urban landfills generate emissions-**

- Scientifically any landfill which is more than **six metres deep** has the potential to generate **methane.**
- **Methane-monitoring satellites** show that **landfills** contributed to **more than 25%** of **methane emissions in Mumbai** and **6% in Delhi.**
- Scientists at **IITM, Pune** found that **microbial and fossil fuel emissions** are two major methane sources in **Pune.**
    a. **Natural gas** was the dominant sector in the fossil fuel sector, while the **waste sector** was the major segment in **microbial emissions.**
    b. In Pune, landfill emissions are very high with respect to other sources.
    c. It could be **methane in CNG stations, CNG pipeline, and CNG gas networks**, and it needs to be investigated
- Landfills in **Kolkata (Dhapa), Mumbai (Deonar)** and **Delhi (Bhalswa and Ghazipur)** are often been in the news for **landfill fires.**
- It causes greenhouse gas emissions.
- It also leads to local pollution in the area.
- In wintertime, the air rises up slowly because of low temperatures.
- So, any smoke or any pollution coming out can **persist in the lower layers for longer periods**.

**Why do these landfills become a hotspot of methane emissions?**

- Because the landfills in India are not scientifically engineered during inception.
- They don't have **bottom liners** and **gas harvesting systems** during the development of the landfill.
- Collection and recovery of landfill gas (methane emissions) is a technical challenge.
- Also, there is no dedicated organisation to maintain the history of waste disposal in landfills, which leads to an overestimation of landfill gases.
- The overestimation of landfill gas concentration led to claiming of more **carbon credits** in **Mumbai's Gorai landfill closure** and **gas capture project,** which was implemented in the **Clean Development Mechanism framework,** the world's largest carbon offset programme, established under the **Kyoto Protocol.**

**Methane emission tracking-**

- The **TROPOMI instrument** on board the **European Space Agency's Copernicus Sentinel-5 Precursor satellite** and **GHG Sat's** space-based emissions monitoring systems are used to detect, locate, and quantify emissions from strong methane point sources around the world.
- Using this approach, they spotlighted **methane emissions hotspots** in **Buenos Aires, Delhi, Lahore, and Mumbai.**

**Emission mitigation-**

- Landfills are potential targets for emission mitigation.
- **Methane SAT-**
    a. It is a planned **American-New Zealand space mission** currently scheduled for launch in 2023.
    b. The mission is planned to be an **Earth observation satellite** that will **monitor and study global methane emissions** in order to combat climate change.
    c. It **aims** to track not only the rate of methane emissions and location but also how those emissions are changing.
    d. The mission is **jointly funded** and operated by the **Environmental Defense Fund (EDF)**, an **American non-governmental organization,** and the **New Zealand Space Agency.**
    e. It marks **New Zealand's first space science mission.**
- Such observations will be useful to initiatives such as the **International Methane Emissions Observatory (IMEO)**.
    a. The **International Methane Emissions Observatory (IMEO)** was launched at the **G20 Summit,** on the eve of the **COP26** UN climate conference in **Glasgow.**
    b. **IMEO** will bring global reporting on **methane emissions** to an entirely different level, ensuring public transparency on anthropogenic methane emissions.
    c. **IMEO** will initially focus on methane emissions from the **fossil fuel sector,** and then expand to other major emitting sectors like **agriculture and waste.**

**Global Methane Pledge**

- The Global Methane Pledge was launched at the ongoing UN COP26 climate conference in Glasgow.
- It is an effort led jointly by **the United States** and the **European Union.**
- Methane is the **second-most abundant greenhouse gas** in the atmosphere, after carbon dioxide, and, therefore, pledges related to cutting down its emissions are significant.

- The pledge was first announced in **September 2021** by the **US and EU**, and is essentially an agreement to reduce global methane emissions. One of the central aims of this agreement is to cut down methane emissions by up to 30 per cent from 2020 levels by the year 2030.
- Among the signatories is **Brazil** — one of the **five biggest emitters of methane**, which is generated in cows' digestive systems, in landfill waste and in oil and gas production.
    - Three others —**China, Russia and India** — have not signed up.
    - **Australia** has said it will not back the pledge.
- According to the latest Intergovernmental Panel on Climate Change report, methane accounts for about half of the 1.0 degrees Celsius net rise in global average temperature since the pre-industrial era.

5. **SUNREF India – Contribution to green housing in India**

**Context-**

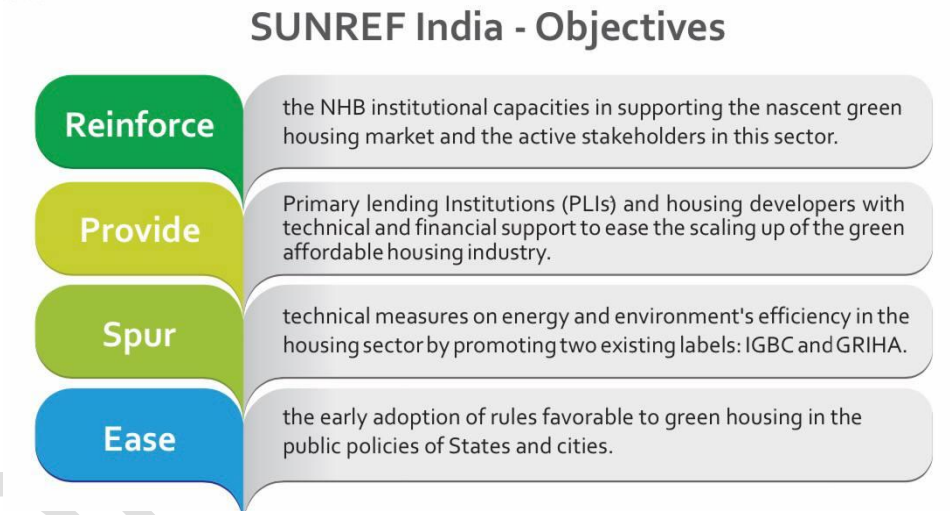
- **National Housing Bank (NHB)** organised the final event of **SUNREF- India Housing Programme.**

**About the event-**

- The **National Housing Bank (NHB)** organised the final event for showcasing the contributions of the **Sustainable Use of Natural Resources and Energy Financing (SUNREF) India Housing Programme** toward green housing in the country on July 25, 2022.
- **CRISIL** Risk and Infrastructure Solutions **(CRIS) Limited** is providing **Technical Assistance** to the **SUNREF** program.
- The event saw the participation of **more than 100 representatives** from multilateral/bilateral agencies, housing finance companies, real estate developers, government agencies, green-building experts, architects, and green material producers from various parts of the country.
- The **EU** and the **Government of India** are cooperating closely under the partnership on **Smart and Sustainable Urbanisation.**

**SUNREF program-**

- **C**ommenced in April 2019.
- **Objective**- scaling up **green affordable housing projects** in India.



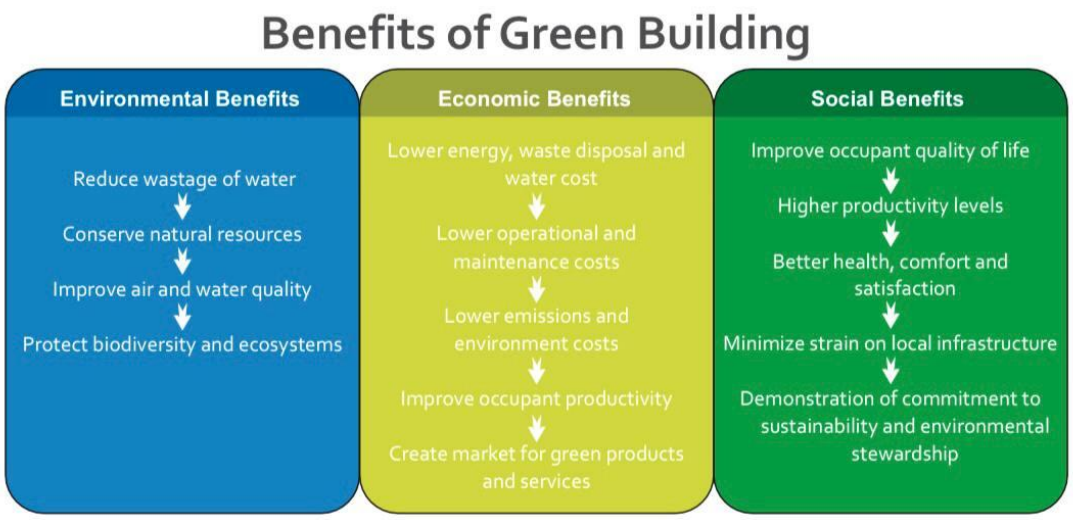

- **Major contribution-**
    a. The **NHB's** efforts on enhancing green affordable housing in the country are in line with the Government of India's priorities to support climate change.
    b. Over the past three years, **SUNREF India Housing Programme** has provided refinance of around **Euro 100 million** to **5300 households**, of which more than **60 per cent** are female owners and half of the households belong to lower income groups/ economically weaker sections.

**What is a green building-**

- According to the **World Green Building Council:** "A '**green'** building is a building that, in its design, construction or operation, reduces or eliminates negative impacts, and can create positive impact, on our climate and natural environment.

**About green affordable housing-**

- Housing is one of the **fastest-growing sectors** in the Indian construction sector.
- However, the **rapid urbanisation** is also giving rise to various challenges, including **congestion; increasing pressure on basic amenities such as energy, water and natural resources;** and, most importantly, **unavailability of affordable homes** for those at the bottom of the pyramid.
- These challenges arise the need for green and affordable buildings in India.




**Green building rating systems:**

- The overarching objective of the rating system is to ensure a high degree of sustainability with no/meagre profound impact on environmental conservation. Several green building labels are available in India, to rate and certify projects, namely

1. **Green Rating for Integrated Habitat Assessment (GRIHA)-**
    a. **GRIHA** is a rating tool that helps people assesses the performance of their building against certain nationally acceptable benchmarks.
    **b.** It evaluates the environmental performance of a building holistically over its entire life cycle, thereby providing a definitive standard for what constitutes a **'green building'.**
    **c.** The rating system, based on accepted energy and environmental principles, will seek to strike a balance between the established practices and emerging concepts, both national and international.
2. **Indian Green Building Council (IGBC)-**
    a. It is a part of the **Confederation of Indian Industry (CII).**
    b. It was formed in the year **2001.**
    c. **Vision-** To enable a sustainable built environment for all and facilitate India to be one of the global leaders in the sustainable built environment by **2025.**
    d. The council offers a **wide array of services** which include developing **new green building rating programmes, certification services** and **green building training programmes.**
    e. The council also organises Green Building Congress, its annual flagship event on green buildings.
3. **Excellence in Design for Greater Efficiencies (EDGE)**
    a. Used in over **100 countries, EDGE** is a free **software,** a **green building standard,** and an **international green building certification system.**
    b. A green building solution created by the **International Finance Corporation (IFC), a member of the World Bank Group**, EDGE empowers one to optimize one's designs to use less energy, water, and embodied energy in materials.
4. **GEM Sustainability (Green) Certification Program**
    a. It **aims** to address the sustainability of a given development throughout its lifecycle from design through construction to operation.
    b. GEM Sustainability Certification Reference Guide provides design guidance and detailed requirements for rating a project's potential performance.

6. **Steel 'waste' sent to BRO to build border road in Arunachal**

**Context-**

Science and Technology Minister Dr Jitendra Singh flagged off the dispatch of a **1,600-metric tonne processed steel slag railway rack** from **Tata Steel's** Jamshedpur plant to the **Border Road Organisation's (BRO) 'Project Arunank'** in **Itanagar, Arunachal Pradesh.**

**About Project Arunank-**

- Project Arunank is responsible for the construction and maintenance of approximately **1113 Kms** of roads in **Arunachal Pradesh** and **Assam.**
- The project was carved out from one of the oldest projects of **BRO Project Vartak.**
- Project Arunank is named after the state of Arunachal Pradesh.
- The **project** is being carried out by **CSIR-CRRI** along with **Tata Steel** and **BRO.**
- In this project the processed steel slag aggregate — a by-product of steel manufacturing — will be used in the construction of **steel slag road** stretches in strategic areas.
- This project is a perfect example of 'waste to wealth'.

**Steel production in India-**

- India is currently the **world's second-largest producer of crude steel,** producing over **118 million tonnes** of crude steel.

- Of this, around **20% of steel slag** is generated as **solid waste** and its disposal is a big challenge to steel industries.
- India is the **2nd largest consumer** of finished steel in 2021 (106.23 MT), preceded by **China.**
- The **National Steel Policy, 2017** envisage **300 million tonnes** of production capacity by **2030-31.**
- The **per capita consumption** of steel has **increased** from **57.6 kgs** to **74.1 kgs** during the last **five years.**
- **Major steel-producing states in India- Odisha, Chhattishgarh, Jharkhand and Karnataka.**

**Steel slag-**

- It is a **by-product of steelmaking** and is produced during the separation of the molten steel from impurities in steel-making furnaces.
- It comes out during the manufacturing of steel through three processes, namely **basic oxygen furnace (BOF) route, electric arc furnace (EAF)** and **induction furnace (IF).**
- The slag occurs as a molten liquid melt and is a **complex solution** of **silicates** and **oxides** that solidifies upon cooling.
- There are several **different types of steel slag** produced during the steel-making process namely- **furnace or tap slag, raker slag, synthetic or ladle slags, and pit or cleanout slag.**

**Uses of steel slag-**

- It can be used as a granular base or as an aggregate material in construction applications
- Slag is used in asphalt paving on Highways and road construction
- Carbon dioxide sequestration using steel slag
- Recently a six-lane highway in Surat made of steel slag -- a first in India is being inaugurated.

**Benefits of using steel slag in road construction-**

- The use of such material in road construction **increases its durability**.
- It helps in **reducing the cost of construction** as slag-based materials have better properties than natural aggregates.
- The use of steel slag in road construction will also **address the shortage of natural aggregate**s in the country.

7. **India successfully tests Ballistic Missile Defence Interceptor capable of neutralising long-range adversary missiles**

**Context-**

The **Defence Research and Development Organisation (DRDO)** conducted a successful maiden flight test of **phase-II Ballistic Missile Defence (BMD)** interceptor **AD-1 missile** with a large kill altitude bracket from the APJ Abdul Kalam Island off the coast of **Odisha** on November 2.

**About AD-1 missile-**

- The system, which is capable of striking down incoming adversary missiles and aircraft, has been developed under the **Ballistic Missile Defence programme.**
- The **AD-1 (Air Defence)** is a **long-range** interceptor missile designed for both **low exo-atmospheric** and **endo-atmospheric** interception of long-range ballistic missiles as well as aircraft.
- The missile is propelled by a **two-stage solid motor** and equipped with an **indigenously** developed advanced control system and a navigation and guidance algorithm to precisely guide the vehicle to the targets that move at very high speeds.
- The fully functional ballistic missile defence system contained **high-power radars** and could potentially protect large areas from adversary missiles or other air attacks.

**India's Ballistic missile defence (BMD) programme-**

- The development of **anti-ballistic missiles** is said to have started by the **DRDO** around the **2000s** (after the **1999 Kargil war**) in view of the development of **ballistic assets** by **Pakistan and China.**
- **Phase-1** of the programme is said to have been completed towards the end of the **2010s** and consisted of the advanced air defence systems and air defence systems based on the **Prithvi missile.**
- Pradyumna Ballistic Missile Interceptor is going to replace the Prithvi air defence, as per the DRDO.
- The **second phase** focuses on the development of **anti-ballistic defence systems** like the **US's Theatre High-Altitude Area Defence system,** which can neutralise intermediate-range ballistic missiles. **Akash Surface-to-Air Missiles (SAM) is part of AAD.**
- The **AD-II,** which is capable of neutralising missiles of even higher ranges, is also said to be under development.
- India also conducted its first successful **anti-satellite (ASAT) test,** under **Mission Shakti** in March 2019.

**Ballistic missile**

- A ballistic missile follows a ballistic trajectory to deliver one or more warheads on a predetermined target.
- It is a rocket-propelled self-guided strategic-weapons system that follows a ballistic trajectory to deliver a payload from its launch site to a predetermined target.
- These weapons are guided only during relatively brief periods—most of the flight is unpowered.
- Short-range ballistic missiles stay within the Earth's atmosphere, while intercontinental ballistic missiles (ICBMs) are launched on a sub-orbital trajectory.
- These weapons are in a distinct category from cruise missiles, which are aerodynamically guided in powered flight.
- They can be launched from aircraft, ships, and submarines in addition to land-based silos and mobile platforms.
- Ballistic missiles can carry conventional high explosives as well as chemical, biological, or nuclear munitions.

**Difference Between Ballistic Missiles and Cruise Missiles**

- Unlike the long arcing trajectory of a ballistic missile, a cruise missile travels at lower altitudes and on far straighter trajectories.

- Cruise missiles don't leave the atmosphere at any point during their flight, nor do they travel unpowered for any significant duration.
- Cruise missiles can be launched from land, sea or air for land attacks and anti-shipping purposes, and can travel at subsonic, supersonic and hypersonic speeds.
- A cruise missile either locates its target or has a preset target.
- Since they stay relatively close to the surface of the earth, they cannot be detected easily by anti-missile systems, and are designed to carry large payloads with high precision.

| Characteristics | Ballistic missiles | Cruise missiles |
|---|---|---|
| Range | From low to very high<br>*Up to 15 000 km* | Mostly around 1 000 km<br>*Up to 4 000 km* |
| Altitude | High<br>*Easily detectable* | Low<br>*Hard to detect* |
| Precision | Low – around a few hundred metres<br>*Fit for large targets* | High – a few metres<br>*Fit for small and mobile targets* |
| Speed | Up to 25 000 km/h at impact<br>*Very hard to intercept* | Around 1 000 km/h<br>*Possibility to intercept* |

8. **IIT-Roorkee discovers antiviral molecules to treat Covid-19**

**Context-** Researchers at **IIT-Roorkee** have identified **"anti-viral molecules"** that they say can be used to treat **Covid-19.**

**About the research-**

- The team identified **three such antiviral molecules** through **drug repurposing,** computational and antiviral experimental studies.
- College officials said the Covid-19 pandemic spurred both computational and experimental studies all over the world to understand the structure and nature of **SARS-COV-2 viral proteins** and develop vaccines and cures for it.
- These studies have resulted in the availability of a **"protein data bank"**, which is a repository of structures of proteins and viruses.
- The team focused on discovering molecules that acted on a specific part of the viral proteins called **nucleotide-binding pockets (NBP).**
- The **NBP** binds to the **nucleotides** — the building blocks of **RNA** and **DNA**—and helps in the replication of the virus.
- **NBP-targeting drugs** are known and used for viral diseases such as **HIV, Hepatitis B, Hepatitis C,** and **Herpes,** among others.
- The team is executing **protein structure-based drug-repurposing research** on **SARS-CoV-2** molecules for clinical evaluation and eventual use as **antiviral therapeutics.**

9. **GSLV MkIII lifts India into a new orbit in satellite launches**

**What is ISRO's GSLV Mk III?**

- India's heaviest rocket launcher, **GSLV MkIII,** is the third-generation rocket from the **Indian Space Research Organisation (ISRO)**.
- The project to develop it was approved in **2002**, with a mandate of achieving the capability to launch a **four-tonne class satellite** into **Geosynchronous orbit.**
- Weighing **641 tonnes,** which is equivalent to a large aircraft, **GSLV (Geosynchronous Satellite Launch Vehicle) MkIII** made its maiden launch on **June 5, 2017,** from the **Satish Dhawan Space Centre in Sriharikota.**
- The launcher is capable of lifting **four-tonne class satellites** to **Geosynchronous Transfer Orbit (GTO)** and about **10,000 tonnes** to **Low Earth Orbit (LEO).**
- The heavy rocket costs around **₹400 crores.**

**Rocket's configuration-**

- GSLV MkIII is configured as a **three-stage vehicle** with **two solid strap-on motors (S200)**; **one liquid core stage (L110)**; and **a high-thrust cryogenic upper stage (C25).**
- The **S200 solid motor** is among the **largest solid boosters in the world** with 204 tonnes of solid propellant.
- The **L110** stage uses a **twin liquid engine** configuration with **115 tonnes** of liquid propellant, while the **C25** is configured with the **fully indigenous high-thrust cryogenic engine (CE20)** with a propellant loading of 28 tonnes.
- The overall length of the vehicle is **43.5 m** with a **gross lift-off weight** of **640 tonnes** and a **5m**-diameter payload fairing.
- The powerful **cryogenic stage** enables it to place heavy payloads into LEO at 600 km altitude as was witnessed in the recent launch of **36 satellites** of **One Web.**

**Other launch vehicles of ISRO-**

- India has **two operational launchers** — the workhorse and most reliable launcher **Polar Satellite Launch Vehicle (PSLV),** and **GSLV.** The next variant of GSLV is GSLV MkIII.

**Significance of GSLV-MKIII's recent launches-**

- The **Chandrayaan-2** spacecraft launched on July 22, 2019, into its planned orbit with a **perigee** (nearest point to Earth) of **169.7 km** and an **apogee** (farthest point to Earth) of **45,475 km,** was a highly complex mission.

- It represented a significant technological leap compared to the previous missions of ISRO, comprising an **Orbiter, Lander and Rover** to explore the **unexplored South Pole of the Moon.**
- The recent successful launch of **One Web satellites** makes India a **cost-effective destination to launch commercial satellites.**

**Next major target for GSLV Mk-III-**

- GSLV MkIII is identified as the launch vehicle for the **Gaganyaan mission,** which aims at carrying **three crew to LEO and bring them back safely** to a predetermined location on Earth.

**Where does India stand today in the satellite launch market?**

- The ISRO, through its commercial arms, has earned around **$279 million** (as per July 2022 data) in foreign exchange by launching satellites for global clients.
- ISRO has been providing launch services for customer satellites since **1999** — more than 350 customer satellites from over 30 countries have been launched by PSLV.
- With the recent launch of **One Web,** GSLV has made a grand entry into the **commercial launch**
- **service market** for heavier satellites.

**Commercial arms of ISRO-**

- **Antrix Corporation Limited** is an **Indian government-owned company** under the administrative control of the **Department of Space.**
    - It was incorporated in **September 1992**, as a **commercial and marketing arm of ISRO** by prompting, commercially delivering and marketing products and services emanating from ISRO.
- **NewSpace India Limited (NeSL)** is a Public Sector Undertaking of the Government of India and the **commercial arm of the Indian Space Research Organisation.**
    - It was established on **6 March 2019** under the administrative control of the **Department of Space** and the **Company Act 2013.**
- **IN-SPACe** is an **autonomous nodal agency,** approved by the Union Government and will be governed by the **Department of Space.**
- This organisation shall act as a medium between **ISRO and the private space secto**r in India.
    - Under the **Indian National Space Promotion and Authorisation Centre**, the private parties will be allowed to perform space activities and use the equipment and facilities of the Department of Space (DoS) for the launch manifest.

10. **Science and Engineering Research Board (SERB) awards national post-doctoral fellowships to 301 researchers**

**Context-**

- **Science and Engineering Research Board (SERB)** has announced the names of **301 young researchers** selected for support under the **SERB-National Post-Doctoral Fellowship (N-PDF).**

**About the fellowship-**

- The fellowship, **initiated in 2015**, supports young budding researchers to establish themselves as independent scientists.
- The fellowship is awarded to work for two years in frontier areas of **science and engineering.** The selected fellows will work under a mentor who holds a regular academic/research position in a recognised institution in India.
- The **fellowship amount is Rs. 55,000 per month** (consolidated) and **Rs. 35,000 per month** for candidates who have submitted the thesis, but the degree has not been awarded.
- The fellows will receive a **research grant of Rs. 2,00,000** and overheads of **Rs. 1,00,000 per annum.**
- To date, around 23000 applications have been received in the last eight years, out of which about 3500 fellows have benefitted.
- N-PDF 2022 fellows will bring this number to 3800.

**Eligibility-**

- Candidates within the **age limit of 35 years,** with a **PhD/MD/MS degree** from a recognised University, and those who have submitted their **PhD/MD/MS thesis** and are awaiting the award of the degree are eligible to apply for it.

**Areas of research under the fellowship-**

- The fellowships are broadly given in **five thematic areas: Chemical Sciences, Earth & Atmospheric Sciences, Engineering Sciences, Life Sciences, and Physical and Mathematical Sciences.**

**About the Science and Engineering Research Board (SERB)-**

- **A statutory body** established by **SERB ACT,2008,** under the **Department of Science and Technology (DST).**
- The Board is **chaired** by the **Secretary to the Government of India in the Department of Science and Technology** and shall have other senior government officials and eminent scientists as members.
- **Vision** is to position science and technology as the fulcrum for social and economic change by supporting relevant, competitive, and quality scientific research and development.
- The **mandate of SERB** includes promoting basic research in Science and Engineering and providing **financial assistance** to persons engaged in such research, academic institutions, research and development laboratories, industrial concerns, and other agencies for such research.
- The Board **aims** to enable quicker decisions on research issues, significantly improving the responsiveness to the genuine needs of the research scientists and the S&T system of India.

**Other fellowships awarded by the SERB-**

- In addition to the **N-PDF**, SERB also offers several other **awards and fellowships,** including the JC Bose National fellowship; Abdul Kalam TIN fellowship; Ramanujan fellowship; SERB Research Scientists Scheme; SERB Power fellowship; SERB Women Excellence Award; Teachers Associateship for Research Excellence (TARE); SERB Science and Technology Award for Research (SERB-STAR); SERB Technology Translation Award (SERB-TETRA); and National Science Chair.
- Besides offering **twelve research grants**, it also runs **two national and three international research networking programmes.**

**11. Astronomers spot 'planet killer asteroid': Is it a threat to Earth?**

**Context-** A team of astronomers has discovered **three massive near-Earth asteroids** hiding in the glare of the Sun. Of these, one called **2022 AP7** is believed to be the largest planet killer-sized asteroid to be spotted in nearly a decade and is **"potentially hazardous" to Earth.**

**What do we know about these asteroids?**

- Scientists have so far discovered only around **25 asteroids** with their **orbits within Earth's orbit.**
- The three asteroids are from a group that is found within the **orbits of Earth and Venus.**
- The three discovered asteroids are- **2021 LJ4, 2021 PH27, and 2022 AP7 asteroids.**
- Two of the three discovered asteroids — **2021 LJ4 and 2021 PH27** — have orbits that are safely constrained inside the limits of Earth's orbit.
- At less than a kilometre in diameter, **2021 LJ4** is the smallest in size.
- The asteroid, **2021 PH27**, is the closest known asteroid to the Sun.
- Due to this, its surface gets hot enough to melt lead.
- The **1.5-kilometre-wide 2022 AP7 asteroid** has an orbit that may someday put it on a **collision course** with our planet.
- An asteroid like **2022 AP7** could have "a devastating impact on life" and could potentially lead to a **"mass extinction event".**

**Why are they tough to spot?**

- They are tough to spot as the brightness of the Sun shields them from telescope observations.
- Another major issue is that, since the asteroids are close to the horizon, they are blurred and distorted by the Earth's atmosphere.
- Asteroids that are further away from the Sun are easier to detect.

**How did they spot the asteroids?**

- Since they were concealed by the Sun's glare, the astronomers conducted their observation during **twilight hours** — a brief but favourable **10-minute window every night.**
- They used a **Dark Energy Camera** at the **Cerro Tololo Inter-American Observatory in Chile.**
- With the high-tech camera, a programme of the **US National Science Foundation's (NSF's) NOIRLAB**, they were able to capture large swathes of the sky with immense sensitivity.
- The camera was originally built to carry out a **Dark Energy Survey,** conducted by the US Department of Energy and the NSF between 2013 and 2019.

**Is there an immediate threat to Earth?**

- At present, the asteroid only crosses the Earth's orbit while it is on the opposite side of the Sun i.e. when the Sun comes between the Earth and the asteroid.
- This will continue for several centuries as it takes the asteroid about five years to orbit the sun.
- Over time, its orbital movement will slowly evolve to be more in sync with Earth's.

**Asteroids**

- Asteroids are **small, airless rocky** objects revolving around the sun that are too small to be called planets. They are also known as **planetoids or minor planets.**
- In total, the mass of all the asteroids is less than that of Earth's moon. But despite their size, asteroids can be dangerous. Many have hit Earth in the past, and more will crash into our planet in the future.

**Asteroids are divided into three classes**:

- **First Group:**
  - Those found in the **main asteroid belt** between **Mars and Jupiter,** which is estimated to contain somewhere between **1.1-1.9 million asteroids**.
- **Second Group:**
  - It is that of **trojans,** which are asteroids that share an orbit with a larger planet.
  - NASA reports the presence of **Jupiter, Neptune** and **Mars trojans.**
  - In 2011, they reported an **Earth trojan** as well.
- **Third Group:**
  - It is **Near-Earth Asteroids (NEA),** which have orbits that pass close to the Earth.
  - Those that cross the **Earth's orbit** are called **Earth-crossers.**
  - More than 10,000 such asteroids are known, out of which over 1,400 are classified as **Potentially Hazardous Asteroids (PHAs).**
  - **NASA's Center for Near-Earth Object Study (CNEOS)** determines the times and distances of these objects, when their approach to the Earth is close, through the Asteroid Watch Widget.

**Potentially Hazardous Asteroids (PHAs)**

- It means that an asteroid has the potential to make threatening close approaches to the Earth.
- Specifically, all asteroids with a **Minimum Orbit Intersection Distance (MOID)** of **0.05 AU** (which is about 7,480,000 Km) or less and an **Absolute Magnitude (H) of 22.0** (about 150 mt in diameter) or less are considered **PHAs.**

**What are The Differences Between An Asteroid, Comet, Meteoroid, Meteor and Meteorite?**

- **Asteroid:** A relatively small, inactive, rocky body orbiting the Sun.
- **Comet:** Comets are cosmic snowballs of frozen gases, rock, and dust that orbit the Sun.
    - Its ice can vaporize in sunlight forming an atmosphere (coma) of dust and gas and, sometimes, a tail of dust and/or gas.
- **Meteoroid:** A small particle from a comet or asteroid orbiting the Sun.
- **Meteor:** The light phenomena which result when a **meteoroid enters the Earth's atmosphere and vaporizes;** a shooting star.
- **Meteorite:** A meteoroid that survives its passage through the Earth's atmosphere and lands upon the Earth's surface.

12. **ISRO's RISAT-2 satellite makes re-entry into Earth's atmosphere**

**Context-**

- **ISRO's RISAT-2 satellite,** launched in **2009**, has made an **uncontrolled re-entry** into the Earth's atmosphere into the **Indian Ocean near Jakarta.**

**No explosion expected-**

- Since its injection, **RISAT-2's radar payload services** were provided for various space applications.
- On re-entry, there was no fuel left in the satellite and hence there are no contaminations or explosion by fuel is expected.
- Studies confirmed that the pieces generated due to **aero-thermal fragmentation** would not have survived re-entry heating and hence no fragments would have impacted Earth.
- The orbital data available from **USSPACECOM** were regularly used to predict the **re-entry time and impact**
- The **Indian System for Safe and Sustainable Space Operations Management (IS4OM)** facility in **ISTRAC, Bengaluru** had been monitoring the **re-entry** for the last one month with analysis carried out by **VSSC** and **ISTRAC** teams through its in-house developed analysis software and tracking the object utilising **Multi-Object Tracking Radar (MOTR)** at **SDSC, Sriharikota.**

**About the Radar Imaging Satellite-2 (RISAT-2)-**

- It was an Indian **radar imaging reconnaissance satellite** that was part of **India's RISAT programme.**
- It was launched by the **PSLV-C12** launch vehicle **13 years ago in 2009.**
- The satellite has a **mass of 300 kg (660 lb).**
- It is India's **first dedicated reconnaissance satellite.**
- RISAT-2 was built at an accelerated pace following the **2008 Mumbai attacks,** due to a delay with the **indigenously developed C-band** for **RISAT-1.**
- The **launch of RISAT-1** came several years after that of **RISAT-2.**
- The **RISAT-2 mission** was **prioritised over RISAT-1** following the **2008 Mumbai attacks,** resulting in **RISAT-1 being delayed** by several years.
- The **principal sensor** of RISAT-2 was an **X-band synthetic-aperture radar (SAR)** from **Israel Aerospace Industries (IAI).**

**Technical capabilities-**

- **RISAT-2** was India's first satellite with a **synthetic-aperture radar (SAR).**
- It possesses **day-night** as well as **all-weather monitoring capability.**
- Potential applications include **tracking hostile ships at sea** that are deemed a military threat to India.
- It is designed to **monitor India's borders** and as part of **anti-infiltration** and **anti-terrorist operations.**
- **ISRO** said that though the initial designed life of the satellite was **four years,** due to proper maintenance of orbit and mission planning by the spacecraft operations team in ISRO and by economical usage of fuel, **RISAT-2** provided very useful payload data for **13 years.**

**About Indian System for Safe and Sustainable Space Operations Management (IS4OM)-**

- The **control centre** would facilitate the intensified activities foreseen for **Space Situational Awareness & Management (SSAM)** in view of the **increasing debris population** and operational space assets.
- **IS40M will undertake**
    - Observation and monitoring of space objects and space environment,
    - Processing the observations for orbit determination
    - Object characterization and cataloguing
    - Analysis of space environment evolution
    - Risk assessment and mitigation
    - Data exchange and collaboration.
- The system would safeguard all **Indian Space assets** by mitigating the **collisional threats** from space objects through specific orbit manoeuvres and complying with international guidelines on post-mission disposal and satellite end-of-life operations.
- It would assimilate the **tracking data of inactive satellites** from indigenous observation facilities and generate useful information from bare observations through analysis.

- For **sustainable use of space,** the control centre would enable research activities pertaining to **active debris removal, space debris modelling and mitigation.**
- **IS4OM** facility will aid India in achieving its **SSA (Space Situational Awareness) goals** by providing comprehensive and timely information on the space environment to users.
    - **Space Situational Awareness (SSA)** refers to the knowledge of the space environment, including the location and function of space objects and space weather phenomena.
    - **SSA** is generally understood as covering **three main areas: Space Surveillance and Tracking (SST) of man-made objects.**

13. **Iran tests satellite-carrying rocket**

**Context-**

- **Iran's Revolutionary Guards** tested a **new satellite-carrying rocket**.

**More on the news-**

- Washington fears the same **long-range ballistic technology** used to put satellites into orbit could also be used to launch nuclear warheads.

**About Ghaem 100-**

- The **Ghaem 100, Iran's first three-stage launch vehicle,** will be able to place satellites weighing **80 kg** in an orbit of **500 km** from the earth's surface.
- The **flight test of this satellite carrier** with a **solid-fuelled engine** was successfully completed.
- The rocket would be used to launch **Iran's Nahid satellite** for the **telecommunications ministry,** as per the report.

**Iran's missile programme-**

- Iran, which has one of the biggest missile programmes in the **Middle East,** has had several failed satellites launches in the past few years, blamed on technical issues.
- A **U.N. resolution in 2015** called on Iran to refrain for up to eight years from work on **ballistic missiles** designed to deliver **nuclear weapons** following an agreement with **six world powers.**

**What was the 2015 Iran nuclear deal?**

- The deal is formally known as the **Joint Comprehensive Plan of Action (JCPOA)**.
- The **JCPOA** was the result of prolonged negotiations from 2013 and 2015 between **Iran and P5+1 (China, France, Russia, the United Kingdom, the United States + Germany).**
- Under the deal, **Iran** agreed to significantly cut its **stores of centrifuges, enriched uranium and heavy-water,** all key components for **nuclear weapons.**
- **Iran** also agreed to implement a protocol that would allow inspectors from the **International Atomic Energy Agency (IAEA)** to access its nuclear sites to ensure Iran would not be able to develop nuclear weapons in secret.
- While the West agreed to lift sanctions related to **Iran's nuclear proliferation**, other sanctions addressing **alleged abuses of human rights and Iran's ballistic missile programme** remained in place.
- The **US committed to lifting sanctions on oil exports,** but continued to restrict financial transactions, which have deterred international trade with Iran.
- Nonetheless, Iran's economy, after suffering years of recessions, currency depreciation, and inflation, stabilized significantly after the deal took effect, and its exports skyrocketed.
- **Israel,** America's closest ally in the **Middle East,** strongly rejected the deal, and other countries like **Iran's great regional rival Saudi Arabia,** complained that they were not involved in the negotiations even though Iran's nuclear programme posed security risks for every country in the region.
- After Trump abandoned the deal and reinstated banking and oil sanctions, Iran ramped up its nuclear programme in earnest, returning to **approximately 97% of its pre-2015 nuclear capabilities.**

14. **Study links PM 2.5 pollutants to anaemia prevalence**

**Context- Long-term exposure** to fine airborne **particulate matter** — **PM 2.5 pollutants** — may increase the **prevalence of anaemia** among **women of reproductive age** through systemic inflammation, a study has found.

**About the study-**

- The study was carried out by researchers from institutions and organisations in **India, the US and China,** including **IIT-Delhi** and **IIT-Bombay.**
- Anaemia prevalence will fall from **53 per cent** to **39.5 per cent** if India meets its recent **clean-air targets**, taking **186 districts** below the national target of 35 per cent.
- India's anaemia prevalence among women of reproductive age (15-45 years) is among the **highest in the world.**
- The findings state that for **every ten microgram/cubic metre** of air increase in ambient **PM2.5 exposure,** the **average anaemia prevalence** among such women increases by **7.23 per cent.** The study suggests that the transition to clean energy would accelerate India's progress towards the **'anaemia-free' mission target.**
- Among **PM 2.5 sources, sulphate** and **black carbon** are more associated with **anaemia** than organics and dust.
- Among sectoral contributors, the **industry** was the biggest followed by the **unorganised sector, domestic sources, power sector, road dust, agricultural waste burning and transport sector.**

**About anaemia-**

- **Anaemia,** a major contributor to the **global disease burden,** is characterised by **diminished blood haemoglobin concentration** and is often accompanied by a **decrease in red blood cells.**

- This results in a **decrease in the oxygen-carrying capacity of the blood.**
- **Women of reproductive age (WRA)** may suffer from regular **iron deficiency** due to **menstruation** and therefore are particularly prone to develop anaemia (from mild to severe).
- According to the **World Health Organization (WHO),** women in the reproductive age group and having **haemoglobin levels lower than 12 grams per decilitre (g / dL)**, as well as **children under five** with haemoglobin levels lower than **11.0 g / dL** are considered **anaemic.**

**Causes of anaemia disease-**

- **Dietary iron deficiency** is another leading cause of anaemia.
- Other contributing factors include **genetic disorders, parasitic infections and inflammation from infections and chronic diseases.**

**Prevalence of anaemia in India-**

- **Anaemia** is highly prevalent in India.
- The **National Family and Health Survey 2015–2016 (NFHS-5)** reported that **57% of WRA, 52.2%** of the **pregnant women** and **67.1% of children under five** were **anaemic.**
- The **World Health Organization** has set a **global target to halve anaemia** among women of reproductive age by **2053.**

**India's initiative-**

- India launched a programme under the **POSHAN Abhiyaan** aiming to make the country **'anaemia-free'** and set a **target of reducing anaemia** in **WRA** to below **35%** by **2022.**
- Because an **iron-deficient diet** is the primary cause of the large burden of anaemia, the **Ministry of Health and Family Welfare** is engaged in increasing the **iron intake** of the population.

**15. Falcon Heavy launch**

**Context**: **The Falcon Heavy launch: the most powerful operational rocket in the world**

**What are the specifications of the Falcon Heavy rocket?**

- **SpaceX claims Falcon Heavy** to be the **most powerful rocket** in the world today by a factor of two. With a lifting capacity of around 64 metric tonnes into orbit, Falcon Heavy can lift more than twice the payload of the next closest operational vehicle, the Delta IV Heavy.

**When was the Falcon Heavy last launched?**

- SpaceX last launched its **Falcon Heavy rocket in June 2019** from NASA's Kennedy Space Center. It carried **24 satellites as part** of the Department of Defense's Space Test Program-2.

**What about the other launches of Falcon Heavy?**

- The **Falcon Heavy debuted in 2018** when SpaceX CEO Elon Musk sent his personal red Tesla Roadster, an electric sports car with a dummy driver, into space as a test payload.

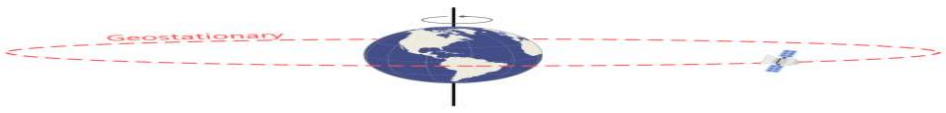
**geosynchronous orbit**

- There's a **sweet spot** above the Earth where a **satellite can match the same rotation** of the Earth. This special position in high Earth orbit is known as **a geosynchronous orbit**.
- If you are an **observer** on the ground, you would see the satellite as if it's in **a fixed position** without movement.
- This makes geosynchronous satellites particularly useful for **telecommunications and other remote sensing applications.**

**Geostationary Orbit**

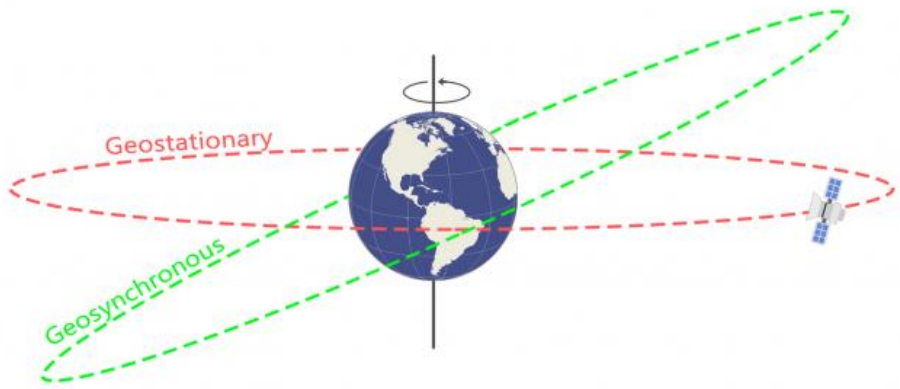
While geosynchronous satellites can have **any inclination**, the key difference from geostationary orbit is the fact that they **lie** on the **same plane as the equator**.

Geostationary orbits fall in the **same category** as **geosynchronous orbits**, but it's parked over the equator. This one **special quality makes** it unique from geosynchronous orbits.




**Weather monitoring satellites like GOES** are in geostationary orbits because they have a constant view of the same area. In a **high Earth orbit**, it's also useful for **search and rescue beacons.**

Here's how both orbits compare:



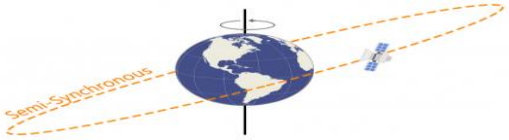

While the **geostationary orbit lies on the same plane as the equator**, the geosynchronous satellites have a different **inclination**. - **This is the key difference between the two types of orbits.**

**Semi-Synchronous Orbit**

**Global Positioning System (GPS)** satellites are in another **sweet spot** known as semi-synchronous orbits. While geosynchronous orbits match the rotation of Earth (24 hours), semi-synchronous orbits **take 12 hours to complete an orbit.**

Instead of 35,786 kilometres above the Earth's surface, semi-synchronous orbits are approximately 20,200 kilometres above the surface. This puts them in the **medium Earth orbit range** out of the three classes of orbits.

These **orbits are close to zero in eccentricity**, meaning they are **near-circular**. Eccentric orbits define **how stretched orbits are**. The closer eccentricity is to zero, the more the orbit **closer to a circle**. The closer to one, the **orbit becomes longer and skinnier**.




16. **Malaria**

Malaria is a disease **caused by a parasite**. The parasite is spread to humans through the bites of infected mosquitoes. People who have malaria usually feel very sick with a high fever and shaking chills.

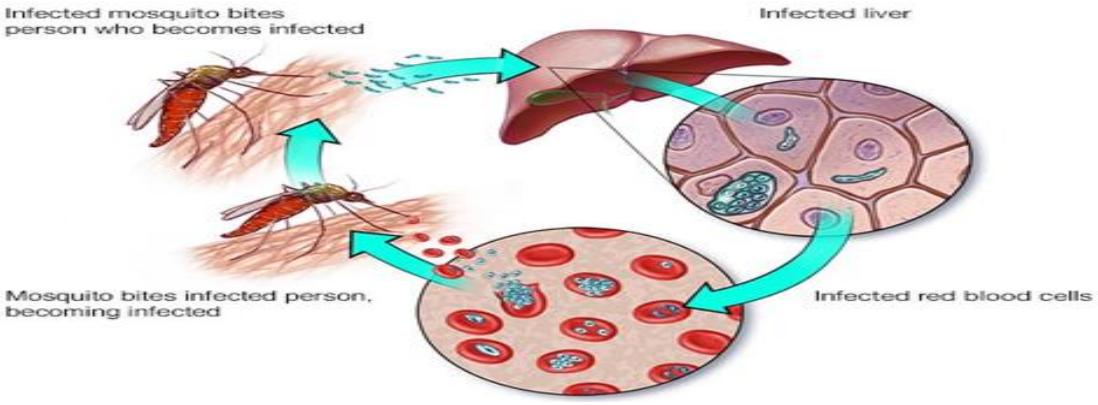
While the disease is **uncommon in temperate climates**, malaria is still common in **tropical and subtropical countries**. Each year more than 400,000 people die of the disease.

**Causes**

Malaria is caused by a **single-celled parasite of the genus plasmodium**. The parasite is transmitted to humans most commonly **through mosquito bites.**

**Mosquito transmission cycle**

- **Uninfected mosquito.** A mosquito becomes infected by feeding on a person who has malaria.
- **Transmission of parasite.** If this mosquito bites you in the future, it can transmit malaria parasites to you.
- **In the liver.** Once the parasites enter your body, they travel to your liver — where some types can lie dormant for as long as a year.
- **Into the bloodstream.** When the parasites mature, they leave the liver and infect your red blood cells. This is when people typically develop malaria symptoms.
- **On to the next person.** If an uninfected mosquito bites you at this point in the cycle, it will become infected with your malaria parasites and can spread them to the other people it bites.




**Malaria transmission cycle -crux**

Malaria spreads when a mosquito becomes infected with the disease after biting an infected person, and the infected mosquito then bites a noninfected person. The malaria parasites enter that person's bloodstream and travel to the liver. When the parasites mature, they leave the liver and infect red blood cells.

17. **'Beaver blood moon' offers world's last total lunar eclipse until 2025**

**Context-**

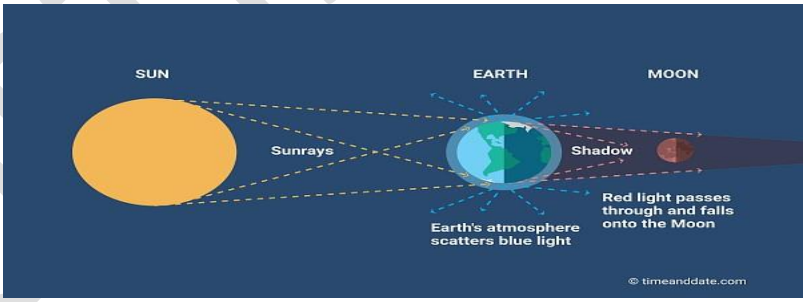
- Night-time sky watchers from **East Asia to North America** will be treated to the rare spectacle of a **"Beaver blood moon"** on Tuesday, weather permitting, as the **Earth, moon and sun** align to produce a **total lunar eclipse for the last time until 2025.**

**What's happening?**

- A **total lunar eclipse** occurs when the **Earth casts its shadow completely over a full moon,** blocking reflection of all direct sunlight from the lunar orb and dimming the colour of the moon to a reddish hue, hence the term "blood moon."
- This is **only possible when the orbits of the Earth, moon and sun align so that the moon is directly behind Earth relative to the sun.**
- Otherwise, the moon passes above or below Earth's shadow because its orbit around Earth is usually tilted relative to Earth's orbit about the sun.

**Why red (Blood moon)?**

- The **reddish appearance** of the **lunar surface** – the moon does not entirely disappear from view – is caused by **rays of sunlight around the outer edge of the eclipse shadow, or umbra,** being filtered and refracted as it passes through Earth's atmosphere, bathing the moon indirectly in a dim copper glow.
- The **degree of redness** depends on **atmospheric conditions** that vary with levels of air pollution, dust storms, wildfire smoke and even volcanic ash.




**Why Beaver moon?**

- Nov. 8 event will coincide with the **"Beaver moon," a moniker for November's full moon** adopted by the **Old Farmer's Almanac** supposedly from **Algonquian languages once spoken by Native Americans in the New England territory.**
- When combined with the phenomena of a total lunar eclipse, it is widely referred to as a **"Beaver blood moon"** in the **United States.**

**How rare is it?**

- **Total lunar eclipses** occur, on average, about **once every year and a half,** according to NASA.
- But the **interval varies**. Nov. 8 event will mark the **second blood moon** this year, following one in mid-May.
- The next one is **not expected until March 14, 2025.**

**Where is it visible-**

- Nov 8's eclipse will be **visible across eastern Asia, Australia, the Pacific and North America.**

**How long it lasts**

- The **entire eclipse** will unfold over a period of **nearly six hours** as the moon gradually edges into the **Earth's paler, outer shadow, its "penumbra,"** then enters the **Earth's darker, inner shadow, or "umbra,"** before reaching totality and eventually emerging from the other side.

- On the **West Coast of the United States,** the whole display will run from **12:01 a.m. PST** until just before **6 a.m.,** with the **total eclipse phase lasting about 90 minutes, peaking at 3 a.m.**

**What is a supermoon?**

- A supermoon occurs when the **Moon's orbit is closest to the Earth** at the same time that the **Moon is full.**
- In a typical year, there may be **two to four full supermoons** and **two to four new supermoons in a row.**

**18. India's first private launch vehicle all set for its maiden flight**

**Context-**

- **India's first** privately developed launch vehicle – **Hyderabad**-based **Skyroot's Vikram-S** – is all set to make its **maiden flight** from the country's only spaceport in **Sriharikota** between November 12 and 16.

**Skyroot aerospace-**

- A private start-up in the Space sector was co-founded by — C. Pawan Kumar (IIT-Kharagpur, 2012 batch) and Naga Bharath D. (IIT-Madras, 2012 batch).

**Mission Prarambh and the Vikram-S rocket-**

- The **mission** named **'Prarambh'** will see **Vikram-S carry three customer satellites in a sub-orbital flight**.
- The **Vikram-S rocket** is a **single-stage sub-orbital launch vehicle** which will carry **three customer payloads** and help test and validate technologies in the **Vikram series space launch vehicles**.
- **The mission will help the company test its systems in space.**
- The company is designing **three Vikram rockets** that will use various **solid and cryogenic fuels** to carry between **290 kg and 560 kg payloads** to **sun-synchronous polar orbits.**
- In comparison, India's workhorse **PSLV** can carry **up to 1,750kg** to such an orbit while the **newly-developed small satellite launch vehicle** – meant for carrying **smaller commercial satellites** – can carry up to **300 kg to sun-synchronous orbit.**

**What is a sub-orbital flight-**

- **Sub-orbital flight,** just like the ones undertaken by **Jeff Bezos and Richard Branson,** are those vehicles which are **travelling slower than orbital velocity** – meaning it is fast enough to reach outer space but not fast enough to stay in an orbit around the Earth.

**Other private sector participation in the Space sector-**

- Although **Skyroot** will be the **first private company to launch its rocket,** others are not far behind.
- **Agnikul Cosmos,** whose **semi-cryogenic Agnilet engine** was test-fired for 15 seconds on Tuesday at **Indian Space Research Organisation's (ISRO's)** vertical testing facility at **Thumba Equatorial Rocket Launching Station (TERLS)**, Thiruvananthapuram.
- **ISRO's Small Satellite Launch Vehicles (SSLV)** are also likely to be manufactured and operated by private players soon.
- As for **private satellite missions, ISRO's heaviest launch vehicle Mark III** launched **36 OneWeb satellites** (India's Bharti is a stakeholder).
- The space agency will be launching another fleet of **36 satellites** for the company as well.
- Other than that, the space agency has also launched at least four satellites made by students.

**India's Space sector-**

- The Indian Space Sector has been **globally recognised for building cost-effective satellites** and taking **foreign satellites to space.**
- Currently, India **constitutes 2-3% of the global space economy** and is expected to enhance its share to more than **10% by 2030.**
- As part of India's commitment to the **Geneva Conference on Disarmament,** the country continues to **advocate peaceful and civilian use of outer space** and oppose any weaponization of space capabilities or programs.

**SAMVAD Program:**

- To encourage and **nurture space research among young minds, ISRO** launched its Student **Outreach Program** called **SAMVAD** at its **Bengaluru facility.**

**Current Challenges Related to the Space sector in India-**

- The government plays the **dual role of regulator and commercial executor,** which has led to **significant bottlenecks in the participation of the private sector.**
- Also, due to this the private sector remains concerned about **sharing its intellectual property with the government.**
- If **no regulatory framework is put in place,** rising commercialisation will lead to **monopolisation in the future**.
- As outer space expeditions increase, more **space debris** will accumulate.
    - **Space Debris** can also lead to **ozone depletion.**
- Compared to other countries, the **Chinese space industry** has grown rapidly.
    - It has successfully launched its own **navigation system, BeiDou.**
    - It is very likely that **China's Belt Road Initiative (BRI) members** will contribute to or join the Chinese space sector, solidifying China's global position.

**19. All you need to know about Vikram S, and why it is a big deal**

**Context-**

- **India's first privately developed launch vehicle** is set to make its maiden flight from **Indian Space Research Organisation's (ISRO)** launchpad at **Sriharikota**.

**Mission Prarambh-**

- Under this mission, Vikram-S will carry 3 customer satellites in a sub-orbital flight.
- **Sub-orbital flights** travel **slower** than orbital velocity — they are fast enough to reach outer space but not fast enough to stay in orbit around the Earth.
- Also, **Spacekidz**, a Chennai-based aerospace startup, will fly **'Fun-Sat'**, a **2.5 kg payload** developed by students from **India, the US, Singapore** and **Indonesia,** on **Vikram-S.**

**Features of Vikram-S launch vehicle-**

- **Skyroot** was the **first startup** to sign a **memorandum of understanding** with **ISRO** for launching its rockets.
- Its launch vehicles have been crafted especially for the **small satellite market.**
- They come in **three forms**, **Vikram I, II, and III.**
- More than **20,000 small satellites** are estimated to be launched in the coming decade, and the **Vikram series** is designed to enable this through unprecedented mass production and affordability.
- Vikram-S offers many services like **multi-orbit insertion,** and **interplanetary missions**; while providing **customised, dedicated** and **ride-share options** covering a wide spectrum of small satellite customer needs.
- **Skyroot claims** a **Vikam rocket** can be **assembled and launched within 24 hours** from any launch site and has the "**lowest cost in the payload segment**".

**The need for satellite launches vehicles like Vikram-**

- Demand for the launch of small satellites (anything weighing between **5 and 1,000 kg)** has increased rapidly in the last 8-10 years.
- Major customers of small satellite launches are- businesses, government agencies, and even universities and laboratories due to the ever-growing need for space-based data, communication, surveillance, imageries, space technology, commerce, weather, agriculture, transport and urban development.

**Need for participation of private sector-**

- Currently, only **ISRO** is providing the satellite launch facility, but the increasing demand is outrunning its capacity.
- So, the sector is being opened up to private players, with ISRO helping them with facilities and knowledge.
- Recently the **Vikram Sarabhai Space Centre (VSSC)**, **ISRO's** lead centre for the development of launch vehicles, facilitated the **hot testing of a rocket engine** developed by **Indian space startup Agnikul Cosmos**.

20. **'Measles deaths': Health ministry sends team to Mumbai**

**Context-**

- After reports of an increase in suspected measles cases and three deaths in children, the Union Health Ministry on Wednesday rushed a multi-disciplinary team to Mumbai.

**What is measles and rubella?**

- **Measles-**
  - Measles (also called **rubeola**) is a **very contagious respiratory viral infection** that causes a **total-body skin rash** and **flu-like symptoms.**
  - It is **transmitted person-to-person** via **droplets** when infected people **sneeze or cough.**
  - **Initial symptoms** usually occur **10–12 days after infection** and comprise **high fever, runny nose, bloodshot eyes** and **Koplik's spots** (tiny white spots on the inside of the mouth).
  - Several days later, a **rash develops** and the most severe complication includes **blindness, encephalitis (an infection that causes brain swelling), severe diarrhoea and pneumonia.**
  - There is **no specific medical treatment.**
- **Rubella-**
  - **Rubella** is a **viral disease** caused by the **rubella virus** that mostly affects the **skin and lymph nodes.**
  - In kids, rubella (commonly called **German measles or 3-day measles**) is usually a **mild illness.**
  - But the **infection is dangerous for pregnant women** because it can cause serious health problems in their babies.
  - Rubella is **transmitted in airborne droplets** from the **nose, mouth** or **throat** of infected people.

**Cases in India-**

- India has seen an **increase** in the **number of measles cases** – **11,156 cases** of measles have been reported in **2022 till September,** according to data from the **World Health Organization.**
- To compare, there were **6,078 recorded in 2021, 5,598 cases in 2020, and 10,708 cases in 2019.**

**What about the vaccination?**

- The **MR vaccine** is a combined product, targeting two diseases in one shot.
- **Two doses of MR vaccine** should be given at **9-12 months** and **16-24 months of age.**
- However, if a child misses the scheduled dose, the MR vaccine can be given **till 5 years of age.**
- For epidemiological reasons, rubella vaccination had to cover children up to 15 years.
- The same vaccine is being given in the routine **Universal Immunisation Programme (UIP)** of India.

21. **EU plan new pledge targeting oil and gas methane emissions**

**Context-**

- **SHARM EL SHEIKH (COP-27)**- The **United States** and **European Union** plan to unveil a **joint agreement** to step up efforts to **reduce emissions of the potent greenhouse gas methane** from the **fossil fuel sector,** and are hoping other nations will sign up.

**Methane emission-**

- Methane is the simplest **hydrocarbon**, consisting of one carbon atom and four hydrogen atoms (CH4). Methane is a **powerful greenhouse gas.**
- Methane is produced by the breakdown or decay of organic material and can be introduced into the atmosphere by either natural processes – such as the decay of plant material in wetlands, the seepage of gas from underground deposits or the digestion of food by cattle – or human activities – such as oil and gas production, rice farming or waste management.
- **Methane is 84 times more potent than carbon** and **doesn't last as long** in the atmosphere before it **breaks down.**
- It is responsible for creating **ground-level ozone,** a dangerous air pollutant.

**Status of methane emission globally-**

- The **27-country EU** is the world's biggest buyer of gas, while the **United States is the world's biggest oil and gas producer.**
- **Agriculture** is the **top source of methane emissions** worldwide, but experts say the **energy sector can cut emissions faster** and often at **low cost.**
- **Methane** is the **main component of natural gas** and **leaches into the atmosphere** from **oil wells** and **leaky gas pipelines.**
- Despite that **incentive to capture emissions**, atmospheric concentrations of methane surged last year by the **highest amount** since records began in the **1980s.**

**About Global Methane Pledge-**

- It is introduced by the **United States** and **EU** in 2021 to slash **methane emissions by 30%** by **2030 from 2020 levels.**
- It has since been **signed by 119 countries,** among them **13 of the world's top 20 methane emitters** including **Brazil, Indonesia, Mexico and Nigeria.**
- Forty countries are expected to publish plans at the **COP27 summit** detailing how they will meet the **Global Methane Pledge** – which is voluntary but aims to trigger more binding policies.
- The **Pledge does not include China,** the **world's biggest methane emitter** and **Russia**, which was **Europe's biggest gas supplier** before it invaded Ukraine in February.

**Top methane emitting countries-**

- The **world's five largest methane emitters** (from all sources) are **China, India, the United States, Russia and Brazil.**
- Together, they are responsible for **close to half of all methane emissions globally.**
- Of these, **only the United States and Brazil** are part of the **Global Methane Pledge.**
- Looking only at **energy-related emissions,** the **five largest emitting countries** are **China, Russia, the United States, Iran and India.**
- Of these, **only the United States is part of the Pledge.**

22. **ISRO, for the first time, delivers FTS packages to space-tech start-ups for sub-orbital mission**

**Agnikul cosmos-**

- **Chennai**-based space-tech start-up **Agnikul,** with the support of the **Indian National Space Promotion and Authorisation Centre (IN-SPACe),** has received **Flight Termination System (FTS) package** from the **Indian Space Research Organisation (ISRO)** as part of its preparation for a fully controlled **sub-orbital mission** from **SHAR, Sriharikota.**
- This is also the **first time** that a system that has been used for ISRO's vehicles is being supplied for supporting a private launch vehicle built in India.
- **Agnikul's first mission** is a **controlled flight tracking** a **predetermined trajectory**.
- Recently, as a part of Agnikul's preparation for its first launch, ISRO facilitated the test firing of Agnikul's single-piece, 3D-printed rocket engine — Agnilet at Vertical Test Facility, Thumba Equatorial Rocket Launching Station (TERLS), at Vikram Sarabhai Space Center (VSSC), Thiruvananthapuram.

**What is a sub-orbital flight-**

- **Sub-orbital flight,** just like the ones undertaken by **Jeff Bezos and Richard Branson,** are those vehicles which are **travelling slower than orbital velocity** – meaning it is fast enough to reach outer space but not fast enough to stay in an orbit around the Earth.

**India's Space sector-**

- The Indian Space Sector has been **globally recognised for building cost-effective satellites** and taking **foreign satellites to space.**
- Currently, India **constitutes 2-3% of the global space economy** and is expected to enhance its share to more than **10% by 2030.**
- As part of India's commitment to the **Geneva Conference on Disarmament,** the country continues to **advocate peaceful and civilian use of outer space** and oppose any weaponization of space capabilities or programs.

**Opening up of Space for the private sector-**

- The space sector was opened up to facilitate private sector participation in **2020,** and in **2021, Skyroot** became the **first space technology startup** to ink an MoU with **ISRO** for sharing facilities and expertise.

- Currently, the **53 space-tech start-ups** in the country have **collectively raised funding** to the tune of **$220 million**.
- **Skyroot** Aerospace leads the pack, followed by **AgniKul** and satellite maker **Pixxel.**
- **ISRO's Small Satellite Launch Vehicles (SSLV)** are also likely to be manufactured and operated by private players soon.
- As for **private satellite missions, ISRO's heaviest launch vehicle Mark III** launched **36 OneWeb satellites** (India's Bharti is a stakeholder).
- The space agency will be launching another fleet of **36 satellites** for the company as well.

23. **Personalized cell 'editing' used to treat cancer patients: study**

**Context-**

- Scientists have, for the first time, used **CRISPR technology** to **insert genes** that **allow immune cells to attack cancer cells,** potentially leaving normal cells unharmed and increasing the effectiveness of immunotherapy.

**About the research findings-**

- The **CRISPR gene editing technique** has been previously used in humans to **remove specific genes** to allow the immune system to be more activated against cancer.
- The research used **CRISPR to insert new ones in immune cells** efficiently **redirecting them to recognise mutations in the patient's own cancer cells.**
- When infused back into patients, these **CRISPR-engineered immune cells** preferentially traffic to cancer and become the most represented immune cells there.
- The **human immune system** has **specific receptors on immune cells** that can specifically recognise cancer cells and differentiate them from normal cells.

**Key constraint-**

- Immune cells are different for every patient, so finding an efficient way to isolate them and insert them back into immune cells to generate a personalised cell therapy to treat cancer is key to making the approach feasible on a large scale.
- The **generation of a personalised cell treatment** for cancer would not have been feasible without the newly developed ability to use the **CRISPR technique** to replace the immune receptors in clinical-grade cell preparations in a single step.

**How do researchers resolve those problems?**

- The researchers found an efficient way to isolate these immune receptors from a **patient's own blood.**
- After **isolation,** the **immune receptors** are used to redirect immune cells to **recognise cancer** using **CRISPR gene editing.**

**What is the CRISPR gene editing technique?**

- **CRISPR–Cas9** is a unique technology that enables geneticists and medical researchers to edit parts of the genome by removing, adding or altering sections of the DNA.
- It is currently the simplest, most versatile and most precise method of genetic manipulation and is therefore causing a buzz in the science world.
- CRISPR **(Clustered regularly interspaced short palindromic repeats)** is a family of DNA sequences found in the genomes of prokaryotic organisms such as bacteria and archaea.
- **Cas-9** is an enzyme.

**How does it work?**

- The **CRISPR-Cas9 system** consists of two key molecules that introduce a change in the DNA. These are:
- an **enzyme** called **Cas9.** This acts as a pair of **'molecular scissors'** that can cut the two strands of DNA at a specific location in the genome so that bits of DNA can then be added or removed.
- a piece of RNA called **guide RNA (gRNA).** This consists of a small piece of **pre-designed RNA sequence** (about 20 bases long) located within a longer RNA scaffold. The scaffold part binds to DNA and the pre-designed sequence **'guides' Cas9** to the right part of the genome. This makes sure that the **Cas9 enzyme** cuts at the right point in the genome.
- The guide RNA is designed to find and bind to a specific sequence in the DNA. The guide RNA has RNA bases that are complementary to those of the target DNA sequence in the genome. This means that, at least in theory, the **guide RNA will only bind to the target sequence and no other regions of the genome.**
- The **Cas9** follows the guide RNA to the same location in the DNA sequence and makes a cut across both strands of the DNA.
- At this stage, the cell recognises that the DNA is damaged and tries to repair it.
- Scientists can use DNA repair machinery to introduce changes to one or more genes. in the genome of a cell of interest.

24. **Substantial per-symptomatic monkeypox spread found**

**Context-**

- Scientists have found evidence to show that the **monkeypox virus** can spread from an **infected person up to four days before they even start exhibiting symptoms of the disease,** a new study has claimed.

**What the research says-**

- The researchers behind the study estimated that **53% of the transmission** of monkeypox occurred in this **pre-symptomatic phase,** meaning that many infections cannot be prevented by asking individuals to isolate after they notice their symptoms.

- **Pre-symptomatic transmission** would have important implications for infection control globally.

**First evidence-**

- This work represents the **first evidence** to support Pre-symptomatic transmission, which was earlier speculated.
- The **two main measures** to prove Pre-symptomatic transmission is –
- **Serial interval** – the time from symptom onset in the primary case patient to symptom onset in the secondary contact – and
- **Incubation period** – the time from exposure to onset of symptoms.
- The findings are based on **routine surveillance** and **contact-tracing data** for **2,746 individuals** who **tested positive for the monkeypox virus in the U. K**.
- Their average age was 38 years and 95 per cent of them reported being gay, bisexual, or men who have sex with men.
- Based on these results, the researchers say an **isolation period of 16 to 23 days** would be required to **detect 95 per cent of people with a potential infection.**

**Important implications-**

- These findings have important implications for **isolation and contact-tracing policies.**
- The **backward contact-tracing strategies** should account for a **pre-symptomatic infectious period** when trying to find the contacts of confirmed cases.

**Need for Vaccine and Vaccine equity-**

- Researchers based in the **U.S., U.K.**, and **Nigeria** argued that **pre-exposure vaccination** and **vaccine equity** are **urgently needed worldwide.**
- Vaccination is likely to be **more cost-effective** than managing the consequences of preventable infections, including hospital admissions, loss of income during isolation, and long-term complications.

**What is Monkeypox?**

- Monkeypox is a **viral zoonotic disease** with symptoms similar to **smallpox**, although with **less clinical severity.**
- The infection was first discovered in **1958** following **two outbreaks of a pox-like disease** in colonies of monkeys kept for research — which led to the name **'monkeypox'.**

**Symptoms**:

- Infected people break out in a rash that looks a lot like chicken pox. But the **fever, malaise, and headache** from Monkeypox are usually more severe than in chickenpox infection.
- In the **early stage** of the disease, Monkeypox can be distinguished from smallpox because the **lymph gland gets enlarged.**

**Transmission**:

- Primary infection is through **direct contact with the blood, bodily fluids, or cutaneous or mucosal lesions of an infected animal.** Eating inadequately cooked meat of infected animals is also a risk factor.
- **Human-to-human transmission** can result from **close contact with infected respiratory tract secretions, skin lesions of an infected person or objects recently contaminated by patient fluids or lesion materials.**
- Transmission can also occur by **inoculation** or via the **placenta** (congenital monkeypox).

**Vulnerability:**

- It spreads rapidly and can cause **one out of ten deaths** if infected.

**Treatment and Vaccine:**

- There is **no specific treatment or vaccine** available for Monkeypox infection,
- But the **European Union has recommended a Small Pox Vaccine, Imvanex** to treat monkeypox after the **WHO declared monkeypox a global health emergency.**

25. **2D Nanos for low-cost LCDs-**

**Context-**

- A new easier technique of manufacturing **liquid crystal displays (LCDs)** which can **reduce the cost of the devices** has been developed.

**Problems with the conventional technique-**

- An **essential requirement** of these **LCDs** is the **uni-directional planar alignment** of the **constituent liquid crystals (LC)** over large areas.
- Although the **conventional polymer rubbing method** yields **quality LC alignment**, it **possesses unavoidable** and **undesirable drawbacks** such as the production of **electrostatic charges** and **dust particles** that interfere with display operation, and even cause damage to the electronic components of the display.
- While **electrostatic charges** increase the **failure rate, dust** creates defects which seriously compromise the **performance of the device.**
- Other problems include a **multistep process** for **coating** and the necessity for **high-temperature curing.**
- This has led to a surge in demand to replace this **rubbing method** with **new non-contact techniques.**

**How 2D nanomaterials solve this problem?**

- The latest among these techniques is to **employ 2D nanomaterials** — **graphene, hexagonal boron nitride (h-BN)**, **transition metal dichalcogenides**, and so on — as alignment layers. But this requires **high deposition temperature,** precursors and yields hazardous by-products. Besides, when the **CVD method** is used, **unidirectional LC alignment** is observed over only small regions.

- A team of scientists from the **Centre for Nano and Soft Matter Sciences (CeNS)**, **Bengaluru,** has developed a novel way of employing **2D materials** to overcome the drawbacks of current methods.
- Using **h-BN nanoflakes** as the specific material researchers employed a **solution-processed deposition technique** and found it to be effective in getting the **LC alignment** over a much larger area.
- They also found the **resultant crystals** to be quite robust with no evidence of decay in LC orientation over several months.

26. **Nanoparticles to aid cancer treatments**

**Context-**

- **Conventional therapies** in **cancer treatment** face challenges in the **delivery of drugs** in the body and just the quantity needed, due to the toxic nature of the medicines used that have unwanted side effects.

**Which kind of nanomaterials can be used?**

- In **nanomedicine**, **three kinds of nanomaterials** are studied predominantly – **organic, inorganic and hybrid** involving both.
- They include **dendrimers, liposomes** and **exosomes, quantum dots, fullerenes, polymeric micelles, Nano emulsions, RNA nanoparticles** and **nanotubes.**
- Examples of **organic molecules** are **dendrimers** — which have a **branched structure** — and **liposomes** that are **akin to lipids,** with each having a property that helps inhibit a cancer cell.

**Use of Nanomaterials in Cancer treatment-**

- **Nanomaterials** have **'enormous' potential** in **cancer treatment.**
- They help **alter the drug toxicity profile** with enhanced surface characteristics which can diffuse inside the **tumour cells.**
- They deliver an **optimal concentration of nano drugs** at tumour sites and reduce toxicity.

**Tumour-specific-**

- The **spherical gold nanoparticles** synthesised in the lab using **marine bacteria Vibrio alginolyticus** were effective in decreasing cell viability in the breast cancer cell lines.
- **12 nanomedicines** that have been clinically approved for the treatment of cancer.
- Liposomes form the bulk of the mentions — in **4 cases** — and are used in the treatment of **pancreatic cancer, acute lymphoblastic leukaemia, acute myeloid leukaemia** and **osteosarcoma.**

**Drug carriers-**

- **Nanoparticles** (particles **less than 100nm** in length) trump traditional drugs and their delivery mechanisms across **three areas: surface characteristics**, the **ability to alter the toxicity of active cancer cells**, and **tumour-specific constituents.**
- An **inorganic nanoparticle** such as **gold, silver** or **platinum,** acts as a **drug carrier.**
- The electrostatic forces between adjacent molecules help in the drug delivery to the tumour site.
- **Nanomaterials** are useful when **only a specific amount of drug needs to be delivered** and anything in excess would only cause side effects of the drug.
- When **Nano drugs** reach the cancer site, they **inactivate the multiplying property of the cancer cell** by **mutating** the **'signalling pathways'** that aid the proliferation of cells.

**Liposomes as a drug carrier-**

- **Liposomes** disseminate inside a cell and easily disintegrate with time.
- In the use of metals, there is always the danger of **accumulation of drug residue** which could have an impact on the patient in future.
- **Liposomes** are **drug-delivery molecules** that play a vital role in **pharmaceuticals** and in the **biomedical arena.**
- Marine-derived liposomes act as drugs.
- They are **organic nanomaterials** that are **effective in drug delivery** due to their **biocompatibility**, enhanced **drug solubility,** and **non-toxic nature**, in addition to being **biodegradable.**
- **Liposomes** can be derived from **plants** and **marine sources.**

**Other Uses of Nanotechnology in Health Care:**

- Nanotech detectors for heart attack.
- Nanochips to check plaque in arteries.
- Nanocarriers for eye surgery, chemotherapy etc.
- Diabetic pads for regulating blood sugar levels.
- Nanoparticles for drug delivery to the brain for therapeutic treatment of neurological disorders.
- Nano sponges are polymer nanoparticles coated with a red blood cell membrane, and can be used for absorbing toxins and removing them from the bloodstream.
- Nanoflares are used for detection of cancer cells in the bloodstream.
- Nanopores are used in making DNA sequencing more efficient.

**Recent Use of Nanotechnology:**

- Antiviral Nano-coating on face masks and **Personal Protection Equipment (PPE)** kits.

**Risks of Nanotechnology:**

- Since this field is still at its nascent stage, the likely risks are contentious.

- Regulatory authorities like the **US Environmental Protection Agency** and the **Health and Consumer Protection Directorate of the European Commission** have started assessing the potential risks posed by the nanoparticles.
- **Nanotoxicology** is the study of the potential health risks of nanomaterials.
- The human body can easily take up nanomaterials as they are small in size. However, there is a need for detailed research on how it would behave inside an organism. The behaviour of **nanoparticles** based on their size, shape and surface reactivity must be thoroughly analysed before launching them into the market.
- **Nano pollution** is the **generic term** that is used to describe the **waste generated by nanodevices or nanomaterials** during the manufacturing process.

27. **Multipurpose antibody database joins the fight against covid**

**Context-**

- Since the outbreak of **Covid-19,** a number of **databases on coronaviruses** have been created. However, there is none as yet that provides useful information such as the **binding affinity** (how tightly an antibody binds to the virus) and **how coronavirus antibodies effectively kill the viruses.**

**About the CoV-AbDab database-**

- A group of scientists from **IIT Madras** have collected Information related to **binding affinity and inhibitory concentration of neutralising antibodies**.
- Also, the **amino acid sequence information** of all **coronavirus-related antibodies** was included in a **sequence database** called **CoV-AbDab**.
- The result was the creation of **Ab-CoV,** a database of **1,780 coronavirus-related antibodies,** including **211 nanobodies.**
- The **database** additionally gives information about each antibody, such as how the antibody was obtained, which strain of virus it binds to and which part of the spike-protein (epitope) does it bind to.

**About Ab-CoV-**

- **Ab-CoV is a database of 1,780 coronavirus-related antibodies, including 211 nanobodies.**
- **Ab-CoV** has a wide range of search and display options.
- Users can directly search and download based on **antibody name, viral protein epitope, neutralised viral strain, antibody, nanobody, etc**.
- It also has the option to view the **structures of antibodies or viral proteins as a 3D model.**
- The **Ab-CoV database** will be a **vital resource for coronaviruses-related studies.**
- It also has the potential to assist researchers in **antibody engineering, analysing immune escape for known and future variants of SARS-CoV-2, computational studies of neutralising antibodies**, to relate structural features with binding affinity specific to **SARS-CoV-2,** and for the design of therapeutic interventions.
- Some data has already been used to understand the **relationship between structural features and binding affinities of spike protein-antibody complexes** as well as **antibody repurposing.**

28. **Attempt No. 3 for Artemis 1, with the promise of a new space age**

**In news-**

- At 1.04 am Eastern time in the United States on Wednesday (11.34 am in India), a **two-hour window** will open for **NASA** to make a **third attempt** to send its **new 322-foot-tall, multi-billion-dollar rocket** known as the **Space Launch System (SLS)**, to the **Moon.**

**Details-**

- The **debut flight** of the rocket was scrubbed twice earlier, on August 29 and September 3, after technical issues were detected during the countdown.
- This mission, known as **Artemis 1,** is unmanned and is intended to test the rocket and the **Orion space capsule,** in which astronauts will ride on future missions.
- If Wednesday's launch takes place, **Orion** will spend a **couple of weeks** in **lunar orbit** before returning for a **Pacific Ocean splashdown** next month.

**What is Artemis-1 mission-**

- NASA's **Artemis mission** is touted as the **next generation of lunar exploration** and is named after the **twin sister of Apollo from Greek mythology.**
- **Artemis** is also the **goddess of the moon.**
- It is the first in a series of increasingly complex missions that will enable human exploration to the Moon and Mars.
- With the Artemis programme, **NASA** aims to **land humans** on the **moon** by **2024,** and it also plans to **land the first woman and first person of colour on the moon.**
- NASA will establish an **Artemis Base Camp** on the **surface and a gateway** (the lunar outpost around the Moon) in lunar orbit to aid exploration by robots and astronauts.
- The **gateway** is a **critical component of NASA's sustainable lunar operations** and will serve as a multi-purpose outpost orbiting the moon.

**Other space agencies are also involved in the Artemis programme.**

- **Canadian Space Agency** has committed to providing advanced robotics for the gateway,
- The **European Space Agency** will provide the **International Habitat** and the **ESPRIT module,** which will deliver additional communications capabilities among other things.

- The **Japan Aerospace Exploration Agency** plans to contribute **habitation components** and logistics resupply.

**What are the Key Points of Artemis I Mission?**

- Artemis I, formerly **Exploration Mission-1,** will be the first integrated flight test of NASA's Deep Space Exploration Systems:
- **Orion spacecraft:** Orion spacecraft is going to remain in space without docking to a space station, longer than any ship for astronauts has ever done before.
- **Space Launch System (SLS) rocket:** It is the most powerful rocket in the world — and travels 2,80,000 miles from the earth for over four to six weeks during the course of the mission.
- **Newly upgraded Exploration Ground Systems** at Kennedy Space Centre in Cape Canaveral, Florida.
- It is an **un-crewed space mission** where the spacecraft will launch on an **SLS rocket.**
- The **primary operating goal** of the mission is to **assure a safe crew module entry, descent, splashdown, and recovery.**
- **SLS** and **Orion** under **Artemis I** will be launched from the **Kennedy Space Centre in Florida, U.S.**
- The mission will **end** with the **Orion spacecraft's ability to return safely to the earth.**

**Why Artemis 1 matters-**

- Under this mission, human beings will go back to the moon, explore the possibilities of long lunar stays, and assess the potential of the moon as a launch pad for exploration into deep space.
- Currently, Artemis-1 is only a lunar Orbiter mission which has a return-to-earth target.
- The **CubeSats** it will carry are **equipped with instruments** meant for **specific investigations** and experiments, including **searching for water in all forms** and for **hydrogen** that can be utilised as a **source of energy.**
- **Biology experiments** will be carried out, and the **impact of deep space atmosphere on humans** will be investigated through the effect on **dummy 'passengers'** on-board **Orion**.
- The **SLS rocket,** the most powerful ever built, will also be on test for its potential for more ambitious missions in the future.

**History of moon exploration-**

- In **1959,** the **Soviet Union's** uncrewed **Luna 1 and 2** became the first rover to visit the Moon.
- The **US** began trying to put people in space as early as **1961**.
- **Eight years** later, on **20th July, 1969**, **Neil Armstrong** along with **Edwin "Buzz"Aldrin** became the **first human to step on the Moon** as part of the **Apollo 11 mission.**
- Before the **USA** sent the **Apollo 11 mission** to the Moon, it sent three classes of robotic missions between **1961** and **1968**.
- After **July 1969**, **12 American astronauts walked on the surface of the Moon** until **1972.**
- In the **1990s**, the **USA** resumed **lunar exploration** with **robotic missions Clementineand Lunar Prospector.**
- In **2009,** it began a new series of robotic lunar missions with the launch of the **Lunar Reconnaissance Orbiter (LRO)** and the **Lunar Crater Observation and Sensing Satellite (LCROSS).**
- In **2011, NASA** began the **ARTEMIS.**
- In **2012,** the **Gravity Recovery and Interior Laboratory (GRAIL) spacecraft** studied the Moon's gravity.
- Apart from the USA, the European Space Agency, Japan, China, and India have sent missions to explore the Moon.

**China** landed **two rovers** on the surface, which includes the **first-ever landing on the Moon's far side in 2019.**

29. **Evergreening of patents**

**Context:**

India is unlikely to agree to a British demand for evergreening of patented medicines under the UK-India free trade agreement.

**Concept:**

- **Evergreening** is the practice of companies filing for an extension of a patent with minor process or product modifications just before the original patent expires at the end of 20 years.
- Patents offer their owners market exclusivity for a limited period of time–For medicines, this exclusivity should last as long as the **primary patent** — which relates to the active pharmaceutical ingredient (API) of the medicine is in effect, typically 20 years.
    - The end of patent exclusivity will reduce the drug prices drastically.
- The threat of this steep fall in profits urges pharmaceutical companies to find new ways to postpone their exclusivity.
    - Companies use a process known as secondary patenting or evergreening to keep generic companies out of the market
    - Secondary patenting or evergreening is achieved by seeking extra patents on modifications of the original drug: new forms of release, new dosages, new combinations or new forms.

**Indian Patent Act and evergreening:**

- The basic principle of the Patent Law in our country is that a **patent is granted only for an invention which must be new and useful.**
- **Section 3(d) of India's patent law** forbids patenting of incremental innovations—or evergreening.
- Section 3(d) of The Patents Act, 1970 –"the mere discovery of a new form of a known substance or the discovery of any new property or new use for a known substance or of the use of a known process, machine or apparatus unless such known process results in a new product or employs at least one new reactant is not patentable".

- This clause was also **upheld by the Supreme Court in 2013** when it turned down Swiss drugmaker Novartis' plea for patenting its cancer drug Glivec.
  - **Section 3(d) necessitates** a demonstration of improvement in its therapeutic efficacy. The provision also bars patents for new uses and new properties of known substances.
  - In the case of Novartis, Glivec was just a new form of a known substance, imatinib, and therefore the patent for Glivec was rejected under section 3(d) of the Patents Act.
- **Section 2(1)(ja)** -the product in question must feature a technical advance over what came before that's not obvious to a skilled person.
- **Section 3(e)** ensures that patents for combinations of known substances are allowed only if there is synergistic effect.
- **Section 3(i)** ensures that no exclusivity can be claimed over methods of treatment.

30. **Bacterial resistance to antibiotics causes 1.27 million deaths per year: WHO official**

**Context-**

- **Bacterial resistance to antibiotics** directly causes **1.27 million annual deaths globally** and indirectly contributes to or is associated with an **additional 4.95 million deaths annually,** according to Dr H Getahun, director of Global Coordination and Partnership on Antimicrobial resistance – **World Health Organisation (AMR-WHO).**

**Antimicrobial resistance-**

- According to a **2017 World Bank report**, if no action is taken now, **antimicrobial resistance** is may cause **US$ 1.2 trillion additional health expenditure per year by 2050**, and push up to 24 million more people, particularly in low-income countries, into extreme poverty by 2030.
- **Antimicrobial resistance** occurs when **bacteria, viruses, fungi** and **parasites** change over time and no longer respond to medicines, making infections harder to treat and increasing the risk of disease spread, severe illness and death.
- As a result of **drug resistance,** antibiotics and other antimicrobial medicines become ineffective and infections become increasingly difficult or impossible to treat.
- Microorganisms that develop antimicrobial resistance are sometimes referred to as **"superbugs".**
- The **World Health Organization (WHO)** has identified AMR as one of the **top ten** threats to global health.
- Researchers estimated that **AMR** in bacteria caused an estimated 1.27 mn deaths in 2019.

**AMR in India:**

- India, with its combination of a large population, rising incomes that facilitate the purchase of antibiotics, high burden of infectious diseases and easy over-the-counter access to antibiotics, is an important locus for the generation of resistance genes (such genes help bacteria in surviving on being exposed to antibiotics).
- The **multi-drug resistance** determinant, **New Delhi Metallo-beta-lactamase-1 (NDM-1)**, emerged from this region to spread globally.
- Africa, Europe and other parts of Asia have also been affected by multi-drug-resistant typhoid originating from South Asia.
- In **India,** over **56,000 new-born deaths each year** due to sepsis are caused by organisms that are resistant to first-line antibiotics.

**Global measures-**

- **World Antimicrobial Awareness Week (WAAW):**
  - Held annually since **2015**, **WAAW** is a global campaign that aims to raise awareness of antimicrobial resistance worldwide and encourage best practices among the general public, health workers and policymakers to slow the development and spread of drug-resistant infections.
- **The Global Antimicrobial Resistance and Use Surveillance System (GLASS):**
  - **WHO** launched the **GLASS in 2015** to continue filling knowledge gaps and to inform strategies at all levels.
  - **GLASS** has been conceived to progressively incorporate data from surveillance of AMR in humans, surveillance of the use of antimicrobial medicines, and AMR in the food chain and in the environment.

31. **Commission for Scientific and Technical Terminology**

**Context: A** website and app by the Commission for Scientific and Technical Terminology will update technical terminology in Indian languages in keeping with the National Education Policy, which advocates teaching in the mother tongue and local languages as far as possible.

**Concept:**

- The **Commission for Scientific and Technical Terminology** will soon launch **Shabd Shala**, a website to invite suggestions for translation of words that are recent additions to the English language.
- Technical terms from disciplines like Linguistics, Public Policy, Finance, Agriculture and Engineering will also be available on the website — shabd.education.gov.nic — and will be launched as an app, too.
- The domain for the website has been registered and it's expected to become operational before the start of the next academic session.

**Commission for Scientific and Technical Terminology (CSTT)**

- CSTT was established in December **1960** by Government of India resolution under provision **Article 344(4)** of Constitution
- Presently, CSTT is functioning under the **Department of Higher Education, Ministry of Education, Government of India** with its **headquarters at New Delhi.**

- The main objective is to evolve standard terminology, propagate its use, and distribute it widely.
- The commission is mandated to collaborate with **State governments, universities, regional textbook Boards, and State 'Granth Academies**', which are nodal bodies in-charge of providing translations of English textbooks in local languages for institutions of higher education.
- Eighteen States were mandated to have Granth Academies.

32. **Hypertension: a ticking time bomb in Indian adolescents**

**Hypertension-**

- **Blood pressure** is the force exerted by circulating blood against the walls of the body's arteries, the major blood vessels in the body.
- Hypertension is when **blood pressure is too high.**
- It is defined as having **systolic blood pressure** level greater than or equal to **140 mmHg or diastolic blood pressure level greater than or equal to 90 mmHg** or/and taking anti-hypertensive medication to lower his/her blood pressure.

**India Hypertension control initiative (IHCI)-**

- The programme was launched in **November 2017.**
- In the first year, **IHCI** covered **26 districts** across **five States** — Punjab, Kerala, Madhya Pradesh, Telangana, and Maharashtra.
- By **December 2020, IHCI** was expanded to **52 districts across ten States** — Andhra Pradesh, Chhattisgarh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Punjab, Tamil Nadu, Telangana and West Bengal.
- The **Health Ministry, the Indian Council of Medical Research, State Governments, and WHO-India** began a **five-year initiative** to monitor and treat hypertension.
- India has committed to a **"25 by 25"** goal.
    - The goal aims to **reduce** premature mortality due to **Non-Communicable Diseases (NCDs)** by **25% by 2025.**
    - One of the nine voluntary targets include reducing the prevalence of high blood pressure by 25% by 2025.

**Findings-**

- Greater prevalence of hypertension in adolescents
- **High blood pressure** is relatively **silent,** with grave consequences, as it is a major cause of **cardiovascular diseases, including stroke.**
- **35%** children aged **10-12 years** and **25%** of children **above 13 years** have hypertension.
- As per the **Indian national Health Portal Data, 30%** of adults have **elevated blood pressure- 35%** in **Urban** areas and **28%** in **rural** areas.
- The study dispels the notion that hypertension is associated with affluence and will not occur in undernourished children.
- **Elevated blood pressure** is more prevalent in poorer than the richest category. It also occurs with similar frequency in rural and urban areas.
- **High blood pressure prevalence** in **younger stunted adolescents** is **40%** compared to **34%** in those not stunted.
- Hypertension prevelence in thin/underweight adolescents is also high- 32% in younger and 22% in older adolescents.
- Higher prevalence of high blood pressure in rural areas may be due to rapid urbanisation- a lower level of physical activity.
- **Chhattisgarh, Odisha, Telangana, andhra Pradesh, Manipur, Mizoram, Tripura and nagaland** have **higher hypertension prevalence (over 35%)** compared with the rest of India.

33. **Draft Digital Personal Data Protection Bill 2022**

**Context:**

**The draft Digital Personal Data Protection Bill 2022 has been released by the Ministry of Electronics and IT (MeitY).**

**Concept**:

**Seven principles:**

- **Lawful**-Usage of personal data by organisations must be done in a manner that is **lawful, fair to the individuals concerned and transparent to individuals**
- **Purposeful limitation**-Personal data must only be **used for the purposes** for which **it was Data Minimisation**-Bare minimum and only necessary data should be collected to fulfill a purpose.
- **Accuracy**-data accuracy at the time of collection.
- **Storage**-personal data that is collected cannot be "stored perpetually by default," and storage should be limited to a fixed duration.
- **Safeguards**-ensure there is no unauthorised collection or processing of personal data.
- **Accountability**-The person who decides the purpose and means of the processing of personal data should be accountable for such processing.

**Key features of the bill**

- **Defines Data Principal and Data Fiduciary**
    - "Data Principal" denotes the individual whose data is being collected.
        - In the case of children – all users under the age of 18— their parents or lawful guardians will be considered their 'Data Principals.'

- "Data Fiduciary" denotes the entity (can be an individual, company, firm, state etc), which decides the purpose and means of the processing of an individual's personal data.

- **Data Collection and Processing**
  - Personal data is any data by which or in relation to which an individual can be identified. .
  - The individuals need to give **consent before their data is processed** and that every individual **should know what items** of personal data a Data Fiduciary wants to collect and the **purpose of such collection** and further processing.
    - Processing means "the entire cycle of operations that can be carried out in respect of personal data."
  - The bill **ensures** that individuals should be able to **"access basic information"** in languages specified in the eighth schedule of the Indian Constitution
  - The notice of data collection needs to be in clear and easy-to-understand language.
  - Individuals also have the right to withdraw consent from a Data Fiduciary.
- **Significant Data Fiduciaries**
  - 'Significant Data Fiduciaries-**deals with a high volume of personal data.**
  - **Designated by the Central government** based on factors ranging from the volume of personal data processed to the risk of harm to the potential impact on the sovereignty and integrity of India.
  - It needs to fulfil **certain additional obligations** to enable greater scrutiny of its practices.
  - Such entities will have to **appoint a 'Data protection officer'** -point of contact for grievance redressal. They will also have to appoint an **independent Data auditor** who shall evaluate their compliance with the act.
- **Rights**
  - Data principals will have the **right to demand the erasure and correction of data collected** by the data fiduciary.
  - They will also have the **right to nominate an individual** who will exercise these rights in the event of death or incapacity of the data principal.
  - The bill also gives consumers the **right to file a complaint against a 'Data Fiduciary'** with the Data Protection Board in case they do not get a satisfactory response from the company.
- **Cross-border data transfer**
  - The bill **allows for cross-border storage and transfer of data** to "certain notified countries and territories preceded by an assessment of relevant factors by the Central Government
- **Financial penalties**
  - The Bill imposes **significant penalties on businesses** that undergo data breaches or fail to notify users when breaches happen.
    - Entities that fail to take "reasonable security safeguards" to prevent personal data breaches will be fined as high as Rs 250 crore as
- **Exemptions**
  - The government could also exempt **certain entities from adhering to provisions of the Bill** on the basis of the number of users and the volume of personal data processed by the entity **for national interest.**
- **Data Protection Board**
  - The bill proposes a new regulatory body to be set up by the government — can impose a penalty of up to ₹500 crore if non-compliance by a person is found to be significant.

**Data protection laws in other geographies:**

- **EU MODEL-General Data Protection Regulation or GDPR**
  - **The European Charter of Fundamental Rights** recognises the right to privacy as well as the right to protection of personal data, and is backed by a comprehensive data protection framework
  - The GDPR focuses on a **comprehensive data protection law for processing of personal data.**
    - It applies to processing of personal data by any means, and to processing activities carried out by both the government and private entities. There are certain exemptions such as national security, defence, public security, etc
- **US MODEL**
  - Privacy protection is largely defined as "liberty protection" focused on the protection of the individual's personal space from the government.
    - It enables collection of personal information as long as the individual is informed of such collection and use.
  - There is no comprehensive set of privacy rights or principles in the US that, like the EU's GDPR
  - There is **limited sector-specific regulation**- the approach towards data protection is different for the public and private sectors-sufficiently well-defined and addressed by broad legislation such as the Privacy Act, the Electronic Communications Privacy Act and other sector-specific norms.
- **CHINA MODEL**- multiple laws
  - **The Personal Information Protection Law (PIPL)**-gives Chinese data principals new rights as it seeks to prevent the misuse of personal data.
    - China's PIPL is deemed to be "similar" to the EU's GDPR in that it gives Chinese consumers the right to access, correct, and delete their personal data gathered by businesses, but credibly impacts offshore data processors.

- The law includes stringent penalties, with fines as high as RMB 50 million, or up to 5% of a company's turnover in the previous financial year. Businesses may also be required to suspend operations until they "demonstrate compliance".

- **The Data Security Law (DSL)**-requires business data to be categorized by levels of importance, and puts new restrictions on cross-border transfers.
  - Companies that mishandle data under the DSL face severe penalties.

**34. Map My India seeks level playing field with Google**

**Context-**

- Homegrown **Map My India,** which works on **geospatial data,** continues to seek a **level playing field with the US tech giant on the usage of satellite imagery.**

**Disparity between domestic and foreign companies-**

- Indian government's regulations put a limit on domestic companies working with **geospatial data** with regard to satellite imagery, but as **Google** is a **US company,** it is free from such restrictions.
- **Private companies** in India using satellite imagery for either consumer or enterprise use cases **cannot put out imagery finer than one-metre resolution.**
- However, **Google Maps** does not comply with this directive and offers even finer and crisper resolution on their maps to consumers, making this regulation a grey area.

**Map my India:**

- It is an Indian technology company that builds **digital map data, telematics services, Global Information Systems** and **Artificial Intelligence services.**
- It is an alternative to Google Maps, which covers as many as **7.5 lakh Indian villages** and **7,500 cities.**
- **Map My India** offers **multiple, digital mapping, navigation, and geospatial tech** offerings and currently has a **client base of 2,000 enterprise customers.**
- Map My India also offers **professional-grade maps** and products directly to retail customers through the Maps app and GPS IoT-enabled gadgets and devices.

**Database:**

- The database has a road network connected by **63 lakh km** and the organisation claims to consist of the most exhaustive digital map database of the country.

**Use:**

- Almost all the vehicle manufacturers in India who come with built-in navigation systems are using Map my India.
- Map My India's consumer-facing app **Mappls** also offers features like road conditions, traffic patterns and conditions in real-time using its partnerships with original equipment manufacturers and mobility fleets.

**Other Products:**

- App called **'Move'** that provides real-time traffic updates and navigation.
- Recently, the **Indian Space Research Organisation (ISRO)** and **MapmyIndia** have partnered to come up with an **indigenous** geospatial portal known as **'Bhuvan'.**
  - Bhuvan is a **web portal** used to find and access **geographic information** (geospatial information) and **associated geographic services** (display, editing, analysis, etc.) via the Internet.

**35. USFDA nod for first treatment to delay type-1 diabetes**

**In news-**

- A **biologic therapy** that **delays the onset of type 1 diabetes** received approval from the **US Food and Drug Administration**.
- It is the first therapy approved for the prevention of type 1 diabetes.

**About the treatment- Tzield-**

- The **monoclonal antibody teplizumab,** which will be marketed under the brand name **Tzield,** from **ProventionBio** and **Sanofi** is given through **intravenous infusion.**
- **Estimated cost of the therapy is about $194,000** for a full course of treatment.
- **Tzield** is approved for use in **people 8 and older** who are in **stage 2 of their type 1 diabetes.**
- The **treatment** comes in a **single 14-day course** of infusions that each last 30 to 60 minutes.

**Side-effects of the treatment-**

- The most common side effects reported in the trial participants were **low white blood cells** and **lymph cells**, **rash** and **headache.**

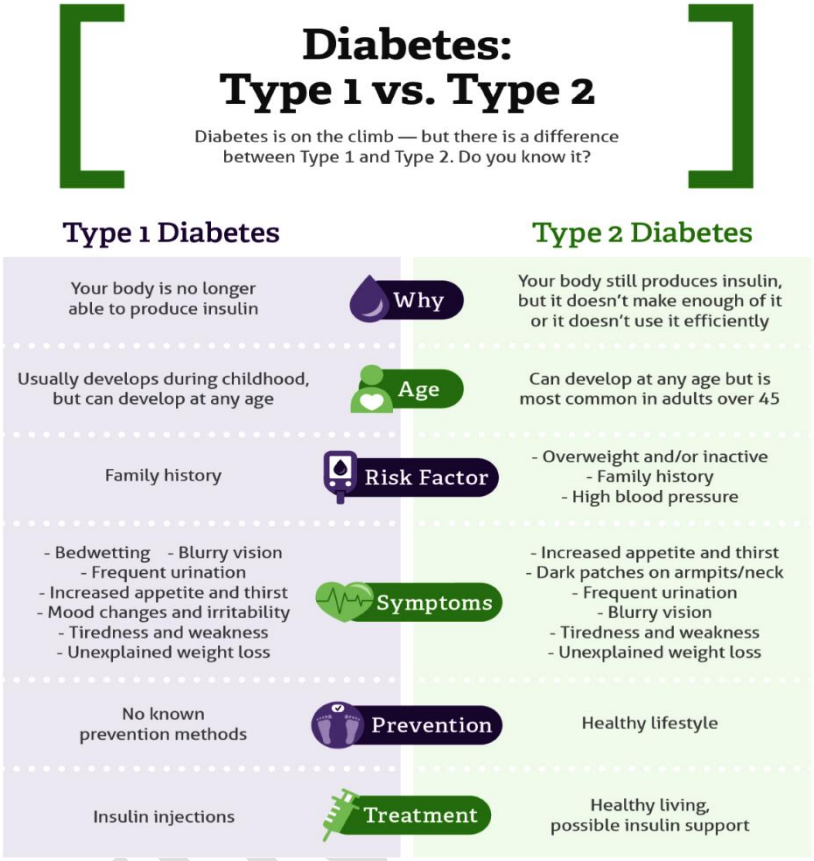
**The first option for preventing type 1**

- With **type 1 diabetes** (also known as **Juvenile Diabetes** as it mostly affects children of age 14-16 years)**,** a person's immune system attacks cells called **beta cells** in the **pancreas that produce insulin,** a **hormone** that helps blood sugar enter cells, where it's used for energy.
- The attack can happen for years before any symptoms of diabetes appear.
- Without insulin, blood sugar can build up in the bloodstream and break down the body's own fat and muscle.
- It is much more severe than **type 2.**
  - Unlike **type 2 diabetes,** which can be prevented with lifestyle changes like losing weight and exercising, **type 1** is a **genetic disease** that has not had any prevention options until now.

- **Tzield** holds off the disease before symptoms appear by stopping the autoimmune disease process and the underlying destruction of **beta cells.**
- The treatment essentially reboots the immune system, preserving **beta cell function.**

**How Rare is Type-1 Diabetes?**

- Out of **10 lakh children and adolescents** living with **type 1 diabetes** in the world, **India** holds the **highest number.**
- Out of **2.5 lakh people living with type 1 diabetes** in India, **90,000 to 1 lakh** are under the age of 14 years.
- **Only 2%** of all hospital cases of diabetes in the country are **type 1** — but which is being diagnosed more frequently.




**What Factors Exacerbate the Condition?**

- **Genetic Factors:** It plays a role in determining whether a person will get **type-1 diabetes.** The risk of disease in a child is
  - **3%** when the mother has it
  - **5%** when the father has it
  - **8%** when a sibling has it.
- **Presence of Certain Genes:** It is also strongly associated with the disease. For example, the **prevalence of genes** called **DR3-DQ2** and **DR4-DQ8** is **30-40% in patients with type 1 diabetes** as compared to **2.4% in the general population.**
- **DR3- DQ2** and **DR4-DQ8** mean the patient is permissive for **celiac disease** and is capable of developing or having the disease.

**36. Narcoanalysis VS Polygraph analysis**

**Context:** ***Shraddha*** Murder Case,

**Polygraph analysis:**

- Itis based on the assumption that physiological responses that are triggered when a person is lying are different from what they would be otherwise.
- Instruments like cardio-cuffs or sensitive electrodes are attached to the person, and variables such as blood pressure, pulse, respiration, change in sweat gland activity, blood flow, etc., are measured as questions are put to them.
- A numerical value is assigned to each response to conclude whether the person is telling the truth, is deceiving, or is uncertain

**Narcoanalysis:**

- Narcoanalysis involves the injection of a drug, sodium pentothal, which induces a hypnotic or sedated state in which the subject's imagination is neutralized, and they are expected to divulge information that is true.
- The drug, referred to as "truth serum" in this context, was used in larger doses as anaesthesia during surgery, and is said to have been used during World War II for intelligence operations.
- Investigating agencies employ these tests in investigation, and are sometimes seen as being a "softer alternative" to torture or "third degree" to extract the truth from suspects.

- However, neither method has been proven scientifically to have a 100% success rate, and remain contentious in the medical field as well.

## 37. QR Code for Drugs

**Context:** Government of India has recently introduced quick response (QR) codes to ensure authenticity and traceability of 300 common drug brands

**Concept:**

- A week ago, the Centre had mandated that the **country's 300 top brands sport QR/barcodes by August 2023**, in an effort to weed out fake and counterfeit products.
- Pharma industry representatives agree that they are still evaluating the logistics involved in its roll-out, said representatives, speaking for drug makers of all hues

**About the notification**

- The Union Ministry of Health has made amendments to the **Drugs Rules, 1945,** to implement this.
- In this regard, the **National Pharmaceutical Pricing Authority (NPPA)** had identified the list of 300 drugs.
- The plan will be implemented in **phases from May 2023.**
- In the first phase, top brands which hold market shares of at least 35% each for lifesaving drugs will be required to display the QR code.
- This is aimed at **preventing the sale of spurious drugs**.
- These high-selling brands have been **shortlisted based on their moving annual turnover (MAT) value.**
- As per the draft notification of the ministry the manufacturers of the formulation products **will print or affix barcode or QR code on its primary packaging label and on the secondary package label** that store data or information legible with software application to facilitate authentication.
- The **stored data or information will include unique product identification code, proper and generic name of the drug, brand name, name and address of the manufacturer, batch number, date of manufacturing, date of expiry, and manufacturing license number.**
- Earlier this year, the **Centre had said active pharmaceutical ingredients (APIs) or bulk drugs that are manufactured on imported in India should bear a QR code** on its label at each level, packaging that stores data or information readable with software application to facilitate tracking.
- The new rule will be applicable from **January 1, 2023.**

**About Bar Code:**

- Barcode is a machine-readable representation of information, which can be read by barcode scanners or computer programs to extract relevant information from an image.
- The encoded information may then be used by computers to perform tasks like reading data from cards into databases and performing mathematical calculations based on the encoded values stored on cards.
- Barcodes are used to store information like price, product type, product identification numbers, etc.

**About QR Code**

- A QR code is a **two-dimensional version of barcode** invented in 1994 by the Japanese automotive company Denso Wave.
- A **QR code (quick response code)** is used to provide easy access to online information through the digital camera on a smartphone or tablet.
- A QR code works similarly to barcodes.
- Each QR code consists black squares and dots which represent different pieces of information.
- When scanned, the unique pattern on the barcode translates into human-readable data.

**Difference between QR Code and Barcode**

- The major difference between Barcode and QR code is that the **Barcode can store data only in one dimension while the QR code can store data in two dimensions**.
- Storage of data is less in Barcode, whereas in QR Code it is higher.
- Data is stored horizontally in Barcode, whereas in QR Code it is stored both horizontally and vertical.

## 38. ISRO Launches PSLV C-54/EOS-06 Mission

**Context:** The Indian Space Research Organization launched PLV-C54/EOS-06 Mission with Oceans-3 and eight nanosatellites on board from Sriharikota spaceport

**Concept:**

- The **PLV-C54/EOS-06** Mission includes **EOS-06 (Oceans-3)**, plus eight nanosatellites which are **BhutanSat, 'Anand' from Pixxel, Thybolt** two numbers from Dhurva Space and **Astrocast**-four numbers from Spaceflight USA.

**BhutanSat**

- ISRO Nano Satellite-2 for Bhutan (INS-2B) spacecraft is configured with INS-2 Bus. INS-2B will have two payloads namely NanoMx and APRS-Digipeater. NanoMx is a multispectral optical imaging payload developed by Space Applications Centre (SAC).

**Anand**

- The Anand Nano satellite is technology demonstrator to demonstrate the capabilities and commercial applications of miniaturized earth-observation camera for earth observation using a microsatellite in Low Earth Orbit.

- This is a three-axis stabilized satellite consisting of a satbus, accommodating all subsystems like telemetry, tele-command, Electrical Power system, Attitude Determination and Control System (ADCS), on-board computers etc.

**Astrocast**

- Astrocast, a 3U spacecraft is a technology demonstrator satellite for the Internet of Things (IoT) as the payload. There are 4 nos. of Astrocast Satellites in this mission. These spacecraft are housed within an ISISpace QuadPack dispenser.
- The dispenser protects the satellite from contamination.

**Thybolt**

- The Thybolt is a 0.5U spacecraft bus that includes a communication payload to enable rapid technology demonstration and constellation development for multiple users.
- It also demonstrates Store-and-Forward functionality for authorized users in the amateur frequency band. The satellites shall be deployed by using Dhruva Space Orbital Deployer to perform the specific mission operations for a minimum lifetime of 1 year.

**About EOS-06 Satellite**

- The EOS-6 is a **third-generation earth observation satellite in the Oceansat series** of satellites.
- This is to provide **continuity services for Oceansat-2 spacecraft** with enhanced payload specifications as well as application areas.
- The payloads are Ocean Colour Monitor (OCM-3), Sea Surface Temperature Monitor and Ku-Band Scatterometer (SCAT-3), and 'ARGOS' Mission.
- ARGOS is the global satellite-based data collection and location system of its kind dedicated to studying and preserving the environment.

**What is EOS?**

- An EOS or **Earth remote sensing satellite** is a satellite used or designed for Earth observation (EO) from orbit.
- It includes spy satellites and similar ones intended for non-military uses such as environmental monitoring, meteorology, cartography, and others.
- The most common type is Earth-imaging satellites that take satellite images, analogous to aerial photographs.
- Some EOS may perform remote sensing without forming pictures, such as in GNSS radio occultation.

**Different nomenclature**

- Two years ago, ISRO had moved to a new naming system for its earth observation satellites which **till then had been named thematically, a**ccording to the purpose they were meant for.
- The Cartosat series of satellites were meant to provide data for land topography and mapping, while the Oceansat satellites were meant for observations overseas.
- Some INSAT-series, Resourcesat series, GISAT, Scatsat, and a few other earth observation satellites were named differently for the specific jobs they were assigned to do, or the different instruments that they.
- All these would now become part of the new EOS series of satellites.

39. **India's SARAS radio telescope gives clues to Universe's 1st stars & galaxies**

**In the news-**

- **Raman Research Institute (RRI)** in **Bengaluru** said that in a **first-of-its-kind work,** using data from an **Indian telescope**, scientists have determined **properties of radio luminous galaxies** formed just **200 million years after the Big Bang**, a period known as the **Cosmic Dawn.**

**What was the research about?**

- They used the **Shaped Antenna measurement of the background RAdio Spectrum-3 (SARAS-3) telescope.**
- For the study, **SARAS-3, indigenously designed and built at RRI,** was deployed over **Dandiganahalli Lake** and **Sharavathi backwaters,** located in **Karnataka,** in early **2020.**
- Scientists study **properties of very early galaxies** by observing radiation from hydrogen atoms in and around galaxies, emitted at a frequency of approximately **1420 MHz.**
- The **radiation is stretched by the expansion of the universe,** as it travels to us across space and time, and arrives at **Earth in lower frequency radio bands 50-200 MHz,** also used by FM and TV transmissions.

**Why detection of the signal is a challenging task?**

- The **cosmic signal** is **extremely faint,** buried in orders of magnitude brighter radiation from our own Galaxy and man-made terrestrial interference.
- So, detecting the signal, even using the most powerful existing radio telescopes, has remained a challenge for astronomers.

**Research findings-**

- The results from the **SARAS-3 telescope** are the **first time that radio observations of the averaged 21-cm line** have been able to provide insight into the **properties of the earliest radio-loud galaxies** that are usually powered by **supermassive black holes.**
- This work takes forward the results from **SARAS-2,** which was the first to inform the properties of the earliest stars and galaxies.
- It has shown that **less than 3% of the gaseous matter** within early galaxies was converted into **stars** and that the earliest galaxies that were bright in radio emission were also strong in **X-rays,** which heated the cosmic gas in and around the early galaxies.

- **SARAS-3** has been able to put an upper limit to excess radiation at radio wavelengths, lowering existing limits set by the **ARCADE** and **Long Wavelength Array (LWA)** experiments in the **US.**
- The analysis has shown that the **21-cm hydrogen signal** can inform about the **population of first stars and galaxies**.

**Challenges ahead-**

- Constraints on the calculation of the **masses of the early galaxies,** along with limits on their energy outputs across radio, X-ray, and ultraviolet wavelengths.

**What are Radio Waves and Radio Telescopes?**

- **Radio waves** have the l**ongest wavelengths** in the electromagnetic spectrum.
- They range from the length of a football to larger than our planet. **Heinrich Hertz** proved the existence of radio waves in the late **1880s**.
- Radio telescopes collect weak radio light waves, bring it to a focus, amplify it and make it available for analysis.
- They help study **naturally occurring radio light from stars, galaxies, black holes,** and other astronomical objects.
- These **specially-designed telescopes** observe the longest wavelengths of light, ranging from **1 millimetre to over 10 metres long.**
- For comparison, **visible light waves** are only a few hundred nanometers long, and a nanometer is only 1/10,000th the thickness of a piece of paper! In fact, we don't usually refer to radio light by its wavelength, but by its frequency.

**Shaped Antenna measurement of the background RAdio Spectrum-3 (SARAS-3) telescope-**

- **SARAS** is a niche high-risk high-gain experimental effort of **RRI.**

**SARAS** aims to design, build and deploy in India a precision radio telescope to detect extremely faint radio wave signals from the depths of time, from our **"Cosmic Dawn"** when the first stars and galaxies formed in the early Universe.

40. **Mumbai measles outbreak: What is the role played by lack of vaccination**

**Context-**

- Despite Measles vaccine being under the **Universal immunisation programme (UIP)** the **lack of a proper vaccination program in Maharashtra** led to the spread of Measles in the region.

**Universal Immunisation Programme**

- **The immunization Programme in India** was introduced in **1978** as **'Expanded Programme of Immunization' (EPI)** by the **Ministry of Health and Family Welfare,** Government of India.
- In **1985,** the programme was modified as the **'Universal Immunization Programme (UIP)** to be implemented in a **phased manner** to cover all districts in the country by **1989-90** with one of the largest health programmes in the world.
- **Ministry of Health and Family Welfare**, Government of India provides **several vaccines** to **infants, children** and **pregnant women** through the Universal Immunisation Programme.

**About immunization-**

- Immunization is the process whereby a person is made immune or resistant to an infectious disease, typically by the administration of a vaccine.
- Vaccines are substances that stimulate the body's own immune system to protect the person against subsequent infection or disease.

**Vaccines provided under UIP:**

- **BCG**
  - **About**-BCG stands for **Bacillus Calmette-Guerin vaccine.** It is given to infants to protect them from **tubercular meningitis** and **disseminated TB.**
  - **When to give** – BCG vaccine is **given at birth** or as early as possible till **1 year.**
- **OPV**
  - **About-OPV** stands for **Oral Polio Vaccine.** It protects children from **poliomyelitis**.
  - **When to give- OPV** is **given at birth** called **zero dose** and **three doses** are given at **6**, **10** and **14 weeks.** A **booster dose** is given at **16-24 months of age.**
- **Hepatitis B vaccine**
  - **About** – **Hepatitis B vaccine** protects from **Hepatitis B virus** infection.
  - **When to give-** Hepatitis B vaccine is **given at birth** or **as early as possible within 24 hours.** Subsequently, 3 doses are given at 6, 10 and 14 weeks in combination with **DPT** and **Hib** in the form of a pentavalent vaccine.

**Pentavalent Vaccine**

- **About-** Pentavalent vaccine is a **combined vaccine to protect children from five diseases Diptheria, Tetanus, Pertussis, Haemophilis influenza type b infection** and **Hepatitis B.**
  - **Diptheria-** A serious infection of the nose and throat that's easily preventable by a vaccine. A sheet of thick, grey matter covers the back of the throat, making breathing hard.
  - Symptoms include sore throat, fever, swollen lymph nodes and weakness.
  - **Tetanus-** Tetanus is an infection caused by **bacteria called Clostridium tetani.** When these bacteria enter the body, they produce a toxin that **causes painful muscle contractions.** Another name for tetanus is **"lockjaw".** It often causes a person's neck and jaw muscles to lock, making it hard to open the mouth or swallow. It can interfere with the ability to breathe, eventually **causing death.**
  - **Pertussis- Whooping cough (pertussis)** is a **highly contagious respiratory tract infection.** Before the vaccine was developed, whooping cough was considered a childhood disease.

- **Haemophilis influenza type b infection-** Haemophilus influenza disease is a name for any illness caused by **bacteria called H. influenzae.** Some of these illnesses, like ear infections, are mild while others, like bloodstream infections, are very serious. In spite of the name, H. influenzae does not cause influenza (the flu). **Vaccines can prevent one type of H. influenzae (type b or Hib) disease.**

- **When to give** - **Three doses** are given at 6, 10 and 14 weeks of age (can be given till one year of age).
- **Rotavirus Vaccine-**
  - **About -RVV** stands for **Rotavirus vaccine.** It gives protection to infants and children against **rotavirus diarrhoea.** It is given in select states.
  - **When to give - Three doses of vaccine** are given at 6, 10, 14 weeks of age (can be given at one year of age).
- **PCV**
  - **About- PCV** stands for **Pneumococcal Conjugate Vaccine.** It protects infants and young children against **disease caused by the bacterium Streptococcus pneumoniae.**
  - **When to give** - The vaccine is given in t**wo primary doses** at 6 & 14 weeks of age followed by a **booster dose at 9-12 months of age.**
  - In December **2020,** India's first fully indigenously developed pneumococcal conjugate vaccine **"Pneumosil"** was launched.
- **fIPV**
  - **About-** fIPV stands for **Fractional Inactivated Poliomyelitis Vaccine.** It is used to boost the protection against **poliomyelitis (Polio).**
  - **When to give- Two fractional doses of IVP** are given intradermally at 6 and 14 weeks of age.
- **Measles/ MR vaccine**
  - **About- Measles vaccine** is used to protect children from **measles**. In a few states **Measles and Rubella,** a combined vaccine is given to protect against Measles and Rubella infection.
  - **When to give- First dose** of Measles or MR vaccine is given at **9** completed months to 12 months (vaccine can be given up to 5 years if not given at 9-12 months age) and second dose is given at 16-24 months.
- **JE vaccine**
  - **About- JE** stands for **Japanese encephalitis vaccine.** It gives protection against **Japanese Encephalitis disease. J**E vaccine is given in select districts endemic for JE after the campaign.
  - **When to give-** JE vaccine is given in **two doses first dose is given** at 9 completed months-12 months of age and **second dose** at 16-24 months of age.
- **DPT booster**
  - **About- DPT** is a **combined vaccine;** it protects children from **Diphtheria, Tetanus and Pertussis.**
  - **When to give -DPT** vaccine is given at **16-24 months of age** is called as **DPT first booster** and **DPT 2nd booster** is given at 5-6 years of age.
- **Tetanus and adult diphtheria (Td) vaccine:**
  - **About- TT vaccine** has been replaced with **Td vaccine** in **UIP** to limit the waning immunity against **diphtheria** in older age groups.

**When to give- Td vaccine** is administered to adolescents at **10** and **16 years** of age and to **pregnant women.**

41. **Red Planet Day: The many missions that brought humans closer to Mars**

**Context-** Commemorating the day one of the most significant space missions to Mars was launched, **November 28** is marked as **Red Planet Day.**

**More on news-**

- On this day in **1964,** the **United States** launched the space probe **Mariner 4** on a course towards Mars, which it flew past in **July 1965,** sending back pictures of the red planet.
- This was the first time that a spacecraft undertook the first flyby of the red planet, becoming the **first-ever spacecraft** to take close-up photographs of another planet.

**crucial space missions to the MARS-**

**Early 19th century-**

- In the late 19th century, **Italian astronomer Giovanni Schiaparelli** claimed to have observed **linear patterns on the surface of the planet** that he called **canali.**
- This was mistranslated into English as canals, leading some to believe canals were built by intelligent beings on Mars — an early instance of Mars being thought to have life, similar to Earth.

**1964: Mariner 4**

- Mariner 4, after 8 months of the voyage to mars, send the images of **lunar-type impact craters.**
- A television camera onboard took **22 pictures, covering about 1% of the planet.**
- These photos were transmitted to Earth in **four days.**
- **Mariner 4** lasts about **three years in solar orbit,** continuing long-term studies of the **solar wind environment** and making coordinated measurements with **Mariner 5.**
- The photographs also revealed a **cratered surface resembling the Moon,** although because of their limited range, they failed to cover the more geologically diverse features that we know about now.

**Viking missions of the 1970s and the 1980s-**

- The **Viking missions (1970s)** carried out the **first chemical analysis of Martian soil,** as well as four biology experiments to detect **biological activity.**
- In the **early 1980s,** scientists hypothesised, based on **mineralogic composition** and **rock texture,** that certain meteorites might have a source region in Mars.
- In **1984,** a study showed that the **isotopic composition of rare gases** (Xenon, Krypton, Neon and Argon) **matched the isotopic ratios** of the **Martian atmosphere** measured by the **Viking spacecraft.**
- This discovery provided a way for geochemists to study Martian samples – and provided a huge boost to our understanding of the **geochemical evolution of Mars.**

**Odyssey, 2001 and water on Mars**

- In **2001**, the **Gamma Ray Spectrometer on board the Mars Odyssey spacecraft** detected a fascinating **hydrogen signature** that seemed to indicate the **presence of water ice.**
- **NASA's Phoenix** landed on the **Martian North Pole in May 2008,** and **survived for about 150 days.**
- The robotic arms of Phoenix **scooped soil** and **ice** from the surface, heated the material in eight ovens, and measured the **composition of the gases with a mass spectrometer.**
- The **Phoenix mission** established conclusively that the **initial discovery of hydrogen by Mars Odyssey in 2002 was indeed water ice.**

**Beyond the West**

- NASA has a **lander (Mars Insight), a rover (Curiosity),** and **three orbiters (Mars Reconnaissance Orbiter, Mars Odyssey, MAVEN);**
- **India** has an **orbiter (Mangalyaan-1);**
    - **India's Mars Orbiter Mission** — a technology demonstration venture — carried **five scientific payloads** (total 15 kg) collecting data on surface geology, morphology, atmospheric processes, surface temperature and atmospheric escape process.
- the **EU** has **2 orbiters (Mars Express and ExoMars Trace Gas Orbiter);** and
- **China** and **UAE** will have an **orbiter each (Hope and Tianwen-1 respectively).**
    - The **UAE mission** will study the **Martian atmosphere** and will seek to address the question of **how and why Mars lost its atmosphere.**

**About Mars planet-**

- **Mars** is the **fourth planet** from the **Sun** and the **second-smallest planet** in the Solar System, being **larger than only Mercury.**
- Mars is a **terrestrial planet** with a **thin atmosphere** (less than 1% that of Earth's) and has a crust primarily composed of elements similar to Earth's crust, as well as a **core made of iron and nickel.**
- Mars has surface features such as impact craters, valleys, dunes, and polar ice caps.
- It has **two small and irregularly shaped moons: Phobos and Deimos.**
- Some of the most notable **surface features on Mars** include **Olympus Mons, the largest volcano and highest known mountain on any planet in the Solar System,** and **Valles Marineris,** one of the largest canyons in the Solar System.
- The **Borealis basin** in the **Northern Hemisphere** covers approximately **40% of the planet** and may be a large impact feature.
- Days and seasons on Mars are comparable to those of Earth, as the planets have a **similar rotation period** and **tilt of the rotational axis** relative to the ecliptic plane.
- Liquid water on the surface of Mars cannot exist due to low atmospheric pressure, which is less than 1% of the atmospheric pressure on Earth.
- Both of **Mars's polar ice caps** appear to be made largely of water.
- In the distant past, Mars was likely wetter, and thus possibly more suited for life. However, it is unknown whether life has ever existed on Mars.
- **Mars** can be viewed from **Earth** with the **naked eye,** as can it's reddish coloring.
- This appearance, due to the **iron oxide prevalent on its surface,** has led to Mars often being called the **Red Planet.**

It is among the **brightest objects in Earth's sky,** with an apparent magnitude that reaches **−2.94**, comparable to that of **Jupiter** and **surpassed only by Venus**, the **Moon** and the **Sun**.

42. **Beijing to launch 3 astronauts to its space station**

**Context:** China will be **sending a three-person crew** its **under-construction space station**

**More about the launch:**

- The spaceship will take **three astronauts** i.e **Fei Junlong, Deng Qingming, and Zhang Lu** to carry out the spaceflight mission.
- **Fei Junlong** will be the **commander of the mission.**
- The crew will stay in orbit for **about six months**, a period in which the **construction of the low-orbit space station** is expected to be **completed**.
- This is the **third manned mission** to be launched by Chin**a to link up with its space station.**

**What is the Tiangong Space Station:**

- The Tiangong space station is a Chinese space station built in **low Earth orbit between 340 and 450 kilometers above the earth.**

- It is part of **China Manned Space Program** and is the **country's first long-term space station.**
- The three modules of the **Tiangong Space Station are**
  - **The Tianhe** means **"Harmony of the Heavens"** is the **core module.**
  - **Wentian** means **"Quest for the Heavens"** is a laboratory cabin module.
  - **Mengtian** means "Dreaming of the Heavens" is a laboratory module.
- With the fully functioning of the Space station China will become only the **third country in history to have put both astronauts into space and to build a space station**, after **Russia and the US.**
- It is **one-fifth** the **mass** of the International Space Station

**43. Blue bugging**

**Concept:**

Bluebugging is a hacking technique that allows individuals to access a device with a discoverable Bluetooth connection.

**Prerequisite for hacking:**

- A bluebugging hacker must be within a **10-meter range** (Bluetooth signal range) of your device for the bluebugging attack to work. However, hackers **can use booster antenna**s to widen the attack range.
- Your device's Bluetooth must be in **discoverable mode**, which is the default setting for most devices.

**How is blue bugging done?**

- A hacker attempts to pair with a victim's device via Bluetooth. Once a connection is established, the hacker installs a backdoor or malware to bypass authentication.
- The malware is usually designed to gain unauthorized access by exploiting a vulnerability. In some cases, the attacker can compromise a device through a **brute-force attack,** which entails **repeatedly logging** in to a victim's account by randomly guessing username-password combinations.
- As soon as the hacker gains access, he/she can essentially do what the device owner can, such as reading messages, making calls, or modifying contact details.
- Bluebugging manipulates a target phone into compromising its security, thus creating a **backdoor attack** before returning control of the phone to its owner.

**What can bluebugging do?**

- The hacker can **read and send messages, access the victim's phonebook, and initiate or eavesdrop on phone calls.**
- Once control of a phone has been established, it is used to **call back the hacker** who is then able to listen in to conversations, hence the name **"bugging"**
- It pretends to be the headset and thereby "**tricking" the phone into obeying call commands**. Not only can a hacker receive calls intended for the target phone, he can send messages, read phonebooks, and examine calendars.
- Even the most secure smartphones like iPhones are vulnerable, any app with access to Bluetooth can record users' conversations with Siri and audio from the iOS keyboard dictation feature when using Air Pods or headsets, a hacker can gain unauthorized access to these apps and devices and control them

**Ways to safeguard from bluebugging:** Update your devices, make your Bluetooth devices "undiscoverable", reject strange messages, watch out for suspicious activity(phone is suddenly disconnecting and reconnecting calls), monitor sudden spikes in data usage

**Difference between bluebugging, bluesnarfing, and bluejacking:**

- **Bluejacking** uses **Bluetooth** to pair with your device to **"prank" you.** Usually, bluejacking hackers send you **annoying pictures or messages to promote products**.
- **Bluesnarfing** uses **Bluetooth** to hack into your device to d**ownload sensitive data, such as images, phone book information, and messages.**

44. **Small modular reactors (SMRs)**

**Context:** Union Minister of State (Independent Charge) Science & Technology Dr Jitendra Singh today said, India is taking steps for development of Small Modular Reactors (SMR), with up to 300 MW capacity to fulfil its commitment to Clean Energy transition.

**Concept:**

**What are small modular reactors (SMRs)?**

Small modular reactors are advanced nuclear reactors that have a power generation capacity of up to 300 megawatts (MW) per unit. This is one-third the capacity of a traditional nuclear reactor. However, the main benefit of the SMR is that it is **smal**l and **modular.**

SMRs were designed to do **away with the problems in conventional nuclear plants**. Conventional nuclear reactors are **massive in size** and have a **high cost of construction**. According to some estimates, the construction of these plants may cost up to $5,945 per kilowatt capacity. SMRs provide a solution to all this.

**What are the advantages of SMRs?**

- The small size of these reactors makes it possible for the companies to install them on **difficult terrain**. Their modular property allows the company to transport them easily from the manufacturing location to the plant. It brings down their cost of production as well as the construction time.
- In areas which **lack sufficient grid capacity**, like rural regions, SMRs can be installed into the existing grid and increase the power output. The SMRs **provide low-carbon power**, which is less harmful to the environment as compared to thermal power.

- According to the International Atomic Energy Agency (IAEA), SMRs are **relatively safer**. **No human intervention or external power** or force is required to shut down systems because passive systems rely on physical phenomena like gravity and self-pressurisation.
- They eliminate or significantly lower the potential for unsafe releases of radioactivity to the environment and the public in case of an accident.
- Moreover, these reactors require less frequent refuelling. As compared to refuelling once every 1-2 years in conventional plants, these plants can last 3-7 years before refuelling.
- Some SMRs are designed to operate for up to 30 years without refuelling

**How many SMRs are currently operating?**

Over 70 commercial SMRs have been developed around the world, but the only modular reactor design that is operating is onboard the floating nuclear power plant Akademik Lomonosov in Russia.

The construction of the biggest land-based SMR began in the Chinese power plant Linglong One in 2021 and is due for completion in 2026.

**What are the disadvantages of SMRs?**

The SMRs are largely more beneficial than conventional nuclear plants and other forms of power generation, but their cost of production is likely to stay high unless mass production is undertaken.

**Current status:** Russia's Academic Lomonosov, the world's first floating nuclear power plant that began commercial operation in May 2020, is producing energy from two 35 MW(e) SMRs. Other SMRs are under construction or in the licensing stage in Argentina, Canada, China, Russia, South Korea and the United States of America.

**IAEA and SMR**

- The IAEA has established the Platform on SMRs and their Applications, a one-stop shop for countries to coordinate support related to all aspects of SMR development, deployment, oversight and their electric and non-electric applications, such as use in district heating and desalination systems.
- The IAEA is assessing the level to which existing IAEA safety standards can be applied to innovative technologies. The IAEA expects to publish a Safety Report on the applicability of IAEA safety standards to SMR technologies in 2022.
- The IAEA's Technical Working Group on Small and Medium Sized or Modular Reactors (TWG-SMR) and the SMR Regulators' Forum unites experts to discuss challenges and share experiences related to the development and future deployment of SMRs.

45. **Wet Leasing an aircraft**

**Context-**

- In efforts to boost international air traffic, the civil aviation ministry has allowed Indian airlines to take wide-body planes on wet lease for up to one year.

**What is Wet Leasing?**

- Wet leasing means taking the plane along with the **operating crew and engineers,** while dry leasing refers to taking only the aircraft on rent.
- The technical term for wet leasing is **ACMI** which stands for **aircraft, crew, maintenance and insurance.**
- These are the aspects of the operation that the wet lease airline takes care of, while the airline client will still be responsible for paying for direct operating costs.
- This includes catering and fuel as well as fees such as airport fees, ground handling charges and navigation fees.
- Operations of an aircraft on wet lease are more difficult for the **Directorate General of Civil Aviation (DGCA)** to monitor, which is why it is allowed for shorter durations.

**What are the new rules?**

- The rules had been **relaxed,** allowing the wet leasing for a year as opposed to the six months permitted so far.
- **Dry leasing** was already allowed for up to **12 months,** with the option to extend the contract for 12 another year.

**Why has govt extended limit now?**

- The **civil aviation ministry's decision** came on a request by the country's largest airline, **IndiGo.**
- It plans for inducting **B777 aircraft** on **wet/damp lease** basis during the current winter schedule.
- The relaxation will be available to all Indian carriers and will be granted based on the international destinations they wish to operate to.
- With Covid-related restrictions lifting, international travel is lifting up, and the wet leasing will allow airlines to fly more routes and rounds.
- Wide-body planes can accommodate more passengers, thereby boosting revenue.

**Why airlines lease aircraft?**

- About **half the plane**s used by airlines around the world are not owned but leased.
- Airlines and aircraft operators prefer leasing planes in order to avoid the massive lump sum payments that buying them would entail, and to quickly increase capacity, perhaps temporarily, on certain routes or sectors.

## ENVIRONMENT

### 1. Ban use of aceclofenac on cattle to save vultures

**Context:** Indian Veterinary Research Institute (IVRI) has demanded a ban on using aceclofenac in cattle after a new study showed that the drug metabolises into diclofenac in water buffaloes — as it does in cows.

**Concept:**

- The researchers gave the recommended dose of aceclofenac to nine domestic water buffaloes. They collected blood samples at intervals of up to 48 hours.
- And carried out an analysis of aceclofenac and its metabolite diclofenac in their plasma.
- It found that **aceclofenac was rapidly converted to diclofenac in the water buffaloes too**.
- Diclofenac was present in the plasma within 20 minutes of the treatment.
- The concentration reached its peak between four and eight hours.
- Allowing the use of aceclofenac was a very unfortunate loophole in India's vulture conservation according to press release of SAVE.

**Background**

- **Aceclofenac** is a **pro-drug of diclofenac** and behaves similarly in domestic water buffalo as it does in domestic cattle, posing the same risk to vultures.
- It is one among the three **non-steroidal anti-inflammatory drugs (NSAIDS) drugs—aeclofenac, ketoprofen and nimesulide**—were introduced as alternatives to diclofenac, that India banned in 2006 for animal use because it caused widespread vulture deaths.
- However, India's **vulture conservation action plan for 2020-25** recommends a ban on the **veterinary use of the three drugs**.

**Diclofenac**

- **Diclofenac**, a **drug used to treat cattle, was linked to kidney failure in vultures** and a decline in the bird's population.
- Though the drug was **banned in 2006**, it is reportedly still available for use.
- Diclofenac, that is potentially toxic to vultures being used by vets for treating cattle. The drugs make their way into the vulture's system as they feed on carcasses.
- **Three of India's vulture species** of the genus 'Gyps'— the **long-billed (Gyps indicus) and the slender-billed (G. tenuirostris) had declined by 97%,** while in **the white-rumped (G. bengalensis) declined nearly 99% between 1992 and 2007.**

**Action Plan for Vulture Conservation 2020-2025**

- It proposes to establish **Vulture Conservation Breeding Centers in Uttar Pradesh, Tripura, Maharashtra, Karnataka and Tamil Nadu.**
- There would also be a conservation **breeding programme** for **the Red Headed vulture and Egyptian vulture**, and **at least one "Vulture Safe Zone" in every State** for the conservation of the remnant populations.
- There would be **four rescue centers** in different geographical areas:
  a) Pinjore in north India,
  b) Bhopal in central India,
  c) Guwahati in northeast India and
  d) Hyderabad in south India,
- There will also be regular surveys to track population numbers, the plan envisages.
- Also, the vulture action plan **recommends meloxicam over diclofenac and Tolfenamic acidis** the other safe option.

**SAVE (Saving Asia's Vultures from Extinction)**

- The consortium of **like-minded, regional and international organizations,** created to oversee and coordinate conservation, campaigning and fundraising activities to help the plight of south Asia's vultures.
- **Objective:** To save three critically important species from extinction through a single programme.
- **SAVE partners**: Bombay Natural History Society, Bird Conservation Nepal, RSPB (UK), National Trust for Nature Conservation (Nepal), International Centre for Birds of Prey (UK) and Zoological Society of London.

**Indian Veterinary Research Institute (IVRI)**

- It was established in 1889 at Bareilly, UP.
- IVRI is one of the premier research institutions dedicated to livestock research and development of the region.

### 2. Yamuna frothing: What causes froth in the river and why is it dangerous

**Context-**

- **Froth in Yamuna:** A layer of froth seen was floating over parts of the **Yamuna river** near Kalindi Kunj.

**Location of frothing in Yamuna-**

- The frothing is seen only near Kalindi Kunj, downstream of the Okhla barrage
- It would have been seen across the **entire stretch of the river,** after the **Wazirabad barrage,** since drains begin emptying into the river from there.

**Frothing and its causes-**

- **Froth is a mass of small bubbles in liquid caused by agitation, fermentation, or salivating.**
- The froth is the **sign of a polluted river.**
- According to the experts, the **release of untreated or poorly treated effluents** could lead to frothing.

- **Sewage network** and **industrial waste** also leads to toxic frothing.
- **Phosphates** present in the river cause froth.
- The turbulence at the barrage near Okhla also forms foam from the phosphates.
- Also, **organic matter from decomposing vegetation** and the presence of **filamentous bacteria** cause foam.
- Pollutants from **sugar** and **paper** industries in **U.P.** that travel through **Hindon canal.**

**Constituents-**

- **Surfactants and phosphates** found in detergent in households and industrial laundry forms **1%** of froth, and remaining **99%** is air and water.

**How can froth formation be stopped-**

- Rid okhla pondage of **water hyacinth.**
- Detergents used must be biodegradable.
- **U.P., Haryana and Delhi** must improve their sewage treatment plants.
- Industrial pollution must be stopped
- Increasing the flow of river.

**Steps taken to reduce/remove frothing-**

- **The Yamuna Monitoring Committee** had asked the **Delhi Pollution Control Committee (DPCC)** and the **Central Pollution Control Board (CPCB)** to inspect and submit reports on this matter.
- The report submitted by the **CPCB** suggests that the **foam formation** takes place at **two locations–downstream of the ITO and Okhla barrages.**
- The water that falls after discharge from the Okhla barrage stirs the foaming agents present in the water.
- In June this year, the **DPCC banned the sale, storage and transportation of soaps and detergents not meeting the quality standards set by the Bureau of Indian Standards (BIS).**

**Delhi govt deploys boats to remove froth-**

- The Delhi government deployed **15 boats to remove the froth** with the help of ropes.
- The **Delhi Pollution Control Committee (DPCC)** is said to conceive the plan and implement it with the help of the **Irrigation Flood Control Department** and **Revenue Department.**

**Possible consequences-**

- According to some **environmentalists**, the **chemical** used to prevent frothing can cause **skin diseases, eye irritation and can pollute the water in the long run.**
- **Long term exposure** can also cause **Neurological issues** and **hormonal disbalance.**

**Yamuna river-**

- **Source:** The river Yamuna, a major tributary of **river Ganges,** originates from the **Yamunotri glacier** near **Bandarpoonch peaks** in the **Mussoorie range** of the **lower Himalayas** at an elevation of about **6387 meters** above mean sea level in **Uttarkashi district of Uttarakhand.**
- **Basin:** It meets the Ganges at the **Sangam** (where Kumbh mela is held) in **Prayagraj, Uttar Pradesh** after flowing through **Uttarakhand, Himachal Pradesh**, **Haryana and Delhi.**
- **Length:** 1376 km
- **Important Dam:** Lakhwar-Vyasi Dam (Uttarakhand), Tajewala Barrage Dam (Haryana) etc.
- **Important Tributaries:** Chambal, Sindh, Betwa and Ken.

**3. Panna, Madhya Pradesh (The latest included BR)**

**What is Man and Biosphere Programme?**

- Launched in 1971, UNESCO's **Man and the Biosphere Programme (MAB)** is an intergovernmental scientific programme that aims to establish a **scientific basis** for the improvement of relationships between **people** and their **environments**.
- MAB combines natural and social sciences, economics and education to improve human livelihoods and the equitable sharing of benefits, and to **safeguard** natural and managed ecosystems, thus promoting innovative approaches to economic development that are socially and culturally appropriate, and environmentally sustainable.

**What is Biosphere Conservation?**

- A scheme called Biosphere Reserve is being implemented by the Government of India since 1986, in which financial assistance is given in 90:10 ratio to the North-eastern Region States and three Himalayan states and in the ratio of 60:40 to other states for maintenance, improvement, and development of certain items.
- The State Government prepares the Management Action Plan which is approved and monitored by the Central MAB Committee.

**World Network of Biosphere Reserves** (**WNBR**)

- The **UNESCO World Network of Biosphere Reserves (WNBR)** covers internationally designated protected areas, known as **biosphere reserves**, which are meant to demonstrate a balanced relationship between people and nature (e.g. encourage sustainable development). They are created under the Man and the Biosphere Programme (MAB).
- The World Network of Biosphere Reserves **promotes North-South and South-South collaboration** and represents a unique tool for international co-operation through sharing knowledge, exchanging experiences, building capacity and promoting best practices.

- **World Network of Mountain Biosphere Reserves** is a new initiative under **UNESCO'S MAN AND BIOSPHERE PROGRAMME**

**Biocapacity.**

- Ecosystems have a limited ability to supply us with natural resources. This is based on factors such as water availability, climate, soil fertility, solar energy, technology and management practices. This capacity to renew, driven by photosynthesis, is called biocapacity.

**Biocapacity deficit Vs Ecological overshoot**

When a population's ecological footprint exceeds the biocapacity of its territory, it runs a biocapacity deficit. This deficit is balanced either through the use of biocapacity from elsewhere, or local overuse, called 'ecological overshoot'. At the global level, deficit and overshoot are identical since there is no interplanetary trade allowing for biocapacity use from elsewhere.

**Global Footprint Network**

- Global Footprint Network calculates the **ecological footprint of countries on an annual basis.**
- Global Footprint Network was **founded in 2003** with the goal of changing how the world manages its natural resources and responds to climate change.
- Global Footprint Network publishes yearly national footprint and Biocapacity accounts. -The Accounts **measure the ecological resource use and resource capacity of nations over time**.

**What is UNESCO?**

- UNESCO is the United Nations **Educational, Scientific and Cultural Organization**. It contributes to peace and security by promoting international cooperation in education, sciences, culture, communication and information.
- UNESCO promotes knowledge sharing and the free flow of ideas to accelerate mutual understanding and a more perfect knowledge of each other's lives. UNESCO's programmes contribute to the **achievement of the Sustainable Development Goals** defined in the 2030 Agenda, adopted by the UN General Assembly in 2015.

**Note – Ecological Footprint already covered**

**4. BS VI norms**

**Context: Annual case of Delhi pollution during the time of winter.**

**Bharat stage (BS):**

**Bharat stage (BS)** emission standards are laid down **by the government** to **regulate** the output of air pollutants from the **internal combustion engine** and spark-ignition engine equipment, including motor vehicles.

The central government has mandated that vehicle makers must manufacture, sell and register only **BS-VI (BS6) vehicles from April 1, 2020.**

**Background:**

The **first emission norms** were introduced in India in **1991 for petrol** and in 1992 for diesel vehicles. Following these, the **catalytic converter** became **mandatory for petrol vehicles** and unleaded petrol was introduced in the market.

**Difference Between BS4 and BS6**

- Both BS-IV and BS-VI are **unit emission norms** that set the **maximum permissible** levels for pollutants that an **automotive or a two-wheeler exhaust** can emit.

**What area unit BSI, BSII, BSIII, BSIV, and BSVI emission norms?**

The abbreviation BS, as mentioned above, refers to **'Bharat Stage'.**

- BSI- was introduced in the year 2000,
- BSII (BS2) was introduced in 2001
- BSIII (BS3) was introduced in 2005
- BSIV was introduced in 2017

the **delay** between the **introduction of BS3 and BS4** resulted in **fast-tracking** the BSVI or BS6 emission norms rather than BSV (BS5) norms.

**Supreme court ruling** –

- On **29 April 1999**, the **Supreme Court of India** ruled that all vehicles in the country had to **meet Euro I or India 2000 norms by June 1, 1999**, and Euro II would be mandatory in the National Capital Region (NCR) from **April 2000**.
- Carmakers were not prepared for this transition and in a subsequent judgment, the implementation of **Euro II was deferred.**
- In a recent judgment, the Supreme Court **banned the sale and registration** of motor vehicles conforming to **Bharat Stage IV** emission standard in the **entire country from 1 April 2020.**

**Committee Recommendations: Mashelkar Committee**

- **In 2002**, the government **accepted** the report submitted by the **Mashelkar committee**, which proposed a **road map for the rollout of Euro-based emission norms** in India.
- It also recommended a phased implementation of future norms, with regulations being implemented in major cities first and extended to the rest of the country after a few years.
- Based on the recommendations of the committee, the **National Auto Fuel policy** was announced **officially in 2003**.

- The road map for the implementation of the BS norms was **laid out until 2010.** The policy also created guidelines for auto fuels, reduction of pollution from older vehicles and R&D for air quality data creation and health administration.
- The **standards** and the **timeline** for implementation are **set by the Central Pollution Control Board** under the **Ministry of Environment**, Forest and Climate Change.
- Since **October 2010**, **Bharat Stage (BS) III** norms were enforced across the country. BS-IV emission norms were put in place in 13 major cities from April 2010, and the entire country from April 2017.
- **In 2016**, the government announced that the country **would skip the BS-V** norms altogether and adopt **BS-VI norms by 2020**.
- However, in Delhi, due to the sudden rise of pollution, it was planned to introduce in **2018 only**, which was protested by automobile companies, since they planned their policy according to the 2020 timeline.

**What makes BS-VI fuel better?**

**Sulphur content in fuel** is a major cause for concern. Sulphur dioxide released by fuel burning is a major pollutant that affects health as well.

BS-VI **fuel's sulphur content is much lower than BS-IV fuel**. It is reduced to **10 mg/kg max in BS-VI** from 50 mg/kg under BS-IV. However, Vehicles that are compliant with **BS-VI will also be more expensive.**

**AIR QUALITY INDEX (AQI)**

- The **air quality index (AQI) is an index** for reporting air quality on a **daily basis**.
- It is a **measure of how air pollution affects one's health** within a short time period.
- The purpose of the AQI is to help **people know how the local air quality** impacts their health.
- The **Environmental Protection Agency (EPA**) **calculates** the AQI for **five major air pollutants**, for which national air quality standards have been established to safeguard public health.

1. **Ground-level ozone**
2. **Particle pollution/particulate matter (PM2.5/pm 10)**
3. **Carbon Monoxide**
4. **Sulfur dioxide**
5. **Nitrogen dioxide**

The **higher the AQI value**, the **greater the level of air pollution** and the greater the health concerns. The concept of AQI has been widely used in **many developed countries** for over the last three decades. AQI quickly disseminates air quality information in real-time.

In India, The **National Air Quality (AQI) India** was launched on **17 September 2014** in New Delhi under the **Swachh Bharat Abhiyan** by the then Environment Minister Shri Prakash Javadekar.

**Objectives of Air Quality Index (AQI)**

- Comparing air quality conditions at different locations/cities.
- It also helps in identifying faulty standards and inadequate monitoring programmes.
- AQI helps in analysing the change in air quality (improvement or degradation).
- AQI informs the public about environmental conditions. It is especially useful for people suffering from illnesses aggravated or caused by air pollution.

**Who is most at risk from air pollution?**

- People with lung diseases, such as asthma, chronic bronchitis, and emphysema
- Children, including teenagers
- Active people of all ages who exercise or work extensively outdoors
- Some healthy people are more sensitive to ozone

**What is the National Air Quality Index?**

- Launched in **2014** with outline 'One Number – One Color -One Description' for the common man to judge the air quality within his vicinity.
- The measurement of **air quality is based on eight pollutants**, namely: Particulate Matter (PM10), Particulate Matter (PM2.5), Nitrogen Dioxide (NO2), Sulphur Dioxide (SO2), Carbon Monoxide (CO), Ozone (O3), Ammonia (NH3), and Lead (Pb).
- AQI has **six categories of air quality**. These are: Good, Satisfactory, Moderately Polluted, Poor, Very Poor and Severe.
- It has been **developed by the CPCB in consultation with IIT-Kanpur** and an expert group comprising medical and air-quality professionals.

**Commission for Air Quality Management in National Capital Region and Adjoining Areas**

1. This was formed to tackle the pollution situation in areas around Delhi NCR.

**Note- SAFAR already covered.**

5. **National Bioenergy Programme**

Context:

The Waste-to-Energy Program Guidelines for the production of Biogas, bio-CNG, and power from urban, industrial, and agricultural wastes and residues have been released by the Centre.

**Details:**

The programme is part of an umbrella scheme, the National Bioenergy Programme.

**National Bioenergy Programme**

- The **Indian Renewable Energy Development Agency (IREDA)** will be the implementing agency for the programme.
    - IREDA will be paid a service charge of 1% of CFA to process applications, besides 1% for the CFA (minimum ₹50,000) for implementing, and monitoring the performance once the plants are commissioned.
- It aims to produce biogas and bio-CNG, and electricity from urban, industrial and agricultural waste and residues.
- The government will offer **financial assistance to project developers and pay service charges to** implementing agencies, including inspection firms for commissioning the waste-to-energy plants.
- It also comprises the biogas and biomass programmes.
    - Standard central financial assistance (CFA) for the biogas projects will be ₹25 lakh for 12,000 cubic metre a day and maximum pegged at ₹5 crore.
    - Financial assistance of ₹75 lakh per MW for new biogas plants and ₹50 lakh per MW for existing units will be given.
- If the waste-to-energy plants are set up in **special category states,** such as the North East, Himachal Pradesh, Sikkim, Jammu and Kashmir, Ladakh, Lakshadweep, Uttarakhand, and Andaman & Nicobar Islands, the eligible **CFA will be 20% higher than the standard CFA pattern.**

**Concept:**

**Biomass Energy (Bio-energy)**

- Biomass is renewable organic material that comes from plants and animals. Biomass energy is energy generated or produced by living or once-living organisms.
- Biomass contains stored chemical energy from the sun. Plants produce biomass through photosynthesis. Biomass can be burned directly for heat or converted to renewable liquid and gaseous fuels through various processes.
- **Biomass sources for energy include:**
    - **Wood and wood processing wastes**—firewood, wood pellets, and wood chips, lumber and furniture mill sawdust and waste, and black liquor from pulp and paper mills
    - **Agricultural crops and waste materials**—corn, soybeans, sugar cane, switchgrass, woody plants, and algae, and crop and food processing residues
    - **Biogenic materials in municipal solid waste**—paper, cotton, and wool products, and food, yard, and wood wastes
    - **Animal manure and human sewage**

**Converting biomass to energy**

- **Direct combustion (burning) to produce heat**
    - All biomass can be burned directly for heating buildings and water, for industrial process heat, and for generating electricity in steam turbines.
- **Thermochemical conversion** to produce solid, gaseous, and liquid fuels
    - Thermochemical conversion of biomass includes pyrolysis and gasification. Both are thermal decomposition processes in which biomass feedstock materials are heated in closed, pressurized vessels called gasifiers at high temperatures.
- **Chemical conversion to produce liquid fuels**
    - A chemical conversion process known as transesterification is used for converting vegetable oils, animal fats, and greases into fatty acid methyl esters (FAME), which are used to produce biodiesel.
- **Biological conversion** to produce liquid and gaseous fuels
    - Biological conversion includes fermentation to convert biomass into ethanol and **anaerobic digestion to produce renewable natural gas.**
        - Ethanol is used as a vehicle fuel.
        - Renewable natural gas – also called biogas or biomethane – is produced in anaerobic digesters at sewage treatment plants and at dairy and livestock operations. It also forms in and may be captured from solid waste landfills.
    - **Anaerobic digestion or Bio methanation:** Bio methanation or methanogenesis, is a scientific process whereby anaerobic microorganisms in an anaerobic environment decompose biodegradable matter producing methane-rich biogas and effluent. The three functions that take place sequentially are hydrolysis, acidogenesis, and methanogenesis.
- **Cogeneration**
    - Co-generation is producing two forms of energy from one fuel. One of the forms of energy must always be heat and the other may be electricity or mechanical energy. In a conventional power plant, fuel is burnt in a boiler to generate a high-pressure system. The steam is used to drive a turbine to produce electric power. The exhaust steam is generally condensed to water which goes back to the boiler.

6. **In the Amazon, a Giant Fish Helps Save the Rainforest**

**Context-**

- Along the **Jurua River,** a tributary of the **Amazon,** riverine settlers and Indigenous villages are working together to promote the **sustainable fishing** of near magic fish called **pirarucu.**

**About the pirarucu fish-**

- The **arapaima, pirarucu**, or **paiche** is any large species of bony tongue in the **genus Arapaima native to the Amazon** and **Essequibo basins of South America.**
- Its **Portuguese name, pirarucu,** derives from the **Tupi language words pira and urucum**, meaning **"red fish".**
- It is **found** primarily in floodplain lakes across the Amazon basin, including the region of **Medio Jurua.**
- They are among the **world's largest freshwater fish,** reaching as much as **3 m (9.8 ft) in length** and 200 kilos (440 pounds) in weight**.**
- Another remarkable **characteristic of the pirarucu** is that It is one of the few fish species in the world that **surfaces to breathe**.
- They are an **important food fish.**

**Overexploitation of pirarucus-**

- They have **declined in the native range** due to **overfishing** and **habitat loss.**
- And it left **pirarucu** designated as **threatened with extinction** unless trade in the fish is closely controlled by the **Convention on International Trade in Endangered Species of Wild Fauna and Flora.**
- In contrast, **arapaima** has been introduced to **several tropical regions** outside the native range (within South America and elsewhere), where they are sometimes considered invasive species.
- In **Kerala, India, Arapaima** escaped from aquaculture ponds after floods in 2018.

**Recovery of the population of the pirarucu-**

- The fish has come back to the lakes of **Medio Jurua.**
- The change began in the late **1990s.** With the assistance of a **Dutch Catholic priest,** rubber tappers organized and led a campaign to persuade the federal government to create the **Medio Jurua Extractive Reserve.**
- This **controlled fishing** has led to a surge in its population in regions where it's employed.
- In the **Sao Raimundo region**, there were **1,335 pirarucus** in the nearby lakes in 2011, when the managed fishing began. Last year, there were **4,092 specimens**, according to their records.
- In the **Carauari region,** the number of **pirarucus** spiked from **4,916**, in 2011, to **46,839**, ten years later.

**Menace of illegal fishing in Brazil-**

- **Illegal fishing** is rampant in **Brazil.** It's the second most frequent environmental crime on protected land, after logging, according to an academic study based on official data.
- **Pirarucu fishing is done once a year**, around September, the period of the lowest water.
- By law, **only 30% of the pirarucu** in a certain area can be fished the following year.

**Current status of Indian fisheries-**

- Fisheries are the primary source of livelihood for several communities.
- **India** is the **world's second-largest fish producer** with exports worth more than **Rs 47,000 crore.**
- **Fisheries** are the **country's single-largest agriculture export,** with a growth rate of 6 to 10 per cent in the past five years.
- Its significance is underscored by the fact that the growth rate of the farm sector in the same period is around 2.5 per cent.
- It has a marine fisher population of 3.5 million; 10.5 million people are engaged in inland fishery and fish farming.

**IUU Fishing as a National Security Threat-**

- **In India, illegal, unreported, and unregulated (IUU) fishing** typically has been viewed as a **non-traditional security concern** that includes **food and economic security**, as well as **broader societal and political issues.**
    - The threat posed by **foreign fishing vessels** near Indian waters.
    - Such distant water fishing vessels have been found fishing illegally around the world.
    - On several occasions, these vessels are present near the exclusive economic zone of other states, raising serious legal and operational questions.
    - Coastal States have shown varied responses to these vessels ranging from strengthening their **maritime security framework** to **using force** and **taking military action against these vessels.**

**Domestic laws against IUU fishing-**

- **Two domestic legislative acts** drive the government's response to **IUU fishing.**
- The **first, the Territorial Waters, Continental Shelf, Exclusive Economic**
- **Zone and other Maritime Zones Act, 1976,** defines India's maritime zones,
- which comply with the **1982 U.N. Convention on the Law of the Sea** (UNCLOS) to which India is a party.
    - Thus, India enjoys its **sovereign rights**, including fishing rights, in the delimited waters under both domestic and international maritime laws.
- The **second,** the **Maritime Zones of India (Regulation of Foreign Vessels) Act, 1981**, provides for the **regulation of foreign fishing vessels** in India's maritime zones and related matters.
    - It **authorizes the Indian Coast Guard**, when appropriate, to **stop and board a fishing vessel, seize and detain** the vessel, including any fishing gear, fishing equipment, stores, or cargo found onboard the vessel or belonging to the vessel, and to seize any fishing gear abandoned by the vessel.
- These laws provide the **domestic legislation governing India's maritime zones** and the **national maritime security framework** for addressing **IUU fishing** by foreign vessels.

7. **Hundreds of elephants, zebras die as Kenya weathers drought**

**Context-**

- Hundreds of animals, including **elephants** and **endangered Grevy's zebras,** have died in **Kenyan wildlife preserves** during **East Africa's worst drought** in decades.

**Drought in Kenya-**

- Parts of Kenya have experienced four **consecutive seasons of inadequate rain** in the past two years, with dire effects on people and animals, including livestock.
- The **worst-affected ecosystems** are home to some of Kenya's most-visited national parks, reserves and conservancies, including the **Amboseli, Tsavo and Laikipia-Samburu areas**.
- The **Kenya Wildlife Service** and other bodies counted the deaths of **205 elephants, 512 wildebeests, 381 common zebras, 51 buffalos, 49 Grevy's zebras and 12 giraffes** in the past nine months.
- They called for an urgent aerial census of wildlife in **Amboseli** to get a broader view of the drought's impact on wild animals there.

**Grévy's zebra (Equus grevyi)**

- Also known as the **imperial zebra**, it is the **largest living wild equid** and the **most threatened of the three species of zebra**, the other two being the **plains zebra** and the **mountain zebra.**
- Named after **Jules Grévy,** it is found in parts of **Kenya, Somalia and Ethiopia.**
- Superficially, **Grévy's zebras'** physical features can help to identify it from the other zebra species.
- Compared to other zebra species, **Grévy's are the tallest** and have the **tightest stripes** of all zebras.
- The **Grévy's zebra** live in the **semi-arid savanna**, where they **feed on grasses, legumes, and browse,** such as **acacia;** they can survive up to five days without water.
- Listed by the **IUCN** as **endangered.**
- Its population has **declined** from 15,000 to 2,000 since the 1970s.

**About Amboseli National Park-**

- Formerly **Maasai Amboseli Game Reserve** is a national park in **Kajiado** South Constituency in Kajiado County, **Kenya.**
- The park ecosystem spreads across the **Kenya-Tanzania border.**
- The local people are mainly **Maasai**
- It has **400 species of birds** including water birds like pelicans, kingfishers, crakes, hamerkop and **47 raptor species.**
- The park protects two of the five main swamps and includes a **dried-up Pleistocene lake** and **semiarid vegetation.**
- The protected area is home to **African bush elephants, Cape buffalo, impala, lion, cheetah, spotted hyena, Masai giraffe, Grant's zebra, and blue wildebeest.**

**Tsavo East National Park**

- **It** is one of the **oldest and largest parks** in **Kenya.**
- Situated in a semi-arid area previously known as the **Taru Desert** it opened in April 1948, and is located near the town of **Voi** in the **Taita-Taveta County** of the former Coast Province.

**8. N+Q**

**The harvest of polluted air-**

**Context-**

- The **haze and smoke over Delhi,** which has become an annual event for about three weeks in October-November, has triggered a **temporary ban on construction activities** and the movement of trucks and diesel four-wheelers that do not comply with **BS-VI norms.**
- The Supreme Court will hear a petition on **agricultural stubble burning** in the **northern states**, considered the prime reason for the extremely bad air quality in Delhi-NCR.

**Is agricultural burning the main culprit?**

- While the region's own pollution sources are a problem, stubble burning was an important factor in the deterioration of air quality in **October-end and November**.
- At this time of the year, the **burning** of agricultural waste in **Punjab and Haryana contributes 30-40%** of the **PM2.5 concentrations in Delhi's air**.
- It is the **single largest source of PM2.5 levels** on most days during this period.
- The concerted straw burning happens over a period of 10-15 days in 7-10 districts. The wind direction is also **north-westerly** and brings the **plume of smoke from Punjab, through Haryana, to Delhi** and then onwards to Kanpur and beyond.
- According to **IARI's paddy straw burning monitoring portal,** over **26,000 fire incidents** have been observed in **Punjab** since September 15. In **Haryana, 2,440 incidents** have been observed.
- Agricultural waste burning in Punjab and Haryana happens in the months of May and June as well but at that time, it accounts for about **15-20% of PM2.5 concentrations in Delhi's air.** So the air quality over the capital does not become this bad.

**Role of weather in the rising pollution levels-**

- **Weather plays a critical role** as well — a **30-40% rise in pollutants** at any other time of the year would not cause the same impact.

- Hotter air rises higher above the surface and takes the pollutants along with it.
- The polluting particles are **lifted 2-3 km above the surface** or even higher, before getting dispersed.
- But during **October-November** the air is not that hot.
- The **pollutants are trapped and tend to get concentrated at lower levels** of the atmosphere, resulting in the **smoke and haze situation**.

**Delhi's geographical location also makes it more susceptible to pollution-**

- With the **Deccan Plateau,** 500 km to its south and the **Himalayas to its north**, the region that stretches from Haryana to Bihar is a valley between two large structures.
- Delhi, moreover, sits on the **Aravallis**, which has an elevation of a few hundred metres.
- This makes Delhi a **tabletop city** of sorts.
- It has a peculiar geography within the Indo-Gangetic Plains, landlocked from all sides.
- This makes it more susceptible to these critical episodes.

**But why is agricultural waste burned?**

- This **waste** is the **remains of the paddy crop** after it has been harvested.
- This kind of burning is not specific only to Punjab or Haryana. However, the scale of burning in these states is much bigger than elsewhere.
- Even in these states, this practice is relatively new. Even 10 years ago, the crop-burning problem was not this acute.
- The burning is necessitated by the need to prepare the fields for the next crop in a very short window of time.
- Due to a slight shift in the cropping pattern in these states, there is now very little time between the harvesting of one crop and the planting of the next crop.
- The **traditional method of manually uprooting, or cutting,** the stumps of the previous crop is **time-consuming** and can delay the sowing of the next crop.
- So, farmers resort to the easier option of burning these remains.

**Would the ban on construction and diesel vehicles work?**

- **Construction** has a **small contribution to PM2.5 concentration.**
- The particles released from these activities are usually larger and **add to PM10 concentrations.**
- The banning of construction is unlikely to have any significant impact on the prevailing situation.
- **Diesel vehicles,** particularly older trucks, are indeed **important contributors to high PM2.5 levels** so a ban on their movement can help in improving the situation.
- However, trucks are not allowed to move inside Delhi during the day in any case.

**Is there no remedy for this situation?**

- Several solutions have been suggested and are being tried, for example, **changing the crop cycle, deployment of mechanised equipment for harvesting that would render burning unnecessary, and conversion of this waste into something more useful, like a source of energy,** which can become an incentive for not burning.
- Experts over the years have suggested that farmers should move away from growing paddy in the quantities that they do, and shift to other crops such as maize, cotton, pulses and oil seeds.

To deal with the issue of stubble burning states, especially Punjab, should look at **crop diversification.**

### 9. A third of world heritage glaciers under threat, warns UNESCO

**Context-**

- A third of the glaciers on the **UNESCO World Heritage list** are under threat, regardless of efforts to limit temperature increases, a study conducted by the UN body has found.

**More on the news-**

- However, the study said it was still possible to save the other two-thirds if the rise in global temperature did not exceed **1.5°C** compared to the preindustrial era.
- The **UNESCO** study, in partnership with the **International Union for Conservation of Nature (IUCN),** showed that these glaciers have been **retreating at an accelerated rate since 2000** due to **CO2 emissions**, which are warming temperatures.
- They are currently l**osing 58 billion tonnes of ice every year** — equivalent to the combined annual water use of France and Spain — and are responsible for nearly **5%** of observed **global sea level rise.**

**Significance of glaciers-**

- Half of humanity depends directly or indirectly on glaciers as their **water source for domestic use, agriculture, and power.**
- Glaciers are also **pillars of biodiversity, feeding many ecosystems**.
- When **glaciers melt rapidly**, millions of people **face water scarcity** and the **increased risk of natural disasters** such as **flooding,** and millions more may be displaced by the resulting rise in sea levels.

**Creation of a dedicated fund-**

- As many as **50 UNESCO World Heritage sites** are home to **glaciers**, representing almost **10% of the Earth's total glacierised area.**
- This study highlights the **urgent need** to cut **greenhouse gas emissions** and invest in **nature-based solutions,** which can help mitigate climate change.

- In addition to drastically reducing **carbon emissions, UNESCO** is advocating for the **creation of a new international fund for glacier monitoring and preservation.**
- Such a fund would support comprehensive research, promote exchange networks between all stakeholders and implement early warning and disaster risk reduction measures.

**Several iconic landscapes found in World Heritage sites are-**

- **Los Glaciares National Park in Argentina** contains some of the largest glaciers on the Earth and is threatened by very large ice loss – about **60%** of the current volume – by 2100.
- In Europe, the disappearance of small glaciers is projected in the **Pyrenees -- Mont Perdu World Heritage site before 2040.**
- **Te Wahipounamu -- South West New Zealand,** which contains three-quarters of New Zealand's glaciers, is projected to lose **25% to 80%** of the current ice volume over the course of this century.

**World Heritage List**

- The **United Nations Educational, Scientific and Cultural Organization (UNESCO)** seeks to encourage the identification, protection and preservation of cultural and natural heritage around the world considered to be of outstanding value to humanity. It has World Heritage List for the same.
- This is embodied in an **international treaty** called the **Convention concerning the Protection of the World Cultural and Natural Heritage**, adopted by **UNESCO in 1972.**

**International Union for Conservation of Nature (IUCN)**

- **IUCN** is a membership Union uniquely composed of both government and civil society organizations.
- Created in **1948**, **IUCN** has evolved into the world's largest and most diverse environmental network.
- It is **headquartered** in **Switzerland.**
- The **IUCN Red List of Threatened Species**, is the world's most comprehensive inventory of the global conservation status of plant and animal species.
- The **IUCN World Heritage Outlook** provides conservation outlook assessments for all-natural World Heritage sites.

**10. Vaccine trial soon amid fear of Ebola virus spread to other countries**

**Context- Ebola outbreak in Uganda**

**More on the news-**

- The **Ebola virus outbreak** that began in **Uganda** on September 20 after one case was confirmed in **Mubende district** the previous day has spread to at least 130 people (lab confirmed) and caused 43 deaths as on November 2.
- The **increase in fatalities** has in turn **increased the case fatality rate** among lab-confirmed cases to 33% (43/130); the **case fatality rate was 26.5%** (34/128) as on October 29.
- The deadly virus has now reached the capital city **Kampala** which was restricted to the rural areas of Uganda since the outbreak began in September.

**Difficulty in tracing-**

- Spreading of the virus to the cities entails an increased risk of the virus spreading to a large population and the increased difficulty of tracing.
- The virus has already spread to school children.
- Also, there is a risk of the virus spreading across borders.

**A rare strain of ebola virus-**

- Unlike the **large Ebola outbreak of 2014-2016** caused by the **Zaire strain** that started in **Guinea** and spread to two other **Western African countries — Sierra Leone and Liberia** — by July **2014**, the outbreak in **Uganda** is caused by the relatively **rarer Sudan strain.**
- **Uganda** is facing a **Sudan Ebola virus outbreak after a decade.**

**Vaccine against the Sudan strain of Ebola virus-**

- The **Ebola outbreak of 2014-2016** which spread to over 28,000 people and killed 11,000 people allowed the testing of **Merck's vaccine** through a **ring vaccination strategy.**
- Currently, there are **no vaccines available** for the **Sudan strain of the Ebola virus.**
- **Merck** developed a vaccine specifically against the **Sudan strain in 2015 and 2016** after the success of the **vaccine against the Zaire strain.**
- Besides **Merck's vaccine for the Sudan strain,** two other vaccines by the **Sabin Vaccine Institute** and the **University of Oxford** are in the process of being produced for **clinical testing.**
- While **Merck's vaccine** uses the **VSV (vesicular stomatitis virus) platform**, both **Sabin Vaccine Institute** and the **University of Oxford** use the **chimpanzee adenoviruses** to carry the virus protein into humans, much like in the case of the **AstraZeneca COVID-19 vaccine.**
- Clinical trials using the **ring vaccination strategy of administering the vaccine** among the contacts might begin by mid-November.

**Ring vaccination strategy of administering the vaccine-**

- **Ring vaccination** is a strategy to **inhibit the spread of disease** by vaccinating those who are most likely to be infected.
- This strategy vaccinates the **contacts of confirmed patients**, and people who are in close contact with those contacts.
- This way, everyone who has been, or could have been, exposed to a patient receives the vaccine, creating a **'ring'** of protection that can limit the spread of a pathogen.

- **Ring vaccination** requires thorough and **rapid surveillance and epidemiologic case investigation.**
- The **Intensified Smallpox Eradication Program** used this strategy with great success in its efforts to **eradicate smallpox** in the latter half of the 20th century.

**About Ebola virus disease (EVD)-**

- **EVD,** formerly known as **Ebola haemorrhagic fever** is a **deadly disease** with occasional outbreaks that occur mostly on the **African continent.**
- The **Ebola virus** was first discovered in **1976** near the **Ebola River** in what is now the **Democratic Republic of Congo.**
- It most commonly **affects people and nonhuman primates** (such as monkeys, gorillas, and chimpanzees).
- It is caused by an infection with a group of viruses within the **genus Ebolavirus:**
    - Ebola virus (species Zaire ebolavirus)
    - Sudan virus (species Sudan ebolavirus)
    - Taï Forest virus (species Taï Forest ebolavirus, formerly Côte d'Ivoire ebolavirus)
    - Bundibugyo virus (species Bundibugyo ebolavirus)
    - Reston virus (species Reston ebolavirus)
    - Bombali virus (species Bombali ebolavirus)

**Host:** Fruit bats of the Pteropodidae family are natural Ebola virus hosts.

**Transmission:**

- **Animal to Human Transmission** occurs through close contact with the blood, secretions, organs or other bodily fluids of infected animals such as fruit bats, chimpanzees, gorillas, monkeys, forest antelope or porcupines found ill or dead or in the rainforest.
- **Human-to-Human Transmission** occurs via direct contact (through broken skin or mucous membranes) with the Blood or body fluids of a person who is sick with or has died from Ebola.
- **Signs and Symptoms:**
  Symptoms may appear anywhere from 2 to 21 days after contact with the virus, with an average of 8 to 10 days which include Fever, Fatigue, Muscle pain, Body weakness, Headache, Sore throat, Vomiting, Diarrhea, Symptoms of impaired kidney and liver function, in some cases, both internal and external bleeding.

11. **COP14 on wetlands begins; draft resolution for international mangrove centre in China on agenda**

**Context-**

- The **14th Meeting of the Conference of the Contracting Parties (COP14)** to the **Ramsar Convention on Wetlands** began **November 5, 2022,** to discuss the state of wetlands globally.

**More on the news-**

- The event is being held in **two different venues: Wuhan in China** and **Geneva in Switzerland** from **November 5-13.**
- Items on the agenda include **water bird population estimates, Ramsar Convention criteria, lists of wetlands of international importance and conservation of small wetlands, and a draft resolution by China to host an international mangrove centre** among others.
- The **draft resolution** on establishing the **International Mangrove Center** has been submitted by **China** and is cosponsored by **Cambodia and Madagascar.**

**Aims and objectives of the COP-**

- The **Conference of the Contracting Parties (COP)** invites Parties and relevant stakeholders to join this **international mangrove cooperation mechanism** for technical exchanges, collaborative research, education and training, and pilot projects on conservation and restoration, to protect mangrove biodiversity and coastal blue carbon ecosystems, enhance mangrove ecosystem services and resilience to climate change.

**What is Ramsar Recognition?**

- A **Ramsar site** is a **wetland of international importance** under the **Ramsar Convention,** which is also known as the **'Convention on Wetlands'** — an **intergovernmental environmental treaty** established by **UNESCO** in **1971**, and named after the **city of Ramsar in Iran,** where the convention was signed that year.
- **Ramsar recognition** is the **identification of wetlands** around the world, which are of international importance, especially if they provide **habitat to waterfowl** (about 180 species of birds).
- There is international interest and cooperation in the conservation of such wetlands and the judicious use of their resources.
- **India's Ramsar wetlands** are spread over **11,000 sq km** — around **10% of the total wetland area in the country** — across **18 States.**
- No other South Asian country has as many sites though this has much to do with India's geographical breadth and tropical diversity.

**Criteria: One of the nine criteria must be fulfilled to be the Ramsar Site.**

- **Criterion 1:** If it contains a representative, rare, or unique example of a natural or near-natural wetland type found within the appropriate biogeographic region.
- **Criterion 2:** If it supports vulnerable, endangered, or critically endangered species or threatened ecological communities.
- **Criterion 3:** If it supports populations of plant and/or animal species important for maintaining the biological diversity of a particular biogeographic region.
- **Criterion 4:** If it supports plant and/or animal species at a critical stage in their life cycles, or provides refuge during adverse conditions.

- **Criterion 5:** If it regularly supports 20,000 or more water birds.
- **Criterion 6:** If it regularly supports 1% of the individuals in a population of one species or subspecies of water bird.
- **Criterion 7:** If it supports a significant proportion of indigenous fish subspecies, species or families, life-history stages, species interactions and/or populations that are representative of wetland benefits and/or values and thereby contributes to global biological diversity.
- **Criterion 8:** If it is an important source of food for fishes, spawning ground, nursery and/or migration path on which fish stocks, either within the wetland or elsewhere, depend.
- **Criterion 9:** If it regularly supports 1% of the individuals in a population of one species or subspecies of wetland-dependent non-avian animal species.

**Significance:**

- **Ramsar Tag** helps develop and maintain an **international network of wetlands** which are important for the conservation of **global biological diversity** and for sustaining human life through the maintenance of their ecosystem components, processes and benefits.
- Sites are protected under strict guidelines of the convention.

**Status of mangroves in China:**

- Mangrove forests in China is growing on the **northern edge of the global mangrove distribution.**
- Limited by the **low temperature**, China has **fewer mangrove species** compared with other Southeast Asian countries, which are the centre of global mangrove distribution.
- Mangroves in China were distributed in the provinces of **Hainan, Guangdong, Guangxi, Fujian, and Zhejiang,** as well as **Hong Kong, Macao and Taiwan** (which the People's Republic claims as its province).
- All these areas are located in the **extreme tropical south of the country.**
- The **Chinese government,** along with three partner organisations, released Report on **China Mangrove Conservation and Restoration Strategy Research Project in 2020.**
- The document was China's first research report to assess the state of mangroves in the country comprehensively.
- It is available on the website of the **Global Mangrove Alliance.**
- The report also noted that since the **1990s**, the mangrove area in China had **decreased sharply** to 22,000 hectares in 2000, only 45 per cent of that of the early 1950s.

**India's stand on China's proposal to establish an International mangrove centre-**

- Mangroves is typically tropical in nature than temperate.
- There is a serious volume of experience that **tropical countries such as India, Bangladesh and Indonesia have in terms of conservation, restoration and socio-economic aspects of mangroves**.
- An international centre would probably benefit more if it was being hosted by these countries rather than a temperate country wherein the diversity and the issues related to mangroves are very different compared to a tropical one.

**12. Smog towers**

**Context: Smog tower in Delhi lowered PM 2.5 by 7-17%**

- The **structure is 24 m high**, about as much as an 8-storey building — an 18-metre concrete tower, topped by a 6-metre-high canopy. At its base are 40 fans, 10 on each side.
- Each fan can discharge 25 cubic metres per second of air, adding up to 1,000 cubic metres per second for the tower as a whole. Inside the tower in two layers are 5,000 filters. The **filters and fans have been imported from the United States**.

Smog tower: How it works

- The tower uses a '**downdraft air cleaning system'** developed by the University of Minnesota, said Anwar Ali Khan, senior environmental engineer, Delhi Pollution Control Committee, who was in charge of the project.
- **IIT-Bombay has collaborated with the American university** to replicate the technology, which has been implemented by the commercial arm of Tata Projects Limited.
- **Polluted air is sucked in at a height of 24 m**, and **filtered air is released at the bottom of the tower, at a height of about 10 m from the ground**. When the fans at the bottom of the tower operate, the negative pressure created sucks in air from the top. The 'macro' layer in the filter traps particles of 10 microns and larger, while the 'micro' layer filters smaller particles of around 0.3 microns.

The **downdraft method is different from the system used in China**, where a 60-metre smog tower in Xian city uses an 'updraft' system — air is sucked in from near the ground, and is propelled upwards by heating and convection. Filtered air is released at the top of the tower

13. **2022 likely to be the fifth or sixth warmest year on record: World Meteorological Organization**

**Context-**

- **Global mean temperatures** for **2022** are currently estimated to be about **1.15 degree Celsius higher than pre-industrial times,** a new assessment by the **World Meteorological Organization (WMO)** has said.

**More on the news-**

- The widely acknowledged danger mark for temperature rise is considered to be **1.5 degrees Celsius from pre-industrial times,** which is the average for the period **1850-1900.**
- The assessment is based on temperature data from January to September this year.

- Data from the remaining three months might make the annual mean for **2022** slightly different from the **1.15-degree Celsius** number, but the **WMO** said the year was still likely to end up being the **fifth or sixth warmest year on record (since 1850).**

**Warmest year on record-**

- The **warmest year on record** so far has been **2016,** when the **global mean temperatures** were measured to be about **1.28 degree Celsius higher than pre-industrial times.**
- This number for **2016** was earlier known to be **1.1 degree Celsius**, but recently the **WMO revised it upwards** after considering the measurements of one more international dataset.
- The estimate for **2022** is part of the **provisional State of Global Climate Report** that the **WMO publishes every year.**

**Prediction by the WM0-**

- In May this year, the **WMO** said there was a **50 per cent** chance that the **global temperatures would temporarily touch the 1.5-degree Celsius** mark within the **next five years (by 2026).**
- It also said it was almost certain (93 per cent likelihood) that one of these five years (till 2026) would end up being warmer than 2016, thus setting a new record.
- The chance of temporarily **exceeding 1.5 degrees Celsius** has risen steadily **since 2015** when it was close to zero.
- For the years between **2017** and **2021**, there was a **10 per cent** chance of exceedance.
- That probability has increased to nearly **50 per cent** for the **2022-2026 period**.

**Dire consequences of rising temperatures-**

- The **warming in 2022** so far has happened despite the presence of a **prolonged La Nina** (a cooling of sea-surface waters in the equatorial Pacific Ocean) which tends to temporarily cool down the earth a bit.
- It also pointed out that the **concentrations of three main greenhouse gases, carbon dioxide (CO2), methane (CH4) and Nitrous oxide (NO2),** were all at **record highs** in **2021.**
- The **emissions of methane,** which is **25 times** more potent than **carbon dioxide** in causing **global warming** have increased at the fastest pace ever.
    - Incidentally, just last year, at the **climate change conference in Glasgow,** countries had pledged to cut **global methane emissions** by at least **30 per cent** by the year **2030.**
- The **extent of the Arctic ice sheet** had **dropped to a record low** in February this year, at nearly **one million square km** below the **long-term mean.**
- **Sea levels** had risen about **10mm** in just the last **two years**.

**About the World Meteorological Organization (WMO)**

- The **World Meteorological Organization (WMO)** is an **intergovernmental organization** with a membership of **193 Member States and Territories.**
- It **originated** from the **International Meteorological Organization (IMO)**, the roots of which were planted at the **1873 Vienna International Meteorological Congress.**
- It is a **specialized agency** of the **UN** and is **headquartered** in **Geneva.**
- It is responsible for promoting international cooperation in atmospheric science, climatology, hydrology and geophysics.
- It facilitates the 'free and unrestricted exchange of data, information, and research between the respective meteorological and hydrological institutions of its members
- The **state of Global Climate Report** is published by the **WMO** annually.
    - **WMO** in its **State of Global Climate Report 2021**, have said that the 4 key climate change indicators – **greenhouse gas concentrations, sea level rise, ocean heat and ocean acidification** – have set new records in 2021.

## 14. The Snow Leopard Population Assessment of India (SPAI)

**Context**: The first-ever recording of the snow leopard from the Baltal-Zojila region has renewed hopes for the elusive predator in the higher altitudes of Jammu and Kashmir and Ladakh. Camera trapping exercises by researchers from Nature Conservation Foundation by researchers from Nature Conservation Foundation (India), partnering with J&K's Department of Wildlife Protection, also raised hopes for other important and rare species such as the Asiatic ibex, brown bear and Kashmir musk deer in the upper reaches of the northernmost part of India.

**The Snow Leopard Population Assessment of India (SPAI**) has been concluded so far in **Himachal Pradesh and Uttarakhand.** The estimated population of the great cat is 50 and 100, respectively, in these two States,

**Concept:**

- The **Snow Leopard (also known as Ghost of the mountains)** acts as an **indicator of the health of the mountain ecosystem** in which they live, due to their position as the top predator in the food web.
- The Snow Leopard lives at **high altitudes** in the steep mountains of **Central and Southern Asia,** and in an extremely cold climate.
- They inhabit the higher Himalayan and trans-Himalayan landscape in the states/union territories of **Jammu and Kashmir, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh.**
- India is a unique country to have a good presence of 5 big cats, including Snow Leopard. The other 4 are, Lion, Tiger, Common Leopard, and Clouded Leopard.
- **Snow Leopard capital of the world**: Hemis, Ladakh.
- Hemis National Park is the biggest national park of India and also has a good presence of Snow Leopard.

- **Threat:** Factors that have contributed to the decline in the snow leopard populations include, reduction in prey populations, illegal poaching and increased human population infiltration into the species habitat and illegal trade of wildlife parts and products among others.

**Protection:**

- IUCN Red List- **Vulnerable**
- **Convention on International Trade in Endangered Species (CITES)- Appendix I**
- **Convention on Migratory Species (CMS)- Appendix I**
- Appendix I includes species threatened with extinction.
- **Indian Wildlife (Protection) Act 1972- Schedule I**
- Schedule I provides absolute protection and offences under this have the highest penalties.

**Conservation Efforts Launched by India:**

- **Himal Sanrakshak:** It is a community volunteer programme, to protect snow leopards, launched on 23rd October 2020.
- In 2019, **First National Protocol was** also launched on Snow Leopard Population Assessment which has been very useful for monitoring populations.
- **SECURE Himalaya: Global Environment Facility (GEF)-**United Nations Development Programme (UNDP) funded the project on conservation of high-altitude biodiversity and reducing the dependency of local communities on the natural ecosystem.
- This project is now operational in four snow leopard range states, namely, Jammu and Kashmir, Himachal Pradesh, Uttarakhand, and Sikkim.
- **Project Snow Leopard (PSL)**: It was launched in 2009 to promote an inclusive and participatory approach to conserve snow leopards and their habitat.
- Snow Leopard is in the list of **21 critically endangered species** for the recovery programme of the Ministry of Environment Forest & Climate Change.
- Snow Leopard conservation breeding programme is undertaken at Padmaja Naidu Himalayan Zoological Park, Darjeeling, West Bengal

## 15. WTO AND ENVIRONMENT

**Context**

The WTO may serve as an appropriate forum for discussions on opening up trade in environmental goods and services according to the **World Trade Report 2022: Climate Change and International Trade.**

**Details:**

- The Elimination of tariffs and reduction in Non-tariff measures on a specific subset of environmental goods would reduce carbon emissions while contributing to increase in exports and GDP in all regions.
- India and several other developing countries are not in favour:
    - It could lead to tariff reduction for dual use goods-used also for non-environmental purposes thus detrimental to the domestic industry
    - Majority of environmental goods production takes place in developed countries.

**WTO and Environment:**

- The WTO also provides trade related technical assistance and capacity building to developing countries and LDCs, which can help to build climate resilient trade capacity
    - Example-Aid for Trade, the Enhanced Integrated Framework and the Standards and Trade Development Facility (STDE)

**About the World Trade Report**

- It is published **annually by the WTO.**
- It **aims** to deepen understanding about the trends in trade, issues, and policies.
- **The 2022 World Trade Report** explores the complex interlinkages between climate change and international trade and how international trade and trade rules can contribute to addressing climate change.

**The Enhanced Integrated Framework (EIF)**

- It is the **only multilateral partnership dedicated exclusively to assisting least developed countries (LDCs) in their use of trade as an engine for growth, sustainable development and poverty reduction.**
- The **EIF partnership of 51 countries, 24 donors and eight partner agencies** work closely with governments, development organizations, civil society and academia.
- The **Integrated Framework (IF) was initially established in October 1997**, at the High-Level Meeting on LDCs' Trade Development held at the WTO.
    - Joining the WTO were the IF's **other core partner agencies:** The International Monetary Fund (IMF), the International Trade Centre (ITC), the United Nations Conference on Trade and Development (UNCTAD), the United Nations Development Programme (UNDP) and the World Bank.
- A Task Force on an Enhanced Integrated Framework provided recommendations in 2006 which led to the **current Enhanced Integrated Framework.**

- The EIF creates genuine partnerships among Least Developed Countries, donors, partner agencies, the EIF Executive Secretariat, the EIF Trust Fund Manager and other development partners who are **supporting LDCs' own drive to:**
    - mainstream trade into national development strategies
    - set up structures needed to coordinate the delivery of trade-related technical assistance
    - build capacity to trade, which also includes addressing critical supply side constraints.
- **EIF and Aid for Trade**
    - LDCs can use the EIF as a vehicle to coordinate donors' support and to lever more Aid for Trade resources, whereas donors can sign up to the EIF as a vehicle to deliver on their Aid for Trade commitments.

**The WTO-led Aid-for-Trade Initiative**

- It encourages developing country governments and donors to recognize the role that trade can play in development. In particular, the initiative seeks to mobilize resources to address the trade-related constraints identified by developing and least-developed countries.
- Aid for Trade relates to the provision of a comprehensive trade package that aims to help developing countries, particularly least-developed countries, develop the trade-related skills and infrastructure for implementing the WTO agreement thereby benefiting from enhanced market access.

**The Standards and Trade Development Facility (STDF)**

- It is a **global partnership which works to strengthen food safety, animal and plant health capacity in developing countries** by encouraging the use of good practices – including through digital technologies – to facilitate safe trade worldwide.
- The STDF supports developing countries to comply with international sanitary and phytosanitary (SPS) requirements, as **outlined in the WTO's SPS Agreement.**
- The goal is to build long-lasting SPS capacity in developing countries, contributing to sustainable economic growth, poverty reduction and food security. The STDF works to achieve this goal in **two main ways:**
    - funding collaborative, innovative SPS capacity building projects at the national, regional and global levels
    - identifying and promoting the use of good practices to develop SPS capacity.
- STDF **founding partners** are the Food and Agriculture Organization (FAO) of the United Nations, which also houses the Codex and IPPC Secretariats, the World Organisation for Animal Health (WOAH), the World Bank Group, the World Health Organization (WHO) and the WTO.

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16. **Early Warning System for the entire world in the next five years**

**Context-**

- Taking forward the initiative of the **India-backed Coalition for Disaster Resilient Infrastructure (CDRI)** at last year's climate meeting, the **World Meteorological Organisation** unveiled a **five-year programme** to set up **early warning systems across the world** to save lives and minimise destruction from a growing number of **climate disasters.**

**What is an Early Warning System (EWS)-**

- An **EWS** is an **adaptive measure** for climate change, using **integrated communication systems** to help communities prepare for **hazardous climate-related events**.
- A successful **EWS** saves lives and jobs, land and infrastructures and supports long-term sustainability.

- Early warning systems will assist public officials and administrators in their **planning, saving money** in the **long run** and **protecting economies.**
- The **UN,** working in diverse partnerships, has introduced a number of innovative early warning systems initiatives in vulnerable areas around the world.
- The five-year programme, launched by **UN Secretary-General Antonio Guterres,** envisages an investment of **$ 3.1 billion** between **now and 2027** to create the infrastructure and build capacities in **early warning systems.**

**Need for Early warning system (EWS)-**

- Nearly half the countries in the world, most of them least developed and small island states, do not have any early warning systems.
- Early warnings save lives and provide vast economic benefits.
- Just **24 hours' notice** of an impending hazardous event can **cut the ensuing damage by 30 per cent**.
- The **Global Commission on Adaptation** had found that spending about **$ 800 million** on **early warning systems** could avoid losses of up to **$ 3-16 billion every year.**

**Steps taken to establish EWS globally-**

- **UNDP's** Signature Programme, **"Strengthening Climate Information and Early Warning Systems for Climate Resilient Development and adaptation to climate change"** is a comprehensive programme operating across **Africa, Asia and the Pacific.**
- Systems in place at the sub-regional and regional levels ensure preparedness and rapid response to natural disasters, using a model that integrates the components of risk knowledge, monitoring and predicting, dissemination of information and response to warnings.
- In **Southeast Asia,** a **four-year program** implemented by **UNDP** with the Government and other partners entailed **installing and re-activating existing Automatic Weather and Agrometeorological Stations** and **Automatic Hydrological Stations** across the country. Farmers now can access climate bulletins for detailed and carry out substantial planning to avoid costly consequences, both in money and lives.
- Last year, **CDRI,** an **international organization** formed three years ago with India's backing, had come up with a similar plan, focused mainly on the **small island states.**
- That programme, called **IRIS**, or **Infrastructure for Resilient Island States,** was not meant only for **early warning systems**, but most of the initial interest it had received from the small island states was regarding **help in setting up these systems.**

**Infrastructure for Resilient Island States or IRIS-**

- This **initiative** has been **launched by India** for **developing the infrastructure of small island nations** vulnerable to climate change.
- The new initiative is the **result of cooperation between India, the U.K. and Australia** and included the **participation of leaders of small island nations** such as **Fiji, Jamaica and Mauritius.**
- **Implementation:**
    - The **IRIS initiative** is a part of the **Coalition for Disaster Resilient Infrastructure (CDRI)** that would focus on building capacity, having pilot projects, especially in small island developing states.

**What is Coalition for Disaster Resilient Infrastructure (CDRI)?**

- **CDRI** is a **global partnership** of **national governments, United Nations agencies and programmes, multilateral development banks and financing mechanisms, the private sector, and academic and research institutions.**
- It **aims** to **increase the resilience of infrastructure systems** to climate and disaster risks, thereby ensuring **sustainable development.**
- It was launched in **2019,** at the **United Nations Climate Action Summit** in **New York.**
- It is the **Government of India's second major global initiative** after the **International Solar Alliance**, and it demonstrates India's leadership in climate change and disaster resilience issues.

**Members:**

- Since its inception, **31 countries, 6 international organisations** and **2 private sector** organisations have joined CDRI as members.
- **6 International Organisations:** Asian Development Bank (ADB), World Bank Group, United Nations Development Programme (UNDP), United Nations Office for Disaster Risk Reduction (UNDRR), European Union, European Investment Bank.
- **2 Private Sector Organisations:** The Private Sector Alliance for Disaster Resilient Societies and Coalition for Climate Resilient Investment.
- **CDRI** has steadily increased its membership by attracting a diverse range of economically advanced, developing, and vulnerable countries to climate change and disasters.
- **Coalition for Disaster Resilient Infrastructure (CDRI)** is working towards developing applications of climate forecast and early warning for reducing infrastructure losses and disruption in basic services.

17. **Why Centre has restricted use of a herbicide in demand among farmers**

**Context-**

- The **Union Agriculture Ministry** has **restricted the use of glyphosate,** a widely used **herbicide.** This comes even as the **Supreme Court** is about to take up a plea seeking a **ban on all herbicide-tolerant crops,** including **transgenic hybrid mustard and cotton.**

**What is glyphosate?**

- It is an **herbicide** used to **kill weeds** — undesirable plants that compete with crops for nutrients, water and sunlight.
- Since weeds basically grow at the expense of crops, farmers remove them manually or spray herbicides.
- **Glyphosate** is a **broad-spectrum herbicide** that can **control a wide range of weeds**, whether **broadleaf or grassy.**
- It is also **non-selective,** killing most plants.
- When applied to their leaves, it **inhibits the production of a protein** named **'5-enolpyruvylshikimate-3-phosphate synthase (EPSPS)'.**
- This **enzyme**, produced **only by plants and microorganisms,** synthesises aromatic amino acids that are necessary for their **growth.**

**Use in India**

- There are **nine glyphosate-based formulations** containing different concentrations of the chemical registered for use under the **Insecticides Act, 1968**.
- These are approved largely for **weed control in tea gardens** and **non-crop areas** such as **railway tracks or playgrounds.**
- **Farmers** also apply **glyphosate on irrigation channels** and **bunds** to clear these of weeds, making it easier for water to flow and to walk through them.
- Weeds growing on bunds are hosts for **fungi,** such as those causing **sheath blight disease in rice.**
- The **chemical cannot ordinarily distinguish between crop and weed.**
- Hence, it can be **used in tea or rubber plantations**, but not in fields where the crops and weeds are at almost the same level.

**What exactly has the government now done?**

- The **Ministry of Agriculture and Farmers Welfare,** on **October 21**, issued a **notification** stating that "the **use of glyphosate** involves **health hazards and risk to human beings and animals**".
- It has not been banned and **only "restricted" its use.**
- The **spraying of glyphosate** and its derivatives shall henceforth **only be permitted through "pest control operators".**

**Why has this been done-**

- **Glyphosate application** has **increased** only with the advent of **genetic modification (GM) or transgenic technology.**
- In this case, it has involved incorporating a **'cp4-epsps' gene,** isolated from a **soil bacterium Agrobacterium tumefaciens,** into **crop plants** such as **cotton, maize and soybean.**
- This **alien gene codes for a protein that does not allow glyphosate to bind with the EPSPS enzyme.**
- These **GM crops** can **"tolerate" the spraying of the herbicide**, which then kills only the weeds.

**Government's failed attempt to curb illegal cultivation of HT cotton-**

- Neither the Centre nor state governments have succeeded in stopping the **cultivation of illegal HT cotton.**
- The fact that their **seeds (1.5 to 2 packets are sown on every acre)** are selling at a premium is proof of farmers themselves wanting them.
- As **manual weeding is costly** and there is **non-availability of labours** when required so farmers are preferring planting **HT cotton** and **spraying glyphosate.**
- Having failed to curb the **illegal sales of seed,** the Centre is cutting the **access of farmers to glyphosate** and **allowing its use only through pest control operators.**
- **GEAC** is further set to take a call on **approving glyphosate-tolerant Bt cotton,** whose illegal cultivation is rampant.

**The extent of use of GM crops globally-**

- In 2019 alone, some **81.5 million hectares** were planted worldwide with **herbicide-tolerant (HT) GM crops**.
- The **global glyphosate market** is annually worth **$9.3 billion**, with over **45 per cent of use on account of GM crops.**

**GM crops market in India-**

- In India, the **only GM crop officially under commercial cultivation today is Bt cotton.**
- This has **two alien genes ('cry1Ac' and 'cry2Ab')** from the **soil bacterium Bacillus thuringiensis,** that **code for proteins toxic to the American bollworm, spotted bollworm and tobacco caterpillar insect pests.**
- In the **2022 Kharif planting season,** about **39 million Bt cotton packets** — each containing **450 gm of seeds** — were **sold** at a **notified maximum retail price of Rs 810/packet.**
- But industry estimates suggest sales of an additional **5 million packets of "illegal" GM cotton seeds** at prices ranging from **Rs 1,100 to Rs 1,350/packet.**
- These seeds harbour both **insect-resistance** and **HT traits,** coming from the **two Bt genes** and the **glyphosate-tolerant 'cp4-epsps' gene.**

**How valid are the health concerns over glyphosate?**

- The **World Health Organisation's International Agency for Research on Cancer (IARC),** in March **2015,** classified glyphosate as **"probably carcinogenic to humans"**.
    - But this was based on **evidence for cancer in experimental animals from "pure" glyphosate,** as opposed to that in humans from real-world exposures through diluted formulations.
- The **US Environmental Protection Agency,** on the other hand, has held that there are **"no risks of concern to human health from current uses of glyphosate"** and **"no evidence"** of it causing **cancer.**
    - Its findings are based on "a significantly more extensive and relevant dataset than the IARC's".

- The **European Chemicals Agency** has also concluded that classifying glyphosate as a carcinogenic, mutagenic (causing DNA changes) or reprotoxic substance is not justified.
- The **Union Environment Ministry's Genetic Engineering Appraisal Committee (GEAC),** on October 18, recommended the **commercial release of Delhi University's GM hybrid mustard.**
    - This crop can also **tolerate the spraying of glufosinate ammonium,** a **non-selective herbicide similar to glyphosate.**

18. **COP27: Non-state actors can't destroy the environment, yet claim to be net zero, says report**

**Context-**

- **Non-state actors** investing in **new fossil fuel supply** or **engaging in deforestation** and other environmentally destructive activities cannot claim to be **net zero,** according to a new report launched November 8, 2022, at **Sharm El-Sheikh.**

**About the report-**

- The document titled **Integrity Matters: Net Zero Commitments By Businesses, Financial Institutions, Cities and Regions.**
- The document, launched by a **High-level Expert Group** at the **27th Conference of Parties (COP27)** to the **United Nations Framework Convention on Climate Change,** lists **10 recommendations for non-state actors.**
- These **non-state actors** include **businesses, financial institutions, cities and regions.**
- The recommendations can help **bring integrity, transparency and accountability** to such actors' net zero ambitions.
- **UNSC** established the **High-level Expert Group** at **COP26** in **Glasgow** to address **credibility issues with net zero pledges and commitments from these entities.**
- The report called for a **task force on net zero regulations** on the net zero path.

**Non-State actors-**

- A **non-state actor (NSA)** are organizations and/or individuals that are not affiliated with, directed by, or funded by any government.
- The **interests, structure, and influence of NSAs** vary widely.
- For example, among NSAs are **non-profit organizations, labor unions, non-governmental organizations, banks, corporations, media organizations, business magnates, people's liberation movements, lobby groups, religious groups, aid agencies,** and **violent non-state actors** such as **paramilitary forces.**

**The role played by Non-state actors-**

- The non-state actors have a crucial role in keeping the **net zero goal alive**.
- They will either help **scale the ambition** and action we need to ensure a sustainable planet, or else they strongly increase the likelihood of failure.
- The path towards **net zero** by **non-state actors** should align with science.
- The recommendations listed in the report also **apply to smaller non-state actors** as they have an important role to play.
- These actors need support and assistance to follow the listed recommendations.
- **Small and medium enterprises (SMEs)** provide **50 per cent of employment**.
- It is risky if **SMEs** do not have the **financing and technical ability to reduce emissions**
- It is also critical to include a **just transition plan** in the path towards **net zero.**

**A few recommendations to the Non-state actors are-**

- **Non-state actors** must also make their **progress public** with verified information.
- This should be compared with other counterparts to ensure that climate accounting is honest and transparent.
- **Non-state actors** purchasing **cheap credits** rather than immediately cutting their own emissions across their value chain is a red flag.
- By **2025,** businesses, financial institutions, cities and regions must ensure that their operations and supply chains don't contribute to deforestation, peatland loss and the destruction of the remaining natural ecosystems.
- Entities should not lobby to undermine ambitious government climate policies directly or through trade associations or other bodies.

**What is Net-Zero Target?**

- It is referred to as **carbon neutrality**, which does not mean that a country would bring down its emissions to zero.
- Rather, it is a state in which **a country's emissions are compensated by the absorption and removal of greenhouse gases from the atmosphere.**
- Further, absorption of the emissions can be increased by creating more **carbon sinks** such as **forests.**
- While the removal of gases from the atmosphere requires futuristic technologies such as carbon capture and storage.
- More than **70 countries** have promised to become **Net Zero by the middle of the century i.e., by 2050.**
- **India** has promised to **cut its emissions to net zero by 2070** at the **conference of parties-26(COP) summit.**

19. **Our choking cities: How we can improve air and water quality in urban spaces**

**Miyawaki Technique-**

- Miyawaki is a technique pioneered by **Japanese botanist Akira Miyawaki,** that helps build **dense, native forests** in a short time.

- In the **Miyawaki technique**, various native species of plants are planted close to each other so that the **greens receive sunlight only from the top and grow upwards rather than sideways.**
- As a result, the plantation becomes approximately **30 times denser,** grows **10 times faster** and becomes **maintenance-free after a span of 3 years.**

**Process:**

- The native trees of the region are identified and divided into **four layers** — **shrub, sub-tree, tree, and canopy.**
- The **quality of soil** is analysed and **biomass** which would help enhance the **perforation capacity, water retention capacity, and nutrients** in it, is mixed with it.
- A mound is built with the soil and the seeds are planted at a **very high density** — three to five saplings per square meter.
- The ground is covered with a **thick layer of mulch.**

**Benefits of the Miyawaki method-**

- They help **lower temperatures** in concrete **heat islands, reduce air and noise pollution, attract local birds and insects,** and **create carbon sinks.**
- The Miyawaki afforestation method requires quite a small space, at least 20 square feet.
- It has revolutionised the concept of **urban afforestation** by turning backyards into **mini-forests**.

**How can the Miyawaki method transform Indian cities?**

- Miyawaki projects have been buoyed by India's promise, under the **Paris Agreement**, to improve its **green cover from 25 to 33 per cent.**
- A rough count reveals that there are over a **hundred Miyawaki forests in India,** but no one has kept track.
- In Ahmedabad, over 20,000 trees have been planted using the **Miyawaki technique** in 7,625 sq metres.
- Chandigarh has about 1,800 parks.
- In **Chennai,** the **NGO Thuvakkam** has been able to grow **25 Miyawaki forests**, raising over 65,000 trees.
- Such plantations are now being replicated in other cities including **Tuticorin, Vellore** and **Kanchipuram.**

**Airshed management-**

- Focus on understanding **meteorological, seasonal and geographic patterns for air quality across a large region.**

**Water pollution-**

- 72 per cent of urban sewage is untreated in India's urban freshwater bodies.
- The **Central Pollution Control Board** reckons that more than **50 per cent** of **351 river stretches** (on 323 rivers) are polluted.
- The **problem** of **untreated waste** and **sewer water** from **unauthorised colonies** can be solved by investing in a **sewerage network.**
- There is also the **threat of climate change.**
- As of May 2021, only **16 Indian cities** had **disclosed their plans to tackle climate change** to international institutions, with only eight having actual sustainability-related targets in their urban master plans.

**What is Blue-Green Infrastructure?**

- **Blue-Green Infrastructure** refers to a network that provides the **"ingredients"** for solving urban and climatic challenges through a **combination of infrastructure, ecological restoration and urban design** to connect people with nature.
    - **Blue** indicates **water bodies** such as rivers and tanks
    - **Green** indicates **trees, parks, and gardens.**

**What are the Advantages of Blue-Green Infrastructure?**

- Utilising blue-green infrastructure in sectors such as **transportation, water,** and **housing** can **improve ecosystem health**, thereby improving human health and the environment.
- Green streetscapes and landscapes enhance **aesthetic and ethical qualities**
- Blue-green infrastructure can provide **shelter in public spaces** and **reduce the urban temperature** and **increase outdoor activities**.
- Due to low temperatures on building surfaces, diminishes the cooling demand which results in decreasing energy needs.
- The **life expectancy of the building** increases as **green infrastructure** will protect it from high temperatures, and help in **lowering maintenance costs.**

**Sponge cities concept-**

- A sponge city is a city that is designed to **passively absorb, clean** and **use rainfall** in an **ecologically friendly way** that reduces dangerous and polluted runoff.
- Associated techniques include **permeable roads, rooftop gardens, rainwater harvesting, rain gardens, green space and blue space** such as ponds and lakes.

**Water (Prevention and Control of Pollution) Act of 1974**

- The Water (Prevention and Control of Pollution) Act was **enacted in 1974** to provide for the prevention and control of water pollution, and for the maintaining or restoring of the wholesomeness of water in the country.
- The Act was **amended** in **1988.**
- The **Water (Prevention and Control of Pollution) Cess Act** was enacted in **1977,** to provide for the **levy and collection of a cess on water** consumed by persons operating and carrying on certain types of industrial activities.
- The **Act** vests **regulatory authority** in **State Pollution Control Boards** to establish and enforce effluent standards for factories.

- A **Central Pollution Control Board** performs the same functions for **Union Territories** and formulates policies and coordinates activities of different State Boards.
- The **Act** grants power to **SPCB** and **CPCB** to test equipment and to take the sample for the purpose of analysis.
- Prior to its amendment in **1988,** enforcement under the Act was achieved through **criminal prosecutions** initiated by the Boards.
- The **1988 amendment act** empowered **SPCB** and **CPCB** to close a **defaulting industrial plant.**

**Water (Prevention and Control of Pollution) Cess Act of 1977**

- The **Water Cess Act** was passed to **generate financial resources** to meet the expenses of the **Central and State Pollution Boards.**
- The Act creates **economic incentives for pollution control** and requires local authorities and certain designated industries to **pay a cess (tax) for water effluent discharge.**
- The **Central Government,** after deducting the expenses of collection, pays the central and state boards such sums, as it seems necessary.
- To encourage capital investment in pollution control, the Act gives a **polluter a 70% rebate** of the applicable cess upon installing effluent treatment equipment.

**Central Pollution Control Board (CPCB)-**

- **The** Central Pollution Control Board (CPCB), the **statutory organization**, was constituted in **September 1974** under the **Water (Prevention and Control of Pollution) Act, 1974.**
- Further, **CPCB** was entrusted with the powers and functions under the **Air (Prevention and Control of Pollution) Act, 1981.**
- The **board** is led by its chairman, who is **nominated** by the **Central Government.**

**Functions**

- It serves as a **field formation** and also provides technical services to the **Ministry of Environment and Forests** of the provisions of the **Environment (Protection) Act, 1986.**
- Principal Functions of the **CPCB,** as spelled out in the **Water (Prevention and Control of Pollution) Act, 1974,** and the **Air (Prevention and Control of Pollution) Act, 1981,**
- to promote the cleanliness of streams and wells in different areas of the States by prevention, control, and abatement of water pollution, and
- to improve the quality of air and to prevent, control, or abate air pollution in the country.

20. **Freddie and Elton kill again: Why the cheetah pair is being tracked so closely**

**Context-**

- The two Cheetah brothers in **Kuno National Park, Freddie** and **Elton**, made their second successful hunt on Wednesday evening, once again killing a Cheetal (spotted deer), forest officials said.

**Why is it important?**

- **India's cheetah reintroduction project** is the **first time in the world** that a large carnivore has been relocated from one continent to another.
- The **cheetahs** are exhibiting normal behaviour which shows they are adapting well and are in the best of health conditions and agility, even after the mandatory quarantine period.
- The animals are tracked in the wild using a **Very High Frequency (VHF) satellite collar.**

**Why weren't they hunting all this while?**

- After the cheetahs reached India they were kept in **quarantine bomas (enclosures)** to prevent them from catching infections from other animals and were fed buffalo meat.
- They are being released into a larger enclosure in a staggered manner, with Freddie and Elton being the first.
- The next cheetah to be released in the large enclosure will be another male, **Obaan.**
- The **larger enclosures** consist of **nine interlinked compartments** spread across a 5-sqkm area.
- The separate compartments have been created so that a particular animal can easily be removed should the need arise.
- The **other five cheetahs** are **Sasha, Siyaya, Savannah, Tbilisi and Asha.**
- The male cheetahs are aged between 4.5 years and 5.5 years while the five female cheetahs are aged two to five years.

**What next-**

- After adapting to the larger enclosures, they will be released into the **748-sqkm Kuno National Park.**
- The enclosure has a **high prey base** but it does not have other large predators.
- Its 11.7-km peripheral fence has an **electric charge to keep other animals away.**
- **Cheetahs** are known to coexist with leopards in Namibia.
- In the national park, they will have to survive with 150-odd leopards.

**Why Kuno was chosen for the cheetahs-**

- The last of these animals were killed in 1947.
- Cheetahs were declared extinct in India in 1952.
- **Six sites,** which had been **assessed in 2010** for the translocation of the **Asiatic Lion,** were **re-assessed in 2020**.
- **Mukundara Hills Tiger Reserve** and **Shergarh Wildlife Sanctuary,** both in **Rajasthan,** and **Gandhi Sagar Wildlife Sanctuary, Kuno National Park, Madhav National Park** and **Nauradehi Wildlife Sanctuary** in **Madhya Pradesh.**
- **Kuno** was found ready to receive the cheetah immediately as it had been prepared for the Asiatic Lion.

- Both animals share the same habitat – **semi-arid grasslands and forests** that stretch across Gujarat, Rajasthan and Madhya Pradesh.

**Will any other site in India get the cheetahs?**

- Madhya Pradesh forest officials are making efforts to accommodate more in the **Nauradehi forest sanctuary** in **Sagar** and **Gandhi Sagar Sanctuary** in **Mandsaur.**

21. **Jharkhand forms a task force to study the impact of climate commitments-**

**Context-**

- The **Jharkhand government** has formed a **task force** to study the **impact on the state of commitments made by India** at last year's global climate summit.

**More on news-**

- At the **COP26** summit in **Glasgow** last year, India committed to achieving **net-zero carbon emissions by 2070** and set a target of **building the capacity to generate 500 GW of non-fossil fuel energy.**

**About the task force-**

- The task force, comprising officials from **13 different departments**, has been formed to assess the magnitude and nature of the effects of the **"accelerated phase-out of coal mines and coal-based industries"** on Jharkhand's economy as well as on the communities that are directly or indirectly dependent on these industries.
- The task force is expected to deliver an interim report within 12 months.
- The state is endowed with **rich coal resources,** and a large number of **coal-based industries** are located in the state.
- So, it is necessary to study the impact of such commitments on the state and its people and to prepare for a transition towards a green and sustainable model of development.

**India's commitment at the Glasgow summit-**

- India presented the following **five nectar elements (Panchamrit)** of India's climate action-
  1. Reach 500GWNon-fossil energy capacity by 2030.
  2. 50 per cent of its energy requirements from renewable energy by 2030.
  3. Reduction of total projected carbon emissions by one billion tonnes from now to 2030.
  4. Reduction of the carbon intensity of the economy by 45 per cent by 2030, over 2005 levels.
  5. Achieving the target of net zero emissions by 2070.

22. **What is the Mangrove Alliance for Climate, which India joined at COP27?**

**Context-**

- At the **27th Session of Conference of Parties (COP27),** this year's **UN climate summit,** the **Mangrove Alliance for Climate (MAC)** was **launched** with **India as a partner**.
- The move, in line with **India's goal to increase its carbon sink,** will see New Delhi collaborating with **Sri Lanka, Indonesia** and other countries to preserve and restore the mangrove forests in the region.

**The MAC-**

- An **initiative led by the United Arab Emirates (UAE)** and **Indonesia,** the **Mangrove Alliance for Climate (MAC)** includes **India, Sri Lanka, Australia, Japan,** and **Spain.**
- It aims to **educate and spread awareness** worldwide on the role of mangroves in curbing global warming and its potential as a solution for climate change.
- The **intergovernmental alliance** works on a **voluntary basis** which means that there are **no real checks and balances** to hold members **accountable**.
- The members will also **share expertise** and support each other in **researching, managing and protecting coastal areas.**

**The current state of the mangroves**

**Geographical Location:**

- Mangroves are found **only along sheltered coastlines** within **tropical or subtropical latitudes** because they **cannot withstand freezing temperatures.**
- They share the unique capability of growing within reach of the tides in salty soil.

**Area Covered**

- **Global Mangrove Cover:**
  - The total mangrove cover in the world is **1,50,000 sq kms.**
  - **Asia** has the largest number of mangroves worldwide.
  - **South Asia** comprises **6.8%** of the world's mangrove cover.
  - **India's** contribution is **45.8% total mangrove cover** in **South Asia.**

**Mangroves in India:**

- **Coverage:**
  - According to the **India State of Forest Report, 2019,** the mangrove cover in India is **4,975 sq km,** which is **0.15%** of the country's total geographical area.
  - **West Bengal** has **42.45%** of India's mangrove cover, followed by **Gujarat at 23.66%** and **A&N Islands at 12.39%.**

**Largest Mangrove Forest:**

- **Sundarbans in West Bengal** is the largest mangrove forest regions in the world. It is listed as a **UNESCO World Heritage Site.**

    - The forest is home to the **Royal Bengal tiger, Gangetic dolphin**s and **Estuarine crocodiles.**
- **Bhitarkanika Mangroves:** The **second largest mangrove forest** in India is Bhitarkanika in Odisha created by the two river deltas of **River Brahmani** and **Baitarani.**
    - It is one of the most significant **Ramsar wetlands in India.**
- **Godavari-Krishna Mangroves, Andhra Pradesh:** The Godavari-Krishna mangroves extend from Odisha to Tamil Nadu.
- The deltas of the **Ganges, Mahanadi, Krishna, Godavari,** and **Cauvery rivers** contain mangrove forests.
- The **backwaters in Kerala** have a **high density of mangrove forests.**
- **Pichavaram in Tamil Nadu** has a vast expanse of water covered with mangrove forests. It is home to many aquatic bird species.

**Significance of Mangroves-**

- Ecologically mangroves are important in **maintaining and building the soil,** as a reservoir in the **tertiary assimilation of waste.**
- They provide **protection against cyclones.**
- Promotes **land accretion, fixation of mud banks, dissipation of winds, tidal and wave energy.**
- The **dense tangle of roots** allows the trees to handle the daily rise and fall of tides.
- Mangrove forests **stabilize the coastline, reducing erosion from storm surges, currents, waves, and tides.**
- Mangroves **improve water quality** by **absorbing nutrients from runoff** that might otherwise cause **harmful algal blooms offshore.**
- Both **coral reefs** and **seagrass beds** rely on the **water-purifying ability of mangrove forests** to keep the water clear and healthy.
- Mangroves make up **less than 2% of marine environments** but account for **10-15% of carbon burial.**
- Once the leaves and older trees die they fall to the seafloor and take the stored carbon with them to be buried in the soil.
- This buried carbon is known as **"blue carbon"** because it is stored underwater in coastal ecosystems like **mangrove forests, seagrass beds** and **salt marshes.**
- **Supports an incredible diversity of creatures** including some species unique to mangrove forests.
- They **provide habitat and refuge to a wide array of wildlife** such as **birds, fish, invertebrates, mammals and plants.**

**Threats Faced by Mangroves**

- **Commercialisation of Coastal Areas:** Aquaculture, coastal development, rice and palm oil farming and industrial activities are rapidly replacing these salt-tolerant trees and the ecosystems they support.
    - Mangrove coverage has shrunk by half in the last 40 years. Less than 1% of tropical forests are mangroves.
- **Shrimp Farms:** The emergence of shrimp farms has caused **at least 35%** of the overall loss of mangrove forests.
- **Temperature-Related Issues:** A **fluctuation of ten degrees** in a short period of time is enough stress to damage the plant and freezing temperatures for even a few hours can kill some mangrove species.
- **Soil-Related Issues:** The soil where mangroves are rooted poses a challenge for plants as it is severely lacking in oxygen.
- **Excessive Human Intervention:** During past changes in sea level, mangroves were able to move further inland, but in many places, human development is now a barrier that limits how far a mangrove forest can migrate.
    - Mangroves also frequently suffer from **oil spills.**

**Conservation of Mangroves**

- **UNESCO Designated Sites:** The inclusion of mangroves in **Biosphere Reserves, World Heritage sites and UNESCO Global Geoparks** contributes to improving the knowledge, management and conservation of mangrove ecosystems throughout the world.
- **International Society for Mangrove Ecosystem (ISME):** The **ISME** is a **non-governmental organization** established in **1990** to promote the study of mangroves with the purpose of enhancing their conservation, rational management and sustainable utilization.
- **Blue Carbon Initiative:** The **International Blue Carbon Initiative** is focused on mitigating climate change through the conservation and restoration of coastal and marine ecosystems.
    - It is coordinated by **Conservation International (CI), IUCN**, and the **Intergovernmental Oceanographic Commission-UNESCO (IOC-UNESCO).**
- **International Day for the Conservation of the Mangrove Ecosystem: UNESCO** celebrates this day on **July 26** with the aim of raising awareness about mangrove ecosystems and promoting their sustainable management and conservation.
- **Mangroves for the Future Initiative: IUCN** and **UNDP** developed a unique initiative to promote investment in coastal ecosystem conservation called the **"Mangroves for the Future (MFF)".**
    - The member nations include **Bangladesh, Cambodia, India, Indonesia, Maldives, Myanmar, Pakistan, Seychelles, Sri Lanka, Thailand, and Vietnam.**
- **National Mangrove Committee:** The **Government of India** set up a **National Mangrove Committee in 1976** which advises the government about the conservation and development of mangroves.

23. **What the latest UN science says about climate change**

**Context-**

- At the **COP27 conference** in **Egypt**, delegates have at their disposal decades of research into warming trajectories published by the **UN climate science agency** to inform their decisions. The **Intergovernmental Panel on Climate Change (IPCC)** produces reports roughly every five years that represent a **global scientific consensus on climate change, its causes and its impact.**

**The Report-**

- Last year's report tackled the main drivers of global warming and the core elements of climate science.
- That was followed by two major reports this year – one in February addressing how the world will need to adapt to climate impacts, from rising seas to dwindling wildlife, and another in April on ways to mitigate climate-warming emissions.

**Here are some key takeaways-**

**1. Humans unequivocally to blame**

- Previously rare weather extremes are becoming more common, and some regions are more vulnerable than others.
- For the **first time**, there is a call for **urgent action to curb methane.** Until now, the **IPCC** had **focused** on **carbon dioxide,** the most abundant greenhouse gas.
- The report supports the idea of looking into the benefits and drawbacks of geoengineering, or large-scale interventions, such as injecting particles into the atmosphere to block out solar radiation.
- The world's nations, including the wealthiest, needed to start preparing for climate impacts and adapting to a warmer world.

**2. Urgent need to adapt to heatwaves, storms, sea level change**

- With climate change already causing **extreme weather worldwide**, the report urged rich and poor countries alike to adapt now to impacts including more frequent heatwaves, stronger storms and higher sea levels.
- The report made clear that different regions face different risks, and offered localised projections for what to expect.
- Millions of people face poverty and food insecurity in the coming years, as climate change hits crops and water supplies and threatens to disrupt trade and labour markets.
- The daunting forecast for the world's poor reignited calls for a **"Loss and Damage" fund** through which rich nations would compensate for costs incurred by poor countries from climate-related disasters.

**3. 'Now or never', individual action matters**

- The report explored how various emissions scenarios would translate into future temperature rises.
- Cities are a big part of the emissions problem but also a source of hope and positive solutions.
- The energy transition to renewable sources and clean-burning fuels is moving too slowly.
- The report went beyond focusing on fossil fuels and manufacturing to urge strong climate action in agriculture, where farming methods and better forest protection could curb emissions.
- It warned that **climate change threatens economic growth,** and for the **first time** highlighted the **need for action at the individual level,** calling on governments to agree on policies to change consumer and transportation habits to **encourage less waste.**

24. **COP27: Dash for natural gas on a scale that threatens 1.5°C goals, says report**

**Context-**

- The report, titled **Massive gas expansion risks overtaking positive climate policies**, was released at the **27th Conference of Parties (COP)** to the **United Nations Framework Convention on Climate Change** in **Sharm El-Sheikh, Egypt.**

**Report analysis-**

- **Liquefied Natural Gas (LNG)** production projects, including those under construction, proposed or approved between **2021** and **2050**, could **increase emissions by over 1.9 Gigatonnes of carbon dioxide-equivalent ($CO_2$) per year in 2030**.
- This estimate is above emission levels estimated by the **International Energy Agency (IEA)'s Net Zero by 2050 scenario,** the report released by **Climate Action Tracker (CAT)** stated.
- The **total global gas use** by **2030** must be at least **30 per cent** below **2021 levels,** according to the 2022 update of the **IEA's Net Zero by 2050: A Roadmap for the Global Energy Sector.**
- Under current proposals, global LNG consumption could more than double by 2030, reaching 800 million tonnes of LNG per year.
- The findings also showed that **cumulative emissions from LNG** are estimated to be **over 40 Gigatons of carbon dioxide-equivalent ($CO_2$) higher between 2020 and 2050.**
- This could **consume 10 per cent** of the remaining **global carbon budget** for **1.5˚C warming by 2050.**
- The world has a **remaining budget** of about **420 gigatonnes of $CO_2$** for a **two-thirds chance of limiting warming to 1.5°C,** according to the **Intergovernmental Panel on Climate Change (IPCC).**
    - The **remaining carbon budget** is the **remaining $CO_2$ emissions that can still be emitted** while keeping the global average temperature increase due to human activities to a specific limit, which is **1.5°C.**
- The **Russia-Ukraine war** has caused the **energy crisis.**
    - This has taken over the climate crisis.
    - The gas industry has taken advantage of that. There is a **massive push for gas everywhere.**

**African gas reserves-**

- **Europe, Africa, the United States, Australia, Canada** and **the Middle East** are expected to expand exports.
    - Europe is expected to see significant increases in **imports,** while **India, southeast Asia,** and **east Asia** have plans to **expand import capacity**.
- There is a **renewed interest in Africa's fossil energy reserves** given the energy crisis.
- It now has **905 proposed fossil gas plants**.
    - **Nigeria, Egypt, Senegal** and **Mozambique** are pushing to accelerate **fossil gas production.**
- The **African Development Bank** will be co-financing an LNG plant in **Mozambique.**
- **Fossil gas projects** are attractive to many **African nations facing a debt crisis.**

**What is Natural Gas?**

- Natural gas is a **fossil energy source** that formed deep beneath the earth's surface. Natural gas contains different compounds. The **largest component** of natural gas is **methane**, a compound with one carbon atom and four hydrogen atoms (CH4).

**What is Liquified Natural Gas (LNG)?**

- Liquefied natural gas (LNG) is **natural gas** that has been **cooled to a liquid state,** at about **-260° Fahrenheit**, for shipping and storage.
- The volume of natural gas in its liquid state is about **600 times smaller** than its volume in its gaseous state.
- This process makes it possible to transport natural gas to places where pipelines do not reach.

**Importance of Gas:**

- **Energy efficient:** Natural gas produces more energy than any of the fossil fuels in terms of calorific value.
- **Cleaner fuel:** Natural gas is a **superior fuel** as compared with coal and other liquid fuels; being an environment-friendly, safer and cheaper fuel.
- **Emission commitments:** India made a commitment to **COP-21 Paris Convention** in December **2015** that **by 2030,** it would **reduce carbon emission by 33%-35% of 2005 levels.**
- **Diverse applications:** Natural gas can be used as domestic kitchen fuel, fuel for the transport sector as well as a fuel for fertilizer industries and commercial units.

25. **COP27: African countries launch 'game-changing' carbon credits initiative**

**African Carbon Markets Initiative (ACMI)-**

- A **new initiative putting carbon credits up for sale in African countries** was launched during the **27th Conference of Parties (COP27)** to the **United Nations Framework Convention on Climate Change** in **Sharm El-Sheikh, Egypt.**
- **African Carbon Markets Initiative (ACMI)** aims to rally the world towards more ambitious climate action, expand the continent's participation in voluntary carbon markets and create jobs while protecting biodiversity.
- **Carbon markets** can unlock billions in climate finance needed to support the economies of African countries.
- The leaders announced their ambitions to grow the **African voluntary carbon markets** at the launch by producing **300 million carbon credits every year by 2030** and **1.5 billion credits annually by 2050.**
- This can **unlock $6 billion (Rs 49,041 crore) in income** and **support over 30 million jobs.**
- **Major carbon credit buyers** and financiers, like **Exchange Trading Group** and **Standard Chartered,** have announced ambitious plans to set up an **advance market commitment (AMC)** for **high-integrity African carbon credits.**
- Nigeria is committed to carbon credits because the sector will soon become a major industry and benefit citizens.

**Concerns in the ACMI-**

- Concerns and doubts about real frontline victims like ordinary African farmers benefiting from the initiative.
- **ACMI** needs political goodwill and the support of technical experts to adopt international best practices from the leading European carbon market.
- ACMI needs to collaborate with other regional carbon market platforms and global integrity initiatives like the Voluntary Carbon Markets Integrity Initiative.
- Calls for regulation of voluntary markets, which are often unchecked.
- Stringent policies are needed to check on social safeguards to **avoid human rights abuses** and **'greenwashing'** loopholes that some corporations exploit to masquerade as **eco-friendly** without reducing requisite emissions.

**What is carbon credit-**

- A **carbon credit** is a **special permit** that gives the user or buyer express rights to emit a given amount of carbon dioxide or other greenhouse gases.
- **Carbon credits** trading is one of the many **technical interventions** used to reduce the amount or concentration of **greenhouse gases** in the atmosphere.
- **Carbon credits** are based on the **"cap-and-trade" model** that was used to reduce **sulfur pollution** in the **1990s.**
- **One carbon credit** is **equal to one metric ton of carbon dioxide,** or in some markets, carbon dioxide equivalent gases (CO2-eq).
- Negotiators at the **Glasgow COP26** climate change summit in November 2021 agreed to create a **global carbon credit offset trading market.**
- The **Kyoto Protocol** provides for **three mechanisms** that enable countries, or operators in developed countries, to acquire greenhouse gas reduction credits:
    1. Under **Joint Implementation (JI),** a developed country with relatively high costs of domestic greenhouse reduction would set up a project in another developed country.

2. Under the **Clean Development Mechanism (CDM),** a developed country can **"sponsor"** a **greenhouse gas reduction project** in a **developing country** where the cost of greenhouse gas reduction project activities is usually much lower, but the atmospheric effect is globally equivalent. The developed country would be given credits for meeting its emission reduction targets, while the developing country would receive capital investment and clean technology or beneficial change in land use.
3. Under **International Emissions Trading (IET),** countries can trade in the **international carbon credit market** to cover their shortfall in **Assigned Amount Units (AAUs).** Countries with surplus units can sell them to countries that are exceeding their **emission targets** under **Annex B** of the **Kyoto Protocol.**

**Carbon Markets:**

- A **carbon market** turns emission reductions and removals into tradeable assets, thus creating incentives to reduce emissions or improve energy efficiency. The carbon markets can be compliance and voluntary.
- **Carbon tradin**g started formally in **1997** under the **United Nations' Kyoto Protocol on climate change** which had more than **150 nation signatories.**
- Parties with commitments under the agreement agreed to limit or reduce their greenhouse gas emissions between **2008 – 2012** to **5.4%** which was well **below the levels of 1990.**
- **Emissions trading,** as set out in the **Kyoto Protocol,** allowed countries to **sell the excess capacity of emission units** to countries that had levels well over their targets.

Several countries like **Kenya, Malawi, Gabon, Nigeria** and **Togo** announced their commitment to scaling voluntary **carbon markets** at **COP27.**

26. **No breakthrough on loss and damage talks pushed to ministerial meets**

**Context-**

- Progress on the loss and damage front at the climate conference here has been halted and left for the ministers to decide at the end of the meeting next week.

**More on the news-**

- **Loss and damage finance** were included on the main agenda for the climate meeting for the first time this year.
- US President Joe Biden said his country was ready to **reclaim the leadership of climate change.**
- Earlier the USA had pulled herself out of the **Paris Agreement.**

**Initiative taken by the USA at CoP27-**

- The USA announced fresh plans to **reduce methane emissions** from the **fossil fuel industry,** and a **doubling of the adaptation finance from US$ 50 million to US$ 100 million.**
- The **US** has so far promised about **US$ 11.4 billion in climate finance**, as part of its contribution to the **US$ 100 billion that developed countries are under obligation to mobilise every year from 2023,** but only a small part of that money has been realized.

**What is the USD 100 Billion Target and why does it matter?**

- In **2009,** at the **UNFCCC COP15** (held in **Copenhagen**),
- The developed country parties, to achieve meaningful mitigation actions and transparency on implementation, jointly set a target of **USD 100 billion** a year by **2020** to address the needs of developing countries.
- The climate finance goal was then **formally recognized** by the **UNFCCC Conference of the Parties at COP16 in Cancun.**
- At **COP21** in **Paris,** Parties extended the **$100 billion goals through 2025.**
- After **COP26** there was a consensus that developed nations will double their collective provision of adaptation finance from **2019 levels by 2025**, in order to achieve this balance between adaptation and mitigation.

**Global Climate Financing-**

- **Green Climate Fund (GCF):**
  - It was established to limit or **reduce greenhouse gas (GHG) emissions** in **developing countries** and to help vulnerable societies adapt to the unavoidable impacts of climate change.
- **Adaptation Fund (AF):**
  - It was established under the **Kyoto Protocol in 2001** and has committed **US$ 532 million** to climate adaptation and resilience activities.
- **Global Environment Fund (GEF):**
  - It has served as an operating entity of the financial mechanism since the Convention came into force in **1994.**
  - It is a **private equity fund** focused on seeking long-term financial returns through investments in clean energy under climate change.
- **Other Funds:**
  - In addition to providing guidance to the **GEF** and the **GCF,** parties have established **two special funds:**
  - **The Special Climate Change Fund (SCCF)** and the **Least Developed Countries Fund (LDCF).**
  - Both funds are **managed** by the **GEF.**
- At the **Paris Climate Change Conference in 2015,** the Parties agreed that the operating entities of the **financial mechanisms** – **GCD, GEF, SCCF** and the **LDCF**, shall serve the Paris Agreement.

27. **A satellite data system will help detect, and act on methane emissions**

**Context-**

- A new **satellite-based system** will now help governments **detect methane emissions** and tackle them.

**About Methane Alert and Response System (MARS)-**

- The **Methane Alert and Response System (MARS)** was launched at the **27th Conference of Parties (COP27)** to the **United Nations Framework Convention on Climate Change** in **Sharm El-Sheikh, Egypt.**
- **MARS** is a **part of global efforts to slow climate change** by tackling global warming gas.
- The **data-to-action platform** was set up as part of the **UN Environment Programme's (UNEP) International Methane Emissions Observatory (IMEO) strategy** to get policy-relevant data into the right hands for emissions mitigation.
- It will be the **first publicly available global system** to connect methane detection to notification processes transparently.
- It will use **state-of-the-art satellite data** to identify significant emission events, notify relevant stakeholders, and support and track mitigation progress.

**Methane as a Greenhouse gas-**

- **Methane** accounts for a small portion of human-induced greenhouse gas emissions compared to carbon dioxide.
- But it is thought to be **80 times more efficient** than **carbon dioxide** at **trapping atmospheric heat** in the **20 years** following its release.
- The global mean temperature in 2022 is currently estimated to be about **1.15 °C above the 1850-1900 pre-industrial average**
- United States National Aeronautics and Space Administration's (NASA) scientists recently found **50 "super-emitters" of methane gas** in **central Asia, west Asia** and the **southwestern United States.**

**Super emitters detected by the Earth Surface Mineral Dust Source Investigation instrument (EMIT)-**

- EMIT located a **plume** in the **Permian Basin, New Mexico.** It was roughly **3.3 kilometres long.** The **Permian**, one of the world's biggest oilfields, extends across portions of southern New Mexico and western Texas.
- In **Turkmenistan**, EMIT identified **12 plumes from oil and gas infrastructure** in the **Caspian Sea port of Hazar.** Some plumes spanned more than **32 kilometres.**
- Most of these sites have ties with agriculture and fossil fuel industries.

**Status of methane emission globally-**

- The **27-country EU** is the world's biggest buyer of gas, while the **United States is the world's biggest oil and gas producer.**
- **Agriculture** is the **top source of methane emissions** worldwide, but experts say the **energy sector can cut emissions faster** and often at **low cost.**
- **Methane** is the **main component of natural gas** and **leaches into the atmosphere** from **oil wells** and **leaky gas pipelines.**
- Despite that **incentive to capture emissions**, atmospheric concentrations of methane surged last year by the **highest amount** since records began in the **1980s.**

**About Global Methane Pledge-**

- It is introduced by the **United States** and **EU** in 2021 to slash **methane emissions by 30%** by **2030 from 2020 levels.**
- It has since been **signed by 119 countries,** among them **13 of the world's top 20 methane emitters** including **Brazil, Indonesia, Mexico and Nigeria.**
- Forty countries are expected to publish plans at the **COP27 summit** detailing how they will meet the **Global Methane Pledge** – which is voluntary but aims to trigger more binding policies.
- The **Pledge does not include China,** the **world's biggest methane emitter** and **Russia**, which was **Europe's biggest gas supplier** before it invaded Ukraine in February.

**Top methane emitting countries-**

- The **world's five largest methane emitters** (from all sources) are **China, India, the United States, Russia and Brazil.**
- Together, they are responsible for **close to half of all methane emissions globally.**
- Of these, **only the United States and Brazil** are part of the **Global Methane Pledge.**
- Looking only at **energy-related emissions,** the **five largest emitting countries** are **China, Russia, the United States, Iran and India.**
- Of these, **only the United States is part of the Pledge.**

28. **Land; sea use changes are drivers of biodiversity loss**

**Context-**

- A new analysis of studies published since **2005** concludes that land and sea use change has been the **dominant anthropogenic driver** of **global biodiversity loss.**
- **Direct exploitation of natural resources** is the **second most dominant driver on land,** but the most important one for the **oceans.**

**The many factors-**

- The **Asia Pacific region** lost **45 per cent** of its **vertebrate population** in four-and-half decades, while the **global average is 68 per cent.**
- **Five major reasons** behind the **biodiversity loss** across the planet-

1. **Changes in land and sea use** (habitat loss and degradation),
2. **Overexploitation of species,**

3. **Invasive species** and **disease,**
4. **Pollution and**
5. **Climate change.**

- In the **Asia Pacific region** including **India**, **habitat loss** was the biggest trigger followed by **species overexploitation** and **invasive species and disease.**
- The **WWF factsheet** stated that almost **a third of Indian wetlands** have been affected by the **combined pressure of urbanisation, agricultural activities and pollution.**
- Habitat fragmentation and pollution, especially from pesticides and insecticides, are playing havoc with the biodiversity status of the country.
- It also put up data to highlight how **forest land has been diverted and has been affecting biodiversity.**
- About **43 per cent** of **forest land** recommended for diversion in **2019** falls in **ecologically sensitive wildlife habitats**.

29. **Carbon Capture Utilisation and Storage (CCUS)**

- **Carbon Capture, Utilization, and Storage (CCUS)** encompass **methods and technologies** to **remove $CO_2$** from the **flue gas** and **from the atmosphere,** followed by **recycling the $CO_2$ for utilization and determining safe and permanent storage options.**
- **CO2** captured using **CCUS technologies** is converted into fuel (methane and methanol), refrigerants and building materials.
- The captured gas is used directly in **fire extinguishers, pharma, food and beverage industries** as well as the **agricultural sector.**
- **CCUS** technologies can play an important role in meeting **net zero targets,** including as one of the few solutions to **tackle emissions** from **heavy industry** and to remove carbon from the atmosphere.
- CCUS is considered an important tool to help countries halve their emissions by 2030 and reach net zero by 2050.
- These goals are crucial to meet the **Paris Agreement targets** for **restricting global warming to 2 degrees Celsius (°C), and preferable to 1.5°C,** over pre-industrial levels.
- CCUS technologies also provide the foundation for carbon removal or **"negative emissions"** when the CO2 comes from **bio-based processes** or directly from the atmosphere.
- There are around **35 commercial facilities applying CCUS** to industrial processes, fuel transformation and power generation.
- **CCUS facilities** currently capture almost **45 Mt CO2 globally,** but this needs to increase.

**Carbon Avoidance-**

- Carbon avoidance involves measures aimed at **preventing carbon from being released into the atmosphere.**
- Carbon avoidance can occur either via **carbon offsets** or via **direct carbon reduction measures.**
- Many human activities carry a significant **carbon footprint,** but particularly intense are the **industrial burning of fossil fuels, and the destruction of natural carbon sinks** such as forests.
- **Carbon avoidance projects** aim to curb these emissions by targeting these activities and capturing the emission they create, or preventing the activities altogether.

**The impact of carbon avoidance on emissions-**

- Carbon avoidance via offsets does not work at the core issue of reducing overall CO2 emissions. Carbon avoidance via direct carbon reduction measures does work at the core issue of reducing overall CO2 emissions.
- The effectiveness of carbon avoidance via carbon offsets depends on the type of project and if the project is realized, additional, permanent, meets certain key criteria and project standards, and does not engage in greenwashing. Carbon avoidance via direct carbon reduction measures is effective because it cuts emissions at their source.

**The main benefits of carbon avoidance**

- Carbon avoidance aids in climate change mitigation, improves air quality, and protects ecosystems.

**The main drawbacks of carbon avoidance**

- Carbon offset limitations and global reliance on fossil fuels are drawbacks to carbon avoidance measures.

30. **India's long-term strategy to transition to a 'low emissions' pathway involves more nuclear power, more ethanol**

**Context-**

- India announced its **long-term strategy** to **transition** to a **"low emissions" pathway** at the **United Nations Conference of Parties (COP)** ongoing in **Sharm el-Sheikh, Egypt**, which is premised on expanding its **nuclear power capacity by at least three-fold** in the next decade, apart from becoming an **international hub for producing green hydrogen** and **increasing the proportion of ethanol in petrol.**

**What are India's LT-LEDS (Long-term low emission development strategies)-**

- Among **195- member countries** only **57 countries** have submitted their long-term document, including India.
- Maximise the use of **electric vehicles,** with **ethanol blending** to reach **20% by 2025** (currently **10%**) and a **strong shift to public transport** for passenger and freight traffic.
- Focus on **improving energy efficiency by the Perform, Achieve and Trade (PAT) scheme,** the **National Hydrogen Mission, increasing electrification, enhancing material efficiency,** and **recycling** and ways to **reduce emissions.**

- India's **forest and tree cover** are a **net carbon sink** absorbing **15%** of **CO2 emissions** in 2016, and the country is on track to fulfilling its **Nationally Determined Contributions (NDC)** commitment of **2.5 to 3 billion tonnes** of **additional carbon sequestration** in **forest and tree cover by 2030**.

**PAT scheme-**

- It is a **market-based mechanism** to further accelerate as well as **incentivize energy efficiency** in the large **energy-intensive industries.**
- The **Energy Savings Certificates (ESCerts)** were introduced in India in **2011** under the **PAT** by the **Bureau of Energy Efficiency (BEE)** under the **National Mission of Energy Efficiency.**
- **NMEEE** is one of the **eight national missions** under the **National Action Plan on Climate Change (NAPCC)** launched by the **Government of India** in the year **2008.**

**Energy Savings Certificates (ESCerts):**

- This **market- based mechanism** is facilitated through the **trading of Energy Savings Certificates (ESCerts)** which are issued to those plants who have **overachieved their targets.**
- The **underachievers are entitled to purchase ESCerts** through **two power exchanges** – **Indian Energy Exchange (IEX)** and **Power Exchange India Limited (PXIL).**
- Industries that take part in this scheme are referred to as **designated shoppers (DC).**

**Sectors Covered:**

- **PAT** covered about **13 energy-intensive sectors:** Thermal power plants (TPP), cement, aluminium, iron and steel, pulp and paper, fertiliser, chlor-alkali, petroleum refineries, petrochemicals, distribution companies, railways, textile and commercial buildings (hotels and airports).

**Other initiatives to Promote Energy Conservation and Energy Efficiency:**

- Standards and Labelling
- Energy Conservation Building Code (ECBC)
- Demand Side Management
- SAATHEE Portal

31. **Digital Shakti program**

**Context:**

- The **National Commission for Women** launched the 4th phase of the Digital **Shakti Program.**

**What is Digital Shakti Program:**

- It is a **pan-India project on digitally empowering and skilling women and girls** in **cyberspace** and focuses on **making women digitally skilled and aware to stand up against any illegal/inappropriate activity online.**
- It is run in **collaboration with Cyber Peace Foundation and Meta.**
- The first phase of the program was **launched in 2018**.

**What is the National Commission for Women:**

- The National Commission for Women was set up as **statutory body in January 1992 under the National Commission for Women Act, 1990** to:
  - Review the Constitutional and Legal safeguards for women
  - Recommend remedial legislative measures
  - Facilitate redressal of grievances
  - Advise the Government on all policy matters affecting women.
- The commission **consists of a chairperson, a member secretary and five other members.**
- The **chairperson of the NCW** is **nominated by the Central Government**.
- The **first commission was constituted on 31st January 1992 as Jayanti Patnaik as the chairperson.**
- **Alok Rawat IAS is the first male member** of the National Commission for Women.

32. **'Greenprint for Chennai' report launched at CoP 27**

**Context:** The Union Minister for Environment, Forests and Climate Change, Bhupender Yadav, today launched a report titled 'Green print for Chennai – Integrating Natural Infrastructure in City Planning', at the COP27 international climate conference currently underway here.

**Concept**:

- The report has been prepared by **The Nature Conservancy (TNC)**, an environmental advocacy body based in the US.
- It has its presence in India since 2017.
- TNC is the **leading conservation organization** working to make a positive impact around the world in **more than 76 countries and territories**.
- Founded in 1951, the mission of The Nature Conservancy is to conserve the lands and waters on which all life depends.
- The **Green print report** ends in a bunch of recommendations such as,
  - Creation of new wetlands
  - Restoration of existing wetlands where urbanization is projected to increase.
  - Creation of Water Fund
- **Water fund:** A water fund is a governance and finance mechanism that improves water security by allowing downstream water users to invest collectively in upstream water and land conservation.

**About CoP 27 Conference:**

- E**gypt's coastal city of Sharm el-Sheikh** is hosting the 27th session of the Conference of Parties (COP27) of the United Nations Framework Convention on Climate Change (UNFCCC) from 6 to 18 November 2022.

**Background:**

- The CoP comes under the United Nations Climate Change Framework Convention (UNFCCC) which was formed in 1994.
- The UNFCCC was established to work towards "stabilisation of greenhouse gas concentrations in the atmosphere."
- The UNFCCC has 198 parties including India, China and the USA. **Cop members have been meeting every year since 1995**.

**Key agenda of the COP27**

Loss and Damage Funding

- The term '**Loss and Damage' refers to the economic and non-economic impacts of climate change**, including extreme events in countries that are particularly vulnerable to the adverse effects of climate change.
- Rich countries, historically responsible for the climate crisis, have bullied poorer nations to protect polluters from paying up for climate damages.
- The term was **brought up as a demand in 1991 by the island country of Vanuatu**, which was representing the Alliance of Small Island States (AOSIS).

**Major initiatives announced in the COP 27 meeting:**

**International Climate Change University:**

- The President of Sri Lanka Ranil Wickremesinghe has proposed to **set up an international climate change university in Sri Lanka,** with an ancillary institution in the Maldives.
- It was reiterated that Sri Lanka and Maldives as island nations are vulnerable to the adverse impacts of climate change.

**UAE-Egypt Deal:**

- The **United Arab Emirates (UAE) and Egypt** have struck a deal on the side-lines of the summit to develop one of th**e world's largest wind farms**.
- Once completed, the 10 GW onshore wind project in Egypt will produce approximately 47,790 GWh of clean energy annually.
- This would offset nearly 9% (23.8 million tonnes) of Egypt's current carbon dioxide emissions.

**Infrastructure Resilience Accelerator Fund**

- IRAF, a multi-donor trust fund of 50 million dollar is launched by Coalition for Disaster Resilience Infrastructure.
- It is established with the **support of United Nations Development Programme (UNDP) and United Nations Office for Disaster Risk Reduction (UNDRR),** will be managed by the United Nation Multi-Partner Trust Fund Office (UN MPTFO) in New York.

**India's Participation in COP27:**

- The Environment Minister of India Shri Bhupender Yadav is leading the Indian delegation to COP-27.
- India would press developed countries to fulfil their c**ommitment to delivering $100 billion of climate finance annually.**
- It would also press for enhanced transparency and more institutional mechanisms to make these funds available to developing countries that are most vulnerable to climate change.

33. **Water Credits**

**Concept:**

- Water credits are one of the financing mechanisms to drive collective action toward common climate adaptation goals.
- **Water credits represent a fixed quantum of water that is conserved or generated** and can be transacted between water deficit and water surplus entities **within a sub-basin.**
- Water credit is an initiative of Water.org. Water.org is a global non-profit organization working to bring water and sanitation to the world.
- The Water Credit Initiative has been funded by social entrepreneur Gary White and Hollywood Actor Matt Damon through their organization Water.org which has invested US$ 2.2 million in Water Credit programs.
- Water credit applies the principles of microfinance to the water and sanitation sector in developing countries. By making small loans to individuals and communities who do not have access to credit, Water-Credit empowers people to address their own water and sanitation needs instead of depending on government funds and charity.
- The concept of water credits is **similar to carbon credits;** however, **unlike the atmosphere, the spatial limit for transaction should remain within the same hydrological unit** — that is, a river basin or watershed.
- **For example,** multiple industries can offset their impact by buying water credits from municipalities that are fund-crunched to finance large-scale floodwater harvesting or wastewater treatment projects that conserve freshwater resources at a city level and promote wastewater reuse.
- This also means that the adoption of water credits would require a multiplayer approach.
- Its implementation would need some pre-requisites such as,
    - a systemic-level intervention (regulatory players and local governance institutions)
    - innovation in adaptation finance to achieve water resilience.

34. **Seven exotic primates, drugs seized in southern Assam**

**Context-**

- The police in **southern Assam's Hailakandi** and **Cachar districts** seized **seven exotic primates, narcotic drugs** worth **₹10 crore** and **Burmese areca nuts** and **foreign-made cigarettes** — both illegal commodities — in hidden chambers of trucks.

**More in news-**

- Wildlife officials have **not been able to identify the species** but they are **endangered** and **not Indian.**
- At least **175 other exotic mammals, reptiles** and **birds** seized in Assam since September.
- The Cachar police seized **54,000 tablets of Yaba,** a **narcotic drug.**
- The police in Cachar district's Lailapur also seized two trucks and **seized a total of 3,505 kg of Burmese areca nuts.**

**Illegal Wildlife trafficking (IWT)-**

- IWT describes any **environment-related crime** that involves the **illegal trade, smuggling, poaching, capture or collection of endangered species, protected wildlife** (including animals and plants that are subject to harvest quotas and regulated by permits), derivatives or products thereof.
- The **IWT** involves **poachers, armed non-state actors** from source nations, **international crime groups** and **institutional corruption across global network chains** and a range of players involved in demand countries – from **organized crime syndicates** and **non-state actors to legitimate authorities.**

**Drivers for the demand of wildlife trafficking-**

- Demand in Zoo, parks and personal desire
- perceived medicinal value of some products
- social status
- Ignorant tourists who purchase souvenirs or pets to take home
- Indian star tortoise has become the most trafficked tortoise worldwide because of its high demand as a pet

**Implications of IWT-**

- Compromises the security of countries
- Profits can be used to finance civil conflicts and terrorist-related activities.
- Hinders sustainable social and economic development
- Reduce the effectiveness of governments
- Deter civil engagement
- Erode the rule of law
- Harm the reputation of and trust in the state
- Affect the growth of local communities
- Destroys natural wealth

**Situation in India-**

- Emerged as a form of **organised transnational crime** that has threatened the existence of many wild species across the globe.
- A large part of this trade is meant for the **international market** and has **no direct demand in India.**
- The **main consumer markets** are **China** and **South East Asia**, but wildlife—alive or as body parts— is also smuggled to the **Gulf, Europe** and **Northern America.**
- Beyond India, the main transit countries are **Nepal, Bangladesh, Bhutan, Sri Lanka** and **Myanmar.**
- **Commonly smuggled wildlife species are-**
    - Tiger and leopard skins, their bones and other body parts, rhino horns, ivory, turtles and tortoises, sea horses, snake venom, mongoose hair, snake skins, tokay gecko, sea cucumber, chiru fleece, musk pods, bear bile, medicinal plants, red sanders timber and caged birds such as parakeets, mynas and munias.

**Legal and Statutory Provisions to Curb IWT in India**

- Trade in over **1,800 species** of **wild animals, plants** and their derivative is prohibited under the country's **Wildlife (Protection) Act, 1972.**
- Since **1976**, India has also been a **member** of the **Convention on International Trade in Endangered Species of Fauna and Flora,** an **international agreement** that **aims** to ensure that global trade in specimens of **wild animals and plants** does not threaten their survival.
- **Wildlife Crime Control Bureau** is a **statutory multi-disciplinary body,** established by the **Government of India** under the **Ministry of Environment and Forests,** to **combat organized wildlife crime** in the country. Under **Section 38 (Z)** of the **Wild Life (Protection) Act, 1972,** it is **mandated-**
    - to **collect and collate intelligence** related to **organized wildlife crime activities** and to **disseminate the same to State and other enforcement agencies** for immediate action so as to apprehend the criminals;
    - to establish a **centralized wildlife crime data bank;**
    - **co-ordinate actions** by various agencies in connection with the enforcement of the provisions of the Act;
    - **assist foreign authorities** and **international organization** concerned to facilitate co-ordination and universal action for **wildlife crime control**;
    - **capacity building of the wildlife crime enforcement agencies** for a scientific and professional investigation into wildlife crimes and assist State Governments to ensure success in prosecutions related to wildlife crimes;

  - and advise the Government of India on issues relating to **wildlife crimes having national and international ramifications,** relevant policies and laws.
  - It also assists and advises the **Customs authorities** in the inspection of the **consignments of flora & fauna** as per the provisions of the **Wild Life Protection Act, CITES** and **EXIM Policy** governing such an item.
- Further, to bring **legal wildlife trade** within **sustainable levels** and **stop all illegal wildlife trade** that has threatened and even pushed many species towards extinction, **TRAFFIC**, a **wildlife trade monitoring network** and a **joint programme of WWF,** (the global conservation organization) and **IUCN,** (the International Union for Conservation of Nature) works closely with the **National** and the **State Governments** and various agencies to help **study, monitor and influence action** to **curb illegal wildlife trade** and bring wildlife trade within sustainable levels.

**Wildlife Crime Control Bureau (WCCB) led operations**

- It had launched the **operation "Save Kurma"** to focus on the poaching, transportation and illegal trade of live **turtles and tortoises.**
- **"Operation Turtshield- I** "and **Operation Turtshield-II"** was taken up to tackle the illegal trade of **live turtles.**
- **WCCB** conducted **Operation "Lesknow", "Lesknow-II"** and **Operation "Lesknow-III"** to gain the attention of enforcement agencies towards the **illegal wildlife trade in lesser-known species of wildlife.**
- WCCB's **"Operation Clean Art"** to drag the attention of enforcement agencies towards the illegal wildlife trade in **Mongoose hair brushes.**
- **"Operation Softgold"** to tackle **Shahtoosh Shawl** (made from Chiru wool) illegal trade and to spread awareness among the weavers and traders engaged in this trade.
- **Operation Birbil** to curb illegal trade in **wild cat and wild bird species.**
- **"Operation Wildnet", "Operation Wildnet-II", "Operation Wildnet-III"**and **"Operation Wildnet-IV"** to draw the attention of the enforcement agencies within the country to focus their attention on the **ever-increasing illegal wildlife trade over internet using social media platforms.**
- **"Operation Freefly"** on the illegal trade of **live birds** and **"Operation Wetmark"** to ensure the **prohibition of the sale of meat of wild animals in wet markets across the country.**

**Campaign- Not All Animals Migrate by Choice**

- In collaboration with the **Airports Authority of India** and **GMR Group,** the campaign will travel across **22 airports** across **India** over the next year.
- Both **WCCB** and **UN Environment** initiated a comprehensive approach with a focus on awareness building of various stakeholders towards the **issue of prevention of illegal trade and smuggling of wildlife and wildlife products** through exit points.
- In the first phase of the campaign, **tiger, pangolin, star tortoise and tokay gecko** have been taken as **flagship species** as they are highly endangered.
- The awareness campaign is expected to complement the efforts of Government Agencies.

35. **COP27: India's national statement lacked teeth; was centred around mission LiFE**

**Context:**

India's national statement made November 15, 2022 during the plenary session of the **27th Conference of Parties (COP27)** to the United Nations Framework Convention on Climate Change, was dominated by **LiFE — 'lifestyle for environment'** — that was announced by Prime Minister Narendra Modi during COP26 at Glasgow.

**Mission LiFE**

- It is a **global initiative by India** to help the world in its fight against climate change and lead to a **sustainable way of life** to achieve the **sustainable development goals** set by the **U.N.**
- **Introduced by India** during the **26th United Nations Climate Change Conference of the Parties (COP26)** in **Glasgow** in **2021.**
- **Launched** at **Statue of Unity, Gujrat**
- Piloted by **NiTi Aayog** and **implemented** by- **Ministry of Environment, Forest and Climate change.**
- The **idea promotes an environmentally conscious lifestyle** that focuses on **'mindful and deliberate utilization'** instead of **'mindless and wasteful consumption** i.e. **Net-zero living or sustainable lifestyle.**
- On **5 June 2022**, on World Environment Day, India furthered the **vision of LiFE** by launching the **LiFE Global Movement,** inviting academicians, researchers, and start-ups across the world to think about specific and scientific ways in which the full potential of collective action can be harnessed to address the environmental crisis.
- The **Mission** encourages the **P3 model,** i.e., **Pro Planet People.**
- **Advocates for the circular economy**.
- **Mission LiFE** makes everyone trustees of the environment.
- **Mission LiFE** aims at following a **three-pronged strategy**-
  - **First** is by **nudging individuals** to practice simple yet effective environment-friendly actions in their daily lives (demand);
  - **Second** is by **enabling industries and markets to respond swiftly** to the changing demand (supply) and;
  - **Third** is to **influence government and industrial policy** to support both sustainable consumption and production (policy).
- **Mobilize at least one billion Indians** and **other global citizens** to take individual and collective action for protecting and preserving the environment in the period **2022** to **2027.**

**India's commitment to Mission LiFE**

- The **annual per capita carbon footprint in the country is only about 1.5 tons**, compared to the **world average of 4 tons per year** while India has the **fourth largest capacity for renewable energy in the world.**
- India is **ranked fourth** in **wind energy** and **fifth** in **solar energy.**
- India's **renewable energy capacity** has increased by about **290 %** in the last **7-8 years.**
- The country has also **achieved** the **target of 40% of the electric capacity** from **non-fossil-fuel sources nine years ahead of the deadline.**
- **National Hydrogen Mission to** move towards an **environment-friendly energy source**. This will help India achieve its goal of a **net zero carbon footprint.**
- Establishment of the **International Solar Alliance**
- Leading the creation of the **Coalition for Disaster Resilient Infrastructure**

**India had launched several initiatives to support the fight against climate change:**

- National Afforestation Programme (NAP)
- National Mission for a Green India (GIM)
- National Action Plan on Climate Change (NAPCC)
- National Biodiversity Action Plan

36. **Water action plan at COP27 gives hope to drought-ravaged Africa**

**Context:**

- World leaders at the **27th Conference of Parties (COP27)** to the United Nations Framework Convention on Climate Change launched a **water adaptation and resilience action plan** on November 14, 2022. The initiative will have an **Africa-first focus,** giving hope to **drought-ravaged populations,** especially in the **Horn of Africa.**

**About the Action on Water Adaptation or Resilience (AWARe)-**

- The **multisectoral initiative** was a **result of collaboration** between various stakeholders, including the **African Union (AU), Water and Climate Coalition Leaders, the World Meteorological Organization (WMO) and the African Ministers' Council on Water (AMCOW),** among others.
- Aims to **foster political efforts in establishing pan-African water hubs.**
- **It** will address **water security** as part of **climate change adaptation** and will focus on **three priorities:**
- Decrease water losses worldwide and improve water supply;
- propose and support implementing policies for cooperative water-related adaptation action
- cooperation and interlinkages between water and climate action.
- One of the **critical goals** of the initiative is to **ensure there is 50 per cent less damage from floods and droughts by 2030**.
- The **action plan has six comprehensive data-driven solutions** it recommends regional blocks or heads of governments to put in place to **enable a quick transition from awareness to action.**
    1. A **set of global water information services** like **accurate hydrological data** to help understand the scarcity and availability of water per region.
    2. **Water and climate stock take** that **integrates water and climate-related databases** to inform decision-making.
    3. A **cryosphere information mechanism** that details **data on frozen water parts of the earth**
    4. A **new financing rationale** focusing on areas of priority
    5. Need **for local engagements** on **how to implement climate-resilient investments** on the ground at different government levels
    6. **Need for regional cooperation** are necessary for shared early warning systems to reduce the impact of loss.
- The plan calls for concerted efforts to stop pollution, manage wastewater and restore or preserve water towers and catchment areas, including glaciers and snow that are melting away, impacting sources of streams and rivers.

**Increasing severity of hazards-**

- Over the **past 20 years,** water-related hazards have consistently increased in frequency and intensity, with at least **1.6 billion people affected by floods** and **1.4 billion by droughts,** according to a **World Bank report of 2021.**
- Weather, climate or water-related disaster has occurred on average every single day within the past **50 years (1970-2019),** taking the lives of **115 people daily** and **causing US$ 202 million in daily losses** as per the study carried out by **WMO** in 2021.
- **Early warning systems** do not cover a third of the world's population, doubling the risk of the number of individuals exposed to floods and droughts due to climate change.

**Horn of Africa-**

- The **Horn of Africa (HoA),** also known as the **Somali Peninsula,** is a large peninsula and **geopolitical region** in **East Africa.**
- Located on the **easternmost part of the African mainland,** it is the **fourth-largest peninsula in the world.**
- It is composed of **Ethiopia, Eritrea, Somalia** and **Djibouti;** broader definitions also include parts or all of **Kenya, Sudan, South Sudan, and Uganda.**
- The term **Greater Horn Region (GHR)** can **additionally include Burundi, Rwanda, and Tanzania.**

- It lies along the **southern boundary** of the **Red Sea** and **extends hundreds of kilometres into the Guardafui Channel, Gulf of Aden,** and **Indian Ocean** and shares a **maritime border** with the **Arabian Peninsula** of **Western Asia**.

37. **COP27: Climate vulnerable countries, G7 launch plan for quick loss and damage funding**

**Context:**

- The **Vulnerable Twenty (V20) group of finance ministers** — representing **58 countries** vulnerable to climate change — and the **G7** (group of seven industrialised countries) launched the **Global Shield Against Climate Risks** initiative November 14, 2022. The initiative was launched at the **27th Conference of Parties (COP27)** to the **United Nations Framework Convention on Climate Change in Sharm El-Sheikh, Egypt.**

**About Global Shield Against Climate Risks-**

- It is envisioned as a **social protection** and **insurance-based finance mechanism** for **loss and damage** outside the **UNFCCC process.**
- The finance facility, based on a **polluter pays principle**, is being intensely argued by the **Least Developed Countries** and the **Association of Small Island States** negotiating blocs at the negotiations in **COP27.**
- The initiative will provide **pre-arranged financial support** designed to be **quickly deployed during climate disasters** such as the devastating Pakistan floods in August.
- **Pakistan, Bangladesh, Costa Rica, Fiji, Senegal, Philippines** and **Ghana** will be among the **first countries** to receive assistance from the **Global Shield initiative.**
- Initial contributions to the initiative include **170 million euros** from **Germany**, **35 million danish kroner** from **Denmark, 10 million euros** from **Ireland** and **seven million dollars** from **Canada.**
- The **US** is also part of the **Global Shield initiative** and is funding the **African Risk Capacity**, an insurance and disaster risk solutions company.
- The **initiative** is also supported by other countries such as the **United Kingdom** and **UN organisations** such as the **UN Development Programme** and the **UN Office of Disaster Risk Reduction.**
- The **Global Shield** is touted to **expand financial protection instruments** for governments, communities, businesses and households.
- In terms of **implementation**, it will **align with the vulnerable country's financial and economic strategies,** helping close the financing gaps.
- This would include livelihood protection, social protection systems, livestock and crop insurance, property insurance, business interruption insurance, risk-sharing networks and credit guarantees.
- It will **support** the **integrated development of instruments** at the level of governments, humanitarian agencies and non-profits, to ensure that money is available when needed.
- The **Global Shield,** and its **predecessor,** the **Insu Resilience Global Partnership,** have thrived whilst delay tactics from rich countries have ensured no progress within the **UNFCCC.**
- Another **crucial issue** is that the **financing mechanism** may put an **additional burden** on already vulnerable populations under debt burden.

**What is the Polluter Pays Principle?**

- The **'polluter pays' principle** 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.
- For instance, a factory that produces a potentially poisonous substance as a by-product of its activities is usually held responsible for its safe disposal.
- The **polluter pays principle** is part of a set of broader principles to guide **sustainable development worldwide** (formally known as the **1992 Rio Declaration**).
- The principle underpins most of the regulation of pollution affecting land, water and air.

38. **COP27: Kolkata presents climate action roadmap, announces city-level summit**

**Context-**

- **Kolkata** presented a report on its **climate vulnerability** as well as **actions taken for mitigation and adaptation** during a meeting at the **27th Conference of Parties (COP27) to the United Nations Framework Convention on Climate Change** being held at **Sharm El-Sheikh in Egypt.**

**About the City- level climate summit-**

- The **civic body** announced its decision to hold a **city-level climate summit soon.**
- **Kolkata** was the **only city from the country** part of the meeting **focused on urban climate resilience** organised by the **Climate Action Network South Asia.**
- The meeting was attended by representatives from several South Asian cities.
- **Kolkata** has been identified as one of the **most vulnerable global cities to climate change** in recent **UN reports.**
- The **Kolkata Municipal Corporation** received the invitation after recently announcing its support to the **global pledge to cut fossil fuel** – the **first city corporation in India** to take the step.

**Vulnerability of Kolkata-**

- Recent global reports have highlighted the **vulnerability of Kolkata** particularly due to its proximity to **Sundarbans;** one of the world's major **biodiversity hotspots.**
- Major risk involves- **high heat, severe cyclones, intense rainfall** within short duration.

- About **15,000 trees** were toppled in the city during **Cyclone Amphan** in **2020** alone.
- The civic body and state have already taken some steps like **providing solar connectivity** in **eight major city parks** and turning them **carbon neutral;** introducing **electrical vehicles;** undertaking the **plantation of trees.**

**IPCC report highlights concerns-**

- **AR 6 IPCC report** underlined both the **city's existing** as well as **predicted risks-**
  - **Beyond 2040,** climate change would lead to numerous risks and the occurrence of multiple climate hazards, often in tandem.
  - **Substantial green cover** was lost because of **Cyclone Amphan**
  - **Limitations of resilience plans** to address the vulnerability
  - It is the most vulnerable to disaster-related mortality among **eight megacities** – **only one from India**
  - It is **third** among the **20 largest coastal flood-prone global cities,** with the **highest estimated flood losses by 2050**. The city also has a **risk of subsidence** because of **sea-level rise** and flooding. In future, rainfall may increase by **55 per cent.**
  - **Category 3-5 cyclones** (extremely severe or super cyclones) likely to increase in Sundarbans, also affecting Kolkata
  - **Bay of Bengal water** expected to **rise 0.6 metres** by century-end; impacting Kolkata which already has an old and stressed drainage system
  - Warming in the city increased by **2.6°C** in the last six decades, highest in the world followed by **Tehran** and **Moscow**
  - Average temperature may rise about **4.5 degrees** by century-end, while the maximum temperature may touch about **50 degrees Celsius** if the present trend of global emission continues.

**39. Double standards on fossil fuel, backtracking on pledges: BASIC fires shots at wealthy countries at COP27**

**At COP27- UNFCCC-**

- The bloc of four large newly industrialised countries, **Brazil, South Africa, India** and **China,** also known as **BASIC**, have put pressure on developed countries, alleging they have not shown leadership, backtracked on financial commitments and showed double standards on fossil-fuel use.

**BASIC countries-**

- The **BASIC group** was formed as the result of an agreement signed by the **four countries** on **November 28, 2009.**
- They are a bloc of **four large newly industrialized countries – Brazil, South Africa, India and China.**

**Recent meeting of BASIC-**

- A **meeting of BASIC** was chaired by **Barbara Creecy, South Africa's** minister for forestry, fisheries and the environment.
- The representatives also collectively expressed concern that **climate adaptation has still not received the appropriate amount of attention** and called for a **fundamental transformation of the global financial architecture.**

**Concerns of developing countries raised by BASIC countries-**

- **BASIC countries** have already implemented the ambitious **nationally determined contributions goals** announced at **COP26** despite enormous developmental challenges and pressures of poverty eradication during a global economic downturn and economic recovery.
- The **bloc alleging** that-
  - developed countries are **not doing enough on fossil fuel use** — redirecting a complaint often shot by wealthy nations, particularly against **China** and **India.**
  - Significant increase in consumption and production of fossil fuels in the past year by developed countries, even as they continue to press developing countries to move away from the same resources.
- **Concerns on Climate finance**
  - **Climate finance** provided by developed countries continues to fall short of the **$100 billion per year commitment**.
  - **Developing countries** and especially the **BASIC countries** have to channel many times this amount of money from their **domestic resources** or **commercial loans.**
- **Adaptation ignored; multilateral climate funds struggling**
  - Adaptation is still not being accorded the **"balanced and substantive attention they deserve in the UNFCCC process,"** despite the opportunities and linkages with **loss and damage.**
  - They also called for to operationalise **Global Goal on Adaptation (GGA),** flagged off in **Paris,** and underscored the necessity for a **special report on GGA** to be produced by the **UN agency Intergovernmental Panel on Climate Change** to help deepen global understanding of the agenda.
  - Adaptation financing needs to be **impact based** and the **new collective quantified goal (NCQG)** by developed countries must, therefore, go beyond the floor of **$100 billion per year,** be significantly public funded with greater transparency.

**Pakistan gets BASIC support-**

- **India** and **China** vowed to **work alongside Pakistan,** which is the **present chair** of **Group of 77** and **China** to **"advance the common interests of developing countries".**

**Global Goal on Adaptation (GGA)-**

- Recognizing that adaptation is a **globally relevant issue,** the **Global Goal on Adaptation (GGA)** was established under the **Paris Agreement** to **enhance work on adaptation** with the **aim** of building adaptive capacity, strengthening resilience, and reducing vulnerability to climate change.

**About New Collective Quantified Goal (NCQG)-**

- The **New Collective Quantified Goal (NCQG)** on **climate finance** is expected to be **finalised by 2024.**
- It will **replace** the **current climate finance goal of $100 billion annually** from developed countries.

**40. Road to net-zero status**

**India's strategy for achieving Net-Zero status-**

- A year after announcing its intention to achieve a **net-zero emission status by 2070, India** on Monday told the world how it was going to reach there.
- In a **121-page document**, India listed some of the measures — **decarbonising of electricity** and **transport sectors, redesigning of urban spaces, increase in energy and material efficiency, revitalisation of forests, and a push for climate-oriented research and development** — it planned to take in the coming decades to achieve the **net-zero status.**
- The context Under the **2015 Paris Agreement**, countries have to prepare and submit two kinds of climate action plans— one for the **short term,** and another for the **long- term.**

**Short-term climate- action plans (NDCs)-**

- Also called **Nationally Determined Contributions (NDCs)**
- Have to be submitted **every five years,** with specific actions being taken over 5- or 10-year periods.
- The **NDCs** are meant to be acheived till **2030.**
- For **developed countries**, **NDCs** must include **specific emission reduction targets for the year 2030.**
- Every subsequent **NDC**— the next one is due in **2025** — must be a **progression from the existing NDC.**
- In its **NDC,** India has promised **three main targets for 2030-**
    1. a **45 per cent reduction** in emission intensity (emission per unit of GDP) from 2005 levels,
    2. a **50 percent share of renewables in electricity generation**,
    3. creation of **2.5 to 3 billion tonnes of additional carbon sink** through forests.

**Long Term Low Emissions Development Strategies (LT-LEDS)-**

- There is **no particular time frame** for which these **long-term strategies** have to be prepared.
- At COP26 held in Glasgow, countries announced target years for achieving **net-zero status.**
- Most of the **developed countries** set the target year for **Net-Zero status 2050. China** has set **2060** as its target year, while **India** set it as **2070.**
- **India's strategy To reach the net-zero destination-**
    - India is planning large-scale interventions in **five sectors**— **energy and electricity, transport, urban design, industries, and forestry.**
- The **long-term strategy document** lists **key focus areas** and **specific interventions** that India is already taking or has planned to initiate, in each of these priority sectors.
    - In the **energy sector,** for example, **decarbonisation** would come mainly through expanding the share of **renewable energy, rationalising the utilisation of fossil fuels, and focusing on demand-side management.**
    - **Low carbon development in the transport sector** would be driven mainly by **the electrification of both public and private vehicles, phased transition to cleaner fuels, and introduction of intelligent traffic systems.**
- There are **no mid-term goals** or **indicative pathways.**
- Most of the **60-odd countries** that have submitted their **long-term strategies have not offered mid-term targets or pathways,** but some, including the **UK** and the **US**, have provided a few sectoral projections with expected milestones they hope to reach.

**Agriculture missing-**

- One of the sectors India has not mentioned in its **long-term strategy is agriculture,** which is mainly responsible for **methane emissions.**
- **Methane** is the **second most common greenhouse gas** in the atmosphere after carbon dioxide.
- That is because methane is far more dangerous than carbon dioxide in its potential to cause global warming.
- That also means that from molecule to molecule, the **reduction of methane offers far greater benefits than carbon dioxide.**
- Unlike **carbon dioxide, methane** is largely a **sectoral gas,** so its **reduction does not have economy-wide repercussions** the way carbon dioxide has.

**Carbon removal technologies-**

- The **net-zero status** can be achieved only when the emissions are offset either by the absorption of **greenhouse gases by forests** or the **physical removal of these gases** through **futuristic technologies.**
- Emissions can be reduced significantly but not brought down to zero.
- The balance would have to be **offset** through various kinds of **carbon capture, and storage technologies (CCS)**.
- **India** will be heavily reliant on **CCS** and **negative emissions technologies** to achieve this goal, and in particular, to offset emissions from challenging and hard-to-abate sectors.

- **R&D** Accordingly, India has **identified several climates- specific technologies** in **CCS, biofuels, smart grids, solar photovoltaics, energy storage,** and others.

41. **What is carbon border tax, which India opposed at COP27**

**Context-**

- A group of countries including India has opposed the **carbon border taxes policy** at the **COP27** in Sharm El Sheikh, saying it could "result in market distortion".

**Carbon Border Adjustment mechanism (CBAM)-**

- The **Carbon Border Adjustment Mechanism** is a plan from the **European Union (EU)** to **tax carbon-intensive products,** such as **iron and steel, cement, fertiliser, aluminium and electricity generation, from 2026.**
- The **CBAM** will **equalise the price of carbon** between domestic products and imports and ensure that the EU's climate objectives are not undermined by production relocating to countries with less ambitious policies.

**What are carbon border taxes?**

- The **carbon border tax** involves imposing an import duty on a product manufactured in a country with more lax climate rules than the one buying it.

**'Carbon leakage': Why need for tax was felt**

- Some **developed nations,** in efforts to **cut emissions,** impose high costs on carbon-intensive businesses in their own countries.
- Businesses can potentially sidestep this simply by moving production to a country with less stringent rules, a practice called **carbon leakage.**
- Companies based in the **EU** could move **carbon-intensive production abroad** to take advantage of lax standards, or EU products could be replaced by more **carbon-intensive imports.**

42. **Equity, unabated coal phasedown in first draft of COP27 'Cover Decision'; other elements missing**

**Context-**

- The Presidency of the **27th Conference of Parties (COP27)** to the **United Nations Framework Convention on Climate Change (UNFCCC)** produced a **'non-paper'** on the morning of November 17, 2022. It did so by compiling inputs from various countries, with the intent of producing a cover decision.

**About the document-**

- The document has extensive sections on the **energy crisis, Intergovernmental Panel on Climate Change report findings and multilateral development banks (MDBs).**
- The document reiterates the **equity principles of the UNFCCC** and the **2015 Paris Agreement** despite resistance from many countries such as the **United States, Switzerland** and **Australia.**
- It calls for the establishment of a **new work programme on just transition.**
- On the **UN's REDD+ programme,** it supports offering more **finance for REDD+ results** assessed and verified under **Article 5.2 of the Paris Agreement**, to help countries meet their nationally determined contributions (NDC) and net zero goals.
- **Article 5.2 of the Paris Climate Agreement-**
    - Parties are encouraged to take action to implement and support, including through results-based payments, the existing framework as set out in related guidance and decisions already agreed under the Convention for: policy approaches and positive incentives for **activities relating to reducing emissions from deforestation and forest degradation,** and the role of conservation, **sustainable management of forests and enhancement of forest carbon stocks in developing countries;** and alternative policy approaches, such as **joint mitigation** and adaptation approaches for the integral and sustainable management of forests, while reaffirming the importance of incentivizing, as appropriate, **non-carbon benefits** associated with such approaches.
- On finance, it "expresses grave concern" that the **$100 billion climate finance goal** has not been met by developed countries.

**43. The Climate Group**

- It is a non-profit organisation that works with business and government leaders around the world to solve the issue of climate change. The group has programmes aims at renewable energy and lowering greenhouse gas emissions. Launched in **2004,** the organisation operates internationally with offices in the **UK (headquarters), the United States, and India.**
- **It acts as the secretariat for the Under2 Coalition**
- The organisation's business endeavours **"RE100", "EP100" and "EV100",** which are run as part of the **We Mean Business coalition,** seek to grow corporate demand for **renewable energy, energy productivity, and electric transport, revving the transition to a zero-emissions economy** while supporting leading businesses to lower carbon emissions, be more resilient and increase returns.

**44. Under 2 coalition**

- The **Under2 Coalition** is a coalition of **subnational governments** that **aims** to achieve **greenhouse gases emissions mitigation.**
- The memorandum was developed just before the **2015 United Nations Climate Change Conference** also known as **COP 21** or **Paris Agreement.**

- It was signed by **twelve founding jurisdictions** on **May 19, 2015** in **Sacramento, California.**
- Originally called the **Under2 MOU**, it became known as the **Under2 Coalition** in **2017.**
- As of **October 2022,** the list of signatories had grown to **270 governments** which represented **over 1.75 billion people** and **50% of the world economy.**
- The **Under2 MOU** was conceived through a partnership between the **governments of California and Baden-Wurttemberg.**
- **The Climate Group** acting as **secretariat.**
- **Purpose-**
    - The **intent** of the memorandum signatories is for each to achieve **Greenhouse gas emission reductions** consistent with a trajectory of **80** to **95 percent below 1990 levels** by **2050** and/or achieving a **per capita annual emission goal** of less than **2 metric tons by 2050.**
- The **Under2 MOU** allows subnational governments such as **cities, counties** and **states** to highlight their work to reduce greenhouse gas emissions.

**45. RE100**

- **RE100** is the **global corporate renewable energy initiative** bringing together hundreds of large and ambitious businesses committed to **100% renewable electricity.**
- **Launched** at **Climate Week NYC 2014** and now with **73 members, RE100** believes that switching the **private sector's energy demand,** which accounts for about **half of the world's electricity consumption**, to renewables will accelerate the transformation of the global energy market and aid the transition to a low carbon economy.
- Recently, **Apple INc**. has joined the **RE100.**
- **Infosys** became the **first Indian Company** to Join **RE100 Renewable Energy Campaign.**
- Infosys joined some of the world's most influential companies such as **IKEA, Swiss Re, BT, Formula E, H&M, KPN, Mars, Nestlé, Philips,** among others, which are taking bold steps to create transformative change needed to drive a clean energy revolution.

**46. EP100**

- **EP100** is a **global initiative** started in **2016,** led by the international non-profit **Climate Group**, bringing together over **120 energy smart businesses** committed to measuring and reporting on **energy efficiency improvements.**
- Energy efficiency is essential as it can deliver over **40% of the reduction in energy** related emissions needed to achieve global climate goals.
- **Purpose:**
    - The **Climate Group's global EP100 initiative** in partnership with the **Alliance to Save Energy** brings together a growing group of energy-smart companies committed to using energy more productively, to lower greenhouse gas emissions and accelerate a clean economy.

**EV100 campaign:**

- The **EV100 campaign** is an initiative of **Climate Group**, an international non-profit organization.
- The campaign aims to make **electric transport the new normal by 2030**.
- For that, it will encourage companies to switch from vehicles running on fossil fuels to EVs and install charging infrastructure.

**Maharashtra** is the first state in the country to join this campaign.

47. **Royal Bengal Tiger count rises to 75 in Andhra Pradesh**

**In the news-**

**Rise in the population of Royal Bengal Tiger-**

- As per the **All India Tiger Estimation taken up in 2022,** the population of Royal Bengal Tigers has **increased by 60% (73 in number)** in **Nagarjuna Sagar Srisailam Tiger Reserve (NSTR)** and two tigers have been spotted in **Papikonda National Park.**
- The overall tiger population in India is estimated at around **3,000**.
- Officials, during the census, observed a rise in the population of **Black Buck, Leopard, Porcupine, Indian Gaur, Sloth Bear, Spotted Deer** and other animals too.

**Royal Bengal Tiger-**

- The **Bengal tiger** is a population of the **Panthera tigris** Tigris subspecies.
- It ranks among the **biggest wild cats alive today.**
- It is considered to belong to the world's charismatic megafauna.
- The tiger is estimated to have been present in the **Indian subcontinent** since the **Late Pleistocene,** for about 12,000 to 16,500 years.
- Today, it is threatened by **poaching, loss** and **fragmentation of habitat**.
- None of the Tiger Conservation Landscapes within its range is considered large enough to support an effective population of more than 250 adult individuals.
- The **Bengal tiger's historical range** covered the **Indus River valley** until the **early 19th century,** almost **all of India, Pakistan, southern Nepal, Bangladesh, Bhutan** and **southwestern China.**

- Today, it inhabits **India, Bangladesh, Nepal, Bhutan** and **southwestern China.**

**Characteristics-**

- The **Bengal tiger's** coat is yellow to light orange, with stripes ranging from dark brown to black; the belly and the interior parts of the limbs are white, and the tail is orange with black rings.
- The white tiger is a **recessive mutant,** which is reported in the wild from time to time in **Assam, Bengal, Bihar,** and especially in the **former State of Rewa.**

**Where are they found in India?**

- Good tiger habitats in **subtropical** and **temperate forests** include the Tiger Conservation Units (TCUs) **Manas-Namdapha.**
- **Tropical dry forests** include **Hazaribag Wildlife Sanctuary, Nagarjunsagar-Srisailam Tiger Reserve, Kanha-Indravati corridor, Orissa dry forests, Panna National Park, Melghat Tiger Reserve and Ratapani Tiger Reserve.**
- **Tropical moist deciduous forests** are probably some of the **most productive habitats** for tigers and their prey and include **Kaziranga-Meghalaya, Kanha-Pench, Simlipal and Indravati Tiger Reserves.**
- **Tropical moist evergreen forests** represent the **less common tiger habitats,** being largely limited to the upland areas and wetter parts of the **Western Ghats,** and include the tiger reserves of **Periyar, Kalakad-Mundathurai, Bandipur** and **Parambikulam Wildlife Sanctuary.**

**Conversation effort-**

- **IUCN status**- Endangered

**Estimation of Tiger Populations**

- 'Tiger census' is conducted **every four years** to know the current tiger populations and population trends.
- The **most commonly used technique** in the past was the **'Pugmark Census Technique'.**
- Recent methods used to estimate the numbers of tigers are **camera trapping and DNA fingerprinting.**
- **M-STrIPES** (Monitoring System for Tigers – Intensive Protection and Ecological Status) is an **app-based monitoring system,** launched across Indian tiger reserves by the **NTCA in 2010.**
- **LIDAR-based survey technology** will be used for the first time to provide water and fodder to animals in the forest itself to deal with the challenge of human-animal conflict which is causing the deaths of animals.

**National Tiger Conservation Authority**

- National Tiger Conservation Authority (NTCA) is a **statutory body** under the **Ministry of Environment, Forests and Climate Change.**
- It was established in **2005** following the recommendations of the **Tiger Task Force.**
- It was constituted under enabling provisions of the **Wildlife (Protection) Act, 1972,** as amended in **2006,** for strengthening tiger conservation, as per powers and functions assigned to it.

**Wildlife Institute of India (WII)**

- Wildlife Institute of India (WII) offers training programs, academic courses, and advisory in wildlife research and management.
- Established in **1982.**
- Established at **Dehradun** (winter capital and the most populous city in Uttarakhand).
- It is an autonomous Institution of the **Ministry of Environment & Forests.**

**Conservation Assured | Tiger Standards (CA|TS)**

- CA|TS is a set of criteria which allows tiger sites to check if their management will lead to successful tiger conservation.
- CA|TS is organised under **seven pillars** and **17 elements of critical management** activity.
- CA|TS was **developed** by **tiger and protected area experts.**
- Officially **launched in 2013,** CA|TS is an important part of **Tx2,** the **global goal to double wild tiger numbers by the year 2022.**
- "The long-term goal of CA|TS is to ensure safe havens for tigers."
- Out of the total India's Tiger reserves **14 have received the Conservation Assured Tiger** Standards accreditation. The 14 tiger reserves which have been accredited are:
    - Manas, Kaziranga and Orang in Assam,
    - Satpura, Kanha and Panna in Madhya Pradesh,
    - Pench in Maharashtra,
    - Valmiki Tiger Reserve in Bihar,
    - Dudhwa in Uttar Pradesh,
    - Sunderbans in West Bengal,
    - Parambikulam in Kerala,
    - Bandipur Tiger Reserve of Karnataka and
    - Mudumalai and Anamalai Tiger Reserve in Tamil Nadu

48. **Climate change drives dengue in France**

**Impact of climate change on Dengue-**

- Dengue-endemic countries will see increased dengue cases through faster viral amplification, and increased vector survival, reproduction and biting rates.

- Longer period of spread
- Increased temperature will allow vector and virus to spread to countries that are currently free of Dengue

**Case of France and other countries-**

- **France** has recorded highest number of Dengue cases this year since 2006.
- And for the **first time in Europe**, one event causing **34 cases on a single day** was recorded in France on October 21, 2022.
- **Aedes albopictus is** the vector responsible for virus spread in **France.**
- **Aedes Aegyptus's** (Vector of dengue in tropical countries) eggs are unable to survive the cold winter in Europe.
- **Aedes-borne virus transmission** locally is expected in **southern France** due to **colonisation of A. Albopictus.**
- The **serotype 3 (DENV-3)** has been identified for the **first time** this year in **France.**

**Why Dengue spread in temperate countries-**

- **Environmental conditions** have a major impact on the efficiency of the vector system as well as on vector density and host-vector contacts.
- **Southern France** and **Mediterranean** have been at risk of **dengue** since the early **2000s** when the **Asian tiger mosquito (Aedes albopictus)** arrived, then spread through Europe.
- The dengue season in Europe is only increasing each year with **climate change.**
- Vietnam and the Philippines reported over **3,00,000 cases.**

**Dengue-**

- Dengue is a **mosquito-borne tropical disease** caused by the **dengue virus** (Genus Flavivirus), transmitted by several species of mosquito within the **genus Aedes,** principally **Aedes aegypti.**
- This mosquito also transmits **chikungunya, yellow fever** and **Zika infection.**
- There are **4 distinct,** but closely related, **serotypes** (separate groups within a species of microorganisms that all share a similar characteristic) of the virus that cause dengue (DEN-1, DEN-2, DEN-3 and DEN-4).

**Controlling dengue using bacteria-**

- Recently researchers from the **World Mosquito Program** have used mosquitoes infected with **Wolbachia bacteria** to successfully control dengue in **Indonesia.**

**Dengue vaccine-**

- The dengue vaccine **CYD-TDV** or **Dengvaxia** was approved by the **US Food & Drug Administration in 2019**, the first dengue vaccine to get the regulatory nod in the US.
- Dengvaxia is basically a **live, attenuated dengue virus** which has to be administered in people of ages 9 to 16 who have laboratory-confirmed previous dengue infection and who live in endemic areas.

49. **Landmark deal at climate talk on fund for damage**

**Context-**

- As the **UN climate summit in Egypt** on Sunday created history by **deciding to establish a fund to address loss and damage,** experts in India welcomed it as a testament to the tenacity of **climate-vulnerable countries** and a warning shot to polluters that they can no longer go scot-free with their climate destruction.

**Establishment of Transitional committee-**

- Governments also agreed to establish a **'transitional committee'** to make recommendations on how to operationalize both the **new funding arrangements** and the **fund at COP28** next year.
- The **first meeting** of the **transitional committee** is expected to take place before the end of March **2023.**
- **Santiago Network for Loss and Damage-** Vision is to catalyze **technical assistance** to developing countries that are particularly vulnerable to the adverse effects of climate change.
    - **CoP 25, Chile** (held in Madriad in 2019)- Parties established the **Santiago network** as part of the **Warsaw International Mechanism (WIM).**
    - **CoP 26, Glasgow, U.K.-** Parties decided on the **functions of the Santiago Network** and issued a call for submissions.
    - **CoP 27, Sherm- Al- Sheikh (Egypt)-** Parties agreed on the institutional arrangements to operationalize the Santiago Network.

**Concerns that are still unresolved are-**

- Definition of loss and damage
- Criteria for vulnerable countries (which country should get the fund)
- Mechanism of funding
- Developed countries versus major economies

**What is loss and damage?**

- The **Intergovernmental Panel for Climate Change (IPCC)** has two definitions for **'loss and damage'.**
    1. The term **'losses and damages'** refer to the economic and non-economic impacts of climate change, including extreme and slow onset events, in developing countries that are particularly vulnerable to the adverse effects of climate change. It's destructive, irreversible, and cannot be addressed by mitigation and adaptation measures.

2. **Loss and Damage (upper case), or L&D,** is a "political debate under the **United Nations Framework Convention on Climate Change (UNFCCC)** following the establishment of the **Warsaw Mechanism** on L&D in 2013" to discuss losses and damages.

- Loss and damage occur when the frequency and intensity of existing climate impacts increase to such an extent that countries and communities are not equipped to handle it.
- Their capacity to prepare, cope, recover, recoup or rebuild is no longer there.

**Where does the term 'L&D' come from?**

- L&D was brought up as a demand in **1991** by the island country of **Vanuatu,** which was representing the **Alliance of Small Island States (AOSIS).**
- Thirty-one years and 26 COPs later, this demand has not been realised.
- Since then, about 189 million people have suffered the effects of **extreme weather-related events** in developing countries, every year, according to The **Cost of Delay,** a report published in October 2022 by the climate advocacy group **L&D Collaboration (L&DC).**
- At the **COP26 in Glasgow,** the **G77,** a coalition of **134 developing countries**, and **China, proposed the Loss and Damage Finance Facility (LDFF),** a dedicated stream of finance to specifically address losses and damages.
- It is finally approved in **CoP 27**, at **Sherm-Al- Sheikh, Egypt.**

**50. Great Knot**

**Context:** A great knot from Russia, has found its way to Kerala's coast, flying over 9,000 km for a winter sojourn. Recently many juvenile great knots have been tagged with MOSKVA rings in the Kamchatka peninsula in eastern Russia.

**Concept:**

**About Great Knot:**

- The Great Knot is an **international migratory wading bird** that travels vast distances between the northern hemisphere breeding grounds and southern hemisphere summer feeding grounds.
- The Great Knot is a **medium-sized shorebird** with a straight, slender bill of medium length and a heavily streaked head and neck.
- IUCN Red List of Threatened Species: **Endangered**
- Scientific name: Calidris tenuirostris
- Species author: (Horsfield, 1821)

**Distribution:**

- Great Knots occur around coastal areas in many parts of Australia during the southern summer.
- They breed in eastern Siberia, and when on migration they occur throughout coastal regions of eastern and South East Asia.

**Habitat:**

- In Australia, Great Knots i**nhabit intertidal mudflats and sandflats** in sheltered coasts, including bays harbours and estuaries.
- They forage on the moist mud, and they often roost on beaches or in nearby low vegetation, such as mangroves or dune vegetation.

**Wading birds**

- Waders are **tiny and long-legged birds commonly found along shorelines** and mudflats.
- Wader birds are members of the order of Ciconiiformes and are distinguished by their long legs.
- Wading birds have developed physical and behavioral adaptations that enable them to **survive in close proximity to or on water**.
- In addition to drinking water, wading birds rely on water for food, shelter, and breeding sites.
- Among the birds in the group are cranes, herons, egrets, storks, spoonbills, and ibises.

51. **In Arittapatti, Tamil Nadu gets its first biodiversity heritage site**

**Context:**

- The **Tamil Nadu** Government, issued a notification declaring **Arittapatti** and **Meenakshipuram** villages in **Madurai district** the **first biodiversity heritage site** in the **State.**

**About the site-**

- The site comprising **139.63 hectares in Arittapatti village** (Melur block) and **53.8 hectares in Meenakshipuram village** (Madurai East taluk) will be known as the **Arittapatti Biodiversity Heritage site**.
- **Arittapatti village**, known for its **ecological and historical significance**, houses around **250 species of birds** including **three** important raptors - birds of prey, namely the **Laggar Falcon, the Shaheen Falcon** and **Bonelli's Eagle.**
- Other wildlife includes the **Indian Pangolin, Slender Loris** and **pythons.**
- The area is surrounded by a **chain of seven hillocks** or **inselbergs** that serve as a **watershed,** charging **72 lakes, 200 natural springs and three check dams**.
- The **Anaikondan tank,** built during the **reign of Pandiyan kings** in the **16th century** is one among them.
- Several **megalithic structures**, **rock-cut temples**, **Tamil Brahmi inscriptions** and **Jain beds** add to the historical significance of the region.

**Biodiversity Heritage Sites (BHS)-**

- Under **Section 37** of **Biological Diversity Act, 2002** the **State Government** in consultation with local bodies may notify the areas of biodiversity importance as Biodiversity Heritage Sites.
- The **Biodiversity Heritage Sites** are the well-defined areas that are unique, ecologically fragile ecosystems - terrestrial, coastal and inland waters and, marine having rich biodiversity comprising of any one or more of the following components:
    - richness of wild as well as domesticated species or intra-specific categories
    - high endemism
    - presence of rare and threatened species
    - keystone species
    - species of evolutionary significance
    - wild ancestors of domestic/cultivated species or their varieties
    - past pre-eminence of biological components represented by fossil beds
    - having significant cultural, ethical or aesthetic values; important for the maintenance of cultural diversity (with or without a long history of human association with them)
- Areas having any of the following characteristics may qualify for inclusion as BHS.

| **Biodiversity Heritage Site (BHS)** | **District/State** |
|---|---|
| • Nallur Tamarind Grove | Bangalore, Karnataka |
| • Hogrekan | Chikmagalur, Karnataka |
| • University of Agricultural Sciences, | Bengaluru,Karnataka |
| • Ambaraguda | Karnataka |
| • Glory of Allapalli | Maharashtra |
| • Tonglu BHS and Dhotrey BHS under the Darjeeling Forest Division | Darjeeling, West Bengal |
| • Mandasaru | Odisha |
| • Dialong Village | Manipur |
| • Ameenpur lake | Telangana |
| • Majuli | Assam |
| • Gharial Rehabilitation Centre | Lucknow, Uttar Pradesh |
| • Chilkigarh Kanak Durga | West Bengal |
| • Purvatali Rai | Goa |
| • Naro Hills | Madhya Pradesh |
| • Asramam | Kerala |
| • Schistura Hiranyakeshi | Sindhudurg, Maharashtra |
| • Arittapatti | Tamil Nadu |

**People's Biodiversity Registers (PBR):**

- The **PBRs** focus on participatory documentation of local biodiversity, traditional knowledge and practices.
- The register shall contain comprehensive information on the availability and knowledge of local biological resources, their medicinal or any other use or any other traditional knowledge associated with them.
- They are seen as **key legal documents** in ascertaining the rights of local people over the biological resources and associated traditional knowledge.

## 52. FRO killed allegedly by Gutti Koya tribals in Bhadradri Kothagudem district

**Context:**

- A **Forest Range Officer (FRO)** named **Challamalla Srinivas Rao, 42,** was brutally killed allegedly by a group of **Gutti Koya Adivasis** with axes and sickles over a **"podu land"** issue in **Errabodu forest area** in **Chandrugonda mandal** of **Telangana's Bhadradri Kothagudem district** on Tuesday.

**Why tribals attacked the FRO-**

- **Srinivas Rao** along with his staff went to **Bendalapadu tribal habitation** to prevent an **alleged attempt by a group of local tribal people to remove saplings in a plantation** raised by the **Forest department** in **Errabodu forest area.**
- The **migrant tribals**, who claimed themselves as **'podu cultivators'**, allegedly chased and killed the FRO.

**What is Podu?**

- **Podu** is a **traditional system of cultivation** used by **tribes** in India, whereby different areas of jungle forest are cleared by burning each year to provide land for crops.
- The word comes from the **Telugu language.**
- **Podu** is a form of **shifting agriculture** using **slash-and-burn methods.**

**Other forms of Shifting cultivation practiced in India-**

| **Type** | **Place of practice** |
|---|---|
| • **Jhum** | **North-eastern India** |
| • **Vevar and Dahiyaar** | **Bundelkhand Region (Madhya Pradesh)** |
| • **Deepa** | **Bastar District (Madhya Pradesh)** |
| • **Zara and Erka** | **Southern States** |

- **Batra** **South-eastern Rajasthan**
- **Podu** **Andhra Pradesh, Telangana**
- **Kumari** **Hilly Region of the Western Ghats of Kerala**
- **Kaman, Vinga and Dhavi** **Odisha**

**About the 'Podu' Land Issue**

- The **Errabodu incident** comes at a time when a **survey of "podu lands" is underway** to find a permanent solution to the **'podu lands' issue** as per the provisions of the **Forest Rights Act (FRA), 2006.**
- **Podu lands** are the lands tilled by tribal people in forests.
- Telangana government has **red-flagged** encroachment of forests by non-tribals, who are indulging in the practice of **shifting agriculture (podu).**
- Several political leaders have raised the **issues of shifting agriculture** and **deforestation** wherein encroachers clear a portion of land to raise crops one season and move to a different location next season, thereby clearing large areas of forests.

**About Gutti Koya tribe tribe-**

- **Koya** are an **Indian tribal community** found in the states of **Andhra Pradesh, Telangana, Chhattisgarh,** and **Odisha.**
- **Koyas** call themselves **Koitur** in their dialect.
- The Koyas speak the **Koya language,** also known as **Koya basha,** which is a **Dravidian language related to Gondi.**
- Koyas are commonly referred to as **Koi, Koyalu, Koyollu, Koya Doralu, Dorala Sattam,** etc.
- **Koya tribes** can be further divided into Koya, Doli Koya, **Gutta Koya or Gotti Koya,** Kammara Koya, Musara Koya, Oddi Koya, Pattidi Koya, Rasha Koya, Lingadhari Koya (ordinary), Kottu Koya, Bhine Koya, Raja Koya, etc

**Displacement threat-**

- They are faceing the new threats of **development and conflicts**.
- In the absence of land and access to a forest, the Koyas depend on **wage labour** in farm lands.
- The scarcity of these jobs lead to **malnutrition of children** and **instances of anemia in women.**
- The **Andhra Pradesh state government** proposed **Polavaram Project** is posing a serious threat of displacement of **170,275 Koyas** of the tribal population and more than **276 villages** in the Khammam district of Bhadrachalam, Palwancha divisions.

**53. Think local climate action, think Meenangadi**

**Context: Carbon neutrality projects across India-**

- In recent years, many panchayats have come forward with the **concept of carbon neutrality,** a prominent example being **Meenangadi gram panchayat** in **Kerala's Wayanad district,** which serves as a model to emulate.

**'Carbon neutral Meenangadi' Project-**

- In **2016**, the **panchayat envisaged** a project called **'Carbon neutral Meenangadi'**.
- The **aim** being to transform **Meenangadi** into a state of **carbon neutrality.**
- **Steps taken were-**
    - Several multi sector schemes were implemented to **reduce emissions, increase carbon sequestration, and preserve the ecology and bio-diversity.**
    - **'Tree banking'** was one of landmark schemes introduced to **aid carbon neutral activities** which encouraged the **planting of more trees by extending interest-free loans.**
        - **1,58,816 trees** were planted which have also been **geo-tagged** to monitor their growth.
    - **Local economic development** was another thrust area where **LED bulb manufacturing and related micro-enterprises** were initiated.

**Initiatives in other Panchayats-**

- **Palli gram panchayat** in **Jammu and Kashmir** has followed the same **people-centric model,** with specific local activities.
    - A **climate-resilient plan** is being prepared.
    - **Bio-gas plants** and **solar panels** were also introduced.
    - A **solar plant (500KW)** has been installed to power 340 households.
    - A **Gram Panchayat Development Plan for 2022-23** is being prepared by integrating a **climate-resilient plan.**
- In **Seechewal gram panchayat,** the **Kali Bein river** was rejuvenated with people's involvement.
- **Odanthurai panchayat** in **Tamil Nadu** has its own windmill (350 KW).
- **Tikekarwadi gram panchayat** in **Maharashtra** is well known for its extensive use of biogas plants and green energy production.
- **Chapparapadavu gram panchayat** in **Kerala** has **several green islands** that have been nurtured by the community.

**The 'Clean and Green Village' theme-**

- The **Ministry of Panchayati Raj** has focused its attention on localising the **Sustainable Development Goals (SDGs)** on a thematic basis.
- **'Clean and Green Village'** has been identified as the **fifth theme** where panchayats can take up activities on **natural resource management, biodiversity protection, waste management** and **afforestation activities.**

According to the latest data, **1,09,135-gram panchayats** have prioritised **'Clean & Green Village'** as one of their focus areas for **2022-23.**

**Carbon Neutrality**

- Carbon neutrality means **every ton of anthropogenic CO2 emitted is compensated with an equivalent amount of CO2 removed**, according to World Resources Institute.
- In order to **limit global warming to 1.5 degrees Celsius**, **carbon neutrality by mid-21st century is essential.** This target is also **laid down in the Paris agreement** signed by 195 countries, including the EU.
- Carbon sink is any system that absorbs more carbon than it emits.
- The main **natural carbon sinks are soil, forests and oceans**.
- To date, no artificial carbon sinks are able to remove carbon from the atmosphere on the necessary scale to fight global warming.
- The **carbon stored in natural sinks such as forests is released into the atmosphere through forest fires, changes in land use or logging.**
- Another way to reduce emissions and to pursue carbon neutrality is to offset emissions made in one sector by reducing them somewhere else. This can be done through investment in **renewable energy, energy efficiency or other clean, low-carbon technologies**.

**54. India's initiatives on green hydrogen could help global decarbonisation**

**Context:**

- India has announced its **long-term low-emission development strategy**, which focuses on **climate justice, sustainable lifestyles,** and **equity,** at the ongoing **UN climate summit** in **Egypt,** joining a select group of fewer than 60 nations to do so.

**India's vision of the Hydrogen economy-**

- **Green hydrogen mission** was announced in **2021** to make India the **Green Hydrogen hub.**
- The central government has set a target of an **annual production capacity of 25 million tonnes by 2047.**

**Production of Green hydrogen-**

- Produced by **breaking down water in an electrolyser using only renewable energy, resulting in no carbon emissions.**
- The hydrogen can then be combined with nitrogen to make **green ammonia,** avoiding hydrocarbons in the process.
- **Green ammonia** is used to store energy and make fertilisers.
- **Green hydrogen** could become an **alternative to coal in steel mills and fossil fuels** in long-haul transport like shipping and trucking.

**Current status-**

- Currently, the bulk of hydrogen produced in the world **uses natural gas,** which is known as **black hydrogen.**
- There is also **grey hydrogen** made from **low-carbon technologies,** but its share in the global market is negligible.
- India has set a target of **five million tonnes of green hydrogen by 2030.**
- Over the next decade, the country plans to add **175 GW of green hydrogen-based energy.**

**Cost of production-**

- Hydrogen produced with **renewable resources** costs anywhere between **$3 per kg** and **$6.55 per kg,** compared with **fossil-based hydrogen** which costs about **$1.80 per kg**.
- In **India,** the production cost of **green hydrogen** is around **Rs 500 per kg.**
- The government expects to **reduce the cost of manufacturing** green hydrogen by **40-50%** through its policy initiatives.

**Prospects of the industry-**

- According to market researcher **Precedence Research,** the **global green hydrogen market** was valued at **$1.83 billion** in **2021** and is expected to hit over **$89.18 billion** by **2030,** expanding at a **compound annual growth rate** of as high as **54%** from 2021 to 2030.
- The **Asia-Pacific region** is the fastest-growing area in the green hydrogen market.

**Challenge of demand generation-**

- Scaling up the technology and making it cost-effective
- Uncertainty on demand growth
- Fuel may not become the first choice in transport and industry

**Private investments in hydrogen energy generation-**

- **Reliance** and **L&T** has announced to invest in hydrogen energy generation**.**
    - **L&T** has recently made a pact with the **Indian Institute of Technology Bombay** to carry out research on furthering **green hydrogen technology.**
- **Indian Oil Corporation** also announced its plans to **build a green hydrogen plant** at its **Mathura refinery in Uttar Pradesh.**
- **GAIL** plans to build **India's largest green hydrogen plant**, as does state-owned power utility **NTPC.**

55. **Tarballs dot India's west coast annually, indicating continued oil spills, ship fuel discharge**

**Context:**

**Tarballs-**

- These are **dark, sticky balls** surfaced every year **after monsoon spell** on the coastline of **India's western states**, from **Maharashtra, Gujarat**, and **Goa** to **Karnataka.**
- These are a **seasonal phenomenon.**
- Tarballs affect **marine life** and **flag concerns** about **oil spills from an offshore oil rig along the Maharashtra-Gujarat coast** in the **Arabian Sea.**

**Origin-**

- These **weathered oil blobs** are often **remnants of oil spills**
- Can also be produced from **natural seeps,** places where oil slowly escapes from the earth's surface above some petroleum reservoirs.

**Goa's beaches reveal a similar story-**

- **2021-22** witnessed **huge tarballs** along almost all beaches, including **Morjim, Vagator, Anjuna and Arambol beaches.**
- Researchers at **India's National Institute of Oceanography (NIO)** documented the **sources of the 2010/11 tarballs** that appeared in **Goa** to be from **oil tanker wash,** while the probable source for the tarballs in **Gujarat's coasts in 2012** was the **crude oil spill** from the **Bombay High (BH) offshore oil rig.**

**Ocean-atmosphere patterns-**

- The **monsoon** has a connection with tarballs.
- From the **southern hemisphere,** winds blowing from the **Australian coast** cross the equator and start hitting the mainland of India around mid-May or June.
- Since these changes in the wind direction are happening in the atmosphere, including its lowermost part near the Earth's surface, **sea waves also get influenced.**
- This is why during the southwest monsoon season, from June to September, these winds **slam India's west coast.**
- **Waves and ocean currents** near the surface move towards the **west coast,** and lead to **accumulations like the tarballs** being **washed ashore along beaches.**

**Oil spills from ships-**

- According to a report by the **Ministry of Shipping,** around **95%** of India's trading **by volume** and **70%** by **value** is through **maritime transport.**
- India is also a signatory to the **MARPOL Convention** – International Convention for the Prevention of Pollution from Ships – which covers the **prevention of pollution of the marine environment by ships** from operational or accidental causes.

**Laws and convention to prevent marine pollution-**

- The **MARPOL Convention** was adopted on **November 2, 1973,** by the **International Maritime Organisation (IMO).**
- Under the **Territorial Waters, Continental Self, Exclusive Economic Zone and Other Maritime Zones Act, 1976,** the power to control and regulate **marine pollution** falls within the **central government's jurisdiction.**
    - **Pollution Control Boards** and **municipal authorities** do have the **power to be called upon for rendering assistance** or provision of any specific facilities.
    - For ships causing oil spills, provisions for **civil liability** laid down under **Merchant Shipping Act, 1958** may be invoked.
    - The **owner of a ship causing an oil spill** can be held liable from the first instance of occurrence if it is a series of events that has led to the oil spill.
- There are **legal provisions** (like **NGT**) to ensure the **protection of marine life**.
    - **In-situ** conservation is one of the mechanisms for the **protection of species.**

**Scattered data is a challenge-**

- The **Indian Coast Guard** has a **mandate** to provide reports to the **Ministry of Defence, Ministry of Shipping** and **other allied Ministries** as and when an instance of an **oil spill occurs.**
- The **NGT** may also **constitute committees** and ask for **detailed reports** to be submitted to it in the event of oil spills.

**International Convention for the Prevention of Pollution from Ships (MARPOL Treaty)**

- The MARPOL is the main international convention covering **prevention of pollution of the marine environment by ships from operational or accidental causes.**
- The **MARPOL Convention** was adopted on **2 November 1973 at IMO.** The **Protocol of 1978** was adopted in response to a spate of tanker accidents in **1976-1977.**
- The current convention is a combination of the **1973 Convention** and the **1978 Protocol,** which entered into force on **2 October 1983.**
- The Convention includes regulations aimed at preventing and minimizing pollution from ships - and currently includes **six technical Annexes:**
    - **Annex I:** Regulations for the Prevention of Pollution by Oil
    - **Annex II:** Regulations for the Control of Pollution by Noxious Liquid Substances in Bulk
    - **Annex III:** Prevention of Pollution by Harmful Substances Carried by Sea in Packaged Form
    - **Annex IV:** Prevention of Pollution by Sewage from Ships
    - **Annex V:** Prevention of Pollution by Garbage from Ships
    - **Annex VI:** Prevention of Air Pollution from Ships

- In **2011**, **IMO** became the **first international regulator** for a transport sector to adopt globally binding energy efficiency requirements, which apply to all ships globally, regardless of trading pattern or flag State, aimed at reducing greenhouse gas emissions from international shipping.

**International Maritime Organization**

- The **International Maritime Organization** is a **specialized agency** of the **United Nations.**
- IMO is responsible for measures to improve the safety and security of international shipping and to prevent pollution from ships.
- It is also involved in **legal matters,** including liability and compensation issues and the facilitation of international maritime traffic.
- It was established by means of a Convention adopted under the auspices of the **United Nations in Geneva** on **17 March 1948** and met for the first time in January **1959.**
- It currently has **174 Member States.**

## 56. CITES COP19: Two Indian turtles facing high risk of extinction added to list of threatened species

**Context**

**Recent development-**

- In a step forward towards conservation, **two Indian turtle species** — the **red-crowned roofed turtles** (Batagur kachuga) and **Leith's soft-shell turtle** (Nilssonia leithii) — have made it to the **Appendix I** (moved from **Appendix ll)** of the **Convention on International Trade in Endangered Species (CITES),** ongoing in **Panama** City.
- Earlier in **2019** during the **18th CITES** plenary meeting in **Geneva, Indian star tortoises** were added to **Appendix I.**

**Red-crowned roofed turtle (Batagur kachuga)**

- **Females** can grow to a shell length of 56 cm (22 in) and weigh 25 kilograms (55 lb), but **males are considerably smaller**.
- **Native** to **India, Nepal** and **Bangladesh** and known to be widely found in the **Ganga and Brahmaputra river basins**.
- At present in **India,** the **National Chambal River Gharial Sanctuary** is the **only geographic area** where the species is found in substantial numbers.
- The male turtle is beautiful and is in high demand in the domestic and international markets.
- IUCN Red list- **Critically endangered**

**Leith's soft-shell turtle (Nilssonia leithii)-**

- Leith's soft-shell turtle is endemic to India.
- They inhabit rivers and reservoirs mainly in **southern peninsular India,** in states like **Odisha, Madhya Pradesh, Karnataka, Andhra Pradesh, Kerala, Maharashtra and Tamil Nadu.**
- Its presence is substantial in the **Cauvery, Tungabhadra, Ghataprabha, Bhavani, Godavari** and **Moyar drainages.**
- Although some of these species are found in protected areas, their habitat is under threat.
- IUCN Red list- **Critically endangered**

**Major threats for these turtles-**

- **Increasing loss of habitat** due to pollution and unchecked urbanisation.
- Water extraction and irrigation, leading to irregular flow of upstream dams and reservoirs.
- Sand mining and agriculture activities along the Ganga are significantly affecting the sandbars, which are safe nesting areas for the species.
- Drowning due to illegal fishing nets, poaching and illegal trade.
- There are four species under the genus nil Sonia and they are extensively sought in international illegal trade for their high demand in traditional Chinese medicine and soup delicacy.

**What is CITES?**

- CITES was conceptualised in **1963** at a meeting of the **(IUCN)** International Union for Conservation of Nature.
- It came into force in **1975** and consists of **183-member countries** to date that abide by CITES regulations by implementing legislation within their own borders to enforce those regulations.
- **Located in Geneva, Switzerland**, the CITES is administered by the United Nations under its **UNEP (United Nations Environment Programme) Wing.**
- The Convention of Parties to CITES is the supreme decision-making body of the Convention and comprises all its Parties.
- India hosted **CoP (3rd)** in **1981.**
- Although **CITES is legally binding on the Parties,** it does not take the place of national laws.
- Rather, it provides a framework to be respected by each Party, which has to adopt its own domestic legislation to ensure that CITES is implemented at the national level.

**CITES Classification or CITES Appendix**

- CITES classifies plants and animals into **three categories,** based on how threatened they are.
- Roughly **5,600 species of animals** and 3**0,000 species of plants** are protected by **CITES** against over-exploitation through international trade.

| Appendix | Description | Example of species |
|---|---|---|

| | | |
|---|---|---|
| **Appendix I** | • Species that are in **danger of extinction**<br>• **Commercial trade is prohibited.**<br>• Permits are required for import and export.<br>• Trade permitted just for research only if the origin country ensures the trade won't harm the species' chance of survival. | • Asiatic lions and tigers (tiger skin trade).<br>• Sea turtles, gorillas, lady slippers orchids (most species), Elephants etc.<br>• Total of **931 species** on the list. |
| **Appendix II** | • Species that **aren't facing imminent extinction but need monitoring** so that any trade doesn't become a threat.<br>• **Trade permits obtained legally and only if the origin country ensures that its harvesting and trade won't harm the species' chance of survival.** | • American Alligators (Alligator skin trade)<br>• Paddlefish, Mahogany, corals, etc.<br>• Total **34,419 species** on the list. |
| **Appendix III** | • Species that are **protected in at least one country.**<br>• Regulations for these species vary, but typically the country that requested the listing can issue export permits, and export from other countries requires a certificate of origin. | • Honeybadger (medicinal or bushmeat purpose)<br>• Walruses, Map turtles, certain beetles, etc.<br>• Total **147 species** on the list. |

**57. Life of Plastic: India is not collecting and recycling its polymer waste properly; here is how**

**Context-**

- India's plastic waste nightmare is because the country is not properly collecting and recycling the trash, thus leading to **lethal plastic pollution**, according to a new report by Delhi-based think-tank, **Centre for Science and Environment (CSE).**

**Report findings-**

- Currently, the focus is **entirely on downstream issues** related to the **collection, management, diversion** and **disposal of plastic waste.**
- Management of plastic waste involves **two distinct steps: collection** and **recycling or end-of-life disposal.** Both are not executed properly in India.
- The **collection** of plastic waste is the **responsibility of local government bodies, producers, importers** and **brand owners.**
- As high as **42-86 per cent** of the plastic waste in India flows through the **informal sector** to material recovery facilities.
- **Brand owners** outsource the work of **waste collection** and recycling to **third parties** and exempt themselves from taking responsibility for their actions.
- The **Indian government** claims that the **country is recycling 60 per cent of its plastic waste.** However, this is **limited to specific types of polymers (plastics)** like **PET bottles.**
- India is recycling (through mechanical recycling) approximately **12 per cent** of its plastic waste.
- Close to **20 per cent** of this waste is **channelized for end-of-life solutions** like **co-incineration, plastic-to-fuel and road making,** which means we are burning **20 per cent** of our plastic waste and still calling it **'recycling'. 68 per cent** of plastic waste is unaccounted for.

**Where does the Real Problem Lie?**

- **Single-Use Plastic:**
  - Plastics are primarily produced from **crude oil, gas, or coal,** and **40% of total plastic is discarded after a single use.**
  - Many plastic products, such as plastic bags and food wrappers, have a lifespan of mere minutes to hours, yet they may persist in the environment for hundreds of years.
- **Microplastics:**
  - **Sea, sunlight, wind,** and **wave action** break down plastic waste into small particles, often **less than one-fifth of an inch (**less than **five millimetres** or **0.2 inches** in diameter) across called **microplastics.** Spread throughout the water column and have been found in every corner of the globe.
  - Microplastics are breaking down further into smaller and smaller pieces. - **Plastic microfibers.** They have been found in **municipal drinking water systems** and drifting through the air.
- **No Strict Adherence to Plastic Waste Management:**
  - Globally, about one-fourth of plastic waste is never collected.
  - In less wealthy countries, waste plastic is sometimes burned in the open, releasing toxic chemicals into the air.

**What are Plastic Waste Management Rules 2016?**

- It mandates the **generators of plastic waste** to take steps to minimize the generation of plastic waste, prevent littering of plastic waste, and ensure segregated storage of waste at source among other measures.

- The rules also **mandate the responsibilities of local bodies, gram panchayats, waste generators, retailers** and **street vendors to manage plastic waste.**

These rules are **amended in 2022** to expedite the process of plastic waste management.

**Provisions under the New Rules-**

- **Classification of Plastics:**
  - **Category 1:** Rigid plastic packaging will be included under this category.
  - **Category 2**: Flexible plastic packaging of a single layer or multilayer (more than one layer with different types of plastic), plastic sheets and covers made of plastic sheet, carry bags, plastic sachets or pouches will be included under this category.
  - **Category 3**: Multi-layered plastic packaging (at least one layer of plastic and at least one layer of material other than plastic) will be included under this category.
  - **Category 4**: Plastic sheet or like used for packaging as well as carry bags made of compostable plastics fall under this category.
- **Plastic Packaging:**
  - The reuse of rigid plastic packaging material has been mandated in the guidelines to reduce the use of fresh plastic material for packaging.
  - The enforceable prescription of a **minimum level of recycling of plastic packaging waste** collected under **Extended Producer's Responsibility (EPR)** along with the use of recycled plastic content will further reduce plastic consumption and support the recycling of plastic packaging waste.
- **Extended Producer Responsibility Certificates:**
  - In a significant first, the guidelines allow for the **sale and purchase of surplus extended producer responsibility certificates.**
  - This will set up a **market mechanism** for plastic waste management.
- **Centralised Online Portal:**
  - The government has also called for **establishing a centralised online portal** by **Central Pollution Control Board (CPCB)** for the registration as well as filing of annual returns by producers, importers and brand-owners, plastic waste processors of plastic packaging waste by 31st March, 2022.
  - It would act as the **single point data repository** with respect to orders and guidelines related to the **implementation of EPR** for plastic packaging under the **Plastic Waste Management Rule, 2016.**
- **Environmental Compensation:**
  - Environmental compensation will be levied based upon the **polluter pays principle,** with respect to **non-fulfilment of EPR targets by producers, importers** and **brand owners**, for the purpose of protecting and improving the quality of the environment and preventing, controlling and abating environmental pollution.
  - The **Polluter Pays Principle** imposes liability on a person who pollutes the environment to compensate for the damage caused and return the environment to its original state regardless of the intent.
- **Committee to Recommend Measures:**
  - A committee constituted by the **CPCB** under the **chairmanship of CPCB chairman** will recommend measures to the **environment ministry** for the effective implementation of EPR, including amendments to **Extended Producer Responsibility (EPR) guidelines.**
- **Annual Report on EPR Portal:**
  - **State Pollution Control Board (SPCBs)** or **Pollution Control Committees (PCCs)** have been tasked to submit an annual report on the **EPR portal** with respect to its fulfilment by producers, importers and brand-owners and plastic waste processors in the state/Union Territory to the CPCB.

58. **Malady to a miracle: Leprosy bacteria grow liver in armadillos, gives hope for human organ regeneration**

**context-**

- **Leprosy** has long been associated with a life of **ostracism.** However, the **bacteria** causing this debilitating disease may offer some hope on the **regenerative medicine horizon.**

**About Leprosy-**

- **Leprosy** is also known as **Hansen's Disease.** Leprosy is a **chronic, progressive bacterial infection.**
- Caused by **Mycobacterium Leprae,** which is an **acid-fast rod-shaped bacillus.**
- Leprosy is one of the **oldest diseases in recorded history,** afflicting humanity since time immemorial. A written account of Leprosy date as far back as **600 B.C.**
- Genetic evidence supports the existence of Leprosy infections in hundred-thousand-year-old remains.

**Areas of Infection:**

- Skin, Peripheral nerves, Upper respiratory tract and Lining of the nose.

**Mode of Transmission:**

- Mainly by breathing airborne droplets from the affected individuals. It can be contacted at any age.

**Symptoms:**

- Red patches on the skin, skin lesions, numbness in arms, hands, and legs, ulcers on the soles of feet, muscle Weakness and excessive weight loss.
- It usually takes about 3-5 years for symptoms to appear after coming into contact with Leprosy causing bacteria. The long incubation period makes it difficult for doctors to determine when and where the person got infected.

- If not treated on time, Leprosy can lead to significant disability, disfigurement, permanent nerve damage in arms and legs and even loss of sensation in the body.

**Cure:**

- Leprosy is curable with a combination of drugs known as Multi-Drug Therapy (MDT).

**What researchers have found-**

- A group of researchers have found that **armadillo livers** grew substantially when infected with **Mycobacterium leprae.**
- The **pathogen** was able to **maintain liver function** and keep its exquisite architecture intact, giving rise to something that looked like **stem cells.**
- The research documents the **in-vitro discovery** of **Mycobacterium leprae's** ability to **reprogramme adult Schwann cells** (the **bacteria's preferred host niche** in the **peripheral nervous system**) to a **stage of progenitor/stem-like cells.**
- Armadillos are among the few animals that leprosy bacteria infect.
- The bacteria were performing something akin to **'biological alchemy'** — a bacterial pathogen was changing the biology of infected cells to become more **'valuable'** such that it can promote the growth of a vital organ like the liver in living animals.
- The **leprosy bacteria** need **functional cells to function within it** because of their dependency on the host to survive and replicate.

**Significance of the findings-**

- Organ growth and development
- Regenerative medicine
- Can prevent **two million annual deaths due to liver disease**.

**Stem cells-**

- **Special human cells** that have the **capability to develop into wide-ranging types of cells** in the human body, from muscle cells to brain cells, are called **stem cells.**

**2 unique properties of Stem Cells-**

- A stem cell is an immature or unspecialized cell that can
    1. Split to form similar cells
    2. Develop into different specialized cells that perform distinct functions.

**Different Types of Stem Cells-**

- Stem cells are classified into **2 main categories –**
    1. Classification based on the formation of cells at different phases of human lives and
    2. Classification based on its ability to form into different specialized cells.

**Classification based on Stem Cells formation at different times of human lives**

1. **Embryonic Stem cells**
    - These are the Stem cells that exist only during the earliest stage of development.
2. **Adult Stem Cells**
    - These are the cells that can multiply when there is a need to repair adult organs and tissues.
    - These cells are present in almost all organs of the human body.
    - They are multipotent i.e. they can give rise to a limited number of mature cell types, usually corresponding to the tissues in which they reside. A most well-known example is the blood-forming (hematopoietic) stem cells from bone marrow that give rise to different blood cells in our body.
    - Some tissue-specific stem cells can only give rise to one or two mature cell types and are called unipotent and bipotent, respectively. Stem cells found in the skin produce new skin cells and are an example of unipotent stem cells.
3. **Induced pluripotent stem cells (iPSC's)-**
    - These cells are not found in the body but made in the laboratory from cells of the body.
    - The iPSC cells have properties similar to those of embryonic stem cells.
    - Human iPSC's were generated in 2007.

**Classification based on Stem cells ability to develop into different specialized cells**

1. **Totipotent Stem Cells**
    - These Stem Cells can transform into all kinds of cells in the human body.
2. **Pluripotent Stem Cells**
    - These Stem Cells can transform themselves into any type of cell in the human body except those kinds that are required to support and develop a fetus in the womb. ESC's and iPSC's are pluripotent stem cells.
3. **Multipotent Stem Cells-**
    - These can give rise to only a few distinct types of cells.

**Use of stem cells in the Medical field-**

- The only stem cells currently used to treat disease are **hematopoietic stem cells.** These are **blood cells forming adult stem cells** found in the **bone marrow.**
- Researchers believe that stem cells would be able to treat a multitude of ailments like
    - Heart disease
    - Type 1 diabetes
    - Spinal cord injury

- Alzheimer's disease
- Rheumatoid Arthritis

59. **Himalayan yak gets food animal tag; milk and meat to be used**

**In the news-**

- The **Himalayan yak** has earned the **food animal tag** from the **Food Safety and Standard Authority of India (FSSAI).**

**About the Yak-**

- The **domestic yak (Bos grunniens),** also known as the **Tartary ox, grunting ox** or **hairy cattle,** is a species of long-haired domesticated cattle **found throughout the Himalayan region of the Indian subcontinent, the Tibetan Plateau, Kachin State** (Northern Myanmar), **Yunnan, Sichuan, Gilgit-Baltistan (Kashmir),** and as **far north as Mongolia** and **Siberia**.
- It is descended from the **wild yak (Bos mutus).**
- The **yak** plays a **multidimensional socio-cultural-economic role** for the **pastoral nomads** who rear it for their food and livelihood due to the lack of other agricultural activities in those regions.
- Yaks are traditionally reared under a **transhumance system.**

**Declining population of yak-**

- The yak population in the country has been **decreasing** at an alarming rate.
- According to a **census** carried out in **2019**, **India** has some **58,000 yaks** – a drop of about **25%** from the **last livestock census** conducted in **2012.**
- The drastic decline in the yak population could be attributed to **less remuneration** from the **bovid, discouraging the younger generations** from continuing with nomadic yak rearing.
- It is mainly because **yak milk** and **meat** are **not a part of the conventional dairy and meat industry,** their sale is limited to local consumers.
- The categorisation is expected to help check the **decline in the population of the high-altitude bovine animal** by making them a part of the **conventional milk and meat industry.**

**Nutrient-loaded-**

- **Yak milk** is **highly nutritious, rich in fat,** contains **essential minerals** and has **medicinal values.**
- According to the nutritional analysis, yak milk contains **78-82% water, 7.5-8.5% fat, 4.9-5.3% protein, 4.5-5.0% lactose** and **12.3-13.4% solids-not-fat.**
- The products which are traditionally produced from yak milk are **churkum, churpi, ghee** and **paneer.**
- Mostly consumed locally, **yak meat** is known to be lean.
- The meat contains **74.8% moisture, 21.7% protein, 1.5% crude fat and 1.2% ash.**

60. **Mumbai national park gets Asiatic lions from Junagadh**

**In news-**

- A pair of **three-year-old Asiatic lions** has been brought to the **Sanjay Gandhi National Park** here **from Sakkarbaug Zoo, Gujarat in exchange for a pair of tigers**.

**Asiatic lions-**

- The **Asiatic Lion** (also known as the **Persian Lion** or **Indian Lion**) is a member of the **Panthera Leo Leo subspecies** that is restricted to India.
- Its previous **habitats** consisted of **West Asia** and the **Middle East** before it **became extinct in these regions.**
- Today their range is **restricted to the Gir National Park in Gujarat.**
- The **Asiatic Lion** is one of the **five pantherine cats native to India.**
- The others being: the Bengal Tiger, the Indian Leopard, Snow Leopard and the Clouded Leopard.

**Characteristics of the Asiatic Lion**

- The **colour** of the Asiatic Lion ranges from **sandy or buffish grey to silvery sheen** in certain lightings.
- The **males have a moderate mane growth at the top,** compared to their **African counterparts,** as such their ears are visible.
- The mane is scarcely present around the cheeks and throat.
- It has a **larger tail buff** compared to the African lion.
- The most striking characteristic character of the Indian lion is a **longitudinal fold of skin along its belly.**

| | |
|---|---|
| **Shoulder height** | Males: 107 – 120 cm<br>Females: 80 – 107 cm |
| **Weight** | Males: 160 to 190 kg<br>Females: 110 to 120 kg |
| **Length** | 2.92 m |
| **Skull length** | Males: 330 to 340 mm<br>Females: 292 to 302 mm |

| | |
|---|---|
| **Habitat** | Restricted to **Gir National Park in Gujarat** but former habitats included **Arabia, Palestine, present day Armenia, Georgia, Azerbaijan** and **Iran** |
| **Conservation status** | **IUCN Red list-** Endangered<br>**Wild life protection act 1972-** Schedule l<br>**CITES-** Appendix-l |

**About the Gir National Park-**

- The **Gir National Park and Wildlife Sanctuary** is located in the **Junagadh district** of **Gujarat.**
- The **Gir Forests** is the **only natural habitat of Asiatic lions.**
- It was declared as a sanctuary in **1965** and a national park in **1975**.
- The Gir Forests is the largest compact tract of **dry deciduous forests** in the **semi-arid western part of India.**
- The Gir Forests **forms a unique habitat for many mammals, reptiles, birds** and **insect species** along with a rich variety of flora.
- Gir is often linked with **"Maldharis"** who have survived through the ages by having symbiotic relationship with the lion.
- Maldharis are religious pastoral communities living in Gir. Their settlements are called **"nesses".**
- **Other National Parks in Gujarat**
    - Black buck National Park
    - Vansda National park
    - Marine National Park

61. **Toxic air: Graded Response Action Plan announced for Kolkata, other Bengal cities**

**Context:**

- **West Bengal environment department** has announced a **'Graded Response Action Plan' (GRAP)** to combat rising pollution in Kolkata and other **non-attainment cities** in the state like Howrah, Barrackpore, Durgapur, Haldia and Asansol.
- **Non-attainment cities** are those that are **critically polluted** and have fallen short of the **National Ambient Air Quality Standards (NAAQS)** for over **five years.**

**Worsening air pollution in Kolkata and other cities of West Bengal-**

- Kolkata's average AQI was higher than Delhi's on two days during the week: November 24 and 25.
- Exposure to very poor air quality may trigger "respiratory illness on prolonged exposure".

**Cause of increased air pollution-**

- Surface temperature inversions, cool air being trapped closer to the surface with high pollution load, play a major role in deteriorating air quality during the winter when these inversions are the strongest.
- The pollutants from vehicles, burning, area sources, and industry get trapped near the ground during inversions, leading to poor air quality".

**GRAP model of west Bengal-**

- West Bengal announced a **10-point "graded response action plan (GRAP)"** to counter the surge in air pollution during this winter in Kolkata and other non-attainment cities of West Bengal.
- **GRAP** is a set of **emergency measures** that are imposed to prevent further deterioration of air quality, once it reaches a certain threshold.
- **Stage 1 of GRAP** is activated when the **AQI is in the 'poor' category** (201 to 300), while stage **2, 3** and **4** are imposed when the **air quality turns 'very poor, 'severe'** and **'severe plus'.**
- However, **Bengal GRAP,** as announced now, is **not graded.**
- **The action plan includes:**
    - Periodic mechanised sweeping and water sprinkling to roads, particularly at heavy traffic corridors and hotspots to suppress dust.
    - Ensuring disposal of dust and garbage in designated sites.
    - Stringent enforcement to stop the open burning of garbage.
    - Ensuring that demolition materials and waste generated from construction sites are properly contained; violator sites should be identified and closed.
    - Stringently enforce the prohibition on open burning of biomass and municipal solid waste.
    - Synchronisation of traffic movements for smooth flow of traffic.
    - Continuously monitoring the implementation of norms at the identified pollution hotspots in the city.
    - Strict enforcement of PUC (pollution under control) norms and taking action against visibly polluting vehicles with heavy fines.
    - Diversion of non-destined truck traffic and reducing 50 per cent of heavy goods vehicles except vehicles carrying essential commodities or providing essential services.
    - Strict action is also proposed against the bursting of banned firecrackers and use of non-compliant diesel generator sets.

**Criticism of West Bengal's GRAP model-**

- The **GRAP,** announced by West Bengal was **neither graded nor in tune with the forecasting base GRAP model** presently being used in Delhi.

- On November 27, the **AQI** was found to be **241 ('poor') from 150** a week earlier**,** a whopping **60 per cent rise**.
- The **most toxic air pollutant** — ultra-fine particulate **PM 2.5** — was the trigger behind the **AQI leapfrog.**
- Proactively implement **GRAP measures** based on **air quality forecasts,** rather than **retroactively implementing** them once acceptable levels are breached.

**62. Indian scientists receive international award on behalf of snow leopard conservation alliance**

**Context-**

- **Indian snow leopard** experts **Charudutt Mishra** and **Koustubh Sharma,** along with **Chyngyz Kochorov of Kyrgyzstan,** received the **Madrid-based BBVA Foundation's Worldwide Biodiversity Conservation Award** on behalf of **The Global Snow Leopard Ecosystem Protection Program (GSLEP)** that they helped create and manage.

**About the Award-**

- The **Spain-based BBVA Foundation Awards for Biodiversity Conservation** seek to recognise and support the work done by conservationist organisations, institutions and agencies in carrying forward environmental conservation policies and projects.

**The Global Snow Leopard Ecosystem Protection Program (GSLEP)-**

- The **GSLEP** is a **first-of-its-kind intergovernmental alliance** for the conservation of the **snow leopard** and its unique ecosystem.
- **GSLEP** was created in **2013** when officials, politicians and conservationists arrived at a common conservation strategy enshrined in the **Bishkek Declaration (2013)** to cooperate in the **conservation of this species** and its habitat.
- It is **led by** the **environment ministers of 12 countries** in **Asia** that form the home range of the snow leopard.
- These are Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan and Uzbekistan.
- The total range spans **two million square kilometres.**
- The **GSLEP Program's secretariat** is based in **Bishkek,** and is hosted by the **Ministry of Natural Resources, Ecology and Technical Supervision** of the **Kyrgyz Republic.**

**About Snow Leopard-**

- **Scientific name:** Panthera uncia.
- **Habitat:** Snow leopards live in the mountains of Central Asia.
- **Numbers:** There are only between 3,920 and 6,390 snow leopards left in the wild.
- **Range extends through twelve countries:** Afghanistan, Bhutan, China, India, Kazakhstan, Kyrgyzstan, Mongolia, Nepal, Pakistan, Russia, Tajikistan, and Uzbekistan.
- **Conservation Status:** Snow leopards were considered **endangered species until 2017** but the **status was changed** to **vulnerable later in the year.**

**Challenges to their conservation:**

- Increased habitat loss and degradation, poaching and conflict with communities.

**Conservation efforts- National level:**

- As per reports, **India** is home to about **450-500 snow leopards** which can be spotted in the **upper Himalayan regions of the country.**
- India has been conserving snow leopards and their habitats through the **Project Snow Leopard (PSL).**
- India has also been part of the **Global Snow Leopard and Ecosystem Protection (GSLEP) Programme since 2013.**
- For conservation, **India** has **identified three large landscapes,** namely, **Hemis-Spiti** across Ladakh and Himachal Pradesh; **Nanda Devi – Gangotri** in Uttarakhand; and **Khangchendzonga – Tawang** across Sikkim and Arunachal Pradesh.
- **Snow Leopard** is in the list of **22 critically endangered species** for the recovery programme of the **Ministry of Environment Forest & Climate Change**.
- **SECURE Himalaya: Global Environment Facility (GEF)-United Nations Development Programme (UNDP) funded** the project on conservation of high-altitude biodiversity and reducing the dependency of local communities on the natural ecosystem.
- This project is now operational in **four snow leopard range states**, namely, **Jammu and Kashmir, Himachal Pradesh, Uttarakhand, and Sikkim.**
- Community volunteer programme **"Himal Sanrakshak"** to protect snow leopards.

**Conservation efforts- International level:**

- In **2013**, the **Bishkek Declaration** set a **goal of protecting at least 20 snow leopard landscapes with viable snow leopard populations by 2020,** and led to the formation of the **Global Snow Leopard and Ecosystem Protection Program (GSLEP).**
- Since then, **October 23** is commemorated each year as **International Snow Leopard Day.**

63. **Update land records to include FRA titles allotted, MoEF&CC directs states**

**Context-**

- The **Union Ministry of Environment, Forest and Climate Change (MoEF&CC)** has written a letter to states across the country, directing them to **record settlement rights in revenue and forest records** within a period of three months.

**More in news-**

- Digital information on the **record of rights (RoR)** under The **Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** or **FRA** will also be integrated with the **PARIVESH portal** and other web GIS platforms of central and state government departments.
- **Geo-referencing** of **RoR** under **FRA** will be beneficial for the people of the states as the **forest and tribal welfare departments** will be able to initiate specific projects and schemes for improving the livelihoods of the FRA title holders.

**Parivesh (Pro-Active and Responsive facilitation by Interactive, Virtuous and Environmental Single-window Hub)-**

- It is an environmental single-window hub for Environment, Forest, Wildlife and CRZ clearances.
- This Single-Window Integrated Environmental Management System has been developed in pursuance of the spirit of **'Digital India'** initiated by the Prime Minister and capturing the essence of Minimum Government and Maximum Governance.

**Key features:**

- **"PARIVESH"** is a **workflow-based application**, based on the concept of web architecture. It has been rolled out for online submission, monitoring and management of proposals submitted by Project Proponents to the **Ministry of Environment, Forest and Climate Change (MOEFCC)**, as well as to the **State Level Environmental Impact Assessment Authorities (SEIAA).**
- It seeks to give various types of clearances (e.g. Environment, Forest, Wildlife and Coastal Regulation Zone Clearances) from Central, State and district-level authorities.
- The system has been designed, developed and hosted by the Ministry of Environment, Forest and Climate Change, with technical support from **National Informatics Centre, (NIC).**
- It provides **single registration** and **single sign-in** for all types of clearances (i.e. Environment, Forest, Wildlife and CRZ), unique-ID for all types of clearances required for a particular project and a single Window interface for the proponent to submit applications for getting all types of clearances (i.e. Environment, Forests, Wildlife and CRZ clearances).

**Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006** or **FRA**

- **FRA** enacted in **2006** recognises the rights of **forest-dwelling tribal communities** and other traditional forest dwellers to forest resources on which these communities were dependent for a variety of needs, including livelihood, habitation and other socio-cultural needs.
- It recognizes and vests the forest rights and occupation in Forest land in **Forest Dwelling Scheduled Tribes (FDST)** and **Other Traditional Forest Dwellers (OTFD)** who have been residing in such forests for generations.
- It strengthens the conservation regime of the forests while ensuring the livelihood and food security of the FDST and OTFD.
- The **Gram Sabha** is the authority to initiate the process for determining the nature and extent of **Individual Forest Rights (IFR)** or **Community Forest Rights (CFR)** or both that may be given to **FDST** and **OTFD.**

**Rights Under the Forest Rights Act:**

- **Title rights:**
  - It gives **FDST** and **OTFD** the right to ownership to land farmed by tribals or forest dwellers subject to a **maximum of 4 hectares.**
  - Ownership is only for land that is actually being cultivated by the concerned family and no new lands will be granted.
- **Use rights:**
  - The rights of the dwellers extend to **extracting Minor Forest Produce, grazing areas** etc.
- **Relief and development rights:**
  - To rehabilitate in case of illegal eviction or forced displacement and to basic amenities, subject to restrictions for forest protection.
- **Forest management rights:**
  - It includes the **right to protect, regenerate or conserve or manage any community forest resource** which they have been traditionally protecting and conserving for sustainable use.

64. **Can Bio-CNG click: A primer on this coming of age tech that can deal with air pollution at 3 levels**

**About Bio-CNG-**

- **Bio-CNG,** also known as **Compressed Biogas (CBG),** is an upgraded version of the humble biogas, the dung-based version of which serves as cooking fuel in many villages in India.

**Process of production-**

- The **first stage** of the **CBG** process is **pre-treatment.** The waste is passed through a trommel screen to remove hard materials like coconut shells and pieces of wood.
- The screened waste is shredded in a hammer mill and made into a slurry with water. This slurry is kept in the pre-digester tank in aerobic conditions for one-two day to attract microbes — the process is called **hydrolysis.**
- It is then transferred to an anaerobic digester where it is retained for 20-25 days. It is at this stage — **methanogenesis** — that **biogas** is generated.
- This **gas** contains **65 per cent methane**, while the rest is **carbon dioxide, hydrogen sulphide and water vapour.**
- The gas is stored in a balloon and then taken to a gas upgradation area.
- It is passed through a **wet and dry scrubber** to remove hydrogen sulphide and carbon dioxide, respectively.

- **Methane,** purified up to **95 per cent,** is obtained here which is then compressed at high pressure in cylinders and sent off to filling stations.
- This **highly purified methane** is similar in chemical properties to **CNG** derived from petroleum sources and can thus be used in vehicles.
- Apart from **biodegradable waste, agricultural residue, cow dung** and **chicken litter** and **press** mud from sugar factories are also used as feedstock in **CBG plants.**

**Need for CBG in India-**

- **India** is the **third largest importer of crude oil.**
- In **2020-2021**, **India** imported **54 per cent** of its **natural gas** requirement.
- **CBG** is a **decentralised energy form** as it is produced closest to the **point of consumption** and unlike **solar** and **wind energy,** can be produced at all hours of the day.
- CBG is better than **incineration-based waste-to-energy plants** that release **toxic emissions**.
- The global warming potential of methane is **28 times** more than that of **carbon dioxide**.
- **EROI** is a **ratio** that measures the energy used to produce another energy source against the actual energy generated from that new source.
- The **energy returned on energy invested (EROI) score** for large biogas plants is **1.24** to **11.05.**

**Benefits-**

- If harnessed correctly, **municipal solid waste (MSW)** and **wastewater energy** can replace **4053.47 tonnes** of **India's diesel consumption per day,** the highest consumed transportation fuel in India.
- If **CBG potential** from all biomass is considered, **50 per cent** of the current diesel usage in transport can be replaced.
- **Biomethane** is the best transportation option to **preserve air quality.**
- CBG provides a very important service of managing our waste and producing organic manure, which can bring back the bio-content in our soil that has been overly laced with chemical fertilisers over the years.
- The **calorific value of Bio-CNG** is more than other transportation fuels.

**Limitations-**

- High maintenance cost
- High global warming potential

**Methane pollution-**

- **Fugitive methane emission** from openly dumped waste also leads to landfill fires as happened in Delhi earlier this year.
- **Landfill sites** are a source of **20 per cent** of the **methane emission.**

65. **Betting for exotic meat, gambling dens in Manipur descend further into illegality**

**In the news-**

- The police and forest officials in the State's **Ukhrul town** have been scanning **"gambling dens"** following reports of wild animals – dead or alive – being offered as prizes for raffle draws.
- **Ukhrul** is about **80 km northeast** of the State capital **Imphal.**

**More on the news-**

- People buying raffle draw tickets ranging from **₹100** to **₹500** to try their luck to win exotic meat.
- The larger or rarer the bird or animal or body part, the higher the price of the ticket.
- Apart from **wild boars** and **deer,** animals such as **binturong** (an arboreal mammal also known as bearcat), **squirrels** and **flying foxes** (bats) have been found to be on offer.
- Different types of birds such as the **grey-sided thrush** and **tragopans** (often called horned pheasants) have also been spotted.

**Wildlife Protection Act (WPA) 1972-**

- As per **Schedule V** of the **WPA** only **mice, rats, common crows, and fruit bats** are allowed to be hunted.

| Schedule of WPA | Details |
|---|---|
| **Schedule I** | • This Schedule covers **endangered species.**<br>• These species need rigorous protection and therefore, the harshest penalties for violation of the law are under this Schedule.<br>• Species under this Schedule are prohibited to be hunted throughout India, except under threat to human life.<br>• Absolute protection is accorded to species on this list.<br>• The Trade of these animals is prohibited.<br>• Examples: tiger, blackbuck, Himalayan Brown Bear, Brow-Antlered Deer, Blue whale, Common Dolphin, Cheetah, Clouded Leopard, hornbills, Indian Gazelle, etc. |
| **Schedule-ll** | • Animals under this list are also accorded high protection. |

| | |
|---|---|
| | • **Their trade is prohibited.**<br>• They cannot be hunted except under threat to human life.<br>• Examples: Kohinoor (insect), Assamese Macaque, Bengal Hanuman langur, Large Indian Civet, Indian Fox, Larger Kashmir Flying Squirrel, Kashmir Fox, etc. |
| **Schedule-lll & lV** | • This list is for species that are not endangered.<br>• This includes protected species but the penalty for any violation is less compared to the first two schedules.<br>• Examples: hyena, Himalayan rat, porcupine, flying fox, Malabar tree toad, etc. |
| **Schedule V** | • This schedule contains animals that can be hunted.<br>• Examples: mice, rat, common crow, fruit bats, etc. |
| **Schedule-Vl** | • This list contains plants that are forbidden from cultivation.<br>• Examples: pitcher plant, blue vanda, red vanda, kuth, etc. |

66. **Indian wildlife biologist gets UN highest environmental award**

**Context:**

**In news-**

- **Indian wildlife biologist Dr Purnima Devi Barman** is among the honourees of this year's **Champions of the Earth award**, the **U.N.'s highest environmental honour,** accorded for their transformative action to prevent, halt and reverse ecosystem degradation.
- Dr Barman has been honoured in the **Entrepreneurial Vision category.**

**About Dr Purnima Devi Barman-**

- Dr Barman leads the **"Hargila Army",** an **all-female grassroots conservation movement** dedicated to protecting the **Greater Adjutant Stork** from extinction.
- Dr Barman is also the **Senior Project Manager** of the **Avifauna Research and Conservation Division, Aaranyak.**

**"Hargila Army"**

- Consists of over **10,000 women.**
- They protect **nesting sites, rehabilitate injured storks**.

**Champions of the Earth award-**

- Started in **2005**, by the **UNEP.**
- The **annual award** has been awarded to trailblazers at the forefront of efforts to protect our natural world.
- It is the **UN's highest environmental honour.**
- This award programme is **successor** to **UNEP's Global 500 Roll of Honour.**
- The award is presented in **five** categories
    1. Lifetime Achievement,
    2. Policy Leadership,
    3. Entrepreneurial Vision,
    4. Action and Inspiration and
    5. Science & Innovation.
- To date, the award has recognised **111 laureates: 26 world leaders, 69 individuals** and **16 organisations.**
- The other honourees include **Arcenciel (Lebanon); Constantino (Tino) Aucca Chutas (Peru); Sir Partha Dasgupta of the United Kingdom** and **Cecile Bibiane Ndjebet (Cameroon).**
- **Prime Minister Narendra Modi** was conferred with **United Nation's Champions of the Earth Award 2018.**

**About Greater Adjutant Stork (Harjila** in **Assam)-**

- **Scientific Name:** Leptoptilos dubius
- **Genus:**
    - The greater adjutant is a member of the stork family, **Ciconiidae**.
    - There are about **20 species** in the family.
    - They are **long-necked large birds.**
- **Habitat:**
    - Once found across **South** and **Southeast Asia,** the **Greater Adjutant** is one of the most threatened stork species in the world.
    - There are only **three known breeding grounds** – one in **Cambodia** and **two in India** (Assam and Bihar).
- **Threat:**
    - The widespread destruction and degradation of the wetlands that this scavenger bird needs to forage (i.e. search for food) and the loss of its nesting trees, led to a decline.
- **Protection Status:**
    - **IUCN Red List:** Endangered

- **Wildlife (Protection) Act 1972:** Schedule IV
- **Significance:**
  - They are considered the mount of Vishnu, one of Hinduism's prime deities.
  - Some worship the bird and call it **"Garuda Maharaj"** (Lord Garuda) or **"Guru Garuda"** (Great Teacher Garuda).
  - They help **farmers by killing rats** and other **farm pests.**

## GOVERNMENT SCHEME

1. **World Diabetes Day- 14 November**

**National Programme for prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and strokes (NPCDCS)**
**About NPCDCS-**

- The National Programme for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke (NPCDCS) was **launched in 2010** in **100 districts across 21 States**, in order to prevent and control the major Non-Communicable Diseases (**NCDs).**
- The **main focus** of the programme is on **health promotion, early diagnosis, management and referral of cases**, besides **strengthening the infrastructure and capacity building.**

**The main strategies of the programme are-**

1. **Health promotion** through behavior change with involvement of community, civil society, community-based organizations, media etc.
2. **Outreach Camps** are envisaged for opportunistic screening at all levels in the health care delivery system from sub-centre and above for early detection of diabetes, hypertension and common cancers.
3. **Management of chronic Non-Communicable diseases,** especially **Cancer, Diabetes, CVDs** and **Stroke** through early diagnosis, treatment and follow up through setting up of NCD clinics.
4. **Build capacity** at various levels of health care for prevention, early diagnosis, treatment, **IEC/BCC**, operational research and rehabilitation.
5. **Provide support for diagnosis** and **cost-effective treatment** at primary, secondary and tertiary levels of health care.
6. **Provide support** for **development of database of NCDs** through a **robust Surveillance System** and to monitor **NCD morbidity, mortality** and **risk factors.**

**Funding:**
The funds are being provided to States under **NCD Flexi-Pool** through **State PIPs of respective States/UTs,** with the Centre to State share in ratio of **60:40** (except for **North-Eastern and Hilly States**, where the share is 90**:10**.

2. **Projects to track small fishing vessels along India's coast makes progress**

**Context-**

- A delayed project to **install transponders on small fishing vessels,** under **20 metres in length,** as part of **coastal security measures** instituted post **26/11 Mumbai attacks** is now making progress, with a project underway in **Tamil Nadu.**

**About the transponders-**

- There are close to **three lakh registered fishing vessels** of which around **2.5 lakh** are under **20 metres.**
- Trials were conducted in association with the **Indian Space Research Organisation** on one of their **communication satellites** last year along the **coasts of Gujarat** and **Tamil Nadu**.
- The process of **installing transponders** on **sub-20 metre boats** commenced with a pilot project in **Tamil Nadu** for **5,000 vessels** is underway.
- For vessels **under 20 metres**, the process has been delayed for several reasons.
- The decision was taken by the **National Committee on Strengthening Maritime and Coastal Security,** headed by the **Cabinet Secretary,** set up to look into **issues related to coastal security.**
- The **Vehicle Management System (VMS)** has advanced features and **enables two-way communication.**

**Measures taken to enhance the security of coastal areas-**

- An **Automatic Identification System (AIS)** was made compulsory for all vessels above **20 metres** after the **2008 terrorist attacks** in Mumbai.
- Verification and monitoring of a large number of fishing vessels in India has been greatly eased by the creation of the online **ReALCraft (Registration and Licensing of Fishing Craft)**.
- This information is available to the **Indian Navy and Coast Guard.**
- Issuance of **biometric identity cards** to the majority of fishermen
- **Composite card readers** to the **maritime security agencies** to **enable biometric verification** of the identity of fishing vessel crews at sea.
- **Maritime Domain Awareness (MDA) on the high seas**
  - The **Quad grouping,** comprising of **India, Australia, Japan and U.S.**, at the **Tokyo summit (2022)** announced an ambitious **Indo-Pacific Maritime Domain Awareness (IPMDA) initiative** to track **"dark shipping"** and build a **"faster, wider, and more accurate maritime picture of near-real-time activities in partners' waters"** integrating three critical regions in the **Indo-Pacific** – the Pacific Islands, Southeast Asia, and Indian Ocean Region (IOR).

- **"Dark ships"** are vessels with their **Automatic Identification System (AIS)** – a transponder system – **switched off** so as not to be detectable.

**Ex-Sea Vigil-**

- The third edition of the **'pan-India'** coastal defence Exercise **'Sea Vigil-22'** is scheduled to be held on **November 15 and 16.**
- The Exercise was conceptualised in **2018** to validate various measures that have been instituted towards **enhancing maritime security since '26/11'.**
- The exercise will be undertaken along the **entire 7,516 km coastline and Exclusive Economic Zone of India** and will **involve all the Coastal States and Union territories** along with other maritime stakeholders, including the fishing and coastal communities.
- The exercise is a build up towards the major **Theatre Level Readiness Operational Exercise (TROPEX)**, which the Indian Navy conducts every two years.
- **Sea Vigil** and **TROPEX** together will cover the **entire spectrum maritime security challenges**.

3. **Bihar's har Ghar Gangajal scheme for Rajgir and Gaya regions**

**Context**:

**Har Ghar Gangajal scheme-**

- It is part of the **Bihar government's Jal, Jeevan, Hariyali scheme.**
- The project has been described as a **"lift-store-tame-treat-supply" system.**
- Hyderabad-based **Megha Engineering & Infrastructures Limited (MEIL)** has been working on the project **since 2019,** employing about **2,200 people** and **high-end technology.**
- In the **Rs 4,000-crore first phase** of the project — which has been completed and will be launched by the Chief Minister — **giant pumps** will lift Ganga water from **Hathidah near Mokama** and supply it to about **7.5 lakh homes** in the state's main tourism destinations of **Rajgir, Bodhgaya, and Gaya.**
- The water will be stored in reservoirs in **Rajgir** and **Gaya** before being channelled to **three treatment-and-purification plants,** from where it will be supplied to the public.
- According to estimates made by the government, the scheme will provide every individual beneficiary with **135 litres** of Ganga water every day for drinking and domestic use.
- The scheme is **currently limited to the urban areas of Rajgir, Gaya,** and **Bodhgaya.**
- During the **second phase** of the project, which is expected to be launched sometime next year, Ganga water will be taken to **Nawada.**
- The water would be lifted **only during the four months of the monsoon** when the Ganga has excess water.
- So, that the diversion will **not lead to depletion of the river, disturbance in its natural flow**, or **potential changes in its course.**

**4. E-GramSwaraj and Audit Online of Ministry of Panchayati Raj has won the GOLD AWARD**

**Context:** e-Panchayat Mission Mode Project (e-GramSwaraj and Audit Online) of Ministry of Panchayati Raj has won the GOLD AWARD under the category "Excellence in Government Process Re-engineering for Digital Transformation" of the National Awards for e-Governance.

**Concept:**

**e-Gram Swaraj:**

- In order to enhance transparency and empower panchayats, Ministry has integrating beneficiary details of various union Ministries/ Departments with e-Gram SWARAJ Application.
- The information shall be available to Gram Panchayats, to read out in the course of the Gram Sabhas for public verification.
- This verification would be a landmark in ensuring accountability through digitalization and public participation. As on December 2021, beneficiary details of nine scheme of three Union Ministries/ Departments are integrated with e-Gram Swaraj Application.
- This includes five schemes of Ministry of Rural Development viz. PM Awas Yojana – Gramin (PMAY-G), Indira Gandhi National Old Age Pension Scheme (IGNOAPS), Indira Gandhi National Widow Pension Scheme (IGNWPS), Indira Gandhi National Disability Pension Scheme (IGNDPS), Indira Gandhi National Family Benefit Scheme (IGNFBS), two Schemes of Department of Animal Husbandry and Dairying viz. National Agricultural Innovation Project (NAIP & NAIP II) and National Animal Disease Control Programme (NADCP), One scheme of Ministry of Agriculture and Family Welfare viz. Pradhan Mantri KISAN Samman Nidhi (PMKSN); One scheme of Department of Drinking Water and Sanitation, Ministry of Jal Shakti viz. Swachh Bharat Mission (Gramin).

**Audit Online:**

- As a part of the critical institutional reform, XV FC has stipulated that the audited reports of Panchayat accounts need to be made available in the public domain, as an eligibility criterion.
- In this regard, MoPR had conceptualized the application "AuditOnline" for carrying out online audit of Panchayat accounts pertaining to Central Finance Commission Grants.
- It not only facilitates the auditing of accounts but also provisions for maintaining digital audit records pertaining to audits that have been carried out. This application provides for streamlining the various audit processes, namely, audit inquiries, draft local audit reports, draft audit paras etc.

- One of the unique features of this application is that it is entirely configurable to suit to the States' Audit process / flows complying to the respective State Audit Rules/Act(s).
- Audit Online is also linked to e-GramSwaraj for ease of flow of accounting related information pertaining to the Panchayats.

## MISCELLANEOUS

1. **Plugging the defence gap**

**Srijan Portal-**

- Pursuant to **Atmanirbhar Bharat's** announcement, the **Department of Defence Production** has developed an **indigenization portal**, **srijandefence.gov.in,** as **'opportunities for Make in India'** in Defence, which will give information on items that can be taken up for indigenization by the **private sector.**
- On this portal, **DPSUs/OFB/SHQs** can display their items which they have been importing or are going to import which the Indian Industry can design, develop and manufacture as per their capability or through a joint venture with OEMs.
- The **Indian Industry** will be able to show their interest. The concerned DPSUs/OFB/SHQs, based on their requirement of the items and their guidelines & procedures will interact with the Indian industry for indigenization.
- **SRIJAN** is a 'one-stop shop' online portal that provides access to the vendors to take up items that can be taken up for indigenization.
- It will help industry partners to play an active role in the goal of self-reliance in the defence sector.
- It will give information on items that can be taken up for indigenization by the private sector.
- There are over **3000 unique items** with a value of over **₹10,000 Crore** that are available through the portal.

**Defence Indigenization in India-**

- A significant beginning in **defence indigenisation** was made in **1983** when the government sanctioned the **Integrated Guided Missile Development Programme (IGMDP)** to develop **five missile systems:**

1. Prithvi (surface-to-surface)
2. Akash (surface-to-air)
3. Trishul (the naval version of Prithvi)
4. Nag (anti-tank)
5. Agni Ballistic missiles with different ranges, i.e. Agni (1,2,3,4,5)

**Government Initiatives-**

- **Defence Procurement Policy:**
  - Based on the recommendations of the **Dhirendra Singh committee, Defence Procurement Procedure 2016** (replaced DPP 2013) added an additional category **"Buy (Indian-IDDM)"** e **Indigenously Designed, Developed and Manufactured,** as the most preferred way of defence goods acquisition.
  - **DPP** allowed the **Defence Acquisition Council** to take a **"fast-track" route** to acquire weapons, something which was limited to only the armed forces till now.

**2. NGO Pratham gets Indira Gandhi Prize**

**Context:** Former Vice-President Hamid Ansari presented the Indira Gandhi Prize for Peace, Disarmament and Development of 2021 to Pratham, an NGO functioning in the field of education.

**Concept:**

- The award is in recognition of Pratham's work in ensuring quality education for children of the country, particularly during the COVID-19 pandemic.
- Pratham also used digital technology to deliver education so that the children could learn during the school closure amid the pandemic.

**About Indira Gandhi Prize**

- The Indira Gandhi Prize for Peace, Disarmament and Development **was instituted in the memory of the former prime minister by a trust** (Indira Gandhi Memorial Trust) **in her name in 1986.**
- It consists of **a monetary award of Rs 25 lakh along with a citation.**
- The award is given **to individuals or organisations** who work towards ensuring international peace and development, ensuring that scientific discoveries are used to further the scope of freedom and better humanity, and creating a new international economic order.

**NGO Pratham**

- Set up in 1995, Pratham began its work in slum areas by setting up community-based pre-schools and by offering remedial education to students who lagged behind in their classes.
- Its A**nnual Status of Education Report (ASER)**, based on surveying 6,00,000 rural Indian children, is now used as a model to assess education outcomes and learning deficiencies in **14 countries over three continents.**
- To respond to the concerns raised by ASER, in **2007 Pratham launched its flagship programme, Read India**, which aims to improve children's learning by strengthening basic reading and arithmetic.

3. **Oxford Word of the Year to be chosen by people**

**Context:** For the **first time**, **people** from across the world **will vote** to choose the **Oxford Word of the Year 2022.**

**What is the issue:**

- For the **first time,** people from across the world will **vote to choose the Oxford Word of the Year 2022.**

- A **team of expert lexicographers** have narrowed down a **longlist of worthy contestants** to a final choice of **three word**s i.e **metaverse, #IStandWith, and goblin mode.**
- The **voting,** which **started on November 21,** will **close on December 2**.
- **Last year 'Vax'** was adjudged **word of the year.**

**How the three words are relevant to the year in a different way:**

- In **'metaverse'**, there is a **conceptual future brought into the vernacular in 2022**. From hybrid working in virtual reality, to debates over the ethics and feasibility of an entirely online future, **usage of this word quadrupled in October 2022** compared to the same period last year.
- **'#IStand with'** recognises the **activism and division** that has characterized this year. From the **war in Ukraine, to the Depp v. Heard lawsuit**, this 'word' **coined on social media to align one's views** to a cause or person can often further foster dispute and sometimes even hate speech in its polarising nature.
- **'Goblin mode'** is another relatively **new concept:** the **idea of rejecting societal expectations put upon people, in favour of doing whatever one wants to**. Early usage dates back to 2009/10, but **as the world emerges from lockdown, the phrase has been coined in rejection of returning 'back to normal'** after a fake 'quote' from actress and model Julia Fox brought the term back into the mainstream.

4. **India's unusual abstention in CITES vote on reopening ivory trade**

**Context:**

- **India's decision not to vote against a proposal to re-open the international trade in ivory** at the ongoing conference of the **Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)** surprised many.
- That proposal, to **allow a regular form of controlled trade in ivory** from **Namibia, Botswana, South Africa, and Zimbabwe,** was defeated **83-15** in Panama City on Friday.

**CITES agreement**

- CITES is an international agreement between **184 governments** to ensure that **international trade in wild animals and plants does not threaten the survival of the species.**
- The convention entered into force in **1975** and **India** became the **25th party** as a state that voluntarily agrees to be bound by the Convention in **1976.**
- **All import, export** and **re-export** of species covered under **CITES** must be authorised through a **permit system.**
- **CITES Appendix I** lists species **threatened with extinction** — import or export permits for these are issued rarely and **only if the purpose is not primarily commercial.**
- **CITES Appendix II** includes species not necessarily threatened with extinction but in which trade must be strictly regulated.
- Every **two years,** the **Conference of the Parties (CoP)**, the supreme decision-making body of **CITES,** applies a set of biological and trade criteria to evaluate proposals from parties to decide if a species should be in Appendix I or II.

**Tussle over ivory**

- **1989-** Global ban on ivory trade, All african elephant populations were put in Appendix l
- **1997-** Namibia, Botswana, and Zimbabwe were transferred to Appendix ll
- **2000-** South Africa was transferred to Appendix ll
- These countries are allowed to **'one-off sale'** of ivory stockpiled from natural elephant deaths and seizures from poachers.
- **CoP17 (2016) & CoP18 (2019)- Namibia's proposal** for allowing a regular form of controlled trade in ivory by delisting the elephant populations of the four countries from Appendix II, was rejected.
- **CoP19 (2022)- Zimbabwe's proposal** for the same has been rejected.

**Why these countries wanted to lift the trade ban-**

- The four southern African countries argue that their elephant populations have bounced back and that their stockpiled ivory, if sold internationally, can generate much-needed revenue for elephant conservation and incentivising communities.

**Opposition's cncern-**

- Any form of supply stokes demand and that sharp spikes in elephant poaching were recorded across the globe after the one-off sales allowed by the **CITES** in **1999** and **2008.**

**India and ivory trade**

- **1975- endangered Asian elephant** was included in **CITES Appendix I, Ban** on the export of ivory from the Asian range countries.
- **1986-** India amended The **Wild Life (Protection) Act, 1972** to ban even **domestic sales of ivory.**
- **1991-** After the ivory trade was globally banned, India again amended the law to ban the import of African ivory.
- **1981- New Delhi** hosted **CoP3**, India designed the iconic **CITES logo** in the form of an **elephant.**
- **1992 CoP8:** In **Kyoto, Japan**, Indian delegate Arin Ghosh, then director of **Project Tiger,** noted a polarisation of parties — one for sustainable use and trade in wildlife, the other favouring total ban and stricter control — with the latter, fortunately, outnumbering the former.
- **1994 CoP9:** At **Lauderdale, US, India opposed** the down-listing of the elephant population of South Africa from Appendix I to II.

- **1997 CoP10:** At **Harare, Zimbabwe,** India opposed the proposal to down-list the southern African elephant populations, expressing concern over repercussions for the Asian elephant, particularly with regard to poaching.
- **2000 CoP11:** At **Gigiri, Kenya**, India moved a proposal along with the host country to **up-list all elephant populations in Appendix II to I.**
- At **CoP17 and CoP18, India voted against proposals to re-open trade in ivory** from the southern African states.

**Why India abstained from voting this time-**

- **India** signed an agreement in July with **Namibia** to fly in **cheetahs.**
- India has agreed to promote **"sustainable utilisation and management of biodiversity"**
- **Namibia** sought India's support under this agreement for the longstanding proposal to re-open the ivory trade at CITES.

5. **Uttarakhand HC: stop construction on bed of sukhatal near Naini lake**

**Context:**

- Hearing a **suo motu Public Interest Litigation (PIL)** on preservation of **Sukhatal Lake** in **Nainital,** the Uttarakhand High Court on Tuesday directed the State to stop all construction activities on the **lakebed** and posted the matter for further hearing on December 20.

**About Sukhtal lake-**

- Sukhatal is a **freshwater lake** having a length of 150m and 10m deep.
- Surrounded by the dense pine and oak forests.
- Sukhatal is a major source of water recharge for Nainital lake.
- Earlier known as **Khudaiya tal**
- Renamed as Sukhatal because the entire water from this lake was drained in the extreme region of the Nainital lake.
- These verdant forests are home to migratory birds.