



# DHEERAN IAS ACADEMY®

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## TOPIC: HISTORY

### LAMBANI ART

#### In News:

- At the 3rd G20 Culture Working Group, In **Hampi, Karnataka, Guinness World Record was set** for the largest display of **Lambani items**.
- A **total of 1755 items were on display**.

#### Analysis of Background:

- It was an effort/initiative **to popularize Lambani art**, craft and culture.
- This initiative is also expected **to encourage the participation of Nari Shakti** in such cultural activities.

#### Lambani Embroidery:

- Also known as **Banjara embroidery**, it is an **intricate embroidery art done on a piece of cloth**.
- This art is mainly **practiced by the community of Lambanis**.
- This art **comprises various processes** such as –
  - **Firstly Basic tools and materials are collected** – for eg – Fabric, needles, thread, accessories etc.
  - Then there is **selection of patterns, types and shapes of stitches, color combinations**
  - Accessories like **beads, mirror are added** in the later stage.
  - Finally it is **ironed** to give the cloth piece a desired look.
- The final piece of cloth **can be used in clothing, curtain, pillow cover, bedcovers, bags, etc.**
- **Sandur Lambani Embroidery** is recognized with a **Geographical Indication tag in 2010**.

#### Features:

- Done **on a loosely woven piece of cloth**.
- It **includes** –
  - Around 14 types of **stitches** with various geometric shapes like - squares, circles, triangles, diagonal lines etc.
  - **Parallel lines of multi color threads**.
  - **Patchwork**.
  - **Mirror work, Beads, Metal buttons, Ghungroo** etc.
  - **Quilting**.
  - **Applique**, an ornamental needlework.

- **Overlaying**
- Most commonly used colors are **red, yellow and blue**

### **Who are Lambanis?**

- These are **nomadic tribes** that are spread across India.
- Regarding the **origins of the Lambani community**, there are many theories, some are -
  - They are considered to be the **descendants of the Romanis of Europe**.
  - **Came from the Ghor province of Afghanistan** and then settled in Rajasthan, Gujarat and then **migrated down south**.
- These tribal communities of Banjara or Lambani **mainly reside** in -
  - Sanduru, Bellary and Bijapur in **Karnataka**, and
  - Hyderabad in **Andhra Pradesh**.

### **Significance of Lambani Art:**

- **Empower marginalised communities** like Lambani
- **Contribution to economy** of the country.
- Preserve the **rich cultural traditions** in line with the constitutional provisions.
- It can also **contribute to improving biodiversity** of their region as
  - Indigenous fibres are required.
  - Native plant dyes are used. and
  - Locally sourced materials are preferred.
- It is **sustainable practice** which works on the principle of recycle and reuse. No fabric or material is wasted in the process.
- **Potential to enhance India's soft power**.

### **Efforts for Conservation:**

- **More exhibitions** to make people interested in the art.
- The artisans should be **financially supported**.
- There should be a **formal course to learn** this art.
- More **promotion and brand engagement** would help to revive this indigenous art.
- More **efforts by government** are needed to **rehabilitate and reform**
- **GI tag will help** in creating a unique selling proposition.
- **More awareness about indigenous textiles and fashion** will help this art to gain momentum.

## NAMDA ART

### In News:

- The first batch of **Namda Art products was exported to UK** on the occasion of World Youth Skills Day.
- This dying art of **Jammu and Kashmir was revived by promoting it under Skill India's pilot project.**

### Analysis of Background:

- MoS **Rajeev Chandrasekhar, of Ministry of Skill Development and Entrepreneurship and Electronics and IT, flagged of the export.**
- Under this, an **industry-based pilot training program**, around **2,200 candidates belonging to six districts of the region were trained.**
- This project was a **part of Pradhan Mantri Kaushal Vikas Yojana.**

### Significance of this project:

- It is a successful **example of a public-private partnership** which **paved the way for more such partnerships in other projects.**
- It will **promote skilling, reskilling, and upskilling** of Indian youths hence leading to their **prosperity.**
- It will lead to **protection and preserving of this traditional craft** of the Jammu and Kashmir region.
- It will **support the local economy and will empower the local weavers** and artisans by creating new opportunities for employment.

### Namda craft:

- It is **traditional Kraft of Kashmir** which involves making a rug which is primarily made of **pure sheep wool.**
- It is **different from regular rug as instead of using normal weaving process, felting technique** is used. Hence no weaving is involved in this process.
  - **Namda means a layer above a regular rug** made of old blankets.
- This art is **believed to be invented in 11th century by Nomadic tribes** of the Central Asian steppes.
- In **India** the use of this art started **from the reign of Mughal emperor Akbar.**
- It is **under process to get a GI tag certification.**

### Conservation:

- During **1998 and 2008** the export declined almost **100 percent.**

- The **possible reasons** are –
  - Low availability of raw material.
  - Lack of skilled manpower.
  - Inefficient and inadequate Marketing techniques.
  - Minimal use of new techniques and technology.

#### Process:

- First the **sheep wool is washed using soap and water**.
- Then the fibre, wool, is **spread on floor** in layers for **washing, pressuring** (using a tool named **pinjra**) to flatten it and for drying.
- Next it is either **dyed metre by meter** OR is **decorated with an embroidery pattern**.
- **Thread is then assembled** for use and complex local floral **patterns are created using Kashmiri aari** embroidery techniques.

## KUI LANGUAGE

#### In News:

- On Monday, the Odisha state cabinet gave an approval to a proposal which recommended the inclusion of **the Kui language in the 8th schedule of the Constitution of India**.
- The cabinet is of opinion that the inclusion of language to 8<sup>th</sup> schedule will not have any financial implications.

#### Analysis of Background:

##### Kui Language;

- There are around **46 languages** which are spoken by tribal population in Odisha.
- **Kui language, a vernacular tribal language**, is one of them.
- It is also referred to as **Kandh, Khondi, Kanda, Kodu, Kuinga**
- It is a **South-Eastern Dravidian language** mainly spoken **by the Kandhas or Kondhs**
- It is mostly **spoken in the hilly and forested areas of Odisha** for instance –
  - South and central Odisha which are Phulbani (Kondhamal), Boudh, Koraput, Kalahandi, Rayagada, Nayagarh, Ganjam, Gajapati, Nabarangpur, Sonapur, Angul and Dhenkanal district.
- Closely **related to the Gondi and Kuvi languages**, Kui language is **written in the Odia script**.
- The language has **approximately 1 million speakers, 9,41,488 to be precise**, as per census of India.

- According to information available on UNESCO site, the Koi language status situation is **potentially vulnerable**.

#### Significance of inclusion in 8<sup>th</sup> schedule:

- As per cabinet committee, **more than 7 lakh people of Kandh tribe of Odisha** will be **benefitted** from this decision.
- The inclusion of Kui language in 8<sup>th</sup> schedule will help in the **preservation, promotion and propagation** of this **language and associated culture**.
- The **recognition** of this language **will get a thrust** hence the **publication and content creation** will be facilitated by this move.
- An eco-system to **assist and enable research and studies of the Kui language** will also be created.

### ALLURI SITARAMA RAJU

#### In News:

- **On the occasion of 125th Birth Anniversary of Alluri Sitarama Raju**, a tribal warrior, was remembered for **patriotism and courage**.
- Smt Droupadi Murmu, the President of India, remembered **his struggle against injustice and exploitation**.
- Alluri Sitarama Raju was an **example of uniting society on egalitarian principles**.
- She reiterated that one should **serve deprived sections of society in a selfless and fearless manner** for its well-being.

#### Analysis of Background:

##### About Alluri Sitarama Raju:

- Alluri Sitarama Raju was a **legendary freedom fighter who rallied the tribes of the Eastern Ghats to rise in revolt against British rule**.
- The **Rampa rebellion**, which he led with unparalleled courage and bravery, raged from August 1922 to May 1924 and is known as one of the most intense uprisings to have challenged the writ of colonial power in the subcontinent.
- He is **remembered for mounting daring raids to seize arms and ammunition from police stations in the Rampachodavaram, Addateegala, Devipatnam and Rajavommangi areas of the tribal backwoods in what is now the northern part of Andhra Pradesh**.
- **Alluri is revered not just in Andhra Pradesh but also in Telangana, Odisha and Karnataka**.
- He believed in armed struggle and sacrificed his life for the liberation of the tribals.



- He opposed the Madras Forest Act, 1882 (the region was then part of the erstwhile Madras Presidency), which prohibited the tribes from indulging in podu (shift cultivation) and usurped their right to collect minor forest produce.

### Why at Bhimavaram?

It is the bastion of the resourceful Raju community that dominates the deltaic Godavari region and is engaged mostly in paddy cultivation and aquaculture. Alluri spent some of his early years there.

### What else has Andhra Pradesh done to bring Alluri's legacy alive for posterity?

Earlier this year, Chief Minister decided to reconstitute the region that includes parts of East Godavari and Visakhapatnam districts as the Alluri Sitarama Raju district.

## GURU PURNIMA

### In News:

- International Buddhist Confederation, on the occasion of Guru Purnima day 2023, organise a programme at the National Museum, Delhi, a place where Sakhyamuni's Holy relic is enshrined.
- The IBC will celebrate Ashadha Purnima, an annual flagship event of the IBC, as Chakra Pravartana Divas.

### Analysis of Background:

- President **Draupadi Murmu will address** the audience through a **video message**.
- His **Holiness 12th Chamgon Kenting Tai Situpa will deliver a Dhamma talk** on the significance of Ashadha Purnima.
- **A film**, India International Centre for Buddhist Culture and Heritage, on IBC's special project in Lumbini **will be screened**.
- After Buddha Purnima or the Vaishaka Purnima, this **day is most important for Buddhists**.
- Organization **IBC is subordinate to the Ministry of Culture**.

### Ashadha Purnima:

- Guru Purnima is **also referred as Ashadha Purnima**.
- As per the Indian lunar calendar it is **celebrated on the full moon day of the Ashadha month**.
- In **Sri Lanka** it is celebrated as **Esala Poya** and in **Thailand** as **Asanha Bucha**.

- On this day, it is believed that **after attaining Enlightenment, Gautam Budha gave first teaching to first five ascetic disciples (pancavargiya)** at 'Deer Park', in **Sarnath**, near Varanasi.
- This day **marks the rainy season**, July to October, **retreat for Monks and Nuns** where they **remain in a single place doing intensive meditation**.

## BAL GANGADHAR TILAK

### In News:

The Prime Minister, Shri Narendra Modi has paid tributes to Lokmanya Tilak on his Jayanti and said that the story of his courage, struggle and dedication in the freedom movement will always inspire the countrymen.

### Analysis of Background:

#### Early Life and Education:

- Bal Gangadhar Tilak was born on 23 July 1856 in Ratnagiri, Maharashtra, India, to a Marathi Hindu Chitpavan Brahmin family.
- His father, Gangadhar Tilak, was a school teacher and Sanskrit scholar.
- Tilak married Tapibai (later known as Satyabhamabai) at the age of sixteen.
- He completed his Bachelor of Arts in Mathematics from Deccan College, Pune, in 1877, and later obtained an LLB degree from Government Law College.

#### The Father of the Indian Unrest:

- Bal Gangadhar Tilak was a prominent Indian nationalist, teacher, and independence activist.
- He was an instrumental figure in the Indian independence movement and was known for his assertive approach in seeking self-rule for India.
- **The British colonial authorities often referred to him as "The father of the Indian unrest" due to his active role in mobilizing the masses and advocating for radical measures to challenge British colonial rule.**

#### Political Ideology;

- Tilak was a **strong proponent of Rashtriyatva**, which can be translated as Nationalism.
- He firmly believed in the idea of a united India where Indians would have control over their own destiny.
- He joined the **Indian National Congress in 1890** and became a part of the extremist faction within the party. This faction advocated for more assertive and radical measures

in the struggle for independence, often differing from the moderate approach of the Congress leadership at that time.

- One of Tilak's most famous slogans was "**Swarajya is my birthright and I shall have it!**". This phrase became a rallying cry for the Indian independence movement, emphasizing Tilak's unwavering commitment to the idea of self-rule for India and the assertion of Indian rights.

#### **Educationist:**

- Recognizing the importance of education in empowering the Indian masses, Tilak co-founded the **New English School in 1880**. The school aimed to provide quality education to Indian youth and foster a sense of pride in their culture and heritage.
- The need for improved education and a sense of national identity prompted Tilak and his college friends to establish the **Deccan Education Society in 1884**.
- The Deccan Education Society's goal was to create a new system of education that would teach young Indians nationalist ideas by emphasizing Indian culture and heritage. As part of this initiative, **Fergusson College was established in 1885**, and Tilak himself taught mathematics at the college.

#### **Freedom Movement:**

- In response to the Partition of Bengal implemented by Lord Curzon in 1905, which was seen as a British strategy to divide and weaken the Indian nationalist movement, **Tilak played a significant role in promoting the Swadeshi Movement**.
- The Swadeshi Movement encouraged Indians to boycott foreign goods and promote indigenous products, fostering a spirit of self-reliance and unity among the Indian masses.
- Tilak reunited with his fellow nationalists and rejoined the Indian National Congress during the **Lucknow Pact in 1916**, bridging the divide between the extremist and moderate factions within the party.
- In the same year, he **co-founded the All India Home Rule League along with G. S. Khaparde and Annie Besant**. The league aimed to seek self-rule for India and played a crucial role in mobilizing public support for the freedom movement.

#### **Religio-Political Views:**

- Tilak sought to unite the Indian population through a combination of anti-British sentiment and pro-Hindu activism.
- He believed that by tapping into the original principles of the Ramayana and the Bhagavad Gita, he could inspire a sense of nationalism and unity among Indians.

- Tilak named this call to activism **karma-yoga**, aligning political action with spiritual duty.
- To foster a sense of national spirit and unity, Tilak **utilized cultural and religious festivals like the Ganapati festival and Shiv Jayanti**. He saw these occasions as opportunities to awaken the spirit of patriotism and mobilize the masses towards the cause of independence.

#### **Books:**

- Bal Gangadhar Tilak was not only an activist but also a prolific writer.
- Among his notable works is "**The Arctic Home in the Vedas**," where he proposed that the Vedas were composed in the Arctic and brought south after the last ice age. This theory generated significant debate among scholars but reflected Tilak's interest in connecting Indian history and culture with ancient global civilizations.
- In "**The Orion**," Tilak attempted to calculate the time of the Vedas using the position of different Nakshatras (stars). He delved into astronomical interpretations of ancient texts to establish their antiquity and cultural significance.
- While in prison at Mandalay, he wrote "**Shrimadh Bhagvad Gita Rahasya**" (The Secret of the Bhagavad Gita). In this work, Tilak provided an in-depth analysis of Karma Yoga as described in the Bhagavad Gita, relating it to the contemporary Indian struggle for independence. The book became widely read and respected for its insights into the philosophical and practical aspects of the Gita.

#### **Newspapers:**

- Tilak was associated with two influential weeklies - **Kesari (Marathi) and Mahratta (English)**.
- Through these newspapers, he played a crucial role in spreading nationalist ideas and mobilizing public support for the freedom movement.
- The newspapers became a platform for Tilak to express his views on political and social issues, reaching a wide audience and galvanizing the Indian masses in their quest for independence.

#### **Legacy:**

- Bal Gangadhar Tilak's contributions to India's struggle for independence and his emphasis on cultural and educational revival left a lasting impact on the nation's history.
- His unwavering commitment to the principles of nationalism and self-rule inspired generations of Indians to continue the fight for freedom.

- Tilak's legacy as an educationist and journalist also continues to be celebrated for its role in empowering the Indian population through knowledge and information dissemination.
- Today, he is remembered as one of India's great leaders and a symbol of the country's relentless pursuit of independence and self-determination.

## CHANDRASHEKHAR AZAD

### In News:

The Prime Minister, Shri Narendra Modi has paid tributes to freedom fighter, Chandra Shekhar Azad on his Jayanti.

### Analysis of Background:

#### Early Life and Ideology:

- Born on July 23, 1906, in Bhavra, Madhya Pradesh, India.
- Witnessed the Jallianwala Bagh massacre of 1919, which deeply influenced his commitment to India's freedom struggle.
- Embraced the **ideology of armed resistance and rejected non-violent approaches** like those advocated by Mahatma Gandhi.

#### The Hindustan Socialist Republican Association (HSRA):

- Became an **active member of the HSRA, founded by Ram Prasad Bismil** in 1928.
- Advocated armed struggle as a means to overthrow British rule.
- Aimed to create a network of like-minded individuals willing to sacrifice for India's independence.

#### Role in Kakori Train Robbery:

- **Involved in the Kakori Train Robbery** on August 9, 1925, near Lucknow.
- Robbery aimed at acquiring funds for the revolutionary activities and striking a blow against the British government.
- Brought Azad and HSRA into the limelight, intensifying British efforts to capture them.

#### The Encounter at Alfred Park (Company Bagh):

- On February 27, 1931, **faced an encounter with the British police at Alfred Park in Allahabad** (now Company Bagh).
- Fought valiantly and single-handedly against a large number of police officers.
- Chose to die as a free man rather than surrender, becoming an inspiration for the freedom struggle.

### Legacy and Inspiration:

- Continues to inspire generations of Indians with his courage and determination.
- Symbol of selfless devotion to the motherland and unwavering commitment to the cause of freedom.
- His commitment to armed struggle left an indelible mark on India's history.

### Commemoration:

- Numerous educational institutions, parks, and public places across India named after him to honor his memory.
- His name invoked as a source of inspiration in India's quest for justice and freedom.
- Remains a symbol of bravery and defiance against oppressive forces

## TOPIC: GEOGRAPHY

### UBINAS VOLCANO

#### In News:

State of emergency was declared in Peru's Moquegua region due to the activity of the Ubinas volcano.

#### Analysis of Background:

- **Peru's Moquegua region** has declared a state of emergency due to ongoing activity of the **Ubinas volcano**.
- The volcano has been spewing ash and experiencing numerous explosions in the past two days.
- President Alberto Otrola declared an emergency, stating that the Ubinas volcano has entered an "eruptive process."

#### Volcano Activity and Impact:

- The **Ubinas volcano, located in the southern Andean region**, began emitting ash onto surrounding villages on Tuesday.
- The volcano had been inactive since 2019.
- The ash plume reaches an altitude of approximately 5,000 meters (16,404 feet) and is carried by the wind to nearby villages.
- The eruption is likely to impact approximately 2,000 people living in the vicinity.
- The ash has covered houses and streets in nearby villages, prompting precautionary measures.

### **Precautionary Measures:**

- Residents have been advised to remain indoors to prevent inhaling the ash.
- The advisory will be in effect for the next two months.
- Local authorities have not issued evacuation orders yet, but federal agencies are making preparations by setting up shelters.

### **Geographical Context:**

- The Ubinas volcano is part of a group of seven volcanoes in southern Peru within a volcanic zone extending from southern Peru to northern Chile.
- The affected area is situated within the "Ring of Fire," known for its volcanic activity and seismic events.

### **Previous Eruptions and Volcanic Region:**

- During the eruption of Ubinas in 2019, hundreds of people were evacuated from the area.
- Historical records indicate that Ubinas has experienced around 25 eruptions since 1550.
- The regions of Moquegua, Arequipa, and Tacna, along with their neighboring areas, are home to approximately 40 volcanoes, with the majority currently dormant.

### **About Peru:**

- Peru is a country located in **western South America**, bordering the Pacific Ocean to the west.
- It shares **borders with Ecuador, Colombia, Brazil, Bolivia, and Chile.**
- The country has a diverse landscape, including the **Andes Mountains, the Amazon rainforest, and coastal regions.**
- Peru has a population of approximately 32 million people, with Lima being the capital and largest city.

## YELLOW SEA

### In News:

Recent developments related to North Korea's missile launches and the heightened tensions on the Korean Peninsula.

### Analysis of Background:

- **North Korea fired several cruise missiles into the Yellow Sea** on Saturday, according to Yonhap news agency.
- South Korean Joint Chiefs of Staff (JCS) reported the launches and confirmed cooperation with the United States for analysis.

### Missile Launch Details:

- **Time of Launch:** Around 4:00 am (local time).
- **Type of Missiles:** Yet to be determined; subject to analysis by South Korean and US intelligence authorities.
- **Fresh Launches:** These come just three days after North Korea fired two short-range ballistic missiles into the East Sea.

### Heightened Tensions on the Korean Peninsula:

- A nuclear-capable US submarine, USS Kentucky (SSBN 737), visited South Korean waters after more than 40 years.
- The inaugural session of the **South Korea-US Nuclear Consultative Group** took place recently.
- North Korea criticized the SSBN's deployment and hinted at potential use of nuclear weapons.

### South Korean Response:

- South Korea warned that any nuclear attack from North Korea would lead to the end of the Kim Jong Un-led regime.
- The South Korean military bolstered surveillance and vigilance while closely cooperating with the United States.

### About Yellow Sea:

- The Yellow Sea covers an area of approximately **380,000 square kilometers** (146,900 square miles).
- It is situated between the **eastern shores of mainland China and the western shores of the Korean Peninsula.**



- To the northwest, the Yellow Sea is connected to the Bohai Sea through the Bohai Strait.
- It opens to the south into the Korea Strait, which leads to the East China Sea.

### **Hydrology and Salinity**

- The Yellow Sea gets its name from the **large amount of yellow sediment carried by the rivers** flowing into it, particularly the Yellow River in China.
- Several rivers, including the Yangtze, Yellow, and Yalu Rivers, discharge into the Yellow Sea, contributing to its high sediment content.
- The sea experiences a mix of freshwater inflow from these rivers and seawater from the open ocean, leading to a lower salinity compared to the surrounding oceans.

### **Biodiversity and Marine Life**

- The Yellow Sea supports a diverse range of marine life due to the mixing of freshwater and saltwater, creating a unique ecosystem.
- The area is known for its rich fishery resources and is an important fishing ground for countries in the region.
- Various species of fish, crustaceans, and mollusks can be found in the Yellow Sea.

### **Economic Importance**

- The Yellow Sea plays a crucial role in the economies of the countries that border it, especially China and South Korea.
- It serves as an essential fishing ground, supporting local fisheries and providing a significant source of livelihood for coastal communities.
- The sea also facilitates maritime trade, **connecting major ports in China and South Korea.**

### **Disputes and Security Concerns**

- The Yellow Sea has been a subject of territorial disputes and geopolitical tensions between China and neighboring countries.
- The maritime boundaries in the region are not universally agreed upon, leading to occasional conflicts over fishing rights and territorial claims.
- Tensions in the region have also been influenced by North Korea's military activities and missile launches.

### **Environmental Challenges**

- The Yellow Sea faces environmental challenges, primarily due to human activities, such as pollution and overfishing.

- The high level of sedimentation from the rivers can lead to siltation and impact coastal ecosystems.
- Efforts are being made to address these environmental issues through regional cooperation and conservation initiatives.

### **Military Activities and Surveillance**

- The Yellow Sea's proximity to North Korea has made it a significant area for military activities and surveillance.
- Countries in the region, particularly South Korea and the United States, closely monitor North Korea's military movements, including missile tests and naval activities.

### **Importance for Regional Stability**

- Given its strategic location and economic significance, the Yellow Sea's stability and peaceful cooperation among the countries in the region are crucial for regional security and prosperity.
- International cooperation and diplomatic efforts play a vital role in managing disputes and maintaining stability in the area.



## GULF STREAM

### In News:

The potential collapse of the Gulf Stream system, known as the Atlantic Meridional Overturning Circulation (Amoc).

### Analysis of Background:

- The Gulf Stream system faces a threat of collapse, known as the **Atlantic Meridional Overturning Circulation (Amoc)**.
- Scientists have observed warning signs of a tipping point in 2021, and a new study suggests a potential timescale for the collapse.
- The **consequences of Amoc collapse would be catastrophic**, with severe climate impacts around the world.

### The Weakening of Amoc

- **Amoc is already at its weakest in 1,600 years** due to global heating.
- Researchers have identified **an influx of fresh water from melting ice caps as a key factor smothering the currents**.
- Past collapses during ice ages indicate temperature changes of 10 degrees Centigrade in just a few decades.

### Estimates and Uncertainties

- The new analysis estimates a **timescale for the collapse between 2025 and 2095, with a central estimate of 2050**, if global carbon emissions are not reduced.
- Uncertainties in assumptions and data make it challenging to provide a reliable estimate of the tipping point's timing.
- However, scientists agree that the prospect of Amoc collapse is extremely concerning and calls for immediate cuts in carbon emissions.

### Impact of Amoc Collapse

- **Disrupts rains** in regions like India, South America, and West Africa, impacting food supply for billions of people.
- **Increases storms and lowers temperatures in Europe**.
- Leads to a **rising sea level** on the eastern coast of North America.
- **Endangers the Amazon rainforest and Antarctic ice sheets**.

## Significance of the Study

- Led by Prof Peter Ditlevsen from the University of Copenhagen, the study **sheds light on the unprecedented nature of Amoc collapse.**
- **Amoc has not been shut off for 12,000 years**, making the potential impact unprecedented.
- The study adds to the growing body of evidence regarding climate tipping points.

## Debate and Further Research

- The potential collapse of Amoc is intensely debated among scientists.
- Some suggest that the uncertainties and limitations of the study may affect the accuracy of the tipping point's timing.
- Scientists call for further research and improved models to gain a better understanding of Amoc behavior.

## About Gulf Stream

- The Gulf Stream is a **powerful ocean current in the Atlantic Ocean**, known for its significant role in influencing regional and global climates.
- **Originating in the Gulf of Mexico**, the Gulf Stream flows northward along the eastern coast of North America before crossing the Atlantic towards Europe.
- It is one of the major components of the Atlantic Meridional Overturning Circulation (Amoc).



## Formation and Pathway

- The Gulf Stream is **formed by the convergence of warm waters from the equator and the Caribbean Sea in the Gulf of Mexico.**
- It follows a distinct pathway along the eastern coast of the United States, extending northward towards the Canadian Maritimes.
- The current then veers eastward across the Atlantic Ocean, eventually reaching Europe.

### **Warmth and Climate Influence**

- The **Gulf Stream is characterized by its warm waters**, which are significantly warmer than the surrounding ocean currents.
- As it moves along the eastern coast of North America, it has a moderating effect on the climate, leading to milder temperatures in the region.
- The warm waters of the Gulf Stream also **contribute to the formation of hurricanes and tropical storms** in the Atlantic.

### **Influence on European Climate**

- The Gulf Stream plays a crucial role in maintaining the relatively mild climate of Northwestern Europe, particularly in regions like the UK, Ireland, and Scandinavia.
- **It transfers large amounts of heat from the tropics to the higher latitudes**, which keeps the coastal areas warmer during winters.

### **Impact on Marine Life**

- The Gulf Stream supports a diverse array of marine life due to its warm waters and rich nutrient content.
- It serves as a migratory pathway for various marine species, including fish, sea turtles, and marine mammals.
- The abundance of food resources along the Gulf Stream sustains numerous fisheries.

### **Trans-Atlantic Shipping and Trade**

- The Gulf Stream has historically been essential for trans-Atlantic shipping and trade routes.
- Sailors and navigators have utilized the current to facilitate faster voyages between the Americas and Europe.

### **Vulnerability to Climate Change**

- The Gulf Stream is **vulnerable to disruptions and shifts due to climate change** and melting ice in the Arctic.
- Changes in temperature and salinity can affect the strength and stability of the current, potentially leading to alterations in weather patterns and regional climates.

## NIGER

### In News:

An attempted coup in Niger, a West African nation, where mutinous soldiers claimed to have ousted President Mohamed Bazoum.

### Analysis of Background:

- On Thursday, **Niger experienced an attempted coup** as mutinous soldiers claimed to have ousted President Mohamed Bazoum.
- **President Bazoum was elected in 2021, marking the country's first peaceful, democratic transfer of power since gaining independence from France in 1960.**
- The attempted coup **threatens the stability of Africa's Sahel region**, which has witnessed multiple coups in recent years, **affecting countries like Mali and Burkina Faso.**

### Rejection of the Coup

- The **Nigerien government strongly condemned the coup attempt**, stating that it cannot accept such actions.
- Minister of Foreign Affairs Hassoumi Massoudou called on all Nigerien democratic patriots to reject the coup and stand up against it.
- The **government demanded the unconditional release of President Bazoum** and stated that talks were ongoing.

### Reasons for the Coup

- The mutinous soldiers, calling themselves the National Council for the Safeguarding of the Country, cited reasons such as **deteriorating security and poor economic and social governance.**
- They took control of state television and announced the suspension of all institutions, asserting that security forces were managing the situation.
- The attempted coup was allegedly **triggered by President Bazoum's decision to relieve the head of the presidential guard, General Tchiani, from his position**

### President Bazoum's Stand

- According to a source close to the President, he has not and will not resign and is safe in his residence.
- President Bazoum tweeted that the hard-won achievements will be safeguarded, and he enjoys strong support among the population and political parties.

- A group of **Nigerien political groups condemned the coup**, describing it as "suicidal and anti-republican madness."

### Implications for the Region

- The coup poses a **significant challenge to efforts by Western countries to stabilize the Sahel** region, which faces extremism-linked challenges.
- Niger was seen as an important partner in the region, but the coup raises concerns about political instability and its potential impact on security cooperation.

### International Response

- The U.S. White House stated that there were no credible indications of involvement by Russia or Wagner (Russian mercenary group) in the coup.
- The international community closely monitors the situation in Niger and its potential implications on regional security and stability.

### About Niger

- Niger is a **landlocked country located in West Africa**. It is bordered by seven countries, including **Nigeria, Chad, Algeria, Libya, Benin, Burkina Faso, and Mali**.
- Niger gained independence from France on August 3, 1960, making it one of the earliest African nations to gain sovereignty from colonial rule.
- The **capital of Niger is Niamey**, which is also its largest city and serves as the political, economic, and cultural center of the country.



## Geography and Climate

- Niger is predominantly covered by the **Sahara Desert**, and its landscape comprises a mix of desert, semi-arid regions, and savannahs.
- The **Niger River**, one of the country's major water sources, flows through its southwestern regions.
- Niger experiences a **hot and arid climate**, with temperatures often reaching extreme highs during the day.
- The country's climate is characterized by **distinct wet and dry seasons**.

## Demographics and Culture

- As of the latest data, Niger has a population of approximately 25 million people, making it one of the most populous countries in West Africa.
- The population of Niger is diverse, with various ethnic groups residing in the country.
- The **Hausa, Djerma-Songhai, Tuareg, and Fulani** are some of the **major ethnic groups**.
- The **official language of Niger is French**.
- However, there are several indigenous languages spoken throughout the country, reflecting its cultural diversity.

## Political Landscape

- Niger operates as a semi-presidential republic, where the President serves as the head of state and the Prime Minister as the head of government.
- Niger has made progress in its democratic journey, witnessing its first peaceful transfer of power through elections in 2021.

## Challenges and Concerns

- Niger faces security challenges due to the presence of extremist groups linked to al-Qaeda and the Islamic State in the Sahel region.
- These groups have carried out attacks, destabilizing the country and the broader region.
- **Niger ranks among the world's poorest countries**, facing significant challenges related to poverty, access to education, healthcare, and infrastructure development.

## International Relations

- Niger is an active member of regional organizations such as the **Economic Community of West African States (ECOWAS) and the African Union (AU)**.
- The country receives international assistance and aid from various countries and organizations to address its developmental and humanitarian needs.



## Economic Activities

- Agriculture forms the backbone of Niger's economy, employing a large proportion of the population. The main agricultural products include millet, sorghum, and livestock.
- Niger has **significant uranium reserves**, making it one of the world's leading producers of uranium.

## DHALA CRATER

### In News:

The Dhala crater, an impact structure located in the Madhya Pradesh region of India.

### Analysis of Background:

- Earth has encountered numerous extraterrestrial bodies over its 4.5 billion years of existence.
- Some impacts have left significant marks on our planet, leading to major events like the extinction of dinosaurs.
- **India has three meteor impact craters: Ramgarh, Lonar, and Dhala.**
- The Dhala crater, **located in Madhya Pradesh**, has recently gained attention as **Asia's largest and the world's seventh-largest impact crater.**

### Discovery of Dhala Crater:

- Dhala crater has a **diameter of 11 kilometers.**
- Scientists from **Allahabad University and the University of Bern, Switzerland**, confirmed that the crater resulted from the **collision of a rare and ancient meteorite known as Ureilite.**
- The impact occurred approximately **2500-1700 million years ago.**

### Ureilite Meteorites:

- Ureilites belong to a **scarce class of primitive meteorites**, making up only a small fraction of all meteorites found on Earth.
- They mainly **consist of olivine and pyroxene silicate rocks.**
- **Ureilites contain less than 10% carbon** in the form of **diamond or graphite, metal sulphides, and a few fine-grained silicates.**

### Dhala Impact Formation:

- A one-kilometer-wide Ureilite meteorite entered Earth's atmosphere at an **extraordinary speed of 15 km/s.**

- The meteorite collided with the **granitoid rocks of the Bundelkhand craton**, creating the Dhala impact structure.

### **Significance of Dhala Crater Study:**

- The discovery of the impactor material provides insight into our early solar system.
- Future research aims to understand the role of the Dhala crater in bringing water to Earth and contributing to the development of life on our planet.

## **SOLAR MAXIMUM**

### **In News:**

The increased interest among scientists regarding the potential consequences of the upcoming Solar Maximum in the current solar cycle.

### **Analysis of Background:**

- The Sun is set to reach the **Solar Maximum in the next two years** of the current solar cycle.
- Heightened interest among scientists regarding the potential impact on Earth.
- **Possibility of disruption to large-scale communication infrastructure and the "internet apocalypse."**
- Lack of comment from NASA on the possibility of an internet outage caused by a solar storm by 2025.

### **What is the Solar Maximum?**

- **Period of peak solar activity with the strongest and most disordered magnetic field.**
- **Solar cycles last around 11 years**, and the **solar maximum occurs roughly in the middle** of each cycle.
- Increased solar activity during the solar maximum can cause large-scale solar storms, eruptions, and flares.
- **Potential impacts on Earth:** disruption of radio communications, power grid, internet, and health risks for astronauts.
- Unlikely for individuals on Earth to experience direct effects of the solar maximum

### **Internet Apocalypse Concerns**

- Uncertainty surrounding the potential impact of the 2025 solar storm on the global internet.
- **Historical examples:** Carrington Event of 1859 caused telegraph line disruptions, 1989 solar storm disrupted the Quebec power grid.

- The Washington Post report highlights valid concerns about the impact on Earth's interconnected infrastructure.
- Lack of experience with extreme case events and unknown response of infrastructure.
- Computer science professor, Sangeetha Abdu Jyothi, mentions the term "internet apocalypse" in her research.
- Severe solar storms can damage undersea communication cables, leading to long-distance connectivity interruptions.
- **Potential economic impact:** reports suggest more than \$11 billion in losses in a single day for the US alone.

## YAMUNA RIVER

### In News:

The rising water level of the Yamuna River in Delhi.

### Analysis of Background:

- Chief Minister Arvind Kejriwal urges the Centre to prevent further rise in Yamuna water level.
- **Yamuna water level reaches a 60-year high, flowing at 208.13 meters, the highest recorded since 1963.**
- Urgent evacuation of people living in areas close to the river is advised.

### Flooding in Delhi

- Several parts of the city near the Yamuna river, including Monastery Market, Yamuna Bazar, Geeta Ghat, and Majnu Ka Tilla to Wazirabad stretch, experience flooding.
- Over 16,500 people have been evacuated from flood-affected areas by the Delhi government.
- The Delhi government is in the process of evacuating around 41,000 people living close to the river.
- Some residents set up makeshift tents on busy roads, while others are provided accommodation by the Delhi government.
- Irreparable losses are suffered, and farmers lose crops due to flooding.
- Residents face challenges in accessing relief and reaching safer locations.

### Rising Water Level and Release from Hathnikund Barrage

- **Heavy rain in north India since July 8-9 causes the Yamuna's water level to rise steadily.**
- The water released from Hathnikund Barrage decreases from 3.59 lakh cusecs to 1.47 lakh cusecs.

- The **reduced water release will take time to affect the river flow in Delhi** due to the 36-72 hour travel time.
- The city is situated in an area that is prone to flooding due to its low-lying elevation and proximity to rivers.
- The city's drainage system is not able to cope with heavy rainfall, which can lead to flooding in low-lying areas. This is due to a number of factors, including the lack of maintenance of the drainage system, the illegal construction of buildings in floodplains, and the dumping of garbage in drains.

### **Strengthening Embankments and Response Measures**

- Public Works Department (PWD) Minister Atishi mentions efforts to strengthen embankments to prevent breaches.
- National Disaster Response Force (NDRF) teams are deployed in affected areas.

### **About Yamuna River**

- The **Yamuna River** is one of the major rivers in India, **originating from the Yamunotri Glacier in the Uttarakhand state** at an altitude of about **6,387 meters** (20,955 feet).
- It is the **largest tributary of the Ganges River** and plays a significant role in the religious, cultural, and historical context of India.
- It has a total length of approximately 1,376 kilometers (855 miles).

### **Course and Flow**

- The river flows through several states, including **Uttarakhand, Himachal Pradesh, Haryana, Delhi, and Uttar Pradesh, before joining the Ganges River.**
- Yamuna **passes through key cities such as Delhi, Agra, and Mathura**, playing a significant role in the cultural and historical heritage of these regions.
- It eventually **merges with the Ganges River at Allahabad (Prayagraj)**, forming a confluence known as **Triveni Sangam.**

### **Sacred River**

- The Yamuna River holds immense religious significance in Hindu mythology and is considered one of the holiest rivers in India.
- It is believed to be the sister of Lord Yama, the god of death, and is associated with various legends and stories.
- Devotees perform religious rituals, ceremonies, and bathing rituals (snan) in the river, particularly during festivals like Karthik Purnima and Yam Dwitiya.

### **Pilgrimage Sites**

- The Yamuna River is closely associated with several pilgrimage sites, including **Yamunotri** (its source), **Mathura** (the birthplace of Lord Krishna), and **Vrindavan** (associated with Lord Krishna's childhood).
- These locations attract millions of devotees and tourists every year, fostering religious tourism and cultural heritage.

### **Pollution and Degradation**

- The Yamuna River faces significant environmental challenges, including pollution from industrial effluents, sewage discharge, and solid waste dumping.
- High levels of pollutants and contaminants have severely affected the river's water quality, leading to ecological degradation and health concerns.

### **Conservation Initiatives**

- Several initiatives have been undertaken to address the environmental issues faced by the Yamuna River.
- Efforts include the construction of sewage treatment plants, riverfront development projects, and awareness campaigns to promote the conservation and cleanliness of the river.
- Government and non-governmental organizations work together to improve water quality, restore ecological balance, and preserve the river's cultural and historical significance.

## **TAYLOR GLACIER**

### **In News:**

The discovery of the cause behind the crimson red color of Blood Falls, located in Taylor Glacier in Antarctica.

### **Analysis of Background:**

- **Blood Falls, located in Antarctica's Taylor Glacier**, has puzzled scientists since its discovery in 1911.
- Recent research has uncovered the reason behind the crimson red color of the waterfall.

### **Discovery of Iron-rich Nanospheres**

- Samples from Taylor Glacier's tongue were analyzed in November 2006 and November 2018.

- Researchers identified the **presence of iron-rich nanospheres as the cause of the red hue.**
- These nanospheres contain elements such as **silicon, calcium, aluminum, and sodium.**
- The nanospheres were initially overlooked because they do not fit the definition of minerals.

### **Challenges in Detecting Nanospheres**

- Previous methods used to examine the solids in the waterfall did not detect the nanospheres.
- Nanospheres lack a specific crystalline structure required to be classified as minerals.
- Advanced analytical equipment, including transmission electron microscopes, was necessary to detect the nanospheres.

### **Implications for Mars Exploration**

- Scientists highlight the potential limitations of current exploration methods used on Mars.
- **Rovers deployed on Mars may not be able to detect all forms of life beneath icy bodies.**
- Spectroscopic equipment used in the study could not be taken to Antarctica and had to be used in overseas labs.
- The analysis conducted by rover vehicles on Mars is incomplete in determining the true nature of environmental materials.
- **Nanosized and non-crystalline materials on colder planets like Mars may go undetected.**

### **Need for Sample Return Missions**

- Bulky equipment like electron microscopes cannot be attached to Mars rovers currently.
- To solve the mysteries of the Red Planet and explore nanoscopic evidence of life, samples collected by rovers must be returned to Earth.
- Analyzing the samples on Earth using advanced equipment will provide a more comprehensive understanding of Martian materials.

### **About Taylor Glacier**

- Taylor Glacier is a glacier **located in the McMurdo Dry Valleys region of Antarctica.**
- It gained significant attention due to a unique phenomenon known as Blood Falls.
- The glacier was first discovered in 1911 by a British expedition.

## Location and Significance



- Taylor Glacier is situated in the southernmost part of the McMurdo Dry Valleys, a region in Antarctica known for its extreme cold and arid conditions.
- The Dry Valleys are considered one of the coldest and least habitable places on Earth.
- The glacier is part of the Taylor Valley, which is an ice-free valley within the McMurdo Dry Valleys.
- The region is of great interest to scientists studying climate change and the potential for extraterrestrial life.

## SOLOMON ISLANDS

### In News:

Concerns raised by Australia regarding China's plan to take a policing role in the Pacific Islands nation of Solomon Islands.

### Analysis of Background:

- **China plans to take a policing role** in the Pacific Islands nation of **Solomon Islands**.
- The deal has raised **concerns among the United States, Australia, New Zealand**, and the **opposition party in Solomon Islands**.
- Prime Minister Manasseh Sogavare denies regional security threats and highlights China's focus on enhancing the capabilities of Solomon Islands' police force.

### Australia's Response:

- Australia has raised the issue with China's top diplomat, Wang Yi.
- Foreign Minister Penny Wong emphasizes the importance of security within the Pacific family.
- **Australia urges transparency and calls for the immediate publication of the policing deal's details.**

### Solomon Islands' Perspective:

- **Prime Minister Sogavare's office states that Chinese police will supplement existing Australian and New Zealand policing support.**

- The government fails to see the Chinese presence as a threat and highlights the need for improving the islands' policing following previous riots in Honiara.
- Sogavare pledges support for China's Global Development Initiative and Global Security Initiative policy.

### **Opposition and Concerns:**

- Opposition leader Matthew Wale raises concerns about the compatibility of Chinese and Pacific policing, emphasizing the importance of upholding human rights and due process.
- Meg Keen, director of the Lowy Institute's Pacific Islands program, highlights the criticality of responsible use of policing equipment, particularly guns and water cannons.

### **Strategic Significance and Regional Tensions:**

- Solomon Islands, with a population of 700,000, occupies a strategic position in the Pacific Islands.
- Historical ties to the U.S. and concerns over China's naval ambitions in the region contribute to increased tensions.
- Worries arise regarding the potential clash of interests between China and the U.S., with the Solomon Islands caught in the middle.

### **About Solomon Islands**

- Solomon Islands is a nation **located in the Pacific Ocean, northeast of Australia.**
- It consists of an archipelago of islands, with **Honiara as its capital** and largest city.
- The country has a population of approximately 700,000 people.
- Solomon Islands is known for its **diverse cultures, languages, and traditional practices.**

### **Strategic Importance in the Pacific Region**

- Solomon Islands holds a strategic position in the Pacific Islands region.
- It was **pivotal in World War II as a base for the U.S. military's** move westward to liberate the Philippines.
- The country's location has geopolitical significance, attracting the attention of major global powers.

### **Political Context and Government**

- Solomon Islands is a **constitutional monarchy with a parliamentary system.**
- The **Prime Minister is the head of government**, elected by the Parliament.
- Political stability has been a challenge in the past, with occasional changes in government.



### **Socio-Economic Factors**

- The economy of Solomon Islands is primarily based on **agriculture, fisheries, and forestry**.
- Key exports include **timber, fish, palm oil, and cocoa**.
- Tourism also plays a role in the country's economy, with visitors attracted to its natural beauty and cultural heritage.
- Despite its natural resources, Solomon Islands faces economic challenges, including **limited infrastructure and high unemployment rates**.

### **Regional Relationships and Security Concerns**

Solomon Islands maintains close ties with neighboring countries, particularly Australia and New Zealand.

### **Challenges and Development Initiatives**

- Solomon Islands faces various challenges, including limited access to healthcare and education services.
- The government is focused on development initiatives to address these challenges and improve the well-being of its citizens.
- Infrastructure development, capacity building, and attracting foreign investments are among the key priorities.

### **Cultural and Natural Heritage**

- Solomon Islands is known for its rich cultural heritage and traditional practices.
- The country offers opportunities for eco-tourism, with pristine beaches, coral reefs, and diverse marine life.
- Cultural festivals, arts, and crafts are integral parts of the local identity and attract visitors from around the world.

## **STATE DISASTER RESPONSE FUND**

### **In News:**

**The release of funds under the State Disaster Response Fund (SDRF) by the Home Ministry.**

### **Analysis of Background:**

- Home Minister Amit Shah approves release of funds to 19 State governments.
- The funds will aid relief measures during the current Monsoon season.

### **Funds Allocation for 2022-23**

- Chhattisgarh, Meghalaya, Telangana, and Uttar Pradesh to receive a total of ₹1,209 crore.
- Aimed at assisting these states in undertaking relief measures.

### **Funds Allocation for 2023-24**

- Andhra Pradesh, Arunachal Pradesh, Assam, Bihar, Goa, Haryana, Himachal Pradesh, Kerala, Maharashtra, Manipur, Meghalaya, Odisha, Punjab, Tamil Nadu, and Tripura will receive a total of ₹4,984 crore.
- Intended to support relief measures during the specified year.

### **Funds Approved for Current Financial Year**

- The Central Government has already approved over ₹3,600 crore for nine states.
- Allocated to aid relief measures during the ongoing financial year.

### **Allocation Based on 15th Finance Commission Recommendations**

- The Central Government has allocated over ₹1,28,000 crore for SDRF.
- Allocation covers the period from 2021-22 to 2025-26.

### **About State Disaster Response Fund**

- The State Disaster Response Fund (SDRF) is a fund established by the Indian government to assist states in managing and responding to various types of disasters.
- **The SDRF aims to provide financial support for relief, response, and mitigation activities during natural or man-made disasters.**

### **Purpose of SDRF**

- The primary purpose of the SDRF is **to support states in undertaking immediate relief measures in the wake of a disaster.**
- The fund also helps in the capacity building of states to handle disasters effectively and efficiently.
- SDRF assists in providing timely financial assistance for rescue operations, relief distribution, medical care, and other emergency measures.

### **Funding Allocation**

- The SDRF is funded through a **combination of contributions from the central government and state governments.**
- The central government **allocates funds to each state based on the recommendations of the Finance Commission.**

- The allocation is generally made on an annual basis and is subject to changes as per the government's decision.

### **Utilization of SDRF**

The SDRF can be utilized by states for various disaster-related activities, including but not limited to:

- a) Rescue and relief operations during natural disasters like floods, cyclones, earthquakes, etc.
- b) Emergency medical care and provision of essential supplies to affected populations.
- c) Restoration and repair of damaged infrastructure, including roads, bridges, and buildings.
- d) Rehabilitation and reconstruction activities post-disaster.
- e) Support for the functioning of state-level emergency response agencies.
- f) Capacity building and training programs for disaster management personnel.

### **Guidelines and Monitoring**

- **The utilization of SDRF funds is governed by specific guidelines issued by the central government.**
- States are required to adhere to these guidelines and provide regular reports on fund utilization and progress of relief activities.
- The central government monitors the utilization of funds and provides necessary support and guidance to states when needed.

### **Periodic Review and Future Allocations**

- The Finance Commission periodically reviews the allocation of funds to the SDRF based on the evolving needs and requirements.
- The allocation for the SDRF is generally made for a specific time period, covering multiple years to ensure continuity of funding for disaster response and mitigation efforts.

### **About National Disaster Response Fund**

- The National Disaster Response Fund (NDRF) is a dedicated fund established by the Indian government to finance relief and rehabilitation efforts during major disasters.
- The NDRF aims to provide timely and effective financial assistance to states and union territories in the event of severe calamities.

### **Creation and Management**

- The NDRF was **created in accordance with the Disaster Management Act, 2005.**

- It is managed by the National Disaster Management Authority (NDMA), which is responsible for overall policy, planning, and coordination of disaster management in the country.

### **Funding**

- The NDRF is primarily **funded by budgetary allocations from the central government.**
- Additional sources of funding include voluntary contributions from individuals, organizations, and contributions from other countries or international organizations during exceptional circumstances.

### **Objective and Utilization of Funds**

- The primary objective of the NDRF is to supplement the funds available with states and union territories to respond effectively to disasters.
- The funds from the NDRF are utilized for various purposes, including:
  - a) Emergency response activities such as search and rescue operations, evacuation, and medical aid.
  - b) Provision of immediate relief assistance to affected individuals and communities, including food, shelter, and medical support.
  - c) Restoration and reconstruction of public infrastructure, including roads, bridges, schools, hospitals, etc.
  - d) Capacity building initiatives to enhance disaster preparedness, response, and mitigation efforts.

### **Release of Funds**

- The **release of funds** from the NDRF is **based on the recommendation of the NDMA.**
- Funds are allocated to states and union territories based on the severity and extent of the disaster, as assessed by the NDMA.
- The release of funds is subject to the approval of the Union Home Minister.

### **Monitoring and Accountability**

- The utilization of funds from the NDRF is monitored by the NDMA and other designated authorities.
- States and union territories are required to submit utilization certificates and reports on the expenditure and progress of relief and rehabilitation activities.
- Audits and inspections may be conducted to ensure transparency, accountability, and proper utilization of funds.

## Emergency Declarations

- In exceptional cases of severe disasters, the **central government may declare a particular event as a "disaster of severe nature" and provide additional financial support** from the NDRF.
- This declaration enables the central government to mobilize additional resources and support for the affected areas.

## Long-term Planning and Preparedness

- The NDRF also supports the development and implementation of long-term disaster management plans and initiatives.
- This includes measures such as risk assessment, hazard mapping, public awareness campaigns, and training programs.

## STRAIT OF HORMUZ

### In News:

Iran attempts to seize two oil tankers near the Strait of Hormuz.

### Analysis of Background:

- In the early hours of Wednesday, **Iran made an attempt to seize two oil tankers near the strategically significant Strait of Hormuz.**
- The US Navy reported that one of the tankers was fired upon by Iranian naval vessels but retreated after the US Navy's response.
- Tensions between Iran and the United States have been escalating since the US withdrawal from the 2015 nuclear agreement.

### Incident Details

- Two oil tankers were targeted by Iranian naval vessels in the Gulf of Oman and off the coast of Muscat, Oman's capital.
- The first incident involved the TRF Moss, a Marshall Islands-flagged tanker, approached by an Iranian naval vessel.
- The second incident occurred three hours later with the Richmond Voyager, a Bahamian-flagged tanker, being ordered to stop by an Iranian naval vessel.

### US Navy Response

- The US Navy promptly responded to both incidents.
- The USS McFaul, a guided-missile destroyer, along with an MQ-9 Reaper drone and a P-8 Poseidon patrol plane, were deployed in response.

- The destroyer approached the tankers at maximum speed to ensure their safety.

### **Iranian Naval Provocations**

- Iran has a history of seizing and harassing commercial vessels in the region.
- **At least five commercial vessels have been seized by Iran in the past two years**, with over a dozen others harassed.
- Most incidents occur in and around the Strait of Hormuz, a critical passage for global crude oil transportation.

### **Motives behind Iranian Actions**

- Iran has used the seizure of commercial vessels as a bargaining tool in negotiations with the West.
- Previous incidents, such as the seizure of a US-bound oil tanker in April, have been justified by Iran as responses to collisions or other claims without providing evidence.

### **About Strait of Hormuz**

- **The Strait of Hormuz is a narrow waterway located between the Persian Gulf and the Gulf of Oman.**
- It serves as a crucial maritime choke point, connecting the Persian Gulf to the Arabian Sea.

### **Geographic Location**

- The strait is situated at the entrance of the Persian Gulf, **bordered by Iran to the north and the United Arab Emirates and Oman to the south.**

### **Strategic Importance**

- Approximately 20% of the world's crude oil passes through the Strait of Hormuz, making it one of the most important shipping lanes globally.
- The strait is a key conduit for oil exports from major oil-producing countries in the Persian Gulf, including Iran, Saudi Arabia, Kuwait, Iraq, and the UAE.
- Any disruption or closure of the strait could have a significant impact on global energy markets, leading to increased oil prices and potential supply shortages.

### **Width and Length**

- The strait is approximately 33 nautical miles wide at its narrowest point.
- **It stretches for about 96 nautical miles**, extending from the Musandam Peninsula in Oman to the Iranian coast.

### **Traffic Volume**

- The strait witnesses heavy maritime traffic with an estimated 17 million barrels of oil passing through it each day.
- Besides oil tankers, the strait accommodates various vessel types, including container ships, cargo vessels, and naval warships.

### **International Law and Jurisdiction**

- The Strait of Hormuz is considered international waters, allowing vessels from different nations to navigate through it.
- Ownership and jurisdictional disputes between Iran and neighboring countries have occasionally emerged, leading to tensions in the region.

### **Security Concerns**

- The strait has been a site of regional tensions, including naval confrontations and incidents between Iran and international forces.
- Piracy and armed robbery against vessels have been reported in the region, requiring international naval patrols and security measures.

### **Geopolitical Significance**

- The strait's location influences geopolitical dynamics, as it provides leverage for regional powers and influences their relationships with international actors.
- Various countries maintain a military presence in the area to protect their interests and ensure the security of maritime traffic.

### **Environmental Considerations**

- The strait is home to diverse marine life and delicate ecosystems, making it important to balance maritime activities with environmental preservation efforts.
- The high volume of oil tanker traffic raises concerns about potential oil spills, which could have severe environmental consequences.

## **MEKEDATU PROJECT**

### **In News:**

The ongoing debate in Bengaluru regarding the city's drinking water problem and the proposed solutions.

### **Analysis of Background:**

- **Environmentalists propose the revival of the Raja Kaluve network and dead lakes in Bengaluru as a solution to the city's drinking water problem.**
- The current state of stormwater drains and lakes in Bengaluru is either concretized or functioning as sewage carriers.
- Reviving the lakes and Raja Kaluve network would help streamline water levels and address water scarcity issues.

### **Importance of Bengaluru's Geographical Location**

- Bengaluru is surrounded by three major valley systems: **Vrishabhavathi Valley, Hebbal Valley, and Koramangala-Challaghatta Valley.**
- These valleys house many lakes and play a crucial role in hydrological processes and groundwater replenishment.

### **Concerns with the Mokedatu Reservoir Project**

- Environmentalists argue that the Mokedatu Reservoir Project is not considering sustainability aspects and has become a political issue.
- The Cauvery River does not have sufficient water to support another dam, as it has maintained a consistent course and precipitation levels over the past 10 years.
- Lakes breach or experience flooding only during the monsoon season when there is no space for water seepage, resulting in overflow.

### **Advocacy for Ancient Methods and Advanced Technology**

- Environmental communicators suggest utilizing advanced technology available for treating impure water instead of constructing a destructive dam.
- Advanced technology allows for the transformation of sewage water into potable water, which can effectively meet the city's water needs.
- Bengaluru, receiving significant rainfall annually and substantial water flow through drainage or sewage (13 tmc), does not require a dam pumping water from the south of the city.

### **Potential Ecological Destruction and Financial Concerns**

- If approved, the Rs 9,000 crore Mokedatu Reservoir Project could lead to the destruction of ecology in both Karnataka and Tamil Nadu.
- Submergence of approximately 63% of the forest area of the Cauvery Wildlife Sanctuary is anticipated.



- Investing in a dam and pumping water back from the south of the city is deemed wasteful in terms of resources.

### **About Mekedatu Reservoir Project**

- The Mekedatu Reservoir Project is a proposed initiative aimed at addressing Bengaluru's drinking water needs.
- The project involves the construction of a reservoir on the Cauvery River, located near Mekedatu in Karnataka, India.

### **Water Supply and Drinking Water Requirements**

- Bengaluru faces a significant drinking water problem due to population growth and water scarcity.
- The Mekedatu project intends to utilize the excess water from the Cauvery River to meet the city's drinking water requirements.

### **Water Management and Sustainability Concerns**

- Environmentalists argue that the project lacks consideration for sustainability and ecological preservation.
- They claim that the Cauvery River does not have sufficient water to support another dam, as it has maintained a consistent course and precipitation levels over the past 10 years.

### **Political Controversy and Government Support**

- The Mekedatu Reservoir Project has become a political issue, with various stakeholders involved.
- Deputy CM and Water Resource Minister DK Shivakumar has met with the Union Jal Shakti Minister to discuss the project's details and water utilization.

### **Impact on Ecology and Forest Area**

- Experts estimate that around 63% of the forest area within the Cauvery Wildlife Sanctuary would be submerged if the project is approved.
- The ecological destruction caused by the reservoir's construction is a significant concern raised by environmentalists.

### **Financial Implications and Resource Allocation**

- The Mekedatu Reservoir Project is estimated to cost around Rs 9,000 crore.

- Critics argue that investing in a dam and pumping water from the south of the city is wasteful in terms of resources, considering Bengaluru's annual rainfall and existing water flow.

### **Alternative Solutions and Advanced Technology**

- Some environmental communicators suggest exploring advanced water treatment technologies to meet the city's water needs.
- Utilizing advanced technology, sewage water can be transformed into potable water, offering a sustainable and environmentally friendly solution.

## **METALLURGICAL COKE**

### **In News:**

An overview of the situation in India where a safeguard probe has been initiated due to a sudden and sharp increase in imports of metallurgical coke.

### **Analysis of Background:**

- India has launched a **safeguard probe** in response to a **complaint by domestic industries regarding a sudden surge in imports of metallurgical coke.**
- The complainants allege that the **increased inbound shipments of low ash metallurgical coke are negatively impacting the industry.**
- BLA Pvt Ltd, Jindal Coke Ltd, Saurashtra Fuels, Vedanta Malco Energy, and Visa Coke Ltd have filed an application with the Directorate General of Trade Remedies (DGTR) under the commerce ministry.

### **Reasons for Initiation of Safeguard Investigation**

- The DGTR has stated that there is sufficient evidence to support the initiation of a safeguard investigation based on the petitioners' application.
- The investigation aims to determine if there has been a sudden and significant increase in imports of metallurgical coke in India.
- It will assess whether the increased imports are a result of unforeseen developments and whether they have caused or pose a threat of serious injury to the domestic industry.

### **Nature of Safeguard Measures**

- Safeguard measures, such as duty or quantitative restrictions, are **trade remedies available to World Trade Organization (WTO) member countries.**

- These measures are imposed **to create a level playing field for domestic players in the event of a sudden and substantial increase in imports of a specific product.**

### **Usage and Importance of Metallurgical Coke**

- Metallurgical coke serves as a primary fuel in various industries including steel plants, chemical plants, ferro alloy plants, foundries, and pig iron plants.

### **Applicants and Import Data**

- The applicants, including BLA Pvt Ltd, Jindal Coke Ltd, Saurashtra Fuels, Vedanta Malco Energy, and Visa Coke Ltd, are engaged in the production of metallurgical coke in India.
- The DGTR will consider import data from the fiscal year 2022-23 for the investigation.
- According to the notification, imports of metallurgical coke from April to December 2022 increased by 40% to 10.03 lakh tonnes.

### **Factors Influencing Increased Imports**

- The petitioners claim that the surge in imports can be attributed to unforeseen factors such as the Russia-Ukraine conflict and sanctions imposed on Russia by Western countries.
- The global increase in coal prices, driven by higher raw material costs (coking coal), has led to an escalation in the production cost of metallurgical coke for domestic producers.
- Sanctions on Russia, a major coal exporter, have caused supply constraints and price hikes. China has benefitted from proximity to Russia, gaining freight advantages.

### **About Metallurgical Coke**

- **Metallurgical coke**, also known as met coke or coke breeze, is a **carbonaceous material derived from the destructive distillation of coal in the absence of air.**
- It is a **hard, porous, and carbon-rich material with high carbon content** (typically ranging from 85% to 90%).

### **Production Process**

- Metallurgical coke is **produced by heating specific grades of coal in the absence of air** in a coke oven or coking chamber.
- The **coal is heated to high temperatures (around 1000 to 1100 degrees Celsius)** in the presence of controlled amounts of heat and pressure.
- The volatile components of coal, such as water, tar, and gases, are driven off, leaving behind the solid carbonaceous residue known as metallurgical coke.

## Properties and Characteristics

- Metallurgical coke has several important properties that make it suitable for various industrial applications:
  1. **High Carbon Content:** Met coke has a high carbon content, which provides it with excellent fuel properties and makes it an efficient source of heat in industrial processes.
  2. **Porosity:** It possesses a porous structure that allows for the efficient flow of gases and facilitates the combustion process.
  3. **Low Moisture Content:** Met coke has a low moisture content, which contributes to its high calorific value and ensures efficient burning.
  4. **High Strength:** It has good mechanical strength, enabling it to withstand the physical demands of industrial operations.
  5. **Low Ash Content:** Met coke has relatively low ash content, which reduces impurities and helps maintain product quality.

## Applications

Metallurgical coke finds extensive use in various industries:

1. **Steel Production:** It serves as a primary fuel and reducing agent in blast furnaces for the production of iron and steel. Met coke reacts with iron ore to remove impurities, facilitating the extraction of molten iron.
2. **Chemical Industry:** Met coke is used in the production of chemicals, such as calcium carbide, which is essential for manufacturing acetylene gas, synthetic rubber, and other chemical compounds.
3. **Foundries:** It is utilized in foundries for melting metals and alloys, providing the necessary heat and reducing agents for the casting process.
4. **Ferroalloy Production:** Met coke is crucial in the production of ferroalloys, which are alloy metals used in the steelmaking process to introduce specific desirable properties.
5. **Pig Iron Production:** It is employed in the manufacturing of pig iron, an intermediate product used in the production of steel and cast iron.

## Importance in the Steel Industry

Metallurgical coke plays a vital role in the steel industry due to the following reasons:

1. **Fuel Source:** It provides the primary source of fuel for the intense heat required in blast furnaces during iron and steel production.
2. **Chemical Reducing Agent:** Met coke acts as a reducing agent by reacting with iron ore, facilitating the extraction of iron and removing impurities.

3. **Structural Support:** The strength and porosity of met coke allow for the uniform distribution of gases, ensuring efficient combustion and maintaining furnace integrity.

### Environmental Concerns

- The production and use of metallurgical coke raise environmental concerns due to its association with carbon emissions and air pollution.
- Efforts are being made to develop alternative processes and technologies that reduce the environmental impact of coke production, such as the use of bio-coke or carbon capture and storage (CCS) techniques.

## CONGO

### In News:

The issue of deforestation in the Congo rainforest, which is the world's second-largest rainforest after the Amazon.

### Analysis of Background:

- **The Congo rainforest, the world's second-largest rainforest, is experiencing significant deforestation.**
- The rainforest spans six African countries, with the **Democratic Republic of Congo (DRC) containing 60% of the rainforest.**

### Deforestation Statistics

- In 2022, the DRC lost over 500,000 hectares of forest, contributing to the overall decline of the Congo rainforest.
- The rate of primary forest loss in the DRC remains alarmingly high, with persistent deforestation.

### Global Deforestation Impact

- Worldwide, 4.1 million hectares of primary tropical forest were lost in 2022, equivalent to the size of Switzerland.
- **Brazil accounted for 43% of the total tropical primary forest loss, followed by the DRC and Bolivia.**
- This deforestation resulted in the emission of 2.7 billion tonnes of CO<sub>2</sub>, equivalent to India's annual emissions.

## **Deforestation in the DRC**

- From 2002 to 2022, the DRC lost 6.33 million hectares of humid primary forest, representing 35% of its total tree cover loss.
- The total area of humid primary forest in the DRC decreased by 6.1% during this period.
- Primary forests, which provide important ecosystem services, are threatened by ongoing deforestation.

## **Key Drivers of Deforestation**

- Small clearings near cyclical agricultural areas contribute to most of the primary forest loss in the DRC.
- Population growth and increased food demand lead to shorter fallow periods and agricultural expansion into primary forest.
- Lack of access to electricity and clean cooking fuel in the DRC has resulted in heavy reliance on forests for food and energy needs.

## **Factors Contributing to Deforestation**

- Slash-and-burn agriculture, uncontrolled bushfires, charcoal production, cattle ranching, and illegal logging are the primary drivers of deforestation in the DRC.
- Charcoal, produced by cutting and burning timber, is the dominant energy source in the region.

## **Economic Factors and Governance Issues**

- The DRC government's decision to auction oil and gas permits in environmentally sensitive areas has raised concerns.
- Economic factors and poverty contribute to deforestation, as the DRC is among the world's poorest nations.
- Forest governance failures have hindered efforts to address deforestation, despite commitments made in the Glasgow declaration.

## **Implications and Challenges**

- Deforestation in the Congo rainforest poses significant challenges for biodiversity conservation, climate change mitigation, and the livelihoods of local communities.
- Reducing primary forest loss in the region remains a challenge, requiring comprehensive strategies and international cooperation.

## About Congo:

- The Democratic Republic of Congo (DRC) is a country **located in Central Africa**.
- It is the **second-largest country in Africa** and is known for its vast natural resources, including minerals and a significant portion of the Congo rainforest.

## Geography and Biodiversity

- The DRC shares borders with nine other African countries and is characterized by diverse landscapes, including rainforests, savannahs, and mountain ranges.
- The country is home to the **Congo River**, the second-longest river in Africa, and the Congo Basin, one of the world's largest tropical rainforest areas.
- The Congo rainforest is renowned for its exceptional biodiversity, hosting numerous plant and animal species, including endangered species such as gorillas and elephants.

## Population and Culture

- The DRC has a population of over 85 million people, making it one of the most populous countries in Africa.
- It is **home to several ethnic groups**, including the Bantu, Luba, Kongo, and many others, each with its own distinct cultural traditions, languages, and customs.
- **Kinshasa, the capital city**, is a vibrant cultural hub with a diverse population and rich artistic and musical traditions.

## Natural Resources and Economy

- The DRC is abundantly rich in natural resources, including copper, cobalt, gold, diamonds, and timber.
- However, the exploitation of these resources has been accompanied by challenges, such as corruption, illegal mining, and environmental degradation.
- The economy heavily relies on the mining sector, but agriculture, including subsistence farming, also plays a significant role in rural areas.

## Political and Social Challenges

- The DRC has experienced periods of political instability and conflict, leading to humanitarian crises and displacement of people.
- The country has faced challenges related to governance, corruption, weak infrastructure, and limited access to basic services such as healthcare and education.
- Efforts to establish stability, democracy, and sustainable development have been ongoing, supported by international organizations and peacekeeping missions.

## Conservation and Environmental Concerns

- The Congo rainforest, located in the DRC, is under threat from deforestation, primarily driven by activities such as slash-and-burn agriculture, illegal logging, and mining.
- Deforestation poses risks to biodiversity, contributes to climate change, and affects the livelihoods of local communities who depend on forest resources.
- Conservation initiatives, international collaborations, and sustainable land-use practices are being pursued to protect the unique ecosystems and promote sustainable development.

## ZAPORIZHZHYA NPP

### In News:

The risks and safety measures at the Zaporizhzhya Nuclear Power Plant (NPP) in Ukraine, particularly in the context of the military conflict in the region.

### Analysis of Background:

- The Zaporizhzhya NPP in Ukraine has faced threats due to military conflict, raising concerns about its safety.
- A report by the Bellona Foundation analyzes the risks associated with hostilities around the NPP and compares them to the Chernobyl NPP accident.

### Comparison to Chernobyl

- Unlike Chernobyl, Zaporizhzhya NPP has VVER-1000 reactors, not RBMK reactors.
- The safety measures implemented at Zaporizhzhya NPP after the Chernobyl and Fukushima disasters further distinguish it from Chernobyl.
- The Bellona report concludes that any damage at Zaporizhzhya NPP is unlikely to have the same scale and impact as Chernobyl.

### Reactor Design at Zaporizhzhya

- Zaporizhzhya NPP has six VVER-1000 reactors, providing a total capacity of 6 GW.
- The reactors utilize a primary cooling circuit where fuel rods are submerged in water, which acts as both coolant and moderator.
- Heat generated in the primary circuit is transferred to a secondary cooling circuit, where water is converted into steam to generate electricity.
- Unlike the Chernobyl RBMK reactors, the VVER-1000 reactors at Zaporizhzhya remain inside a thick prestressed concrete containment.



## Risks and Threats at Zaporizhzhya

- The worst-case scenario involves complete containment damage and a projectile striking an operating reactor.
- A breach could lead to depressurization of the primary water circuit, releasing steam, radioactive materials, and volatile substances into the air.
- The mixture may contain iodine-131, which poses a short-term threat due to its potential dispersal by wind and accumulation in the human thyroid gland.
- Cesium-137, with a longer half-life and responsible for contamination after Chernobyl, could also be released in the event of a breach.

## Other Threats and Operational Status

- Reactors being shut down for several months significantly reduces the threat of iodine-131 release.
- Cold-shutdown, where the primary circuit is near atmospheric pressure, reduces the risk of explosive leaks.
- As of May 2023, all reactors except the sixth were in cold shutdown at Zaporizhzhya.

## Recommendations and Concerns

- The Bellona report suggests that all reactors should be in shutdown or cold-shutdown states during hostilities.
- Fuel movement and hostilities should be kept away from the plant's territory.
- Rehabilitation of plant staff should be considered when Russian troops withdraw from the plant.
- Concerns are raised about the working conditions of the plant's employees, particularly regarding management, violation of protocol, and suspicions of disloyalty.

## About Zaporizhzhya NPP

- The Zaporizhzhya NPP is one of the largest nuclear power plants in the world.
- It consists of six VVER-1000 reactors, each with a power-generating capacity of 1 GW.
- The total installed capacity of the plant is 6 GW, making it a significant contributor to Ukraine's electricity production.

## Reactor Design

- The reactors at Zaporizhzhya NPP are of the VVER-1000 type, which stands for "**Water Water Energetic Reactor.**"
- The VVER-1000 design is a pressurized water reactor (PWR) technology widely used in various countries.

- In this design, water acts as both the coolant and moderator to maintain stable nuclear reactions.
- The primary cooling circuit involves water circulating around the fuel rods to remove heat generated by nuclear fission.
- The heat is then transferred to a secondary cooling circuit, where it produces steam to drive turbines and generate electricity.

### **Safety Measures**

- The Zaporizhzhya NPP incorporates several safety measures to prevent accidents and protect the environment and surrounding communities.
- The facility is equipped with multiple redundant safety systems, including emergency cooling systems and containment structures.
- The containment structures, made of prestressed concrete, provide an additional layer of protection by confining any potential releases of radioactive materials.

### **Regulatory Oversight**

- The operation of the Zaporizhzhya NPP is regulated by the **State Nuclear Regulatory Inspectorate of Ukraine (SNRIU)**.
- The SNRIU ensures compliance with national and international safety standards, conducts inspections, and grants licenses for operation.

### **Environmental Impact**

- Like other nuclear power plants, the Zaporizhzhya NPP does not emit greenhouse gases during electricity generation.
- However, nuclear energy production produces radioactive waste, which requires careful management and disposal.
- The plant adheres to strict protocols for the handling, storage, and disposal of radioactive waste to minimize environmental impact.

### **International Cooperation**

- The Zaporizhzhya NPP operates in collaboration with international organizations, including the International Atomic Energy Agency (IAEA).
- The IAEA provides technical assistance, conducts safety reviews, and promotes best practices in nuclear safety and security.

### **Public Perception and Incident**

- The perception of nuclear power has been influenced by past incidents, including the 1986 Chernobyl disaster in Ukraine.
- While the Zaporizhzhya NPP has a different reactor design and enhanced safety measures, public concerns about nuclear safety persist.

### **Future Prospects and Challenges**

- The Zaporizhzhya NPP, along with other nuclear power plants, faces challenges in ensuring long-term safe operation and addressing public concerns.
- The plant's future prospects depend on continued adherence to rigorous safety standards, effective waste management, and transparent communication with the public.

## **EL NINO ONSET**

### **In News:**

The recent declaration of El Nino conditions by the World Meteorological Organization (WMO) in the equatorial Pacific Ocean.

### **Analysis of Background:**

- The **World Meteorological Organization (WMO)** declared the **onset of El Nino conditions in the equatorial Pacific Ocean** on July 4, 2023.
- **El Nino is the warmer-than-normal phase of the El Niño Southern Oscillation (ENSO) phenomenon.**
- It is **characterized by higher sea surface temperatures (SST) in the Nino 3.4 region of the equatorial Pacific Ocean.**
- **The Ocean Nino Index (ONI)** measures the temperature anomaly, with values exceeding  $0.5^{\circ}\text{C}$  indicating El Nino conditions.
- The ONI value was  $0.9^{\circ}\text{C}$  in mid-June, according to WMO.

### **Rapid Changes in Oceanic Conditions;**

- The oceanic conditions leading up to the El Nino have changed rapidly in recent months.
- **The ONI went from  $-0.44^{\circ}\text{C}$  in February 2023 to  $+0.47^{\circ}\text{C}$  in May 2023 and reached  $0.9^{\circ}\text{C}$  by mid-June.**
- Despite these changes, there is still some uncertainty regarding the impacts on the atmosphere and the sustainability of El Nino.
- WMO expects a fully established coupling in the tropical Pacific within approximately another month.

### Impacts of El Nino:

- **El Nino is expected to lead to extreme weather events such as heat waves and droughts globally.**
- Previous El Nino events have resulted in severe droughts in Australia, Indonesia, parts of southern Asia, Central America, and northern South America.
- Increased rainfall can be observed in parts of southern South America, southern United States, the Horn of Africa, and central Asia.
- **El Nino can also fuel more hurricanes in the central and eastern Pacific Ocean while suppressing hurricane formation in the Atlantic Ocean.**

### El Nino and Global Warming

- The current El Nino event coincides with heightened global temperatures due to ongoing global warming caused by greenhouse gas emissions.
- In May, **WMO released a report** indicating a 98 percent chance of the **next five years being the warmest ever recorded.**
- There is a 66 percent chance of the global annual average temperature temporarily crossing the 1.5°C mark.
- The combination of global warming and El Nino in 2016 resulted in record-breaking temperatures.

### Impacts on Monsoon Season in India

- El Nino is expected to have a significant impact on India's ongoing monsoon season.
- **Past El Nino years have led to droughts and decreased monsoon rainfall** throughout the country.
- **In 2015, a developing El Nino year similar to 2023, India experienced a 14 percent deficit in monsoon rainfall, leading to a drought year.**

#### India Meteorological Department (IMD) Forecast

- **The India Meteorological Department (IMD) predicted El Nino conditions based on the three-month average ONI at the end of June.**
- IMD forecasts **normal rainfall in July** overall for the country.
- However, the probabilistic rainfall distribution map predicts below-normal rainfall in large parts of Uttar Pradesh, Bihar, Assam, Meghalaya, Punjab, Ladakh, southern Karnataka, and Tamil Nadu.

### Concerns and Calls for Action

- WMO's declaration of El Nino serves as a signal to governments worldwide to mobilize preparations and limit the impacts on health, ecosystems, and economies.
- Early warnings and anticipatory action for extreme weather events associated with El Nino are crucial to saving lives and livelihoods.
- The current El Nino event is another reminder that efforts to limit global warming and meet the targets set in the Paris Agreement need to be intensified.

### **About El Nino and La Nina**

- El Nino and La Nina are two phases of the El Niño Southern Oscillation (ENSO) cycle, a climate phenomenon that occurs in the equatorial Pacific Ocean.
- ENSO refers to the natural variations in oceanic and atmospheric conditions, affecting weather and climate patterns globally.

### **El Nino**

- **Definition:** El Nino is the warmer-than-normal phase of the ENSO cycle.
- **Oceanic Conditions:**
  - Warmer sea surface temperatures (SST) in the Nino 3.4 region of the Pacific Ocean.
  - Weakening of trade winds, which blow from east to west.
  - Displacement of warm water and associated atmospheric changes towards the central and eastern Pacific.
- **Effects:**
  - Changes in atmospheric circulation patterns, leading to altered weather and climate patterns globally.
  - Impacts can include heatwaves, droughts, and reduced rainfall in some regions.
  - Increased tropical cyclone activity in the central and eastern Pacific, while suppressing hurricane formation in the Atlantic.

### **La Nina**

- **Definition:** La Nina is the colder-than-normal phase of the ENSO cycle.
- **Oceanic Conditions:**
  - Cooler sea surface temperatures in the Nino 3.4 region of the Pacific Ocean.
  - Strengthening of trade winds, resulting in upwelling of cold water in the eastern Pacific.
  - Enhanced cooling of the surface waters in the central and eastern Pacific.
- **Effects:**
  - Altered atmospheric circulation patterns, leading to distinct weather and climate patterns globally.
  - Increased rainfall in some regions, potentially causing floods and heavy precipitation.

- Enhanced hurricane formation in the Atlantic, while reducing tropical cyclone activity in the central and eastern Pacific.

### **Relationship Between El Nino and La Nina**

- El Nino and La Nina are opposite phases of the ENSO cycle, representing different patterns of oceanic and atmospheric conditions.
- They are part of a natural cycle that oscillates between warmer and colder phases, influencing global weather and climate patterns.
- El Nino and La Nina events can vary in duration, intensity, and frequency.

### **Impacts on Global Weather and Climate**

- El Nino and La Nina have widespread effects on weather and climate patterns globally.
- **El Nino Effects:**
  - Droughts, heatwaves, and reduced rainfall in some regions (e.g., Australia, southern Asia, Central America).
  - Increased rainfall in other regions (e.g., southern South America, southern United States, central Asia).
- **La Nina Effects:**
  - Increased rainfall, floods, and higher chances of tropical cyclone formation in certain regions (e.g., Australia, South Asia, western United States).

### **Forecasting and Monitoring**

- International weather organizations, such as the World Meteorological Organization (WMO), monitor and forecast El Nino and La Nina conditions.
- Advanced climate models and oceanic/atmospheric data are used to predict the onset, intensity, and duration of these events.
- Early warning systems and preparedness measures are vital for managing the potential impacts on societies, economies, and ecosystems.

### **Long-Term Climate Change and ENSO**

- While El Nino and La Nina events occur naturally, their impacts can interact with long-term climate change caused by human activities.
- Climate change can influence the frequency and intensity of ENSO events, potentially altering their characteristics and associated impacts.
- Understanding these interactions is crucial for assessing future climate projections and implementing effective mitigation and adaptation strategies.

## NO-CONFIDENCE MOTION

### In News:

The Lok Sabha Speaker announced that he had accepted a no-confidence motion moved by the Opposition parties against the ruling Government.

### Analysis of Background:

- A No-Confidence Motion in the Lok Sabha, the lower house of the Indian Parliament, is a significant parliamentary procedure that allows members to express a lack of confidence in the Council of Ministers, commonly known as the government, led by the Prime Minister.
- The procedure for moving the No Confidence resolution is **outlined in Lok Sabha Rule 198**. The Indian Constitution lacks an Article for a Motion of Confidence or No Confidence.
- Article 75 of the Indian Constitution, says that the Council of Ministers is collectively responsible to the Lok Sabha.
- It is an essential mechanism in India's parliamentary democracy to hold the government accountable and ensure that it enjoys the confidence of the elected representatives.

### Process of No-Confidence Motion in Lok Sabha:

- **Any member of the Lok Sabha can submit** a No-Confidence Motion in writing to the Speaker of the Lok Sabha.
- The Speaker examines the motion to ensure that it complies with the procedural requirements. If the Speaker finds the motion in order, it is admitted for discussion.
- The **Speaker allocates time for the discussion** on the No-Confidence Motion. Generally, the discussion takes place after ten days of its admission, allowing for adequate notice to the government.
- During the debate, members of the Lok Sabha discuss the reasons for expressing a lack of confidence in the government. The Prime Minister or a representative from the government has the right to reply to the motion. After the debate, a vote is conducted.
- **For the motion to succeed, it must be passed by a simple majority** in the Lok Sabha. In other words, more members should vote in favour of the motion than against it.
- **If the No-Confidence Motion is passed**, it indicates that the government has lost the confidence of the Lok Sabha. In such a scenario, the **Prime Minister and the entire Council of Ministers are required to resign**.

- Following the resignation of the Council of Ministers, the President, as the head of state, may invite the leader of the opposition or any other member who can demonstrate majority support to form the new government.

### Significance of No-Confidence Motion

- The No-Confidence Motion provides a means for the Lok Sabha members to hold the government accountable for its actions and policies.
- It ensures a **check on the power of the executive** and maintains a balance between the legislature and the executive.
- It allows for a peaceful transition of power without the need for snap elections or constitutional crises.
- The No-Confidence Motion **upholds the democratic principle of parliamentary democracy**, where the government derives its legitimacy from the confidence of the elected representatives.

## DATA PROTECTION BILL

### In News:

The Union Cabinet approved the Digital Personal Data Protection (DPDP) Bill on July 5, 2022. It clears the way for the Bill to be tabled in Parliament during the forthcoming Monsoon Session, which begins on July 20.

### Analysis of Background:

- The Bill aims **to protect the privacy and rights of individuals** concerning their data and to regulate the processing of such data by data fiduciaries.
- The data privacy law **defines standards for the administration of personal data of Indian residents** and demands specific agreement from those whose information is gathered and utilised.
- According to an official, nearly 20,000 comments were received on the draft Bill, but they will **not be made public**. He also stated that there has been little change between the draft that was published for public feedback and the final Bill that will be presented in parliament.
- The Union government has **refused to give copies of comments on the Bills** from industry, civil society, and government entities in response to Right to Information demands.
- The need for a comprehensive data protection law was felt after the **Supreme Court of India declared privacy as a fundamental right in Justice K.S. Puttaswamy v/s Union of**



**India (2017).** The Court also directed the government to enact a law to safeguard the personal data of citizens from unauthorized use by state and non-state actors.

- In response, the government formed a committee under Justice B.N. Srikrishna to draft a data protection bill. The committee submitted its report and a draft bill, titled the Personal Data Protection Bill, 2018.
- The bill was then revised by the government and introduced in the Lok Sabha as the Personal Data Protection Bill, 2019. However, the bill was referred to a joint parliamentary committee for further scrutiny and public consultation.
- The joint parliamentary committee submitted its report along with a modified draft bill, titled the Digital Personal Data Protection Bill, 2022. Recently the bill was approved by the cabinet and is now ready to be presented in Parliament.

### Features

- The DPDP Bill has several features that are similar to its previous versions as well as some new provisions that reflect the changing landscape of data governance.
- It applies to all online and offline data in India that relates to an identifiable natural person or digital nagrik.

### Data fiduciaries

- The bill applies to data fiduciaries or entities that collect, process, store or share personal data of individuals.
- **Data fiduciaries are entities that collect, store or process personal data on behalf of individuals.** They have a duty of care and loyalty to protect the data from unauthorized access, misuse, or harm.
- It requires **data fiduciaries to obtain consent from individuals before collecting or processing their data**, except in certain cases such as for state functions, legal obligations, emergencies or public interest. The consent should be free, informed, specific, clear and revocable.
- It mandates data fiduciaries to adhere to certain principles while processing personal data, such as purpose limitation, collection limitation, data quality, storage limitation, accountability and transparency.

### Personal data

- The bill **categorizes personal data into three types:** general personal data, sensitive personal data and critical personal data.

- **Sensitive personal data** includes financial, health, biometric, genetic, sexual orientation, religious, political and other data that may cause harm or discrimination to individuals if misused.
- **Critical personal data** includes any data that the government may notify as such from time to time.
- It grants several rights to individuals concerning their data, such as the right to access, correction, erasure, portability and restriction of processing. Individuals can also file complaints against data fiduciaries for violations of their rights or seek compensation for any harm caused by such violations.

### **Restrictions on cross-border transfer**

- The bill **imposes restrictions on cross-border transfer of personal data.**
- **General personal data can be transferred outside India subject to contractual clauses** or adequacy decisions by the government.
- **Sensitive personal data can be transferred outside India only with the explicit consent of individuals** and subject to additional conditions such as storage of a copy of such data in India.
- **Critical personal data can only be processed and stored within India.**

### **Exemptions**

- The bill provides for exemptions from its provisions for certain categories of personal data or processing activities. These include personal or domestic purposes, journalistic purposes, research purposes and security purposes.
- The government can also exempt any agency from the bill for reasons of sovereignty, security, public order or friendly relations with foreign states.

### **Data Protection Board of India**

- The bill envisages the setting up of a Data Protection Board of India to manage the implementation and enforcement of the bill.
- The board will consist of a chairperson and six members appointed by the government on the recommendation of a selection committee. It will have powers to issue codes of practice, conduct inquiries, impose penalties and perform other functions as assigned by the government.

## Key Terms in PDP Act



### Significances

#### For individuals

- The bill empowers individuals to have **greater control and choice over their data and to exercise their rights effectively**. It protects them from potential harm or discrimination arising from misuse or breach of their data by data fiduciaries.
- It grants individuals the right to access, correct, erase, port and restricts their data, as well as the right to be forgotten and the right to object to certain processing activities.
- It requires data fiduciaries to obtain consent from individuals before processing their data, except in certain circumstances.
- It mandates data fiduciaries to provide clear and transparent notice about their data practices and to implement appropriate security safeguards and privacy by design principles.

#### For businesses


- The bill will **create a level playing field for businesses that deal with personal data and foster trust and confidence among customers and stakeholders**. It enables businesses to leverage the opportunities offered by the digital economy and to innovate and compete in the global market.
- The bill provides **flexibility for businesses to process personal data for reasonable purposes, subject to certain conditions and safeguards**. It allows businesses to process anonymized or non-personal data for various purposes, without any restrictions.

- It encourages businesses to adopt codes of practice, certification schemes and sandbox mechanisms to demonstrate their compliance and enhance their reputation.


### For the Government

- The bill will contribute to the social and economic development of the country by promoting data-driven governance, public service delivery, research and innovation.
- It will enhance the national security and sovereignty of the country by ensuring that critical personal data is processed and stored within India.
- The bill **allows the government to process personal data for various purposes, such as security, law enforcement, health, welfare, taxation, etc., subject to certain safeguards and oversight.**
- It empowers the government to exempt certain processing activities from the provisions of the bill, in the interest of national security or public order.


### Decoding the data protection bill

 **WHAT IT MEANS FOR CONSUMERS**

- **DATA** can be processed or shared by any entity only after consent.
- **SAFEGUARDS**, including penalties, introduced to prevent misuse of personal data.
- **ALL** data to be categorized under three heads—general, sensitive and critical.

 **THE GOVERNMENT & REGULATORY ROLE**

- **GOVT** will have the power to obtain any user's non-personal data from companies.
- **THE** bill mandates that all financial and critical data has to be stored in India.
- **SENSITIVE** data has to be stored in India but can be processed outside with consent.

 **WHAT COMPANIES HAVE TO DO**

- **SOCIAL** media firms to formulate a voluntary verification process for users.
- **SHARING** data without consent will entail a fine of ₹15 crore or 4% of global turnover.
- **DATA** breach or inaction will entail a fine of ₹5 crore or 2% of global turnover.

Source: Mint research

### Challenges

#### Wide-ranging exemptions to the government

- The bill grants **wide-ranging exemptions to the government and its agencies from its provisions, raising concerns about the potential misuse of personal data by the state for surveillance, profiling or political purposes.** There are also doubts about the independence and accountability of the Data Protection Board, given that its members are appointed by the government.

### **Restrictions on cross-border transfer of personal data**

- The bill imposes stringent restrictions on the cross-border transfer of personal data, especially sensitive and critical personal data, which may hamper the growth and competitiveness of Indian businesses that rely on global data flows. It may also affect the interests of foreign businesses that operate in India or offer services to Indian customers.

### **Complex and cumbersome compliance regime**

- The bill creates a complex and cumbersome compliance regime for data fiduciaries, especially small and medium enterprises, start-ups and non-profit organizations that may lack the resources and expertise to comply with its provisions. It may also increase the cost and risk of doing business in India.

### **Does not adequately address some of the emerging issues**

- The bill does not adequately address some of the emerging issues and challenges in the field of data protection, such as anonymization, de-identification, artificial intelligence, machine learning, blockchain, cloud computing, the Internet of Things, etc. It may also become obsolete or irrelevant in the face of rapid technological changes and innovations.

## **PM JAY**

### **In News:**

Ayushman Bharat, the world's largest health insurance scheme, aims to provide universal health coverage to the poor and vulnerable in India. However, official data revealed that more than a third of the hospitals empanelled under the scheme are inactive, raising concerns about its effectiveness and accessibility.

### **Analysis of Background:**

- The Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY) is the world's largest health insurance scheme **aimed at providing universal health coverage** in India. However, official data has revealed a worrying trend of **inactivity among the empanelled hospitals under the scheme**. Out of the 27,000 hospitals empanelled since its launch in 2018, only 18,783 are currently active.
- The inactive hospitals can be categorized into two groups: 4,682 hospitals have been **inactive since the beginning and have never treated a single PM-JAY beneficiary**, and an additional 3,632 hospitals turned inactive in the last six months. This brings the total number of inactive hospitals to 8,314.
- The reasons for hospital inactivity may vary, but they could include **dissatisfaction with the pricing packages for medical services or delayed payments**. Some hospitals may

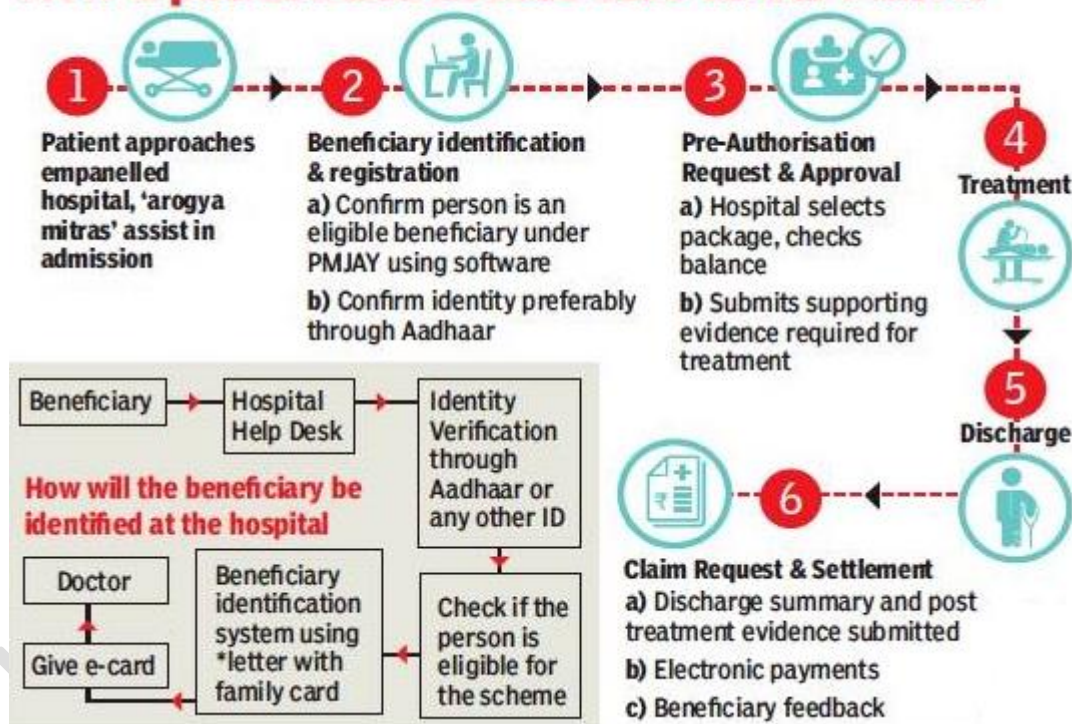
also lack the necessary facilities for secondary and tertiary care hospitalization, leading to their inactivity under the scheme.

- The **responsibilities for addressing the issue of hospital inactivity are with the state health authorities (SHAs)** rather than the National Health Authority (NHA), which is implementing the scheme. NHA has set stringent guidelines to de-empanel hospitals that fail to raise even a single pre-authorization within six months of empanelment.
- The level of inactivity varies across states, with Andhra Pradesh and Rajasthan having the highest number of inactive hospitals.

### Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (PM-JAY)

- It is a flagship health insurance program launched by the Government of India in 2018. The scheme aims to **provide financial protection to vulnerable and economically weaker sections of society** by offering health coverage for secondary and tertiary hospitalization.

#### How a patient can access care under PMJAY



### Features

- **Universal Health Coverage:** PM-JAY aims to cover over 100 million poor and vulnerable families, approximately 500 million beneficiaries, with a health insurance cover of up to ₹5 lakhs per family per year for specified secondary and tertiary care treatments.
- **Cashless Treatment:** Beneficiaries can avail of cashless and paperless treatment at empanelled public and private hospitals across India.



- **Empanelled Hospitals:** The scheme has a network of both public (government) and private hospitals. As of the data mentioned earlier, around 15,000 private and 12,000 government hospitals are empanelled under PM-JAY.
- **No Cap on Family Size:** The scheme covers the entire family, including up to five members, and there is no cap on the family size or age of family members.
- **Pre-existing Conditions:** PM-JAY covers pre-existing conditions from day one of enrollment, ensuring access to treatment for existing health issues.
- **Portability:** The scheme is portable across India, meaning beneficiaries can avail treatment in any empanelled hospital in any state or union territory.

### Significances

- **Financial Protection:** PM-JAY provides a crucial safety net to vulnerable sections of society by protecting them from catastrophic health expenditures that can push families into poverty.
- **Improved Access to Healthcare:** By providing cashless treatment at empanelled hospitals, PM-JAY enhances access to quality healthcare for millions of beneficiaries who may not have had access to it otherwise.
- **Reduced Out-of-Pocket Expenditure:** The scheme reduces the burden of out-of-pocket expenses for medical treatments, making healthcare more affordable for the poor.
- **Health Outcomes:** PM-JAY aims to improve health outcomes by facilitating timely access to appropriate medical care, especially for serious illnesses that require secondary and tertiary care services.
- **Strengthening Healthcare Facilities:** The scheme incentivizes hospitals to participate and improve their facilities to meet the standards required for empanelment, thus contributing to the overall improvement of healthcare infrastructure.

### Challenges

- **Inactivity of Empanelled Hospitals:** As mentioned earlier, a significant number of hospitals empanelled under PM-JAY are inactive, which poses a challenge in ensuring adequate healthcare access for beneficiaries.
- **Quality of Care:** While the scheme focuses on financial protection, ensuring the quality of care delivered at empanelled hospitals is essential to achieve positive health outcomes.
- **Information and Awareness:** Some eligible beneficiaries might not be aware of the scheme or how to access it, leading to underutilization of the benefits.
- **State Disparities:** The level of implementation and participation may vary across states, leading to disparities in healthcare access among beneficiaries.

By addressing these challenges and building on their significance, the Ayushman Bharat Pradhan Mantri Jan Arogya Yojana can continue to make significant strides in providing universal health coverage and financial protection to millions of vulnerable families across India.

## SCHENGEN VISA

### In News:

- In 2022, Indians reportedly spent over Rs 87 crores trying to get a Schengen Visa for their Europe trips.
- However, as per new data released, India become the second country with the highest rejection rate for the Schengen Visa last year.

### Analysis of Background:

#### Schengen Visa

- A Schengen visa is an **official document mandatory for some non-Europeans to travel to all the 27 countries** which are part of the Schengen area.
- Once granted, this visa **allows the traveler to cross the borders of the other member-states without going through identity checks at the border.**
- There are several types of Schengen visa but the most common (**the short-stay visa**) **allows to travel/stay for 90 days maximum over a 6-month period starting from the entry date stated on the visa.**

#### What is the Schengen area?

- The Schengen Area, or Schengen Countries Zone, is a **group of 27 European nations that have abolished border controls between each other.**
- These include France, Germany, Italy, Spain, The Netherlands, Poland, and Scandinavian nations, **but not the U.K. and Ireland.**
- Most European Union (EU) countries are signatories to the Schengen Agreement, although some non-Schengen countries, like Bulgaria and Romania, are signed up but not yet active members and merely obliged to join in the future.
- Switzerland, Iceland, and Norway are **not in the EU but are inside of the Schengen Area.**  
**Here is the complete list of 27 countries members of the Schengen zone:**





### Which European countries are not part of the Schengen area?

Although 27 countries are inside the Schengen Zone, including most nations in mainland Europe - not every European state is inside the area where border checks have been abolished. Countries we associate with Europe **that aren't in the Schengen Zone**:

<b>Albania</b>	<b>Armenia</b>	<b>Azerbaijan</b>	<b>Belarus</b>
<b>Bosnia &amp; Herzegovina</b>	<b>Bulgaria</b>	<b>Croatia</b>	<b>Cyprus</b>
<b>Ireland</b>	<b>Macedonia</b>	<b>Moldova</b>	<b>Montenegro</b>
<b>Serbia</b>	<b>Ukraine</b>	<b>United Kingdom</b>	<b>Romania</b>

- The microstates of **Andorra, Monaco, and Vatican City** are also not members - but are considered as de facto inside the area, as they do not impose border controls.
- **Romania, Bulgaria, Croatia, and Cyprus** are also outside of the Schengen Zone but are legally obliged to join as members of the European Union at some point in the future.

### Who needs a visa to enter Europe?

- Most non-European citizens (particularly from Africa, Russia, India, and China) need a Schengen visa to enter one of the Schengen member states.
- Some countries, such as the United States, Canada, Mexico, Brazil, Australia, and Japan, have signed a visa **waiver agreement** with the European Union. This means that their **nationals don't need a visa to enter Europe if their visit doesn't exceed 90 days**.
- However, residents, and not yet citizens, of such countries will need a Schengen visa if they are originally from countries that haven't signed this waiver agreement.

## What are the different types of Schengen visas?

### Type A Schengen visa - Airport Transit Visa

- The type A visa (Airport Transit Visa) **allows citizens of non-Schengen states to transit through or wait for their connecting flight** in the international zone of an airport located in a Schengen country.
- It is compulsory for those traveling from a non-Schengen country to another non-Schengen country and who have to connect flights to the airport of a Schengen country. The holder of a type A visa is not allowed to enter the said Schengen country.

### Type B Schengen visa

- The type B visa relates to journeys lasting fewer than five days has been **replaced by type "C" with the condition "transit"**.

### Type C Schengen visa

- The short-stay Schengen visa is the most common one. It is **issued by the visa services** (embassies, consulates, appointed external providers) of a country belonging to the Schengen area.
- It allows the holder to stay or travel freely in the Schengen area **for less than 90 days over a 180-day period**.
- According to the purpose of one's trip, the short-stay category C Schengen visa **can be a single-entry, a double-entry or a multiple-entry**.

### Type D Schengen visa

- The national visa is the type D long-stay Schengen visa. It is **mandatory for any foreigner wishing to study, work or live in a Schengen country for longer than 90 days (up to 1 year)**.

## Where to apply for a Schengen visa?

- To apply for a Schengen visa, one needs to contact the consular authorities of the Schengen country one wishes to visit.
- To apply for a Schengen Visa, Indians need to submit **a fee of Rs 7,200 or 80 Euros**.

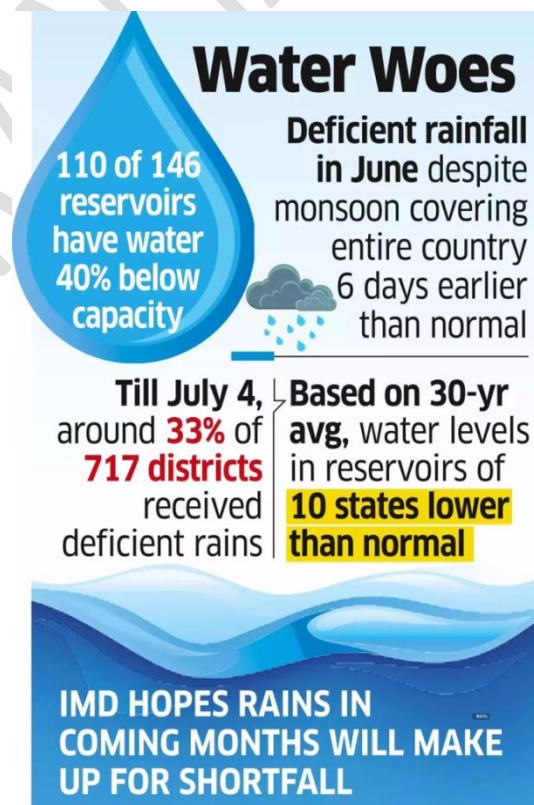
## CENTRAL WATER COMMISSION

### In News:

India is facing a serious water crisis as most of its reservoirs are running low on water due to deficient rainfall in June, the first month of the monsoon season. This has affected the sowing of kharif crops and raised concerns about the availability of water for irrigation and drinking purposes till May 2024.

## Analysis of Background:

- According to the latest data from the Central Water Commission (CWC), which monitors 146 reservoirs across the country, water levels in 110 of them are 40% or below their capacities as on June 30.
- The CWC data also shows that water levels in the reservoirs of 10 states are lower than the normal levels based on their 30-year average. These states are Bihar, West Bengal, Odisha, Jharkhand, Uttar Pradesh, Uttarakhand, Kerala, Karnataka, Tripura and Nagaland. The deficiency ranges from 11% to 80% in these states.
- The situation is alarming as India's hydrological year starts in June and continues till May of next year. The reservoirs depend on the monsoon rains for filling up during the June-September period. However, this year, several parts of India received deficient rainfall in June, despite the monsoon covering the entire country six days earlier than normal, said experts.
- The India Meteorological Department (IMD) data reveals that till July 4, around 33% of 717 districts for which data are available received deficient rains, while for another 10%, it was even worse.
- Insufficient rainfall has also affected the sowing of main kharif crops such as paddy, which requires adequate water for germination and growth.
- The CWC, however, said that the water level was better than the last 10-year average and that it reviews the situation on a weekly basis along with other departments under the Ministry of Agriculture & Farmers' Welfare to take further actions.



## Central Water Commission (CWC)

- The Central Water Commission (CWC) is a premier technical organization in India in the field of water resources. It was **established in 1945 as an advisory body to the Government of India on matters relating to water resources development and management.**
- It operates as an **attached office of the Ministry of Jal Shakti**, Department of Water Resources, River Development and Ganga Rejuvenation, Government of India.
- Its main role is to plan, design and implement schemes for the management, conservation and use of water resources across the country, for purposes such as flood control, irrigation, navigation, drinking water supply and hydropower generation.

## Working Structure

- CWC is headed by a Chairman, who has the rank of Ex-Officio Secretary to the Government of India. The work of CWC is **divided into three wings:**
  - Designs and Research (D&R) Wing
  - River Management (RM) Wing
  - Water Planning and Projects (WP&P) Wing.
- Each wing is led by a Member, who has the rank of Ex-Officio Additional Secretary to the Government of India and oversees several organizations that perform specific tasks and duties within their scope of functions.
- A separate Human Resources Management Unit (HRMU) headed by a Chief Engineer, handles the human resources development, financial management, training and administrative matters of CWC.
- **National Water Academy (NWA)** located in Pune is responsible for training central and state in-service engineers and it functions directly under the guidance of the Chairman.
- CWC has nineteen organizations located at its headquarters in New Delhi and thirteen organizations spread over various locations in India.

## The main functions of the CWC are:

- To **provide technical assistance and guidance** to the state governments and central ministries on planning, design, construction, operation and maintenance of water resources projects.
- To **undertake a techno-economic appraisal** of major and medium irrigation, flood control and multipurpose projects and to accord investment clearance.
- To **monitor the implementation** of major and medium irrigation, flood control and multipurpose projects and to evaluate their performance.

- To collect, compile and publish hydrological and hydro-meteorological data and to maintain a national network of observation stations.
- To **carry out surveys and investigations** for basin planning, inter-state water disputes, flood forecasting and reservoir regulation.
- To **conduct research and studies** on various aspects of water resources engineering, hydrology, sedimentation, soil conservation, groundwater, etc.
- To **promote international cooperation** in water resources development and management.

The CWC plays a vital role in the optimal utilization and management of the country's water resources. It contributes to the national objectives of enhancing food security, ensuring water security, mitigating floods and droughts, promoting regional equity, fostering interstate harmony and safeguarding environmental sustainability.

#### **Some of the major achievements of the CWC are:**

- **Preparation of National Perspective Plan for Water Resources Development (NPP)** envisaging interlinking of rivers for optimal utilization of surplus water.
- **Development of National Water Policy (NWP)** providing a framework for water resources planning, allocation and management at various levels.
- **Formulation of the National Hydrology Project (NHP)** for strengthening the hydrological information system and improving the quality and reliability of data.
- **Establishment of the National Water Informatics Centre (NWIC)** for creating a comprehensive web-based water resources information system.
- **Implementation of a Dam Rehabilitation and Improvement Project (DRIP)** for improving the safety and operational efficiency of existing dams.
- **Coordination of Jal Shakti Abhiyan (JSA)** for enhancing water conservation and recharge activities across the country.

#### **Challenges**

- **Increasing demand-supply gap** due to population growth, urbanization, industrialization, climate change, etc.
- **Declining per capita availability and quality of water** due to over-exploitation, pollution, degradation, etc.
- **Rising conflicts and disputes over sharing of water** among states, sectors and users.
- **Inadequate institutional capacity and financial resources** for planning, implementation and maintenance of water resources projects.
- **Lack of public participation and awareness** on water conservation and management issues.

To overcome these challenges, the CWC needs to adopt a holistic, integrated and participatory approach towards water resources development and management.

**Some of the possible ways forward are:**

- Strengthening the data collection, analysis and dissemination system for informed decision-making.
- Promoting conjunctive use of surface and groundwater to augment water availability and reduce stress on aquifers.
- **Encouraging demand management measures** such as water pricing, metering, rationing, etc. to reduce wastage and improve efficiency.
- Enhancing inter-sectoral coordination and cooperation for optimal allocation and utilization of water among competing uses.
- **Resolving inter-state water disputes** through dialogue, negotiation and arbitration mechanisms.
- **Implementing participatory irrigation management (PIM)** involving farmers' organizations in the operation and maintenance of irrigation systems.
- Adopting best practices in the design, construction, operation and maintenance of dams to ensure their safety and performance.
- Incorporating environmental and social aspects in water resources planning, appraisal and implementation to minimize adverse impacts.
- **Creating awareness among stakeholders** on the importance of water conservation and management through mass media, education, training, etc.

## BHASHINI

**In News:**

Prime Minister of India has proposed to share India's AI-based language platform, Bhashini, with the member countries of the Shanghai Cooperation Organisation (SCO) to facilitate communication and cooperation within the regional bloc.

**Analysis of Background:**

- Prime Minister made this offer during his virtual address at the SCO summit, which was attended by leaders of Russia, China, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan and Uzbekistan.
- The PM said that "India would be happy to share its AI-based language platform, Bhashini, with everyone to remove language barriers within the SCO. This can serve as an example of digital technology for inclusive growth,"

- The SCO is a Eurasian political, economic and security alliance that was established in 2001 in Shanghai by the presidents of six countries. India and Pakistan joined the organisation as full members in 2017.
- The official languages of the SCO are Mandarin and Russian, but India has been advocating for the inclusion of English as well.

### **India's AI-based language platform, Bhashini: A game-changer for digital inclusion**

- India is a country of linguistic diversity, with **22 official languages and hundreds of regional dialects**. However, **most of the internet content and digital services are available only in English, which is spoken by less than 10% of the population**. This creates a huge barrier for millions of Indians who want to access the benefits of the digital world.
  - To address this challenge, the **Indian government launched Bhashini, an AI-based language platform that aims to enable easy access to the internet and digital services in Indian languages**, including voice-based access, and help the creation of content in Indian languages.
- Bhashini was unveiled in 2022 and was recently presented by the Prime Minister of India at the Shanghai Cooperation Organisation (SCO) summit, where he offered to share it with other SCO member countries to remove language barriers within the international grouping.

### **Components of Bhashini;**

#### **Bhasha Daan;**

- A crowdsourcing initiative that invites volunteers to contribute language data, such as text, speech and images, in various Indian languages. The data is used to train AI models and improve the quality of language technologies.

#### **Universal Language Contribution API (ULCA):**

- ULCA is a standard API and open scalable data platform that supports various types of datasets and models for Indian language research and development.
- It provides access to language datasets, such as parallel text corpus, monolingual text corpus, automatic speech recognition corpus, text-to-speech corpus, optical character recognition corpus and natural language understanding datasets.
- It provides access to open-sourced models for language-specific tasks, such as machine translation, automatic speech recognition, text-to-speech, optical character recognition and natural language understanding.



- It enables transparent benchmarking of different models using large, diverse and task-specific benchmarks and research community-approved metric systems.

#### **Anuvaad:**

- A suite of AI tools that leverage natural language technologies to enable translation, transcription, transliteration, summarization and sentiment analysis in Indian languages.
- It helps users communicate across languages, access information in their preferred language and create content in Indian languages.

#### **Significance:**

- Bhashini has significant implications for India's digital inclusion and empowerment.
- By transcending language barriers, **Bhashini can help millions of Indians access the internet and digital services in their language, increase their participation in the digital economy and society**, and preserve and promote their linguistic and cultural diversity.
- It can **foster innovation and collaboration among various stakeholders**, such as academia, industry, government and civil society, for developing cutting-edge solutions for Indian language challenges.

#### **Challenges in its implementation and adoption**

- **Data scarcity:** Despite the efforts of Bhasha Daan, there is still a lack of sufficient and high-quality data for many Indian languages and domains. This affects the performance and accuracy of AI models and tools.
- **Data privacy:** There are concerns about how the data collected from users and volunteers is stored, processed and shared by Bhashini. There is a need for clear policies and guidelines to ensure data privacy and security.
- **Digital literacy:** Many potential users of Bhashini may not have adequate digital skills or awareness to use the platform effectively. There is a need for capacity building and outreach programs to educate and empower users.
- **User feedback:** There is a need for continuous user feedback and evaluation to improve the quality and usability of Bhashini's products and services. There is also a need for user-centric design and development to cater to the diverse needs and preferences of users.

## **HAR GHAR JAL**

#### **In News:**

The **Har Ghar Jal initiative is likely to fall short of its target**, with only 75% of village homes expected to have drinking water taps by April 2024.



### **Analysis of Background:**

- **The Har Ghar Jal initiative aims to provide potable water connections to all rural households in India by 2024 under the Jal Jeevan Mission.**
- Multiple sources and data analysis indicate that the initiative is likely to fall short of its target, with only 75% of village homes expected to have drinking water taps by April 2024.
- The scheme faced several challenges, including the COVID-19 pandemic, shortage of qualified manpower, state-specific issues, and the impact of the Russia-Ukraine war.

### **Challenges and Issues**

#### **COVID-19 Pandemic:**

- The pandemic led to delays in the implementation of the Har Ghar Jal initiative.
- Restrictions and disruptions affected the availability of resources and manpower required for the project.

#### **Shortages of Steel and Cement:**

- The ongoing Russia-Ukraine war resulted in major shortages of steel and cement, which are critical for manufacturing and connecting metal pipes.
- Price revisions and contract renegotiations caused delays in the supply of these materials.

#### **Lack of Skilled Manpower:**

- Many states faced challenges in finding enough skilled workers to construct tanks, cisterns, and water connections of acceptable quality.
- Rajasthan, for instance, struggled with the availability of water itself, while West Bengal and Kerala dealt with water contamination issues.

### **Progress and Expectations**

#### **Expected Coverage:**

- **Officials expect about 75% of households to be covered by March 2024 and 80% by December.**
- However, there are approximately one crore households (5% of the total) where work has not even begun, and some areas may not be fully connected until 2025-26.

#### **Financial Outlay and Funding:**

- The Jal Jeevan Mission has a financial outlay of ₹3.60 lakh crore, with the center funding 50% of the cost and states/union territories bearing the rest.

### **Reported Tap Connections:**

- Data on the Jal Shakti Ministry portal indicates that about 63% of rural households have tap connections, benefiting approximately 9.1 crore households since 2019.
- However, there is a significant gap between reported and verified connections, with only 58,357 out of 1,68,000 villages being certified as 'Har Ghar Jal' villages.

### **State-Specific Examples:**

- **Uttar Pradesh witnessed a dramatic increase in the number of households with tap connections**, but only a small percentage of villages have been certified.
- **Rajasthan and West Bengal also showed progress**, but the certification process is still lacking in many villages.

### **Independent Verification**

- The government relies on **independent mechanisms for verification**, including an **audit agency and a panel of National WASH experts**.
- A survey conducted in October 2022 found that only 62% of households in 5,298 reported 'Har Ghar Jal' villages had fully functional connections.

### **Political Angle**

- Two states, Bihar and Telangana, did not certify their connection status as they did not rely on central funds for their drinking water supply programs.
- Certification involves prominently publicizing the Prime Minister and Chief Minister's images on posters, which some states are hesitant to do due to political reasons.

### **About Har Ghar Jal Initiative**

- **The Har Ghar Jal initiative is part of the Jal Jeevan Mission.**
- Its objective is to **provide potable water connections to all rural households** in the country by 2024.

### **About Jal Jeevan Mission**

- The Jal Jeevan Mission is a flagship program launched by the Government of India.
- Its aim is to provide tap water connections to every rural household in the country.

### **Objective and Scope**

- The primary objective of the Jal Jeevan Mission is to **provide potable water to all rural households in India.**

- The mission focuses on ensuring piped water supply to every household, promoting ease of access to clean drinking water.

### **Targeted Coverage and Timelines**

- The mission aims to achieve 100% coverage of tap water connections in rural areas by 2024.
- The target is to provide functional tap connections to approximately 19.5 crore rural households in the country.

### **Financial Outlay and Funding**

- The Jal Jeevan Mission has a significant financial outlay of ₹3.60 lakh crore.
- **The funding is shared between the central government and states/union territories, with the central government contributing 50% of the cost.**

### **Key Features and Components**

#### **Infrastructure Development**

- The mission focuses on developing the necessary infrastructure for providing tap water connections.
- This includes the construction of water sources, water treatment plants, storage tanks, distribution networks, and individual household connections.

#### **Community Participation**

- The mission emphasizes the active involvement of local communities in planning, implementation, and management of water supply schemes.
- It encourages the formation of Water and Sanitation Committees at the village level for effective community participation.

#### **Capacity Building and Training**

- The mission focuses on capacity building and training programs for rural communities, particularly on water management and maintenance of infrastructure.
- Training sessions are conducted to raise awareness about the importance of clean water and proper hygiene practices.

#### **Water Quality Monitoring**

- The Jal Jeevan Mission emphasizes the regular monitoring of water quality to ensure that the supplied water is safe for drinking.

- Testing laboratories are set up at various levels to monitor and maintain the quality of water supplied to rural households.

## **Implementation Strategy**

### **Convergence with Other Schemes**

- The mission aims to ensure convergence with other government schemes, such as Swachh Bharat Abhiyan (Clean India Mission), to achieve better outcomes in water supply and sanitation.

### **State-level Implementation Plans**

- Each state/union territory prepares a detailed implementation plan based on local needs and requirements.
- These plans outline the strategy for achieving the mission's objectives within the specified timelines.

### **Monitoring and Evaluation**

- Regular monitoring and evaluation mechanisms are established to assess the progress of the mission.
- Performance indicators are used to track the implementation, coverage, and quality of water supply in rural areas.

### **Impact and Benefits**

#### **Improved Health and Hygiene**

- The mission aims to provide clean drinking water, reducing the risk of waterborne diseases and improving overall health and hygiene in rural areas.

#### **Women Empowerment**

- Access to piped water connections reduces the burden on women and girls, who traditionally bear the responsibility of fetching water from distant sources.

#### **Time and Productivity Savings**

- Availability of tap water connections saves time and effort, allowing individuals to engage in productive activities, education, and skill development.

## INDIA TANZANIA RELATIONS

### In News:

The Memorandum of Understanding (MoU) for setting up of campus of IIT Madras in Zanzibar- Tanzania was signed between India and Zanzibar- Tanzania.

### Analysis of Background:

- This is the **first ever IIT campus to be set up outside India**.
- IIT campus in Zanzibar- Tanzania is envisioned as a **world-class higher education** and research institution with a broader mission to develop competencies in response to emerging global requirements, deepen ties between the nations, and support research and innovation in the region. It **will serve as an example to the world, of the aspirational qualities of Indian higher education and innovation**.
- It is **reflective of the longstanding friendship between India and Tanzania** and a reminder of the focus India places on building people-to-people ties across Africa and the Global South.
- Recognizing the strategic partnership between the Tanzania and India, the relationship of educational partnership has been formalized by signing the document.
- The setting up of IIT Campus shall also **enhance India's reputation globally** and its **diplomatic relationships** and **expand the international footprint of IIT**.
- It will further serve to **deepen research collaborations with other top-ranked academic institutions worldwide**.

### Zanzibar

- Zanzibar is an **archipelago off the coast of east Africa** that **united with Tanganyika in 1964** to form the United Republic of Tanzania.
- It is a **semi-autonomous region of Tanzania**.



## Tanzania

### History

- After Tanganyika and Zanzibar became independent countries, they merged in **1964 to form the nation of Tanzania.**

### Size and Islands

- Tanzania is the largest country in East Africa and **includes the islands of Zanzibar, Pemba, and Mafia.**

### Borders

- It is **bordered by** the Indian Ocean and eight countries: Kenya, Uganda, Rwanda, Burundi, Democratic Republic of Congo, Zambia, Malawi, and Mozambique.

### Physical Features

- It is **home to Mount Kilimanjaro**, the tallest mountain in Africa. Three of the **largest lakes on the continent** are also found in Tanzania – **Lake Victoria in the north, Lake Tanganyika in the west and Lake Nya in the southwest.** These lakes border the Mount Kilimanjaro.
- It also **incorporates Africa's lowest point:** the floor of Lake Tanganyika, at 1,471 metres (4,826 ft) below sea level.
- **Kalambo Falls** in the southwestern region of Rukwa is the second highest uninterrupted waterfall in Africa, and is located near the southeastern shore of Lake Tanganyika on the border with Zambia.

## Human Settlements

- Some of the world's **oldest human settlements** have been found in Tanzania, at a site called **Olduvai Gorge**. The hundreds of fossilised bones and stone tools excavated here, are over two millions years old.
- The genus *Australopithecus* ranged across Africa between 4 and 2 million years ago, and the oldest remains of the genus *Homo* are found near Lake Olduvai.



## Biodiversity

- Tanzania is **highly biodiverse** and contains a wide variety of animal habitats.
- On **Tanzania's Serengeti plain**, white-bearded wildebeest (*Connochaetes taurinus mearnsi*), other bovids and zebra participate in a large-scale annual migration.
- Tanzania is home to about 130 amphibian and over 275 reptile species, many of them strictly endemic and included in the International Union for Conservation of Nature's Red Lists of countries.
- Tanzania has the **largest lion population in the world**.
- Tanzania is the **world's largest producer of cloves**.

## Conservation

- Tanzania has a number of important national parks and nature reserves – such as the **Selous Game Reserve**, where one of the largest populations of elephants live,

and **The Gombe Stream National Park**, where animal expert Dr Jane Goodall carried out her famous research on chimps in their natural habitat.

- The **Serengeti National Park**, Tanzania's oldest and most popular park for tourists, is home to over 1.7 million wildebeest and about a million other animals.

### **India-Tanzania Relations: Overview**

- Tanzania and India have **traditionally enjoyed close, friendly, and cooperative relations**.
- From the 1960s to the 1980s the political relationship was driven largely by **shared ideological commitments to anti-colonialism and socialism in various**.
- Traditional ties and the spirit of mutual cooperation between Tanzania and India have been consistently reinforced through various international co-operations such as the **Non-Aligned Movement (NAM)** and later through the various initiatives of **South-South Cooperation**. The most recent example of such **South-South solidarity was the 2008 India – Africa summit** hosted by India to advance and strengthen the ties between India and Sub-Saharan Africa.
- The traditional ties between India and Tanzania have their historical roots in the migration of Indian traders to East Africa. The colonial dimension played a significant role in migratory patterns. It should be noted that Indian traders, mostly settled in the other British colonies of Kenya and Uganda and the British protectorate of Zanzibar.
- India is the **second largest trading partner of Tanzania** with bilateral trade of USD 2.37 billion in 2020-21.
- India is also **among the top five investment sources in Tanzania** with investments in Tanzania reaching USD 3.65 billion in 2022. The **exports of India to Tanzania have increased at an annualized rate of 10.5%**, from USD 115M in 1995 to USD 1.41B in 2020. The main products that India exported to Tanzania in 2020 were **Refined Petroleum (USD 481M), Packaged Medicaments (USD 215M), and Raw Sugar (USD 30.7M)**.
- The exports of Tanzania to India have **increased at an annualized rate of 9.51%**, from USD 92M in 1995 to USD 891M in 2020.
- In 2020, **Tanzania exported USD 891M to India**.
- The main products that Tanzania exported to India were **Raw Copper (USD 260M), Coconuts, Brazil Nuts, and Cashews (USD 221M), and Gold (USD 159M)**.

### **Commercial and Economic Relations**

- India and Tanzania share **vibrant economic, commercial and business ties**.
- India is the **third largest trading partner of Tanzania** with bilateral trade of USD 4.58 billion in 2021-22 (as per DGCI&S data). India is also **among the top five investment**



**sources in Tanzania** and as per Tanzania Investment Centre, Indian investments in Tanzania add up to USD 3.68 billion.

- At present major Indian companies in Tanzania are **Airtel (telecom); Tata Africa Holdings Ltd, Mahindra & Mahindra (tractors), Kamal Group (Steel)**, Kalpataru (power transmission), Tanzindia (insurance with significant share of Indian PSEs), Larsen & Toubro, Afcons, Hester Biosciences (animal vaccines), Mahashree Agro, Purandare Industries (sugar factory) etc.
- Hester Biosciences Africa Limited is constructing a USD 18 million **veterinary Vaccines manufacturing factory in Kibaha**, Coast Region.
- Purandare Industries (Tanzania) Limited is setting up a **sugar factory in Chamvino District of Tanzania near Dodoma**.
- Mahashree Agro has invested in Tanzania for **pulses processing**.
- A large number of Escorts manufactured tractors and farm equipment, TATA, Ashok Leyland and Eicher commercial vehicles can be seen in Tanzania.
- 3 Indian banks that are operating in Tanzania are Bank of Baroda, Bank of India, and Canara Bank.
- Two Indian companies – M/s Pacco Gems Limited and M/s Nazareth Investment Company Limited have **obtained licenses for Graphite extraction in Tanzania**.
- India's major exports to Tanzania include petroleum products, pharmaceuticals & chemicals, motor vehicles, electrical goods, articles of iron & steel, sugar, machinery, etc. Tanzania's major exports to India include gold dore, cashew nuts, pulses, timber, spices (mainly cloves), ores and metal scrap, gemstones, etc.

### **Bilateral Treaties & Agreements**

**India and Tanzania have signed a number of bilateral Treaties/MOUs/Agreements. They are:**

- Agreement on Friendship & Technical, Economic and Scientific Cooperation (1966)
- Trade Agreements (1972)
- MOU on Technical Cooperation in the field of Posts and Telecommunications (1996)
- Agreement on the **establishment of Joint Business Council** (1997)
- Agreement on establishment of a Joint Trade Committee (2000)
- MOU for Co-operation in the field of Agriculture and Allied Sectors (2002)
- Agreement in the field of Health & Medicine (2002)
- MoU on **Exchange Programme on Co-operation in the field of Education** (2003)
- MOU on Defence Cooperation (2003)
- Agreement on **Waiving Tanzania's Outstanding Loans** (2004)
- Agreement **on Cooperation in Information Technology and Services** (2004)

- Letter of Intent on PTA/FTA (2008)
- MOU on JV between National Social Security Fund, Tanzania, Ministry of Health and Social Welfare and Apollo Hospitals Ltd. (2011)
- Agreement on **Double Taxation and Prevention of Fiscal Evasion (2011)**. Earlier DTAA was signed in 1979.
- **Joint Action Plan** between National Small Industries Corporation Ltd and Small Industries Development Organisation (2011).
- **Letter of Intent** between Ministry of Steel and Ministry of Energy & Minerals.

### Defence & Security Cooperation

- India and Tanzania signed a **Memorandum of Understanding (MoU) on Defence Co-operation in Oct 2003**. The MoU provides an over-arching framework for progressing various defence co-operation initiatives between the two countries.
- In recent years, India and Tanzania have been cooperating in the field of defence training in Indian institutions. Over 550 Tanzanian defence personnel have been trained in India.
- **Hydrography** is another advancing area of cooperation between the two countries. Indian naval survey ships have conducted **hydrographic surveys of Tanzanian ports** and prepared navigational charts
- High Commission of India organised a **DefExpo on 30th May 2022 in Dar es Salaam** in association with Department of Defence Production, Ministry of Defence & Society of Indian Defence Manufacturers (SIDM).
- In 2022, IN Ship Tarkash participated in bilateral Maritime Partnership Exercise with Tanzania and 1st trilateral exercise involving India-Tanzania-Mozambique.

### Culture

- **Swami Vivekananda Cultural Centre (SVCC), Dar es Salaam** under the **Indian Council for Cultural Relations (ICCR)**, coordinates cultural outreach since its establishment in December 2010. SVCC offers classes in Yoga, vocal music, tabla and Hindi language by Indian teachers.
- In 2021, ICCR sponsored Baba Gorekhnath Gotipua Dance Association from Odisha to perform at prestigious **40th Bagamoyo International Festival in Bagamoyo**, Tanzania.
- An MoU for establishment of **ICCR chair at University of Dar es Salaam (UDSM)** was signed between ICCR and UDSM in 2021. Tanzanian siblings **Kili and Neema Paul** who lip sync Indian songs, have a huge following in India.
- Famous **Nyati Mchoya group** from Tanzania were sponsored by Government of India to perform at International Suraj Kund Mela in Faridabad from in 2022.

- **8<sup>th</sup> International Day of Yoga (IDY 2022)** was **celebrated** on 19 June 2022 at **Uhuru Stadium in Dar es salaam**.
- High Commission in collaboration with Institute of Social and Cultural Studies (ISCS) Kolkata and National Museum of Tanzania organized a **2-day International Conference on “India-Tanzania Relations: An Overview”** in 2022.

### Indian Diaspora

- Tanzania is **home to about 40,000 people of Indian origin** which are concentrated in the major urban centres of Dar es Salaam, Arusha, Mwanza, Dodoma, Morogoro, Zanzibar, and Mbeya.
- The Indian origin community is **active in the field of trade and industry in Tanzania**.
- Indian/Asian community organizations active in Tanzania **regularly organize Indian festivals and social events** mostly with local participation and occasionally by inviting performing artistes from India.
- Indian community have managed to retain their **cultural identity and celebrate all Indian festivals**.
- The real core of India’s relation with Tanzania lies in its people-to-people relations. The role of People of Indian Origin (PIO) and other Indian settlers is crucial in strengthening the historical bond shared by these countries across the Indian Ocean.

## ASIAN DEVELOPMENT BANK (ADB)

### In News:

The **Asian Development Bank (ADB)** has approved USD 200 million in additional financing for the Rajasthan secondary towns development sector project to improve water supply and sanitation systems.

The aim is to **support the enhancement of urban resilience and heritage living in India**.

### Analysis of Background:

#### Asian Development Bank (ADB);

- The Asian Development Bank (ADB) is a regional development bank that **provides loans and equity investments for development projects in its member countries**.

#### Vision

- ADB’s vision is to achieve a **prosperous, inclusive, resilient, and sustainable Asia and Pacific while sustaining its efforts to eradicate extreme poverty**.

## **Establishment**

- The bank was **set up in 1966** under the auspices of the **United Nations organization now known as ESCAP (Economic and Social Commission for Asia and the Pacific)** and **leadership of Japan as one of the first industrialized states in Asia.**

### **Headquarters**

- Ortigas Center located in the city of **Mandaluyong, Metro Manila, Philippines.**

## **Field Offices**

- The bank also **maintains 31 field offices around the world** to promote social and economic development in Asia.

## **Members**

- From 31 members at its establishment, ADB now has **68 members.**
- Out of 68 members, **49 are regional members and 19 are non-regional members.**
- The **regional members are geographically situated in Asia** and are primary beneficiaries of the bank's programs, whereas the **non-regional members primarily from Western countries**, mainly Europe and North America, are contributors of capital to the bank.

## **Admission of Members**

- The bank admits the members of the **UN Economic and Social Commission for Asia and the Pacific** (UNESCAP, formerly the Economic Commission for Asia and the Far East or ECAFE) and **non-regional developed countries.**

## **Main Partners**

- ADB's main partners are governments, the private sector, nongovernment organizations, development agencies, community-based organizations, and foundations.

## **Main Instruments**

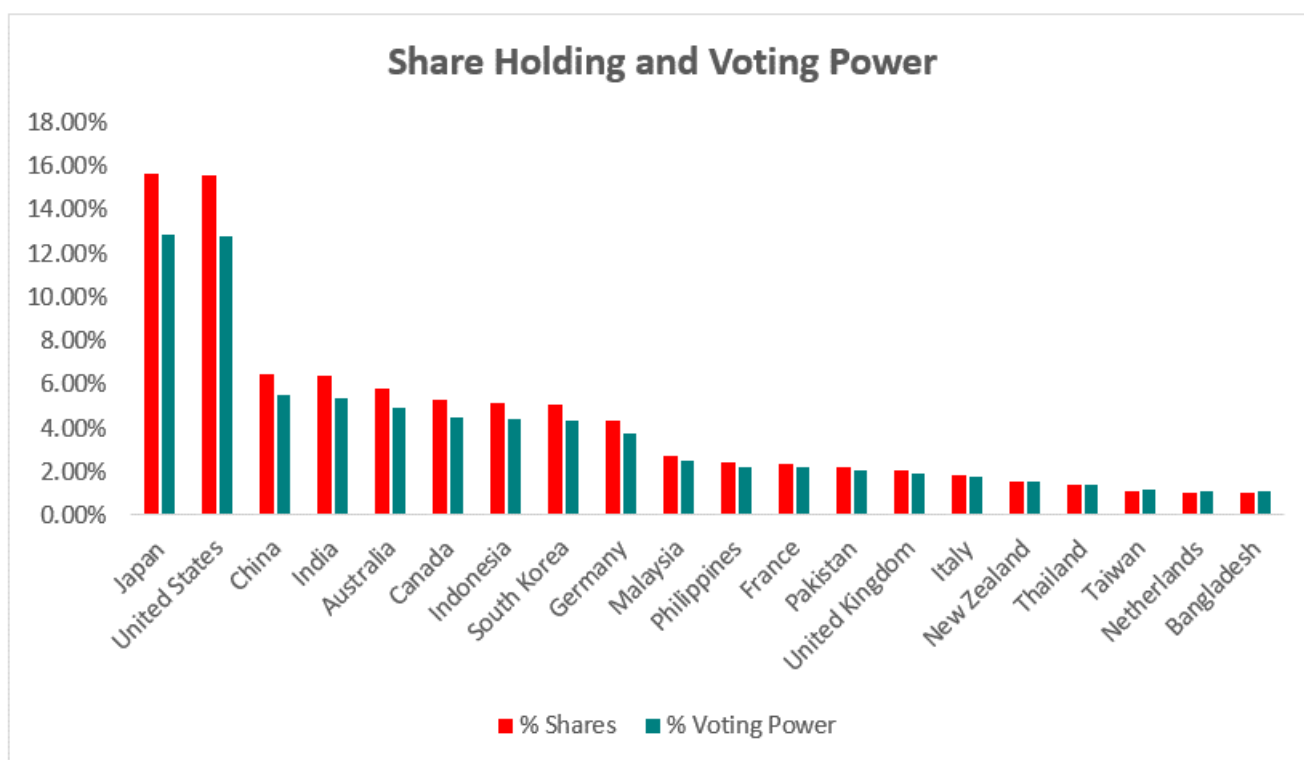
- Its main instruments for helping its developing member countries are **policy dialogue, loans, equity investments, guarantees, grants, and technical assistance.**

## **Decision making**

- The decision-making process at the Asian Development Bank is like that of the World Bank.
- The number of votes controlled by a member is **commensurate with the number of shares held by that member.**

- Today, **Japan controls the highest number of shares, which is about 15.5% of the ownership of the bank.**

The following figure summarizes the ownership structure and the voting power of member states:



### Areas of Focus

- The bank focuses on the key areas of development that are aligned with the World Bank’s sustainable development goals (SDGs). These key areas are:
  - Education
  - Health
  - Transport
  - Energy
  - Finance Sector
  - Climate Change
- The ADB aims to provide for sustainable and inclusive economic growth by financing projects in areas like education and health, while also helping improve the capital markets and business infrastructure in target countries.
- There are other more specialized areas as well, such as Public-Private Partnerships (PPPs), Information Technology, Regional Cooperation and Integration, etc., which serve as secondary capacity-building programs.

### India and ADB

- **India is a founding member of ADB and the bank’s fourth-largest shareholder.**

- Since commencing operations in 1986, ADB has aligned its operations in the country to the government's developing priorities. This approach will be pursued through the forthcoming country partnership strategy, 2023–2027.
- ADB remains committed to **reinvigorating India's economy to generate more formal jobs, help address climate challenges, and assist lower-income states.**
- ADB operations also promote private sector development, gender empowerment, regional integration, knowledge solutions, and capacity development.
- To date, **ADB has committed 605 public sector loans, grants, and technical assistance totaling \$52.6 billion to India.**
- Cumulative loan and grant disbursements to India **amount to \$40.71 billion.** These were financed **by regular ordinary capital resources, and other special funds.** ADB's sovereign portfolio comprises **66 loans totaling \$15.4 billion.**
- In 2022, ADB committed **over \$1.8 billion in sovereign loans to India.**
- ADB extended **\$15.64 million in technical assistance and \$16.41 million in grants under the sovereign portfolio.**
- The bank continued to **support India's metro network expansion through a \$350-million loan** to improve connectivity in the city of Chennai while enabling transit-oriented development and first- and last-mile connectivity.
- ADB committed a **\$350-million loan to help develop Maharashtra's road network in 10 lagging districts,** improve rural communities' access to health and social services, and reduce transportation costs for small businesses.
- Other projects included a **\$300-million loan for upgrading state highways and major district roads in Assam** and a \$110-million loan to upgrade state highways in Rajasthan.
- To support government reforms in India's logistics sector, **ADB approved a \$250-million loan to develop an institutional and policy framework for incentivizing private sector participation in multimodal logistics projects.**
- The bank also provided a **\$220-million loan to Tripura to improve energy security and supply quality, and to build the sector's resilience.**
- ADB committed a **\$125-million loan to provide climate-resilient sewage collection, drainage systems, and water supply in Tamil Nadu.**
- A **\$96-million loan will help provide safe, sustainable, and inclusive rural water supply and sanitation services in Himachal Pradesh.**
- ADB also committed funds to **help plan and design projects for developing the infrastructure of industrial estates in Tripura, and for urban infrastructure development in Nagaland and Tripura's capital, Agartala.**

- **Non-sovereign operations:** Total outstanding balances and undisbursed commitments of ADB's nonsovereign transactions in India as of 31 December 2022 was \$2.84 billion representing 22.2% of ADB's total private sector portfolio.

In 2022, ADB signed six nonsovereign transactions in India with a total commitment of \$208.1 million along with three regional transactions, with India allocations, totaling \$185 million.

Further, ADB's Microfinance Risk Participation and Guarantee Program supported new loans of \$226 million. Some of the notable deals involve the electric mobility space, water sector, agribusiness sector, crop nutrition, and transport finance.

### Operational challenges

- ADB operations in India **cover more than 20 states**, requiring a differentiated approach across and within lower- and higher-income states. Support to lower-income states focuses on basic infrastructure and services to accelerate inclusive growth.
- Support to higher-income states includes **transformative projects marked by replicable innovation and good practices**. Because of the spatial peculiarities across regions, ADB programs need to be calibrated to location-specific needs.
- ADB has also been requested to **support India's medium- to long-term recovery** by enhancing assistance to micro, small, and medium-sized enterprises, and to health, education, and social protection systems in the post-pandemic era.
- ADB support to **boost government infrastructure financing through non-sovereign operations** will depend on the volume and type of private sector investment opportunities available.

### Future Directions

- ADB's program for India from **2023 to 2025 supports the country's priorities for robust, climate resilient, and inclusive growth, aligned with ADB's Strategy 2030** and the forthcoming country partnership strategy, 2023–2027.
- To help achieve greater inclusiveness, ADB will have to support India in strengthening its health care and social protection systems, and assist small- and medium-sized enterprises to bounce back from the pandemic.
- ADB will have to **increase investments in education, finance, and public sector management**.
- Support should be provided to help India meet **its ambitious climate-action commitments**.
- ADB should strategically engage with higher- and lower-income states through a differentiated approach.

- Other areas of support will include promoting **gender equity, strengthening governance and institutions, increasing digitalization, and promoting regional cooperation and integration.**
- Innovative upstream **strategic studies and financing approaches** should be pursued to **boost private sector investment.**

## G-20 RESEARCH AND INNOVATION INITIATIVE (RIIG) SUMMIT

### In News:

The Secretary, Department of Science and Technology, Dr. Srivari Chandrasekhar welcomed delegates at **the G-20 Research and Innovation Initiative (RIIG) Summit** which started off in Mumbai on July 4, 2023.

### Analysis of Background:

#### Research and Innovation Initiative Gathering (RIIG) Summit:

#### Location:

- The G-20 Research and Innovation Initiative Gathering (RIIG) Summit took place in Mumbai and it was chaired by the Secretary, Department of Science and Technology (DST).

#### Participants

- A total of about 107 foreign delegates, including Research Ministers from 29 G-20 members, invited guest countries and international organizations, participated in the meeting.

#### Theme

- India has taken forward the Research and Innovation Initiative (RIIG) during its Presidency in 2023 under the theme ***“Research and Innovation for Equitable Society”***.

#### Thematic Conferences

- A total of 5 RIIG meetings were hosted by India this year.
- The RIIG Inception Meeting was held at Kolkata, followed by four thematic conferences in:
  - Ranchi on the theme: **‘Materials for Sustainable Energy’**;
  - Dibrugarh on the theme: **‘Circular Bioeconomy’**,
  - Dharamshala, on the theme: **‘Eco-Innovations for Energy Transition’**; and in
  - Diu, on the theme **‘Sustainable Blue-economy’**.



## The Meeting

- The meeting **discussed and negotiated the draft Outcome document at the RIIG Summit.**
- It marks the culmination of the G-20 science engagements that took place through series of meetings in different parts of India during India's G-20 Presidency in 2023.

## G-20

- The G-20 is an **intergovernmental forum comprising 19 countries and the European Union (EU)** that works to address major issues related to the global economy, such as international financial stability, climate change mitigation and sustainable development. It consists of most of the **world's largest economies, including both industrialized and developing nations.**

## SHANGHAI COOPERATION ORGANIZATION (SCO)

### In News;

Chinese President Xi Jinping will attend next week's virtual summit of the **Shanghai Cooperation Organisation (SCO)** being hosted by India.

### Analysis of Background:

#### Shanghai Cooperation Organization (SCO)

- The Shanghai Cooperation Organization(SCO) is an **intergovernmental organization** founded in Shanghai on 15 June 2001.

#### Member States

- SCO currently comprises **eight Member States** -China, India, Kazakhstan, Kyrgyzstan, Russia, Pakistan, Tajikistan and Uzbekistan).
- It has **Four Observer States** interested in acceding to full membership - Afghanistan, Belarus, Iran, and Mongolia.
- It has **six "Dialogue Partners"** - Armenia, Azerbaijan, Cambodia, Nepal, Sri Lanka and Turkey.
- In 2021, the decision was made to start the accession process of Iran to the SCO as a full member, and Egypt, Qatar as well as Saudi Arabia became dialogue partners.

### Focus Area

- Since its inception in 2001, the SCO has mainly focused on **regional security issues**, its fight against **regional terrorism, ethnic separatism and religious extremism**. To date, the SCO's priorities also include **regional development**.

### Observer

- The SCO has been an observer in the **UN General Assembly since 2005**.

### Partnerships

- SCO Secretariat has also established partnerships with the UN Educational, Scientific and Cultural Organization (UNESCO), the World Tourism Organization (UNWTO), and the International Organization for Migration (IOM), in addition to its ongoing cooperation with the UN Office on Drugs and Crime (UNODC), United Nations Economic and Social Commission for Asia and the Pacific (ESCAP) and the UN Office on Counter-Terrorism (UNOCT).
- The Department of Political and Peacebuilding Affairs (DPPA), as well as UNRCCA (United Nations Centre for Preventive Diplomacy for Central Asia) maintain regular contacts with the SCO officials.
- The cooperation activities focus on security developments in the region and key issues related to counterterrorism and prevention of violent extremism.
- Since 2017, DPPA has deployed a Liaison Officer to the SCO in Beijing.

### SCO RATS

- The Regional Anti-Terrorist Structure (RATS), **headquartered in Tashkent, Uzbekistan**, is a **permanent organ of the SCO**, which serves to promote cooperation of member states against the three evils of terrorism, separatism and extremism.

### Future of SCO

- The future of SCO would depend firstly on **how it addresses the conflicting interests of member states** and other regional and extra regional players in the region.
- Secondly, how cooperation and mutually advantageous equality would serve as the basis of the relations among member states and states with observer status.
- Thirdly, the question of expanding the organization would determine the scope and role of the SCO.
- Fourthly, the SCO's success in economic co-operation would be conditioned by the fear of smaller SCO members, in that smaller states might fear that their resources would become vulnerable to exploitation by larger members.

- The geographical configuration and political composition of the SCO reveal the asymmetry among member states. It consists of two major powers and four small states of Central Asia.
- If the SCO has to emerge as a successful regional organization, it should develop into **an effective multilateral organization to address security and economic challenges** in the region on the basis of mutually beneficial terms among its members.
- The future of SCO would depend firstly on how it addresses the conflicting interests of member states and other regional and extra regional players in the region.



## INDIA JAPAN RELATIONS

### In News:

Japan has contributed to many revolutions in India, said External Affairs Minister S Jaishankar during the **India Japan Forum** which was also attended by his Japanese counterpart Yoshimasa Hayashi.

### Analysis of Background:

#### History

- The **exchange between Japan and India is said to have begun in the 6th century** when Buddhism was introduced to Japan. Indian culture, filtered through **Buddhism, has had a great impact on Japanese culture**, and this is the source of the Japanese people's sense of closeness to India.
- After **World War II, in 1949**, Indian Prime Minister Jawaharlal Nehru donated an Indian elephant to the Ueno Zoo in Tokyo. This brought a ray of light into the lives of the Japanese people who still had not recovered from defeat in the war.
- **Japan and India signed a peace treaty and established diplomatic relations on 28th April 1952.** This treaty was one of the first peace treaties Japan signed after World War II.
- Ever since the establishment of diplomatic relations, the two countries have enjoyed cordial relations.
- In the post-World War II period, **India's iron ore helped a great deal Japan's recovery from the devastation.**
- Following Japanese Prime Minister Nobusuke Kishi's visit to India in **1957, Japan started providing yen loans to India in 1958, as the first yen loan aid extended by Japanese government.**

#### Recent Relations

- Prime Minister Yoshiro Mori's visit to India in August 2000 provided the **momentum to strengthen the Japan-India relationship.** Mr. Mori and Prime Minister Atal Bihari Vajpayee decided on the **establishment of a "Global Partnership between Japan and India"**. Since Prime Minister Junichiro Koizumi's visit to India in April 2005, **Japan-India annual summit meetings** have been held in respective capitals.
- When Prime Minister Manmohan Singh visited Japan in December 2006, **the Japan-India relationship was elevated to the "Global and Strategic Partnership"**.
- In September 2014, Prime Minister Narendra Modi paid an official visit to Japan and had a summit meeting with Prime Minister Shinzo Abe. They concurred to **upgrade the bilateral relationship to a "Special Strategic and Global Partnership."**

- In December 2015, Prime Minister Abe paid an official visit to India and had a summit meeting with Prime Minister Narendra Modi. The two Prime Ministers resolved to transform the **Japan-India Special Strategic and Global Partnership into a deep, broad-based and action-oriented partnership**, which reflects a broad convergence of their long-term political, economic and strategic goals. They announced **“Japan and India Vision 2025 Special Strategic and Global Partnership Working Together for Peace and Prosperity of the Indo-Pacific Region and the World”**, a joint statement that would serve as a guidepost for the **“new era in Japan-India relations.”**
- In March 2023, Prime Minister Kishida visited India and held **Japan-India Summit Meeting** with Prime Minister Modi. The two leaders confirmed their commitment to discuss and work together on various issues in the international community in the lead-up to both the **G7 and G20 summits** and concurred to **further develop Japan-India relations** and work closely toward the **realization of a “Free and Open Indo-Pacific”**.

### Cooperation in Security Fields

- During Prime Minister Singh’s visit to Japan in October 2008, two leaders issued **"the Joint Declaration on Security Cooperation between Japan and India"**.
- There are also various frameworks of security and defense dialogue between Japan and India including **Foreign and Defense Ministerial Meeting (“2+2” meeting), annual Defense Ministerial Dialogue and Coast Guard-to-Coast Guard dialogue**.
- In September 2022, the **second “2+2” meeting was held in Tokyo**.
- On September 9th 2020, the Agreement between the Government of Japan and the Government of the Republic of India Concerning the Reciprocal Provision of Supplies and Services between the Self-Defense Forces of Japan and the Indian Armed Forces (so-called **“Acquisition and Cross-Servicing Agreement” or ACSA**) was signed. ACSA came into force on July 11th, 2021.

### Exercises

- Army -----**DHARMA GUARDIAN**
- Navy -----**JIMEX**
- Air Exercise -----**Shinyuu Maitri**
- Multilateral exercise ----- **La Perouse**-----India, France, Japan and Australia
- Air combat exercise **“Veer Guardian 23”**
- Naval Exercise---**Malabar**- Australia, Japan, USA, and India.

### Economic Relations

- In recent years, the economic relationship between Japan and India has steadily expanded and deepened. The volume of trade between the two countries has increased.
- **India was the 18th largest trading partner for Japan, and Japan was the 13th largest trading partner for India in 2021.**
- Also, direct investment from Japan to India has been increased, and **Japan was the 5th largest investor for India in FY2021.**
- Japanese private-sector interest in India is rising, and, currently, **about 1,439 Japanese companies have branches in India in 2021.**
- At recent summit meetings, The two leaders confirmed that they will promote active investment by Japanese companies in India in light of the **5-trillion-yen target of public and private investment and financing from Japan to India over the next 5 years**, which was set on the occasion of Prime Minister Kishida's visit to India in March 2022.
- It also concurs on the importance of the Indian side further improving the business environment for smooth operations of Japanese companies in India, including cooperation for the diversification and enhancement of supply chains through the **"India-Japan Industrial Competitiveness Partnership"**.
- The two leaders also concurred to promote the **"Clean Energy Partnership"** announced during Prime Minister Kishida's visit to India in March 2022 to achieve carbon neutrality and ensure energy security at the global level, and to promote concrete cooperation in the areas of hydrogen, ammonia and LNG through the **"Japan-India Energy Ministerial Dialogue"** and other initiatives.

### **Economic Assistance**

- India has been the **largest recipient of Japanese ODA loans for the past decades.** Delhi Metro is one of the most successful examples of Japanese cooperation through the utilization of ODA.
- Japan continues to cooperate in supporting strategic connectivity linking South Asia to Southeast Asia through the synergy between **"Act East" policy and "Partnership for Quality Infrastructure."**
- Besides, Japan and India had committed to building High-Speed Railway in India by introducing Japan's Shinkansen System, which is the flagship project of Japan-India relations.
  - Loan: 567.49 billion yen (FY 2022)
  - Grants: 4.67 billion yen (FY 2021)
  - Technical Cooperation: 8.5 billion yen (FY 2021)

## **Cultural Relations**

- The year **2012** marked the **60th Anniversary of the Establishment of Diplomatic Relations between Japan and India**. Various cultural events took place both in Japan and in India to promote mutual understanding between the two countries, under the theme of **“Resurgent Japan, Vibrant India: New Perspectives, New Exchanges.”**
- During the visit of Prime Minister Modi to Japan in November 2016, the two Prime **Ministers declared the year 2017 the Year of Japan-India Friendly Exchanges** to further enhance people-to-people exchanges between Japan and India.
- The year 2017 also marked the **60th anniversary since the Cultural Agreement came into force in 1957**. Various commemorating events took place in both countries.
- In 2022, Japan celebrates anniversaries with the seven countries of Southwest Asia, including India. **Japan designated 2022 as “Japan-Southwest Asia Exchange Year”** with the aim of taking Japan’s relations with the countries of Southwest Asia to new heights.

## **Number of Residents**

- Number of Japanese nationals residing in India: 8,145 (as of October, 2022)
- Number of Indian nationals residing in Japan: 40,752 (as of June, 2022)

## **Bilateral Treaties and Agreements**

- Treaty of Peace (1952)
- Agreement for Air Service (1956)
- Cultural Agreement (1957)
- Agreement of Commerce (1958)
- Convention for the Avoidance of Double Taxation (1960)
- Agreement on Cooperation in the field of Science and Technology (1985)
- Japan-India Comprehensive Economic Partnership Agreement (2011)
- Agreement between the Government of Japan and the Government of the Republic of India Concerning the Transfer of Defence Equipment and Technology (2015)
- Agreement between the Government of Japan and the Government of the Republic of India Concerning Security Measures for the Protection of Classified Military Information (2015)
- Agreement between Japan and the Republic of India on Social Security (2016)
- Agreement between the Government of Japan and the Government of the Republic of India for Cooperation in the Peaceful Uses of Nuclear Energy (2017)
- Agreement between the Government of Japan and the Government of the Republic of India Concerning Reciprocal Provision of Supplies and Services between the Self-Defense Forces of Japan and the Indian Armed Forces (2021).

## **Commitment to a Free and Open Indo-Pacific**

- In the backdrop of China's rising military manoeuvring in the Indo-Pacific, India and Japan have asserted their steadfast commitment to a free and open Indo-Pacific that is inclusive and resilient.
- **Japan's Free and Open Indo-Pacific (FOIP) strategy** and **India's Indo-Pacific Oceans Initiative (IPOI)** have provided the framework for the two countries to deepen their strategic partnership and cooperation in the region.
- The **Japan-India Maritime Exercise (JIMEX) started off in 2012** and had its 10th edition in September 2022. The event consolidated the **high degree of interoperability** that exists between maritime forces of the two countries, through complex exercises in the surface, sub-surface and air domains.
- In 2015, the **Japan Maritime Self-Defense Force (JMSDF)** became a permanent participant in the U.S.-India Malabar exercise, a step up from its previous sporadic involvement. To discuss issues of mutual interest in maritime domain and identify ways of furthering maritime cooperation, the Maritime Affairs Dialogue was instituted.
- The sixth round of this Dialogue took place in virtual format in 2021. The two nations also, recently, concluded the inaugural edition of the bilateral air **exercise 'Veer Guardian 2023'** between the Indian Air Force (IAF) and Japan Air Self Defence Force (JASDF).
- Several agreements enable the exchange of supplies and services between the armed forces of the two countries, and the recently signed **Acquisition and Cross-Servicing Agreement (ACSA) will further the interoperability of the Indian and Japanese navy.**
- The **2022 National Defense Strategy** expresses Tokyo's intention to "deepen bilateral and multilateral defence exchanges including service-to-service exchange in a broad range of fields including maritime security and cybersecurity, while promoting training and exercises as well as defence equipment and technology cooperation."
- A critical aspect of the "**Japan and India Vision 2025**", that seeks synergy between India's 'Act East' policy and Japan's 'Partnership for Quality Infrastructure,' is the intention expressed by the two nations to promote quality infrastructure to augment connectivity in the region. During his visit to India in March 2022, Japanese Prime Minister Kishida announced an investment target of 5 trillion Yen (approximately \$37 billion) in India over the next five years.

## **Defence Technology: Innovation and Collaboration**

- As two of Asia's most significant economies, Japan and India have made strategic investments in their respective military sectors. While India ranks as the fourth-largest spender on military expenditure globally, Japan follows at tenth place.



- Japan has committed to boosting its military spending over the next few years, highlighting its dedication to expanding its military capabilities.
- In a show of collaboration, **both countries have identified several joint projects in various dual-use technology areas, such as UAVs, robotics, and intelligence systems.**
- Additionally, cybersecurity cooperation between Japan and India, particularly concerning 5G technologies, has been a topic of discussion, underlining the importance of cooperation between these two powerful nations.

### **Multilateralism and the Global Role**

- India and Japan's growing defence ties in the Indo-Pacific are grounded in a shared commitment to multilateralism and strengthening the rules-based order.
- Both countries have been **active members of forums such as the Quad and ASEAN**, and have sought to build coalitions with like-minded countries to **maintain regional stability and counter China's assertiveness in the region.**
- In a joint statement, the Quad announced the formation of the **Indo-Pacific Maritime Domain Awareness (IPMDA)** to strengthen maritime security cooperation and enhance situational awareness in the Indo-Pacific region.
- As two of the largest democracies in Asia, India and Japan recognize their global role in shaping the strategic environment of the Indo-Pacific.
- At the helm of the G20 and the G7, India and Japan, respectively, seek to pursue the interests of the Indo-Pacific region.
- At a recent meeting, the G7 Ministers reiterated their strong endorsement for ASEAN centrality and unity, and their dedication to fostering collaboration in accordance with the ASEAN Outlook on the Indo-Pacific.
- Given this context, **India-Japan partnership has the potential to shape the regional security architecture and contribute to the maintenance of a free and inclusive Indo-Pacific.** Japan's recent announcement of its investment of a staggering \$75 billion to assist the economies in the Indo-Pacific region by 2030 is **a significant step aimed at promoting greater economic integration and cooperation between countries.**

### **CHEMICAL WEAPONS CONVENTION (CWC)**

#### **In News:**

The United States has destroyed the last of its declared chemical weapons stockpile, a milestone in the history of warfare dating back to World War I.

## **Analysis of Background:**

### **Chemical Weapons Convention (CWC):**

- The Chemical Weapons Convention (CWC) is a **multilateral treaty that bans chemical weapons and requires their destruction within a specified period of time.**
- The treaty is of unlimited duration and is **far more comprehensive** than the 1925 Geneva Protocol, which outlaws the use but not the possession of chemical weapons.

### **Genesis and Commencement**

- CWC negotiations **started in 1980** at the UN Conference on Disarmament.
- The convention opened for signature on January 13, 1993, and **entered into force on April 29, 1997.**

### **Implementation**

- The CWC is **implemented by the Organization for the Prohibition of Chemical Weapons (OPCW)**, which is headquartered in The Hague.

### **Mechanism of Implementation**

- The OPCW receives states-parties declarations detailing chemical weapons-related activities or materials and relevant industrial activities.
- After receiving declarations, the OPCW inspects and monitors states-parties' facilities and activities that are relevant to the convention, to ensure compliance.

### **Members and Parties**

- The CWC is open to all nations and currently has 193 states-parties.
- Israel has signed but has yet to ratify the convention.
- Three states have neither signed nor ratified the convention (Egypt, North Korea, and South Sudan).

### **Prohibitions**

The Chemical Weapons Convention prohibits:

- Developing, producing, acquiring, stockpiling, or retaining chemical weapons.
- The direct or indirect transfer of chemical weapons.
- Chemical weapons use or military preparation for use.
- Assisting, encouraging, or inducing other states to engage in CWC-prohibited activity.
- The use of riot control agents "as a method of warfare."

## Declaration Requirements

- The CWC requires states-parties to declare in writing to the OPCW their **chemical weapons stockpiles, chemical weapons production facilities (CWPFs), relevant chemical industry facilities, and other weapons-related information.**
- This **must be done within 30 days of the convention's entry into force for each member state.**

**Chemical Weapons Stockpiles**—States-parties must declare all chemical weapons stockpiles, which are broken down into three categories:

- **Category 1:** chemical weapons based on Schedule 1 chemicals, including VX and sarin.
- **Category 2:** chemical weapons based on non-Schedule 1 chemicals, such as phosgene.
- **Category 3:** chemical weapons including unfilled munitions, devices and equipment designed specifically to employ chemical weapons.

### **Other weapons-related declarations states-parties must make include:**

- Chemical weapons production facilities on their territories since January 1, 1946.
- Facilities (such as laboratories and test sites) designed, constructed, or used primarily for chemical weapons development since January 1, 1946.
- “Old” chemical weapons on their territories (chemical weapons manufactured before 1925 or those produced between 1925 and 1946 that have deteriorated to such an extent that they are no longer useable).
- “Abandoned” chemical weapons (abandoned by another state without consent on or after January 1, 1925).
- Plans for destroying weapons and facilities.
- All transfers or receipts of chemical weapons or chemical weapons-production equipment since January 1, 1946.
- All riot control agents in their possession.

## Chemical Industry

- The CWC requires states-parties to declare chemical industry facilities that produce or use chemicals of concern to the convention.
- These chemicals are grouped into “schedules,” based on the risk they pose to the convention. A facility producing a Schedule 1 chemical is considered a Schedule 1 facility.

1. **Schedule 1 chemicals** and precursors pose a “high risk” to the convention and are rarely used for peaceful purposes. States-parties may not retain these chemicals except in small quantities for research, medical, pharmaceutical, or defensive use. Many Schedule 1 chemicals have been stockpiled as chemical weapons.

2. **Schedule 2 chemicals** are toxic chemicals that pose a “significant risk” to the convention and are precursors to the production of Schedule 1 or Schedule 2 chemicals. These chemicals are not produced in large quantities for commercial or other peaceful purposes.
3. **Schedule 3 chemicals** are usually produced in large quantities for purposes not prohibited by the CWC but still pose a risk to the convention. Some of these chemicals have been stockpiled as chemical weapons.

## TOPIC: ECONOMY

### US FED RATE HIKE

#### In News:

The US Federal Reserve has raised its benchmark lending rate by a quarter percentage point, reaching the highest level since 2001. This is the second rate hike this year, following a pause in June, and it reflects the Fed's confidence in the strength of the US economy and its determination to keep inflation under control.

#### Analysis of Background:

- The Fed's key lending rate, also known as the federal funds rate, is the interest rate that banks charge each other for overnight loans. It **influences other interest rates in the economy**, such as mortgages, credit cards, car loans, and business loans.
- A higher federal funds rate means that **borrowing money becomes more expensive, which can affect consumer spending, business investment, and economic growth**.
- The Fed's main goal is to maintain price stability, which means keeping inflation low and stable. The Fed has a 2% inflation target, which it considers consistent with healthy economic growth and employment. However, in recent months, **inflation has been running above the Fed's target, mainly due to higher energy and food prices**.
- The Fed believes that these factors are transitory and that inflation will moderate in the coming months. However, it also acknowledges that there are some risks that inflation could persist or accelerate, such as supply chain disruptions, labour shortages, or rising wages.
- By raising the federal funds rate, the **Fed is trying to slow down the pace of economic activity and reduce the pressure on prices**. The Fed hopes that by tightening monetary policy gradually and cautiously, it can achieve a soft landing for the economy, where growth remains solid but inflation falls back to the target. The Fed also wants to avoid creating asset bubbles or excessive leverage in the financial system, which could pose risks to financial stability and economic growth.

## Key implications

### Consumer Borrowing

- With the federal funds rate being the benchmark for many other interest rates, borrowing costs for consumers can increase. This means that **mortgages, car loans, credit card interest rates, and other forms of personal borrowing may become more expensive**. As a result, **consumers might cut back on spending**, particularly on big-ticket items that often require financing, such as homes and cars.

### Business Investment

- Higher interest rates can also impact business investment decisions. When borrowing becomes more costly, businesses may reduce their capital expenditures and expansion plans. **This could lead to a slowdown in economic activity and potentially impact job creation.**

### Inflation Control

- The Fed's rate hike is aimed at controlling inflation. By making borrowing more expensive, the central bank hopes to moderate consumer spending and overall economic growth, which, in turn, **can help ease inflationary pressures.**

### Savings and Investments

- On the flip side, higher interest rates can be beneficial for savers and investors. **Savings accounts, certificates of deposit (CDs), and bonds may offer higher returns**, leading to increased income for those who rely on these investments

### Economic Growth

- The rate hike is a signal of the Fed's confidence in the strength of the economy. However, if the central bank raises rates too quickly or aggressively, it **could potentially slow down economic growth and lead to a downturn.**

### Market Reactions

- Financial markets tend to react to changes in interest rates. Following the rate hike announcement, the US dollar strengthened, and US Treasury yields rose slightly. The stock markets can also be affected, with **some sectors benefiting from higher rates while others may suffer due to lower growth expectations.**

## Housing Market

- The housing market is particularly sensitive to changes in interest rates. Higher mortgage rates can reduce affordability for potential homebuyers, leading to a slowdown in home sales and a cooling of the real estate market.

## Inflation and Prices

- One of the Fed's key mandates is to maintain price stability. A rate hike is often implemented to combat rising inflation. By making borrowing more expensive, the Fed aims to reduce spending and keep price levels in check.

## Exchange Rates

- Higher interest rates in the US can attract foreign investors seeking better returns on their investments. This **increased demand for US assets can strengthen** the US dollar relative to other currencies, impacting international trade and competitiveness.

## Consumer Confidence and Sentiment

- Rate hikes can influence consumer confidence and sentiment. When interest rates rise, individuals might become more cautious about spending and borrowing, which can impact overall economic sentiment.

## Government Debt

- Higher interest rates **can increase the cost of servicing government debt**, potentially putting pressure on government budgets.

## International Impact

- The Federal Reserve's actions and interest rate decisions can have spillover effects on the global economy. Changes in US interest rates can influence capital flows to and from other countries, impacting their economies and financial markets.

## Impact of a Federal Reserve rate hike on India

### Capital Flows

- A rate hike by the Federal Reserve **can lead to a tightening of global financial conditions**. As the US interest rates rise, investors may find US assets more attractive, leading to capital outflows from emerging markets like India. This can **put pressure on the Indian rupee and lead to currency depreciation**

## Foreign Investment

- India is a recipient of foreign direct investment (FDI) and foreign institutional investment (FII). Higher US interest rates can reduce the appetite for riskier assets in emerging markets, including India, as investors seek better returns in the US. **This could result in reduced foreign investment in Indian stocks and bonds.**

## Stock Market

- Indian equity markets may experience increased volatility and potential corrections as foreign investors adjust their portfolios in response to changing global conditions and raising US interest rates.

## Inflation and Import Costs

- **A weaker Indian rupee can increase the cost of imports, leading to imported inflation.** India is a major importer of commodities like oil, and a depreciating currency can raise the cost of oil imports, which may have a cascading effect on inflation.

## Interest Rates

- In response to potential currency depreciation and inflationary pressures, the Reserve Bank of India (RBI) may take its monetary policy actions. It could raise its benchmark interest rates to combat inflation and stabilize the currency.

## Current Account Deficit

- India's current account deficit (CAD) may widen as the cost of imports rises due to currency depreciation. A wider CAD could put additional pressure on the rupee and create external vulnerabilities.

## Economic Growth

- A rising interest rate environment in the US may lead to a slowdown in global economic growth, which **can indirectly impact India's export-oriented sectors.**

## Commodity Prices

- India is a net importer of commodities, and a global slowdown resulting from higher US interest rates can lead to reduced demand for commodities, potentially impacting their prices.

## Government Finances

- A depreciating rupee can increase the cost of servicing India's foreign-denominated debt, potentially putting pressure on the government's finances.

## Market Sentiment

- Changes in US interest rates can influence market sentiment and investor confidence in India. Uncertainty in global financial markets may lead to cautiousness among domestic investors and businesses.

It's important to note that India's economic fundamentals, policy responses, and global factors all play a role in determining the actual impact of a Federal Reserve rate hike on the country. The Indian government and the RBI may implement measures to mitigate adverse effects and support the economy in response to changing global conditions.

## CIRCULAR ECONOMY COALITION

### In News:

The Union Minister of Environment, Forest and Climate Change launched the Resource Efficiency Circular Economy Industry Coalition (RECEIC). The Minister said that a circular economy model would help shift from the linear “take-make-waste” paradigm and embrace a more sustainable and regenerative approach.

### Analysis of Background:

- The Resource Efficiency Circular Economy Industry Coalition (RECEIC) is a collaborative effort **involving 39 multinational corporations from various sectors**, including steel, FMCG (FastMoving Consumer Goods), and electronics.
- These corporations have **pledged to adopt circular economy principles** to address environmental challenges, particularly those related to waste management, including plastics, microplastics, e-waste, and chemical waste.
- Resource efficiency means using natural resources in a way that **minimizes environmental impacts**, such as greenhouse gas emissions, water consumption, and waste generation.
- The RECEIC is open to any company or organization that shares its vision and mission, and that is willing to commit to its principles and objectives.

### Circular Economy

- The concept of a circular economy has gained prominence in response to the challenges posed by the traditional linear economy, which is based on the "take-make-waste" model.



- In a linear economy, resources are extracted, processed into products, used, and eventually discarded as waste. This linear approach leads to resource depletion, environmental pollution, and waste accumulation.
- The circular economy seeks to **create a closed-loop system where resources are continuously reused, repaired, remanufactured, and recycled, thereby minimizing waste generation and maximizing resource efficiency.**

### Features

- The circular economy focuses on regenerating natural systems, restoring ecosystems, and ensuring a positive impact on the environment.
- The emphasis is on designing products and processes to minimize waste and keep materials in circulation for as long as possible.
- Products are designed for durability, reparability, and upgradability to extend their lifespan.
- The circular economy promotes closed-loop systems, where materials are continuously circulated through reuse, recycling, and remanufacturing.
- Optimizing the use of resources to reduce inputs and minimize environmental impact.

### Significance

- A circular economy **promotes responsible resource management**, reducing the burden on natural resources and ecosystems.
- By minimizing waste and pollution, the circular economy contributes to cleaner and healthier environments.
- Adopting circular business models can lead to new economic opportunities and job creation in the recycling, remanufacturing, and repair industries.
- A circular economy can help lower greenhouse gas emissions by reducing the demand for new raw materials and reducing energy consumption.

### Steps Taken by India

- **Policy initiatives:** The government has introduced policy measures and guidelines to promote waste management, recycling, and sustainable consumption.
- **Extended Producer Responsibility (EPR):** India has implemented EPR regulations for various products, making producers accountable for their waste management.
- **Swachh Bharat Abhiyan:** The Clean India Mission focuses on improving waste management and sanitation infrastructure, promoting a cleaner and more sustainable environment.

- **Plastic waste management:** India has been actively working on managing plastic waste through various initiatives, including plastic waste recycling programs.

### Challenges

- **Behavioural change:** Transitioning to a circular economy requires changing consumer behaviour and business practices, which can be challenging.
- **Lack of infrastructure:** Insufficient infrastructure for recycling, remanufacturing, and resource recovery can hinder circular economy implementation.
- **Market barriers:** Some circular products and services face market barriers, such as higher initial costs or limited demand.
- **Informal sector involvement:** The informal waste sector plays a significant role in recycling, but it also faces challenges related to health, safety, and working conditions.
- **Global coordination:** As resources and materials often move across borders, achieving a truly circular economy requires global collaboration and coordination.

## GIFT NIFTY

### In News:

The launch of GIFT NIFTY, formerly known as SGX NIFTY, marked a new milestone in the collaboration between India and Singapore's capital markets. The product, which is based on the NIFTY 50 index of the National Stock Exchange (NSE), began trading at the Gujarat International Finance Tec-City (GIFT City) on 3rd July, attracting more than 30,000 trades in one session.

### Analysis of Background:

- This is the **first cross-border initiative that connects the two financial hubs and offers investors access to both markets.** The deal between Singapore Exchange (SGX) and National Stock Exchange (NSE) is based on a five-year agreement that splits the revenue from the product depending on the source of business.
- **For transactions originating from Singapore,** SGX will receive 75% of the revenue, while NSE will get 25% cent.
- **For transactions originating from the International Financial Service Centre (IFSC) at GIFT City,** NSE will retain 75% of the revenue, while SGX will get 25%. Once a certain volume threshold is reached, the revenue sharing will become 50:50 for both parties.

## GIFT NIFTY

- GIFT NIFTY is the first cross-border initiative in connecting India and Singapore's capital markets. It is a new product that allows investors to trade futures and options contracts

on the NIFTY 50 Index, which is the benchmark index of the National Stock Exchange of India (NSE), on the Singapore Exchange (SGX).

- The **GIFT NIFTY stands for Gujarat International Finance Tec-City (GIFT) NIFTY, as the contracts are cleared and settled at the International Financial Services Centre (IFSC) in GIFT City, Gujarat, India.**
  - The IFSC is a special economic zone that offers various incentives and benefits to participants, such as lower taxes, relaxed regulations, and access to global markets.
- It is supported by the regulatory authorities of both countries, namely the Securities and Exchange Board of India (SEBI) and the Monetary Authority of Singapore (MAS).
- The GIFT NIFTY started trading on July 3, 2023 and has received positive feedback from market participants.

### Objectives

- To provide more opportunities and flexibility for investors who want to gain exposure to the Indian equity market, which is one of the fastest-growing and most dynamic markets in the world.
- Enhances the liquidity and depth of the NIFTY 50 Index, which reflects the performance of the 50 largest and most liquid companies listed on the NSE.

### GIFT CITY

- Gift City, or Gujarat International Finance Tec-City, aims to create a world-class financial hub in Gujarat.
- It is a planned smart city that will offer state-of-the-art facilities and services for various financial activities, such as banking, insurance, asset management, capital markets, and fintech.
- The city will have a **special economic zone (SEZ) status**, which will allow it to enjoy tax benefits, relaxed regulations, and simplified procedures.
- The city will also have high-speed connectivity, a green and sustainable environment, and a vibrant social and cultural life.
- The vision of Gift City is to attract domestic and international investors, businesses, and professionals to set up their operations in the city and leverage its competitive advantages.
- The city will also provide employment opportunities for the local population and boost the economic growth of the region.

## **GIFT NIFTY offers several advantages to investors**

### **Longer trading hours**

- The GIFT NIFTY contracts are available for trading from 9:00 am to 11:55 pm Singapore time (6:30 am to 9:25 pm India time), which covers both the Indian and Singapore market hours, as well as some of the European and US market hours.

### **Lower costs**

- The GIFT NIFTY contracts are denominated in US dollars, which reduces the currency risk and conversion costs for international investors. The GIFT NIFTY contracts also have lower transaction fees and margin requirements than the existing NIFTY 50 contracts traded on the NSE.

### **Higher leverage**

- The GIFT NIFTY contracts have a smaller contract size than the existing NIFTY 50 contracts traded on the NSE, which allows investors to trade with higher leverage and lower capital outlay.

### **Greater diversification**

- The GIFT NIFTY contracts enable investors to diversify their portfolios across different markets and asset classes, as well as hedge their exposure to the Indian equity market.

## **AT-1 BOND**

### **In News:**

State Bank of India (SBI), the country's largest lender, recently issued additional tier-1 (AT-1) bonds worth Rs 10,000 crore at a coupon rate of 8.1%. However, the issue received a lukewarm response from investors, as only Rs 3,100 crore worth of bonds were subscribed.

### **Analysis of Background:**

- AT-1 bonds are a **type of perpetual debt instrument that banks issue to shore up their capital base**. They have no maturity date and can be called back by the issuer after a specified period. It carries higher interest rates than regular bonds, as they are riskier for investors.
- In case of a bank's failure or breach of certain capital ratios, the AT-1 bonds can be written off or converted into equity at the discretion of the Reserve Bank of India.

### **Additional tier-1 (AT-1) bond**

- An additional tier-1 (AT-1) bond is a type of debt instrument that banks issue to raise capital. It is also known as a perpetual bond because it has no fixed maturity date and can be redeemed only at the discretion of the issuer. AT-1 bonds are considered to be hybrid securities because they have some features of both equity and debt.

### **Why is it important for Banks?**

- AT-1 bonds are important for banks because **they help them meet the Basel III norms, which are global standards for banking regulation.**
- **Basel III requires banks to maintain a minimum capital adequacy ratio (CAR),** which is the ratio of their capital to their risk-weighted assets. Capital is divided into three tiers: tier-1, tier-2 and tier-3.
  - Tier-1 capital is the highest quality and most liquid form of capital, consisting of common equity and retained earnings.
  - Tier-2 capital is the second-highest quality and less liquid form of capital, consisting of subordinated debt and preference shares.
  - Tier-3 capital is the lowest quality and least liquid form of capital, consisting of short-term subordinated debt.
- AT-1 bonds are part of tier-1 capital, but they are not as good as common equity, because they have lower priority in case of liquidation and they do not have voting rights. However, they are better than tier-2 capital, because they have higher interest rates and they can absorb losses on a going-concern basis.
  - This means that if the bank's CAR falls below a certain threshold, the issuer can either write off the principal amount of the AT-1 bonds or convert them into equity. This way, the bank can avoid insolvency and continue its operations.

### **Some of these features are:**

#### **No maturity date**

AT-1 bonds do not have a fixed maturity date, which means that they can be redeemed only at the option of the issuer. The issuer can also call back the bonds after a certain period, usually five years, but this is not mandatory.

#### **High-interest rate**

AT-1 bonds offer higher interest rates than other debt instruments because they carry higher risks for investors. The interest rate is usually linked to a benchmark rate, such as the repo rate or the government bond yield, plus a spread that reflects the credit risk of the issuer.

### **Interest payment discretion**

The issuer has the discretion to pay or skip the interest payments on AT-1 bonds, depending on its profitability and capital position. If the issuer skips an interest payment, it does not constitute a default, but it affects its credit rating and reputation.

### **Loss absorption**

AT-1 bonds have a loss absorption mechanism that allows the issuer to either write off the principal amount or convert it into equity if its CAR falls below a certain level. The loss absorption mechanism can be either automatic or discretionary, depending on the terms and conditions of the bond.

### **Subordination**

AT-1 bonds are subordinated to all other liabilities of the issuer, except for equity. This means that in case of liquidation, they will be paid only after all other creditors are paid.

### **Significances**

#### **For banks**

AT-1 bonds help banks raise capital without diluting their equity or affecting their return on equity (ROE). They also help banks meet the Basel III norms and improve their CAR. They also provide flexibility to banks in managing their capital structure and interest payments.

#### **For investors**

AT-1 bonds offer higher returns than other debt instruments, especially in a low-interest rate environment. They also provide diversification to investors' portfolios and exposure to the banking sector. They also benefit from tax advantages, as they are treated as equity for tax purposes.

### **Challenges**

#### **For banks**

AT-1 bonds increase the cost of capital for banks, as they have higher interest rates than other debt instruments. They expose banks to regulatory risks, as they are subject to changes in rules and norms by the regulators. They create reputational risks for banks, as skipping interest payments or triggering loss absorption can damage their image and credibility.

## For investors

AT-1 bonds carry higher risks than other debt instruments, as they have lower priority in case of liquidation and a higher probability of loss absorption. They have lower liquidity than other debt instruments, as they have no maturity date and limited secondary market. They have higher volatility than other debt instruments, as they are sensitive to changes in interest rates, credit ratings and market sentiments.

## POTATO PATENT CASE

### In News:

The Delhi High Court confirmed the decision of the Protection of Plant Varieties and Farmers' Rights Authority (PPVFRA) to cancel the intellectual property protection that was given to PepsiCo India Holdings Pvt. Ltd for a potato variety that it had developed.

### Analysis of Background:

- The court agreed with the **PPVFRA that PepsiCo had failed to disclose the source of the genetic material used in developing the potato variety** and had violated the provisions of the Protection of Plant Varieties and Farmers' Rights Act, 2001.
- The court also noted that **PepsiCo had not complied with the benefit-sharing obligations under the Act and had tried to restrict the rights of farmers** to save, use, exchange or sell the seeds of the potato variety.

### What is the case about?

- The case revolves around **FL 2027, a special kind of potato that has low moisture and sugar levels, making it ideal for producing chips**. Unlike regular potatoes, which lose water and consume more energy during processing, and turn dark when fried due to high sugar content, FL 2027 can retain its quality and colour.
- FL 2027 was created in 1996 by Robert W Hoopes, a potato breeder who worked for Frito-Lay Agricultural Research, a part of PepsiCo Inc. **The company has been using this variety to make potato chips for its Lay's brand, which are grown by around 14,000 contract farmers in India who sell their produce to PepsiCo at pre-determined prices.**
- PepsiCo India Holdings, the Indian arm of the US-based multinational, **obtained a registration certificate for FL 2027 as an "extant variety" on February 1, 2016. This meant that for six years from the date of registration, which could be extended up to 15 years, no one else could grow, sell, market, distribute, import or export this variety without the permission of the breeder.**

## Origin of the issue

- The **PPVFRA, which had previously approved FL 2027, a variety of potatoes developed by PepsiCo India, withdrew its approval** on December 3, 2021. The authority also denied PepsiCo India's request to renew its registration on February 11, 2022.
- PepsiCo India appealed against the decisions in the Delhi High Court. However, the court ruled in favour of the PPVFRA. Justice Navin Chawla, who presided over the case, said he did not find any reason to overturn the PPVFRA's order.

## Why approval was cancelled?

- The reason for cancelling the registration of FL 2027 was **that PepsiCo had violated the rules for applying as a “new variety”**. According to the law, a “new variety” must not have been sold in India more than one year before the date of application.
- PepsiCo had applied for FL 2027 as a “new variety” on February 16, 2012, but it had already sold it in India since December 17, 2009.
- PepsiCo had **not disclosed that FL 2027 was not a new variety at all, but an “extant variety” that had been sold in Chile since 2002**. An “extant variety” only needs to meet the standards of distinctiveness, uniformity and stability, not novelty.
- PepsiCo had provided false information to get the registration certificate for FL 2027, which was against the law.

## What Is a Patent?

- A patent is an exclusive right granted by the Government to the inventor to exclude others to use, make and sell an invention is a specific period of time.
- A patent is also **available for improvement in their previous invention**.
- The main motto to enact patent law is to **encourage inventors to contribute more in their field by awarding them exclusive rights for their inventions**. They are a form of incorporeal right. [*Incorporeal rights are rights to property that can't be seen or touched but are still enforceable by law. Generally, incorporeal rights pertain to intangible property such as copyrights, licenses, rights-of-way, and easements.*]

## Basic tests for any invention to be patentable:

- Firstly, the **creation must be novel, which does not already exist**.
- Second, the **creation must be non-obvious**; it should be a considerable advance over the prior one; a slight modification in technique will not issue the product the right to a patent.



- Third, the **innovation must be beneficial in a legitimate manner**, which means that it must not be exclusively employed in any unlawful work and must be valuable to the world in an honest way.

### Key Pointers

- An invention considered as new if, on the date of filing the application, any **such invention is not known to the public in any form**, i.e. oral, writing, or any other form.
- The patent has a **limited term of 20 years**, which is counted from the date of filing of the patent application.
- A patent is a **territorial right**. Thus it can **only be applied in the country where it has been granted**. Therefore, any legal action against infringement or infringement of patent rights can only be taken in that country. To obtain patent protection in different countries, each country must apply for a patent.
- The **Patent Cooperation Treaty (PCT)** provides a way to file an international patent application in which a patent can be filed through a single patent application in a large number of countries. However, the PCT of a patent remains discretionary of the individual patent office only after the application is filed.
- Patent ownership is transferable. A patent owner has the right to grant a license for use or even sell the ownership of a patent.

### History of Patents in India

- The first step of the patent in India was Act VI of **1856**
- The Act was repealed by Act IX of 1857 as it had been enacted without the approval of the British Crown. Fresh legislation was enacted for granting 'exclusive privileges' was introduced in 1859 as Act XV of 1859. The Act excluded importers from the definition of an inventor. The Act was then amended in 1872, 1883 and 1888.
- The **Indian Patent and Design Act, 1911** repealed all previous acts. The **Patents Act 1970, along with the Patent Rules 1972, came into force on 20 April 1972**, replacing the Indian Patent and Design Act 1911. The Patent Act is basically based on the recommendations of the report Justice Ann. The **Ayyangar Committee headed by Rajagopala Iyengar**.
- Again, **The Patents Act, 1970** was amended by the **Patents (Amendment) Act, 2005** regarding extending product patents in all areas of technology including food, medicine, chemicals and microorganisms.

### What cannot be patented?

1. **Frivolous Inventions:** These are contrary to natural laws. E.g. If any invention runs from the blood of a human and nothing else. This would be contrary to the natural laws and will come under the frivolous inventions. Something always against the establishment of natural laws.
2. **Inventions against public order** or morality or which causes harm to the environment.
3. **Mere discovery of scientific principles** or any discovery. E.G Newton's theories and other principles etc. If these theories will be patentable, how wills students study them if they are not given freely in the public domain.
4. **Mere discovery of a known substance** is not patentable.

### Compulsory License

- Compulsory Licensing is one of the most important aspects of the Indian Patents Act 1970, subject to certain conditions being fulfilled.
- At any period **after the expiry of three years from the date of the sealing of a patent**, any interested party may, subject to the following conditions, apply to the Patent Controller for the issuance of a compulsory patent license.
- **If a person grants permission to use any product, then it would be called a voluntary license.** Any person can ask for a compulsory license. Be it a natural person, artificial person, or a company.

### Grounds for granting of compulsory license

1. The **reasonable demand** shall be there.
2. The product shall not be reasonably in public domain.
3. The patented invention is not worked in the territory of India.

**Example:** If any country makes the vaccine for the COVID 19, the other countries shall be given the vaccine for the same. **Public health is the agenda for the WHO and the TRIPS.** The Government has released a norm that the process of the vaccine shall be granted as a compulsory license for the other countries. PPP is the **triangle of public health, patent, and pandemic and it is a relative issue in this crisis.**

## WORLD INVESTMENT REPORT 2023

### In News:

According to the **World Investment Report 2023 released by the United Nations Conference on Trade and Development (UNCTAD)**, foreign direct investment (FDI) in developing countries in Asia remained at \$662 billion in 2022, accounting for about half of the global inflows.

### **Analysis of Background:**

- The report said that **India and ASEAN were the most resilient destinations, with FDI increases of 10% and 5%, respectively**, and robust growth in project announcements.

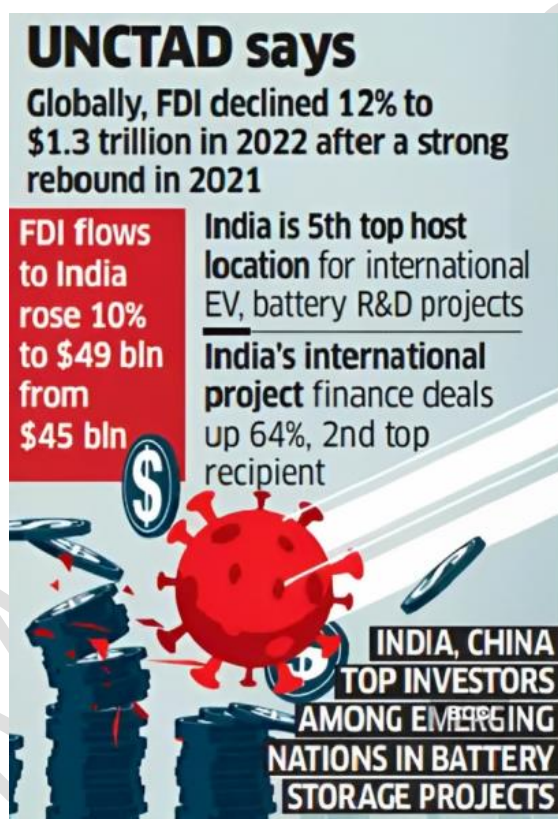
### **Highlights of the Report**

- Developing countries received more FDI than developed economies in 2022.
- **FDI worldwide fell 12% to \$1.3 trillion in 2022** after a sharp recovery in 2021 from the severe impact of the coronavirus pandemic.
- **China, the world's second-largest FDI host country**, registered a 5% rise in FDI.
- FDI in the Gulf region dropped, but the number of project announcements surged by two-thirds.
- The report also said that many smaller developing countries saw no change in FDI inflows, and FDI to the least developed countries (LDCs) decreased.
- The report highlights the **importance of investing in sustainable energy for all**, as most of the international investment in renewable energy has been in developed countries.
- It urges more support for developing countries to close the gap by attracting huge investments in clean energy.
- Developing countries require renewable energy investments of around \$1.7 trillion per year but only received foreign direct investment in clean energy of \$544 billion in 2022.
- The report recommends **reducing the risk of energy transition investment in developing countries** through loans, guarantees, insurance instruments and equity participation from both the public sector - through public-private partnerships and blended finance - and multilateral development banks. It also proposes a "new model of climate-aligned dealmaking".
- According to the report, the investment gap for all the Sustainable Development Goals has risen to more than \$4 trillion per year from \$2.5 trillion in 2015.
- The biggest gaps are in energy, water and transport infrastructure. The increase is due to both underinvestment and additional needs.

### **United Nations Conference on Trade and Development (UNCTAD):**

- The United Nations Conference on Trade and Development (UNCTAD) is a **specialized agency of the United Nations** that deals with issues related to international trade, investment, development and cooperation.
- It was **established in 1964 by the UN General Assembly** as a permanent forum for discussing and addressing development challenges, especially those related to international trade.

- UNCTAD's **main objectives are to help developing countries integrate into the global economy**, to assist them in diversifying their exports, to enhance their productive capacities, and to support their efforts to achieve the Sustainable Development Goals.
- It provides policy advice, technical assistance, and research on various topics such as trade, finance, technology, aid, and transport.
- It convenes a conference every four years, where member states adopt resolutions and set the organization's priorities.
- UNCTAD has 195 member countries and is headquartered in Geneva, Switzerland.
- Reports published by the UNCTAD include the **Trade and Development Report, The Least Developed Countries Report, and the Commodities and Development Report.**



## NANO UREA

### In News:

According to the Union Chemical and Fertilizer Minister, India is aiming to manufacture 44 crore bottles of Nano Urea annually by the year 2025. He said, nine plants will be set up across the country to achieve the target.

### Analysis of Background:

- India is on the verge of a breakthrough in the field of agriculture with the introduction of Nano Urea, a liquid fertilizer that can replace conventional urea and enhance crop

productivity. Nano Urea is a product of the Indian Farmers Fertiliser Cooperative Limited (IFFCO), which has developed a nanotechnology-based process to produce urea molecules in liquid form.

- According to the Union Chemical and Fertilizer Minister, **India is aiming to manufacture 44 crore bottles of Nano Urea annually by the year 2025.** He said, nine plants will be set up across the country to achieve the target. He said, Nano Urea has an 80% urea absorption rate by crops, compared to only 30% in the case of traditional urea.

### **Indian Farmers Fertilizer Cooperative Limited (IFFCO)**

Indian Farmers Fertilizer Cooperative Limited (IFFCO) is a leading cooperative society in India that is owned and operated by Indian Cooperatives.

It was established in 1967 **to provide quality and affordable fertilizers to Indian farmers.**

Since then, it has grown into a diversified conglomerate with interests in various sectors such as General Insurance, Rural Telecom, Agrochemicals, Logistics, Power, Renewable Energy and more.

IFFCO's vision is to empower Indian farmers and enhance their productivity and income through the timely delivery of reliable and sustainable agricultural inputs and services.

IFFCO also strives to contribute to the social and economic development of rural communities and the nation at large.

### **Nano Urea: A Game-Changer for Indian Agriculture**

- India is one of the **largest consumers of chemical fertilizers in the world.** However, excessive and imbalanced use of fertilizers has led to several problems, such as soil degradation, water pollution, greenhouse gas emissions, and reduced crop productivity. Moreover, the country is dependent on imports for meeting its demand for urea, the most widely used nitrogenous fertilizer.
- To address these challenges, the Indian Farmers Fertiliser Cooperative Limited (IFFCO) has developed a novel product called Liquid Nano Urea (LNU), which is claimed to be the world's first nano-fertilizer.
- Nano Urea is a liquid formulation that **contains nanoparticles of urea coated with a biodegradable polymer.** It can be sprayed on the leaves of plants, where it is absorbed and utilized more efficiently than conventional urea.



### Features

- Liquid Nano Urea is made by converting urea into nano-particles and suspending them in water.
- One bottle of Liquid Nano Urea (500 ml) is equivalent to one bag of conventional urea (45 kg) in terms of nitrogen content.
- It **can be sprayed on crops** using a sprayer or a drip irrigation system.
- It has a shelf life of three years and does not require any special storage conditions.

### Significance

- Liquid Nano Urea can **reduce the consumption of conventional urea by 50%, saving farmers money and reducing the subsidy burden on the government.**
- It can enhance crop productivity and quality by providing a uniform and timely supply of nitrogen to plants.
- It can **reduce soil degradation, water pollution and greenhouse gas emissions** caused by excessive use of conventional urea.
- It can contribute to the goals of sustainable agriculture, food security and climate change mitigation.



## **Nano Urea has several advantages over conventional urea**

### **Higher efficiency**

Nano Urea has an efficiency of about 80%, compared to 25% for conventional urea. This means that less amount is required to achieve the same or better results than conventional urea.

### **Lower cost**

Nano Urea is cheaper than conventional urea, both in terms of purchase price and transportation and storage costs. It saves water and energy by reducing the need for frequent irrigation and cultivation.

### **Improved plant nutrition**

Nano Urea enhances plant growth, yield, and quality by providing a balanced and timely nitrogen supply. It prevents lodging, which is the bending over of stems near ground level that reduces harvestability and yield.

### **Reduced environmental impact**

Nano Urea minimizes the leaching of nitrogen into groundwater, which causes eutrophication and contamination. It reduces the emission of nitrous oxide, a potent greenhouse gas that contributes to global warming and climate change.

### **Issues that need to be addressed**

- The regulatory framework and quality standards for nano-fertilizers in India are still evolving and need to be harmonized with international norms.
- The awareness and adoption of Nano Urea among farmers need to be increased through effective extension services and demonstration trials.
- The **safety and efficacy of Nano Urea on different crops and soils need to be evaluated** through rigorous scientific studies and monitoring mechanisms.
- The potential risks and benefits of Nano Urea on human health and the environment need to be assessed and communicated transparently to all stakeholders.

## **E-WAY BILL**

### **In News:**

The 50<sup>th</sup> GST Council meeting approved the issuance of an order to make an e-way bill compulsory for the intra-state movement of gold, gold jewellery and precious stones.

### Analysis of Background:

- The e-way bill is an electronic document that contains details of the goods being transported and the vehicle carrying them. It is mandatory for inter-state movement of goods under the Goods and Services Tax (GST) regime.
- The 50th GST Council meeting approved the issuance of an order to extend the e-way bill requirement to intra-state movement of gold, gold jewellery and precious stones as well.
- **E-Way Bill is an electronic document generated for the movement of goods worth more than Rs. 50,000. But, in the case of gold, gold jewellery and precious stones it must be more than Rs 2 lakh.**
- The decision aims to curb malpractices and ensure proper collection of GST on these items. It will bring uniformity and transparency in the taxation of these goods across the country.
- **The e-way bill for these goods will have a validity period of three days instead of one day.** They will also have a special code that will enable the authorities to verify its authenticity and track its movement.

### Significances

- **For the government**, it will help in preventing tax leakage and enhance revenue collection.
- **For the traders**, it will reduce the compliance burden and harassment by tax officials.
- **For the consumers**, it will ensure the quality and purity of these goods and protect them from fraud.

### Challenges

- The lack of awareness and preparedness among the traders and transporters about the new system and its procedures.
- The **technical glitches and connectivity** issues in generating and verifying the e-way bills online.
- The possibility of misuse and manipulation of the e-way bills by unscrupulous elements.
- The **coordination and cooperation** among the central and state authorities in monitoring and regulating the movement of these goods.

### The government needs to take some steps such as:

- **Conducting extensive outreach and training programs** for the traders and transporters to educate them about the new system and its benefits.



- Strengthening the IT infrastructure and network to ensure the smooth functioning of the e-way bill portal and app.
- Develop robust mechanisms to detect and deter any fraudulent activities involving the e-way bills.
- **Establishing a harmonized and cooperative framework** among the central and state agencies to ensure effective enforcement of the order.

## SOVEREIGN GREEN BOND

### In News:

The Pension Fund Regulatory and Development Authority (PFRDA) is exploring the possibility of allowing pension funds to invest in sovereign green bonds (SGBs), which are issued by the government to finance projects that have environmental benefits.

### Analysis of Background:

- PFRDA Chairman recently said that the regulator is in favour of **pension funds investing in SGBs, as they offer a secure and long-term investment option with positive social impact**. He said that the regulator is awaiting the guidelines from the government on the issuance of SGBs in the second half of the current fiscal year.
  - The concept of green bonds emerged as a financing instrument to support environmentally friendly projects and initiatives.
  - **Sovereign green bonds (SGBs) are issued by governments** to raise funds for projects that have a positive impact on the environment, such as renewable energy, clean transportation, sustainable infrastructure, and conservation efforts.
- Pension funds are among the major institutional investors in the Indian debt market, and have a significant role in mobilising long-term savings for productive purposes. **10 pension fund managers manage funds under the National Pension System (NPS)**, which is a voluntary, defined contribution scheme for employees of central and state governments, corporates and unorganised sectors.

### Significance

- **Promoting Sustainable Projects:** By allowing pension funds to invest in SGBs, there is a direct channelling of funds into environmentally beneficial projects, contributing to the country's sustainable development goals.
- **Greening Pension Portfolios:** Allowing pension funds to include SGBs diversifies their investment portfolios and aligns with the growing demand for socially responsible investments.

- **Government's Environmental Commitment:** Issuing SGBs reflects the government's commitment to addressing environmental challenges and promoting a greener economy.

### Challenges

- **Limited SGB Supply:** The availability of SGBs might be limited as governments issue them selectively and based on specific environmental projects.
- **Pricing and Returns:** The pricing and returns of SGBs might differ from conventional bonds, affecting the risk-reward profile for pension funds.
- **Regulatory Framework:** Pension funds' investment guidelines and regulatory restrictions might need adaptation to accommodate investments in SGBs.

## DPT3 IMMUNISATION

### In News:

India achieved a remarkable milestone in its immunisation programme by reaching an all-time high of 93% coverage for the third dose of diphtheria, pertussis and tetanus (DPT3) vaccine in 2022, according to the latest report by the World Health Organization (WHO).

### Analysis of Background:

- According to the latest estimates by the World Health Organization (WHO) and United Nations Children's Fund (UNICEF), India achieved a remarkable milestone in its immunisation programme in 2022, reaching the highest-ever coverage rate for the third dose of diphtheria, pertussis and tetanus (DPT3) vaccines.
- **India recorded a 93% coverage rate for DPT3 in 2022, up from 85% in 2021** and surpassing the previous record of 91% in 2019, before the pandemic disrupted routine immunisation services.
- The WHO South-East Asia Region showed a strong recovery in its immunisation coverage in 2022, matching the pre-pandemic level of 91% for DPT3, after dropping to 82% in 2021. The region also improved its coverage of the measles vaccine from 86% in 2021 to 92% in 2022.
- These achievements demonstrate the resilience and commitment of the health workers and governments in the region to protect children from vaccine-preventable diseases.

### DPT3 Immunisation

- DPT3 immunisation is the third dose of the vaccine that protects children against three deadly diseases: diphtheria, pertussis (whooping cough) and tetanus. It is one of the essential vaccines that every child should receive as part of the routine immunisation programme.

- Diphtheria, pertussis and tetanus are serious infections that can cause severe complications and even death in children.
  - **Diphtheria is a bacterial infection** that affects the throat and can cause breathing problems, heart failure and paralysis.
  - **Pertussis is a highly contagious respiratory disease** that causes violent coughing fits and can lead to pneumonia, seizures and brain damage.
  - **Tetanus is a bacterial infection** that enters the body through wounds and causes painful muscle spasms, lockjaw and breathing difficulties.
- These diseases are **preventable with vaccines**, but they still pose a threat to millions of children around the world who do not have access to them.
- DPT3 immunisation has a significant impact on reducing the burden of disease and mortality caused by diphtheria, pertussis and tetanus. According to the WHO, between 2000 and 2019, DPT3 immunisation prevented an estimated 50 million deaths from these diseases globally. It also contributes to the achievement of the Sustainable Development Goals (SDGs), especially SDG 3 on ensuring healthy lives and well-being for all.

### Challenges

- Inadequate supply of vaccines and cold chain equipment.
- Lack of trained health workers and community mobilisers.
- Low awareness and demand for immunisation among parents and caregivers.
- Geographical, socio-economic and cultural barriers to accessing immunisation services.
- Conflicts, disasters and emergencies that disrupt health systems and service delivery.

### Steps Taken by the Indian Government to Improve DPT3 Immunisation

- India has made remarkable progress in improving its DPT3 immunisation coverage over the years. According to the WHO and UNICEF estimates for national immunisation coverage for 2022, India recorded an all-time high of 93% DPT3 coverage in 2022.
- India also reduced the number of zero-dose children (those that have not received even the first dose of the DPT vaccine) from 2.9 million in 2021 to 1.4 million in 2022.

### Some of the steps taken by the Indian government to achieve this feat include:

- Strengthening the supply chain management and cold chain infrastructure for vaccine delivery.
- Expanding the reach of immunisation services to remote, rural and urban slum areas.
- Enhancing the capacity and motivation of health workers and frontline workers.

- Launching **innovative campaigns and initiatives such as Mission Indradhanush, Intensified Mission Indradhanush, Indradhanush Plus** and COVID-19 Vaccination Programme.
- Leveraging digital technologies such as the CoWIN platform, eVIN system, m-RNA app and RapidSMS for real-time monitoring and data management.
- Engaging with various stakeholders such as civil society organisations, media, religious leaders, celebrities and influencers to generate awareness and demand for immunisation
- Addressing misinformation, rumours and vaccine hesitancy through effective communication strategies

**Some of the actions that India can take to further improve its DPT3 immunisation coverage include:**

- Ensuring adequate availability and accessibility of vaccines for all eligible children.
- Addressing the remaining gaps and inequities in immunisation coverage across states, districts and socio-demographic groups.
- Strengthening the surveillance and response systems for vaccine-preventable diseases.
- Integrating immunisation with other essential health services and social protection schemes.
- Investing in research and innovation to develop new and improved vaccines and delivery mechanisms.
- Collaborating with regional and global partners to share best practices and learnings.

#### **TOPIC: SCIENCE AND TECH**

#### **NATIONAL SICKLE CELL ANAEMIA ELIMINATION MISSION**

##### **In News:**

The Prime Minister of India recently inaugurated the National Sickle Cell Anaemia Elimination Mission (NSCAEM) in Shahdol, Madhya Pradesh. He also handed over sickle cell genetic status cards to the beneficiaries, which will help them access timely diagnosis and treatment.

##### **Analysis of Background:**

Sickle cell anaemia is a **hereditary blood disorder that affects the red blood cells, causing them to become rigid and sickle-shaped**. This impairs their ability to carry oxygen and leads to various complications such as pain, infections, organ damage and anaemia.

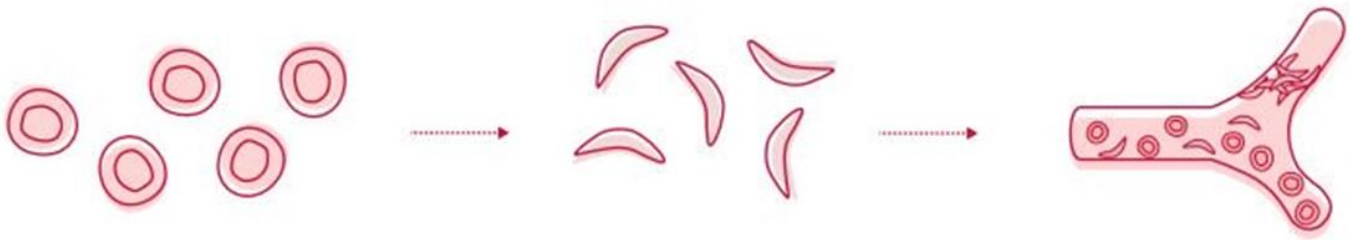
## Sickle Cell Anaemia (SCA)

- Sickle cell anaemia (SCA) is a **genetic disorder** that affects the shape and function of red blood cells (RBCs), which carry oxygen to all parts of the body.
- Normally, RBCs are round and flexible, but in SCA, some of them are shaped like sickles or crescent moons. These sickle cells are rigid, sticky and prone to getting trapped in small blood vessels, blocking blood flow and causing pain, tissue damage and organ failure.
- SCA is one of the most common inherited blood disorders in the world, affecting millions of people, especially those of African, Asian and Mediterranean descent.
- In India, SCA is prevalent in some tribal and non-tribal communities in states like Maharashtra, Madhya Pradesh, Chhattisgarh, Gujarat, Odisha, Jharkhand and Bihar. According to a 2018 report by the Indian Council of Medical Research (ICMR), **about 1.2% of the Indian population has sickle cell trait (SCT), which means they carry one copy of the mutated gene that causes SCA.**
  - People with SCT usually do not have any symptoms, but they can pass on the gene to their children. If both parents have SCT, there is a 25% chance that their child will have SCA.

## Challenges and the way forward

- SCA is a **lifelong condition that has no cure for most people**. However, it can be managed with proper diagnosis, treatment and care.
- **Early screening and counselling can help** identify people with SCT and SCA and provide them with genetic education and reproductive options.
- **Regular blood tests and check-ups** can monitor the health status and complications of people with SCA. Medications such as hydroxyurea, painkillers and antibiotics can help reduce the frequency and severity of pain crises, infections and other complications.
- **Blood transfusions and bone marrow transplants can also be used** in some cases to treat severe anaemia and prevent strokes.
- Lifestyle modifications such as drinking plenty of water, avoiding extreme temperatures and stress, and getting adequate rest and exercise can help improve the quality of life of people with SCA.

# What is Sickle Cell Disease?



## SCD is a blood disorder

Sickle Cell Disease (SCD) is an **inherited blood disorder** that affects red blood cells. Normal red blood cells are round and flexible, which lets them travel through small blood vessels to deliver oxygen to all parts of the body.

## Causing misshapen blood cells

SCD causes red blood cells to **form into a crescent shape**, like a sickle.

## Creating painful complications

The sickle-shaped red blood cells break apart easily, clump together, and stick to the walls of blood vessels, **blocking the flow of blood**, which can cause a range of serious health issues.

## National Sickle Cell Anaemia Elimination Mission

- The NSCAEM aims to eliminate sickle cell anaemia from the country by 2047, the 100th year of India's independence.
- The mission will create awareness among the public and health workers about the prevention and management of sickle cell anaemia.
- It will reduce the morbidity and mortality associated with sickle cell anaemia, and enhances the quality of life of the affected individuals and families.
- It will also contribute to the achievement of the Sustainable Development Goals related to health, education and social inclusion.

## The mission has four main components:

### Screening

All newborns and pregnant women will be screened for sickle cell trait or disease using a simple and rapid test. Those who are found positive will be given a genetic status card, which will help them in accessing appropriate health care and counselling services.

### Prevention

Couples who are carriers of sickle cell trait will be counselled about the risk of having a child with sickle cell disease and the available options for prevention. **Prenatal diagnosis and medical termination of pregnancy will be offered** to those who wish to avoid having an affected child.

## **Treatment**

Patients with sickle cell disease will be provided with free and regular treatment, including blood transfusions, hydroxyurea therapy, pain management and antibiotics. They will also be enrolled in a national registry, which will help in monitoring their health outcomes and quality of life.

## **Research**

The mission will support research and innovation in the field of sickle cell anaemia, such as developing new drugs, vaccines, gene therapy and stem cell therapy. It will also promote awareness and education among the public and health professionals about the disorder.

## **Challenges in its implementation**

### **Lack of awareness and stigma**

Many people are unaware of their sickle cell status or the implications of the disorder. They may also face discrimination and social exclusion due to their condition.

### **Shortage of resources**

The mission requires adequate funding, infrastructure, manpower and blood supply to ensure effective screening, prevention and treatment of sickle cell anaemia.

### **Ethical and legal issues**

The mission involves sensitive issues such as genetic testing, prenatal diagnosis, abortion and gene editing, which may raise ethical and legal concerns among some sections of society

### **Coordination and collaboration**

The mission requires coordination and collaboration among various stakeholders, such as central and state governments, health departments, civil society organizations, research institutions and international agencies.

To overcome these challenges, the NSCAEM needs to adopt a multi-sectoral and multi-stakeholder approach that involves collaboration among various ministries, departments, agencies, organisations, institutions, communities and individuals.

## OSIRIS-REx

### In News:

The OSIRIS-REx spacecraft, which collected a sample from asteroid Bennu last year, has successfully executed a critical manoeuvre that will bring it closer to Earth. On July 26, the spacecraft fired its thrusters for about 63 seconds, changing its speed and direction by 2.09 kilometres per hour. This small but essential adjustment will enable the spacecraft to intersect with Earth's orbit and deliver its valuable cargo - a piece of the ancient asteroid.

### Analysis of Background:

- OSIRIS-REx (Origins, Spectral Interpretation, Resource Identification, Security, Regolith Explorer) is a **NASA spacecraft mission designed to study the near-Earth asteroid Bennu**.
  - Bennu is a carbon-rich asteroid that is believed to be a remnant of the early solar system. It is also potentially hazardous, as it has a small chance of impacting Earth in the late 22nd century.
  - By studying Bennu, scientists hope to learn more about the origin and evolution of our solar system, as well as the resources and risks of near-Earth asteroids.
- The spacecraft was launched in September 2016, and it arrived at Bennu on December 2018.
- OSIRIS-REx spent over two years orbiting and mapping Bennu, using a suite of instruments to characterize its shape, size, composition, surface features, and rotation. The spacecraft also performed a series of daring manoeuvres to touch down on the asteroid's surface and collect a sample using a robotic arm.

### Key Objectives of the Mission

#### Sample Collection

- The primary **objective of Osiris-Rex is to collect at least 60 grams of pristine regolith (loose rocks and dust) from the surface of Bennu** using a robotic arm called the Touch-And-Go Sample Acquisition Mechanism (TAGSAM).
- The spacecraft will approach the asteroid at a low speed and briefly touch the surface with the TAGSAM head, which will release a burst of nitrogen gas to stir up and capture the regolith. The spacecraft will then store the sample in a capsule for return to Earth.

#### Studying bennu's Composition

- To characterize Bennu's surface, composition, mineralogy, and shape using a suite of instruments onboard the spacecraft. These include cameras, spectrometers, a laser altimeter, and a radio science experiment. The instruments will map Bennu's geology,



chemistry, morphology, and thermal properties, as well as identify potential sample sites and hazards.

### Understanding Asteroid Properties

- To improve our knowledge of the physical and orbital properties of near-Earth asteroids, especially those that are potentially hazardous to Earth. Bennu has a 1 in 2700 chance of impacting the Earth in the late 22nd century, according to current estimates.
- Osiris-Rex will measure Bennu's mass, density, spin rate, spin axis, and gravitational field, as well as monitor its non-gravitational forces such as solar radiation pressure. These data will help refine Bennu's orbit and impact probability, as well as inform future asteroid impact mitigation strategies.

### Sample Return to Earth

- To bring back the sample collected from Bennu to Earth for further analysis. The spacecraft will depart from Bennu in May 2021 and begin its two-year journey back to Earth. The sample return capsule will separate from the spacecraft and enter the Earth's atmosphere in September 2023. It will land with a parachute in the Utah Test and Training Range, where it will be retrieved and transported to NASA's Johnson Space Center for curation and distribution.

## PALLIATIVE CARE

### In News:

The government has recently issued a new set of operational guidelines for the prevention and control of non-communicable diseases (NCDs) in India. However, these guidelines have been criticized by some experts for neglecting the aspect of palliative care for people with chronic and life-limiting illnesses other than cancer.

### Analysis of Background:

- India is one of the most populous countries in the world, with almost a fifth of the global population living within its borders. Most of these people live in rural areas, where access to health care and other services may be limited.
- India also faces a growing challenge of **non-communicable diseases**, such as cancer, diabetes, hypertension, and respiratory diseases, that are linked to lifestyle factors and environmental conditions. These diseases **often require palliative care at some point in their course**, which is a type of care that focuses on relieving pain and suffering and improving the quality of life for patients and their families.

## What is Palliative care?

- Palliative care is an **essential component of health care that aims to improve the quality of life of patients and their families by providing relief from pain and suffering, as well as emotional and spiritual support.** It does not aim to cure the disease, but to relieve the symptoms and distress caused by it.
- Palliative care **also supports the patients' families and caregivers, who may face emotional, financial, and practical challenges.** It can be given at any stage of the illness, along with other treatments that may still be effective.
- According to the World Health Organization (WHO), palliative care **should be integrated into the health system at all levels of care and should be accessible to all people with serious health-related suffering, regardless of their diagnosis, prognosis, age, or socio-economic status.**
- The new guidelines on the NDC from the Indian Government **only mention palliative care in the context of cancer management and do not address the needs of people with other NCDs** such as cardiovascular diseases, diabetes, chronic respiratory diseases, and neurological disorders. This is a major gap in the policy framework, as NCDs account for more than 60% of deaths in India, and many of these conditions require long-term care and symptom management.

## How many need palliative care?

- The demand for palliative care in India is high, but the supply is low. Palliative care is a type of medical care that **focuses on relieving pain and suffering for patients with serious illnesses.**
- However, in India, palliative care is mostly available in urban areas, where only a small fraction of the population lives. According to a medical oncologist from Kerala, Aju Mathew, **70% of his patients need palliative care, but they are not able to access it.**
- India has made significant progress in improving its health system since independence. It has established a three-tier health system, launched various national health programmes and schemes, and introduced the Ayushman Bharat Health Insurance Scheme to provide affordable health care to all.
- However, these initiatives are not enough to prevent millions of people from falling into poverty due to health-related expenses. One of the reasons for this is over-medicalisation, which refers to the excessive use of medical interventions that may not be necessary or appropriate for the patient's condition.

### Is there a palliative care programme?

- The **National Programme for Prevention & Control of Non-Communicable Diseases (NP-NCD)** is a national programme that **covers some of the most common and costly noncommunicable diseases in India**, such as cancer, diabetes, cardiovascular diseases and stroke. These diseases often require long-term and complex care and can cause significant distress and disability for patients and their caregivers.
- However, the **NP-NCD does not adequately address the palliative care needs of these patients**. The programme focuses mainly on the prevention and early detection of these diseases and provides limited support for curative and rehabilitative services.
- **Palliative care is not integrated into the programme's objectives, strategies, activities or indicators**. There is also a lack of trained and qualified palliative care professionals, infrastructure, drugs and equipment at various levels of health care delivery. Therefore, there is an **urgent need to strengthen the palliative care component of the NP-NCD**. This would entail revising the programme's guidelines to include;
  - Palliative care as the core element of comprehensive care for non-communicable diseases.
  - Developing a national policy and framework for palliative care.
  - Enhancing the capacity and skills of health workers in palliative care.
  - Ensuring the availability and accessibility of essential palliative care drugs and equipment.
  - Establishing referral linkages and coordination mechanisms between different levels of health care.
  - Creating awareness and advocacy among stakeholders and the public about the importance and benefits of palliative care.

### What are the gaps in the recent NDC guidelines?

- Per the Global Atlas of Palliative Care, in 2020, the need for palliative care was higher for non-cancer illnesses. However, the revised **NP-NCD operational guidelines, released in May 2023, mention palliative care in synonymy with cancer only. This is a step back from the previous operational guideline (2013-2017), in which chronic and debilitating conditions also fell under the ambit of palliative care.**
- Most patients who need palliative care are suffering from debilitating diseases, and home-based care forms the ideal mode of healthcare delivery. Previously, the programme guidelines mentioned support being provided to facilitate home-based palliative care services. However, **palliative care service delivery starts only from the district hospital in the revised guidelines, with no mention of home-based care.**

- The new guidelines mention the linking of 11 programmes to promote the convergence of services focusing on the care of non-communicable diseases. One of these is the National Programme for Palliative Care (NPPC).
  - NPPC was announced in 2012; however, the lack of a dedicated budget has prevented the implementation of the programme since its inception. Experiences from the field suggest that many medical officers at primary health centres are not aware of the existence of such a programme.

### Significance of palliative care

- **It respects patient autonomy and preferences** and requires end-of-life conversations to ascertain the wishes of the person who is dying and those of the family.
- **It provides holistic care** that addresses the physical, psychological, social and spiritual aspects of suffering.
- It involves a multidisciplinary team of professionals, including doctors, nurses, social workers, counsellors, volunteers and others.
- **It can be delivered in various settings**, such as hospitals, hospices, home-based care, community-based care and mobile units.
- **It reduces the burden** of suffering and improves the quality of life for millions of people who are living with incurable or chronic diseases.
- It enhances the dignity and comfort of the dying and supports the bereaved families.
- **It reduces the unnecessary use of costly and futile interventions** that may prolong suffering or cause harm.
- It contributes to the development of a compassionate and humane society that values life and death.

### Challenges that hinder the development and delivery of palliative care

- **Lack of awareness and education** among health professionals, policymakers and the public about the concept and benefits of palliative care.
- **Lack of national and state-level policies and programmes** to support palliative care integration across all levels of care.
- **Lack of availability and accessibility of essential medicines** for pain relief and symptom management, especially opioids, due to restrictive regulations and inadequate supply chains.
- **Lack of trained and qualified palliative care providers and specialists**, as well as a lack of standardized curricula and accreditation for palliative care education.
- **Lack of infrastructure and resources for palliative care services**, especially in rural and remote areas.

- **Lack of research and evidence on palliative care needs**, outcomes and best practices in the Indian context.
- **Lack of social and cultural acceptance of palliative care** and end-of-life issues, as well as a lack of legal and ethical frameworks to protect the rights and preferences of patients and families.

**Palliative care development requires a multi-pronged strategy that involves:**

- **Advocacy and awareness campaigns to increase the demand and recognition** for palliative care among health professionals, policymakers and the public.
- **Policy reforms and implementation** to create an enabling environment for palliative care integration across all levels of care, including primary health care, secondary health care, tertiary health care and community-based care.
- **Education and training** to increase the capacity and competence of palliative care providers and specialists, as well as to incorporate palliative care into undergraduate and postgraduate curricula for health professionals.
- **Service development and expansion** to increase the availability and accessibility of palliative care services across different settings, especially in rural and remote areas.
- **Research and evaluation** to generate evidence on palliative care needs, outcomes and best practices in the Indian context, as well as to monitor the progress and impact of palliative care development.
- **Collaboration and partnership** to foster a coordinated and comprehensive approach to palliative care delivery among various stakeholders, such as government agencies, non-governmental organizations, academic institutions, professional associations, civil society groups, media outlets, religious leaders and patient groups.

## mRNA MALARIA VACCINE

### In News:

The Trans-Tasman research collaboration between Te Herenga Waka—Victoria University of Wellington’s Ferrier Research Institute in New Zealand, the Malaghan Institute of Medical Research in New Zealand, and the Peter Doherty Institute for Infection and Immunity in Australia has made a significant breakthrough in developing an mRNA-based vaccine against the malaria-causing parasite Plasmodium.

### Analysis of Background:

- Malaria is a life-threatening disease **caused by the Plasmodium parasite and transmitted to humans through the bite of infected female Anopheles mosquitoes**. It remains a major global health problem, particularly in regions with warm climates, where mosquitoes thrive.

- According to the World Health Organization (WHO), there were an estimated 229 million cases of malaria and 409,000 malaria-related deaths worldwide in 2019. Developing an effective malaria vaccine has been a long-standing challenge, and existing preventive measures like bed nets and antimalarial drugs have limitations in controlling the disease.

#### **Features of the mRNA-based Malaria Vaccine:**

- The mRNA-based vaccine developed by the Trans-Tasman research collaborators has several notable features

#### **mRNA Technology**

- The vaccine uses messenger RNA (mRNA) technology, a relatively novel approach in vaccine development. **mRNA vaccines work by introducing genetic material (mRNA) that encodes specific antigens of the target pathogen.** In this case, the mRNA encodes antigens from the malaria-causing Plasmodium parasite.

#### **Whole Malaria Protein**

- Unlike traditional peptide-based vaccines that contain small protein fragments of the pathogen, this mRNA vaccine encodes an entire malaria protein. This enables the vaccine to **generate a broader immune response, potentially leading to better protection.**

#### **Resident Memory Cells**

- The vaccine is designed to **stimulate the generation of resident memory cells in the liver, the primary site where the Plasmodium parasite develops and matures after entering the bloodstream.** This targeted approach aims to prevent the parasite's further development, thereby stopping the spread of the infection.

#### **Adjuvant Enhancement**

- The vaccine is combined with an adjuvant developed for cancer immunotherapies at the Malaghan and Ferrier Institutes. This adjuvant helps stimulate liver-specific immune cells, enhancing the immune response at the site of infection.

#### **Significance for global health**

- **Effective Malaria Prevention:** A highly effective malaria vaccine would be a game-changer in the fight against malaria, potentially reducing the disease burden and saving countless lives.

- **Broader Immune Response:** The use of an entire malaria protein in the vaccine could lead to a more comprehensive immune response, offering broader protection against different strains of the parasite.
- **Potential for Pre-Exposure Protection:** The vaccine's ability to provide protection even in individuals previously exposed to malaria is promising, as this is a critical challenge faced by many malaria vaccines.

### Challenges that need to be addressed

- **Safety and Efficacy in Humans:** The vaccine's safety and efficacy need to be thoroughly evaluated in human clinical trials to ensure it works as intended and does not cause any adverse effects.
- **Scale-up and Distribution:** If the vaccine proves successful in clinical trials, there will be a need for large-scale production and distribution to make it accessible to communities at risk of malaria.
- **Cost and Accessibility:** Ensuring the vaccine's affordability and accessibility, especially in low-income regions where malaria is prevalent, will be crucial for its widespread use.

### Way Forward for the mRNA-based malaria vaccine

- **Clinical Trials:** The vaccine must undergo rigorous testing in human clinical trials to assess its safety, immunogenicity, and protective efficacy in a diverse population.
- **Regulatory Approval:** If the vaccine demonstrates safety and efficacy in clinical trials, it will need regulatory approval from relevant health authorities before being deployed for public use.
- **Collaboration and Funding:** Continued collaboration between research institutions, governments, international organizations, and pharmaceutical companies will be essential to support further research, development, and funding of the vaccine.
- **Global Implementation:** Once approved, efforts will be needed to ensure the vaccine's equitable distribution and accessibility to populations at risk of malaria worldwide.

## CBDC VS CRYPTOCURRENCY

### In News:

Recently, the International Monetary Fund (IMF) issued a statement on the use of cryptocurrency in the Latin America and Caribbean market, and about the rising interest in blockchain-based central bank digital currencies (CBDCs).

## Analysis of Background:

### Definition Of Cryptocurrency

- Cryptocurrency is a digital asset designed as a medium of exchange using cryptography to secure financial transactions without going through a third party.
- Such a type of currency **does not have the regulatory authority to log transactions.**
- The storage of Cryptocurrency transactions is **done on Blockchain, which is a public distributed ledger.** This distributed ledger contains all the transactions' details that are made on the network.
- All the participants have to access this ledger to view the transactions stored within it.
- The most famous cryptocurrency is Bitcoin.
- Apart from Bitcoin, there are thousands of cryptocurrencies available in the market, and some of the best known are Ethereum, Litecoin, Ripple, etc.

### Definition Of Central Bank Digital Currency (CBDC)

- Digital currency is a **digital version of the official currency issued by the government.**
- CBDCs are **issued and regulated by a country's central bank and use blockchain technology to speed up and increase the security of digital transaction processes.**
- Issued by a central bank, the **currency is accessible universally.**
- For the verification and storage of transaction data, CBDCs use Blockchain technology. In the verification process, the nodes are selected by the Central Bank and are likely to refer to the banks and financial institutions that facilitate quick transactions in the system.

***Note: Not all CBDCs use blockchain technology, for example, e-CNY (China's CBDC). Unlike Bitcoin and other cryptocurrencies, e-CNY does not operate via a blockchain-based decentralized ledger.***

### Benefits Of Central Bank Digital Currency (CBDC)

#### Expanding Access to Finance

- Digital currencies can **connect customers and central banks directly** as they are distributed on mobile devices.
- CBDC can also be a solution for people who are far from bank branches and cannot access cash.

#### Free From Liquidity and Credit Risk

- CBDC **eliminates third-party risk** from events such as a banking crisis or collapse.



## Improving Monetary Policy

- The CBDC gives the central bank direct influence over the money supply, thereby increasing control over transactions for tax control.  
CBDCs will work seamlessly where the transactions won't have to pass through multiple banks, like the UPI. The CBDC transaction can happen nearly instantaneously on one digital ledger. For those who are unbanked, CBDCs would provide a way to transfer money digitally, which is *not possible at present with UPI or a wallet*.

## Risk Of Central Bank Digital Currency (CBDC)

### Changes In Financial Structure

- The financial system can undergo significant transformations. It is still being determined what effect these changes have.
- It might affect consumer spending, investment, the financial services industry, interest rates, bank reserves, or the economy as a whole.

### Financial System Stability

- Regarding financial system stability, the impact of switching to CBDC is still uncertain. In a financial crisis, for example, there may not be enough central bank liquidity to support withdrawals.

### Cyber Security

- Weak banking security controls are subject to cyber-attacks. The same types of thieves may flock to central banks issuing digital money. So great efforts must be made to thwart system infiltration and theft of assets or information.

### CBDC Adoption

- Globally, many nations, such as **China, Ghana, Jamaica**, and some European countries are exploring their CBDC products. Some have even launched their digital currencies.
- There are nine countries that have fully launched their CBDCs. Eight of the nine countries are located in the Caribbean. The **Sand Dollar of the Bahamas was the first CBDC in the world, which was launched in 2019**.

### Similarities Between the CBDCs & Cryptocurrencies

- If we consider the similarities between CBDCs and cryptocurrencies, they **both are virtual assets** that reduce the need for physical cash.
- Their **existence streamlines the process of making payments for goods and services**.

- Another similarity they both hold is the **basic concept of blockchain technology, allowing the storage of transaction data in blocks.**
- Cryptocurrencies and CBDCs are **both blockchain-based digital currencies.**

### **What is the difference between cryptocurrency and CBDCs?**

- Cryptocurrencies are generally run by private companies or individuals, a CBDC is **controlled and tracked by a country's central bank and corresponds to that country's fiat currency.**
- CBDCs are **fully regulated by a central authority or bank instead of decentralized like cryptocurrencies.** As we know, the ownership and authority of crypto can be entirely in the hands of its users, unlike CBDC.
- CBDC acts as a **digital version of fiat money**, where personal details and transactions will be attached to the CBDC assets of its users. However, transaction details will only be available to the sender, recipient, and bank. It is what makes CBDC different from crypto. As we know, **crypto transaction details are publicly available, but without disclosing personal data**, such as users' real names.
- CBDC and cryptocurrencies have different values. CBDC is used as a means of payment and is operated by a central bank. It means that **specific financial institutions can only access their blockchain network with the necessary privileges.** Meanwhile, **cryptocurrency is a decentralized digital asset** hosted by a public blockchain network and can be accessed by anyone.

# DIFFERENCES BETWEEN CRYPTOCURRENCY AND DIGITAL CURRENCY

## TL/DR



Digital currency is the electronic form of fiat money that can be used in contactless transactions.



Cryptocurrency is a store of value that is secured by encryption.

## Regulation



Digital currency is regulated by a central authority (RBI for India).



Cryptocurrency is decentralised and unregulated.

## Stability & usage



Digital currency rates are stable, and currencies are globally accepted.



Cryptocurrency rates are highly volatile, and digital coins are not widely accepted yet.

## Who gets to know about the transactions?



Digital currency transactions are only known to the sender, receiver, and the bank.



Cryptocurrency transactions are publicly available on a decentralised ledger.

## Encryption & blockchain usage



Digital currency needs strong passwords to protect digital wallets, banking apps, credit, debit cards.



Cryptocurrencies are secured by encryption.

## CHANDRAYAAN 3

### In News:

India is gearing up for its third attempt to land on the moon with a launch scheduled for 14th July at 2:35 pm. The mission, named Chandrayaan-3, will carry a lander and a rover that will try to touch down softly on the lunar terrain and conduct scientific experiments.

### Analysis of Background:

- India is set to launch Chandrayaan-3, its third lunar exploration mission. The mission **aims to achieve a soft landing on the moon's South Pole**, a feat that eluded Chandrayaan-2 in 2019.
- Chandrayaan-2 was India's most ambitious space mission to date. It consisted of an orbiter, a lander named Vikram, and a rover named Pragyan. The orbiter successfully entered the lunar orbit and is still functioning, but the lander and the rover crashed during the descent phase in September 2019. The cause of the failure was attributed to a software glitch that resulted in a loss of communication and control.
- Chandrayaan-3 is a **modified version of Chandrayaan-2**, with some key differences. It does not have an orbiter, as it will use the existing one from Chandrayaan-2. It has a new lander and rover, with improved design and performance. It also has more fuel and thrusters to ensure a smoother landing. The mission will use the same launch vehicle, the GSLV Mk III, as Chandrayaan-2.
- The main objective of Chandrayaan-3 is to demonstrate India's capability to land softly on the moon and operate a rover on its surface. The lander and rover will carry several scientific instruments to study the lunar terrain, mineralogy, seismology, and thermal properties.

### Chandrayaan 3

- Chandrayaan-3 is a follow-on mission to Chandrayaan-2 to demonstrate end-to-end capability in safe landing and roving on the lunar surface. It consists of Lander and Rover configuration. It will be launched by GSLV MkIII from SDSC, Sriharikota. The propulsion module will carry the lander and rover configuration till 100km lunar orbit. The propulsion module has Spectro-polarimetry of HAbitable Planet Earth (SHAPE) payload to study the spectral and polarimetric measurements of Earth from the lunar orbit.
- **Lander payloads:**Chandra's Surface Thermophysical Experiment (ChaSTE) to measure the thermal conductivity and temperature; Instrument for Lunar Seismic Activity (ILSA) for measuring the seismicity around the landing site; Langmuir Probe (LP) to estimate the plasma density and its variations. A passive Laser Retroreflector Array from NASA is accommodated for lunar laser ranging studies.
- **Rover payloads:**Alpha Particle X-ray Spectrometer (APXS) and Laser Induced Breakdown Spectroscope (LIBS) for deriving the elemental composition in the vicinity of landing site.

## Further Details

- It will demonstrate India's capability of soft landing on a celestial body, with the rover.
- It will then communicate with Earth via the existing orbiter from Chandrayaan-2 and take images 100 km from Moon's orbit. The orbiter has an estimated lifespan of seven years.
- The unique exploration of Chandrayaan-3 aims at studying not just one area of the Moon but all the areas combining the exosphere, the surface as well as the sub-surface in a single mission.
- With Chandrayaan-1, ISRO achieved immense success as the 'Moon Impact Probe' by Chandrayaan-1 lunar remote sensing orbiter detected water in vapor form in trace amounts.
- With Chandrayaan-3, India aims to further the study of the lunar surface, **focussing on the South Pole or dark side of the Moon that has not seen sunlight in billions of years, which is believed to have ice and vast mineral reserves.**

## Why exploring the Moon is imperative?

- The Moon is the closest cosmic body at which space discovery can be attempted and documented.
- Further, Moon is a promising testbed to showcase technologies required for deep-space missions.
- Exploring the Moon **will enhance our understanding of the celestial body clearly, stimulating the advancement of technology, promoting global alliances and inspiring future generations of explorers and scientists.**

## Why Lunar South Pole of the Moon is targeted for exploration?

- The Moon provides the best linkage to Earth's early history and civilization.
- The exploration will offer an undisturbed historical record of the inner Solar system environment.
- The Lunar South pole is especially interesting because the lunar surface area that remains in shadow is much larger than that at the North Pole.
- Further, there could be a possibility of the presence of water in permanently shadowed areas around it.
- In addition, the South Pole region has craters that are cold traps and contain a fossil record of the early Solar System.





**2023**  
**CHANDRAYAAN-3**  
**COMPONENTS**  
Propulsion module, Lander, Rover

**EXPERIMENTS ON BOARD**

- Same experiments on Lander and Rover as Chandrayaan-2
- New experimental payload added to propulsion module

**WEIGHT**

Propulsion module	2,379 kg
Lander	1749.86 kg (including rover)
Rover	26 kg
Payload total	3,900 kg

**MISSION LIFE**  
**PROPULSION MODULE:** :3 to 6 months  
**LANDER, ROVER:** 1 lunar day

**LANDING SITE**  
69.36 degree S, 32.34 degree E; slightly off the site for Chandrayaan-2

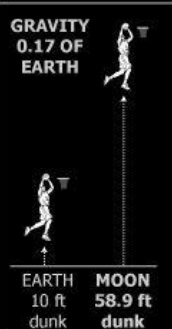
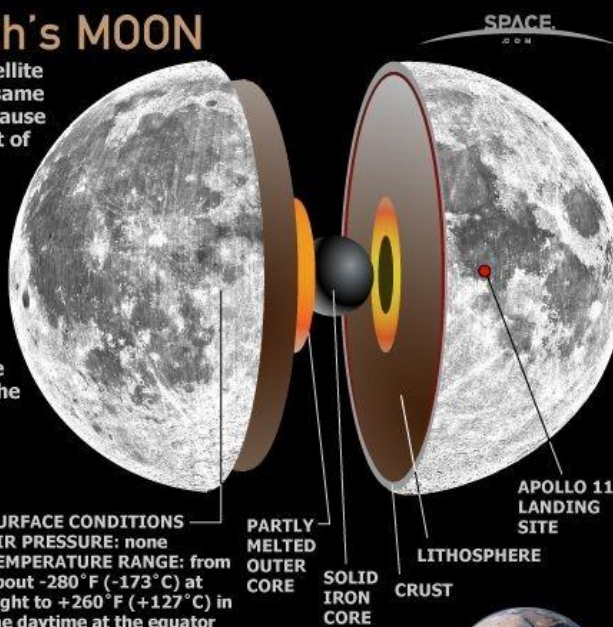
**DAYS TO MOON**  
**42 DAYS; SOONER THAN CHANDRAYAAN-2**

**LANDER**  
4 thrusters; stronger legs; built with redundancies for more scenarios, using data already generated by the C2 orbiter. Additional solar panels.

Isro's LVM3 carrying Chandrayaan-3 being moved to the launch pad ahead of its launch, at the Satish Dhawan Space Station, in Sriharikota. *PTI*

## Inside Earth's MOON

Our large natural satellite always presents the same face to the Earth, because it completes one orbit of Earth in about the same span of time it takes to complete one rotation. The dark plains on the side facing Earth are volcanic features called seas, or "maria." The first human landing on the moon took place on the Sea of Tranquility.



**SURFACE CONDITIONS**  
**AIR PRESSURE:** none  
**TEMPERATURE RANGE:** from about -280°F (-173°C) at night to +260°F (+127°C) in the daytime at the equator



Astronaut James Irwin on the moon, Apollo 15, August 1971

The moon is 2,159 mi (3,474 km) in diameter, about 1/4 that of Earth

SOURCE: NASA

KARL TATE, SPACE.com

### Launch Vehicle Mark 3 (LVM3)

- The Launch Vehicle Mark 3 (LVM3) is ISRO's newest **medium-heavy lift launch vehicle**, the heaviest rocket currently in use by India. Formerly called the Geosynchronous Satellite Launch Vehicle Mark III (GSLV Mk III), the rocket is **designed to mainly launch satellites into geostationary orbit at 35,000km**.
- The LVM3 is capable of lifting much heavier satellites than the GSLV Mk II with a bigger cryogenic upper stage and a larger first stage. **Both GSLV Mk II and LVM3 are three-stage vehicles**, while the PSLV, which launches to low earth polar orbits, is a four-stage vehicle.
- The GSLV Mk-II can place up to 2,500kg in geosynchronous orbits and up to 5,000kg to low earth orbit. By comparison, the **LVM3 can lift 4,000kg to GTO and up to 8,000 kg to LEO**. Currently, America's SpaceX's non-human rated Falcon Heavy, a super-heavy lift vehicle, is the heaviest rocket that is operational.
- The LVM3 **also has the human-rated variant which will be used for Gaganyaan missions**.

### GRAVITY HOLE

#### In News:

A team of scientists from the Indian Institute of Science has made a breakthrough discovery that could explain the origin of the anomalous "gravity hole" in the Indian Ocean. The gravity hole is a region where the gravitational pull is significantly lower than the surrounding areas, creating a dip in the Earth's gravity field.

#### Analysis of Background:

- The Earth's shape and gravity are not uniform across its surface. Instead, **it is slightly flattened at the poles and wider at the equator**. Moreover, the gravitational force varies depending on the mass distribution of the crust, mantle and core below each location. One of the most striking examples of this variation is the Indian Ocean geoid low (IOGL), a huge depression in the sea level that is about 106 metres lower than the global average, as reported by Scientific American.
- The IOGL was first detected in 1948 by Felix Andries Vening Meinesz, a Dutch geophysicist, during a ship-based survey. Later, it was confirmed by other experiments and satellite measurements. However, the cause of this anomaly remained a mystery for decades. Now, a new study has finally revealed the reason behind this phenomenon. The journal Geophysical Research Letters published a research article by Debanjan Pal and Attreyee Ghosh, who are researchers from the Indian Institute of Science (IISc) in Bengaluru. They explain their hypothesis about the origin of the gravitational anomaly.

## Methodology

- They **used computer-simulated models to reconstruct the geological history of the past 140 million years**. They discovered the traces of an ancient ocean that was about 965 kilometres deep under the Earth's crust, below Africa, as reported by BBC.
- The simulations showed that there were molten rock plumes under Africa, which could have been formed by the subduction of tectonic plates into the mantle. They suggest that these plumes could be responsible for IOGL.
- However, they admitted to New Scientist that they did not have any clear seismic evidence to confirm the existence of the plumes in the simulations under the Indian Ocean. They think that there are other unknown factors that contribute to the dip that need to be investigated further.

## Gravity hole

- It is a term used to describe a **phenomenon where a region of space-time exhibits extremely strong gravitational forces that nothing can escape from it, not even light**.
- They are **usually formed by the collapse of massive stars**, but they can also be created artificially by advanced technologies.

## Features

- Gravity holes are mysterious and fascinating objects in the universe. They have some remarkable features that make them different from other celestial bodies.

## Event horizon

- Gravity holes have a point of no return, called the event horizon, beyond which nothing can escape. Not even light can get out of a gravity hole once it crosses the event horizon. This is why they are invisible to our eyes and telescopes.

## Singularity

- Gravity holes have a singularity, where the density and curvature of space-time become infinite. This means that the laws of physics break down at the centre of a gravity hole, and we do not know what happens there.

## Distort the surrounding space-time

- Gravity holes can distort the surrounding space-time, causing gravitational lensing, time dilation, and redshift.
- Gravitational lensing is when a gravity hole bends the light from distant objects, creating multiple or distorted images of them.



- Time dilation is when time slows down near a gravity hole, making it seem like an eternity for an observer inside it.
- Redshift is when the light from a gravity hole loses energy and shifts to longer wavelengths, making it appear redder.

### **Hawking radiation**

- Gravity holes can emit radiation, called Hawking radiation, due to quantum effects near the event horizon. This radiation is very weak and hard to detect, but it implies that gravity holes are not completely black and can lose mass over time.

### **Impact**

- They can **affect the formation and evolution of galaxies, stars, and planets.**
- They can be sources of gravitational waves, which are ripples in space-time that carry information about violent events in the cosmos.
- They can be used as probes to test the theories of gravity and quantum mechanics and to explore the nature of space-time itself.

### **Significance**

- They can challenge our understanding of reality and our place in the universe.
- They can offer opportunities for scientific discovery and technological innovation, as well as ethical dilemmas and existential risks.

### **Challenges**

- They are extremely difficult to observe and measure, due to their invisibility and distance.
- They are extremely dangerous and unpredictable, due to their immense power and unpredictability.
- They require advanced instruments and methods, as well as rigorous theoretical models and simulations, to investigate and exploit them.

## **OPENKYLIN 1.0**

### **In News:**

China has launched its computer operating system, named OpenKylin. The system is designed to reduce China's reliance on US technology, and it was developed by a consortium of Chinese companies led by China Electronics Corp.

### Analysis of Background:

- **OpenKylin 1.0 is a Linux-based operating system** that was built by a community of around 4,000 developers. The system can be used in various sectors such as finance, energy, and space exploration.
- It has a **distinctive desktop environment called UKUI, which gives it a unique appearance** compared to other Linux distributions.
- China's tech industry has been focusing on **developing its operating system that is independent of US technology**. One of the companies that is working on this project is UnionTech Software Technology Co Ltd, which is developing an operating system called "Unity."
- The project is supported by the China Industrial Control Systems Cyber Emergency Response Team, which is affiliated with the Ministry of Industry and information technology. The project also has the backing of more than ten software companies.

### Objectives

- To **provide a free and open-source alternative to Windows**, this is still widely used in China despite its security and privacy issues.
- To **provide a secure and independent operating system for China**, this has been pursuing technological sovereignty and innovation for reasons of state security.
- To **provide a user-friendly and compatible operating system for desktops and devices**, this can run Windows, Linux and Android applications with ease.

### Keywords

#### Computer Operating System

- A computer operating system is a **software program that manages the hardware and other software resources of a computer**.
- It provides an interface between the user and the machine and allows the user to run various applications on the computer.
- The operating system also handles tasks such as memory management, file system, security, networking, device drivers, and system services. Some examples of popular operating systems are Windows, Linux, macOS, Android, and iOS.

## EUCLID SPACE TELESCOPE

### In News:

- The European Space Agency plans to survey billions of galaxies using the **Euclid Space Telescope** which is due to launch on July 1 from Cape Canaveral in Florida.

## Analysis of Background:

### Euclid Space Telescope:

- Euclid is a visible to **near-infrared space telescope** developed by the **European Space Agency (ESA) and the Euclid Consortium.**

#### Objective

- The objective of the Euclid mission is to **better understand dark energy and dark matter by accurately measuring the acceleration of the universe.**

### Working

- Euclid will probe the history of the expansion of the universe and the formation of cosmic structures **by measuring the redshift of galaxies out to a value of 2, which is equivalent to seeing back 10 billion years into the past.**
- To achieve this, **the Telescope will measure the shapes of galaxies at varying distances from Earth and investigate the relationship between distance and redshift.**
- The link between galactic shapes and their corresponding redshift will help to show how dark energy contributes to the increased acceleration of the universe. The methods employed exploit the phenomenon of gravitational lensing, measurement of baryon acoustic oscillations, and measurement of galactic distances by spectroscopy.
- Dark energy is generally accepted as contributing to the increased acceleration of the expanding universe, so understanding this relationship will help to refine how physicists and astrophysicists understand it.

## E.Coli

### In News:

A public health alert has been issued for Burney, a small city in California (USA), after a surge of E. coli infections among its residents. The Los Angeles Times reported that many people, especially children and the elderly, have been suffering from symptoms such as vomiting, diarrhoea, and fever, and some have been hospitalized or needed medical care.

### Analysis of Background:

- A report by the Los Angeles Times revealed that **Burney, a small city in California (USA), is facing a serious public health crisis due to an outbreak of E. coli infections.** Several residents, especially children and the elderly have been hospitalized or sought medical attention after experiencing symptoms such as vomiting, diarrhoea, and fever.
- According to the authorities, they have detected E. coli in the water supply, which could indicate a possible leakage of sewage or animal waste into the system.

- **Escherichia coli, commonly known as E. coli, is a type of bacteria that can be found naturally in the intestines of humans and many other animals.** While most strains of E. coli are harmless and even beneficial, some strains can cause illness and infections.
- Pathogenic E. coli strains are the ones that can lead to various health issues, ranging from mild gastrointestinal problems to severe and life-threatening conditions.

### **coli outbreak**

- coli is a type of bacteria that normally lives in the intestines of humans and animals. However, **some strains of E. coli can cause serious illness, such as diarrhoea, urinary tract infections, and pneumonia and kidney failure.** In recent months, there has been a surge of E. coli infections in several countries, affecting thousands of people and causing several deaths.

### **What are the reasons for the E. coli outbreak?**

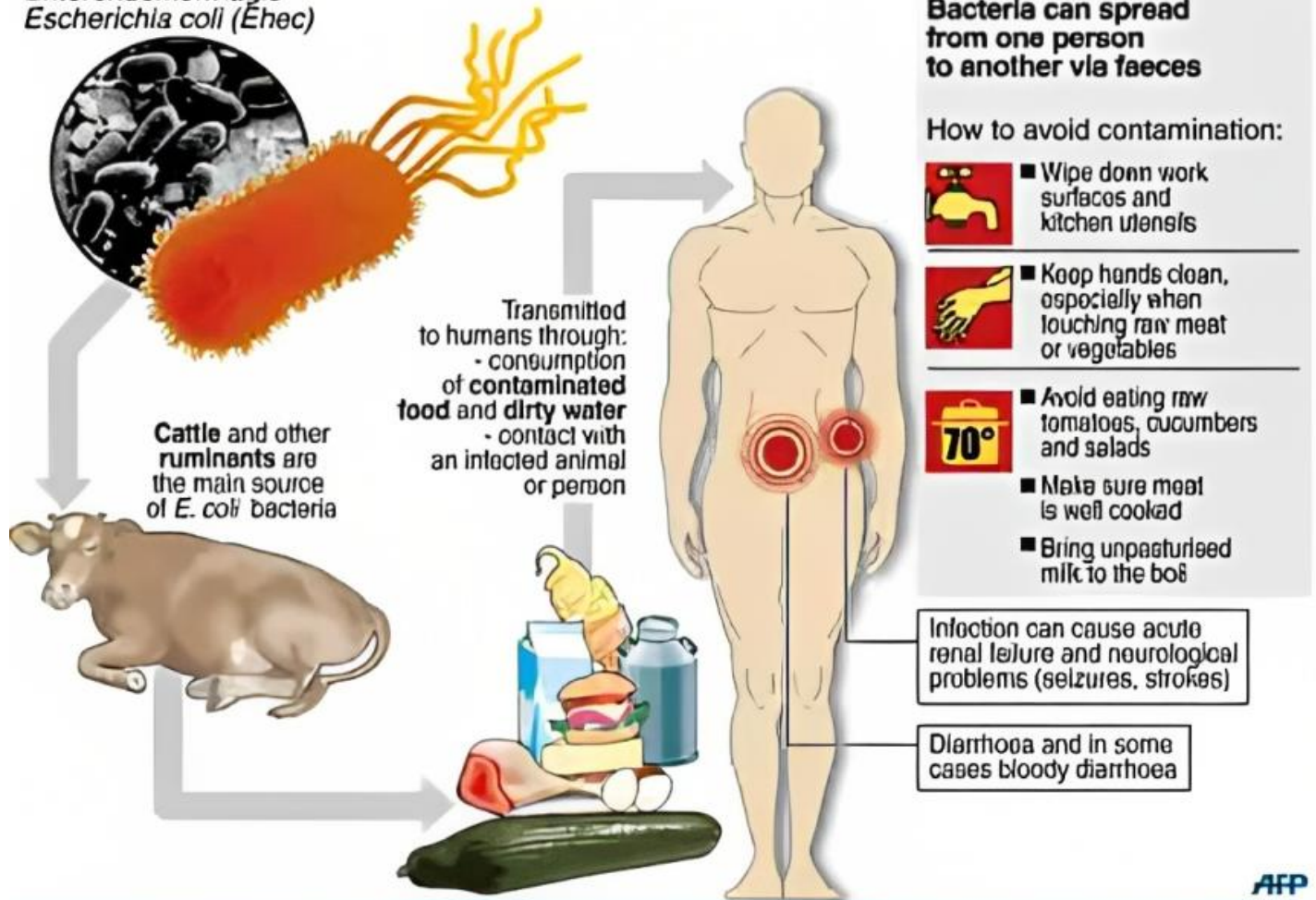
- **Contaminated food or water:** coli can spread through raw or undercooked meat, unpasteurized milk, fresh produce, or water that has been contaminated by animal or human faeces.
- **Poor hygiene:** coli can also spread through contact with infected people or animals, especially if proper handwashing is not practised.
- **Antibiotic resistance:** Some strains of E. coli have developed resistance to common antibiotics, making them harder to treat and more likely to cause severe complications.

### **What are the impacts of the E. coli outbreak?**

- **Health risks:** coli infection can cause symptoms such as abdominal cramps, diarrhoea, vomiting, fever and blood in the stool. In some cases, it can lead to hemolytic uremic syndrome (HUS), a life-threatening condition that damages the kidneys and other organs.
- **Economic losses:** The E. coli outbreak has affected the food industry, especially the meat and dairy sectors, as consumers lose confidence in the safety and quality of their products. It has also increased the costs of health care, testing and surveillance.
- **Social disruption:** The E. coli outbreak has caused fear and anxiety among the public, as well as social stigma and discrimination against certain groups or regions that are perceived to be associated with the outbreak.

# E. coli - when contamination leads to infection

Enterohaemorrhagic  
Escherichia coli (Ehec)



## What are the challenges in dealing with the E. coli outbreak?

- **Identifying and tracing the source:** The E. coli outbreak involves multiple countries, regions and products, making it difficult to pinpoint the origin and transmission routes of the bacteria.
- **Preventing and controlling the spread:** The E. coli outbreak requires coordinated efforts from various sectors, such as agriculture, health, environment and education, to implement preventive measures, such as improving sanitation, hygiene and food safety standards, as well as raising public awareness and providing timely information.
- **Treating and supporting the patients:** The E. coli outbreak demands adequate resources and facilities to diagnose, treat and monitor the patients, especially those who develop severe complications or require dialysis or transplantation.

The E. coli outbreak is a complex and evolving situation that requires continuous vigilance and collaboration from all parties involved.

### Some possible steps for the way forward include

- **Strengthening surveillance and reporting systems:** The E. coli outbreak calls for improved surveillance and reporting systems that can detect and track outbreaks quickly and accurately, as well as share data and information across borders and sectors.
- **Developing new technologies and strategies:** The E. coli outbreak urges the development of new technologies and strategies that can prevent, diagnose and treat E. coli infections more effectively and efficiently, such as vaccines, rapid tests and novel antibiotics.
- **Enhancing cooperation and communication:** The E. coli outbreak highlights the need for enhanced cooperation and communication among governments, organizations, industries and communities that can foster trust, transparency and coordination in responding to the outbreak.
- **Implement stricter standards and regulations** for the production, processing, distribution and handling of fresh produce and other foods, based on scientific evidence and risk assessment, and enforce them through regular audits and inspections.
- **Invest in research and innovation** to develop new technologies and methods that can prevent or reduce the contamination of fresh produce and other foods, such as biocontrol agents, irradiation, packaging and sanitation.
- **Educate consumers and food handlers** about the risks of foodborne illnesses, the symptoms and treatment of E. coli infection, and the proper ways to wash, store and prepare fresh produce and other foods.

### DARK PATTERNS

#### In News:

The Secretary of the Department of Consumer Affairs strongly recommended internet platforms not to involve in unfair trade practices by introducing dark patterns into their web dashboards to manipulate customer choice and breach consumer rights.

#### Analysis of Background:

- If you have ever shopped online, signed up for a service, or downloaded an app, you may have encountered dark patterns. **These are design choices that manipulate you into taking actions that you might not otherwise take, such as buying a product, signing up for a service, or sharing personal information.**
- Dark patterns are not only unethical but also illegal in some countries. The government of India has recently asked online platforms to avoid dark patterns that compromise consumer interests.



## What are dark patterns?

- Dark patterns are **design choices that exploit cognitive biases, emotional triggers, or deceptive wording to influence user behaviour**. They often make it difficult for users to access or understand the information they need, or to exercise their rights and preferences.

## Some common types of dark patterns are:

### Bait and switch

- The user is promised one thing, but then given something else or forced to agree to additional terms. For example, a free trial that automatically converts into a paid subscription without the user's consent.

### Confirm shaming

- The user is made to feel guilty or ashamed for not choosing a certain option, such as a subscription or a donation. For example, a pop-up that says "No thanks, I don't care about saving money" when the user tries to close it.

### Countdown timer

- The user is pressured to make a decision quickly by showing a fake or arbitrary timer that creates a sense of urgency or scarcity. For example, a banner that says "Only 2 items left in stock! Order now before it's too late!"

### Hidden costs

- The user is not informed of the full price or fees until the final stage of the checkout process, making it harder to cancel or compare alternatives. For example, a flight booking adds taxes, baggage fees, and insurance at the last step.

### Misdirection

- The user is distracted from the important information or choices by highlighting or emphasizing something else, such as a testimonial or a badge. For example, a website that shows a large "Buy Now" button and hides the "Continue Shopping" button in small font.

## Why are dark patterns harmful?

- Dark patterns can have **negative consequences for your online privacy, such as exposing your data to third parties**, signing you up for unwanted services or subscriptions, or tricking you into spending more money than you intended.
- Dark patterns are a serious threat to consumer rights and trust in the digital economy. They undermine the autonomy and dignity of consumers by exploiting their cognitive

biases and vulnerabilities. They distort the market competition by creating an uneven playing field for online platforms that respect consumer choice and consent.

### **What is the Government doing about it?**

- The Government has taken several steps to protect consumers from dark patterns and other unfair trade practices in the online space. The Consumer Protection Act, 2019, which came into force last year, has provisions to deal with misleading advertisements, unfair contracts, e-commerce liabilities and consumer redressal mechanisms.
- The Government has also issued guidelines for e-commerce entities to ensure transparency, accountability and fair treatment of consumers.

### **How can you avoid dark patterns?**

- The Government is committed to ensuring that consumers have a safe, secure and fair online experience and that their rights are respected and protected. However, as a consumer, you can also take some steps to avoid falling prey to dark patterns, such as:
  - Be aware of the common types and techniques of dark patterns and how they affect your decision-making.
  - Read the fine print carefully and look for hidden clauses, fees, or terms before agreeing to anything.
  - Take your time and do not rush into making decisions based on urgency or scarcity cues.
  - Compare prices and options from different sources and do not rely on discounts or testimonials as indicators of quality or value.
  - Opt out of any unnecessary data collection or sharing and review your privacy settings regularly.
  - Report any instances of dark patterns or manipulative online practices on the National Consumer Helpline by calling 1915.

## **COSMIC BACKGROUND HUM**

### **In News:**

Scientists have discovered a new phenomenon in the cosmos: low-frequency gravitational waves. These are ripples in space-time that are caused by massive events such as collisions and mergers of black holes and neutron stars. Albert Einstein predicted their existence more than a century ago, but they have eluded detection until now.



### Analysis of Background:

- Unlike **high-frequency gravitational waves**, which have been detected by laser interferometers on Earth, **low-frequency gravitational waves require a different approach.**

### Methodology

- Scientists used **radio telescopes to observe pulsars, which are rapidly spinning neutron stars that emit beams of radio waves.** By measuring the precise timing of these pulses, scientists can detect tiny changes in the distance between Earth and the pulsars, which could be caused by passing gravitational waves.

### Outcome

- The results, published in The Astrophysical Journal Letters, are based on data from five international collaborations of radio astronomers. They suggest that the **universe is filled with a background of low-frequency gravitational waves, which create a faint cosmic hum.**

### Cosmic background hum

- The cosmic background hum is a faint, low-frequency sound that fills the entire universe. **It is not audible to human ears, but it can be detected by sensitive instruments such as radio telescopes.**
- The cosmic background hum is a **remnant of the cosmic microwave background (CMB), which is the oldest light in the universe.** The CMB was **emitted about 380,000 years after the Big Bang** when the universe became transparent to radiation.
  - The CMB has been stretched by the expansion of the universe, and its wavelength has increased from microwaves to radio waves. The cosmic background hum is essentially the CMB in sound form.
- The detection of the cosmic background hum was a remarkable achievement, as it required filtering out all the other sources of noise in the sky, such as stars, galaxies, and human-made signals.

### Significance

- It confirms the standard model of cosmology, which describes how the universe evolved from a hot and dense state to its current state.
- It **provides information about the early stages of the universe**, such as its temperature, density, and composition.

- It **reveals clues about the origin and nature of dark matter and dark energy**, which are mysterious components that make up most of the mass and energy of the universe.
- It offers a new way to test theories of quantum gravity and extra dimensions, which are beyond the scope of conventional physics.

## e-SARAS Mobile App

### In News:

The Deendayal Antyodaya Yojna- National Rural Livelihoods Mission (DAY-NRLM) has taken another step to support the marketing of products made by women of Self-help Groups (SHGs) by launching the eSARAS mobile App. The App, which is an initiative of the Ministry of Rural Development (MoRD), will provide a more effective platform for selling the best and most authentic handicrafts and hand looms made by the SHGs.

### Analysis of Background:

- The eSARAS mobile App was **launched by the Union Ministry of Rural Development**.
- The Minister also inaugurated the eSARAS Fulfillment Centre at the Ministry's Janakpuri office in New Delhi. The Fulfillment Centre will be managed by the Foundation for Development of Rural Value Chains (FDRVC), a Not for Profit Company constituted jointly by MoRD and Tata Trust.
  - The Centre will handle the logistics required to process, package and ship the products that customers order through the eSARAS Portal and App.
  - It will also ensure that the products reach the customers' doorstep in a timely and safe manner.

### Significance:

- The eSARAS mobile App is a part of the MoRD's efforts to promote the spirit of Vocal for Local and empower the SHG women by providing them with multiple sources of livelihood.
- Through the eSARAS mobile App, customers can access a wide range of handmade products made by SHG women from different parts of the country.
- The App also enables customers to rate and review the products, as well as share feedback with the SHG women directly.

## SATPURA RESERVE

### In News:

The **carcass of tiger** which was found in Satpura reserve **was believed to be killed by poachers. Poachers carried away its head** leaving the dead body to decompose.

### Analysis of Background:

- There is a **search going on to find the head** of tiger but has **not yielded any result so far**.
- The **possibility of poisoning is less likely**, as suggested by official.
- However **water sample of nearby pond and body parts** of carcass has been sent for **further examination**.
- **Jaiy Tamang, an international poacher** from Tibet, is also **being suspected** for the death of tiger.
- In India it **costs around Rs 5 lakh annually** to monitoring and protect a tiger.

### Satpura Tiger Reserve

- The park was established **in the year 1981**.
- **In 1999**, Satpura Tiger Reserve was declared as the **first biosphere reserve of Madhya Pradesh**.

### Area and Spread

- **Core Area** : 1339.26 Sq Km
- **Buffer Areas** : 794.04 Sq Km
- **Total Area**: 2133.30 Sq Km
- It is located in **Satpura ranges of Central India** and situated in Hoshangabad district of Madhya Pradesh (India).
- It is a part of the **Deccan bio-geographic zone of India** and in **south of Narmada River**.
- This reserve has an Archaeological significance as it has more than **50 rock shelters with painting that are 1500 to 10,000 years old**.

### Flora and Fauna

- The reserve is **habitat of 52 species of Mammals, 31 of Reptiles and 300 species of birds**, out of which **14 are endangered** which includes **Tiger, Giant Squirrel, Indian Skimmer, Black Bellied Tern, Leaf-nosed Bat, etc.**

## Other mammals

- Flying Squirrel, Eurasian Otter, **Indian Bison, Crocodiles, Wild Dogs and Smooth Coated Otter** are also found here.

## Birds

- Malaba Pied Hornbill, **Malabar Whistling Thrush, Paradise Flycatcher** (State bird of Madhya Pradesh).
- **Migratory birds** such as Bar-headed Geese, Pintails, Spot-bills, spoon-bills, etc. are also spotted specially in autumn.

## Flora

- Mainly **Sal forests are found** in the **high ranges** of the Pachmarhi plateau.
- **Lower ranges** are covered with dense **teak forests**.
- **Other trees** include - **Tendu, Mahua** (Indian Butter-Tree), **Bel** (Stone- Apple), **Bamboo**, Palas, **Salai, Dhawada, Gurajan, Semal**, Harra, Ber
- Many types of **grasses and bushes** are found.
- It is also known as the **northern extremity of Western Ghats** because 26 species of Himalayan region and 42 species of Nilgiri areas are found.

## EU'S NATURE RESTORATION LAW

### In News:

- On 12 July 2023, **European Parliament voted to pass a key biodiversity bill to protect and preserve land and water habitats** of European Union.
- The nature restoration law was **passed with 336 votes in favour**. 13 were abstained and 300 were against it.

### Analysis of Background:

#### Nature restoration act:

- This act is an **initiative of European Commission** to protect nature and **combat climate change and biodiversity loss**.
- It **aims to restore habitats and species covering 20% of land/sea areas by 2030**.
- Some of its **objectives** are
  - To revive and preserve the degraded ecosystems.
  - To protect and preserve forest and marine areas.
  - To increase and boost connectivity between rivers.
  - To encourage the growth of bees, birds and butterflies population

### Opposition of the nature restoration law:

- The conservative lawmakers, especially from European people's party, **opposed this law for the feat that it will hurt the farmers across EU.**
- They said it was a bad proposal from farmers' point of view which would also fuel inflation.
- According to the **construction of wind and hydroelectric energy facilities would be affected.**
- **Concerns about food security were also**

### Need and significance of this law

- **Succession of droughts, floods and heat waves in Europe.**
- To full fills the **objectives of United Nations biodiversity conference agreement**, which necessitates protection of 30% of the world's lands and oceans important for nature.
- **More than 80% of habitats in Europe** are in **degraded conditions.**
- This law will be **economically significant.** To put it in quantifiable terms – it is assumed that every euro invested would result in at least eight euro in benefits.
- This law would also **help in revitalising soils and will support pollinators** which will add to food and nutrition security.

## IREDA

### In News:

- **36th Annual General Meeting** Indian Renewable Energy Development Agency Ltd. (IREDA) was held in **New Delhi at India Habitat Centre.**
- **Annual accounts for the financial year 2022-23**, which demonstrated remarkable achievements, were **adopted.**

### Analysis of Background:

- **Figures and facts related to progress and achievement of IRDEA were presented to shareholders by CMD of IREDA Pradip Kumar Das.**
- Every parameter given below showed a **significant improvement over last fiscal year.**
- **Details/overview** of company shared with shareholders is given below -
  - It achieved the **highest-ever annual loan sanction** amounting to **₹ 32,586.60 crore.**
  - **Loan Disbursements** showed an **annual growth of 35%** compared to last year which is ₹ 21,639.21 crore.
  - **₹ 47,076 crore Loan Book**
  - **₹ 1,139.25 crore Profit Before Tax** and **₹ 63 crore Profit After Tax**
  - **₹ 5,935.17 crore Net Worth**

## Highlights of the Overview

- It reiterated its **aim to facilitate efficient and ethical business practices without compromising on the values of corporate governance, transparency and business ethics.**
- It reiterated its **commitment to maintain strong asset quality.**
- **Structured recovery, monitoring mechanism, quarterly and monthly review** helped in **improving performance related to NPA ratios** in time bound manner.
  - Gross NPA - 3.21% (in FY 22 it was 5.21%)
  - Net NPA - 1.66% (in FY 22 it was 3.12%)

## Other Initiatives:

- Partnerships with **green energy developers**
- raise awareness of new products like **E-mobility, Green Hydrogen, and Green Transmission**

## IREDA

- It is a **Mini Ratna company of category 1, established in the year 1987 as a Non-Banking Financial Institution.**
- Ministry of **New and Renewable Energy has administrative control of IREDA.**
- **Vision of IREDA is to expand and promote sustainability and affordability in the renewable energy sector** in the country.
- In fiscal year 2023 IREDA published **Annual Audited results within 25 days after the financial year ended** (against the allowed period of 60 days); hence it became the **first Central Public Sector Enterprise** to do so.
- Also **within 90 days after the conclusion** of the financial year, it **holds the AGM.** It is a testimony of sound business practices and efficient management of IREDA.

## ETHANOL BLENDING IN INDIA

### In News:

- India's ethanol production program has seen significant progress in the last five years.
- Quantities supplied by sugar mills/distilleries to oil marketing companies (OMCs) have increased substantially.
- The program has diversified its raw material sources from cane molasses and juice to rice, damaged grains, maize, and millets.

### Analysis of Background:

### Ethanol and its Blending:

- Ethanol is a **high-purity alcohol that can be blended with petrol for fuel purposes**.
- It differs from rectified spirit (94%) used in industries and extra neutral alcohol (96%) for potable liquor.

### **PM Modi's Announcement**

- Prime Minister Narendra Modi announced that India has achieved 20% ethanol-blended petrol and aims for nationwide coverage by 2025.
- This move is part of India's efforts to promote ethanol as an eco-friendly and renewable fuel.

### **Cane Options and Ethanol Production**

- Sugar mills traditionally produced ethanol from 'C-heavy' molasses, containing around 40-45% sugar.
- Mills can optimize sugar extraction to produce ethanol from 'B-heavy' molasses (50%-plus sugar) or ferment the entire cane's fermentable sugars into ethanol.

### **Diversification of Feedstocks**

- Ethanol supplies have surged from 38 crore liters in 2013-14 to an estimated 559 crore liters in 2022-23.
- Feedstocks have diversified, including B-heavy molasses, direct sugarcane juice, rice, maize, and other foodgrains.

### **Ethanol Yields from Grains**

- Ethanol yields from grains are higher than from molasses.
- Rice (450-480 liters/tonne), broken/damaged grains (450-460 liters/tonne), maize (380-400 liters/tonne), jowar (385-400 liters/tonne), and millets (365-380 liters/tonne) contribute to higher ethanol production.

### **Challenges in Grain Ethanol Production**

- Ethanol production from grains involves a longer process of converting starch into sucrose and simpler sugars before fermentation.
- Molasses already contain sugars and are more straightforward to convert into ethanol.

### **Year-round Production with Multiple Feedstocks**

- Leading sugar companies have installed distilleries that can operate on multiple feedstocks, enabling year-round production.
- This flexibility ensures a consistent ethanol supply throughout the year.

### **Differential Pricing Policy**

- The government's policy of differential pricing incentivizes the use of various feedstocks by fixing higher prices for ethanol produced from B-heavy molasses and sugarcane juice/syrup.
- This compensates mills for reduced sugar production.

### **Boost in Ethanol Blending**

- The policy boost has resulted in a significant increase in ethanol blending with petrol, reaching 11.75% in 2022-23 compared to 1.6% in 2013-14.

### **New Demand for Grains**

- The incorporation of new feedstocks can create additional demand for grains like rice, barley, and millets.
- States like Uttar Pradesh and Bihar, known for sugarcane and maize, respectively, can contribute to "fueling India" with ethanol.

### **Byproduct Benefits**

- Molasses-based distilleries have multi-effect evaporator (MEE) units that help in treating liquid effluent (spent wash).
- The concentrated wash can be used as boiler fuel, and the ash contains potash suitable for fertilizers.
- Grain distilleries produce distillers' dried grain with solubles (DDGS), a valuable animal feed product.

## **Biofuel**

### **Definition**

- Biofuels are **renewable fuels derived from organic materials**, such as plants and animal waste, rather than fossil fuels like coal, oil, and natural gas.
- They are considered a greener alternative to conventional fuels because they reduce greenhouse gas emissions and promote sustainability.

### **Purpose**

- The main purpose of biofuels is to **provide a cleaner and more sustainable source of energy to replace fossil fuels, which contribute significantly to climate change and environmental degradation.**
- Biofuels also aim to reduce the dependence on imported oil and enhance energy security.

### **Types of Biofuels**

- **Ethanol:** Produced from fermenting sugars and starches found in crops like corn, sugarcane, and wheat.



- **Biodiesel:** Made from vegetable oils, animal fats, or recycled cooking oil through a chemical process called transesterification.
- **Biogas:** Generated from the anaerobic decomposition of organic matter, such as agricultural waste, sewage, and landfill gas.
- **Bioethanol:** Derived from cellulosic biomass, such as wood, grasses, and agricultural residues, using advanced technologies.

## Ethanol Blending

### Meaning

- Ethanol blending refers to the practice of mixing a certain percentage of ethanol with conventional gasoline or petrol to create blended fuels.
- It is an effective way to reduce greenhouse gas emissions, improve air quality, and promote renewable energy usage in the transportation sector.

### How it is done?

- Ethanol blending is achieved by mixing ethanol with gasoline in specific proportions.
- The most common blend is E10, which contains 10% ethanol and 90% gasoline.
- Blends like E15 (15% ethanol), E85 (85% ethanol), etc., are also used in certain regions depending on the suitability of vehicle engines.

## Different Generations of Biofuels

### First Generation Biofuels

- Derived from food crops, such as sugarcane, corn, soybeans, and vegetable oils.
- Widely used and easily available, but criticized for potential competition with food production.
- Examples: Biodiesel, bioethanol, and vegetable oil-based fuels.

### Second Generation Biofuels

- Produced from non-food feedstocks like agricultural residues, woody biomass, and waste materials.
- Address concerns about food competition and offer more sustainable options.
- Examples: Cellulosic ethanol, biobutanol, and biofuels from algae.

### Third Generation Biofuels

- Focus on using microorganisms and algae to convert sunlight into biofuels through photosynthesis.
- Highly efficient in terms of land use and resource utilization.

- Examples: Algal biofuels and cyanobacterial biofuels.

#### **Fourth Generation Biofuels**

- Utilize advanced technologies to engineer microorganisms for biofuel production.
- Aim for higher yields and cost-effectiveness compared to previous generations.
- Examples: Synthetic biology-based biofuels and genetically engineered biofuels.

#### **Ethanol Blended Petrol (EBP) Programme**

##### **Implementation Scope**

- The EBP Programme is implemented across India, except in the Union Territories of Andaman Nicobar and Lakshadweep islands.
- Oil Marketing Companies (OMCs) sell petrol blended with 10% ethanol to promote eco-friendly and renewable fuel.

##### **Government Interventions for Increased Ethanol Production**

- Since 2014, the government has taken multiple measures to boost indigenous ethanol production.
- These interventions include reintroducing the administered price mechanism, opening alternate routes for ethanol production, amending the Industries (Development & Regulation) Act for smooth ethanol movement, reducing GST on ethanol for EBP, differential pricing based on raw material, extending EBP nationwide, and interest subvention schemes.

##### **Expanded Raw Materials for Ethanol Production**

- In 2018-19, the EBP Programme allowed new raw materials for ethanol production, including B heavy molasses, sugarcane juice, sugar, sugar syrup, and damaged food grains (unfit for human consumption) like wheat and rice.
- Different ex-mill prices of ethanol were fixed based on the raw material used.

##### **Increase in Ethanol Procurement**

- The government's actions led to a significant increase in ethanol procurement by PSU OMCs.
- Ethanol procurement increased from 38 crore litres in ESY 2013-14 to 188.6 crore litres in ESY 2018-19, achieving an average blend percentage of 5.00% in ESY 2018-19.

### **Addressing Ethanol Distillation Capacity Constraint**

- To achieve the target of 20% by 2030, the government identified a constraint in available ethanol distillation capacity.
- The Department of Food and Public Distribution (DFPD) introduced a Scheme to extend financial assistance to sugar mills for enhancing and augmenting ethanol production capacity.

### **Long Term Ethanol Procurement Policy**

- The Ministry of Petroleum and Natural Gas (MoP&NG) issued a Long Term Ethanol Procurement Policy under the EBP Programme on 11th October 2019 to provide a strategic roadmap for achieving higher ethanol blending in petrol.

## **KALAGARH TIGER RESERVE**

### **In News:**

A 76-year-old woman was mauled to death in the Kalagarh Tiger Reserve's Adnala forest range when she had gone to gather fodder for her livestock.

### **Analysis of Background:**

- Kalagarh Tiger Reserve is located in the Terai region of Uttarakhand, India.
- It spans parts of Pauri Garhwal and Nainital districts, covering a significant area.
- The reserve is known for its rich biodiversity and its efforts towards tiger conservation.

### **History of Kalagarh Tiger Reserve**

#### **Pre-Independence Era**

- The history of Kalagarh Tiger Reserve can be traced back to the pre-independence era when it was known as the Kalagarh Forest Division.
- During this period, the forest area was primarily managed for timber extraction and hunting, with little emphasis on wildlife conservation.

#### **Post-Independence Era**

- After India gained independence, there was a growing recognition of the importance of conserving wildlife and preserving natural habitats.
- In the 1970s, the Kalagarh Forest Division was upgraded to a wildlife sanctuary to provide protection to the diverse flora and fauna in the region.

### **Notification as a Tiger Reserve**

- In 1974, the Indian government launched the 'Project Tiger' initiative to conserve the declining tiger population in the country.
- As a part of this initiative, Kalagarh Wildlife Sanctuary was **notified as a tiger reserve in 1974**, becoming one of the first nine tiger reserves in India.

### **Formation of Kalagarh Tiger Reserve**

- The Kalagarh Tiger Reserve was officially established in **2000 with the merger of the Kalagarh Wildlife Sanctuary and the eastern part of the Corbett Tiger Reserve.**
- This merger aimed to create a larger protected area for the conservation of not only tigers but also other wildlife species.

### **Location**

- **Situated in the Terai region of Uttarakhand**, bordering the state of Uttar Pradesh.
- The reserve is **bounded by the Ramganga River on the west and the Mandal River on the east.**
- Its geographical location makes it an essential part of the state's wildlife conservation efforts.

### **Flora**

- Kalagarh Tiger Reserve boasts a diverse range of flora, making it a habitat for various plant species.
- The forest area is dominated by a mix of deciduous and tropical vegetation.
- Prominent tree species include Sal, Bamboo, Semal, and Dhak, creating a lush and green environment.

### **Fauna**

- The reserve is home to a wide variety of wildlife species, making it a haven for wildlife enthusiasts.
- The Royal Bengal Tiger is the apex predator and the star attraction of the reserve's fauna.
- Other prominent inhabitants include the Asian Elephant, Leopard, Sloth Bear, Wild Boar, and numerous bird species.

### **Tiger Conservation**

- Kalagarh Tiger Reserve plays a crucial role in the conservation of the endangered Royal Bengal Tiger.

- The reserve focuses on maintaining the tiger's natural habitat and implementing conservation measures.
- Efforts are made to prevent poaching, habitat encroachment, and human-wildlife conflicts to protect the tiger population.

### Importance of the Reserve

- Kalagarh Tiger Reserve is significant for the ecological balance and preservation of biodiversity in the region.
- It acts as a wildlife corridor, allowing animals to move freely between different forest areas, promoting genetic diversity.
- The reserve contributes to the state's tourism industry, attracting wildlife enthusiasts and nature lovers from all over the country.

### Challenges and Future Prospects

- The reserve faces challenges like illegal encroachments, deforestation, and human-wildlife conflicts.
- Sustainable development practices and community participation are essential for the long-term conservation of the reserve.

## NALLAMALA FOREST

### In News:

- In Nallamala region **local population is not able to move freely** due to fear of encounter with wildlife, especially tigers.
- Human-wildlife conflict has **an implication for privacy and protection for tigers too.**

### Analysis of Background:

- **Access to Nallamala forest has been suspended for three months.** It is done **for ensuring privacy and protection of tigers.**
- However there are instances where **tigers visited nearby habitations in search of prey, spreading a panic** among local residents.
- Other **activities by officials to handle the man animal conflict** situation –
  - Regular **monitoring** of the situation.
  - **Awareness campaigns** are being conducted by forest officials to educate the residents about handling such encounters with wild animals.
  - Many initiatives to **safely trap the tiger and relocating** it to the deep forest areas.
  - In nearby tribal villages **patrols and camps** are being organized.

### Why the Forest area is restricted for Human activities?

- The **breeding season** for tigers is from **July to September** (around 93 to 112 days).
- They have a **gestation period of 16 weeks** and the **cubs stay with their mothers till the age of 2.5 year**.
- Hence **any disturbance** during this time **can affect the breeding cycle**.

### Nallamala forest region

- Located in **Nallamala Hill**, a part of **Eastern Ghats**, this forest is considered **one of the largest undisturbed stretches** of forest in South India.
- Situated to the **south of the Krishna river** in **Andhra Pradesh and Telangana state**, a part of the forest belongs to the **Nagarjunsagar-Srisailem Tiger Reserve**.
- Area of the **Nagarjuna Sagar-Srisailem Tiger Reserve** spreads in Andhra Pradesh and Telangana State
  - **In Andhra Pradesh** - Kurnool, Guntur and Prakasam and
  - **In Telangana** - Mahaboobnagar and Nalgonda
- It has a **core forest area of about 2,250 Km** and a total reserve area of about **6000 sq. Km**.
- The area consists of **147 tribal hamlets** (total population around 15,000) and 171 Chenchu Gudems with **6,950 families**.

### Fauna

- As per wildlife survey records, Nallamala forest houses over **700 types of animals, including tiger, bear, black buck, wild hog, chinkara**, monkey, porcupines, peacock, pangolin and several rare bird species.
- The **2022 wildlife census, presence of 75 tigers were confirmed** in the Nagarjuna Sagar-Srisailem Tiger Reserve.

### Flora

- Mostly **Dry Mixed and moist Deciduous Forests** are found.
- **Few tree species** are - *Anogeissus latifolia*, *Tectona grandis*, *Cassia fistula*, *Cassine glauca*, *Cleistanthus collinus*, *Cochlospermum religiosum*, *Dalbergia lanceolaria*, *D. paniculata*,
- **Growth of large tree is limited** due to lack of water.
- **Abundant medicinal plants** are also found some of them are Koringa, Uttareni, Vasa, Bilwapatram, Pindikura, Ponnaganti Aaku, Neelanemu, Ada beera, Neeti sambrani, Atuku Mamidi, Burugu, Buddakakara, Kalimi, rela, nela tangedu,

## DIVERSITY FOR RESTORATION (D4R) TOOL

### In News:

- Researchers from **Bioversity International** have devised a tool named **Diversity for Restoration (D4R)** for promoting restoration programmes in India.
- Another team from **Ashoka Trust for Research in Ecology and the Environment** helped these researchers to **modify** the tool for Indian conditions.

### Analysis Of Background:

- In countries like **Malaysia, Ethiopia, Columbia, Peru, Burkina Faso, Cameroon** the tool is **already in use**.
- It is **modified for India** and provides recommendations about a **particular tree species** for plantations in a specific location.
- This tool will serve the **purpose of socio-ecologically responsible restoration** and will benefit **local communities**.

### Significance of the tool

- This tool is being claimed to help in **enabling appropriate agroforestry and aiding systematic ecosystem restoration** programmes in India.
- By using this tool **tree species**, which match the restoration objectives, are **identified along with their ecological benefits**.
- It helps in identifying the **best suited tree species for a particular geographical region**. Hence it **promotes sustainable development**.
- It will also help in **success of restoration of land and ecosystems** with **minimum instances of failure of plantation programme**.
- Thus **better decision would be taken** regarding selection of the species **suitable to local environmental, soil, and geographical conditions**.
- This tool contains information on **100 plant functional traits of 237 important native trees of Western Ghats** which have socio-economic significance.
- **Functional trait provides information on** economic and ecological uses of tree like timber, medicine, fruits or other commercial benefits.
- **Habitat suitability, threat status** are also considered by this tool while identifying suitable species.

## JUST ENERGY TRANSITION PARTNERSHIP DEAL

### In News:

- Senegal signed the **Just Energy Transition Partnership deal, announced on June 22, 2023, after South Africa, Indonesia & Vietnam** to fasten the process of providing electricity access to all its citizens by 2025.
- This deal will help in **increasing the share of renewable energy installed capacity to 40%** and **2.5 billion euros will be mobilized** for country to achieve this target.

### Analysis of Background:

- Senegal became the **fourth country to sign the deal promoted by International Partners Group.**
- **International Partners Group** comprises of France, Germany, the European Union, the United Kingdom and Canada.
- This **financing will extend over an initial period of 3-5 years** and will be provided by **international partners and multilateral development banks.**

### Just Energy Transition Partnership (JET-P) deal

- It is a **type of innovative funding models by developed countries** in the direction of generation of energy through clean and renewable sources.
- The **first Just Energy Transition Partnership was announced at COP 26 Glasgow** in November 2021.
- The mechanism will **help developing countries in achieving their targets related to energy security and access, climate change mitigation.**
- It helps in **decarbonisation of the emerging economies** of a country that are heavily coal-dependent.

### Significance of the Deal

- It **will provide various opportunities for investment** from the private sector, sovereign wealth funds and philanthropic foundations.
- **Development of renewable energy** will be in a **quick and efficient manner.**
- It will **help Senegal in shaping and publishing a long-term vision for greenhouse gas emission** strategy before COP28.
- Its **nationally determined contributions** will reflect the **new climate ambitions** hence positively contributing towards environment.



### **Current situation and targets of Senegal**

- **Until 2010, Heavy Fuel Oil** was the main source of electricity. Its **contribution was as high as 85%** to the total electricity generation.
- In later years, **2014-17, oil and gas reserves were discovered** and **country has seen a shift to gas-to-power strategy in 2018.**
- In 2015, **targets of 20 per cent renewable energy** in the electricity mix by 2020 and **23 per cent in 2030** were set.
- Also in 2015, a new target was set which was - **30 % of photovoltaic and wind** in the electricity generation mix **by 2025.**
- **By 2020-21** total installed capacity in Senegal was **2 to 1.5 gigawatts.**
- **Currently** In the total installed capacity of Senegal, **renewable energy contribution is around 31%.**
- Also **only 20 % of the total electricity is generated by using renewable sources** thus Senegal **relies heavily on imported fossil fuels.**
- However it is to be notes that **Senegal emits less than 0.03 % of the global CO2 emissions,** 13.6 million tonnes of CO2.

### **Europe's Vested Interests**

- **Germany supported export of gas and other LNG sources** from Senegal to Europe, Subsequently a **Germany-Senegal gas plan came up in 2022.**
- For **exporting gas Infrastructure** is already in place and **more is being developed.**
- Greater **Tortue Ahmeyim field** for instance **will start exporting by end on 2023.**
- However organizations like **African civil society are opposing the exploitation of Africa's natural resources by Global North** and **criticising its energy policies.**

### **Energy Challenges and concerns of Senegal**

- Providing **energy access to its 16.8 million** populations by 2025.
- Around **30 per cent of population,** especially in rural areas, is **lacking access to electricity.**
- **Most used fuel sources are firewood and charcoal** for cooking which are **not good for health and environment.**
- In the **new deal** there is **no emphasis on grants and concessional loans** for the required energy transition.
- As per Beyond Climate Finance report, **annual debt burden of Senegal is far more than the cost of achieving its climate goal.** Hence a concern of affordability of this electricity rises.

## India and JET-P deal

- India has **not signed the deal**
- There is a **possibility of India signing a similar JET-P deal** but no final decision is made due to various concerns.
- **Major concerns** are –
  - **Consent of stakeholders** is challenging as they are diverse, **large and there are complex ownership** of the Indian power sector.
  - **Nature of Finance** – as evident from the experiences of other countries like South Africa, it is mostly in the form of loans which creates a financial burden.
  - India's energy **security and development objectives are not properly considered** in such deals.

## HALOGENS

### In News:

- A new study **published in journal Nature** found that Ocean release **naturally produced short-lived halogens** like chlorine, bromine and iodine which **contribute to 8-10 % cooling of this planet**.
- By 2100, there is a **possibility that this cooling could increase to 18-31 %**.

### Analysis of Background:

- Oceans perform **variety of functions for wellbeing of this planet** which includes **absorbing carbon dioxide, moderating the climate and cooling the planet**.
- Substantial **impact of short-lived halogens**, with a lifetime of less than six months in the atmosphere, in cooling the planet **can't be ignored** as climate models for future prediction do not account for these.

### Halogens

- The name **halogen is derived from words having Greek roots** -
  - Hal - salt and
  - gen - to produce
- These are **non-metallic elements** which **constitute Group 17** (Group VIIa) of **the periodic table**.
- These **elements include** fluorine (F), chlorine (Cl), bromine (Br), iodine (I), astatine (At) etc.
- These elements **produce sodium salts** of similar properties for instance – NaCl (common table salt).

### Reasons for Halogen release by Ocean

- **Naturally released by Oceans.**
- **Human activities** may accelerate it –
  - **Pollutants like ozone** are deposited on the ocean due to increased anthropogenic activities.
  - It makes **hard for ocean to dissolve halogens** as they become insoluble.
  - These **halogens** are forced out of sea water and **released into the atmosphere.**

### **Study and findings**

- Initially study was focussed on to **find out the depletion of ozone** in the troposphere **by Halogens.**
- They **considered solar radiation emitted by the sun** and **Earth's terrestrial radiation** to find out **global radiative balance** across pre-industrial, present-day and future climates.
  - **Ozone is a greenhouse gas** which contributes to warming.
- It was found that **short-lived halogens from oceans reduce warming by depleting ozone.**
- They also studied the **methane and water vapors too** but it was **observed that halogens destroy hydroxyl radicals** and **increase the lifespan of this methane greenhouse**
- Also the similar effect was seen on water vapours.
- **Formation of cooling aerosols** was also **declined** by halogen.
- However these halogens **destroy ozone leading to an overall net cooling effect** on climate.
- These halogen emissions are found **more in polar regions.**

### **TOPIC: DEFENSE AND SECURITY:**

#### **SAGAR NIDHI**

##### **In News:**

Scientists from Bangladesh and Mauritius embarked onboard India's research vessel **Sagar Nidhi** on June 29 to participate in a joint ocean expedition.

##### **Analysis of Background:**

- The event took place under the framework of the **Colombo Security Conclave (CSC)** between the **nations of the Indian Ocean Region (IOR).**
- The expedition **will last nearly 35 days.** The cruise is conducted by **Indian National Centre for Ocean Information Services (INCOIS)** under the Ministry of Earth Sciences.
- The scientists will collaboratively research ocean data to predict and manage changes in the marine environment and variations in ocean parameters.

- The decision to embark on the expedition was a direct outcome of the maiden CSC Oceanographers and Hydrographers conference held at Goa and Hyderabad in November 2022.

### **ORV Sagar Nidhi**

- ORV Sagar Nidhi is an **ice-strengthened multidisciplinary vessel operated by the National Institute of Ocean Technology, India.**
- It was **constructed at Fincantieri, Italy.**
- The 104-metre-long vessel has fully automatic diesel-electric propulsion equipped with dynamic positioning system, azimuth thrusters, and a winch to hoist 60 tonnes from a depth of 6,000 metres.
- The vessel is capable of carrying out **geo-scientific, meteorological and oceanographic research**, and is designed with **blue-water capability with ranges of up to 10,000 nautical miles (19,000 km)** for voyages lasting up to 45 days.
- She is expected to support research in the Indian and Antarctic Oceans.
- Sagar Nidhi will be utilized for deep sea mining, launching of ROV's, AUV's, manned and unmanned submersibles and exploration of gas hydrates.

### **Colombo Security Conclave**

- India has sought to enhance security cooperation with the Indian Ocean island and littoral nations, through a **new 'minilateral' group called the Colombo Security Conclave (CSC).**
- Held at the National Security Advisor (NSA)-level, the CSC, which brings together **India, Sri Lanka, Maldives, and Mauritius, along with Bangladesh and the Seychelles** as observers.
- It is now the **most active security-focused group operating in the Indian Ocean region.**
- The CSC's remit includes **maritime security, countering terrorism, and cybersecurity.** The small group provides an **opportunity for India to address its own strategic concerns in the Indian Ocean** while providing an opportunity for the island and littoral nations to address their own challenges.

### **History and Evolution**

- The CSC evolved out of trilateral meetings between NSAs and Deputy NSAs from **India, Maldives, and Sri Lanka**, starting in
- Since its **revival and re-branding as the CSC in 2020**, Mauritius was added as a member of the grouping, with Bangladesh and the Seychelles as observers. A **secretariat for the group was established in Colombo in 2021.**

- The group has operationalised practical cooperation under the CSC by hosting **regular security-focused exercises**.
- Since July 2021, the CSC's exercises have included on **maritime search and rescue; cybersecurity; coastal security; and investigation of terrorism cases**.

### Challenges and Solutions

- The CSC will need to address several key challenges to enhance its impact. First, if the CSC does expand its membership, **it should not duplicate the work of the other Indian Ocean region multilateral groups**. The effectiveness of the CSC's limited membership and scope has been demonstrated in the regularity of the CSC's dialogues at the NSA and Deputy NSA-level, along with security-focused exercises.
- The CSC countries are all members of the two region-wide Indian Ocean groupings, the Indian Ocean Rim Association (IORA), and the Indian Ocean Naval Symposium (IONS). However, the **lack of coordination between the IORA and the IONS** has hindered the effective functioning of these institutions. To encourage coordination, the **CSC could include the rotating country Chairs of IORA and IONS, as observers**.
- Second, the **group will be vulnerable to domestic political changes** unless it can better institutionalize itself within the participant's systems. The CSC **should seek to insulate itself from the impact of changes in governments** through, for example, establishing working groups at the senior official level.
- Third, with the CSC subsuming the former India-Sri Lanka-Maldives maritime security dialogue, India does not currently hold a regular and dedicated bilateral maritime security dialogue with any of the other five CSC countries. Therefore, to ensure a focus on shared maritime concerns in the CSC, **India could establish bilateral maritime security dialogues with each of the island and littoral nations, to complement the CSC process**.

### BRAHMOS MISSILE DEAL

#### In News:

- The Philippine Army is actively pursuing plans to bolster its coastal defence capabilities by acquiring batteries of the BrahMos supersonic anti-ship cruise missile.
- Negotiations have begun with India's BrahMos Corporation, and it is expected that orders will be placed later this year.

### Analysis of Background:

- The Philippine Navy has already taken a significant step towards enhancing its maritime defence capabilities by ordering three batteries of the BrahMos supersonic anti-ship cruise missile.
- The missiles are expected to be delivered to the Philippine Marine Corps by December of this year.
- This acquisition is part of the Navy's efforts to modernize its naval assets and strengthen its coastal defence capabilities.
- The BrahMos missile, known for its high speed and accuracy, **will greatly enhance the Philippine Navy's ability to deter potential threats in the maritime domain.**
- The Army intends to deploy these missiles along the country's coastlines to strengthen its coastal defence roles.
- By leveraging the BrahMos missile's advanced capabilities, **the Philippine Army aims to enhance its ability to protect its territorial waters and critical coastal infrastructure.**

### About BrahMos:

- It is a medium-range **ramjet supersonic cruise missile** that can be launched from submarine, ships, aircraft, or land.
- **Developed by:** It is a joint venture between the **Russian Federation's NPO Mashinostroyeniya** and India's Defence Research and Development Organisation (**DRDO**), who together have formed BrahMos Aerospace.
- It is the **world's fastest anti-ship cruise missile** in operation.
- **Version in use:** land-launched and ship-launched versions.
- **Recent development:** In 2016, India became a member of the **Missile Technology Control Regime (MTCR)**, India and Russia are now jointly developing a new generation of Brahmos missiles with **600 km-plus range**.
- In 2019, India upgraded the missile with a new range of 500 km.

## SALVEX EXERCISE

### In News:

The Seventh edition of the Indian Navy – US Navy (IN – USN) **Salvage and Explosive Ordnance Disposal (EOD) exercise, SALVEX** was conducted from 26 Jun – 06 Jul 23 at Kochi.

### Analysis of Background:

#### About SALVEX Exercise

- The **maiden IN-USN SALVEX was conducted in 2005.**

- In 2011, US and Indian Navy divers began the **joint Salvage and Explosive Ordnance Disposal (EOD) exercise, SALVEX** series of exercises off Port Blair in the Andaman Sea, India.
- SALVEX is an exercise aimed to strengthen US and Indian divers' capability in diving and salvage techniques.

### Highlights of the 2023 SALVEX Exercise

- The exercise saw participation from both the navies which included the ships – **INS Nireekshak and USNS Salvor** in addition to Specialist Diving and EOD teams.
- Spanning over 10 days, the diving teams of both countries **shared experiences on maritime salvage and trained together in various facets of EOD operations on land as well as at sea.**
- SALVEX also saw the conduct of **joint training exercises towards enhancing interoperability, cohesiveness and gaining from best practices** mutually in maritime salvage and EOD operations.
- The constructive engagements on operational terms **enhanced the skill sets of the diving teams** in a number of diverse disciplines such as mine detection and neutralization, wreck location and salvage.

### “NOMADIC ELEPHANT – 2023”

#### In News:

India-Mongolia joint military exercise “Nomadic Elephant – 2023” to commence at Ulaanbaatar, Mongolia.

#### Analysis of Background:

##### Exercise NOMADIC ELEPHANT:

- **Exercise NOMADIC ELEPHANT** is an **annual training event with Mongolia** which is conducted alternatively in Mongolia and India.

#### Aim

- The aim of this exercise is to **build positive military relations, exchange best practices, develop inter-operability, bonhomie, camaraderie and friendship between the two armies.**

#### Scope

- The scope of this exercise involves **Platoon level Field Training Exercise (FTX).**

- During the exercise, Indian and Mongolian troops engage in various training activities designed to enhance their skills and capabilities. These activities include **endurance training, reflex firing, room intervention, small team tactics and rock craft training. Soldiers from both sides will learn from each other's operational experience.**

### **Significance**

- India and Mongolia have a **shared commitment to regional security and cooperation.**
- Exercise NOMADIC ELEPHANT-23 will be yet another **significant milestone in the defence cooperation between the Indian Army and Mongolian Army which will further foster bilateral relations between the two nations.**

### **Nomadic Elephant – 2023 Edition**

- Indian Army contingent comprising of 43 personnel left for Mongolia.
- The contingent will participate in the 15th edition of the **bilateral joint military exercise “NOMADIC ELEPHANT-23”.**
- The exercise is scheduled to be **conducted at Ulaanbaatar, Mongolia from 17 to 31 July 2023.**
- Soldiers of the Mongolian Armed Forces Unit 084 from and Indian Army soldiers from the **JAMMU AND KASHMIR LIGHT INFANTRY Regiment** will be participating in the exercise.
- The primary theme of the exercise will focus on **counter-terrorism operations in mountainous terrain under United Nations mandate.**