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# CURRENT AFFAIRS MAGAZINE

**JULY 2024**

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## PRELIM BITS (JULY 2024)

### 1. HISTORY, ART & CULTURE

#### 1.1 Santhal Hul (Santhal Rebellion), 1855-56

In Jharkhand, June 30 marks the 169<sup>th</sup> anniversary of the Santhal Hul, one of the earliest peasant uprisings against the British.

- Santhal Hul of 1855 is an **organized revolt** against imperialism of British in **Jharkhand**.
- **Leaders** – The revolt is led by
  - **4 brothers** - Sidho, Kanho, Chand, and Bhairav Murmu, along with
  - **Sisters** - Phulo and Jhano.
- **Revolted against** - The Santhals also fought against the upper castes, zamindars, darogas, and moneylenders, described by the umbrella term 'diku', to safeguard the economic, cultural, and religious aspects of their lives.
- **Reason for the uprising** - Certain areas were delimited as 'Santhal Pargana' or 'Damin-i-Koh' in 1832.
- It comprises present-day Sahibganj, Godda, Dumka, Deoghar, Pakur, and regions of Jamtara, in present-day Jharkhand.
- The area is allocated to the Santhals displaced from Birbhum, Murshidabad, Bhagalpur, Barabhum, Manbhum, Palamau, and Chhotanagpur, all areas of the Bengal Presidency.
- While the Santhals were promised settlement and agriculture in Damin-i-Koh, what followed is the repressive practice of Land-grabbing and Begari (bonded labour) of 2 types - kamioti and harwahi.
- The Murmu brothers led around 60,000 Santhals against the East India Company and engaged in **guerrilla warfare**.
- More than 15,000 Santhals were killed, and 10,000 villages were laid to waste.
- The British hanged Sidhu to death on August 9, 1855, followed by Kanhu in February 1856.
- The insurrection ended, but the impact it left is everlasting.
- **Santhal Pargana Tenancy Act, 1876** - In result of this uprising the Santhal Pargana Tenancy Act of 1876 (SPT Act) is enacted by the British.
- The act prohibits the transfer of **Adivasi lands (urban or rural land) to non-Adivasis**.
- The land can only be inherited as per the Act, thus retaining the rights of Santhals to self-govern their land.

#### Chhotanagpur Tenancy Act, (CNT Act)

- It is enacted by the British in 1908 a result of the Birsa Movement, allows land transfers within the same caste and certain geographical areas with the approval of the District Collector.
- This Act also restricts the sale of Adivasi and Dalit land, while allowing land transfers between Adivasi individuals from the same police station and Dalits in the same district.

#### 1.2 Limestone cave, Leang Karampuang

A team of Indonesian and Australian researchers discovered the cave painting inside the Leang Karampuang cave.

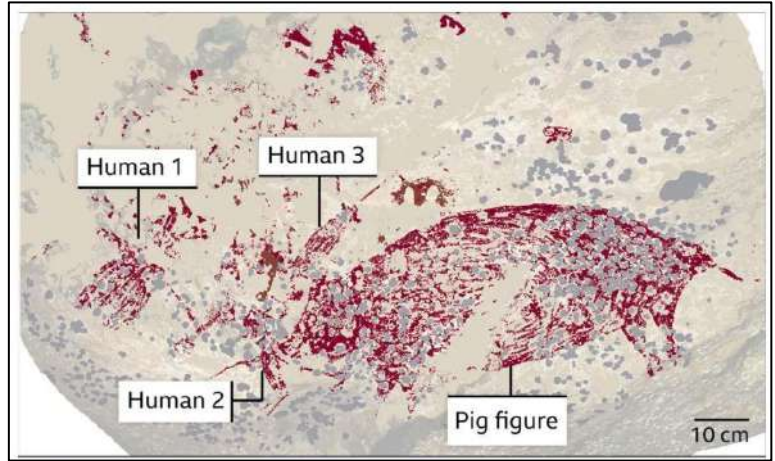
##### Findings

- Location- South Sulawesi, Indonesia.
- These caves on Sulawesi have revealed the world's oldest hunting scene, now dated to at least 48,000 years.
- It is famous for its prehistoric rock art, specifically hand stencils and animal paintings, which are estimated to be around 35,000 to 40,000 years old.
- Evidence- Prehistoric people painted **3 human figures** and a **wild pig** on a limestone cave ceiling using red pigment.
- Flickering torchlight in the dark cave would have brought this art work to life.

- This innovative method is poised to revolutionize rock art dating globally.

### Limestone caves

- Limestone caves are formed when rainwater seeps through cracks in limestone rock and dissolves it.
- Limestone is generally formed in a warm shallow sea where plants and animals thrive.
- **Speleogenesis** - Limestone caves are primarily formed through the process of *chemical weathering*. The process of cave formation is known as speleogenesis.



## 1.3 International Council on Monuments and Sites (ICOMOS)

The Moidams of Assam have been recommended for UNESCO World Heritage status by ICOMOS.

- **About-** ICOMOS is a global **non-governmental organization** dedicated to the conservation and protection of cultural heritage places.
- **Establishment-** In 1965, Warsaw, Poland.
- **Headquarters-** Paris.
- **Objective-** To promote the application of theory, methodology, and scientific techniques in the conservation of architectural and archaeological heritage.
- **Role-** It has a wide range of activities related to heritage conservation, including
  - Advising UNESCO on World Heritage **nominations and management**.
  - Developing international standards, guidelines, and charters for conservation practice.
  - Conducting research, training, and capacity building in heritage conservation.
  - Advocating for the protection of cultural heritage at global, regional, and national levels.

### Moidams of Assam

- Moidams are significant cultural heritage sites found primarily in **Assam**.
- **Period-** Between **13<sup>th</sup> CE to 17<sup>th</sup> CE**.
- **History-** The Moidams situated in Charaideo are the burial grounds of **Ahom kings and queens**.
- These are comparable to the pyramids of Egypt and substances of wonder seen through the brilliant architecture and expertise of the artisans and masons of Assam of the medieval era.
- It is famously called as the **Pyramids of Assam**.
- **Distribution-** Moidams are primarily associated with Assam and neighbouring regions influenced by the Ahom kingdom, such as parts of Arunachal Pradesh and Nagaland.
- **Construction-** Moidams are typically made of **earth and stone**, sometimes reinforced with bricks or terracotta.
- **Management-** The site is jointly managed by 2 separate entities namely, the Archaeological Survey of India (ASI) and the Assam Government's Directorate of Archaeology (DoA).
- It is the only applicant from India which is set to be evaluated at the 46<sup>th</sup> ordinary session of the World Heritage Committee.



## 1.4 Project PARI (Public Art of India)

Recently, the Ministry of Culture launched Project PARI at the 46<sup>th</sup> Session of the World Heritage Committee Meeting in Delhi.

- **Aim** - It seeks to bring forth public art that draws inspiration from millennia of artistic heritage (lok kala/lok sanskriti) while incorporating modern themes and techniques.
- **Nodal Ministry - Ministry of Culture.**
- **Executed by** – The **Lalit Kala Akademi** and the **National Gallery of Modern Art.**
- The first intervention under Project PARI is taking place in **Delhi.**
- The project aims to provide a platform to uplift the aesthetic and cultural outlook of Delhi while adding grandeur to the rich historical legacy of our national capital.
- The artworks and sculptures draw inspiration from World Heritage Sites such as Bhimbetka and the 7 natural World Heritage Sites in India find a special place in the proposed artworks.
- Traditional art forms as well as sculptures, murals, and installations have been created under this beautification project.
- More than **150 visual artists** from all over the country have come together to create the various wall paintings, murals, sculptures, and installations being prepared under this project.
- Women artists have been an integral part of Project PARI and their participation in large numbers is a testimony of Bharat's NARI SHAKTI.

**World Heritage Committee (WHC)**

- The WHC decides on inscription of new sites into the **UNESCO World Heritage List.**
- India will be hosting the meeting for the **first time** in July, 2024.
- The number of UNESCO World Heritage Sites in India grew to **42** with the **'Sacred Ensembles of the Hoysala'** added recently.
- These sites include 34 in the cultural category, seven in the natural category and one mixed property.
- Currently, India has the **6<sup>th</sup> largest number of (UNESCO) sites in the world.**
- The countries that have 42 or more world heritage sites are **Italy, Spain, Germany, China and France.**



### 1.5 Indian Newspaper Society

Recently, the Prime Minister inaugurated INS Towers at the Indian Newspaper Society Secretariat in Bandra Kurla Complex, Mumbai.

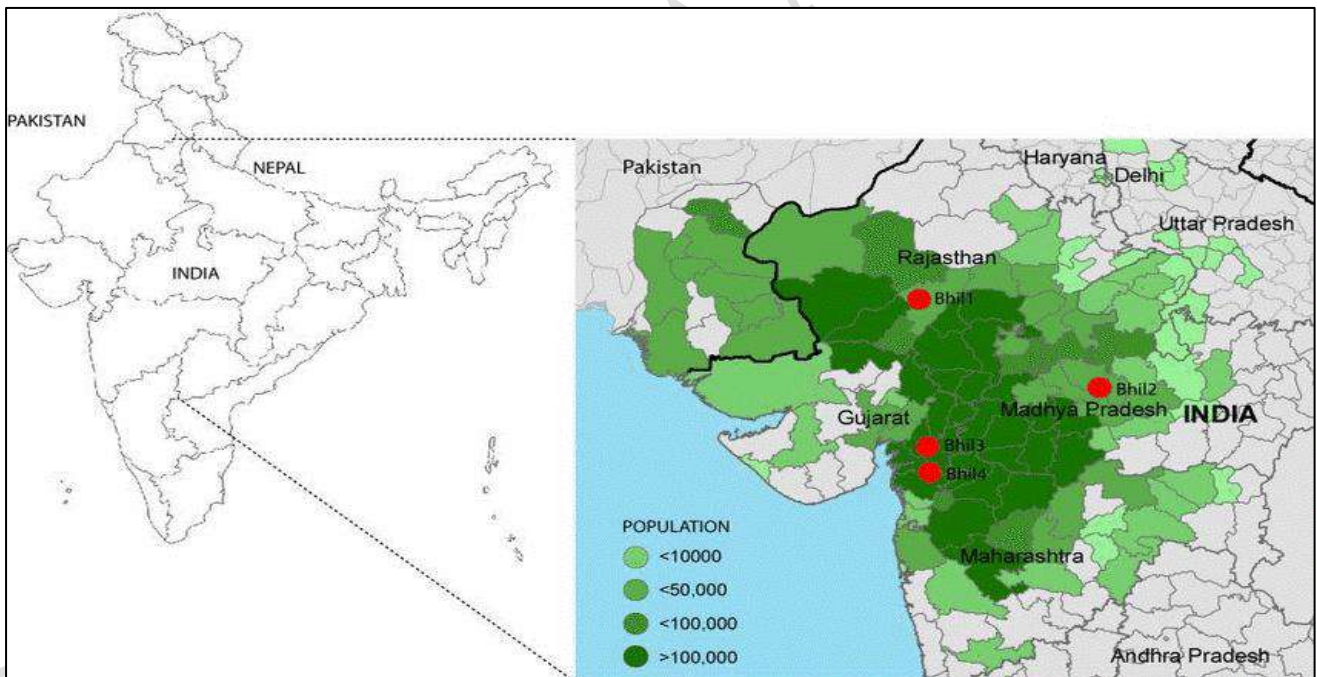
- The Indian Newspaper Society is an independent body authenticating circulation figures of newspapers and periodicals in India.
- It is the central organization of the Press of India.
- **Founded in** - 1939.
- **Headquarters**- New Delhi.
- **Objectives**- To promote **Freedom of the Press** by advocating for the rights and freedoms of newspapers.
- To provide **accreditation** to advertising agencies and ensure they adhere to set standards.
- **Functions**- It advocates lobbying with the government and other regulatory bodies on behalf of the print media industry.

- To collect information on all topics having a practical business interest for its members and to communicate the same to them.
- To promote cooperation in all matters affecting the common business interests of members.
- It recognizes excellence in journalism and other aspects of the newspaper industry through various awards.
- It organizes training, workshops, seminars, and training programs for journalists and media professionals.
- It conducts studies and surveys on various aspects of the newspaper industry, including readership patterns and advertising trends.

## 1.6 Bhil tribe

The Rajasthan tribal community has reiterated their demand for a new state called 'Bhil Pradesh'

- **Bhil tribe** – They are one of the largest indigenous tribal communities in India.
- **Historical origin** - They belong to the race of the **pre-Aryans**.
- The word "Bhil" is derived from the *Dravidian word "Billu,"* meaning bow, reflecting their *traditional skills in archery*.
- **Geographic distribution**- They are predominantly found in the states of **Rajasthan, Madhya Pradesh, Gujarat and Maharashtra**.
- Some population are also found in the north eastern parts of *Tripura*.
- **Classification** – They are classified as:
  - o Central or pure bills
  - o Eastern or Rajput Bhils



- **Language- Bhili**, a language that has many dialects and variations.
- Bhili is part of the Western Zone of the Indo-Aryan languages.
- In different regions, Bhils may also speak the local state languages such as Marathi, Gujarati, or Rajasthani.
- **Economy**- Traditionally, the Bhils are *forest dwellers* and their livelihood is closely linked with the forest.
- They practice agriculture, hunting, and gathering.

Article 3 of the India constitutions states that the Parliament may by law form a new State by separation of a territory from any State or by uniting two or more States completely or in parts or by uniting any territory to a part of any State.

- Shifting cultivation is common among them.
- **Festivals- Baneshwar fair** is their main festival.
- **Kakad Bhairav** – Also known as **Bhilat Baba**, a stone deity worshipped by the Bhils in Madhya Pradesh's Bagh was recently proved to be a fossilized dinosaur egg.

## 1.7 Kalaripayattu

The Union Ministry of Youth Affairs & Sports has officially recognized the Indian Kalaripayattu Federation as the Regional Sports Federation to promote Kalaripayattu across the country.

- Kalaripayattu is considered one of the most ancient martial arts in the world and is popularly known as the **mother of martial arts**.
- **Origin-** The practice of Kalaripayattu is believed to be originated in the **3rd century BC in Kerala**.
- The term Kalaripayattu is derived from two words, "Kalari" meaning place of exercise or gymnasium and "payattu" meaning to fight or exercise
- **Founder-** The **Saint Parshurama**, the 6<sup>th</sup> incarnation of Vishnu is said to be the founder of Kalaripayattu.
- He established 42 Kalaris and taught 21 masters of these Kalaris to protect the land of Kerala.
- Kalaripayattu, a personal combat system, includes exercises to develop sharp reflexes for unarmed combat and skillful use of weapons.
- It is known for its high-flying acrobatics and graceful movements, Kalaripayattu incorporates deadly weapons with ease.
- The movements in Kalaripayattu are inspired by the mannerisms and fighting techniques of animals.
- **Styles of Kalaripayattu**
  - **Vadakkan or Northern style**– The Vadakkan Kalaripayattu is predominantly practiced in the **Malabar region of Kerala**.
  - The Vadakkan style emphasizes more on graceful body movement and the weaponry.
  - **Thekken or Southern Style-** The Thekken Kalaripayattu or Adi Murai is practiced mainly in the **Travancore region**, involves more free armed techniques & powerful movements.
- **Stages of learning in Kalaripayattu**
  - The combat training is given at Kalari.
  - The basic principle of Kalari training is that it starts with an oil massage which goes on till the body is agile and supple.
  - The practice of Kalaripayattu is divided mainly into 4 stages:
    - **Maithari** – Body Control Exercises
    - **Kolthari** – Practise of wooden weapons
    - **Ankathari-** Practice of metal weapons
    - **Verumkai** – Bare hand fighting techniques

## 1.8 Vishnupad Temple and Mahabodhi Temple

The Finance Minister announced during her Union Budget Speech recently that corridor projects will be built for the Vishnupad Temple and the Mahabodhi Temple.

### Vishnupad Temple

- The temple is dedicated to Lord Vishnu located in Gaya, Bihar.
- It was built by **Queen Ahilyabai Holkar in 1787** on the banks of **the Phalgu River**.
- It is around 100 feet tall and has 44 pillars.
- Dharmasila, the footprint of Lord Vishnu etched into a slab of basalt, marks the location of this temple.





- The entire temple is carved by the large **grey granite stones** joint with iron clamps.

### Mahabodhi Temple

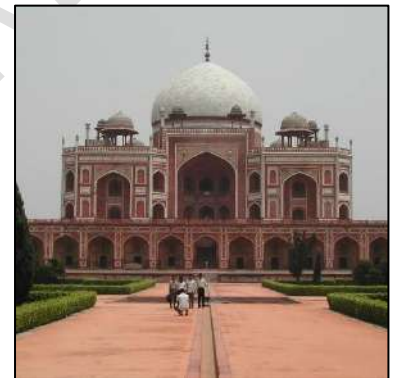
- It is one of the 4 sacred sites associated with the life of Lord Buddha and is significant as the location where Buddha attained Enlightenment.
- It is located in Bodh Gaya in Bihar, on the banks of the **Niranjana River**.
- **Built by** – **Emperor Ashoka** in the 3<sup>rd</sup> century B.C.
- The temple is recognized as a **World Heritage site by UNESCO**.
- The temples is completely built in brick had significant influence on the development of brick architecture over the centuries.



## 1.9 Humayun's Tomb

The Union Minister of Culture and Tourism recently inaugurated the Humayun's Tomb World Heritage Site Museum in New Delhi.

- The tomb is an exemplary piece of **Mughal architecture** and it was the **1<sup>st</sup> garden tomb** on the Indian subcontinent.
- **Construction-** Commissioned by **Bega Begum in 1569-70 and completed in 1572**.
- **Architect-** Designed by **Mirak Mirza Ghiyas** and his son, Sayyid Muhammad, Persian architects chosen by Bega Begum.
- **Design-** Represents the synthesis of Persian and Indian architectural styles, a hallmark of Mughal architecture.
- **Cultural Influence-** Humayun's Tomb inspired the construction of several later Mughal structures, including the Taj Mahal.
- **UNESCO World Heritage Site-** It was listed as a **UNESCO World Heritage Site in 1993** for its cultural importance and exceptional Mughal architecture.
- **Humayun's Tomb World Heritage Site Museum** - The Museum is a facility of the Archaeological Survey of India designed and built in collaboration with the Aga Khan Trust for Culture (AKTC).



## Humayun

- Humayun, born Nasir-ud-Din Muhammad Humayun was the second Mughal Emperor.
- He was the son of Babur, the founder of the Mughal Empire, and the father of Akbar the Great.
- **Born-** March 6, 1508
- **Place of Birth-** Kabul, Afghanistan
- **Died-** January 1556, Delhi
- Humayun played a key role in the development of Mughal painting by bringing Persian artists like **Mir Sayyid Ali and Abdal Samad** to India.
- **Architectural Achievements-** He founded **Dinapanah**, built the Jamali mosque, and started Humayun's Tomb, completed later by his wife, Hamida Banu Begum.

## 2. GEOGRAPHY

### 2.1 Hurricane Beryl

Recently, the Indian cricket team is stranded in Barbados due to Hurricane Beryl.

- **About-** Hurricane Beryl is the earliest **Category 4 Atlantic hurricane** which poses a severe threat to the **Windward Islands**.
- It is currently surging through the Windward Islands, the southern part of the Lesser Antilles, which form part of the West Indies and comprise Barbados, Grenada and Trinidad and Tobago.
- **Wind speed-** 130 miles per hour.

**Tropical Cyclones**

- Tropical cyclones are intense, rotating storms that form over warm tropical or subtropical waters.
- Tropical cyclones are the second-most dangerous natural hazards, after earthquakes.
- Tropical cyclones are referred to by different names depending on where they originate in the world.

*The Windward Islands are a group of islands in the West Indies that make up the southern part of the Lesser Antilles, located in the eastern Caribbean Sea.*

**Characteristics of cyclones**

- **Low pressure**
  - They are **warm-core low pressure** systems without fronts.
- **Organized circulation**
  - They are rotating systems of clouds and thunderstorms with closed, low-level circulation.
- **Favorable conditions**
  - They typically form when atmospheric conditions are favorable and the sea surface temperature is **above 26.5 °C**
- **Spin**
  - They spin **clockwise in the southern hemisphere** and **anticlockwise in the northern hemisphere** due to the Coriolis Effect.

<b>Hurricanes</b>	Tropical cyclones that form over the Atlantic Ocean or the eastern Pacific Ocean.
<b>Typhoons</b>	Tropical cyclones that form in the Northwest Pacific.
<b>Cyclones</b>	Tropical storms that form in the Bay of Bengal or the Arabian Sea.

**2.2 Minami-Torishima Island**

*Japanese researchers have recently discovered a trove of magnesium deposits essential for electric car batteries around the Minami-Torishima Island*

- It is also known as **Marcus Island**, is an isolated Japanese coral atoll in the north western Pacific Ocean.
- The shape of the island is close to an equilateral triangle.
- **Location-** Minami-Torishima is situated about 1,848 kilometers **southeast of Tokyo, Japan**.
- **Latitude** - Its latitude is about the same as that of Ishigaki and Iriomote Islands, and the longitude is slightly east of Sydney's.
- **Topography-** It's located on the **Marcus-Necker Ridge**, and the only land of it in Japan on the Pacific Plate.
- The Island is relatively flat and low-lying, with its highest point being only a few meters above sea level.
- **Climate-** Located in the transitional zone between tropical and subtropical climates, it has an oceanic climate with an average annual temperature of around 25.6°C.
- **Exclusive Economic Zone (EEZ)** - The exclusive economic zone based on the baseline of the Minami torishima Island is larger than Japan's land area.

*Atoll is a ring-shaped reef including rim which is present around a lagoon.*



*EEZ is an area of the ocean, generally extending 200 nautical miles (230 miles) beyond a nation's territorial sea, within which a coastal nation has jurisdiction over both living and nonliving resources.*

- **Current Status-** The island is administered by Japan as part of the **Tokyo Metropolis**.

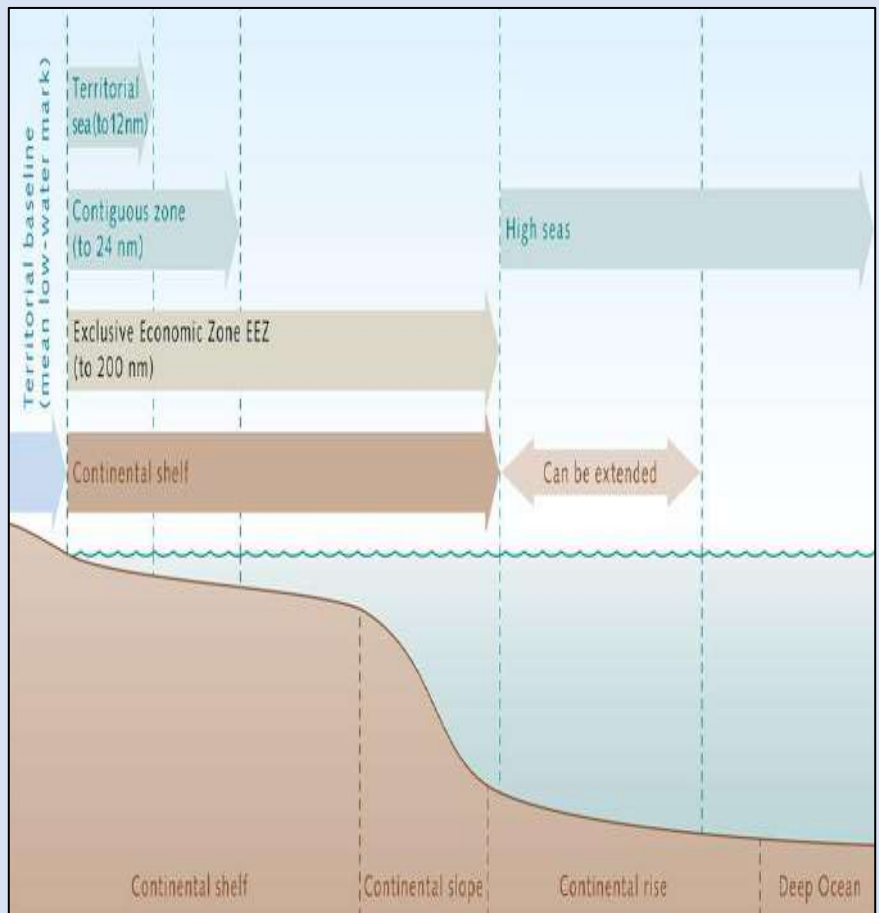
### 2.3 Biodiversity Beyond National Jurisdiction (BBNJ) Agreement

Recently, the Union Cabinet of India approves to sign of the Biodiversity beyond National Jurisdiction (BBNJ) Agreement.

- The BBNJ Agreement, or the 'High Seas Treaty', is an international treaty under the **United Nations Convention on the Law of the Sea (UNCLOS)**.
- **Aim-** To address the growing concerns over the long-term protection of marine biodiversity in the high seas.
- It sets precise mechanisms for the sustainable use of marine biological diversity through international cooperation and coordination.
- **SDG Goal-** It contribute to achieving SDG14 (Life below Water).
- **Pillars-** The BBNJ Agreement consists of the following 4 pillars:
  - Marine genetic resources, including the fair and equitable sharing of benefits
  - Measures such as area-based management tools, including marine protected areas
  - Environmental impact assessments
  - Capacity-building and the transfer of marine technology.
- **Members -** As of now, 91 countries have signed the BBNJ Agreement, and eight Parties have ratified it.
- It aims to protect biodiversity and achieving the objective to protect at least 30% of the planet by **2030**.

#### United Nations Convention on the Law of the Sea (UNCLOS)

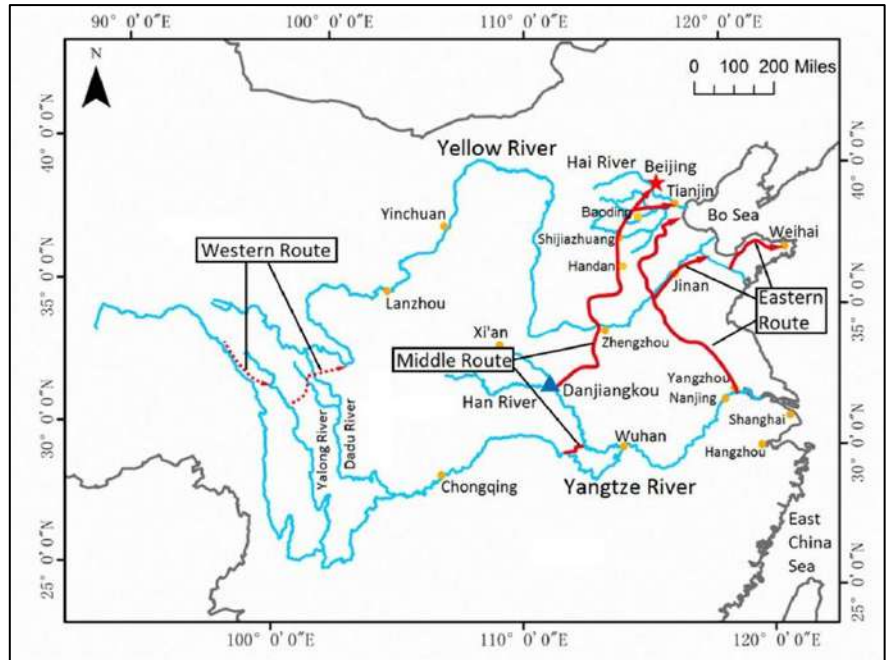
- It is crucial for the environmental protection of the seas and addressing maritime boundaries, rights to marine resources, and dispute resolution.
- It is also known as **Law of the Sea**.
- It is the only international convention which stipulates a framework for state jurisdiction in maritime spaces.
- It provides the backbone for offshore governance by coastal states and those navigating the oceans.
- It divides marine areas into 5 main zones namely- Internal Waters, Territorial Sea, Contiguous Zone, Exclusive Economic Zone (EEZ) and the High Seas.
- **Operation-** UNCLOS was adopted on 1982 and came into force on 1994.
- **Mining regulation-** It establishes the International Seabed Authority to regulate mining and related activities on the ocean floor beyond national jurisdiction.
- **Members-** Presently, more than **160 countries** have ratified UNCLOS.
- **India** is a state party to the UNCLOS.



### 2.4 Upper Siang Hydroelectric project

The government authorities have detained two anti-dam activists protesting against the Upper Siang Hydroelectric project.

- The Upper Siang project is a significant hydropower project on the **Siangriver** in the Upper Siang district of Arunachal Pradesh.
- **Type- Run-of-the-river** hydroelectric project with a dam.
- **Capacity-** Initially proposed at around **10,000 MW**, making it one of the largest hydroelectric projects in India
- **Project Developer-** NHPC (public sector Hydropower Company), North Eastern Electric Power.
- **Components-** Includes a large dam, underground **powerhouses**, and **extensive tunnelling systems**.



- **Objectives-** To boost India's hydroelectric capacity and providing a substantial amount of renewable energy.
- To foster economic development in the northeastern region of India, including **improved infrastructure and job creation**.

Siang River	
<ul style="list-style-type: none"> <li>• <b>Geographical Importance-</b> The project is situated in a remote, mountainous region, known for its challenging terrain and rich biodiversity.</li> </ul>	<ul style="list-style-type: none"> <li>• The Siang River, also known as the Dihang River, is a major river in the Indian state of Arunachal Pradesh.</li> <li>• It is part of the Brahmaputra River system and plays a crucial role in the hydrology and ecology of the region.</li> <li>• The Siang River originates in the glaciers of the Himalayas in Tibet, where it is known as the Yarlung Tsangpo.</li> </ul>

## 2.5 Chagos Archipelago

India has reiterated its support for Mauritius in its sovereignty dispute with the UK over the Chagos archipelago.

- **Chagos Archipelago** – It is a group of islands located in the central Indian Ocean.
- **Location-** It is situated approximately 1,600 kilometers (1,000 miles) south of India and Sri Lanka.
- **Physiography-** It consists of about 60 small islands, with the largest and most significant being Diego Garcia.
- **Climate-** They have a tropical climate with warm temperatures year-round, high humidity, and seasonal rainfall.
- **Biodiversity-** It is known for its rich biodiversity, including coral reefs, various species of fish, and seabirds.
- It is part of the British Indian Ocean Territory Marine Protected Area, which aims to conserve its unique marine environment.



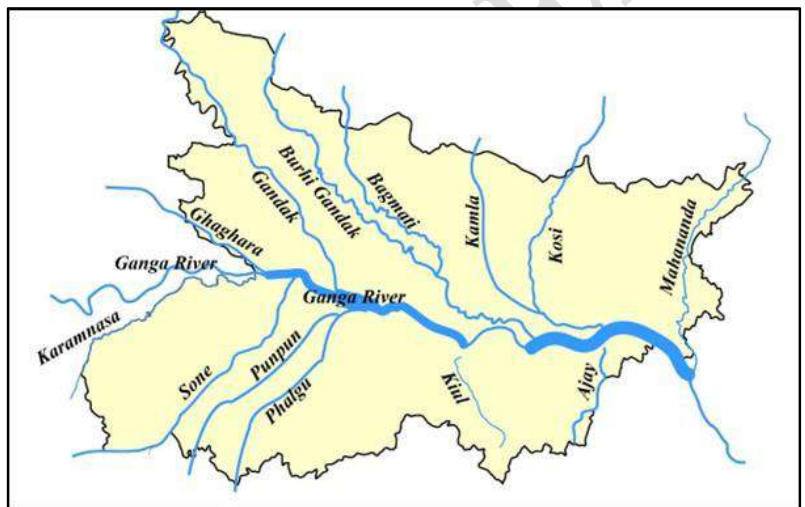
- **Territorial dispute-** The dispute is between Mauritius and the United Kingdom (UK).

- **Historical background-** It was originally a part of the British colony of Mauritius.
- In 1965, the UK separated it from Mauritius and established it as the *British Indian Ocean Territory (BIOT)*.
- In 1966, Britain *leased Diego Garcia to the United States*, which was seeking a military base in the region.
- Mauritius, which gained independence from Britain in 1968, has consistently maintained its claim over the Chagos Islands
- **Current status** – In 2019, the *International Court of Justice* ruled that the *UK had no right to govern* the Chagos Islands and urged it to withdraw from the archipelago.

## 2.6 Bagmati river

The Chief Minister of Bihar has repeatedly raised concerns about the Bagmati River's annual flooding with multiple leaders from Nepal.

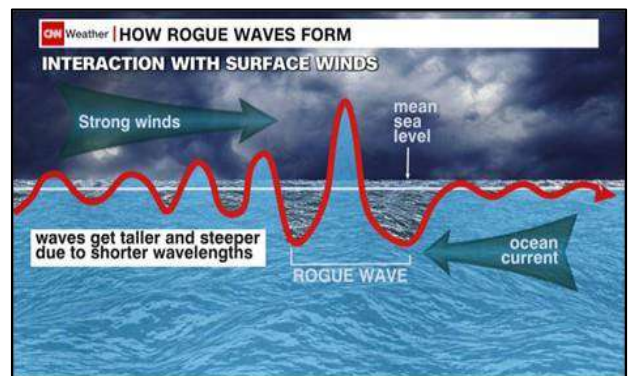
- Bagmati River is a transboundary river between the **Nepal and India border**.
- The Bagmati flows from Nepal and crosses the Bihar before meeting the river Kamla in Samastipur and flows southward through the Shivalik Range (southernmost range of the Himalayas).
- **Origin- Shivapuri Hills** to the north of Kathmandu, Nepal.
- **Mouth of the River-** The River ultimately joins the Narayani River.
- The merged waters of the Bagmati and Narayani eventually make their way southward and into the Ganges.
- **Tributaries-** Bishnumati River, Manohara River, Dhobi Khola River.
- The river is currently swollen, is a major cross-border river flowing through Bihar's plains, carrying significant water from Nepal's Himalayas.
- **Hindu pilgrimage-** Located on the river's edge, the **Pashupatinath Temple, UNESCO world heritage site** is an important Hindu pilgrimage site dedicated to Shiva.
- **New course-** The river had a different course, draining directly into the Ganga, but it is the new course that has created the flooding issue.



## 2.7 Rogue waves

Researchers have recently developed a new tool to predict rogue waves.

- A rogue wave is a large, unexpected, and dangerous ocean wave that can be more than twice the size of the surrounding waves.
- These waves are also called as **freak, extreme storm waves, or killer waves**.
- **Causes** - Rogue waves can be caused by a **combination of waves and currents**, or by multiple wind-driven wave crests stacking up at a single point.
- They can also be caused by constructive interference or gale-force winds.
- **Direction** - They may move in either the **same direction, the opposite direction, or at oblique angles** to the prevailing wind and wave motion.

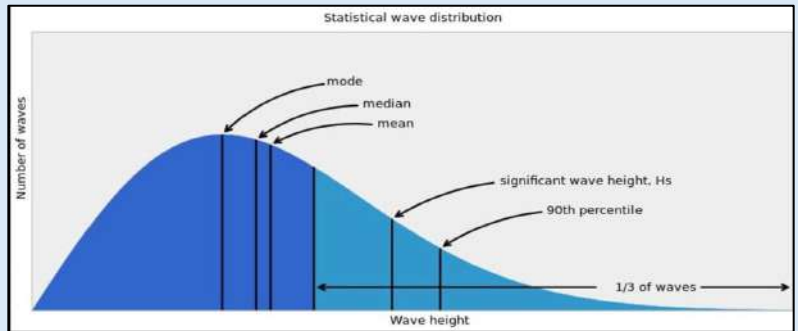


- **Appearance** - Rogue waves are often steep-sided with deep troughs and can look like walls of water.
- **Size** - They can reach heights of up to **30 meters** and can come from unexpected directions, even opposite to the prevailing wind and waves.
- **Threats** - Rogue waves can pose a threat to ships, coastal infrastructure, and human lives.
- **Promise of AI**- This program subsequently predicted about **75%** rogue waves 1 minute in advance.
- Roughly **73%** of rogue waves could be predicted 5 minutes in advance.

The Draupner wave is the highest confirmed rogue wave known. However, the most extreme rogue wave occurred in the Pacific Ocean in 2020 was more than 3 times higher than the surrounding waves.

### Quick facts

- **Significant Wave Height**- It is the average of the highest one-third of waves that occur over a given period.
- It is defined traditionally as the mean wave height (trough to crest) of the highest third of the waves.
- It should be noted that some individual waves might be much larger than this.



## 2.8 Extreme Weather Events in India

India has recently experienced extreme weather conditions, including heavy rain, floods, droughts, and cyclones, which some experts attribute to climate change.

### Extreme weather events

- It refers to significant variations in weather that can lead to severe and often destructive conditions.
- Examples include heatwaves, cold waves, heavy precipitation (like floods), tornadoes, tropical cyclones, and droughts.
- These events are often short-lived but can have devastating impacts on communities and ecosystems.
- **Causes**
  - Climate Change
  - Natural Climate Variability
  - Atmospheric Conditions
  - Geographical Factors
  - Human Activities
  - Seasonal Changes

### Extreme weather events in India

Events	Location	Impacts
Heatwave and Floods, 2023	New Delhi	Casualties
Storms and Floods, 2023	Mumbai	Casualties
Flooding and Landslides, 2023	Assam	Animal population decreased including rare one-horned rhinoceroses, drowned in <b><u>Kaziranga National Park</u></b> .

<b>Cyclone, 2023</b>	<b>Southern India</b>	Casualties
<b>Himalayan Glacial Lake Outburst, 2023</b>	<b>Sikkim</b>	High Casualties
<b>Landslide, 2021</b>	<b>Uttarakhand</b>	Destroyed 2 Hydro-electric projects
<b>Landslide, 2023</b>	<b>Near Mumbai</b>	Casualties
<b>Floods, 2018</b>	<b>Kerala</b>	40% more rainfall than usual with Heavy casualties

### 3. POLITY

#### 3.1 Kangaroo Courts

Tajimul Islam, known for presiding over such 'salishi sabhas' (kangaroo courts) recently arrested after a video of him whipping a woman and a man surfaced on social media.

- It is as **unofficial court** held by a group of people used to refer to proceedings or activities where a judgement is made in a manner that is unfair, biased, and lacks legitimacy.
- Their decisions are **not legally binding**.
- Kangaroo courts first appeared in the United States at the time of the 1849 California Gold Rush, and the term was first used in the southwestern United States.
- It first appeared in print in 1853 in a Texas book.
- Some dictionaries say the association with the animal could have a relation to Australians, though the term probably originated in America.
- **Drawbacks of the courts**
  - **No legality** - These informal courts, run by individuals with no legal authority. They operate outside the bounds of the official judicial system.
  - **Unfairness** - The rule of law gives way to the rule of individuals wielding unchecked power.
  - The procedure here is only conducted as a formality.
  - **Lack of Accountability** - Judges and decision-makers are frequently not accountable to any higher authority, it is difficult to hold them accountable for any wrongdoing.
  - **No appeal** - The courts doesn't allow for appeal against their judgment.
  - **Swift and Harsh Punishments** - Kangaroo courts frequently impose swift and harsh punishments, often without regard for the gravity of the crime or the circumstances of the accused.
  - **Mob Mentality** - Rather than pursuing justice, kangaroo courts may be motivated by mob mentality or a desire for vengeance.
- **Examples of kangaroo courts** - Lynch mobs, military tribunals that do not follow due process, and workplace tribunals that are set up to target employees unfairly.

#### 3.2 Anand Marriage Act

Recently, the National Commission of Minorities held a meeting with states and Union Territories to discuss the implementation of the Anand Marriage Act.

- **About-** The Anand Marriage or Sikh Marriage Act is legally recognizing and **protects Sikh marriages** conducted through the Anand Karaj ceremony.
- **Emergence** – It dates back to 1909 when the British Imperial Legislative Council passed a legislation for the recognition of the Sikh wedding ceremony Anand Karaj.

- **Legal Recognition-** In 2012, the Parliament passed the Anand Marriage (Amendment) Bill, bringing Sikh traditional marriages under the purview of legal recognition.
- While the central government approved the amendments, it was left for individual states and Union territories to frame respective rules for the registration of Anand marriages.
- It also protects the rights and responsibilities of Sikh couples within the framework of legal marriage.
- **Objective-** To address concerns from the Sikh community regarding the validity of their marriages under **existing Hindu marriage laws.**
- **Implementation-** States including **Jharkhand, Maharashtra, and Meghalaya** have reported implementing the Anand Marriage Act.

### 3.3 National Company Law Tribunal

Recently, the Bengaluru bench of the National Company Law Tribunal (NCLT) admitted BCCI's petition seeking insolvency proceedings against ed-tech giant Byjus.

- It is a **quasi-judicial authority** incorporated for dealing with corporate disputes that are of civil nature arising under the **Companies Act.**
- **Ministry** - Ministry of Corporate Affairs.
- **Background** - It is the outcome of the **Eradi Committee.**
- The NCLT functions like a regular court, ensuring fair, unbiased case evaluations based on principles of natural justice.
- It issues decisions in the form of orders.
- **Appeals** - Decisions of the tribunal may be appealed to the National Company Law Appellate Tribunal, the decisions of which may further be appealed to the Supreme Court of India on a point of law.
- **Major Functions of NCLT**
  - It has been empowered to take several steps, from canceling the registration of a company to dissolving any company.
  - The Tribunal could even render the liability or charge of members unlimited.
  - It is also empowered to hear grievances of rejection of companies in transferring shares and securities and under section 58- 59 of the Act.
  - It has the power to order an investigation. It could be conducted within India or anywhere in the world.

#### National Commission for Minorities

- The National Commission for Minorities (NCM) is a **statutory body** established to safeguard and protect the rights of religious and linguistic minorities in the country.
- It was set up under the National Commission for Minorities Act, 1992.
- **Functions and Powers-** It ensure that the constitutional and legal safeguards for the protection of minorities are implemented effectively.
- It evaluates the progress of the development of minorities under the Union and States.
- It makes recommendations for the effective implementation of safeguards and measures for the protection of minorities.
- It advises the central government on minority-related issues.
- **Civil Court Powers-** The NCM has the powers of a civil court while investigating any matters related to deprivation of rights of minorities.
- **Notified minority communities (6)** – Muslims, Christians, Sikhs, Buddhists, Zoroastrians (Parsis), Jains.
- As per the 2011 Census, The 6 religious minority communities constitute around 20% of the country's population.

### 3.4 Governing rules on civil servants

The Centre has formed a single-member committee to review all documents submitted by probationary IAS officer Puja Khedkar for her civil services candidature.

- All IAS, Indian Police Service (IPS) and Indian Forest Service officers are governed by the **All India Services (conduct) Rules, 1968** from the time they are allotted their service, and begin training.



- **AIS (Conduct) Rule 3(1)** - Every member of the Service shall always maintain absolute integrity and devotion to duty and shall do nothing unbecoming of a member of the Service.
- **Rule 4(1)** - Officers must not use their “position or influence” to “secure employment for any member of his family with any private undertaking or NGO”.
- **Rule 11(1)** - Officers may accept gifts from close relatives or friends without official dealings on special occasions but must report gifts over Rs 25,000.
- **Rule 12**- It outlines circumstances for discharging probationers, including being found ineligible or unsuitable by the central government, willfully neglecting probationary studies or duties, and lacking necessary qualities of mind and character.
- **Few sub-rules**
- Officers should maintain ***high ethical standards***,
  - Integrity and honesty;
  - Political neutrality;
  - Accountability and transparency;
  - Responsiveness to the public, particularly to the weaker sections; courtesy and good behavior with the public.
- They must take a decision solely in the public interest.
- Declare any private interests relating to his public duties.
- Not place himself under any financial or other obligations to any individual or organization which may influence him.
- Not misuse his position as civil servant and not take decisions to derive financial or material benefits for himself, his family or his friends.

### 3.5 Shadow Cabinet

Recently, Leader of the Opposition (LoP) in Odisha has formed a Shadow Cabinet in legislative assembly to track Government Works.

- **Origin** – It is a unique system of British Cabinet system.
- **Shadow Cabinet** – It is formed by the opposition party to balance the ruling cabinet and to prepare its members for future ministerial office.
- Almost every member in the ruling cabinet is 'shadowed' by a corresponding member in the opposition cabinet.
- **Role** - It serves as the 'alternate cabinet' if there is change of government.
- **Existence** – United Kingdom, Australia, Canada, and New Zealand.
- In Britain, the opposition enjoys an official recognition and is well organised as the government and thus runs a 'Parallel' government with its shadow cabinet.
- **In India** – As of now, there is no official shadow cabinet formed in the Parliament and is not mandated by the law.
- The Parliament can amend its rules to formally recognize the LoP and grant them the right to appoint a shadow cabinet.
- Previously, Maharashtra, Kerala, Madhya Pradesh, and Goa governments has experiments with Shadow Cabinet in India.
- In Odisha, 50 MLAs were assigned various departments for monitoring the policies and programmes implemented by the ruling government in the state.
- **Benefits** – By shadowing each ministries, MLAs/MPs can gain knowledge, expertise, and enabling them to participate during assembly debates.

*Ivor Jennings described the leader of Opposition as the 'alternative Prime Minister' considering the importance of shadow cabinet.*

### 3.6 Enemy Property

Indian government has begun auction properties belonging to erstwhile citizens of the country who now hold Pakistani and Chinese citizenship.

- **Enemy Property** – Is a property of the erstwhile citizens of India, who now hold the passports of Pakistan and China, the enemy countries of India.
- The ‘enemy properties’ is any property that belongs to and held or managed on behalf of an enemy, an enemy subject, or an enemy firm.
- **Custodian of Enemy Property for India (CEPI)** – Is a department under the Ministry of Home Affairs.
- The “enemy properties” are vested by the central government under the CEPI.
- The vested properties are further divided into moveable and immovable enemy properties.
- **Regulation** – The enemy properties are regulated by the Enemy Property Act, 1968.
- The Act enables the state to regulate and appropriate real estate belonging to erstwhile citizens of the country who now hold Pakistani and Chinese passports.

**Amendment** – In 2017, Parliament passed two acts:

- The Enemy Property (Amendment and Validation) Act, 2017, which amended The Enemy Property Act, 1968 and
- The Public Premises (Eviction of Unauthorised Occupants) Act, 1971.

Uttar Pradesh has the maximum number of enemy property, followed by West Bengal.

- The amendment expanded the meaning of the term “enemy subject”, and “enemy firm” to include:
  - The legal heir and successor of an enemy, whether a citizen of India or a citizen of a country which is not an enemy and
  - The succeeding firm of an enemy firm, irrespective of the nationality of its members or partners.
- Even if the enemy or enemy subject or enemy firm ceases to be an enemy due to death, the enemy property vests with CEPI.
- **Verdict of Kerala High Court** – According to the case Kunji Koya vs. High Court of Kerala, the High Court underlined that **“A person working in Pakistan, cannot be called as an enemy”**.

### 3.7 President & Governor’s immunity under Article 361

Recently, the Supreme Court agreed to hear a plea to redefine the constitutional immunity of state Governors.

- Article 361 of the Constitution that deals with **immunity to the President and the Governors**.
- **Origin**- The protection given to the President and the Governor can be traced to the Latin maxim *rex non potest peccare* or **“the king can do no wrong”**, which is rooted in English legal traditions.
- **Constitutional immunity** - Article 361 states that the President, or the Governor of a state shall not be answerable
  - To any court for the exercise and performance of the powers and duties of his office; or
  - For any act done or purporting to be done by him in the exercise and performance of those powers and duties.
- **Two sub-clauses of immunity**- First, the provision further **says no criminal proceedings** whatsoever shall be instituted or continued against them.
- Second, **no process for the arrest or imprisonment** can take place while the President, or the Governor, holds office.
- However, civil proceedings can be carried against them for their acts after 2 months' notice.

### 3.8 Genetic Engineering Appraisal Committee (GEAC)

Recently, the Supreme Court has ruled against the commercial sale and release of genetically modified mustard in India for now.

- GEAC is the **statutory committee** constituted under
  - The Rules for the Manufacture, Use/Import/Export, and Storage of Hazardous Micro Organisms/Genetically Engineered Organisms or Cells (Rules, 1989) framed under the **Environment (Protection) Act, 1986**.
- **Nodal Ministry**- Ministry of Environment, Forest and Climate Change (MoEF&CC).
- **Mandate**- It is responsible for the appraisal of activities involving large-scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle.
- **Objective**- The committee is also responsible for appraisal of proposals relating to release of **genetically engineered (GE) organisms** and products into the environment including experimental field trials.
- **Composition**- The GEAC is chaired by the Special Secretary/Additional Secretary of MoEF&CC and co-chaired by a representative from the Department of Biotechnology (DBT).
- Presently, it has **24 members** and meets **every month** to review the applications in the areas indicated above.
- **Functions**- The functions of GEAC as prescribed in the Rules 1989 are as follows
  - To appraise activities involving large-scale use of hazardous microorganisms and recombinants in research and industrial production from the environmental angle.
  - To appraise proposals relating to the release of genetically engineered organisms and products into the environment including experimental field trials.
  - The committee or any persons authorized by it has powers to take punitive action under the Environment Protection Act.

### 3.9 Panchamasali Lingayats

Members in Panchamasali Lingayat community hold a rally demanding the inclusion of the community in the 2A reservation category, in Bengaluru.

#### Lingayats

- Lingayat term denotes a person who wears a personal linga, an iconic form of the god Shiva, on the body which is received during the initiation ceremony.
- Lingayats are the followers of 12<sup>th</sup>-century philosopher-**saint Basavanna**, who started an anti-caste movement that rejects the orthodox ritualistic Hindu practices.
- They are strict **monotheists** who follow only one god, Lord Shiva.
- Lingayats had been classified as a Hindu subcaste called “Veerashaiva Lingayats”.
- **Sub-sects** - Prominent sub-sects include the Panchamasalis, Ganiga, Jangama, Banajiga, Reddi Lingayat, Sadars, Nonaba and Goud-Lingayats.
- All these sub-sects practise the same rituals at the time of births, weddings and deaths.
- For instance, the dead are buried in sitting positions among Lingayats.
- Members of the community carry their Ishta Linga suspended in a silver box around their necks.
- **Category** – Currently Lingayats will fall into **3(B) category**.

Lingayats are believed to be the single largest caste group in Karnataka and account for nearly 17% of the state's population.

#### Panchamasali Lingayats

- It is a sub-section within the Lingayat community, and they are often involved in agriculture and community service.
- **Recent Demands** - They are demanding a **2A category reservation under the OBC list**.
- In 2A category reservation these communities will get preferential reservations of 15% in government jobs and educational institutions.
- There is a demand that the community be identified only as “Lingayat”, and not “Veerashaiva Lingayat” in caste certificates.

- In the Hindu Marriage Act, 1955 and Hindu Succession Act, 1956 Lingayats, Buddhists, Jains, and Sikhs are included among Hindus.
- State and Central governments identified Buddhists, Sikhs and Jains as minority religions in 1993, 1963, and 2014 respectively.
- But, Lingayats remain unrecognized under a separate religious status.

### 3.10 DIGIPIN

The Department of Post has released a beta version of DIGIPIN (Digital Postal Index Number), intended as a permanent digital infrastructure for national addressing.

- **DIGIPIN code-** It is designed as a **permanent digital infrastructure** that will not change with changes in the names of the state, city, or locality, or changes in the road network.
- **Developed by** - Postal department and IIT Hyderabad.
- DIGIPIN will use one of the **16 alphanumeric symbols** (2,3,4,5,6,7,8,9,G,J,K,L,M,P,W,X).
- The first character for the DIGIPIN will identify one of these **16 regions**.
- The entire country will first be divided into 16 regions (4X4), including the maritime Exclusive Economic Zone (up to 200 nautical miles from the coastline).
- This code will then be used as the offline addressing reference for any specific location within the DIGIPIN system.
- It can be used to provide addresses for Indian assets in the sea such as oil rigs, future artificial islands, etc.
- It will act as a pillar of Geospatial Governance, leading to enhancements in public service delivery, faster emergency response, and logistics efficiency.
- It will serve as an addressing reference system, using a logical naming pattern to provide directional properties for accurately locating addresses.
- The DIGIPIN is proposed to be fully available in the public domain and can be easily accessed by everyone.
- DIGIPIN can also be used for emergency rescue operations and national disasters such as floods

### 3.11 Appointment of Governor

Recently, the President appointed new Governors for Rajasthan, Telangana, Maharashtra, Punjab, Sikkim, Meghalaya, Assam, Jharkhand, and Chhattisgarh.

- **Constitutional Provision-** Article 153 of the Indian Constitution mandates a Governor for each State.
- A 1956 amendment allows the same person to be Governor for multiple States.
- **Appointment Procedure-** Article 155 specifies that the President appoints the Governor by warrant under their hand and seal.
- According to Article 156, the Governor serves at the President's pleasure, typically for five years.
- **Central Government Influence-** The President, acting on the advice of the Prime Minister and Union Council of Ministers, effectively appoints and can remove the Governor.
- **Eligibility Criteria-** Articles 157 and 158 require the Governor to be:
  - An Indian citizen,
  - At least 35 years old,
  - Not a member of Parliament or state legislature and
  - Not holding any other office of profit.

### Relationship with State Government

- **Advisory Role-** The Governor, as per Article 163, acts on the advice of the state's Council of Ministers, headed by the Chief Minister, except when exercising discretionary functions.
- **Powers and Significance-** The Governor has significant powers, including assent to state Bills, determining legislative majorities, and calling parties to prove their majority in case of a hung verdict.

#### 4. GOVERNMENT INTERVENTIONS & SCHEMES

##### 4.1 Saubhagya scheme (Pradhan Mantri Sahaj Bijli Har Ghar Yojana)

The Meghalaya government recently issued notifications for the alleged irregularities in the implementation of the Saubhagya scheme in the state.

- It is a scheme to **ensure electrification (24x7) of all willing households** in the country in rural as well as urban areas.
- **Aim**
  - Last mile connectivity and electricity connection to all un-electrified households in rural areas;
  - Last mile connectivity and electricity connection to all remaining economically poor un-electrified households in urban areas.
- **Launched in** – 2017.
- **Nodal agency** - Rural Electrification Corporation Limited (REC).
- **Implemented by** - Ministry of Power.
- **Target** - The States and Union Territories are required to complete the works of household electrification by the 31<sup>st</sup> of December 2018 and further extended to March, 2019.
- **Beneficiaries** - The beneficiaries for free electricity connections would be identified using Socio Economic and Caste Census (SECC) 2011 data.
- Non-poor urban households are **excluded** from this scheme.
- It is a concurrent program to **Deen Dayal Upadhyaya Gram Jyoti**.
- **Solar for remote areas** - Solar Photovoltaic (SPV) based standalone system for un-electrified households located in remote and inaccessible areas.
- It also includes the Repair and Maintenance (R&M) for 5 years.

Deen Dayal Upadhyaya Gram Jyoti is a scheme designed to provide continuous electricity supply to rural India.

##### 4.2 Right to Repair Portal

The Union government recently collaborates with automobile associations and partner companies to onboard them onto the Right to Repair Portal in India.

- **About-** The Right to Repair Portal India aims to empower consumers by
  - Providing easy access to repair information,
  - Promoting reuse,
  - Contributing to the circular economy, and
  - Reducing e-waste efficiently.



- **Nodal office-** Department of Consumer Affairs.
- **Nodal Ministry-** Ministry of Consumer Affairs, Food and Public Distribution.

- **Aim-** To uphold **consumer rights** and respond to evolving concerns regarding **hassle free product repairs**.
- Under this framework, it would be mandatory for manufacturers to share their product details with customers so that they can either repair them by self or by third parties, rather than only depending on original manufacturers.

### 4.3 New Food Packaging Rules

Recently, The FSSAI approved an amendment to the Food Safety and Standards (Labelling and Display) Regulations, 2020, concerning nutritional information labeling during its 44th meeting.

- **New rules on Nutritional information** - It has mandated the display of nutritional information on **total sugar, salt, and saturated fat** in bold letters and larger font sizes.
- **Aim of the new rules** - The proposed amendments aims to empower consumers to better understand the nutritional value of the products they consume, promoting healthier decisions.
- **e-commerce** - FSSAI advised e-commerce sites to remove the term "health drink" and directed food businesses to stop labeling and advertising reconstituted fruit juices as **"100% fruit juice."**
- **Governing body** - In India, the **Food Safety and Standards Authority of India (FSSAI)** serves as the authority that mandates food labeling standards.
- **Penalty on noncompliance** - Any unintentional breach of FSSAI food labeling standards and failure to secure a Food Business license may lead to consequences such as fines, penalties, product recalls, or delays in product launches.

As per the FSSAI, regulations 2 (v) and 5(3) of the FSS (labeling and display) regulation, 2020, specify requirements to mention serving size and nutritional information on the food product label, respectively.



### 4.4 e-FAST India (Electric Freight Accelerator for Sustainable Transport – India)

NITI Aayog announced the launch of the NITI GearShift Challenge as part of the e-FAST India initiative.

- The e-FAST India initiative is the country's 1st platform to facilitate collaboration between government stakeholders and private sector partners to shape strategies and actions that support freight electrification at scale.
- **Aim-** It aims to raise awareness on **freight electrification** bolstered by on-ground demonstration pilots, and evidence-based research.

- **Launched by** - NITI Aayog, in collaboration with World Resources Institute (WRI).
- Supported by the World Economic Forum, CALSTART, and RMI India, the platform brings different stakeholders together, from across the freight ecosystem.
- e-FAST India also aimed at accelerating freight electrification in India.
- e-FAST was born from the recognition of the urgent need to decarbonize road-based freight transportation in India to realize its 2070 net zero commitments.
- **NITI GearShift Challenge**- This invites students, transport professionals, academics, and researchers to create innovative business models tackling financial, technical, and operational challenges in electric truck adoption.
- The GearShift Challenge is a pivotal step towards sustainable freight transportation in India.
- The program has gained support from e-FAST India knowledge partners, financial institutions, and industry forums.

*NITI GearShift Challenge, a hackathon aims to develop practical solutions to accelerate the adoption of zero-emission trucks, benefiting both the economy and the environment.*

*Currently, around 71% of freight in India is transported by road. Freight activity is projected to increase five-fold by 2050, leading to a vehicle stock of about 50 million.*

#### 4.5 Emergency Credit Line Guarantee Scheme (ECLGS)

A report recently released shows that the ECLG scheme extended liquidity support of over ₹3.68-lakh crore to 1.19 crore businesses in just a 3-year tenure between May 2020 and March 2023.

- **Aim** - It was aimed to support businesses and individuals affected by the **COVID-19 pandemic**.
- **Launch** - 2020.
- **Ministry** - It is under the operational domain of the Ministry of Finance, Department of Financial Services (DFS).
- The scheme aims to provide emergency funding to mitigate the economic impact of the pandemic.
- It is a **part of the Atmanirbhar Bharat Abhiyan**.
- **Objective** - The scheme is designed to ease the financial burden by providing an additional source of funding with minimal interest rates and extended repayment terms.
- **Funding** - The overall ceiling initially announced for ECLGS was Rs 3 lakh crore which was subsequently enhanced to Rs **4.5 lakh crore**.
- However, ECLGS being a **demand-driven scheme**, sanctions are made by lending institutions based on assessment of borrower's requirement and their eligibility.
- **Guarantee** - The scheme provides a 100% guarantee on the credit facilities extended by banks and financial institutions.
- **Interest rates** - The government has capped the interest rate under ECLGS scheme at
  - **9.25% for Banks** and Financial Institutions and
  - **14% for Non-Banking Financial Institutions**.
- This scheme also offers a **one-year moratorium** on payment of principle component.
- **Implementation** - The scheme is administered through public sector banks, private sector banks, and non-banking financial companies (NBFCs).

#### 4.6 Srijan portal

Department of Defence Production, Ministry of Defence has notified the 5<sup>th</sup> Positive Indigenization List on the Srijan Portal.

- It is a non-transactional online portal for promoting indigenization in defence production.
- **Aim** - It aims to partner the private sector in indigenization efforts of Defence Public Sector Undertakings (DPSUs), and the Armed forces.

- **Ministry** - Ministry of Defence.
- **Launched in** - 2020.
- DPSUs/OFB/SHQs can display the items On this portal, which they have imported or going to import, each item having a sizeable importable value.
- The Indian Industry will show their interests in those items for which they can design, develop and manufacture as per their capability or through a joint venture with OEMs.
- The concerned DPSUs/OFB/SHQs, based on their requirement of the items and their guidelines & procedures will interact with the Indian industry for indigenization.

#### 4.7 U-WIN

*U-WIN portal is all set for pan-India launch by end of August that aims to maintain electronic records for the routine immunization.*

- **U-WIN** – Is a platform to maintain an electronic registry of routine immunizations of every vaccination event under the Universal Immunization Programme (UIP).
- It is going to be the single source of information for immunization services and slated to become the world's largest immunization registry.
- **Aim** – It will ensure timely administration of vaccine doses by digitally recording every vaccination event under the Universal Immunization Programme (UIP).
- **Coverage** – **All pregnant women and children aged 0-5 years.**
- **Ministry** – **Ministry of Health and Family Welfare.**
- **Budget Union** – Finance Minister has announced in the Interim Budget 2024-2025 along with Mission Indradhanush.
- **National Health Mission (NHM)** – India's Universal Immunization Programme (UIP) is a part of Reproductive and Child Health (RCH) program under National Health Mission (NHM).
- **Co-WIN** – U-WIN is a replication of the Covid-19 vaccine management system Co-WIN.
- **e-certificate** – The platform generates uniform QR-based digitally verifiable e-certificate similar to Covid vaccination certificate can be accessed anytime by the citizens.
- **Ayushman Bharat Health Account (ABHA)** – It facilitates the creation of ABHA IDs for comprehensive health record maintenance.
- **Frontline workers** – U-WIN supports the frontline workers to digitally record all vaccination events for children and pregnant women for complete, accurate and easy record maintenance.
- **Frontline workers** are employees who interact directly with customers or the public, and are often the first point of contact with clients.
- **Challenges** – There is no mechanism of individual tracking.
- Lack of awareness among beneficiaries especially in urban areas.

#### Universal Immunization Programme (UIP)

- It is high-quality immunization services to all communities to prevent mortality, morbidity and disability from diseases.
- 12 vaccine preventable diseases are covers under Universal Immunization Programme (UIP).
- Diphtheria, Pertussis, Tetanus, Polio, Measles, Rubella, severe form of Childhood Tuberculosis, Rotavirus diarrhea, Hepatitis B, Meningitis & Pneumonia caused by Hemophilus Influenza type B and Pneumococcal Pneumonia and sub-nationally against 1 disease - Japanese Encephalitis (JE vaccine is provided only in endemic districts).

#### 4.8 Scheme of Assistance to National Sports Federations (NSFs) and Khelo India Scheme

*The Union government had promoted sports, including football, through two key schemes, Assistance to National Sports Federations (NSFs) and Khelo India.*

#### Scheme of Assistance to National Sports Federations (NSFs)



- The Scheme is designed to provide **financial and technical support** to NSFs for the development of sports in the country.
- **Nodal Ministry-** Ministry of Youth Affairs and Sports.
- **Launched in-** 2001
- **Objectives-** To enhance the **quality of sports** and achieve excellence at national and international levels.
  - To provide financial assistance to athletes for training, participation in competitions, and other requirements.
  - To improve sports infrastructure and facilities.
  - To support the development of coaching standards and training programs.
- **Key Features-** It Provide financial assistance and grants for various activities, including training camps, purchase of equipment, and participation in **international competitions**.
  - The scheme aims to enhance the bench strength of Indian athletes by implementing a robust talent identification and development system, striving for sporting excellence, and making India a sporting powerhouse.
  - It supports talent scouting and nurturing through scholarships and training programs.
  - It provides funding for anti-doping awareness and testing programs.

### Khelo India

- It is a national program which aims to promote sports at the **grassroots level**.
- **Nodal Ministry-** Ministry of Youth Affairs and Sports
- **Launched in-** 2018.
- **Aim-** It aims to revive the sports culture by building a solid framework for all sports played in India and establishing our country as a sporting nation.
- It is a national scheme for the development of sports.
- It also targets at mainstreaming sports as a tool for national, economic, community and individual development.
- **Sports disciplines-** Archery, Athletics, Badminton, Basketball, Boxing, Football, Gymnastics, Hockey, Judo, Kabaddi, Kho-Kho, Shooting, Swimming, Volleyball, Weightlifting, and Wrestling.
- **Objectives of the Khelo India Scheme**
  - Mass youth participation in annual sports competitions through a structured competition
  - Identification of sports talent
  - Nurturing and guidance of the talent through a new set or existing sports academies either by the Central Government, state government, or in Public-Private Partnership (PPP) mode.
  - Creation of sports infrastructure at district, mofussil, tehsil, state levels, etc

### 4.9 National Bioenergy Programme

The Union government has revised the financial assistance rates for Biomass Pellet manufacturing under the National Bioenergy Programme component.

- The programme endeavours to promote bioenergy as a **sustainable and renewable energy source**.
- **Nodal Ministry-** Ministry of New and Renewable Energy.
- **Objective-** To support the setting up Waste to Energy projects for the generation of **Biogas/ BioCNG/ Power/ producer or syngas** from urban, industrial, and agricultural wastes/residues.

#### BioUrja portal

- BioUrja portal has been developed as a single window platform to register and submit online applications for grant of Central Financial Assistance (CFA) to Waste to Energy projects
  - Biogas/ BioCNG/ Power/ producer or syngas from urban, industrial, and agricultural wastes/residues,
  - Biomass Briquette/Pellet manufacturing plants and Biomass (non-bagasse) based cogeneration projects.
- The portal also enables registered users to track the status of their submitted applications.

- The program aims to establish Biomass Briquette/Pellet manufacturing plants and support non-bagasse biomass cogeneration projects in the country.
- **Aim-** To harness bioenergy for energy security, rural development, and environmental sustainability.
- It seeks to promote the use of biomass resources to generate energy, thereby reducing dependence on fossil fuels and mitigating climate change.
- **Components**
  - **Waste to Energy Programme-** This includes projects that generate energy from urban, industrial, and agricultural waste.
  - It encompasses technologies like biogas production, bio-CNG, and power generation from municipal solid waste.
  - **Biogas Programme-** This promotes the use of biogas for cooking, electricity generation, and as a vehicle fuel.
- **Central Financial Assistance-** The program provides Central Financial Assistance (CFA) to project developers and service charges to implementing/inspection agencies.
- The revision of CFA will enhance the utilization of Biomass in the Country including the utilization of Paddy Straw in States like **Punjab, Haryana, and Uttar Pradesh** and would contribute to **Air Quality Management by avoiding stubble burning**.

#### 4.10 Food Safety in Schools

The Bureau of Indian Standards (BIS) revised setting new hygiene standards for food preparation in Tamil Nadu schools, including creches.

- **Kitchens covered-** The code addresses school kitchens and centralized kitchens.
- This code currently excludes facilities for infants up to 22 months (about 2 years).
- **Food handling-** Measures for procurement, storage, preparation, and serving.
- **Infrastructure-** Required equipment and facilities in kitchens.
- **Hygiene practices-** Cleaning, pest control, and personal hygiene of food handlers.
- **Testing-** Meals should be tested every 6months for contaminants like e-coli and salmonella.
- **BIS Certification-** A checklist for certification will be prepared within 6 months based on state requirements.
- The Chief Minister's breakfast scheme and Puratchi Thalaivar M.G.R. Nutritious Meal Programme are in place, with quality monitoring systems.

#### Bureau of Indian Standards

- It comes under the **Ministry of Consumer Affairs, Food & Public Distribution**.
- **Headquarters-** Delhi.
- It is established by the **Bureau of Indian Standards Act, 2016** which came into effect in 2017.
- The **Minister in charge** of the Ministry or Department having administrative control of the BIS is the ex-officio President of the BIS.

#### 4.11 New Pension Scheme 'VATSALYA'

The Union Budget 2024-25 has proposed a new pension scheme named 'Vatsalya' for minors.

- The scheme enables parents and guardians to start a National Pension Scheme (NPS) for minors until the **child turns 18**.
- **Objective-** The scheme offers families a systematic approach to ensure the **future financial security** of their children and contribute towards their retirement savings.
- **Eligibility-** All parents and guardians, whether Indian citizens, NRIs, or OCIs, are eligible to open an NPS Vatsalya account for their minor children.
- **Benefits-** The NPS Vatsalya Scheme will promote savings habits in children.

- The NPS Vatsalya account, opened when a child is a minor, allows significant accumulation for retirement, with **60%** available for withdrawal at retirement.
- The Scheme instills financial responsibility, converting to a standard **NPS account at 18**, allowing independent contributions.
- It provides a structured way for families to secure their children's financial future and build a **retirement corpus**.
- **Conversion to normal NPS account**- On attaining the age of majority, the plan can be converted seamlessly into a normal NPS (National Pension Scheme) account.

#### 4.12 Electric Mobility Promotion Scheme (EMPS), 2024

The Ministry of Heavy Industries has recently launched the Electric Mobility Promotion Scheme (EMPS) 2024 to boost green mobility and EV manufacturing in the country.

- **Aim** - It aims to boost the adoption of two-wheeler and three-wheeler electric vehicles for commercial purposes and provide the necessary support for developing and manufacturing EVs in India.
- **Launched in** - March 2024.
- **Launched by** - Minister of Heavy Industries.
- **Implementation Period** - 1 April 2024 - 31 July 2024.
- **Objective** - To improve sales of two and three-wheeler electric vehicles.
- **Eligibility** - Two-wheeler and three-wheeler EVs must be registered under the Central Motor Vehicles Rules, 1989.
- **Beneficiaries** - Two-wheeler EVs, three-wheeler EVs, e-rickshaws, e-carts.
- **Subsidies** - Up to Rs. 10,000 will be provided for each two-wheeler EV, up to Rs. 25,000 for each small three-wheeler EV, and up to Rs. 50,000 for each large three-wheeler EV.
- The ministry has adopted the **Phased Manufacturing Programme (PMP)** under this scheme to encourage domestic manufacturing and strengthen the EV supply chain.

EMPS 2024 vs FAME		
Feature	EMPS 2024	FAME II
Subsidy Level	Up to Rs. 10,000	Up to Rs. 22,500
Initial Purchase Cost	Higher due to lower subsidies	Lower due to higher subsidies
Impact on Manufacturers	Increased cost pressure	Lower cost pressure

#### 4.13 Skill Loan Scheme

The Union government has announced a new centrally-sponsored scheme for skilling the youth in the Union Budget 2024-25.

- It is an **institutional credit scheme** for students who want to take courses in skill development aligned with National Occupations Standards and Qualification Packs.
- **Launched in**- 2024.
- **Nodal Ministry**- Ministry of Finance.
- **Duration of Course** - No minimum duration
- **Quantum of Finance**
  - Minimum loan amount - Rs.5000
  - Maximum loan amount - Rs.1.5 lakh
- **Eligibility Criteria** - Individuals who are eligible for the Skill Loan Scheme should have secured admission to a course that is conducted by any one of the following institutions:
  - Industrial Training Institutes (ITIs)
  - Polytechnics
  - Schools recognized by the State or Central Board of Education

- Colleges affiliated to a recognized university
- Training partners affiliated to the Sector Skill Councils, National Skill Development Corporation (NSDC), State Skill Mission, or State Skill Corporation
- **Repayment Period**
  - Loans up to Rs. 50,000 - Up to 3 years.
  - Loans between Rs. 50,000 to Rs. 1 lakh - Up to 5 years.
  - Loans above Rs. 1 lakh - Up to 7 years.
- **Collateral** – None.
- **Recent Notification** - The Model Skill Loan Scheme will be revised to facilitate loans up to Rs. **7.5 lakh** with a guarantee from a government promoted Fund.
- This is expected to help 25,000 students every year.
- To assist youth ineligible for government schemes, the government has announced **financial support for loans up to RS.10 lakh** for domestic higher education.
- Each year, 1 lakh students will receive e-vouchers providing **a 3% annual interest subsidy** on these loans.

#### 4.14 JIYO PARSI SCHEME

Union Minister for Ministry of Minority Affairs presented the information related to Jiyo Parsi Scheme recently.

- Jiyo Parsi is a **central sector scheme** introduced to protect the Parsi (Zoroastrians) community who are residing in India.
- **Aim** - To reverse the declining trend of Parsi Population by adopting scientific protocol and structured interventions to stabilize their population in India.
- **Ministry** – Ministry of Minority Affairs.
- **Launched in** – 2013.
- **Components**
  - **Medical Assistance** – To provide financial assistance for medical treatment under standard medical protocol.
  - **Advocacy** – To provide for counselling of couples with fertility issues, marriage, family, drug awareness, parenting and publicity including workshops.
  - **Health of Community** – To provide financial assistance to Parsi couples towards childcare and assistance to dependent elderly.
- **Benefits** - The beneficiaries benefited through Direct Benefit Transfer (DBT) mode after biometric authentication and other verifications by the State Governments.
- The Ministry has been providing financial assistance to numerous Parsi couples under the **Medical and Health of Community (HOC)**.
- The scheme also offers cash assistance to encourage Parsi couples to have children.
- It applies to **all couples**, irrespective of their financial status.

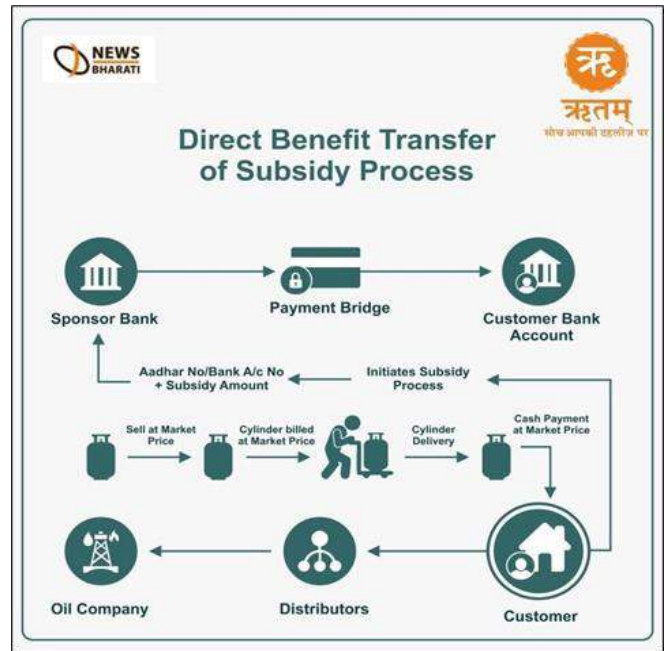
*Parsi (Zoroastrians) are the group of followers in India who follows the Iranian prophet Zoroaster. They are Persian descendants.*

#### 4.15 Pratyaksh Hanstantrit Labh (PAHAL) Scheme

The Union government has introduced Aadhar-based LPG customer authentication to improve beneficiary targeting in the PAHAL and Ujjwala Schemes.

- The PAHAL or Direct Benefits Transfer for LPG (DBTL) scheme is an initiative aimed at **transferring subsidies** directly into the bank accounts of consumers purchasing LPG cylinders.
- **Launched in** - June 2013.
- The scheme was later modified and relaunched on January 1, 2015.
- **Nodal Ministry**- Ministry of Petroleum and Natural Gas.

- **Aim-** This scheme aims to **reduce subsidy leakage, eliminate duplication**, and ensure subsidy reaches the intended beneficiaries.
- **Eligibility-** All domestic LPG consumers who have completed the KYC process and linked their Aadhaar or bank account details with their LPG consumer number are eligible.
- The subsidy amount is directly transferred to the consumer's bank account after the purchase.
- **Subsidy-** A targeted subsidy of **Rs.300 per 14.2 kg cylinder for up to 12 refills** of 14.2 Kg equivalent domestic LPG is being provided to all PMUY consumers.
- In addition, various State Governments have also been providing subsidized refills or further subsidies to PMUY beneficiaries.
- **Key Features of Scheme**
  - To streamline the subsidy distribution process for LPG cylinders.
  - To reduce misuse and diversion of subsidized LPG.
  - To ensure that the benefits reach the deserving sections of society directly.
- **Total participation-** As July 2024, more than **30.19 crore LPG consumers are enrolled under PAHAL scheme.**



#### 4.16 The National Mission for Manuscripts (NMM)

Union Minister for Culture and Tourism speaks about the National Mission for Manuscripts (NMM) recently.

- **Aim-** The Mission seeks to unearth and preserve the vast manuscript wealth of India.
- **Establishment-** 2003.
- **Nodal agency-** Ministry of Tourism and Culture.
- **Mandate-** The Mission has the mandate of identifying, documenting, conserving, and making accessible the manuscript heritage of India.
- **Motto-** NMM is working towards fulfilling its motto, **'conserving the past for the future'**.
- **Objectives**
  - Locate manuscripts through national level Survey and Post-Survey
  - Document each manuscript and manuscript repository, for a National Electronic Database.
  - Conserve manuscripts incorporating both modern and Indigenous methods of conservation and training a new generation of manuscript conservators
  - To train the next generation of scholars in various aspects of Manuscript Studies like languages, scripts, and critical editing and cataloging of texts and conservation of manuscripts
  - To promote access to manuscripts by digitizing the rarest and most endangered manuscripts
  - To promote access to manuscripts through the publication of critical editions of unpublished manuscripts and catalogs

Manuscript	
•	A manuscript is a handwritten composition on paper, bark, cloth, metal, palm leaf or any other material dating back <b>at least seventy-five years</b> that has significant scientific, historical or aesthetic value.
•	Lithographs and printed volumes are not manuscripts.
•	Manuscripts are found in hundreds of different languages and scripts.
•	Manuscripts are distinct from historical records such as epigraphs on rocks, firmans, revenue records which provide direct information on events or processes in history.
•	Manuscripts have knowledge content.

- To facilitate the public's engagement with manuscripts through lectures, seminars, publications, and other outreach programs
- **Significance**
  - India possesses an estimate 10 million manuscripts, probably the **largest collection in the world**.
  - These cover a variety of themes, textures and aesthetics, scripts, languages, calligraphies, illuminations and illustrations.

#### 4.17 E-Upahaar portal

Recently the Rashtrapati Bhavan has launched an online E-Upahaar portal.

- **Aim-** The portal is designed to streamline sending and receiving gifts and messages for various occasions, especially for interactions with the **President of India and former Presidents**.
- **Developed by-** National Informatics Centre (NIC).
- **Launched in-** July, 2024.
- **Launched by-** President of India.
- This initiative aims to boost **citizen engagement** and support a noble cause.
- All proceeds from the auction will be donated to help **children in need**.
- **Auction phase-** In the first phase, around 250 exquisite gifts will be auctioned.
- **Features**
  - **Facilitating Communication** - It provides a digital platform for individuals and organizations to connect with the President's office.
  - **Managing Gifts and Wishes** - The portal allows users to send gifts, congratulatory messages, or invitations, particularly for significant events like birthdays or anniversaries.
  - **Transparency and Efficiency** - By digitizing these interactions, the portal aims to make the process more efficient and transparent, reducing administrative burdens.

The National Informatics Centre (NIC) is a premier government department under the Ministry of Electronics and Information Technology (MeitY).

#### 4.18 Paramparagat Krishi Vikas Yojana (PKVY)

Minister of State for Chemicals and Fertilizers recently released a report on Paramparagat Krishi Vikas Yojana (PKVY) and Mission Organic Value Chain Development in the Northeast Region.

- The Paramparagat Krishi Vikas Yojana (PKVY) is an extended component of **Soil Health Management (SHM)** under the **National Mission on Sustainable Agriculture (NMSA)**.
- **Launched in-** 2015.
- **Scheme type-** Centrally Sponsored Scheme (CSS).
- **Aim-** It aims at supporting and **promoting organic farming**, in turn resulting in the improvement of soil health.
- To reduce the cost of agriculture to farmers through sustainable integrated organic farming systems thereby enhancing farmer's net income per unit of land.
- To protect the environment from hazardous inorganic chemicals by adopting eco-friendly low-cost traditional techniques and farmer-friendly technologies
- **Objective-** To produce agricultural products free from **chemicals and pesticide** residues by adopting eco-friendly, low-cost technologies.
- **Funding pattern-** Under the scheme in the ratio of **60:40** by the Central and State Governments respectively.
- In the case of North Eastern and Himalayan States, Central Assistance is provided in the ratio of 90:10 (Centre: State) and for Union Territories, the assistance is 100%.
- **Target-** The Scheme targets to form 10,000 clusters of 20 ha each and bring nearly two lakh hectares of agricultural area under organic farming by 2017-18.

- **Exclusions-** All farmers with less than 2 ha of land are eligible for applying to the scheme.
- **Participatory Guarantee System-** The scheme supports Participatory Guarantee System (PGS-India) for organic certification, which relies on mutual trust and local relevance, involving both producers and consumers.
- PGS-India operates independently of Third-Party Certification.

#### 4.19 National Initiative for Proficiency in Reading with Understanding and Numeracy (NIPUN)

In several Indian states, mothers of young children have education beyond Grade 10, making them valuable assets for NIPUN.

- It is a national mission to ensure that all children in India have **foundational literacy and numeracy skills** by the end of grade 3 by 2026-27.
- It is one of the components of the NEP 2020.
- **Launched in-** 2021.
- **Nodal agency-** The Department of School Education & Literacy, Ministry of Education.
- **Objectives-** Ensure all children can read with comprehension and have basic numeracy skills by the **end of Grade 3.**
- NIPUN Bharat focuses on holistic development, goes beyond traditional classroom learning.
- It recognizes that students are multi-dimensional and addresses their cognitive, emotional, physical, and social growth.
- It focuses on different domains of development, such as physical and motor development, socio-emotional development, literacy and numeracy development, cognitive development, and life skills.
- These domains are interrelated and interdependent and will be reflected in a Holistic Progress Card.

NEP 2020 aims to increase the Gross Enrolment Ratio in higher education including vocational education from 26.3% (2018) to 50% by 2035.

#### State-wise mother education data

- In Uttarakhand, Maharashtra, Punjab, and Haryana, 30-40% of mothers of young children have schooling beyond Grade 10.
- In Tamil Nadu, this figure is close to 43%.
- In Himachal Pradesh, it is over 54%.
- **Kerala** tops the list with nearly 72% of these mothers having high school education.

#### 4.20 Integrated Disease Surveillance Program (IDSP)

The government recently released a report that 1,862 disease outbreaks were reported to the Integrated Disease Surveillance Programme, with Kerala reporting the highest number last year.

- **IDSP-** The Integrated Disease Surveillance Programme (IDSP) is a decentralized, state-based program in India that aims to detect and respond to disease outbreaks early.
- It is now part of the **National Health Mission.**
- **Launch-** It was launched in **2004** with assistance from the **World Bank.**
- **Ministry -** Ministry of Health and Family Welfare.
- **Mandate-** It is mandated with surveillance and response to outbreak prone communicable diseases.
- **Functions**
  - **Early warning -** Detect early warning signs of disease outbreaks so that effective responses can be initiated quickly
  - **Data collection -** Provide data to monitor the progress of disease control programs and allocate health resources more effectively
  - **Information sharing -** Facilitate the sharing of relevant information with health administration, communities, and other stakeholders
  - **Disease trends -** Detect disease trends over time and evaluate control strategies

- **Training** - Train health and social workers to help implement the program.
- **Surveillance units** - The IDSP has established
  - Central Surveillance Units (CSUs) in Delhi,
  - State Surveillance Units (SSUs) in state and union territory headquarters, and
  - District Surveillance Units (DSUs) in all districts.
- It has also established a referral lab network in 9 states that links medical college labs and other major centers with adjoining districts to provide diagnostic services for epidemic-prone diseases.
- Data Management - Under IDSP data is collected on epidemic-prone diseases on weekly basis (Monday–Sunday).
- The information is collected on 3 specified reporting formats, namely
  - “S” (suspected cases),
  - “P” (presumptive cases) and
  - “L” (laboratory confirmed cases).
- It is filled by Health Workers, Clinicians and Laboratory staff respectively.
- The weekly data gives information on the disease trends and seasonality of diseases.
- **IDSP Portal** – It is a one stop portal which has facilities for data entry, view reports, outbreak reporting, data analysis, training modules and resources related to disease surveillance.
- About 90% of Districts are now reporting disease surveillance data in the portal.

#### 4.21 National Culture Fund

*The Union Minister for Culture recently discussed the National Culture Fund's functioning in the Lok Sabha session.*

- The National Culture Fund (NCF) is a trust that facilitates donor institutions in supporting the **protection, restoration, conservation, and development** of India's tangible and intangible cultural heritage in partnership with the government.
- **Nodal Ministry**- Ministry of Culture.
- **Establishment**- As a Trust under the Charitable Endowment Act, 1890 in 1996.
- **Objectives**- Manage and utilize the Fund for the conservation, maintenance, promotion, protection, preservation, and enhancement of monuments.
- Provide training and support the development of specialists and cultural administrators.
- Expand existing museums and build new ones to **create or accommodate special galleries.**
- Document cultural expressions and forms that are becoming obsolete or facing extinction.
- **Composition**- The NCF is managed by a Governing Council chaired by the Minister of Culture, with up to **25 members** to set policies.
- An Executive Committee led by the Secretary of Culture, with up to 11 members, executes these policies.
- **Role of NCF**- NCF partners with Corporations, NGOs, etc., to implement heritage preservation projects, allowing donors to specify project details, locations, and implementing agencies.
- To prevent delays in PPP projects, the Project Implementation Committee, led by the Director General of the Archaeological Survey of India or Ministry of Culture officials, regularly monitors progress.
- NCF accepts donations from **Corporations, PSUs, Trusts, and Individuals** for maintaining and preserving centrally protected monuments and cultural projects.
- Donors must comply with the terms and conditions of the MoU for each project.

#### 4.22 Atomic Energy Regulatory Board (AERB)

*The Atomic Energy Regulatory Board (AERB) has approved for the "First Approach to Criticality" of the 500 MWe Prototype Fast Breeder Reactor (PFBR) at Kalpakkam, Tamil Nadu*



- **Aim** -To ensure that ionizing radiation and nuclear energy are safe and do not pose undue risk to public health.
- The Atomic Energy Regulatory Board (AERB) develops and oversees the design and operation of facilities safety regulations for ***nuclear and radiation facilities***.
- **Capacity**- 500 Mwe.
- **Location**- Kalpakkam, Tamil Nadu.
- **Establishment**- 1983.
- **Headquarters**- Mumbai, India.
- **Act** - It operates under the ***Atomic Energy Act of 1962***.
- **Key Functions**- It enforces safety standards for nuclear and radiation facilities.
  - It grants licenses for nuclear facilities and radiation applications.
  - It conducts safety inspections and assessments of nuclear plants and radiation facilities.
  - It develops and updates safety standards, codes, and guides.
  - It promotes research in nuclear and radiation safety.
  - It also Investigates and analyses nuclear incidents and accidents.
- **Organizational Structure**- The AERB is headed by a chairman Including the Board members who are experts from various fields.
- **Significance**- This authorization marks a major step towards operationalizing the PFBR, a key element of India's nuclear power program, and signifies significant progress in enhancing the country's nuclear energy capabilities.

Prototype Fast Breeder Reactor	
•	The Prototype Fast Breeder Reactor (PFBR) is a nuclear reactor design that is part of India's nuclear power program.
•	It represents an important step in the country's pursuit of advanced nuclear technology.
•	Unlike conventional nuclear reactors, breeder reactors generate more fissile material than they consume.
•	The PFBR is designed to convert fertile materials like Uranium-238 into fissile materials like Plutonium-239.
•	The PFBR typically uses mixed oxide (MOX) fuel, a blend of plutonium oxide and uranium oxide.

#### 4.23 PM-PRANAM

*The Cabinet Committee on Economic Affairs (CCEA) has recently approved the PM-PRANAM scheme.*

- **PM-PRANAM**- PM Programme for Restoration, Awareness Generation, Nourishment, and Amelioration of Mother-Earth.
- **Aim**- It aims to protect the environment by encouraging the sustainable use of fertilizers, adopting alternative fertilizers, and promoting organic and natural farming.
- **Nodal agency**- Ministry of Chemicals and Fertilizers.
- **Background**- It was launched in Union Budget 2023–24.
- **Coverage**- All States/UTs are covered under the PM- PRANAM.
- **Funding**- The scheme will not have a separate budget and will be financed by the savings of existing fertilizer subsidy.
- **Benefits**- If a State/UT reduces its chemical fertilizer consumption (Urea, DAP, NPK, MOP) in a financial year compared to the previous three years' average, 50% of the saved subsidy will be granted to that State/UT.
  - 70% of the grant provided under the scheme can be used for asset creation related to technological adoption of alternate fertilisers and alternate fertiliser production units.
  - 30% grant money can be used for incentivizing farmers, panchayats, farmer producer organizations, self-help groups, etc.
- **Data**- ***iFMS (Integrated fertilisers Management System)*** data available in the Fertiliser Ministry dashboard will be used for this purpose.

## 5. INTERNATIONAL ORGANISATIONS

### 5.1 Shanghai Cooperation Organisation

India's External Affairs Minister attended the Shanghai Cooperation Organization (SCO) summit 2024.

- **Background-** It is world's largest regional organisation for ***international security and defence***.
- It is a ***permanent intergovernmental*** international organization formed in 2001.
- **Origin-** It is basically an extension of the ***Shanghai Five Group*** (China, Kazakhstan, Kyrgyzstan, Russia and Tajikistan), created in 1996.
- **Headquarters-** Beijing (China)
- **Founding nations-** Kazakhstan, China, the Kyrgyz Republic, Russia, Tajikistan, and Uzbekistan.
- The SCO now has ***10 members***, including ***India***, Iran, and Pakistan, Belarus in addition to the founding members.
- **Observer states** – Afghanistan, and Mongolia (2 members).
- **Dialogue Partners** - Armenia, Azerbaijan, Cambodia, Nepal, Sri Lanka, Turkey and more (14 members).
- **Significance-** The SCO consists of 40% of the world's population and 30% of global gross domestic product (GDP).
- The SCO has been an ***observer in the UN General Assembly*** since 2005.
- **Goals of the SCO**
  - To strengthen mutual trust, friendship, and good-neighbourliness between the Member States.
  - To encourage the effective cooperation between the Member States in such spheres as politics, trade, economy, science and technology, culture, education, energy, transport, tourism, environmental protection, etc.
  - To jointly ensure and maintain peace, security and stability in the region and
  - To promote a new democratic, fair and rational international political and economic international order.

#### Shanghai Cooperation Organization (SCO) summit, 2024

- **Venue-** Astana, Kazakhstan.
- **Theme-** Strengthening Multilateral Dialogue—Striving Towards a Sustainable Peace and Prosperity.
- **Objective-** Addressing key ***regional issues*** and providing a platform to ***advocate for dialogue and diplomacy once again***.
- **New SCO member- Belarus** recently upgraded to member state from Observer status in (SCO), becoming its 10<sup>th</sup> member state.

*Belarus, officially the Republic of Belarus, is a landlocked country in Eastern Europe.*

### 5.2 U.S.-India Business Council (USIBC)

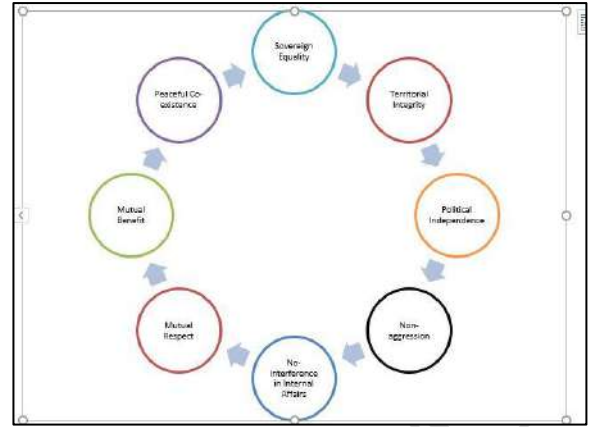
A USIBC delegation, led by its Executive Vice Chairman, met with the Union Minister in Delhi to discuss various collaboration opportunities.

- **Background** - It was formed in ***1975*** at the request of the U.S. and Indian governments.
- **About-** It represents top global companies operating across the United States and India, ***creating connections between businesses and governments*** in both countries.
- **Aim** - The Council aims to create an ***inclusive trade environment*** between India and the US by representing industry, connecting businesses with governments, and supporting long-term partnerships.
- **Membership** - It has around 200 member companies of which ***70% are from the United States*** and the remaining ***30% are from India***.
- **Headquarters** - Washington D.C.

- It has offices in Delhi, Mumbai, and Bengaluru.
- The USIBC is also **part of the U.S. Chamber of Commerce.**

### Key Points of the meeting

- **Green initiatives** - Deployment of Greenfield renewable energy, battery storage, and emerging green technologies.
- **Advanced technologies** - Focus on quantum technology, artificial intelligence, critical metals, and semiconductors.
- **Anusandhan NRF** - Introduction of a research foundation in India similar to the US National Research Foundation.
- **Biotech growth** - In India, this industry has reached \$140 billion with over 4,000 companies.
- **Space collaboration** - NISAR mission with NASA and ISRO highlights India's space sector prowess.



### 5.3 South Asian Centre of Excellence for Sustainable Maritime Transport (SACE-SMarT)

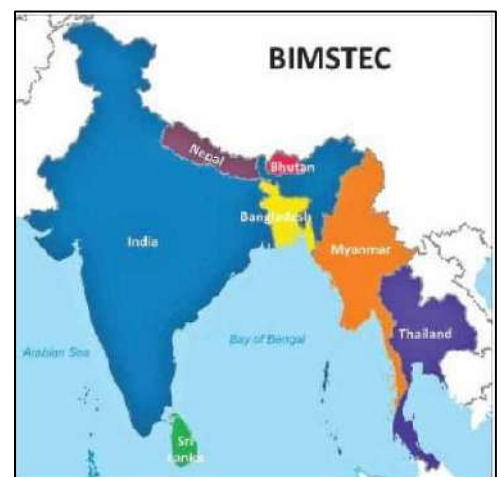
Ministry of Ports, Shipping and Waterways recently participated in the 132<sup>nd</sup> session of the Council of the International Maritime Organization (IMO) in London.

- It is a regional hub aims to transform the maritime sector in India and South Asia into a technologically advanced, environmentally sustainable, and digitally proficient industry.
- It is dedicated to identifying and tackling seafarers' issues and the human element in maritime operations.
- The center will focus on reducing greenhouse gas emissions, fostering technical cooperation, capacity-building, and digital transition.
- Recently, India reiterated its proposal for the South Asian Centre of Excellence for Sustainable Maritime Transport (SACE-SMarT).
- Other proposed members include the Philippines, Thailand, Liberia, Panama, Greece, the US, and France.

### 5.4 BIMSTEC

Recently, India hosted the 2<sup>nd</sup> Bay of Bengal Initiative for Multi-sectoral Technical and Economic Cooperation (BIMSTEC) foreign ministers' meeting in Delhi.

- **BIMSTEC** - It is a **regional organization**, established in **1997** with the signing of the **Bangkok Declaration**.
- It is initially known as BIST-EC (Bangladesh-India-Sri Lanka-Thailand Economic Cooperation), now known as BIMSTEC.
- **Headquarters** - Dhaka, Bangladesh.
- **Members** -It comprises **7 Member States** from South and Southeast Asia lying in the littoral and adjacent areas of the **Bay of Bengal**.
- **7 members**
  - **South Asia** - India, Sri Lanka, Bangladesh, Nepal and Bhutan.
  - **Southeast Asia** – Myanmar and Thailand.
- **Principles**
- **Objectives**
  - Promote mutual assistance in economic, social, technical, and scientific fields.
  - Provide training and research facilities in education and technical spheres.
  - Collaborate to combat terrorism, organized crimes, and address disasters and diseases.



*BIMSTEC houses 1.73 billion people and having a combined gross domestic product of US\$5.2 trillion (2023)*

- Maintain cooperation with similar international and regional organizations.
- Strive to eradicate poverty in the region.
- Promote trade and investment to foster regional development.
- **BIMSTEC Centres**
  - BIMSTEC Energy Centre
  - BIMSTEC Centre on Weather and Climate

## 5.5 United States Secret Service

The US Secret Service faces intense scrutiny and investigations after the assassination attempt on the former U.S. President.

- **About-** The United States Secret Service (USSS) is a **federal law enforcement agency** with two primary missions i.e. **protection and investigation**.
- The agency plays a critical role in both **national security** and the integrity of the **nation's financial systems**.
- Its dual mission requires a unique blend of law enforcement and protection skills, making it one of the most versatile agencies in the U.S. government.
- **History-** The Secret Service was established in **1865** as a bureau in the Treasury Department to suppress widespread counterfeiting.
- **Nodal agency-** Department of Homeland Security.
- **Headquarters-** Washington, D.C.
- **Mandate-** The Secret Service is mandated to protect the vice president, the president-elect, their immediate families, former presidents, and their spouses (except when the spouse remarries) and children of former presidents **until age 16**, among others.
- **Functions-** It manages national special security events for significant events like presidential inaugurations and major international summits.
- It Investigates **counterfeit currency** and prevents counterfeiting of U.S. currency.
- It Investigates financial crimes including credit card fraud, cybercrime, and identity theft.
- It conducts threat assessments and investigations to prevent potential threats to protectives.
- **Training-** Secret Service agents undergo rigorous training at the **Federal Law Enforcement Training Centre (FLETC)** and the James J. Rowley Training Centre.

## 5.6 International Organization of Securities Commissions (IOSCO)

The International Organisation of Securities Commissions (IOSCO) is now engaged in strengthening the reporting structure of Sustainability and Environmental, Social, and Governance.

- IOSCO is the international body that **brings together the world's securities regulators** and is recognized as the global standard setter for financial markets regulation.
- IOSCO was created in **1983**.
- It has a permanent secretariat in **Madrid, Spain**.
- **Members** - IOSCO is a standard-setting body with **more than 200 members**, representing **95%** of the world's securities regulators.
- These members include national securities commissions, such as the
  - Securities and Exchange Commission in the United States and
  - The Financial Services Authority in the United Kingdom, as well as
  - Other governmental regulators and international standard-setting bodies.

- **Securities and Exchange Board of India** is a member to this commission.
- **Membership categories** - Membership is divided into 3 categories.

The organization develops, implements, and promotes adherence to internationally recognized standards for securities regulation.

IOSCO also works with the G20 and the Financial Stability Board (FSB) on global regulatory reform and to address financial vulnerabilities that could affect global financial stability.

• **Objectives**

- Enhance investor protection
- Ensure markets are fair and efficient
- Promote financial stability by reducing systemic risk

• **Committees** - It has 4 regional committees and a technical committee, which does much of the organization's regulatory work.

Ordinary members	Associate members	Affiliate members
The primary futures markets and securities regulators in a given jurisdiction.	Consisting of additional futures and securities regulators in those jurisdictions that have multiple regulatory bodies.	Self-regulatory organizations, stock exchanges, and stock market industry associations.
Each ordinary member has one vote.	Associate members do not have a vote.	These members do not have a vote
	They aren't eligible for the Executive Committee, but are members of the Presidents' Committee.	They are not eligible for either the Executive Committee or the President's Committee, but may be members of the Self-Regulatory Organizations (SRO) Consultative Committee.

**5.7 World Heritage Committee**

India is hosting the World Heritage Committee Meeting for the 1<sup>st</sup> time at Bharat Mandapam in New Delhi.

- **Aim**- It is responsible for managing all matters on World Heritage and deciding on sites to be inscribed on the World Heritage list.
- It is a committee of the **United Nations Educational, Scientific, and Cultural Organization (UNESCO)**.
- **Meet**- The committee meets **annually**.
- **Objective**- Credibility, Conservation, Capacity building, Communication and Communities.
- **Powers**- The Committee is responsible for implementing the World Heritage Convention, defines its use, and allocates financial assistance upon requests from States Parties.
- It has the final say on whether a property is inscribed on the World Heritage List.
- It examines reports on the conservation of inscribed properties and asks States Parties to act when properties are not being properly managed.
- It also decides on the inscription or deletion of properties on the List of World Heritage in Danger.
- **Representation**- It consists of representatives from 21 of the States Parties to the Convention elected by their General Assembly.
- **Bureau of the World Heritage Committee**- The Bureau consists of 7 States Parties elected annually by the Committee: a **chairperson, 5 Vice-Chairpersons, and a Rapporteur**.
- The Bureau of the Committee coordinates the work of the Committee and fixes the dates, hours and order of business of meetings.
- **Tenure**- Committee member's term of office is for **6 years**, but most States Parties choose voluntarily to be Members of the Committee for only 4 years, to allow other States Parties to be on the Committee.

**6. ECONOMY**

## 6.1 Money mule

The Reserve Bank of India has warned banks about mule accounts and urged them to strengthen their security measures to curb digital fraud.

- A money mule is someone who receives and moves money that came from **victims of fraud**.
- A person may become a money mule intentionally or unintentionally and receive **illegally acquired funds** and help in its transfer to others.
- The Money mules are frequently innocent individuals who are drawn into the plan by a variety of tactics, such as **job offers, online classified ads, or social media postings**.
- **Financial Frauds-** Money Mule Actions are commonly associated with various types of financial crimes, such as **money laundering, fraud, and cybercrime**.
- **Types of Money Mules-** The FBI categorizes money mules into 3 categories based on their goals and degree of involvement:
  - Unknowing/unwitting money mules
  - Witting money mules
  - Complicit money mules
- **Process -** Fraudsters contact customers via **e-mails, chat rooms, job websites or blogs** and convince them to receive money into their bank accounts, in exchange of attractive commissions.
- The fraudsters then transfer the illegal money into the money mule's account.
- The money mule is then directed to transfer the money to another money mule's account starting a chain that ultimately results in the money getting transferred to the fraudster's account.
- When such frauds are reported, the money mule becomes the target of police investigations.
- **Mule Accounts -** It is a bank account used to receive/transfer funds acquired illegally on behalf of others.
- These accounts are often used for money laundering and tax evasion.
- Mule accounts are in violation of several rules and individual involved in it can be prosecuted under the **Prevention of Money Laundering Act (PMLA)**.

## 6.2 AT1, Tier-II bonds

Recently Bank of Baroda announced its board's approval to raise capital through Additional Tier 1 (AT1) and Tier 2 bonds.

- A bond is a fixed-income investment that represents a loan made by an investor to a borrower, usually corporate or governmental.

Feature	Additional Tier 1 (AT1) Bonds	Tier 2 Bonds
<b>Definition</b>	AT1 bonds, also called perpetual bonds, carry no maturity date but have a call option.	Tier-2 bonds are a type of debt instrument banks issue to raise capital for their operations.
<b>Ranking in Capital Structure</b>	Higher risk, subordinated to Tier 2 and other senior debts.	Lower risk, subordinated to senior debts but senior to AT1 bonds.
<b>Coupon Rate</b>	Generally higher due to higher risk.	Generally lower compared to AT1 bonds.
<b>Call Option</b>	Often callable by issuer after 5-10 year.	Typically, callable by issuer after a specific period.
<b>Interest Payments</b>	Non-cumulative, can be skipped without default.	Cumulative, cannot be skipped without default.
<b>Conversion to Equity</b>	Can be converted to equity if bank's capital falls below a threshold	Not convertible to equity.

### 6.3 Equity mutual funds

According to the Association of Mutual Funds in India (AMFI), inflows into India's equity mutual funds hit a record high.

- **About-** Equity mutual funds are **investment vehicles** that pool money from multiple investors to invest primarily in **stocks or equity securities** of publicly traded companies.
- **Objective-** Equity mutual funds aim to provide **capital appreciation over the long term** by investing in stocks that are expected to grow in value.

Equity Mutual Funds	
Types	Details
Small-cap Equity Funds	<ul style="list-style-type: none"> <li>• These funds are considered to be riskier than mid- or large-cap equity funds but can offer the relatively higher returns.</li> <li>• Their minimum exposure to such stocks is 65% of the total assets.</li> </ul>
Mid-cap Equity Funds	<ul style="list-style-type: none"> <li>• These funds are considered to be less risky than small-cap funds, but more than large-cap funds.</li> <li>• Their minimum exposure to such stocks is 65% of the total assets.</li> </ul>
Large-cap Equity Funds	<ul style="list-style-type: none"> <li>• These funds are considered to be the least risky as far as equity fund-picking goes. Their minimum exposure to such stocks is 80% of the total assets.</li> </ul>
Large- & Mid-cap Equity Funds	<ul style="list-style-type: none"> <li>• These equity mutual funds equally divide the allocation between large- and mid-cap equity and related instruments and have the potential to offer high returns.</li> </ul>
Multi-cap funds	<ul style="list-style-type: none"> <li>• Multi-cap equity funds invest in stocks across large-, mid-, and, small-cap companies. Their minimum exposure to such stocks is 65% of the total assets.</li> </ul>

#### Features of an Equity Mutual Fund

- **Returns-** Equity mutual funds **focus on stocks**, offering potentially high returns compared to other types of mutual funds due to their concentration on equities.
- **Tax Benefits-** The investor can gain tax benefits with the investments in these funds.
- **Risk-** The risk factor of equity funds is **high**.
- **Expense Ratio-** These funds also tend to have a higher expense ratio than their counterparts, given the requirement of constant management.
- **Long-Term Investments-** These funds are suitable for long-term investors, given that they perform well in the long term
- **Growth trend-** India's equity mutual funds surged 17% sequentially to a record high of US\$ 4.87 billion (Rs. 40,608 crore) in June.
- Equity mutual funds have seen net inflows aggregating to **Rs 5.9 trillion from domestic investors** since February 2021.

*Expense ratio is the annual maintenance charge levied by mutual funds to finance its expenses.*

#### Association of Mutual Funds in India

- It is a non-profit industry body of the asset management companies (AMCs) of all Mutual Funds in India that are registered with Securities and Exchange Board of India (SEBI).
- AMFI was incorporated on 1995 under section 25 of the Companies Act, 1956.
- It sets ethical standards, promotes investor education, and collects industry data.

- AMFI represents all registered Mutual Funds in India, ensuring fair practices among distributors and advisors.
- It advocates for industry interests and spearheaded the 'Mutual Funds Sahi Hai' campaign since 2017 to boost awareness about Mutual Funds as a viable investment option.
- AMFI is also a member of the ***International Investment Funds Association (IIFA)***.

#### 6.4 Commemorative coins

The Union Ministry of Finance recently issued a commemorative coin on the occasion of the birth centenary of former Tamil Nadu Chief Minister M Karunanidhi.

- **Commemorative coins** - Also known as ***ceremonial coins*** are issued to commemorate a certain event, celebrate a certain person, or further a certain message.
- They have a distinctive design, which references the occasion for which they were issued, and are often of a different or generally larger denomination, than regular coins.
- **Authority** - The sole authority to print or mint any Indian currency lies with the ***Reserve Bank of India***, which works under the Union Finance Ministry.
- Thus, it is the ***Union Finance Ministry*** that ultimately decides whether to issue a commemorative coin or not.
- State governments, government-run cultural institutions, or even private organizations can request the government to issue commemorative coins.
- **Circulation** - These are often issued in very small quantities, and kept by the RBI as uncirculated collectors' items.
- Sometimes, however, they can also be meant for mass circulation.
- This depends on the Centre's intention behind issuing a certain coin.
- **Famous personalities** - Commemorative coins have been issued in honor of many Indian luminaries, including Rabindranath Tagore, B R Ambedkar, Bhagat Singh, Lal Bahadur Shastri, Lala Lajpat Rai, Shyamaprasad Mukherjee, Jayprakash Narayan, and Indira Gandhi.
- In 1974, the Indira Gandhi Government introduced a coin with the theme and legend 'Family Planning', reflecting her government's concerted population control push.
- They are also used as tools of remembrance.
- The very first commemorative coins in India were issued in 1964, after the death of Prime Minister Jawaharlal Nehru.
- Some coins institutions (like the State Bank of India or Mata Vaishno Devi Shrine Board), or ***occasions*** (like the 75th anniversary of Indian Independence) rather than individuals.

#### 6.5 Information Ratio

SEBI's recent consultative paper recommends that asset management companies (AMCs) disclose their funds' information ratio (IR) to highlight risk-adjusted returns.

- The Information Ratio (IR) is a quantitative measure used to evaluate the ***performance of an investment portfolio*** or financial asset compared to a benchmark index, factoring in the volatility of the returns.
- The benchmark typically represents the market, an industry, or a specific sector.
- A higher information ratio indicates that the fund manager has ***consistently outperformed the benchmark*** and similar fund managers over a given period.
- IR figures are usually annualized for easy understanding.
- **Calculation**
  - Information Ratio =  $(\text{Portfolio Return} - \text{Benchmark Return}) / \text{Tracking Error}$
- The Portfolio Return refers to the portfolio's overall return.
  - **Benchmark Return** - The value of the benchmark index that was chosen.



- **Tracking Error-** The standard deviation of the difference in portfolio returns from benchmark returns.
- **Applications for Information Ratio**
  - **Performance Evaluation-** Investors utilize internal rate of return (IR) to assess **portfolio manager performance**. It aids in analyzing whether the management is generating enough extra returns for the level of risk taken.
  - **Portfolio Comparison-** IR enables the comparison of many portfolios against the same benchmark, resulting in a standardized measure of **risk-adjusted performance**.
  - **Investment Decision-Making-** Investors utilize IR to make informed decisions about allocating funds to different portfolios or managers based on risk-adjusted returns.

## 6.6 Report on Currency and finance

Recently, the Reserve Bank of India released its Report on Currency and Finance (RCF) for the year 2023-24, highlighting India's role in the global digital revolution.

### Highlights of the report

- India is at the forefront of global digital transformation.
- **Economic contribution-** The digital economy currently accounts for a **tenth of India's GDP** and is expected to constitute a fifth of India's GDP by 2026 based on growth rates observed over the past decade.
- **Internet penetration-** In 2023, internet penetration in India reached **55%**, with an increase of 199 million internet users over the past three years.
- **Data affordability-** India has the **lowest cost per gigabyte (GB)** of data globally, averaging ₹13.32 (US\$ 0.16) per GB.
- **Mobile data consumption-** India has one of the highest mobile data consumption rates in the world, with an average per-user, per-month mobile data consumption of 24.1 GB in 2023.
- **Smartphone users-** India has about 750 million smartphone users, a number expected to reach approximately **one billion by 2026**.
- **Smartphone manufacturing-** India is on track to become the **second-largest** smartphone manufacturer within the next five years.
- **Startup ecosystem-** India has the world's **third-largest** startup ecosystem, with over 1.4 lakh startups and more than 100 unicorns.
- **Global rankings-** India ranks first in biometric-based identification (Aadhaar) and real-time payments volume and second in telecom subscribers.
- **FinTech and digital payments-** India has embraced financial technology (FinTech) by speeding up digital payments comprising biometric identification, UPI, mobile connectivity, digital lockers, and consent-based data sharing.

## 7. AGRICULTURE

### 7.1 Zinc

Researchers have discovered that zinc plays a crucial role in the health of legume crops.

- **Zinc's Role in Nitrogen Fixation-** The researchers found that zinc in plants aids in **nitrogen fixation**.
- The study identifies a key transcription factor that regulates nodule breakdown under high soil nitrogen levels.
- These discoveries can be applied to legume crops such as **fava beans, soybeans, and cowpeas**.
- **Fixation Under Nitrate-** Researchers found that legumes use zinc as a

*Legume crops are plants that belong to the family Fabaceae which includes beans, chickpeas, peanuts, lentils, lupins, mesquite, carob, tamarind, alfalfa, and clover.*

secondary signal to integrate environmental factors and regulate **nitrogen fixation efficiency** through a transcriptional regulator called Fixation Under Nitrate (FUN).

- FUN is an important transcription factor that controls **nodule breakdown when soil nitrogen concentrations are high.**
- **Symbiotic relationship-** Legume crops form a symbiotic relationship with **rhizobia**, a bacterium that fixes atmospheric nitrogen in root nodules.
- **Significance-** The Continued nitrogen fixation is a beneficial trait, increasing nitrogen availability for both legumes and subsequent crops that rely on residual soil nitrogen.
- Understanding how nitrogen fixation is regulated by zinc and FUN enables researchers to develop strategies to **optimize this process in legume crops.**
- This could lead to increased nitrogen delivery, improved crop yields, and reduced reliance on synthetic fertilizers.

### Nitrogen Fixation

- Nitrogen fixation is a crucial natural process through which nitrogen (N<sub>2</sub>) in the atmosphere is converted into ammonia (NH<sub>3</sub>) or related nitrogenous compounds in soil and in living organisms.
- This process is essential for the synthesis of amino acids, nucleotides, and other cellular constituents required for life.
- The nitrogen-fixing bacteria participate in the process of nutrient fixation.
- Nitrogen-fixing bacteria includes Rhizobium (formerly Agrobacterium), Frankia, Azospirillum, Azoarcus, Herbaspirillum, Cyanobacteria, Rhodobacter, Klebsiella, etc.
- 2 types of Nitrogen Fixation
- Biological nitrogen fixation which is carried out by specific bacteria and cyanobacteria (diazotrophs). For example: Rhizobium bacteria, Azotobacter
- Abiotic nitrogen fixation which occurs naturally through lightning strikes and ultraviolet radiation from the sun.
- **Nitrification-** It is the process that converts ammonia to nitrite and then to nitrate and is another important step in the global nitrogen cycle.
- Most nitrification occurs aerobically and is carried out exclusively by prokaryotes.

## 7.2 Makhana Cultivation

Makhana have become a popular 'super snack', with prices rising sharply in both domestic and international markets since 2019.

- **About** - Foxnuts or Makhana is an aquatic crop traditionally grown in India.
- **Botanical Name-** Euryale ferox.
- **Common Names-** Fox nut, Gorgon nut, Phool Makhana.
- **Production-** Makhana, is mainly cultivated in the states of **Bihar, West Bengal and Assam.**
- **Climate-** Makhana is an aquatic crop and requires a warm, humid climate. It is typically cultivated in areas with temperatures ranging from **20°C to 35°C.**
- **Soil-** It thrives in loamy and clayey soils with good water **retention capacity.** The pH of the soil should be between 5.5 to 7.5.
- **Nursery Preparation-** Seeds are collected from mature Makhana fruits.
  - Seeds are soaked in water for 24-48 hours before sowing.
  - Seeds are sown in nursery beds or trays filled with a mixture of soil and cow dung.
- **Main Field Preparation-** Select low-lying areas or water bodies like **ponds, lakes, or wetlands.**
  - **Transplanting-** Seedlings are transplanted into the main field after 30-40 days when they are about 15-20 cm tall.
- **Fertilization-** Organic fertilizers like cow dung can be applied. Chemical fertilizers are generally avoided.
- **Harvesting-** Makhana plants take about **4-5 months** to mature.

Bihar is the leading producer of makhana accounting for more than **90%** of the total production of India. India contributes to **80%** of the world's demand.

- The seeds are harvested when the fruits start to crack and the seeds float on the water surface.
- **Nutritional value-** The crop is a good source of vegetarian **protein**, at 10%, and contains five of the **nine amino acids**.
- There are also **quercetin and kaempferol flavonoids**, both of which protect against diabetes and obesity.
- It is considered a 'super snack' because they are low in calories, rich in protein, and contain essential nutrients.
- **Makhana Development Scheme-** The Bihar government runs the Makhana Development Scheme that gives a **75% subsidy** on the Suvarna Vaidehi variety of seeds, calculated at ₹97,000 per hectare.
- Makhana is approved under the Union government's **One District One Product scheme**, which provides subsidies to food processors for branding, marketing, and infrastructure development.

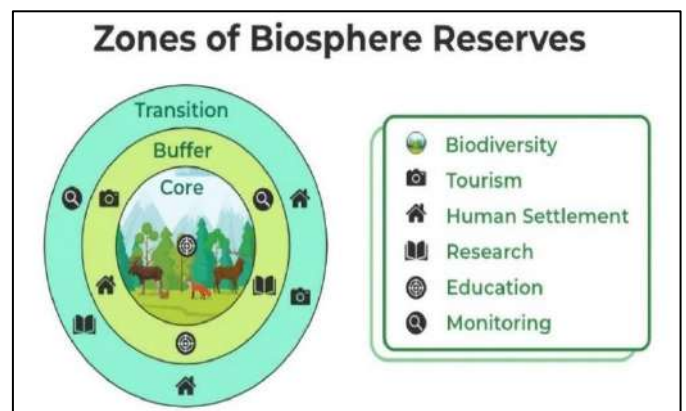
## 8. ENVIRONMENT

### 8.1 Biosphere Reserves

UNESCO has recently designated 11 new Biosphere Reserves across 11 countries.

New Additions to the UNESCO Biosphere Reserve List	
Kempen-Broek Transboundary Biosphere Reserve	Belgium, Kingdom of the Netherlands
Darién Norte Chocoano Biosphere Reserve	Colombia
Madre de las Aguas Biosphere Reserve	Dominican Republic
Niumi Biosphere Reserve	Gambia
Colli Euganei Biosphere Reserve	Italy
Julian Alps Transboundary Biosphere Reserve	Italy, Slovenia
Khar Us Lake Biosphere Reserve	Mongolia
Apayaos Biosphere Reserve	Philippines
Changnyeong Biosphere Reserve	Republic of Korea
Val d'Aran Biosphere Reserve	Spain
Irati Biosphere Reserve	Spain

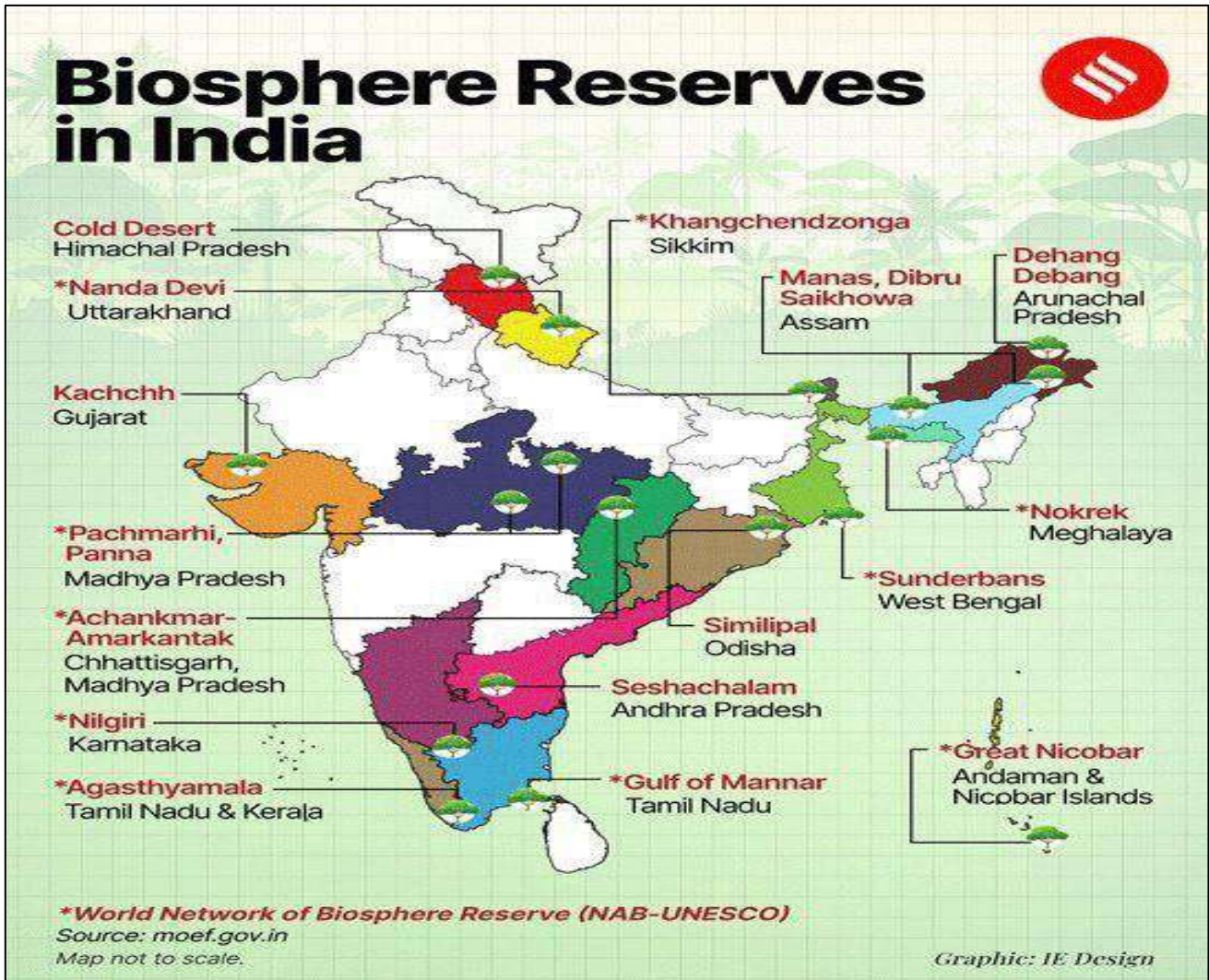
- **Biosphere Reserve-** A biosphere reserve is a protected area with defined boundaries that aims to conserve ecosystems and genetic diversity.
- They are designated by the **United Nations Educational, Scientific and Cultural Organization (UNESCO)** as part of its **Man and the Biosphere (MAB) program**.
- **Criteria for designation of BR**
  - A site that must contain an effectively protected and minimally disturbed core area of value of nature conservation.
  - The core area should be typical of a biogeographical unit and large enough to sustain viable populations representing all trophic levels in the ecosystem.
  - The management authority to ensure the involvement/cooperation of local communities to bring variety of knowledge and experiences to link biodiversity conservation and socio-economic development while managing and containing the conflicts.



- Areas potential for preservation of traditional tribal or rural modes of living for harmonious use of environment.

The World Network of Biosphere Reserves now totals 759 sites in 136 countries.

- **Biosphere Reserves in India**



## 8.2 Talacauvery Wildlife Sanctuary

The National Green Tribunal (NGT) principal bench has taken suo moto cognizance of alleged tree felling and burning near Talacauvery Wildlife Sanctuary.

- **Location** - It is a wildlife sanctuary in **Karnataka**.
- It is also known as the Greater Talacauvery National Park and was declared a sanctuary in **1987**.
- It is located in the **Brahmagiri hills**, which is part of the **Western Ghats**, a **UNESCO World Heritage site**.

Tree felling and burning indicate a violation of the provisions of the Environment Protection Act, of 1986, and the Forest (Conservation) Act, of 1980.

- **Border** - It borders Ranipuram Hills and Kottencheri Hills in the Kasaragod district of Kerala.
- **Geography** – It is characterized by dense evergreen forests that have largely remained untouched.
- **Flora** - Key plant species include rosewood, teak, and laurels.
- **Fauna** - Elephants, tigers, leopards, Indian bison (gaur), wild boar, Malabar giant squirrels, and sambar deer, Great Indian hornbill, Malabar trogon, and various species of woodpeckers, flycatchers, and thrushes.

- **Cultural significance** - The sanctuary is home to the ***Talakaveri temple***, an important pilgrimage site where the Kaveri River is believed to originate.

### River Kaveri

- **Origin** - The Kaveri River originates at ***Talakaveri*** in the Western Ghats in Kodagu district, Karnataka.
- **Flow** - It flows southeast for about 800 kilometers through the states of ***Karnataka and Tamil Nadu*** before emptying into the ***Bay of Bengal***.
- **Tributaries**
  - **Left Bank** - Harangi, Hemavati, Shimsha, Arkavati.
  - **Right Bank** - Lakshmana Tirtha, Kabini, Bhavani, Noyyal, Amaravati.
- **Dams and Reservoirs** - ***Krishna Raja Sagara (KRS) Dam*** and ***Mettur Dam***.
- **Interstate Water Dispute** - The Kaveri water dispute between ***Karnataka and Tamil Nadu*** has been one of India's most contentious interstate water disputes.

### 8.3 South Eastern Coalfields Limited

According to WorldAtlas.com, Gevra and Kasmunda coal mines rank 2nd and 4th among the world's 10 largest coal mines.

- **SECL** – South Eastern Coalfields Limited is a Government of India undertaking.
- **Body** – It is a Public Sector Undertaking, a ***miniratna company***.
- **Parent body** – ***Coal India Limited*** (CIL), a Public Sector Undertaking (PSU).

*World Atlas is one of the largest publishing resources in geography and other topics it covers, including sociology, demography, environment, economics, politics, and travel.*

- **Mission**- To ***produce and market the planned quantity of coal*** and coal products efficiently and economically in an eco-friendly manner with due regard to safety, conservation and quality
- **Location** – It is spread ***across 2 states*** operating 65 mines.
  - **Chhattisgarh** – 39 mines
  - **Madhya Pradesh** – 26 mines

### Gevra and Kasmunda coal mines

- **Location** – Chattisgarh
  - **Company** – South Eastern Coalfields Limited's (SECL)
  - **Type of Mining** – Open cast
  - **Production** – They collectively produce more than 100 million tons of coal annually, accounting for about 10 percent of India's total coal production.
- **Categorization** – For effective administrative control and operation, coal mines at SECL has been divided into 3 groups
    - Central India coalfields (CIC)
    - Korba coalfields
    - Mand Raigarh Coalfields.
  - **Significance** – It is the ***highest coal producing company*** of India.
  - It is ***one of the leading energy suppliers*** in the country, by adopting the best practices and leading technology from mine to market.

## SPECIES IN NEWS

### 8.4 Painted lady Butterfly (Vanessa Cardui)

A recent discovery is made on the painted lady butterflies that travelled 2,600 miles to the French Guiana beach.

- The painted lady also called as the **thistle butterfly**, is native to Canada and cannot survive colder climates.
- **Scientific Name** - Vanessa cardui.
- The insect is a champion of long-distance travel, routinely crisscrossing the Sahara on a trek from Europe to sub-Saharan Africa, and covering up to 9,000 miles.
- **Appearance** - It has orange wings with black tips. The upper side of the forewings have a pattern of white spots and thick black lines.
- This is visually similar to the American lady, but it can be distinguished by the four eyespots instead of two on its hindwing.
- **Habitat** - This butterfly can be found almost anywhere, from the seashore and town gardens, to the tops of the highest mountains.
- **Distribution** – It is one of the world’s most widespread butterflies, but it isn’t found in **South America**.
- **Diet** – It fed on Thistles, the primary food plant of this species.
- This is one of the few species that can breed in intensive farmland since even these sites typically contain a patch of Thistles.
- **Breeding** They reproduce when conditions are favorable, this includes **year round mating** in warmer climates.
- **Conservation status** - This species is not legally protected in India under any schedules of WildLife (Protection) Act, 1972.



DNA Metabarcoding allows for simultaneous identification of many taxa within the same sample.

## 8.5 Senna spectabilis

The forest department of Kerala is set to uproot the *Senna spectabilis* from Wayanad Wildlife Sanctuary.

- It is a deciduous plant species of the **legume family (Fabaceae)**.
- The species is classified as an **Invasive Alien Species** in India.
- **Origin**- It is native to America.
- **Geographic Range**- It is widespread in South America, Central America and the Caribbean.
- **Morphology**- It grows up to 15 to 20 metres which can be evergreen in climates with rain all year round.
- **Habitat**- It inhabits moist and seasonally dry forests including pine and coastal forest, disturbed or secondary woodland, caatinga and cerrado.
- **Inhibitors**-The dense foliage of the tree hinders the growth of native trees and grasses, leading to food shortages for herbivores.
- It significantly affects the germination and growth of the native species.
- **IUCN Status**- The plant is classified as **'Least Concern'**

### Wayanad Wildlife Sanctuary

- The Wayanad Wildlife Sanctuary in **Kerala** is formed in 1973.
- The sanctuary was carved out of two territorial divisions- Wayanad and Kozhikode.
- The sanctuary is located on the southern part of Western Ghats.
- It is a part of the **Nilgiri Biosphere Reserve** and also an Elephant Reserve.
- The sanctuary is significant because of ecological and geographic continuity with other protected areas such as
  - Bandipur Tiger Reserve and Nagarhole National Park of Karnataka in north-eastern portion.
  - Mudumalai Tiger Reserve of Tamil Nadu in south-eastern side
- The vegetation comprises of tropical semi-evergreen forests, moist mixed deciduous forests, dry mixed deciduous forests, bamboo forests, and marshy grasslands.

An invasive species is an organism that causes ecological or economic harm in a new environment where it is not native.

## 8.6 Syntrichia caninervis

Recently, Scientists have identified a species of desert moss called '*Syntrichia caninervis*'.

- It is also known as the **tortula moss or twisted moss**.

- **Plant group-** Bryophyte (moss).
- **Habitat-** Found in **arid and semi-arid regions.**
- It can grow on soil, rocks, and sometimes on other plants.
- **Distribution-** Commonly found in deserts and dry areas around the world, including **Antarctica and the Mojave Desert, North America, Europe, and Asia.**
- **Features-** It has a remarkable capacity to withstand temperatures as low as **-196°C.**
- The plant can handle extreme **cold, extreme radiation levels and drought.**
- This land plant is highly tolerant to multiple stresses and can act as a pioneer species, aiding in ecosystem establishment and maintenance by contributing to oxygen production.
- **Adaptations-** It can quickly rehydrate and resume photosynthesis after rainfall or dew.
- **Significance**
  - **Space exploration-** The discovery of new species could be a game-changer for future space exploration and colonisation efforts.
  - The plant could possibly be able to survive and grow in the harsh climate of Mars.
  - **Soil Stabilization-** It helps in stabilizing soil in arid regions, preventing erosion.
  - **Nutrient Cycling-** It plays a role in the cycling of nutrients in its habitat, especially in nutrient-poor environments.

*Bryophytes are a familiar group of non-vascular, nonflowering and seedless plants.*



## 8.7 Xenophrys apatani

Researchers from the Zoological Survey of India have recorded new species of forest-dwelling horned frog in Talley Wildlife Sanctuary, Arunachal Pradesh.

- **Nomenclature-** The frog has been named after the dominant **Apatani community** in recognition of their ingenuity in the conservation of wild flora and fauna.
- **Biogeographic distribution-** Along the **Eastern Himalayan** and the **Indo-Burma biodiversity hot spots.**
- **Significance-** The discovery of *Xenophrys apatani* emphasizes India's diverse biodiversity and underscores the importance of detailed **taxonomic studies in comprehending our natural heritage.**
- It represents a notable addition to the country's reptile and amphibian diversity.

*The Apatani, also known as Tanw, Apa, and Apa Tani, are a tribal group of people who live in the Ziro Valley of Arunachal Pradesh, India.*



## Talley Wildlife Sanctuary

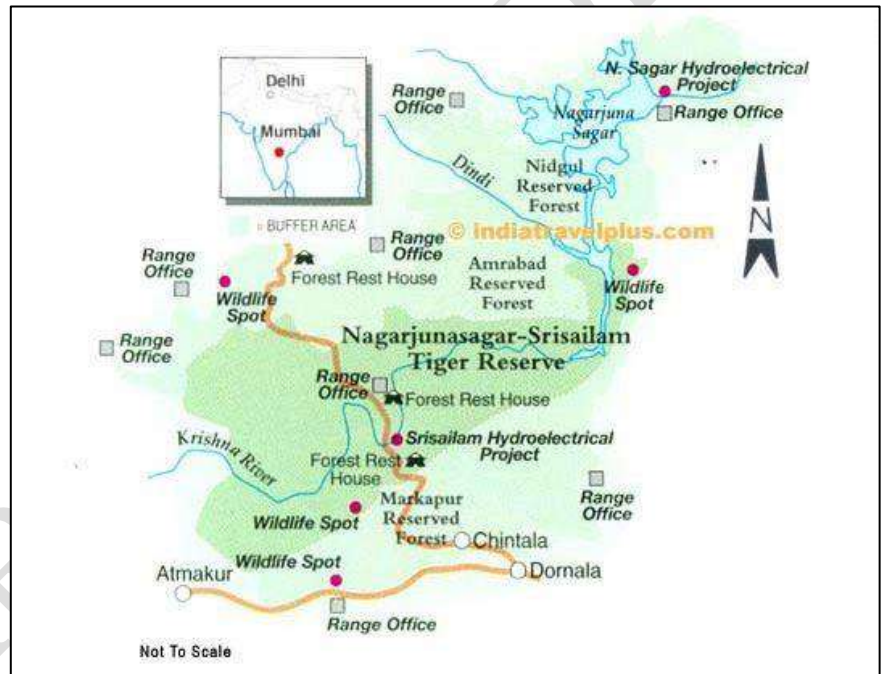
- Talley Valley Wildlife is a protected wildlife sanctuary as well as a bio-diversity hotspot in Arunachal Pradesh.
- It lies between Subansiri, Sipu and Pange rivers surrounded by densely forested mountains ranging for 2,000 to 4,000 mtr. altitude.
- **Talley** – It is a plateau with dense forest of silver fir trees, pine clad plateau of beautiful grandeur, and a vast wasteland.
- **Forest types-** Sub-tropical broad leafed, temperate broad leafed, and temperate conifer types.
- **Fauna** - The area has some of the most important endangered species including the clouded leopard.
- UNESCO has proposed the Apatani valley for inclusion as a World Heritage Site for its “extremely high productivity” and “unique” way of preserving the ecology.

## 8.8 Indian Gaur & Srisaïlam Tiger Reserve (NSTR)

The Indian gaur, previously locally extinct, has been spotted in the Nagarjunasagar Srisaïlam Tiger Reserve (NSTR) after decades.

### Indian Gaur

- The Gaur also called **Indian Bison**, is the largest extant bovine, native to South Asia and Southeast Asia.
- **Scientific Name-** *Bos gaurus*
- **Diet- Herbivore**, primarily grazing on grasses, leaves, and fruits.
- **Distribution** – It is prevalent in Western Ghats and also found in north east India and Nepal, Bhutan, and Bangladesh.
- **Habitat-** They are largely confined to **evergreen forests or semi-evergreen** and moist deciduous forests, but also occur in deciduous forest areas at the periphery of their range.
- **Population diversity-** Mainland South and Southeast Asia, including Vietnam, Cambodia, Laos, Thailand, Peninsular Malaysia, Myanmar, India, Bangladesh, Bhutan, China and Nepal.
- **Threat** - Gaur is highly threatened by poaching for trade to supply international markets.
- **Conservation Status**
  - IUCN **Red List-** Vulnerable
  - CITES- Appendix I.
  - Wild Life Protection Act, 1972- Schedule I



### Nagarjunasagar Srisaïlam Tiger Reserve (NSTR)

- Nagarjunasagar-Srisaïlam Tiger Reserve is the **largest tiger reserve** in India.
- **Location-** Nallamala hill ranges of Andhra Pradesh.
- **Geographical spread-** The reserve spreads over **5 districts**, Nandyal District, Prakasam District, Palnadu District, Nalgonda District and Mahabub Nagar district.
- **Tiger Reserve Status-** It attained the status of a Tiger Reserve in **1983**.
- **Area-** The total area of the reserve including core and buffer is 3727.82 Square Kilo meters and it is India's largest Tiger Reserve.
- Two wildlife Sanctuaries, namely Rajiv Gandhi Wildlife Sanctuary and Gundla Brahmeswaram Wildlife Sanctuary (GBM) constitute the Tiger Reserve.
- **Vegetation-** Features **tropical, dry, moist, deciduous vegetation** with diverse flora and fauna.
- **River-** The **Krishna River** flows through the reserve for about 270 kilometers.

The Krishna River in the Deccan plateau is the third-longest river in India, after the Ganges and Godavari.

## 8.9 Common Grass Yellow Butterfly

For the first researchers have observed a significant migration of Common Grass Yellow at Mudumalai Tiger Reserve (MTR).

- Grass Yellows are small butterflies easily identified by their bright **yellow wings**.
- **Scientific name-** *Eurema hecabe*.



- **Habitat**- It is found in a variety of habitats including open fields, gardens, and grasslands.
- **Distribution**- They are widely distributed butterfly species found across Asia, Australia, Africa and North America.
- They are often seen in large groups, and the females usually fly about by themselves to find nectar from a wide variety of plants.
- **Life Cycle**- It undergoes a complete metamorphosis consisting of egg, larval (caterpillar), pupal (chrysalis), and adult stages.
- **Ecological Significance**- As pollinators and prey for various predators, they play a role in their ecosystems.
- **Conservation status**
  - IUCN – Least Concern
  - WPA, 1972 – Not listed



### 8.10 Uropeltis caudomaculata

A team of researchers have recently discovered a new species of shieldtail snake in the Meghamalai-Munnar hill region of the Western Ghats.

- **Shieldtail snakes** - These are a **non-venomous**, small, and fascinating group of **burrowing snakes** with over 50 species identified from the Western Ghats.
- Shield-tail snakes belong to the Uropeltidae family, endemic to peninsular India and Sri Lanka.
- They have a **large keratinous shield** at the tip of the tail and hence called shield tailed snakes.
- **Habitat** – Inhabit Hilly forests, occupy tunnels in the leaves, humus, rocks & logs.



#### Uropeltis caudomaculata

- It is a shieldtail snake recently found in Western Ghats have similarities with its closest known relative, Uropeltis pulneyensis.
  - The name, Uropeltis caudomaculata, refers to the lateral yellow spot on each side of the base of the tail.
  - **Endemic** - Uropeltis caudomaculata is known to be found in only 3 localities
    - Meghamalai Tiger Reserve in Tamil Nadu
    - Periyar Tiger Reserve
    - Yellapetty, Munnar in Kerala.
  - **Breeding** - These snakes spend most of their life **underground** and emerge during the **monsoons** for breeding.
  - **Diet** - They feed on earthworms and other small snakes.
- **Sky island habitats** - These are separated from each other **physically and environmentally** but have similar communities of species distinct from those elsewhere in the Western Ghats.
  - In the Western Ghats, the **shola grassland forests of the Agasthyamalai region, Meghamalai, Anamalais, Nilgiris, and Wayanad** are some of the important sky islands with rich and unique biodiversity.
  - The fragile sky islands are highly threatened by the rapid encroachment of highly invasive species such as **acacia, lantana, wattle, and pine trees**.
  - **Reptiles** - The Western Ghats is one of the most diverse regions for reptiles in India, with **more than 50% endemic species**.
  - 15 new species of snakes have been described from the Western Ghats in the past 5 years.

### 8.11 Salvinia molesta

An exotic beetle, *Cyrtobagous salviniae* released into a reservoir built on the Tawa river in Madhya Pradesh has successfully eradicated an invasive weed species, *Salvinia molesta* recently.

- **Common name-** Giant salvinia.
- It is an ***invasive aquatic fern*** that floats on the surface of the water.
- Salvinia molesta is named after Antonio Maria Salvini, an Italian naturalist.
- It is locally known as “***Chinese Jhalaar***” which was first spotted in India in 2018 and had completely carpeted the reservoir by 2019.
- **Appearance-** Salvinia molesta consists of ***floating leaves*** and submerged root-like structures.
- The floating leaves are oval to oblong, measuring about 2-5 cm in length.
- **Habitat-** It thrives in slow-moving, nutrient-rich freshwater bodies like ponds, lakes, rivers, and irrigation channels.
- **Distribution**
  - **Native Range-** Southeastern Brazil.
  - **Invasive Range-** It has spread to many parts of the world, including North America, Europe, Asia, Africa, and Australia.
- **Reproduction-** It has a very high rate of reproduction. It reproduces vegetatively through fragmentation.
- **Environmental Impact-** Dense mats of Salvinia molesta ***block sunlight, reducing oxygen levels*** in the water and harming aquatic life.
- They can also disrupt native plant communities and alter habitats.



#### Cyrtobagous salviniae

- The salvinia weevil, Cyrtobagous salviniae is a subaquatic (underwater) herbivorous insect.
- **Native -** Brazil.
- This insect feeds on the invasive aquatic plants *Salvinia molesta* and *Salvinia minima* (Baker).
- These insects can breathe underwater through an air bubble (called a plastron) that they create and attach to the underside of their body.
- This insect is an effective classical biological control agent used in several countries to control the invasive giant salvinia, *Salvinia molesta*.



#### Tawa River

- Tawa River is a river located in the central part of India, primarily in the state of Madhya Pradesh.
- **Location-**The Tawa River originates in the Satpura Range of Madhya Pradesh.
- **Tributary-** It is a significant tributary of the Narmada River, one of the major rivers in India.
- The Tawa River begins in the Satpura Range, which is known for its lush greenery and dense forests.
- **Flora and Fauna-** The river and its surrounding areas support a rich variety of wildlife and plant species.
- The Satpura Range, through which the river flows, is home to numerous species of birds, animals, and plants.
- **Significance-**The Tawa River is crucial for irrigation in the region, supporting agriculture in the fertile plains of Hoshangabad and nearby areas.

#### 8.12 Squalus Hima

Scientists from the Zoological Survey of India (ZSI) have discovered a new species *Squalus hima* from Sakthikulangara fishing harbour in Kerala along the Arabian Sea.

- It is a newly discovered dogfish shark characterized by smooth dorsal fin spines.
- It is commonly known as ***spurdogs***.
- **Genus -** Squalus and Centrophorus.

- **Family-** Squalidae.
- This species has been largely misidentified with *S. mitsukurii* and *S. Lalannei*.
- **Distinction-** *Squalus hima* sp.nov differs from other species by the number of precaudal vertebrae, total vertebrae, teeth count, trunk & head heights, fin structure, and fin color.
- **Apperance** – It is characterised by an angular short snout, a small mouth almost as wide as the snout, first dorsal fin origin behind the pectoral fins, and body without any spots.
- **Threats** - Genus *Squalus* and *Centrophorus* contains liver oil that with high levels of squalene (or squalane when it is processed for products).
- It is in high demand for pharmaceutical industries, particularly for making high end cosmetic products and anti-cancerous products.



### 8.13 Zebra mussel (*Dreissena polymorpha*)

Recently, an invasive species discovered in the Colorado River poses a threat to ecosystems and can cause extensive, costly damage.

- **Zebra mussels-** These are an invasive, ***fingernail-sized mollusk*** native to fresh waters in Eurasia.
- Their name comes from the dark, zig-zagged stripes on each shell.
- **Native-** It is native to ***eastern Europe***.
- Biologists first discovered zebra mussels in the U.S. in 1988 in the Great Lakes region.
- **Life span-** Zebra mussels typically live ***2-5 years*** in temperate climates.
- **Food habit-** They feed primarily on phytoplankton and zooplankton but also bacteria and detritus.
- **Breeding-** Zebra mussel veliger (Larval stage) can be seen only with a microscope and float freely in river water.
- A single female mussel can release up to a million veligers a year.
- The mussels multiply rapidly once they are connected to a surface and can clog pipes, drains, pumps and other water infrastructure.
- No species in the western U.S. has evolved to eat the mussels.
- **Threat-** It can wipe out entire aquatic ecosystems and cause millions of dollars in infrastructure damage.
- It can obliterate ecosystems by eradicating basic food sources other species rely on.
- **Removal-** There is ***no effective way*** to remove the mussels from a river once they are established.



### 8.14 *Peliosanthes Meghalayensis*

An extraordinary rare plant species was discovered in the Wari Chora in Garo Hills in Meghalaya.



- *Peliosanthes Meghalayensis* is a small terrestrial and evergreen herb, that thrives sporadically on the slopes towards the Wari Chora gorge in Meghalaya.
- **Family** –Asparagaceae.
- **Habitat** - Evergreen forest, boasts a humid climate ideal for this species.
- **Distribution** - These are distributed in south and southeast Asia, covering India, Nepal, Myanmar, Thailand, Malaysia, Indonesia, Vietnam, China and Taiwan.
- **Similarity** - It is Similar to *P. pumila* but differs chiefly by knobby rhizome, broader leaf blades, closer transversal veinlets, slightly larger cernuous flowers, and pistils with 6 distinct ridges.



- **Conservation Status** – Its wider distribution remains unknown, prompting a provisional assessment as **Data Deficient (DD)**.

### 8.15 German wasp & European paper wasp

*Invasive wasps, particularly the German wasp (Vespula germanica) and the European paper wasp (Polistes dominula), pose significant ecological and socio-economic threats in South Africa.*

	The German wasp	European paper wasp
<b>Scientific name</b>	Vespula germanica	Polistes dominula
<b>Geographical diversity</b>	Native to Europe but now found in various parts of the world, including North America, Australia, and New Zealand.	Native to Europe, but it has spread to many other parts of the world, including North America.
<b>Appearance</b>	About 12-17 mm long with a distinctive yellow and black striped abdomen. They have a black dot on each yellow segment of the abdomen.	About 10-15 mm long. They have predominantly black and yellow coloration, with distinctive orange antennae and legs.
<b>Body</b>	The head and thorax are mostly black with yellow markings.	They have a slender body with a narrow waist and long legs that hang below the body in flight.
<b>Diet</b>	They are omnivorous and feed on a variety of foods including insects, fruits, and human food. They are particularly attracted to sweet foods and drinks.	They are omnivorous, feeding on nectar, fruit, and insects. They are particularly beneficial as they prey on many garden pests.
<b>Habitat</b>	They are commonly found in gardens, parks, and around human structures. They build nests in tree cavities, logs, and underground.	They are commonly found around buildings, gardens, and in sheds. They nest in barns, sheds, and other structures, as well as in vegetation and fields.
<b>Status</b>	Category 1b Invasive Alien Species (Biodiversity Act (NEMBA), Act 10 of 2004)	Category 1b Invasive Alien Species (Biodiversity Act (NEMBA), Act 10 of 2004)
		

- **Ecological Impact**- These wasps are generalist **predators and scavengers**, impacting local insect populations, including honey bees.

### 8.16 Agarwood

*India has successfully prevented agarwood from being included in CITES's Review of Significant Trade (RST).*

- It is a tree species from the **Thymelaeaceae family** which is a dark, fragrant, resinous wood that comes from the heartwood of the Aquilaria tree.
- **Scientific name**- Aquilaria malaccensis
- **Habitat**- This species typically grows in **tropical rainforests** at elevations up to 1000 meters.
- **Distribution**- Aquilaria malaccensis is primarily found in Southeast Asia, including countries like India, Bangladesh, Bhutan, Indonesia, Malaysia, Myanmar, the Philippines, and Thailand.

- **Appearance-** The tree can grow up to 40 meters tall and has a diameter of up to 60 centimeters.

### CITES

- The Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) is an international agreement to which States and regional economic integration organizations adhere voluntarily.
- **Establishment-** CITES was established in 1973 and came into force on July 1, 1975.
- **Purpose-** The main aim of CITES is to ensure that international trade in specimens of wild animals and plants does not threaten their survival.
- **Membership-** As of now, CITES has 184 member countries, also known as Parties
- **Aim-** Its aim is to ensure that international trade in specimens of wild animals and plants does not threaten the survival of the species.
- It plays a critical role in the conservation of biodiversity by regulating international trade in wildlife, ensuring that such trade is legal, sustainable, and traceable.
- **Secretariat-** The CITES Secretariat is administered by UNEP and is in Geneva, Switzerland.

### Appendices

- **Appendix I-** Includes species threatened with extinction. Trade in these species is only permitted in exceptional circumstances.
- **Appendix II-** Includes species not necessarily threatened with extinction but may become so unless trade is closely controlled.
- **Appendix III-** Includes species protected in at least one country, which has asked other CITES Parties for assistance in controlling the trade.

- Its leaves are oblong and leathery, and it produces small, fragrant flowers.

- **Applications-** It is renowned for producing a dark, fragrant resin known as agarwood or "oud," highly valued for its use in perfumes, incense, and traditional medicines.

- Agarwood is utilized in numerous applications such as in the aroma industry, in medicine preparations, preparations of air fresheners and purifiers.

- The essential oil extracted from agarwood has anti-inflammatory, anti-rheumatic, analgesic and antioxidant properties.

- **Conservation Status**

- IUCN - ***Critically Endangered***.

- Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) - ***Appendix II***.



## 9. SCIENCE AND TECHNOLOGY

### SPACE

#### 9.1 Low-Frequency Array (LOFAR)

Recently, Astronomers discover new radio galaxy, J0011+3217 using Low-Frequency Array (LOFAR).

- LOFAR (LOW Frequency ARray) is currently ***the largest radio telescope*** operating at the ***lowest frequencies (30–300 kHz)*** that can be observed from Earth.
- **Developed by** - Dutch Institute for Radio Astronomy (ASTRON) in 2012.
- **Location-** The radio telescope network located mainly in the ***Netherlands***.

- It consists of thousands of small antennas spread across Europe, with the core located in the Netherlands.
- **Directions** - It is the 1<sup>st</sup> telescope that consists of a vast array of **omnidirectional antennas**, can observe in several directions simultaneously.
- **Utility**- LOFAR is used for various astronomical studies, including
  - The observation of **cosmic rays**,
  - The mapping of the universe's **large-scale structure**, and
  - The study of **transient astronomical phenomena**.
- It is a powerful tool for exploring the early universe and the formation of galaxies, stars, and black holes.
- **Recent Findings**- The research revealed that the newfound galaxy, showcases peculiar features, including a one-sided secondary lobe.
- The finding noted that radio galaxy cores emit significant radio waves due to black holes accreting gas and dust, producing high-energy jets that accelerate charged particles, visible in radio wavelengths.

### Radio galaxy

- Radio galaxies are a type of active galaxy that emit more radio waves than visible light. They are also known as radio-luminous or radio-loud galaxies.
- Radio galaxies are powered by jets from supermassive black holes at the center of the galaxy, which interact with charged particles and strong magnetic fields to create radio emissions.
- These emissions form giant regions called radio lobes that extend beyond the visible structure of the galaxy, often in pairs.
- The lobes can be up to 15 million light-years across.
- Radio galaxies are much larger than most other galaxies and are almost always large elliptical galaxies.
- The first radio galaxy to be discovered, and still the brightest, is called **Cygnus A**.
- **Examples**
  - **Cygnus A** -One of the brightest radio galaxies in the sky, known for its large and powerful radio lobes.
  - **Centaurus A** -A nearby radio galaxy that is also a source of X-rays and gamma rays.

## 9.2 Astrophysical jets

Recently, a team of scientists have traced the effect of plasma composition on dynamics of astrophysical jets from celestial bodies.

- **About**- An astrophysical jet is an astronomical phenomenon where outflows of **ionised matter** are emitted as extended beams along the axis of rotation.
- **Formation**- They are believed to form due to complex interactions involving **magnetic fields and the accretion disks** around compact objects.
- **Composition**- It consist of **charged particles (plasma)**, which can include electrons, protons, and other atomic nuclei.
- These particles are accelerated to relativistic **speeds, approaching the speed of light**.
- **Velocity**- Jets associated with stars are composed of **ionized gas** moving away from the star with velocities of a few hundred kilometres per second.
- **Findings of the recent study**- Scientists have studied how the plasma composition of astrophysical jets are streams of ionized matter from celestial objects like **black holes, neutron stars, and pulsars** affects their behaviour.
- The study demonstrated that altering plasma composition affects jet propagation **velocities, despite identical initial parameters**.

## 9.3 CHAPEA project

Recently, 4 volunteer crew members of NASA's Mars simulation mission emerged after a year of living in a habitat replicating the Red Planet.

- **About** - Crew Health and Performance Exploration Analog (CHAPEA) project.
- It was the first of three planned simulations to understand the challenges Mars poses for space explorers.

- **Organization** - NASA.
- **Mars simulation** - A **3D printed airlocked habitat** of 1,700 sq feet was created and set up at the Johnson Space Center in Houston, Texas, called "**Mars Dune Alpha**".
- Simulated Martian soil and a backdrop of red, rocky cliffs were provided for an immersive experience.
- **Aim** - NASA aimed to collect data for insight into the potential impacts of long-duration missions to Mars on crew health and performance and understand and counter the physical and mental challenges astronauts will face.
- The data will also help them prepare for long-term presence on the Moon as part of its Artemis programme.
- **Significance** - Mars remains NASA's horizon goal for human exploration because it is one of the only other places we know where life may have existed in the solar system.
- **India's plans for a Mars mission** - In 2014, India tasted success with its Mars Orbiter Mission (MOM) or Mangalyaan, becoming the first nation to reach Martian orbit in its first attempt.

The first CHAPEA mission focused on nutrition, and the next two are planned for 2025 and 2026. NASA hopes to send astronauts to Mars by the 2030s.

### Quick facts

- The temperature on Mars ranges between 20 degrees Celsius and -153 degrees Celsius.
- The planet has a rocky surface with, volcanoes, dry lake beds, and craters, all covered in red dust.
- Winds can create dust storms, with tiny ones resembling tornadoes and large ones occasionally enveloping the entire planet.
- It has about one-third the gravity of Earth the atmosphere is much thinner than Earth's, containing more than 95% carbon dioxide and less than 1% oxygen.
- The planet turns on its axis more slowly than Earth, and being farther from the Sun, takes longer to revolve around the Sun.
- A day on Mars is 24.6 hours and a year is 687 Earth days long.

## 9.4 OJ 287 and Black Hole Pairs

A recent study has spotted the smaller black hole in a pair, marking the first confirmed sighting of an orbiting black hole.

- **OJ 287** – It is a distant galaxy, four billion light years away.
- **Black holes in OJ 287** – NASA's TESS satellite have confirmed the theory that there are two black holes at the centre of OJ 287.
- Researchers have found indirect evidence that a very massive black hole in OJ 287 is orbiting a giant black hole 100 times its size.
- **Discovery** - TESS monitored the brightness of the primary black hole and the jet associated with it.
- **Observation of black hole orbiting another** - Direct observation of the smaller black hole orbiting the larger one is very difficult, but its presence was revealed by a sudden burst of brightness.
- **Fast burst of brightness** - It occurs when the smaller black hole "swallows" a large slice of the accretion disk surrounding the larger black hole, turning it into an outward jet of gas.
- The jet of the smaller black hole is then brighter than that of the larger black hole for about twelve hours.
- **Color changes** – This event makes the colour of OJ287 less reddish, or "yellow", instead of the normal red and after the burst, the red colour returns.
- The "yellow" colour indicates that for the 12-hour period, we are seeing the light from the smaller black hole.

Both black holes have jets associated with them, the larger one with reddish colour, and the smaller one with a yellowish colour jet.



### Transiting Exoplanet Survey Satellite (TESS)

- **TESS** – It is an Astrophysics Explorer mission.
- **Launched by-** NASA, led and operated by MIT in Cambridge and Massachusetts.
- **Aim-** To discover thousands of exoplanets orbit around the brightest dwarf stars in the sky.
- **Findings** – It is finding planets ranging from small, rocky worlds to giant planets, showcasing the diversity of planets in our galaxy.
- **Significance-** It has so far found 410 confirmed exoplanets or new worlds circling stars other than the Sun.

### 9.5 Asteroid 2011 MW1

Recently, NASA predicted that a large asteroid, 2011 MW1, made a close approach to Earth.

- It is as an **Apollo-class asteroid** due to its orbit intersecting Earth's path.
- It is classified as a **Near Earth Asteroid (NEA)**, a term for celestial bodies that pass relatively close to our planet. **Measurement-** 380 feet in diameter.
- **Speed-** 28,946 kilometres per hour.
- **Passage-** The asteroid will pass within 2.4 million miles of Earth, a distance considered safe.
- **Non-Hazardous-** It does not meet the criteria for being labeled a Potentially Hazardous Asteroid.
- **Significance-** These celestial bodies provide valuable insights into the conditions and processes that shaped our solar system billions of years ago.

NASA's Center for Near Earth Object Studies (CNEOS) is responsible for characterizing the orbits of all Near Earth Objects.

Apollo asteroids are a category of near-Earth asteroids named after 1862 Apollo, the first discovered by German astronomer Karl Reinmuth.

Asteroids larger than 140 metres and within 4.6 million miles of Earth's orbit are considered potentially hazardous.

### Quick facts

#### Asteroids

- They are often called minor planets.
- These are relatively small, inactive bodies orbiting the Sun.
- Asteroids are remnants of the early solar system and provide invaluable scientific information about the conditions that existed billions of years ago.
- They are typically composed of rocky, dusty, and metallic materials.
- Most of them reside in the asteroid belt between Mars and Jupiter.
- To date, scientists have identified over 1.3million of these space rocks.

## HEALTH

### 9.6 Oropouche Fever

Italy reported its first case of Oropouche fever recently.

- It is a **mosquito-borne disease** common in Latin and South America.
- **Caused by** - Oropouche virus, which is transmitted most often through the bite of the *Culicoides paraensis* midge. It is an RNA virus, belonging to the family **Bunyaviridae**.
- **Transmission** - It is transmitted through the bites of infected midges and mosquitos.
- There is **no evidence of human-to-human transmission** of the disease.
- **Symptoms** - Similar to dengue, and typically start between 4 and 8 days after the bite, includes fever, headaches, pain, chills, joint stiffness, and sometimes nausea and vomiting.
- Severe clinical presentation is rare, but it may result in aseptic meningitis.



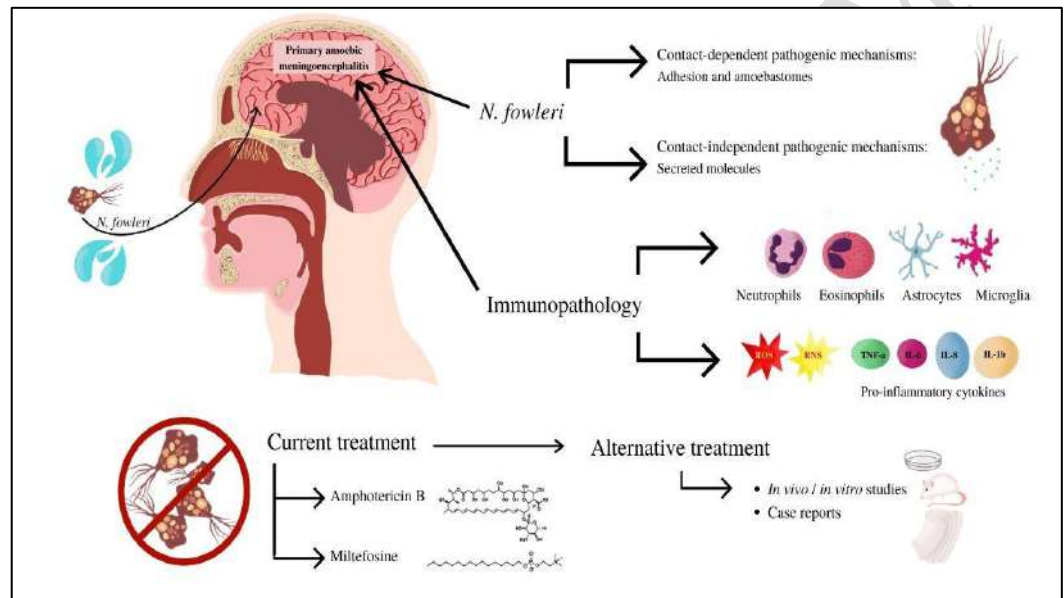
- **Affecting age** - Illness can occur in people of any age. Most patients recover in about 7 days.
- **Treatment** - There is no specific vaccine or antiviral treatment available for the disease.
- Outbreaks are periodically reported in Brazil, Bolivia, Colombia, Ecuador, French Guiana, Panama, Peru, and Trinidad and Tobago.

### 9.7 Amoebic Meningoencephalitis (PAM)

Recent amoebic meningitis deaths have raised concerns among the public and the health department of Kerala.

- **About-** Amoebic meningoencephalitis (PAM) is a **non-communicable, rare and fatal infection** of the brain and its surrounding tissues.
- **Caused by - *Naegleria fowleri*** also known as the "brain-eating amoeba."

- **Transmission**  
- *Naegleria fowleri* is a free-living amoeba or a single-celled living organism.
- The amoeba can be found in warm freshwater, such as lakes and rivers, swimming pools, splash pads, surf parks that are poorly maintained or minimally chlorinated and soil around the world.



- It infects people when it enters the body through the nose.
- Higher temperatures of up to **115°F (46°C)** are conducive to its growth and it can survive for short periods in warm environments.
- **Pathogenesis-** Once inside the nasal passages, the amoeba travels along the **olfactory nerve fibers to the brain**, where it causes a severe and usually fatal infection.
- It rapidly multiplies and causes extensive inflammation and destruction of brain tissue.
- The amoeba feeds on nerve cells and glial cells, leading to necrosis (cell death) and hemorrhage.
- **Symptoms-** Headache, fever, nausea, vomiting, and stiff neck.
- **Treatment-** Antifungal and antimicrobial drugs are typically used, but prognosis remains poor.

### 9.8 Down syndrome

A recent research study has discovered first Case of Down Syndrome in Neanderthals.

- It is a genetic disorder caused when **abnormal cell division** results in an extra full or partial copy of **chromosome 21**.
- Human cells normally contain **23 pairs of chromosomes**, One chromosome in each pair comes from father and mother.
- **Causes-** Down syndrome typically occurs spontaneously during fetal development due to errors in cell division, rather than being inherited.
- This can impact the development of the brain and body, and is usually associated with developmental delays, mild to moderate intellectual disability, and characteristic physical features.
- **Symptoms-** At birth, babies with Down syndrome usually have certain characteristic signs, including:

- flat facial features
- small head and ears
- short neck
- bulging tongue
- eyes that slant upward
- atypically shaped ears
- poor muscle tone
- **Genetic variations-** Three genetic variations can cause Down syndrome
  - **Trisomy 21-** In about 95% of cases, Down syndrome results from trisomy 21, where a person has **three copies of chromosome 21 instead of the usual two**, due to abnormal cell division during egg or sperm development.
  - **Mosaic Down syndrome-** In mosaic Down syndrome, some cells have **an extra copy of chromosome 21** due to abnormal cell division after fertilization, leading to a mix of normal and abnormal cells.
  - **Translocation Down syndrome-** In this syndrome, a portion of chromosome 21 attaches to another chromosome before or at conception. These individuals have the **usual two copies of chromosome 21**, along with extra genetic material from chromosome 21 attached to another chromosome.
- **Treatment-** Presently, there's **no cure** for Down syndrome, treatment can help people reach their full potential.

## 9.9 Ban of Antibiotics

The Drugs Consultative Committee (DCC) recommends banning the import, production, distribution, and sale of antibiotics.

- **Background** – DCC banned antibiotics **Chloramphenicol and Nitrofurans**
- **Antibiotics-** An antibiotic is a type of antimicrobial substance active against bacteria.
- **AMR- Anti-Microbial Resistance** refer to the ability of microorganisms (such as bacteria, viruses, fungi, and parasites) to resist the effects of drugs designed to kill them or inhibit their growth.
- **Recommendation-** The DCC members noted that chloramphenicol and nitrofurans are often misused in poultry and other animal feed supplements.
- This misuse can lead to antibiotic-resistant bacteria and exacerbate the global health issue of **antimicrobial resistance (AMR)**.

The DCC functions as the advisory committee to the Central Drugs Standard Control Organization (CDSCO).

- **Other banned antibiotics-** As per Coastal Aquaculture Authority (CAA) guidelines, **20 antibiotics** and other pharmacologically active substances are banned for use in shrimp aquaculture.

Chloramphenicol	Nitrofurantoin
<ul style="list-style-type: none"> <li>● It is an antibiotic useful for the treatment of a number of <b>bacterial infections</b> including superficial eye infections, enteric fever, typhoid fever and central nervous system infections.</li> <li>● It is recognised by the WHO as a <b>Highly Important Antimicrobial (HIA)</b>.</li> </ul>	<ul style="list-style-type: none"> <li>● It is an antibiotic medication that is used for the treatment of uncomplicated <b>lower urinary tract infections</b>.</li> <li>● Its derivatives are classified as <b>Important Antimicrobials (IA)</b> by WHO.</li> </ul>

- This includes chloramphenicol and types of nitrofurans, including furaltadone, furazolidone, furylfuramide, nifuratel, nifuroxime, nifurpazine, nitrofurantoin and nitrofurazone.
- **Concerns-** In May 2023, Marine Products Export Development Authority (MPEDA) proposed a ban on the import and production of these drugs to the Department of Animal Husbandry and Dairying (DAHD).

Marine Products Export Development Authority (MPEDA), the nodal agency for the development of the seafood industry in India, especially focusing on exports of marine products.

### Central Drugs Standard Control Organization

- The CDSCO is the Central Drug Authority for discharging functions assigned to the Central Government under the Drugs and Cosmetics Act.
- It is the National Regulatory Authority for the medical devices industry under the provisions of the Drugs & Cosmetics Rules.
- **Nodal Ministry-** Ministry of Health & Family Welfare.
- CDSCO, along with state regulators, is jointly responsible for the grant of licenses for certain specialized categories of critical Drugs.
- **Functions-** Regulatory control over the import of drugs, approval of new drugs and clinical trials.
- Approval of certain licences as Central Licence Approving Authority

### 9.10 Poliovirus & Vaccines

Vaccine hesitancy in major cities of Afghanistan and Pakistan is causing a resurgence of the poliovirus, posing a serious threat to the WHO's Global Polio Eradication Initiative.

- Polio is a **highly infectious** viral disease caused by a human enterovirus called the poliovirus.
- **Vulnerable-** It largely affects children **under 5 years of age**.

#### Types of polio

- **Abortive poliomyelitis-** causes flu-like and intestinal symptoms. It only lasts a few days and doesn't cause long-lasting issues.
- **Non-paralytic poliomyelitis-** cause aseptic meningitis, a swelling of the area around brain.
- **Paralytic poliomyelitis-** The poliovirus attacks brain and spinal cord. It can paralyze the muscles that allow to breathe, speak, swallow and move your limbs.
- **Polioencephalitis-** It is a rare type of polio that mostly affects infants. It causes brain swelling.

Feature	Inactivated Polio Vaccine (IPV)	Oral Polio Vaccine (OPV)
Type	Inactivated virus	Live attenuated virus
Administration	Injectable	Oral drops
Immune Response	Induces primarily humoral immunity	Induces both humoral and mucosal immunity
Global Use	Used in countries where wild poliovirus is eradicated	Used in countries where polio is endemic or recently eradicated
Current Usage	Used in polio eradication campaigns in developed countries	Used extensively in polio eradication efforts globally

- **Symptoms-** Between 70% and 95% of people infected with poliovirus don't have symptoms.

#### Vaccines

- There are two types of vaccines used to prevent poliomyelitis (polio) i.e. **Inactivated polio vaccine (IPV) and oral polio vaccine (OPV)**.
- The world has used both vaccines in the fight against polio.
- While some countries, such as **Norway, Sweden, Finland, and Iceland**, relied exclusively on the IPV, most countries have used a combination of the two.
- **Potency of OPV-** OPV offered several advantages over IPV.
- Firstly, it induced protection at the gut, the viral entry site, providing stronger immunity compared to IPV.

- Secondly, OPV was administered orally, eliminating the need for syringes and trained personnel for its delivery.
- **Concerns-** Despite successful efforts in many regions, particularly in Africa, these countries continue to struggle with the virus.
- There are concerns that the WHO may not meet its goal of ***global polio eradication by the end of 2024.***

### 9.11 Vaccine for Shigella

The Indian Council of Medical Research (ICMR) has recently found an Indian partner to manufacture the breakthrough vaccine for the Shigella infection.

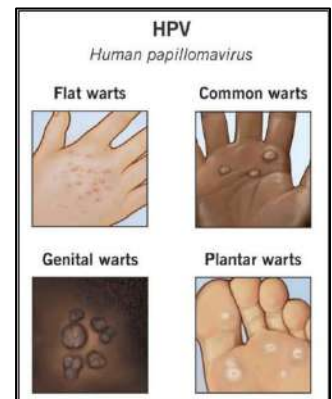
- **Shigella** - It is an ***intestinal infection*** caused by ***bacterium*** that belongs to the ***enterobacter family***.
- **Four species of Shigella**
  - Shigella sonnei
  - Shigella flexneri
  - Shigella boydii
  - Shigella dysenteriae
- The main sign of shigella infection is ***diarrhea***, which often is bloody.
- **Symptoms** - Diarrhea (often containing blood or mucus), Stomach pain or cramps, Fever, Nausea or vomiting.
- Some people have ***no symptoms*** after they've been infected with shigella but their feces may still be contagious up to a few weeks.
- **Transmission** - Shigella is ***very contagious***.
- People get infected with shigella when they come in contact with and swallow small amounts of bacteria from the stool of a person who is infected with shigella.
- Eating or drinking ***contaminated food or water***.
- It can also be spread during ***sexual activity*** with a sick person.
- **Vulnerable Age** - ***Children under age 5*** are most likely to get shigella infection, but it can occur at any age.
- **Prevention** - Washing your hands frequently with soap and water is key to preventing the spread of this infection.
- **Vaccine** - There is ***no vaccine*** or cure yet.

Shigellosis affects about 188 million cases per year that result in about 1 million deaths per year around the world.

### 9.12 Human Papilloma Virus (HPV)

India's public health sphere recently saw a one-sided discussion on how HPV vaccination prevents cervical cancer and reduces related deaths.

- It is a ***viral infection***.
- There are more than 100 varieties of human papillomavirus (HPV).
- Some types of human papillomavirus (HPV) infection cause ***skin or mucous membrane growths (warts)*** and some can cause ***different types of cancer***.
- Most HPV infections ***don't lead to cancer***. But some types of genital HPV can cause cancer of the lower part of the uterus that connects to the vagina (cervix).
- Other types of cancers, including cancers of the ***anus, penis, vagina, vulva, and back of the throat (oropharyngeal)***, have been linked to HPV infection.
- **Symptoms of HPV** - it includes Genital warts, Common warts, Plantar warts, Flat warts.
- **Transmission of HPV** - These infections are often transmitted sexually or through other skin-to-skin contact.



- **Vaccine** - Vaccines can help protect against the strains of HPV most likely to cause genital warts or cervical cancer.
- **Gardasil 9** is an HPV vaccine approved by the U.S. Food and Drug Administration and can be used for males and females to protect against cervical cancer and genital warts.

### Quick fact

- **Cervical cancer** - Nearly all cervical cancers are caused by HPV infections, but cervical cancer may take 20 years or longer to develop after an HPV infection.
- Cervical cancer **doesn't cause symptoms**.
- Getting **vaccinated against HPV infection** is your best protection from cervical cancer.
- The Serum Institute of India (SII) has developed '**Cervavac**'.
- It is a **vaccine against cervical cancer**.
- It uses similar techniques, deploying virus-like particles (**VLPs**) produced using recombinant deoxyribose nucleic acid (**rDNA**) techniques to generate an immune response against HPV infections.
- It is only the **second rDNA vaccine in the world** using the techniques of the early 1970s, the first being the vaccine against **Hepatitis-B**.

### 9.13 Semaglutide vs tirzepatide

India's drug regulator could soon approve the weight-loss drug tirzepatide.

- Semaglutide and tirzepatide are **small proteins** that increase levels of hormones like **GLP-1**, helping to control weight via the brain and digestive tract.
- **Manufacturer-** Eli Lilly, American pharmaceutical company.
- The United States Food and Drug Administration (FDA) has approved **Wegovy (semaglutide) and Zepbound (tirzepatide)** for chronic weight management in adults.
- **Prescription-** These drugs can be prescribed to adults who are obese (BMI over 30) or overweight (BMI between 27 and 30) with at least one weight-related health condition, such as high blood pressure, high cholesterol, or type 2 diabetes.

*Glucagon-like peptide 1 (GLP-1) is a hormone most commonly known for stimulating insulin release following meal consumption.*

Feature	Semaglutide	Tirzepatide
<b>Drug Class</b>	Glucagon-like-peptide 1 (GLP-1) receptor agonist	Dual GIP and GLP-1 receptor agonist
<b>Brand Names</b>	Ozempic, Rybelsus, Wegovy	Mounjaro
<b>Indications</b>	Type 2 diabetes, chronic weight management	Type 2 diabetes, potentially for weight loss
<b>Mechanism of Action</b>	Mimics GLP-1 to increase insulin secretion, decrease glucagon release, and slow gastric emptying	Activates both GIP and GLP-1 receptors to enhance insulin secretion, inhibit glucagon release, and slow gastric emptying
<b>Efficacy in HbA1c Reduction</b>	Reduces HbA1c by approximately 1.0-1.5%	Reduces HbA1c by approximately 1.5-2.0%
<b>Weight Loss</b>	Significant weight loss observed (up to 15% body weight in trials for Wegovy)	Significant weight loss, potentially greater than Semaglutide (up to 22.5% in trials)
<b>Side Effects</b>	Nausea, vomiting, diarrhea, constipation, potential risk of thyroid C-cell tumors	Similar to Semaglutide: nausea, vomiting, diarrhea, potential risk of thyroid C-cell tumors, injection site reactions

<b>Cardiovascular Benefits</b>	Shown to reduce major cardiovascular events in patients with type 2 diabetes and cardiovascular disease	Shown to reduce major cardiovascular events in patients with type 2 diabetes (ongoing studies to further validate)
<b>Approval Status</b>	FDA approved for type 2 diabetes and chronic weight management	FDA approved for type 2 diabetes (weight management indications under investigation)

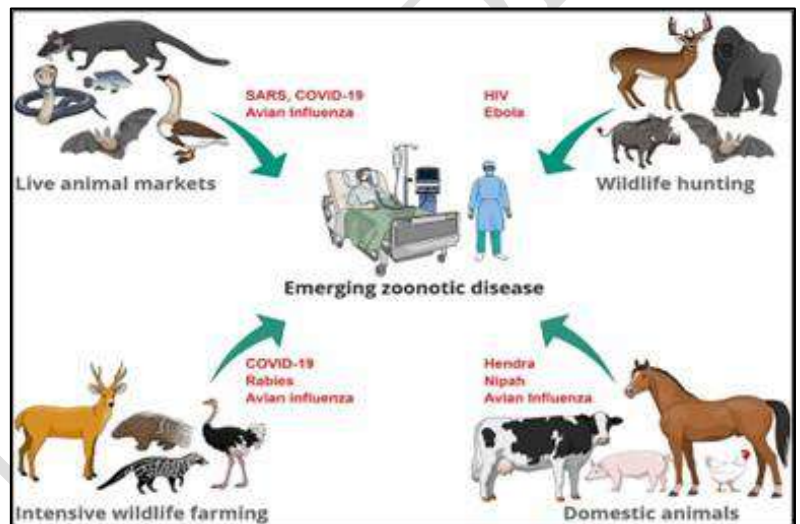
- **Global scenario-** The development of various weight loss drugs has been a game changer for obesity treatment in recent years, especially in the **US and Europe**.
- Semaglutide vs tirzepatide drugs are **yet to be** commercially available in India.

India's drug regulator could soon approve the weight-loss drug tirzepatide.

### 9.14 Zoonotic diseases

United Nations Environment Programme (UNEP) has issued a stark warning about emerging zoonotic diseases that may trigger another pandemic by 2030.

- **About-** Zoonotic diseases are infections that are **spread between people and animals**.
- **Different pathogens-** Many different pathogens can cause zoonoses. These include **Bacteria, Parasites (protozoa or parasitic worms), Viruses, Fungi, and Prions**.
- **Types-** There are various types of zoonotic diseases.
- Examples include rabies (from bites of infected animals), Ebola (through contact with infected animals), Lyme disease (from ticks), and COVID-19 (thought to originate from bats).
- **Symptoms-** Some common symptoms include Fever, Tiredness (fatigue), Headache, Body aches, Rash, Diarrhoea, and Vomiting.
- **Prevention-** Prevention involves measures like avoiding contact with wild animals, proper food handling and cooking, using insect repellents, and vaccination of animals.
- **Recommendations-** The UNEP report emphasizes the urgent need for proactive measures to address ecological disruptions and human-wildlife interactions, stressing that safeguarding planetary health is crucial in preventing future zoonotic outbreaks.
- Understanding zoonotic diseases is crucial for public health preparedness and managing outbreaks effectively.



### 9.15 Chandipura virus

Recently 6 children have died due to suspected Chandipura virus Infection (CHPV) in Gujarat.

- Chandipura virus, aka Chandipura vesiculovirus (CHPV), is an **RNA virus**.
- It is a **noncontagious** disease.
- **Virus Family-** Rhabdoviridae family.
- **First identified-** In 1965 in Chandipura, Maharashtra.
- **Transmission-** Chandipura virus is primarily transmitted through the **bite of infected sandflies** (genus Phlebotomus).
- The virus primarily affects children and has been associated with outbreaks of acute encephalitis in India.

RNA virus is a virus that has single-stranded as well as double-stranded RNA as its genetic material.

The Rhabdoviridae family are bullet-shaped, negative-sense single-stranded RNA (ssRNA) viruses which also includes the rabies virus.

- It is a serious pathogen with a rapid onset of severe symptoms, primarily affecting children in certain regions.
- The virus resides in the salivary gland of these insects, and can be transmitted to humans or other vertebrates like domestic animals through bites.
  - **Vector-borne transmission-** The primary mode of transmission is through sandfly bites.
  - **Animal reservoirs-** Certain animal species may act as reservoirs for the virus, though this is still under investigation.
  - **Environmental factors-** Outbreaks have been linked to specific environmental conditions that favor the breeding of sandflies.
- **Symptoms** - Fever, Headache, Vomiting, Convulsions, Coma.
- **Treatment-** There is ***no specific antiviral treatment*** or vaccine for Chandipura virus infection.
- **Prevalance of Disease in India-** Significant outbreaks of the disease in India were seen in 2003-04 in states such as ***Maharashtra, northern Gujarat and Andhra Pradesh.***
- The infection has largely remained endemic to the central part of India, where the population of CHPV infection-spreading sandflies and mosquitoes is higher.

### 9.16 Measles and its vaccines

According to WHO-UNICEF, India has the highest number of unvaccinated children for measles in 2023, with 1.6 million cases.

- Measles is a highly ***contagious viral disease*** caused by the measles virus, which is a ***single-stranded RNA virus*** of the genus Morbillivirus within the family Paramyxoviridae.
- **Symptoms-** High fever, Cough, Runny nose, Diarrhea and Pneumonia.
- **Transmission-** It is an ***airborne disease.*** spreads through person-to-person contact.
- **Vulnerable-** Unvaccinated young children and pregnant persons are at highest risk of severe measles complications.
- **Prevalent Regions** - Measles is still common, particularly in parts of Africa, the Middle East and Asia.
- **Treatment** - There is no specific treatment for measles.
- **Prevention - Measles Vaccines-** The primary method for preventing measles is vaccination. There are several types of measles vaccines:
  - **MMR Vaccine-** MMR stands for Measles, Mumps, and Rubella. This combined vaccine protects against all three diseases.
  - **MMRV Vaccine-** MMRV stands for Measles, Mumps, Rubella, and Varicella (chickenpox). This combined vaccine protects against all four diseases.
- In some regions, a single measles vaccine may be available, but it is less commonly used compared to the MMR and MMRV vaccines.
- **Immunisation Agenda 2030-** The Immunization Agenda 2030 (IA2030) sets an ambitious, overarching global vision and strategy for vaccines and immunization for the decade 2021–2030.
  - A key goal of the Immunisation Agenda 2030 (IA2030) is to reduce the number of ***zero-dose children by half by 2030.***

*zero-dose children is a children who don't receive a single dose of diphtheria, tetanus and pertussis containing vaccine.*

#### Recent Findings of WHO-UNICEF

- In 2023, India was one of the top 10 countries globally where 55% of children lacked measles vaccination, despite 90-94% of its children being vaccinated for measles.
- India has recorded more ***'measles zero dose'*** children in 2023 than in 2022.
- India logs 3<sup>rd</sup> highest number of children not vaccinated against measles after Nigeria and Congo.
- The latest finding noted that measles outbreak in at least 5 Indian states in 2022, driven by reduced vaccination during the COVID-19 pandemic.
- ***Maharashtra*** reported the most cases and deaths in India.

### 9.17 Diphtheria, Tetanus and Pertussis (DTaP)

Recently WHO and UNICEF estimates of national immunization coverage (WUENIC) for 2023 indicate a slight decline in childhood immunization compared to 2022.

Diseases	Diphtheria	Tetanus	Pertussis( Whooping Cough/ Black Cough)
<b>Caused by</b>	Bacteria	Bacteria	Bacteria
<b>Transmission</b>	It can spread from person to person.	It enters the body through cuts or wounds.	It can spread from person to person.
<b>Symptoms</b>	It causes a thick covering in the back of the throat. It can lead to breathing problems, paralysis, heart failure and even death in severe cases.	It causes painful tightening of the muscles usually all over the body. Tetanus can lead to serious health problems, including being unable to open the mouth, having trouble swallowing and breathing, or death.	It causes can cause uncontrollable, violent coughing that makes it hard to breathe, eat, or drink. Pertussis can be extremely serious especially in babies and young children, causing pneumonia, convulsions, brain damage, or death. In teens and adults, it can cause weight loss, loss of bladder control, passing out, and rib fractures from severe coughing.
<b>Prevention</b>	Can be prevented through vaccine.	Can be prevented through vaccine.	Can be prevented through vaccine

- **DTaP Vaccine-** The DTaP vaccine contains **inactivated toxins (toxoids)** from the bacteria that cause diphtheria and tetanus, along with whole-cell pertussis bacteria or parts of it.
- Typically administered to infants and children in a series of doses starting at 2 months old, with booster shots given at intervals to maintain immunity.
- **Findings-** WHO and UNICEF estimates noted that, in 2023, India had 2.04 million under-vaccinated children, down from 2.11 million in 2019.
- Vaccine coverage fell to 85% during the first two years of the pandemic, down from 91% in 2019.
- India saw DPT vaccine coverage drop from **95% in 2022 to 93% in 2023.**
- This decline suggests an increase in children receiving no routine immunizations.
- India's DPT coverage in 2023 was higher than the global average of 89%, and significantly above 2020 and 2022 figures of 87% and 88% respectively.

#### National Immunization Coverage

- The World Health Organization (WHO) and UNICEF jointly monitor national immunization coverage through the WHO-UNICEF Estimates of National Immunization Coverage (WUENIC).
- **Aim-** WUENIC aims to track and report immunization coverage globally to assess progress towards immunization goals, such as those set out in the Global Vaccine Action Plan (GVAP).
- **Vaccination Coverage-** In 2023, India had 1.6 million zero-dose children, up from 1.1 million in 2022 but down from 2.73 million in 2021.
- During the pandemic's early years, coverage dropped to 85% from 91% in 2019.
- In 2023, 2.04 million children were under-vaccinated, slightly fewer than the 2.11 million in 2019.
- **Significance-** These estimates are used to monitor progress towards immunization targets, identify gaps in coverage, and guide immunization strategies and interventions to improve coverage rates.

### 9.18 Excipients in Drugs information



The Health Ministry initiated the process to amend the drug rules to mandate inclusion of details of excipients into the data stored in the label of drug formulation products.

- **Excipients**- Excipients are substances other than active pharmaceutical ingredients in finished pharmaceutical dosage forms.
- Almost all drug dosage forms include excipient to guarantee dosage, stability, and bioavailability.
- Currently, the other information that are stored in the label in bar code or QR Code include
  - The unique product identification code,
  - Proper and generic name of the drug,
  - Brand name,
  - Name and address of the manufacturer,
  - Batch number,
  - Date of manufacturing and
  - Date of expiry.
- There is no clear cut indication of composition of excipient on the strips of medicines available on retail medical shops and patients find it difficult to find paraben free antihypertensive medicines and others.
- **Recent consideration** - The listing of excipients was considered by the Ministry after multiple grievances about adverse related to parabens.
- The suggestion was to include the details of excipient or INS codes of the excipients on every strip of medicines.
- **Aim**- The move is aimed at helping patients omit any adverse reactions causing ingredients while under treatment.
- It will amend the **sub-rule (7) of Rule 96 of the Drugs Rules, 1945** to include details of excipients.

### 9.19 Late Blight Diseases

Central Potato Research Institute (CPRI) has issued an advisory for potato farmers across the country, warning a high risk of late blight disease in the crop due to changes in weather conditions.

- Late blight is a **water mold disease** that can affect tomato and potato plants and is caused by the fungal-like pathogen, **Phytophthora infestans**.
- **Favored condition** - Late blight is favored by cool, damp conditions and humid regions with temperatures between 4 and 29 °C.
- **Symptoms**
  - **Leaves** - Large, dark brown blotches with a green gray edge.
  - **Stems** - Firm, dark brown with a rounded edge.
  - **Fruits** - Firm, dark brown, circular spots that may become mushy.
  - **Tubers** - Discolored, anywhere from brown to red to purple.
  - **Lesions** - Round or irregularly shaped areas that range in color from dark green to purplish black.
- **Threat** - The disease spreads quickly in fields and can result in total crop failure if untreated.
- **Prevention** - Farmers are advised to spray fungicides like cymoxanil + mancozeb, fermion + mancozeb, or dimethomorph + mancozeb.



#### Lahaul Valley

- Lahaul Valley, a coldest desert in Himachal Pradesh, which is a prominent place of potato producing.
- Low Aphid population in the state also a reason that contributing the disease-resistant potatoes.
- Lahaul Valley is famous for cultivating prized seed varieties of potatoes Kufri Chandramukhi, Kufri Jyoti, Table Santana, and Shepody

- **Prevalent Regions** - Late blight occurs frequently in the districts of Hoshiarpur, Jalandhar, Nawan Shehar, Kapurthala, Ropar and Amritsar of Punjab.

## 9.20 Strain MCC0200

Scientists have discovered a new strain of lactic acid bacterium with potential for broader probiotic use through collaborative genome analysis.

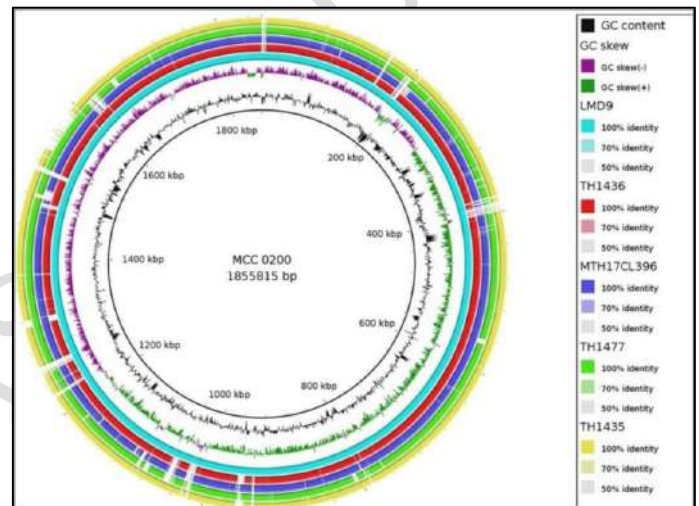
- Strain MCC0200 identified as ***Streptococcus Thermophilus***, is a probiotic bacterium isolated from dairy products.

### Recent Findings

- It demonstrates several health-promoting traits, such as surviving
  - Gastrointestinal transit,
  - Adhering to intestinal mucosa, and
  - Exhibiting **antioxidant and anti-hypercholesterolemic activities**.

Genome analysis, also known as genomic analysis, is the study of an organism's genome, or complete set of genetic information.

- **Probiotic efficacy** – It withstands the harsh conditions of the gastrointestinal tract and exhibits remarkable resilience against gastric juices and bile acids.
- **Gut health**- It can adhere to mucosal surfaces, crucial factor a in promoting gut health and immune function.
- **Mitigating oxidative stress**- Genome analysis reveals its ability to produce beneficial compounds like **folate and bacteriocins**, and enzymes that mitigate oxidative stress.
- **Production of essential vitamins**- It is considered to be a nutrient powerhouse including the production of essential vitamins like **folate (vitamin B9)**.



- **Cardiovascular benefits**- MCC0200's **cholesterol-lowering properties** hold promise as a functional food ingredient with cardiovascular benefits.

## 9.21 Listeria and listeriosis

Two separate outbreaks of listeria have been reported in the United States and Canada in recent weeks.

- **Listeria**- It is a type of **bacteria (*Listeria monocytogenes*)** found in soil, vegetation, water, sewage, and even the feces of animals and humans that can contaminate many foods.
- Listeria can cause an intestinal illness that is usually mild.
- **Listeriosis**- People who eat those foods can get infected with Listeria and this infection is called listeriosis.
- **Infected through** - Raw meat & seafood, Ready-to-eat processed meat & seafood, Raw vegetables, refrigerated pates, Prepared salads, Melons, Soft cheeses and Unpasteurized milk products.
- **People at risk**- It is most likely to sicken people who are pregnant and their newborns, adults aged 65 or older, and people with weakened immune systems.
- **Symptoms**- Most people do not fall sick or develop symptoms, but the typical symptoms include
  - Fever,
  - Flu-like symptoms include muscle aches and fatigue, Headache, Stiff neck, Confusion, Loss of balance, Seizures, Diarrhea, and Vomiting.

Pregnant Hispanic women are 24 times more likely than the general population to get Listeria infection.

- **Treatment-** The treatment is like one for a routine stomach infection and could require antibiotics.

## 9.22 Tinzaparin

Recently, researchers discovered that tinzaparin significantly reduces damage to human cells caused by spitting cobra venom.

- **Tinzaparin-** Tinzaparin is a prescription drug used to treat deep vein thrombosis (DVT) and pulmonary embolism (PE).
- It is a Low Molecular Weight Heparin (LMWH) and a drug commonly used to **prevent blood clots**.
- Tinzaparin is a potent inhibitor of activated coagulation factors, especially Factors Xa and IIa (thrombin).
- It can also inhibit angiogenesis by binding to heparin-binding sites on endothelial cells, and by increasing the release of tissue factor pathway inhibitor (TFPI).
- It can also be used in conjunction with warfarin for the treatment of acute symptomatic Deep Venous Thrombosis (DVT) with or without PE.
- It significantly reduces damage to cells due to spitting cobra venom.
- It could protect these cells even when it was introduced an hour after the cells had been exposed to the venom.
- **Highlights of the recent study** - The researchers hypothesized that if the venom's toxicity depended on the biological pathway that synthesised **heparan sulphate**, artificially stopping this pathway could ameliorate the venom's toxic effects.
- Tinzaparin could protect these cells even when it was introduced an hour after the cells had been exposed to the venom.
- Tinzaparin worked by blocking the interaction between the venom and its receptor in the cell by binding to venom molecules.

Encounters with venomous snakes kill about 1.4 lakh people every year, especially in the tropical regions of Africa and Asia.

### Naja pallida

- It is also known as the **red spitting cobra**.
- It is orange and red in colour.
- It is **native to Tanzania**.
- It is formidable (Humans fear due to its great size).
- It has a 1.2-metre-long foe.
- When threatened, the cobra raises its hood, hisses, and if necessary, sprays venom from its mouth at the predator's face before lunging to bite and deliver more venom.
- The venom attacks cells in the body and damages the nervous system.



## BIOTECHNOLOGY

### 9.23 Genome editing


The Kerala University of Fisheries and Ocean Studies (Kufos) is set to launch a genome editing mission.

- **About** - Genome editing is a method for making specific changes to the **Deoxyribonucleic acid (DNA) of a cell or organism**.
- It can be used to **add, remove or alter** DNA in the genome.
- Human genome editing technologies can be used on **somatic cells, germline cells and germline cells**.
- **Usage of Genome editing**
  - **Research-** Genome editing can be used to change the DNA in cells or organisms to **understand their biology** and how they work.

- **Disease treatment-** Genome editing has been used to modify **human blood cells** that can be put back into the body to treat conditions including blood cancers and AIDS.
- **Biotechnology-** Genome editing has been used to **modify agricultural crops to improve their yields** and resistance to disease and drought.

### Pearl spot production mission

- **Objective of the mission** - It will help enhance breeding and seed production of **pearl spots**.
- **Significance-** Genome editing will target the genetic makeup of the fish **to promote faster growth**.
- It will also enhance the breeding and seed production of pearl spots.

Pearl spot	
<ul style="list-style-type: none"><li>● It is an indigenous fish extensively found along the east and south-west coasts of Peninsular India.</li><li>● <b>Scientific name-</b> <i>Eetroplus suratensis</i>.</li><li>● <b>Common name-</b> “Karimeen” in Kerala.</li><li>● <b>Habitat-</b> It is an important candidate species for aquaculture in ponds in both brackish water and freshwater environments.</li><li>● <b>Distribution</b> – Kerala, Goa, Odisha in India and Srilanka.</li><li>● <b>Harvest-</b> Despite slow growth, high stocking density allows table-size pearl spot to be harvested within 9-12 months.</li><li>● <b>Conservation Status</b> – IUCN – Least Concern.</li></ul>	

### 9.24 Mineral nano particles

Recently, IIT-Madras team makes mineral nanoparticles with water.

- **Background** - Water droplets are **ubiquitous** in our environment which exist in various sizes from large raindrops to minute aerosol particles.
- Among these, **microdroplets**, which are a thousandth the size of typical raindrops, display unique properties and behaviors.
- **Surface Molecules vs. Bulk Molecules** - In bulk water, surface molecules participate in chemical reactions more readily than those inside.
- Microdroplets, due to their **confined space and close-packed molecules**, engage in chemical reactions more eagerly and up to a **million times faster than bulk water**.
- **Electrically Charged Microdroplets** - Microdroplets at the beach can **carry ions from seawater**, settling on skin.
- As larger droplets evaporate and shrink, remaining water molecules bond closer, potentially leading to the formation of **negatively charged hydroxyl ions (OH<sup>-</sup>) and free protons (H<sup>+</sup>)**.
- **Research Findings on Microdroplets** - The team conducted an experiment using **quartz, ruby, and fused alumina crystals**.
- Applying a **high voltage** to mineral microparticles in water, they observed the particles breaking into nanoparticles within milliseconds.
- Free protons might infiltrate crystal layers and break them apart.

Nanoparticles
<ul style="list-style-type: none"><li>● <b>Nanoparticles</b> - They are tiny particles that measure between <b>1 and 100 nanometers in size</b>.</li><li>● A nanometer is <b>one-billionth of a meter</b>, making nanoparticles incredibly small, often comparable in size to atoms and molecules.</li><li>● <b>Property</b> - Due to their small size, nanoparticles have a <b>large surface area relative to their volume</b>.</li><li>● This enhances their <b>chemical reactivity and physical properties</b>.</li><li>● <b>Applications</b> - Medicine, Electronics, Energy, Environmental, Materials Science.</li></ul>

- Surface tension and electric fields could contribute to **creating shockwaves** that fragment the microdroplets.
- **Implications of the Study**
- **Origins of Life** - The study's findings could aid research on proto-cells, potential precursors to modern cells, providing insights into the origins of life.
- **Agricultural Applications** - Silica nanoparticles, essential for plant growth, can be supplied to soil, improving agricultural productivity.
- This method could **transform unproductive soils** and desertified areas into fertile lands.

### 9.25 Bimetallic NiFe systems

A new study claims that a bimetallic Nickel-Iron layered double hydroxide system is the most efficient for oxygen production through water splitting.

- **Research by** - The Institute of Advanced Study in Science and Technology (IASST).
- **Nodal Agency**- Department of Science and Technology (DST)
- **Finding**- A bimetallic Nickel-Iron layered double hydroxide system **efficiently produces O<sub>2</sub> through water splitting**.
- It eliminates the need for trimetallic solutions to enhance productivity.
- To improve water splitting efficiency, scientists have focused on 2 key reactions i.e.
  - The hydrogen evolution reaction (HER) and
  - The oxygen evolution reaction (OER).
- **Composition and Structure**- NiFe systems combine nickel (Ni) and iron (Fe) at the molecular level.
- NiFe LDHs are structured with **positively charged** metal hydroxide layers separated by anions and water molecules.
- This structure provides a high surface area and favorable catalytic sites.
- **Catalytic Properties**- NiFe LDHs are highly efficient catalysts for the OER, a crucial step in water splitting.
- The combination of **Ni and Fe** improves **catalytic activity** and stability.
- **Applications**- NiFe systems are extensively used in electrochemical cells for splitting water into hydrogen and oxygen.
- They also explored applications in batteries, supercapacitors, and other energy storage and conversion devices due to their excellent electrochemical properties.
- **Advantages**- NiFe systems are made from abundant and inexpensive metals, making them a cost-effective alternative to precious metal catalysts like **platinum and iridium**.

Water splitting is a sustainable and eco-friendly method to generate green and pure H<sub>2</sub> and O<sub>2</sub> on a large scale without harming flora and fauna.

### 9.26 Kindlins

A recent study of Kindlins has uncovered significant and novel pathways to cancer treatment.

- Kindlins are a family of **proteins** that play crucial roles in cellular processes, particularly **cell adhesion, migration, and signaling**.
- There are 3 members in the Kindlin family - Kindlin-1, Kindlin-2, and Kindlin-3.

#### Kindlin family

##### Kindlin-1

- **Gene**- FERMT1
- **Function**- Kindlin-1 is primarily expressed in epithelial cells.
- It is involved in the regulation of integrin activation, which is essential for cell adhesion, migration, and wound healing.

	<ul style="list-style-type: none"> <li>• <b>Clinical Relevance-</b> Mutations in the FERMT1 gene are associated with <b><i>Kindler syndrome</i></b>, a rare genetic disorder characterized by skin fragility, blistering, and progressive skin atrophy.</li> </ul>
<b>Kindlin-2</b>	<ul style="list-style-type: none"> <li>• <b>Gene-</b> FERMT2</li> <li>• <b>Function-</b> Kindlin-2 is ubiquitously expressed and plays a significant role in integrin-mediated cell adhesion and signaling.</li> <li>• It is involved in various cellular processes, including cell spreading, migration, and survival.</li> <li>• <b>Clinical Relevance-</b> Kindlin-2 is implicated in several diseases, including cancer, where it can influence <b><i>tumor cell adhesion</i></b>, migration, and invasion.</li> </ul>
<b>Kindlin-3</b>	<ul style="list-style-type: none"> <li>• <b>Gene-</b> FERMT3</li> <li>• <b>Function-</b> Kindlin-3 is predominantly expressed in hematopoietic cells (blood cells).</li> <li>• It is crucial for the activation of integrins in these cells, impacting processes like leukocyte adhesion and platelet aggregation.</li> <li>• <b>Clinical Relevance-</b> Mutations in the FERMT3 gene lead to a condition known as <b><i>leukocyte adhesion deficiency type III (LAD-III)</i></b>, which results in severe immunodeficiency due to the inability of leukocytes to adhere and migrate properly.</li> </ul>

- **Functions-** Kindlins interact with the cytoplasmic tails of integrins, helping to activate them and promote their ***binding to ECM proteins***.
- It influences cell adhesion to the ECM and subsequent cell migration, which is critical in processes like wound healing and immune responses.
- It participates in ***signaling pathways*** that regulate cell survival, proliferation, and differentiation.

## INFORMATION TECHNOLOGY

### 9.27 Snowblind malware

A new Android-targeting banking malware named 'Snowblind' is stealing banking credentials.

- It is a new Android malware that uses a built-in Android security feature to ***bypass anti-tamper mechanisms and steal banking credentials***.
- It is a type of ***Trojan malware*** that cover-ups as legitimate software to infiltrate Android devices.
- **Discovered by-** Promon (Cybersecurity firm).
- **Operating procedure-** People usually get this virus by downloading a malicious app that looks legitimate. The malware repackages an app to avoid detection and misuses accessibility features to steal sensitive information and control the app remotely.
- Once installed, it remains dormant until triggered by specific actions or commands.
- **Working -** Snowblind bypasses Android's built-in security by exploiting a feature called ***"seccomp"*** in the Linux kernel, which is supposed to check for tampering.
- Snowblind injects code before seccomp activates, allowing it to bypass security checks and use accessibility services to monitor your screen.
- It can also ***disable biometric and two-factor authentication (2FA)***, the security features commonly used by banking apps to thwart unauthorised access.
- The malware works quietly in the background, so users might not even realise it is on the device.

A Trojan Horse Virus is a type of malware that downloads onto a computer disguised as a legitimate program.

The Linux kernel is the kernel used by Linux-based operating systems and the interface between the hardware and the computer processes.

Other Trojan horse virus attacks	
<b>Rakhni Trojan</b>	<ul style="list-style-type: none"> <li>It delivers ransomware or a cryptojacker tool, enables an attacker to use a device to mine cryptocurrency to infect devices.</li> </ul>
<b>Tiny Banker</b>	<ul style="list-style-type: none"> <li>Tiny Banker enables hackers to steal users' financial details.</li> <li>It was discovered when it infected at least 20 U.S. banks.</li> </ul>
<b>Zeus or Zbot</b>	<ul style="list-style-type: none"> <li>It is a toolkit that targets financial services and enables hackers to build their own Trojan malware.</li> <li>The source code uses techniques like form grabbing and keystroke logging to steal user credentials and financial details.</li> </ul>

## 9.28 Internet Archive

The Internet Archive is facing a legal battle with traditional publishers over alleged copyright violations.

- **About-** It is an American non-profit digital library which offers free access to digitized collections like websites, software, music, videos, and books.
- **Foundation-** 1996
- **Founder-** Brewster Kahle
- **Headquarters-** San Francisco, California, U.S.
- **Open Access-** It operates under principles of open access and aims to provide digital materials for educational and research purposes.
- Much of the content on the Internet Archive is freely accessible to the public.
- **Projects-** In addition to archiving web pages, the Internet Archive runs various projects such as digitizing books, partnering with cultural institutions for preservation efforts, and providing resources for people with disabilities.
- **Legal dispute-** In 2020, traditional publishers Hachette, HarperCollins, Wiley, and Penguin Random House sued the Internet Archive.
- **Wayback Machine-** The Wayback Machine is easy and free of cost digital archive of the World Wide Web and other information on the Internet.
- It allows users to browse through over 650 billion web pages archived from 1996 to the present.
- Users can use it to see how websites looked at different points in time and to access content that has been deleted or changed.
- The archive is maintained by the Internet Archive.

*Copyright infringement occurs when the violating party exercises any of the creator's exclusive rights to the work without permission.*

*The World Wide Web (WWW), often called the Web, is a system of interconnected webpages and information that you can access using the Internet.*

## 10. IMPORTANT DAYS

### 10.1 International Cooperative Day

The Union Minister of Cooperation recently addressed the conference on the occasion of the 102<sup>nd</sup> International Day of Cooperatives.

- **Background-** The International Day of Cooperatives, established by the UN on December 16, 1992, is celebrated on the 1<sup>st</sup> Saturday of July.
- **Aim-** It aims to raise awareness of cooperatives and further the values of the movement, which includes:
  - International solidarity
  - Economic efficiency

*Co-operatives are people-centred enterprises owned, controlled, and operated by their members to meet their shared economic, social, and cultural needs and aspirations.*

- Equality
- Global peace
- **Nodal ministry** - Ministry of Cooperation.
- **Objective**- Its goal is to ***promote and expand cooperatives globally***, highlighting their role in addressing major UN issues and strengthening international partnerships.
- **3rd Foundation Day**- The day also marks the ***3rd foundation day of the Union Ministry of Cooperation***, which came into being on July 6, 2021.

**Recent Highlights, 2024**

- **Recognition by UN**- The year 2025 has been declared the ***International Year of Cooperatives (IYC2025)*** by the ***United Nations General Assembly*** recently.
- **Theme, 2024** - Cooperatives Build a Better Future for All.
- **New Initiatives in India** - The Ministry of Cooperation has launched over ***54 initiatives*** in the cooperative sector recently.
- The ministry will also inaugurate launch of '***Bharat Organic Atta***' produced by the National Cooperative Organics Limited (NCOL).
- The ministry will launch the scheme for 50% assistance on the purchase of nano-fertilizer by the farmers for the FY 2024-25.

**11. OTHERS**

**11.1 Type of Reactors**

During the 2024 Budget speech, the Finance Minister highlighted small modular reactors (SMRs) as a promising technology.

- Bharat Small Reactors are compact nuclear ***reactors designed to generate electricity*** on a smaller scale than traditional large nuclear power plants.
- The BSRs will be based on India's tried and tested ***220-megawatt pressurized Heavy Water Reactor (PHWR) technology***, of which 16 units are already operational in the country.

*A pressurized heavy-water reactor (PHWR) is a nuclear reactor that uses heavy water (deuterium oxide D<sub>2</sub>O) as its coolant and neutron moderator.*

Feature	Large Conventional Reactors	Small Modular Reactors (SMRs)	Micro Reactors
<b>Power Output</b>	1000 - 1700+ MW	10 - 300 MW	< 10 MW
<b>Size</b>	Very large, requires significant space	Modular, smaller footprint	Minimal, compact design
<b>Construction Time</b>	5-10 years	3-5 years	1-3 years
<b>Scalability</b>	Limited, typically single unit	High, can be added incrementally	Very high, suitable for remote or small-scale applications
<b>Fuel Cycle</b>	Typically uses enriched uranium	Can use enriched uranium, thorium, or other fuels	Often uses advanced fuels like TRISO fuel
<b>Economic Model</b>	Economies of scale, centralized power generation	Cost-effective through factory assembly and modular construction	Cost-effective for niche markets and remote locations



<b>Environmental Impact</b>	High impact due to large footprint and water usage	Lower impact, more efficient land and water use	Minimal impact, designed for minimal environmental footprint
<b>Grid Compatibility</b>	Requires robust, stable grid	Can support both large and small grids	Ideal for microgrids and isolated applications
<b>Use Cases</b>	Base load power generation for large urban centers	Flexible use for urban, industrial, and rural areas	Remote areas, military bases, disaster recovery, small communities

- **Objective-** SMR reactors represent a significant shift in India's nuclear energy strategy, aiming to make nuclear power more accessible and versatile.
- **PPP model-** The government plans to partner with the private sector to set up Bharat Small Reactors and **conduct R&D on small modular reactors** and new nuclear technologies.

## 11.2 Olympic Order

Recently, Abhinav Bindra, a sport shooter has been honoured with prestigious Olympic Order.

- The Olympic Order is the **highest accolade** bestowed by the **International Olympic Committee (IOC)** for exceptional service.
- It is given to individuals who have rendered outstanding services to the Olympic cause.
- **Established in-** 1975.
- **Nomination-** Candidates are typically nominated by members of the Olympic family, including National Olympic Committees (NOCs), International Sports Federations (IFs), and IOC members.
- **Selection-** The **final decision** is made by the IOC Executive Board.
- **Award Grades-** The award comes in 3 grades - **gold, silver, and bronze**, with the gold medal being the most prestigious.
- The recipients of the Olympic Order are chosen by the IOC's Executive Board.
- The award symbolizes the recipient's dedication to the Olympic spirit and their contributions to promoting the values of excellence, friendship, and respect in sports.
- **Award ceremony-** The award ceremony will be held during the **142nd IOC Session in Paris** on August 10, a day before the closing of the Olympics.
- **Significance-** The Olympic Order is not just an award but a symbol of recognition for those who embody the spirit of Olympism.
- It honours dedication, perseverance, and exceptional contributions to the global sports community.

*Abhinav Bindra become, the 1<sup>st</sup> Indian to win a bar of individual gold at the Olympics*

### International Olympic Committee

- The International Olympic Committee (IOC) is a non-governmental sports organization.
- **Headquarter-** Lausanne, Switzerland.
- **Established in-** 1894
- **Founded by-** Pierre de Coubertin
- The IOC is responsible for organizing the modern Summer and Winter Olympic Games.
- **Key Responsibilities**
  - The IOC oversees the preparation and organization of the Summer and Winter Olympics, held every four years.
  - The IOC promotes the Olympic values of excellence, friendship, and respect, and encourages the practice of sports worldwide.

- Through various programs, the IOC provides support to athletes, including scholarships and funding for training and development.
- The IOC enforces rules against doping and other forms of cheating to ensure fair competition.
- **Structure-** The President of the IOC is elected for an eight-year term, renewable once for four years.
- The current president (as of 2024) is Thomas Bach.

### 11.3 Polyatomic ion

Recently, researchers have discovered a new method to utilize carbon dioxide (CO<sub>2</sub>) in ambient conditions, unlike the previously harsh thermal conditions.

- **Conversion of Amines to N-Formamides Using CO<sub>2</sub>**- The transformation of amines to N-formamides is essential for synthesizing heterocycles, pharmaceuticals, and bio-active compounds.
- **Polyoxometalates (POMs)**- These are synthesized nanomaterials composed of three or more transition metals linked by shared oxygen atoms.
- These compounds are promising candidates for improving the photocatalytic conversion of CO<sub>2</sub> due to their unique properties:
  - POMs provide high-efficiency catalytic sites that enhance reaction rates.
  - They exhibit extraordinary thermal stability, making them suitable for various reactions.
  - POMs have excellent redox abilities and properties like semiconductors, crucial for photocatalysis.
  - The light absorption properties of POMs can be finely tuned by incorporating different transition metals, enhancing their photocatalytic efficiency.
- **Recent Advancements** - They have explored 2 novel Keggin POM-based solids.
- Among these, PS-97 was found to be highly efficient for the photocatalytic N-formylation of various substituted anilines and morpholine with CO<sub>2</sub> using phenyl silane as a reducing agent.
- Notably, this reaction operates under ambient conditions.

### 11.4 National Metallurgist Awards, 2024

Union Ministry of Steel invites applications for the National Metallurgist Awards, 2024.

- **Objective** - To recognize the outstanding contributions in the metallurgical field, covering Operations, Research & Development, Waste Management, and Energy Conservation.

- The awards are given on an **annual** basis.

- The 1<sup>st</sup> award was given in the year **1963**.

- **Categories** – The Awards are given in the following **5 categories**.

- Lifetime Achievement Award
- National Metallurgist Award
- Young Metallurgist(Metal Science) Award
- Young Metallurgist(Environment) Award
- Award for R&D in Iron & Steel Sector.

Sl.No		Details	Weightage
Criteria I	Work-related achievements/ accomplishments	Performance, outcome and impact in the specified line of business.	30%
Criteria II	Service to the profession	Public education and creating awareness of the role of metallurgy in India; active participation in various Industry, Academic & Research domain.	30%
Criteria III	Service to society and the community beyond the nominee's regular employment	Apart from technical competence, Community Services & Volunteer work carried out for redressal of socially oriented problems with the aim of alleviating the conditions of people & community in general.	10%
Criteria IV	Technical Publications/ Patents/ Copyrights	Indicates the peer recognitions of the work carried out and published/ utilised for industrial applications. The significance and quality of such articles/ patents would be an added merit.	30%

- **Eligibility** - This scheme is **only for Indian nationals**, who have contributed to the field of metallurgy in India through their work in Industry, R&D or Academia.

- **Mode of Nominations** - Nominations will be through companies/organizations or from the public through self-nomination.

- **Assessment Criteria & Weightage** - Awards shall be considered only on a minimum score of 75 out of 100.