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**MAY 2024**

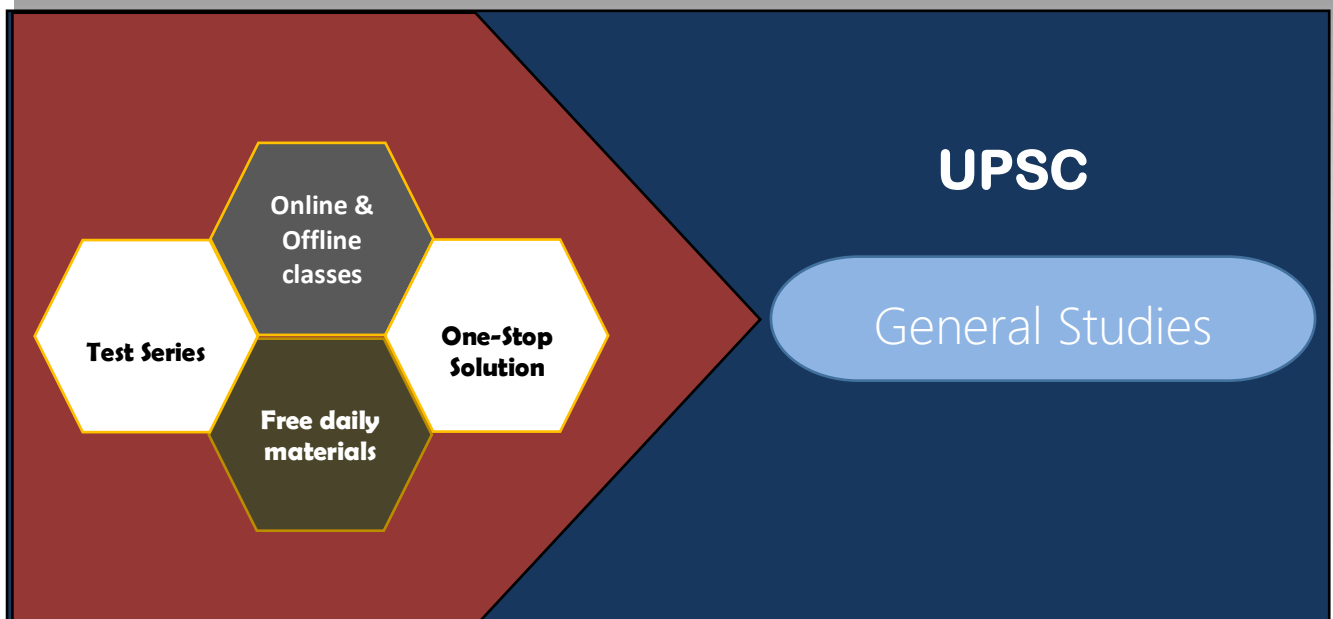
**Monthly current affairs magazine**

**SHIKSHA**

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**Articles of the day  
THE HINDU & INDIAN EXPRESS**



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## GS 1 : Heritage, culture ,Geography of the World and Society

### 1. 'Hicky's Bengal Gazette': India's First Newspaper

- **World Press Freedom Day**, observed annually on **May 3**, underscores the significance of journalism in society, tracing its roots back to pivotal moments in history.
- Hicky's Bengal Gazette, founded by James Augustus Hicky in 1780, marked the inception of Indian journalism, serving as a platform for social discourse and political critique.

#### Who was James Augustus Hicky?

- **Born in Ireland in the 1730s**, James Augustus Hicky ventured to India, then known as the "**Jewel in the Crown of the British Empire**", in search of better opportunities.
- Faced with initial setbacks, including debts that led to his **imprisonment**, Hicky demonstrated resilience by setting up a **printing press within the jail premises**.

#### Establishment of 'Hicky's Bengal Gazette':

- 'Hicky's Bengal Gazette' was the **first newspaper ever published in India** (indeed in Asia), with its inaugural edition released on **January 29, 1780**.
  - Hicky served as its **founder-editor**, aiming to **cater primarily to the European community** in Calcutta.
  - He initially focusing on local issues such as **road repairs and maintenance**.
- The newspaper later delved into broader societal concerns, including **government corruption and civic issues**.
- Despite its reputation for **gossip and salacious content**, the Gazette also published **articles critical of the British East India Company** and advocated for infrastructure development and sanitation improvements.
- Hicky's newspaper was **printed once a week on Saturday**, and **retailed for Rs 1**.
- Its circulation was estimated to be around **400 copies per week**, although possibly more.

### Challenges and Legal Battles:

- The Gazette faced legal challenges, including multiple libel
- lawsuits filed by prominent figures such as **Governor General Warren Hastings** in 1780s and missionary **Johann Zacharias Kiernander**.
- He described Hastings in an article as being **Robert Clive's "miserable successor"**.
- Hicky's **bold stance against powerful figures**, including scathing **critiques of Hastings' expansion policies**, led to his **imprisonment and financial ruin** due to legal fees and penalties.
- The publication was **ceased on 30 March 1782**.

### Legacy and Impact:

- Despite its eventual closure due to legal pressure and financial constraints, 'Hicky's Bengal Gazette' left an indelible mark on Indian journalism.
- Hicky's pioneering efforts laid the **groundwork for the development of a vibrant media landscape in India**, inspiring subsequent generations of journalists and press pioneers.
- The Gazette's brief but impactful existence demonstrated the power of the press in advocating for societal change and holding the powerful to account.

## 2. Taam Ja': World's Deepest Blue Hole

Researchers have made a discovery in Mexico, uncovering the world's deepest blue hole, known as Taam Ja' Blue Hole (TJBH).

### Taam Ja' Blue Hole (TJBH)

- TJBH extends at least 1,380 feet (**420 meters**) **below sea level**, making it the deepest known underwater sinkhole in the world.
- It is located in **Chetumal Bay** off the southeast coast of the **Yucatan Peninsula**.
- It was **first discovered in 2021**, was originally thought to be 900 feet deep.
- This discovery surpasses the previous record-holder, the **Sansha Yongle Blue Hole** in the **South China Sea**, by an impressive **480 feet**.

### Blue Holes

- Blue holes, such as TJBH, are **formed in coastal regions** with soluble bedrock, such as **limestone, marble, or gypsum**.
- Water percolates through the rock, **dissolving minerals and widening cracks**, ultimately leading to the formation of sinkholes.
- **Famous examples:** 410-foot Great Blue Hole in Belize, the 663-foot Dean's Blue Hole in the Bahamas and the 328-foot Blue Hole in the Red Sea near Dahab, Egypt.

### Research Expedition and Findings

- Scientists utilized a **conductivity, temperature, and depth (CTD) profiler** to collect data about the environmental conditions within the blue hole.
- Despite **reaching depths of 1,640 feet** (500 meters), the CTD profiler was **unable to reach the bottom** of TJBH, indicating its remarkable depth.
- Data from the profiler suggested the presence of different water layers within the blue hole, with **conditions resembling those of the Caribbean Sea** at depths below 1,312 feet (400 meters).

### 3. Demographic Transition in India

India's population growth has been a major focus, with projections of reaching 1.7 billion by 2065, according to the UN Population Division, underscoring the ongoing Transition of Demographic Dividend in India.

- Several factors have jointly triggered a demographic transition in India, the rapid pace of economic development being the key one. Lower infant and child mortality rates reducing the need to have a large family for old-age support, would be the other factor, backed by the rise in women's education and work participation rates. Improvement in housing conditions and the old-age security system are the other contributing factors.

#### Demographic Transition:

- It refers to a change in the composition of a population over time. This change can occur due to various factors such as changes in birth and death rates, migration patterns, and changes in social and economic conditions.

#### Demographic Dividend:

- It is a phenomenon that occurs when a country's population structure shifts from having a high proportion of dependents (children and elderly) to having

a higher proportion of working-age adults. This change in population structure can result in economic growth and development if the country invests in its human capital and creates conditions for productive employment.

### **Factors that triggered Demographic Transition in India:**

- The pace of economic development, particularly since the early years of the 21st century, has been a significant driver of demographic transition. Economic growth leads to improved living standards, better healthcare facilities, and increased access to education, which collectively contribute to lower fertility rates.
- Lower mortality rates among infants and children have reduced the need for families to have a large number of children for old-age support. As healthcare facilities improve and child mortality decreases, families feel more confident in having fewer children.
- Increased education and participation of women in the workforce have also played a crucial role. As women become more educated and financially independent, they tend to have fewer children and delay childbirth, leading to a decline in total fertility rates.
- Better housing conditions and access to basic amenities contribute to improved quality of life, which, in turn, affects family planning decisions.

### **Issues/Challenges Faced by Demographic Transition in India:**

- While initially, the decline in TFR leads to a fall in the dependency ratio and a larger working-age population, it eventually results in a larger share of elderly dependents. This places a strain on resources for healthcare and social welfare, similar to the situations observed in China, Japan, and European countries.
- The decline in fertility rates is not uniform across all states in India. Some states, particularly larger ones like Uttar Pradesh, Bihar, and Jharkhand, may take longer to achieve replacement-level fertility. This can exacerbate regional disparities in economic development and healthcare access.
- While the demographic transition can potentially increase labour productivity and spur economic growth, it also poses challenges in terms of managing the aging workforce and ensuring adequate skills development for the younger population.

### **Opportunities for Demographic Transition in India:**



- The demographic transition can lead to a deceleration in population growth. This can result in higher availability of capital resources and infrastructure on a per capita basis, ultimately boosting labour productivity.
- Decreasing fertility rates enable the reallocation of resources towards education and skill development, which can lead to improved human capital and workforce productivity. A declining TFR will lead to a situation where the number of children enrolling in schools is lower, as is already happening in states like Kerala. This could improve educational outcomes without additional resources being spent by the state.
- A major factor responsible for the low participation of women in the workforce is their engagement in childcare at an age when they should be in the labour force. With less time needed for childcare, one would expect more women to join the labour force in the coming decades.
- The movement of labour from regions with surplus labour to regions with growing industries can create spatial balance in the labour market. This would get an impetus with the modern sectors in the southern states, and Gujarat and Maharashtra, soliciting cheaper labour from the northern states. This, over the years, must result in improved working conditions, elimination of wage discrimination for migrant workers, and the mitigation of security concerns in the receiving states through institutional safeguards.

#### **4. Archaeologist finds first evidence of rock art in form of footprints in Mangaluru city**

The first evidence of rock art in Mangaluru city has been found near Bloor Panne Koteda Babbu Swamy shrine.

##### **Details of the discovery:**

- The rock art is in the form of a **pair of human footprints**.
- Found on a **natural stone boulder** near the shrine.
- These footprints might have been created in the **first or second century A.D.**

##### **Significance:**

- **Rock art** refers to **paintings and rock paintings**, which were **unquestionable cognitive evidence of illiterate societies**.
- This discovery is part of the work of **recreating the history of Babbu Swamy**.
- This discovery gives a clue to search for **similar art forms near other shrines of Babbu Swamy**.

- Need further exploration to know the **origin of Babbu Swamy**, a revered legend of the region.

### **Babbu Swamy:**

- In **Tulunad (Karnataka)**, two types of Daivas are worshipped.
- One type is those Daivas who come to this land with the purpose of achieving some objective.
- The other kind of Daivas are those who are **born in this world like humans** and later on become **Daivas**. **Babbu Swamy** comes under this type.
- **Babbu** was born in **Kemmannu**, a small place near **Udupi** in a **Dalith family**.

### **Previous discoveries:**

- A **rock site** in **Buddhanajeddu** in the **Udupi district** was discovered in 2009, an important **rock art site** near **coastal Karnataka**.
- The site has **more than 20 footprints** on the **laterite surface**, and it belonged to the **first or second century A.D.**
- There was **evidence of pottery and stone tools** of the **Neolithic period** at the **Buddhanajeddu site**.

## **5. The Battle of Udagai: Cholas vs. Cheras**

- The southern part of India historically ruled by the **Chera, Chola, and Pandya kings**, was known for its great literature, art, culture, and temple architecture.
- It also witnessed fierce battles among these kingdoms led by **Raja Raja I**.

### **Raja Raja I**

- His reign marked a **golden era for the Chola Empire** through extensive military conquests, administrative reforms, and cultural patronage.
- **Ponniyin Selvan** (The Son of Ponna) is a Tamil language historical fiction novel with the story of the early days of Prince Raja Raja I (also called Arulmozhiarman).

Here are detailed facts and key events from the reign of Raja Raja I:

### **Background and Ascension to the Throne:**

- **Full Name:** **Arulmozhiarman**, popularly known as **Raja Raja Chola I**.
- **Reign:**
  - He reigned from 985 AD to 1014 AD, taking the throne following the death of his father **Sundara Chola**.
  - He was succeeded by **Rajendra I**.

### Military Conquests:

Raja Raja I embarked on several military campaigns that significantly expanded the Chola Empire.

- He conquered parts of what is now Tamil Nadu, **northern parts of Sri Lanka**, and the **Maldives**, consolidating the Chola influence across the region.
- His most notable military achievement was the **conquest of the ancient Chera capital of Mahodayapuram** and the **invasion of Sri Lanka**, where he captured the northern half of the island.
- **Nagapattinam Port** was his major naval base.
- His success allowed his son Rajendra Chola to lead the Chola invasion of **Srivijaya** (Sumatra) and **Kadaram** (Malaysia).

### Administrative Reforms:

- He streamlined the administrative structure of the empire with **precise revenue collection** and management systems.
- He implemented a **well-organized provincial administration** with efficient governance, dividing his empire into various provinces under the control of local governors.

### Cultural Contributions and Temple Building:

Raja Raja I was a great patron of the arts and architecture. Under his reign, Chola architecture and Tamil literature flourished.

- **Construction of the Brihadeeswara Temple in Thanjavur** (Dravidian style).
- **Completed in 1010 AD**
- He also supported the revival of Hinduism and **promoted Shaivism**, actively endowing temples and supporting the livelihood of the temple priests. He called himself '**Shivapada Shekhara**'.
- He also **allowed for the flourishing of other religious practices** for example Vaishnavism and Buddhism.

### Trade and Diplomacy:

- His reign saw an increase in **trade and diplomatic contacts with far-off kingdoms**, including those in **Southeast Asia**.
- The Chola navy played a crucial role in **protecting and enhancing trade routes in the Bay of Bengal** and the **Arabian Sea**.

To promote trade, Rajaraja sent the **first Chola mission to China**.

### About the Battle of Udagai/Udayagiri

- It occurred in **1003 CE** between the **Cholas and the Cheras** at Udagai, now known as Udayagiri in Kalkulam taluk of Kanniyakumari district, during the **reign of Raja Raja I**, the greatest of Chola kings.
- It was the **bloodiest war** in medieval Indian history, where the **Cholas plundered Udagai and returned to their headquarters in Thanjavur** with **tonnes of gold** and the best elephants.
- The battle began with the **conquest of Kanthalur Salai** in the Chera Kingdom.
- The Chola army was **led by Raja Raja's son Rajendra**.

### Evidence from Epigraphy

- The Discovery of a Chola period epigraphy near Chengam suggests that **Salai was an army training centre** run by the Cheras.
- The training centre was a **challenge to the Cholas**.
- The battle marked the **end of the relationship between the Cholas and the Cheras**, which had been established through marriages.

### Aftermath of the War

- The battles **terminated the relationship between the Cholas and Cheras** during the reign of Rajendra Chola.
- In **1004 CE**, Raja Raja **celebrated his birthday grandly in the Chera kingdom**, renaming the village Muttam as Mummudi Chola Nalloor.
- He **granted the temple at Thirunanthikarai** for a seven-day celebration of his birthday.
- Subsequently, he **returned to Thanjavur with gold, elephants, and cattle**.
- **Kamban Manian**, a Chola general, **brought a Shiva idol made of emerald to Thirupazhanam** near Thanjavur, though it is no longer found there.

## 6. Heatwaves in India

The Indian Meteorological Department (IMD) issued a red alert for heatwaves in Delhi, Punjab, Haryana, and most parts of Western Rajasthan.

### Heatwave

- **About-** According to IMD, heatwave is a period of abnormally high temperatures, more than the normal maximum temperature that occurs during the summer season in the North-Western parts of India.

- **Occurrence**-Heatwaves typically occur between March and June, and in some rare cases even extend till July.
- **Impact**-The extreme temperatures and resultant atmospheric conditions adversely affect people living in these regions as they cause physiological stress, sometimes resulting in death.
- **Qualitatively**- Heat wave is a condition of air temperature which becomes fatal to human body when exposed.
- **Quantitatively**- Heatwave is defined based on the temperature thresholds over a region in terms of actual temperature or its departure from normal.
- **Heatwave**- If the prevalent temperature is 4.5°C to 6.4°C more than normal, it is classified as a heatwave.
- **Severe heatwave**-A rise of more than 6.4°C is considered a severe heatwave. May is the peak month for heatwaves in India.
- **For coastal areas** - When maximum temperature departure is 4.5 °C or more from normal, heat wave may be described provided actual maximum temperature is 37°C or more.
- **Vulnerable**- The States frequently affected include Punjab, Haryana, Delhi, Uttar Pradesh and Bihar.
- **Red alert**- A red alert refers to an extreme heat warning. It means that a severe heatwave has persisted for more than 2 days or the total number of heat/severe heatwave days has been more than 6 days.

### What are the factors contribute to heatwaves?

- **Climate change**- As GHG emissions increase, the Earth's atmosphere retains more heat, causing overall temperature rise. This in turn leads to extreme weather events, including heatwaves which become more common and severe.
- **El Nino**- It is a climatic phenomenon characterized by the abnormal warming of surface waters in the equatorial Pacific Ocean. El Nino years often experience
  - **Extreme temperatures**- Increased likelihood of breaking temperature records.
  - **Extended heatwave spells**- More frequent and prolonged heatwaves.
  - **Reduced pre-monsoon rainfall**- Less precipitation before the monsoon season, exacerbating the heat condition.

World Meteorological Organization (WMO) states that El Niño greatly increases the likelihood of extreme heat events both on land and in the oceans.

- **Heat dome-** It occurs when an area of high pressure traps warm air over a region for an extended period, acting like lid on a pot. Prolonged heat domes can result in deadly heatwaves due to persistent and intense heat.
- **Anticyclone-** It is a high-pressure system, involves descending air that increases in temperature as it is compressed. This results in hot, dry weather conditions.
- **Urban heat island effect-** Urban areas experience higher temperatures than rural surroundings due to the urban heat island effect. The concentration of buildings, concrete, and asphalt absorbs and retains heat, elevating temperatures during heatwaves.
- **Loss of evapotranspiration-** Due to deforestation and changing land use pattern there is loss of trees and vegetation, it leads to less cooling through evapotranspiration, leading to higher local temperatures.

### What are the impacts of heatwaves?

- **Heat exhaustion-** It is characterized by heavy sweating, weakness, dizziness, nausea, and fainting which occurs when the body loses excessive amounts of water and salt.
- **Heat stroke-** A severe, life-threatening condition where the body fails to regulate its temperature, leading to dry, warm skin, confusion, unconsciousness, and potential organ failure. Immediate medical intervention is critical.]
- **Health impact-** Heatwaves increase the incidence of heat-related illness such as heatstroke, dehydration, heat exhaustion and heat cramps.
- **Drought-** Prolonged heatwaves can exacerbate drought conditions by increasing evaporation rates and reducing soil moisture.
- **Water scarcity-** Reduced water availability affects both human populations and natural ecosystems.
- **Ecosystem stress-** Wildfires can destroy habitats, reduce biodiversity, and disrupt ecological balances.
- **Economic impact-** Farmers and the food industry face significant economic losses due to reduced productivity and increased costs for irrigation and livestock care.
- **Food security-** Reduced agricultural output can lead to food shortages and increased food prices, affecting food security for populations.
- **Infrastructural damages-** Prolonged heat can damage infrastructure such as roads, railways, and power lines, further compounding the challenges during heatwave.

### What are the precautions that should be taken for heatwaves?

- **NDMA-** National Disaster Management Authority (NDMA) has prescribed the following measures can be taken to minimise heatwave impact.
- **Avoid sun exposure-** Stay indoors during the hottest part of the day, especially between noon and 3 pm. If you need to be outside, use protective gear like a hat or an umbrella.
- **Stay hydrated-** Drink plenty of water, even if you don't feel thirsty. Staying hydrated is essential to prevent heat-related illnesses.
- **Appropriate clothing-** Wear lightweight, light-coloured, loose-fitting, and breathable cotton clothes. Protect your eyes with goggles, and use an umbrella or hat to shield yourself from direct sunlight.
- **Avoid dehydrating beverages-** Limit alcohol, tea, coffee, and carbonated soft drinks, as they can dehydrate your body. Instead, opt for oral rehydration solutions (ORS) or homemade drinks like lassi, torani (rice water), lemon water, or buttermilk.
- **Treatment of heatstroke-** Immediate action is to lay the person in a cool place, wipe with a wet cloth and pour normal temperature water on head. Hydrate the person with ORS and other liquids finally the person must be taken to the nearest health centre or hospital promptly.

## 7. La Nina & its impact on global weather

The India Meteorological Department (IMD) forecasted above-normal rain in the upcoming monsoon season in India, with “favourable” La Nina conditions expected to set in by August-September.

### What is ENSO?

- El Nino and La Nino together called as El Nino Southern Oscillation which affects weather events across the world.

### How La-Nina will impact global weather?

- **Asia and the Indian Subcontinent-** It brings above-average rainfall, benefiting regions like India by *enhancing the monsoon*.
- **Water shortage-** However, eastern and north-eastern India may receive *below-average rainfall*, potentially leading to water shortages.
  - Increased thunderstorms and lightning during La Niña years pose risks, especially during peak agricultural seasons.
- **Southeast Asia-** Countries such as Indonesia, the Philippines, and Malaysia often experience *increased rainfall*, leading to flooding risks.

- **North America-** Southern regions, including the *southern U.S.*, face drier and warmer conditions, potentially causing *droughts*.
  - Conversely, the *Pacific Northwest and Canada* can experience *heavier rainfall* and flooding.
- **Africa-** Southern Africa generally sees higher rainfall, while eastern regions might suffer from drought.
- **Atlantic Ocean-** La Niña years see heightened hurricane activity, with more frequent and intense storms.

### How the climate change is impacting ENSO?

- **Increased frequency-** Studies suggest global warming could lead to more frequent and intense El Niño events.
- **Extreme weather events-** This would affect weather patterns and climatic conditions globally, exacerbating extreme weather events.
- **Shifts in ocean conditions-** Warming oceans can alter the baseline conditions, potentially triggering more pronounced ENSO cycles.
- **WMO warning-** The World Meteorological Organization (WMO) suggests that climate change is likely to increase the intensity and frequency of extreme weather events such as severe heatwaves, droughts and storms associated with both El Niño and La Niña.

### 8. Nor'westers (Kalbaisakhi)

Meteorologists will soon be able to deploy drones, mobile vans and high-end instruments to track the monstrous nor'westers, or Kalbaisakhi.

#### Nor'westers (Kalbaisakhi):

- Nor'westers commonly begin over the **Chhotanagpur Plateau**, gaining strength as they move southeastward across Eastern India, particularly impacting states like **Odisha, West Bengal, and Assam**.
- These storms predominantly occur during the transition from spring to summer, mostly observed **from mid-April to mid-May**.

#### Characteristics:

- Accompanied by strong, gale-speed winds often exceeding 100 km/h.
- Features heavy rainfall, thunder, and lightning.
- Hailstorms and occasionally tornadoes are also reported, adding to their intensity.

#### Impact:



- Can cause significant agricultural damage due to strong winds and hail.
- Often leads to infrastructure damage, including downed power lines and structural damage.
- The sudden onset and intensity necessitate staying indoors and securing loose objects.

#### Atmospheric Conditions:

- Formation is influenced by the collision of hot moist air from the **Bay of Bengal** with dry land air from **northwest India**, underpinned by high **surface temperatures and moisture**.

### 9. Collapse of Earth's magnetic field

Recent research on ancient rocks from South Africa and Brazil suggests that a significant weakening of **Earth's magnetic field** around **591 million years ago** may have boosted **oxygen** levels, potentially paving the way for the **evolution** of **complex life forms**.

#### Key Findings:

##### Weakening of Magnetic Field:

- Earth's magnetic field experienced a major weakening about **591 million years ago**.
- This period aligns with the **Ediacaran era** (635 million to 541 million years ago).

##### Implications for Oxygen Levels:

- The **weakening** of the magnetic field may have led to an increase in atmospheric and oceanic oxygen levels.
- Enhanced oxygen levels likely contributed to the **evolution of larger** and more mobile life forms.

#### Mechanism of Magnetic Field Weakening

##### Earth's Core Dynamics:

- The magnetic field is generated by the movements of **Earth's iron-rich core**.
- Currently, the field's strength is maintained by the churn of the **outer liquid core**, driven by heat from the **crystallizing solid inner core**.
- Prior to the **solidification** of the **inner core**, the magnetic field was sustained by heat transfer from the entirely liquid core to the mantle.

### Cooling and Reduced Churn:

- Over time, the core's cooling reduced the **temperature difference** between the **mantle** and **core**, decreasing the efficiency of heat transfer.
- This reduction in **heat transfer** weakened the magnetic field.

### Impact on Evolution:

#### Ediacaran Oxygenation:

- The weakened magnetic field, approximately 30 times weaker than today, coincided with the **Ediacaran oxygenation event**.
- The weakened field allowed **more hydrogen** to escape into space, reducing the amount of hydrogen available to bind with **oxygen**.
- This led to an increase in **free oxygen** in the atmosphere and oceans.

#### Evolutionary Advantage:

- **Increased oxygen levels** provided conditions for organisms to grow larger and become more mobile.
- This period of **weak magnetic field** strength and increased oxygenation may have been a pivotal moment in the evolution of complex life.

## GS 2 : Polity, Governance, International Relations

### 1. Religion-based' reservation in India

India is debating fundamental constitutional questions around reservation during Lok Sabha elections 2024.

#### Why the Indian Constitution says on religion-based reservation?

- **Affirmative action**- The Indian Constitution provides for affirmative action measures such as reservation to address historical injustices and inequalities.
- **Articles 16(4)**- It enables the state to make any provision for reservation in favour of any backward class of citizens which is not adequately represented in the services under the state".
- **1<sup>st</sup> Amendment Act, 1951**- It inserted Article 15(4), which empowered the state to make "any special provision for the advancement of any socially and educationally backward classes of citizens or for the Scheduled Castes and the Scheduled Tribes".

- **Religion based reservation-** The reservation based solely on religion is prohibited by Article 15, which prohibits discrimination on grounds of religion, caste, sex, race, or place of birth.
- **Constitutional provisions-** The term “only” in Articles 15 and 16 implies that if a group is socially and educationally backward, it is entitled to special provisions.
- **Muslim reservations-** Some Muslim castes received reservations because they were part of the backward class, not solely because they were Muslims.
- **Mandal commission, 1979-** It identified various socially and educationally backward classes, including certain Muslim castes, and recommended their inclusion in the OBC category. This inclusion was based on social and economic criteria rather than solely on religious identity.
- **Indra Sawhney case, 1992-** The Supreme Court ruled that any social group meeting the criteria for backwardness should be treated as a backward class, regardless of their specific identity.

### What are the state level initiatives that included special provisions for Muslims?

- **Kerala-** Muslims, who constituted 22% of the population, were included within the OBCs.

The concept of religion-based reservation was initially introduced in 1936 in the Travancore-Cochin state.

- **Karnataka-** The 3<sup>rd</sup> Backward Classes Commission of the State headed by Justice O Chinnappa Reddy (1990) found that Muslims fulfilled the requirements for being considered among the backward classes.
- **Tamil Nadu-** Based on the recommendations of the 2<sup>nd</sup> Backward Classes Commission of the State headed by J A Ambasankar, the State provided within the 30% OBC quota, a sub-category of Muslims with 3.5% reservation in 2007, this did not include upper-caste Muslims.
- **Andhra Pradesh-** In 1994, the question of Muslim reservation was referred to the Andhra Pradesh Backward Classes Commission. By 2004, based on a report highlighting the backwardness of Muslims, the government provided a 5% reservation.
- **Judicial intervention** - The High Court struck down the reservation due to a lack of mandatory consultation with the Andhra Pradesh Commission for Backward Classes and absence of data for determining backwardness.
- **M R Balaji vs State of Mysore, 1962-** The High court referred to this case and stressed that social backwardness should not solely rely on caste considerations and acknowledged that the Muslim community as a whole could be socially backward in certain states.

- However, the court affirmed that reservations for Muslims do not conflict with the secular nature of the Constitution.

The Supreme Court has recognized that Muslims, like other religious groups, can be socially backward and thus eligible for reservations under Articles 15(4) and 16(4).

- In 2007, a law was enacted giving reservation to only 14 Muslim castes with occupational similarities to Hindu castes already enjoying reservation.
- This law was also struck down, and the Supreme Court's final decision on its constitutionality is pending.
- **Telangana-** After the bifurcation in 2014, the Telangana government proposed a 12% reservation for OBC Muslims based on the G Sudhir Commission's findings with the aim to address the educational and economic disparities faced by Muslims compared to other communities.
- The proposal exceeded the 50% reservation cap set by the Supreme Court and was referred to the central government for inclusion in the Ninth Schedule. However, the central government did not bring the proposal to Parliament.
- **Judiciary stand-** Some of these reservation policies have faced legal challenges, particularly regarding the criteria used for determining backwardness and the extent of reservation.
- Courts have emphasized the importance of ensuring that reservation policies are based on objective criteria and do not violate the constitutional principles of equality and non-discrimination.
- **SC/ST reservation-** The reservation for Muslims is intersected with the reservation for SCs and STs but the reservation for SCs and STs is based on historical disadvantage and social exclusion, rather than religious identity.

### **What are the Centre's intervention on special provisions for Muslims?**

- **Justice Rajinder Sachar Committee, 2006-** It found that the Muslim community was almost as backward as Scheduled Castes (SCs) and Scheduled Tribes (STs), and more backward than non-Muslim Other Backward Classes (OBCs).
- **Justice Ranganath Misra Committee, 2007-** It suggested a 15% reservation for minorities, with 10% specifically for Muslims.
- **Executive Order, 2012-** The government issued an order providing 4.5% reservation for minorities within the existing 27% OBC quota.
- **Presidential order, 1950-** It specified that only Hindus could be included in the SC list, however Sikhs were included within SCs in 1956, and Buddhists in 1990.

Article 341 of the Constitution allows the President to specify Scheduled Castes (SCs) for each state or union territory, it also emphasizes that only Hindus are eligible for inclusion within SCs.

### What lies ahead?

- While Sikhs and Buddhists were included within SCs, Muslims and Christians remain excluded.
- This exclusion raises questions about whether such reservations are based on religion, given the religious distinctions in eligibility criteria.

## 2. Constitutional Framework Related to Custodial Death

The Supreme Court has emphasized the necessity of adopting a “more rigorous approach” when considering bail applications from police officers charged in cases of custodial deaths.

- Observing that a police officer may wield more influence than an ordinary person the Supreme Court has set aside the bail granted to a police constable in a case of custodial death.

### Custodial Death:

- Custodial death refers to a death that occurs while a person is in the custody of law enforcement officials or a correctional facility.
- It can occur due to various causes such as the use of excessive force, neglect, or abuse by the authorities.
- According to the Law Commission of India, the crime by a public servant against the arrested or the detained person who is in custody amounts to custodial violence.
- Article 21 of the Constitution of India guarantees the right to life and personal liberty, which includes the right to be free from torture and other cruel, inhuman, or degrading treatment or punishment.
- Article 20 grants protection against arbitrary and excessive punishment to an accused person, whether a citizen or foreigner or a legal person like a company or a corporation. It contains three provisions in that direction – No ex-post-facto law (Article 20 (1)), No double jeopardy (Article 20 (2)), and No self-incrimination (Article 20 (3)).
- In *Selvi v. State of Karnataka*, the court observed that the state could not perform narco-analysis, polygraph, and brain-mapping tests on any individual without their consent.

### Legal Protections Associated with Custodial Death:

- Section 24 Indian Evidence Act, of 1872 declares that all the confessions made by the accused by succumbing to the threat of investigating agencies would not be admissible in a court of law. This Section primarily works to prevent the accused from giving confessions using force against his will.
- Sections 330 and 331 of the Indian Penal Code (IPC) criminalise voluntarily causing hurt or grievous hurt to extort confession or information from any person.
- Section 41 of the Criminal Procedure Code (CrPC) was amended in 2009 to include safeguards so that: Arrests and detentions for interrogation have reasonable grounds and documented procedures; Arrests are made transparent to family, friends, and the public, and there is protection through legal representation.

### **International Conventions Against Custodial Torture:**

- International Human Rights Law of 1948 contains a provision that protects people from torture and other enforced disappearances.
- United Nations Charter of 1945 calls for treating prisoners with dignity. The Charter clearly states that despite being prisoners, their fundamental freedoms and human rights are set out in the Universal Declaration of Human Rights, the International Covenant on Civil and Political Rights, and the International Covenant on Economic, Social, and Cultural Rights. The International Human Rights Law contains a provision that protects people from torture and other enforced disappearances.
- The Nelson Mandela Rules of 2015 were adopted by the United Nations General Assembly in 2015 to treat prisoners with inherent dignity and to prohibit torture and other ill-treatment.
- United Nations Convention Against Torture (UNCAT) is an international human rights treaty under the purview of the United Nations that aims to prevent torture and other acts of cruel, inhuman, or degrading treatment or punishment around the world.

### **Way Forward to Combat Custodial Torture:**

- Strengthening Legal Systems by enacting comprehensive legislation explicitly criminalising custodial torture like Supreme Court directives in Prakash Singh Case 2006. SC directed the separation of investigation and law and order functions to better improve policing, setting up of State Security Commissions (SSC) that would have members from civil society, and forming a National Security Commission.
- By ensuring prompt and impartial investigations into allegations of custodial torture.

- By enhancing police training programs to emphasise respect for human rights and dignity.
- By promoting a culture of accountability, professionalism, and empathy within law enforcement agencies.
- By establishing oversight mechanisms to monitor and address cases of custodial torture effectively.
- Empowering Civil Society and Human Rights Organisations to actively advocate for victims of custodial torture. The National Human Rights Commission (NHRC) should be allowed to inquire into any matter even after one year from the date of the alleged human rights violation. Its jurisdiction should be expanded to cases of human rights violations by armed forces with appropriate measures.
- By providing support and legal assistance to victims and their families.
- By collaborating with international human rights bodies and organisations to seek redress and justice.

### 3. Issues related to labour statistics

#### Trade unions can play a pivotal role in producing labour statistics

- **Lack of Rigorous Labour Statistics:** Labour statistics are not as robust as economic and industrial data. While institutions like the Annual Survey of Industries (ASI) and the National Sample Survey Office (NSSO) provide valuable information.
- **Voluntary Reporting of Work Stoppages:** Data collection on work stoppages relies on voluntary reporting, which may lead to underreporting or incomplete information. This lack of comprehensive data on strikes and other work stoppages affects the accuracy and reliability of labour statistics.
- **Limited Use of Evidence in Social Dialogue:** Lack of evidence-based arguments in these dialogues undermines their effectiveness, leading to a perception of the ILC as a mere “talking shop.”
- **Class-Based Opinions without Data Support:** Stakeholders often advocate for labour reforms based on “class-based opinions” rather than credible data or empirical evidence.

#### The role of trade unions in producing labour statistics:

- **Data Collection on Labour Inspection:** Trade unions can gather information and statistics on labour inspection practices, including the number of sanctioned and employed inspectors, inspection frequency, and coverage.

This data can highlight deficiencies in inspection systems and advocate for their strengthening.

- **Monitoring Retrenchment and Closure Applications:** Trade unions can track retrenchment and closure applications submitted to labour departments, along with permissions granted or refused. This data can provide insights into the prevalence of denials and the impact of labour regulations on job security.
- **Analysis of Strikes and Lockouts:** Trade unions can utilize data on strikes and lockouts published by agencies like the Labour Bureau to analyze trends and patterns. This analysis can inform discussions on labour laws and industrial relations, challenging the need for harsher clauses on strikes.
- **Evidence-based arguments:** Trade unions can use objective data and empirical studies to contest labour reforms in policy debates. By presenting evidence-based arguments, trade unions can influence decision-making processes and advocate for policies that promote workers' rights and well-being.

### Conclusion:

Implement more robust and standardized data collection methods for labour statistics to ensure accuracy and consistency across different sources. This may involve leveraging technology, such as digital reporting systems, to streamline data collection processes.

## 4. Implementing the Street Vendors Act

Celebrated as a progressive legislation (Street Vendors Act), the Act now faces numerous challenges in its implementation.

### The Street Vendors (Protection of Livelihood and Regulation of Street Vending) Act, 2014

- It is an Act of the Parliament of India enacted to regulate street vendors in public areas and protect their rights.
- The Act aims to protect the rights of urban street vendors and regulate street vending activities. It delineates the roles and responsibilities of both vendors and various levels of government.
- According to the Ministry of Housing and Urban Poverty Alleviation, there are around 10 million street vendors in India, with major cities like Mumbai, Delhi, Kolkata, and Ahmedabad.



## Significance of street vendors

- **Role of Street Vendors:** Street vendors constitute about 2.5% of any city's population and play multifaceted roles in city life, providing essential services, modest income for migrants and the urban poor, and affordable goods for others.
- **Integral to Urban Life:** Street vendors are essential for maintaining affordability and accessibility to food, nutrition, and goods distribution, and they are integral to the cultural fabric of cities like Mumbai and Chennai.

## Challenges related to Act implementation

- **Administrative Challenges:** Increase in harassment and evictions of street vendors despite the Act's emphasis on protection and regulation. Outdated bureaucratic mindset viewing vendors as illegal entities.
- Lack of awareness and sensitization about the Act among state authorities, the public, and vendors.
- Limited influence of street vendor representatives in Town Vending Committees (TVCs), often remaining under the control of local city authorities. Tokenistic representation of women vendors in TVCs.
- **Governance Challenges:** Weak existing urban governance mechanisms.
- Lack of integration of the Act with the framework established by the 74th Constitutional Amendment Act for urban governance.
- Insufficient powers and capacities of ULBs.
- Focus of top-down policies like the Smart Cities Mission on infrastructure development, ignoring provisions for the inclusion of street vendors in city planning.
- **Societal Challenges:** Prevailing image of the 'world-class city' tends to be exclusionary. Marginalization and stigmatization of street vendors as obstacles to urban development rather than legitimate contributors to the urban economy.
- Reflection of these challenges in city designs, urban policies, and public perceptions of neighborhoods.

## Way forward

- **Decentralization of Interventions:** There's a need to decentralize interventions and enhance the capacities of Urban Local Bodies (ULBs) to plan for street vending in cities.
- **Shift from Department-led Actions to Deliberative Processes:** Moving away from high-handed department-led actions towards actual deliberative processes at the Town Vending Committee (TVC) level is crucial.

- **Amendments to Urban Schemes and Policies:** Urban schemes, city planning guidelines, and policies need to be amended to include provisions for street vending.
- **Need based Welfare Provisions:** Broad welfare provisions of the Act should be used creatively to meet the emerging needs of street vendors, such as addressing the impact of climate change, competition from e-commerce, and reduced incomes.
- **Adaptation in National Urban Livelihood Mission:** The sub-component on street vendors in the National Urban Livelihood Mission should acknowledge changed realities and facilitate innovative measures to address needs.

## 5. Shanghai Cooperation Organisation (SCO)

India's Defence Secretary participated in a crucial Defence Ministers' meeting alongside counterparts from Shanghai Cooperation Organisation (SCO) member states in Astana, Kazakhstan.

### Key highlights of the meet:

- During the gathering, a significant protocol was signed, underscoring the collective commitment of all SCO members towards fostering peace and cooperation in the region.
- The meeting concluded with a **Joint Communiqué**, emphasizing key agreements and initiatives, including the embrace of the ethos of '**One Earth, One Family, One Future**', inspired by the timeless Indian philosophy of '**Vasudhaiva Kutumbakam**'.
  - Vasudhaiva Kutumbakam is a Sanskrit phrase found in Hindu texts such as the **Maha Upanishad**, which means "**The World Is One Family**".

### About SCO:

- SCO is a **permanent intergovernmental international** organization established in 2001 at **Shanghai summit** by the **Kazakhstan, China, Kyrgyz Republic, Russia, Tajikistan** and **Uzbekistan**.
- It is the **successor to the Shanghai Five, formed in 1996** between the China, Kazakhstan, Kyrgyz Republic, Russia, and Tajikistan.
- SCO has nine member countries (**India** Joined in 2017), three observer countries and Six countries have dialogue partner status with the SCO.
- The official languages of the SCO are **Russian and Chinese**.
- The SCO is governed by the **Heads of State Council (HSC)**, its supreme **decision-making body**, which meets once a year.

- The organization also contains the **Regional Antiterrorist Structure (RATS)**.
  - Executive Committee of the Regional Anti-Terrorist Structure (RATS) is in **Tashkent**.

### Principles:

- Internally, the SCO upholds the "**Shanghai spirit**" of **mutual trust, mutual benefit, equality, consultation, respect for diversity of civilizations, and pursuit of common development**.
- Externally, it **advocates non-alignment**, avoids targeting other countries or regions, and **promotes openness**.

### Goals of the SCO:

- To **strengthen mutual trust**, friendship and good-neighborliness between the Member States;
- To **encourage the effective cooperation** between the Member States in such spheres as politics, trade, economy, science and technology, culture, education, energy, transport, tourism, environmental protection, etc.
- To **jointly ensure and maintain peace, security and stability** in the region; and
- To **promote a new democratic, fair and rational international political and economic international order**.

### Significance of SCO for India:

- **Regional Security:** RATS **collaboration on security and intelligence sharing** to address challenges like **terrorism, extremism, and drug trafficking**.
- **Economic Opportunities:** Opens avenues for **energy procurement, infrastructure projects, and trade with Central Asia**.  
**Energy Cooperation:** Central Asia's rich **reserves of oil, natural gas, and minerals** like uranium are vital for energy security.
- **Diplomatic Engagement:** Offers a platform to **manage relations with neighbors**, including China and Russia, and **counterbalance Chinese influence**.
- **Connectivity Projects:** Supports India's initiatives for **regional connectivity** by giving boost to initiatives like Chabahar Port, International North-South Transport Corridor (INSTC), etc.
- **Cultural Exchanges:** Enhances cultural and educational ties with SCO countries, fostering mutual understanding.
- **Multilateralism:** Provides an avenue for **promoting multilateralism** and a more **inclusive global governance framework**.

### Challenges for India in SCO:

- **Balancing Relations:** India is part of the **Quad**, which requires it to balance its relations with China and Russia, who have different regional and global priorities.
- **Anti-Western forum:** Western countries perceive the SCO as an anti-Western forum.
- **Security Concerns:** Addressing security issues, particularly with **neighboring Pakistan and China**.
- **Economic Competition:** Navigating economic dynamics with **dominant regional players**, especially **China**.
- **Connectivity Projects:** Dealing with regional connectivity initiatives that conflict with India's sovereignty concerns, such as the **Belt and Road Initiative**.

### 6. Recognize 'this leave' as a woman's right

The DMK's 2024 election manifesto in Tamil Nadu pledges to advocate for a law mandating menstrual leave for women, promoting gender equality and women's welfare.

### Tracking Regional Progress:

- **Indian States:**
  - The Kerala Sahitya Academy published work, Kerala in 19th Century, mentions that Kerala was the first (in the Cochin State) to recognize the need for " period leave" for students and allowed it during examinations in 1912.
  - Kerala, in January 2023, introduced menstrual and maternity leave to all students above the age of 18.
  - Bihar, in 1992, allowed government employees two-day menstrual leave.
- **Asian Countries:**
  - Japan introduced menstrual leave in 1947, Indonesia in 1948, and South Korea. Taiwan and Vietnam have also implemented paid leave. But concerning the Asian countries, the progress made by the western world, except in Sweden and Spain, is still abysmal.

### Global Scenario:

- **International Labour Organisation** report, in 2003, asked nations to recognise menstrual leave.
- The **World Health Organization** recognised a non-governmental organisation driven World Menstrual Hygiene Day on May 28 from 2014.
- India's new code on Social Security, 2020, passed by Parliament, which consolidated existing labour laws (yet to be notified), has not included the aspect of menstrual leave in its code.

### Legal Initiatives in India:

- **Bill in Tamil Nadu:** In December 2021, S. Jothimani, Congress Member of Parliament (MP) from Tamil Nadu, had introduced a Private Member Bill named, 'Right to Menstrual Hygiene and Paid Leave Bill, 2019', which sought to bring menstrual leave into the ambit of the rights of a woman.
- **Bill in Arunachal Pradesh:** Congress MP from Arunachal Pradesh, introduced a private member Bill on menstrual leave in 2017 (the Menstruation Benefit Bill, 2017).
- **Bill in Kerala:** Shashi Tharoor, Congress MP from Kerala, introducing a similar Bill named The Women's Sexual, Reproductive and Menstrual Rights Bill, 2018.
- **The Supreme Court of India**, early in 2023, **refused** to entertain a public interest litigation in Shailendra Mani Tripathi vs Union of India which sought direction to the state on menstrual leave; it thought that it is in **the policy domain of the government**.

### Way Forward:

- **Legislation and Policy Implementation:** Advocate for the passage of bills at both the state and national levels that mandate menstrual leave for women. Additionally, ensure effective implementation and enforcement of these policies to guarantee that women can avail themselves of their entitled leave without fear of discrimination or repercussions.
- **Awareness and Education:** Launch comprehensive awareness campaigns to remove shame of menstruation and promote understanding of its biological, social, and cultural aspects.

## 7. Historical context of property rights in India

Supreme Court has constituted a nine-judge Bench to interpret the Directive Principles of State Policy (DPSP) with respect to ownership and control of material resources.

- **Right to property-** The Constitution initially recognized the right to property as a fundamental right under Article 19(1)(f).
- **Article 31-** It also stated that the State shall pay compensation in case of private property acquisition.
- **Amendments-** Due to limited resources and the need for flexibility in land acquisition, amendments were made notably Article 31A, Article 31B, and Article 31C.
- **Judicial interpretation-** The Supreme Court has adjudicated on the balance between fundamental rights and DPSP, particularly in cases like Golak Nath case (1967), Kesavananda Bharati (1973) and Minerva Mills (1980).

The Supreme Court ruled that the Constitution exists on a harmonious balance between fundamental rights and DPSP.

- **Current status-** Right to private property remains a crucial aspect of both constitutional and legal frameworks. When the state seeks to acquire private property, it must adhere to specific principles
  - **Public purpose-** Any law allowing the state to acquire private property should serve a public purpose.
  - **Adequate compensation-** Property owners must receive fair and just compensation when their land or assets are acquired

### What lies ahead?

- Growing inequality is a global challenge within liberalized open-market economies. While innovation and growth are essential, it is crucial for government to protect the interests of marginalized and economically vulnerable populations.
- Past policies, such as high tax rates, estate duties, and wealth taxes, did not always achieve their intended goals and sometimes led to hiding income or assets to avoid taxation or for other financial advantages.
- Balancing economic growth with equitable distribution is essential. Policies should be carefully framed through debate and consideration of current

economic models. Ultimately, the underlying principle remains consistent: economic justice for all, as enshrined in our Constitution

## 8. A New Vision for Agriculture Sector

The Centre is contemplating the establishment of the **National Council for Agriculture and Rural Transformation (NCART)**, envisioned as a federal body to formulate policies and programs for the agricultural sector.

### NCART

- The NCART is a **proposed federal body** aimed at coordinating and driving actions in the agriculture sector in India.
- It would have representation of both the Centre and States.
- The idea for NCART has been proposed by the **Ministry of Agriculture and Farmers' Welfare** as part of its **100-day action plan** for the new government.
- It draws inspiration from the Goods and Services Tax (GST) Council.

### Terms of Reference of NCART:

- **Policy Formulation:** NCART is envisioned as an overarching federal body responsible for devising policies and programs to promote agricultural and rural development.
- **Coordination:** One of the key objectives of NCART is to ensure coordinated actions across various stakeholders involved in the agriculture sector, including the central government, state governments, and other relevant entities.
- **Consultative Body:** NCART is expected to include representation from both the central and state governments, similar to the Goods and Services Tax (GST) Council, to ensure a consultative approach in decision-making.
- **Legal Status:** While the GST Council is a constitutional body, the exact status of NCART is yet to be finalized.

## 9. India and Greece Relations

During extensive talks between Prime Minister Narendra Modi and his Greek counterpart Kyriakos Mitsotakis held recently, the leaders aimed to inject “new energy” into their bilateral ties.

- India’s contacts with Greece began over 2500 years ago. Trading between the Mauryan Kings and Greece is evidenced by coinage and writings. In 326 BC, Alexander the Great invaded the North-Western part of the Indian subcontinent as far as the Hyphasis (Beas River), and fought with Raja Puru, King of Pauravaa – between the Jhelum and Chenab), and Ambhi who ruled at Taxila. He did not cross the Indus into India; and turned South and apparently went back to Babylon.

### India and Greece Relations:

- Greece has historical linkages with India as Chanakya, in Chandragupta’s Court records in Arthashastra mentioned the Yavan Ambassador in the Kings’ court, named Megasthenes. Trading between Mauryan Kings and Greece is evidenced by coinage and writings. Gandhara art is believed to be a fusion of Indian and Greek influences.
- Diplomatic relations were established between the two countries in 1950. Greece opened its Embassy in Delhi in 1950 and India in Athens in 1978.
- Agreement on Science and Technology was ratified by both sides to encourage and support cooperation in the science and technology field based on equality and mutual benefit.
- Greece supported India’s membership at NSG (National Supplier Group) and bid for a permanent seat on the United Nations Security Council.
- India’s relations with Greece and Armenia are crucial in the context of an emerging Turkey-Pakistan-Azerbaijan military axis (often referred to as the Three Brothers) and can counter increased Chinese presence in the region.
- Greece borders the Mediterranean Sea, which covers three continents, i.e., Asia, Africa, and Europe, and thus can help enhance India’s outreach to the Mediterranean region. The Mediterranean region is vital for India’s Indo-Pacific policy.
- India is exploring a multi-modal link between Mumbai and the European mainland via the Greek transshipment port of Piraeus. This will allow much faster shipment of Indian goods to markets in the entire Eurasian region.
- The Mediterranean region can be a potential source to meet India’s increasing energy demand and enhance energy security given its vast resources of oil (1.7 billion barrels) and gas (112 trillion cubic feet). Greece’s abundant sunshine and its robust wind energy capacity present substantial untapped opportunities for electricity generation.



- With Greece expanding its defence expenditure from US\$5 billion to 8.4 billion (2019- 2022), it can act as a potential market for India's defence exports. India and Greece have engaged in joint naval exercises in the Mediterranean Sea and multinational air force exercise INIOCHOS-23.

#### **Issues/Concerns associated with India- Greece Relations:**

- The absence of high-level interaction in four decades has resulted in a lack of strong strategic connections.
- Chinese state-owned shipping company COSCO has approx. 60% stake in the Piraeus port and thus can hamper India's connectivity plans and trade opportunities through the port.
- India's trade relations with Greece face challenges characterised by limited business opportunities, insufficient investment and capital inflow, a shortage of enterprises capable of bolstering exports, etc.

#### **Way Forward:**

- Greece and Cyprus are two EU member states that can act as a bridge between the European Union and India, and thus, urgent steps are required to strengthen bilateral ties.
- India can extend its Line of Credit, utilise its soft power and diaspora to counter China's presence and provide an alternative to China's Debt Trap Policy.
- Collaborate on tourism promotion efforts, including joint marketing campaigns and improved air connectivity. Greece is emerging as a popular tourist destination among Indians.
- Enhance cooperation on maritime security, including information sharing and joint naval exercises.

#### **10. Key Reasons for Re-polling:**

The Election Commission of India recently conducted **re-polling** at various stations in Manipur and Arunachal Pradesh.

- This was necessary due to several disruptions, including **booth capturing** and **EVM malfunctions**.
- **Booth Capturing:** This involves the unlawful control of polling stations, which can intimidate voters or affect the vote count.

- Under the Representation of the People Act (RPA), 1951, the penalty for civilians ranges from **1-3 years**, and for government employees, it is **3-5 years**.
- This is detailed in **Section 58A** of the RPA 1951.
- **EVM Complications:** Problems such as unauthorized access, destruction, or malfunctioning of Electronic Voting Machines are addressed under **Section 58**.
- **Natural Disasters:** Events like floods, storms, or riots that disrupt the polling process are covered under **Section 57**.
- **Death of a Candidate:** If a candidate from a recognized political party dies after nomination but before the polling date, it is addressed under **Section 52**.

### Procedures Following Election Disruptions:

- The Returning Officer (RO) informs the Election Commission (EC) and state officials immediately if **disruption occurs**. The EC then decides **whether to void the poll**.
- The public is informed through announcements, written notices to candidates, and drum beats in affected areas to ensure everyone is aware of the re-polling.
- New polling dates are set by the EC. Only those who did not vote in the original poll are allowed to vote in the re-poll. To ensure this, the **left middle finger** of voters is inked during the re-poll.

### Implications of Major Disruptions:

- **Severe Booth Capturing:** If multiple stations are affected or if the integrity of the vote count is compromised, the election for the entire constituency may be countermanded.

## 11. Muslim inheritance laws in India

The Supreme Court of India will examine if former Muslims should be governed by Muslim personal law or secular laws in succession matters.

### What is the case before Supreme Court?

- A petitioner representing former Muslims in Kerala, has filed a plea with the court seeking that individuals who choose not to be governed by Muslim Personal Law should have the option to be governed by secular law specifically Indian Succession Act, 1925.

- **Succession-** In India, issues related to succession are governed by the Indian Succession Act of 1925, the Hindu Succession Act of 1956 and the Muslim personal law or Shariat.
- **Sabarimala verdict-** The petitioner cited the Supreme Court's 2018 ruling in the Sabarimala temple entry case, which highlighted the right to freedom of religion under Article 25 of the Indian Constitution.
- **Shariat law-** The petitioner approached the the court seeking a declaration to not be governed by the Shariat for matters under Sections 2 and 3 of the 1937 Act.
- The petitioner claimed that the Indian Succession Act, 1925 can be applied for both intestate (without a will) and testamentary (with a will) succession.
- This plea is rooted in the right to freedom of religion as per Article 25 of the Indian Constitution.

Article 25 emphasizes the right to not follow any religion and the associated civil rights, such as inheritance, without facing discrimination.

- The case is significant as it addresses the legal challenges faced by those who leave their faith but are still subject to religious laws in personal matters.

#### What does the court decide?

- The Supreme Court, initially indicating that Muslims are governed by Shariat regardless of their beliefs, eventually agreed to hear the case.
- The court noted the absence of a secular law on wills and legacies for Muslims and directed responses from the Central and Kerala governments.

## 12. Governor immunity from criminal prosecution

Recently West Bengal Governor instructed Raj Bhavan staff to ignore any communication from Kolkata Police in connection with the sexual harassment complaint filed against him.

#### What does the Constitution say about criminal prosecution against Governor?

- **Article 361-** The President or the Governor is not answerable to any court the exercise and performance of the powers and duties of office.
- **Criminal proceedings-** The article says that no criminal proceedings shall be instituted or continued against the President or the Governor in any court during his term office.

- **No process to Arrest/ imprisonment-** The article ensures that no process for the arrest or imprisonment of the President or Governor shall be issued from any court during his term of office.
- **Civil proceedings-** It can be initiated against President and Governor for their personal acts after a notice period of 2 months.
- **Duration of immunity-** The immunity provided by Article 361 is limited to duration of their in office, once their term expires or they resign from their position, they can be subject to legal proceedings like any other citizen.
- **Balance of powers-** The article reflects the framers' intention to maintain a balance of powers between the executive, judiciary, and legislative branches of government.
- **Prevent interferences-** By providing immunity to certain constitutional officeholders, it aims to prevent undue interference or harassment that could impede the functioning of these offices.

### What is the Supreme Court's stand on Article 361?

- **Rameshwar Prasad vs Union of India, 2006-** The Supreme Court held that the Governor enjoys complete immunity under Article 361 of Constitution.
- **Immunity from legal proceedings-** The Supreme Court has affirmed that Article 361 provides immunity to the President, Governors and Rajpramukhs from legal proceedings during their term in office.
- **Actions beyond immunity-** If a President, Governor, or Rajpramukh engages in actions beyond the scope of their constitutional authority, they may still be subject to legal proceedings.
- **Unconstitutionality-** If there is evidence to suggest that an official has acted with improper motives or has violated the Constitution, courts have the authority to intervene and ensure accountability.
- **Nebam Rebia and Bamang Felix vs Deputy Speaker, 2016-** The Court reaffirmed that the discretionary power of the Governor are subject to judicial review.
- **Recording statement-** Madhya Pradesh High Court held that the immunity under Article 361 does not extend to recording of statement of the Head of a State by the police in connection with investigation of a crime, if it is so essential.
- **Defensive role of government-** The Supreme Court has recognized that the government can defend the actions of the President, Governors, or Rajpramukhs before a judicial forum.
- However, the government must provide valid justifications and refer to the material on record to support its defense.

### 13. Status of Women in Judiciary:

The Supreme Court on Thursday reserved **one-third of the seats** in the executive committee of the **Supreme Court Bar Association (SCBA)** for women.

#### Supreme Courts

- **Only 11 women have served as judges in the Supreme Court since independence**, comprising merely 4.1% of the total 268 judges appointed.
- The first woman judge, Justice Fathima Beevi, was appointed in 1989.
- **Currently, there are three female judges: Justices Hima Kohli, Bela Trivedi, and BV Nagarathna.**
- Justice BV Nagarathna is projected to be the **first female Chief Justice of India** in 2027, albeit for a short tenure of 36 days.
- The appointment in 2021 of Justices Kohli, Nagarathna, and Trivedi marked a historical moment with **four female judges simultaneously serving** in the Supreme Court, the highest number to date.

#### High Courts

- India has 25 High Courts with a sanctioned strength of 1,114 judges, but **only 782 are currently serving**.
- Of the serving judges, **only 107 are women**, which is about 13%.
- **Justice Sunita Agarwal** was recently appointed as the Chief Justice of Gujarat High Court, a notable appointment given the scarcity of female chief justices across other High Courts.
- Despite no reservation for specific groups, the Centre has advised High Court Chief Justices to consider candidates from diverse backgrounds, including women, to ensure social diversity in appointments.

#### Lower Judiciary

- The lower judiciary shows a **higher representation of women compared to the higher courts**, with 35% of judges being women according to the India Justice Report 2022.
- A study by the Vidhi Centre for Legal Policy in 2018 noted that while there is better representation at the lower judiciary level, it diminishes significantly in higher positions such as district judges.
- In states like Goa, Meghalaya, and Sikkim, women judges exceed 60% of the judiciary, the highest in the country.
- Several states including Andhra Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Karnataka, Odisha, Rajasthan, Tamil Nadu, Telangana, and Uttarakhand have **implemented quotas ranging from 30% to 35% for women** in the lower judiciary through direct appointments.

#### 14. Issues with the Pradhan Mantri Jan Arogya Yojana

State Governments have recently reported **large debts** under the **Pradhan Mantri Jan Arogya Yojana (PMJAY)**. This financial burden has led them to reconsider their participation in the scheme.

##### About the PMJAY:

- It is world's largest government-funded healthcare program, that offers free health protection cover to low-income families.
- It aims to provide **₹5 lakh per family annually** for secondary and tertiary care hospitalization via a network of **Empanelled Health Care Providers (EHCP)**.
- **Nodal Ministry:** Ministry of Health and Family Welfare.
- **Implementing Agency:** National Health Authority (NHA).
- **Launched:** In 2018 as one of the two components of Ayushman Bharat.
- **Eligibility:** Open to all families without restrictions on size, age, or gender.
- **Coverage:** States/Union Territories can voluntarily opt-in to the scheme.
- **Provides:**
  - Coverage for up to 3 days of pre-hospitalization and 15 days post-hospitalization.
  - Diagnostics and medicines.
  - All pre-existing medical conditions.
- **Facilities:** Offers cashless and paperless access to services for beneficiaries in both public and private hospitals.

#### 15. Mullaperiyar Dam Dispute

The Tamil Nadu government has moved the Supreme Court accusing Kerala of “crying foul” about the safety of the old Mullaperiyar dam.

##### History of Mullaperiyar dam

- **Location-** It is a masonry gravity dam in Idukki district of Kerala, where the Periyar and Mullayar rivers meet.
- **Periyar National Park-** It is located in Thekkady around the reservoir of dam.
- **Built by-** Pennycuik between 1887 to 1895.
- **Need-** To provide water to the arid shadow region of Madurai which was in greater need of supply of water.

- **Periyar lease deed-** The dam is operated by Tamil Nadu following an 1886 lease indenture for 999 years.
- **Post independence-** In 1947, the Kerala government said that the lease agreement was invalid and needed to be renewed.
- **Agreement renewal-** The agreement was renewed in 1970, Tamil Nadu is operating the dam and has been paying to the Kerala government.
- **Ownership-** The dam is owned and operated by Tamil Nadu Public Work Department.
- **Risk zone-** The dam is located in the Seismic Zone III area (moderate damage risk zone)
- **Issue -** There lies a bone of contention between Tamil Nadu and Kerala regarding the safety of the dam, release of water etc.,

### What is the genesis of the dispute?

- **Safety of the dam-** In 1979, a problem erupted over the safety of the dam which led to a tripartite meeting that decided to bring the water level from the full reservoir level of 152 ft to 136 ft.
- **Restore dam level-** By mid-1990, Tamil Nadu started demanding restoration of the water level in the Mullaperiyar as it had completed the dam strengthening works.
- **Supreme Court verdict-** Supreme Court was approached due to lack of consensus, it allowed Tamil Nadu to raise water level of the dam to 152ft in 2006.
- **Supervisory committee, 2006-** It was constituted by Supreme Court that is empowered to oversee the repair work and allowed to take the required necessary safety measures for the benefit of both the states and the dam
- **Irrigation and Water Conservation (Amendment) Act, 2006-** It was enacted by Kerala in response to the verdict and put in the Schedule of 'Endangered Dams' and fixed its maximum water level to 136ft.
- **Restrictions on Kerala-** In 2014, the apex court declared the Act unconstitutional and restrained Kerala from interfering with the rights of Tamil Nadu in raising the water level in the dam to 142 feet.
- **A.S. Anand Committee, 2010-** It was set up by the Supreme Court to look into the dispute, it was mandated to study all the aspects of the dam including its safety.
- **Hydrologically safe-** The committee declared that the dam was "structurally and hydrologically safe" and that the Tamil Nadu government could raise the water level to 142 feet after carrying out some repairs.
- **Periodic inspection-** A permanent supervisory committee is set up under Ministry of Jal Sakti based on directions of Supreme Court to oversee the process of raising the water level, inspect the dam routinely and look into the safety concerns.

- **Rule curve-** The permanent supervisory committee finalised the rule curve which is a tabulation that specifies quantum of storage of water or empty space to be maintained in a reservoir during different times of a year, based on the rainfall data for 35 years.

According to Tamil Nadu Water Resources Organisation, Mullaperiyar is the first reservoir to have Rule Curve implemented, in India.

- **Study by IIT, Roorkee-** It was commissioned by Kerala, the study reiterated that the dam would not be able to withstand a major earthquake.

### What is the recent issue?

- **No progress-** Despite the constitution of three panels, including a Supervisory Committee and two sub-committees, no significant progress has been made in finding a solution to the pending issues.
- **Failure of supervisory committee-** Tamil Nadu's grievance is that the reconstituted Supervisory Committee, despite having powers under the Dam Safety Act, 2021 has failed to ensure that Kerala permits and facilitates dam strengthening and related works.
- **Dam safety evaluation-** Tamil Nadu also emphasizes the need for a comprehensive dam safety evaluation within five years, as stipulated by the Dam Safety Act, 2021.

### What lies ahead?

- Kerala prioritizes dam safety, while Tamil Nadu seeks to balance safety with water availability.
- Both states should resume bilateral negotiations, maintaining their right to legal recourse.

## 16. Status of Women in Judiciary:

The Supreme Court on Thursday reserved **one-third of the seats** in the executive committee of the **Supreme Court Bar Association (SCBA) for women**.

### Supreme Courts

- **Only 11 women have served as judges in the Supreme Court since independence**, comprising merely 4.1% of the total 268 judges appointed.
- The first woman judge, Justice Fathima Beevi, was appointed in 1989.
- **Currently, there are three female judges: Justices Hima Kohli, Bela Trivedi, and BV Nagarathna.**



- Justice BV Nagarathna is projected to be the **first female Chief Justice of India** in 2027, albeit for a short tenure of 36 days.
- The appointment in 2021 of Justices Kohli, Nagarathna, and Trivedi marked a historical moment with **four female judges simultaneously serving** in the Supreme Court, the highest number to date.

## High Courts

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- Several states including Andhra Pradesh, Assam, Bihar, Chhattisgarh, Jharkhand, Karnataka, Odisha, Rajasthan, Tamil Nadu, Telangana, and Uttarakhand have **implemented quotas ranging from 30% to 35% for women** in the lower judiciary through direct appointments.

## 17. ECI Directives on Ethical use of Social Media Platforms (SMPs)

The Election Commission of India issues directives to address violations of the Model Code of Conduct (MCC) during Lok Sabha election campaigning related to social media misuse.

### Key Directives by ECI:

- **Political parties must comply with MCC** guidelines which restrict criticisms to policies, past records, and work, avoiding attacks on private lives.
- Parties are instructed to **remove deepfake content from social media platforms (SMPs) within three hours** of identification.
- They must **report any unlawful information and fake user accounts** detected on social media.
- ECI emphasized the adherence to **Section 123(4) of the Representation of People Act, 1951**, which deems publishing false statements about a candidate's personal character or conduct as a corrupt practice.
- The directive also includes **Section 505 of the Indian Penal Code (IPC)**, which deals with statements promoting enmity between different groups and carries a potential sentence of up to three years in prison.
- **Party members responsible for posting misleading or false content must be identified and warned** as per the ECI's guidelines.

### Concerns Related to Misuse of Social Media in Elections

- There is a significant concern regarding the **potential of social media to sway voters' opinions** and erode trust in the electoral process through the dissemination of manipulated content.
- The **use of AI-based tools to create deepfakes** can distort information or propagate misinformation, impacting the integrity of elections.
- The **legal framework governing the regulation of misinformation** using deepfakes underlines the responsibility of political entities to uphold the authenticity and truthfulness of electoral content.
- Misuse of social media platforms during elections poses challenges to maintaining a fair and transparent electoral environment, necessitating stringent regulatory measures from the ECI to prevent such abuses.

## 18. Elections in India

Contesting seats in elections involves various rules and regulations governed by the Representation of the People Act (RPA), 1951. Over the years, amendments and guidelines have shaped the process, influencing candidates' eligibility, the number of seats they can contest, and disqualification criteria.

### Issues

- **Cap on Contesting Seats:** The RPA allows candidates to contest from two constituencies, but they can hold only one seat if elected from both, leading to concerns over the necessity for by-elections and the potential for representation gaps.

- **Minimum Age and Qualifications:** While the minimum age for contesting Lok Sabha and Assembly polls is 25 years, there is no minimum educational qualification required. However, certain disqualification criteria exist, such as holding an office of profit or being convicted of specific offenses.
- **Disqualification Criteria:** The RPA disqualifies individuals holding offices of profit, those declared of unsound mind, undischarged insolvents, non-citizens of India, or citizens holding citizenship of a foreign state. Conviction of certain offenses also leads to disqualification.

### Significance

- **Fair Representation:** The regulations aim to ensure fair representation in elections by defining eligibility criteria and disqualification factors.
- **Democratic Processes:** By limiting the number of seats a candidate can hold simultaneously and setting minimum age requirements, the rules uphold democratic principles and prevent potential conflicts of interest.

### Solutions

- **Amendments to RPA:** Proposals have been made by the Election Commission of India and the Law Commission to amend the RPA to restrict candidates to contesting from only one seat, thereby reducing the need for by-elections.
- **Enhanced Monitoring:** The Election Commission has introduced measures such as banning cash transportation after sunset and monitoring non-scheduled chartered flights to curb malpractices during elections.
- **Legislative Reforms:** Addressing issues related to criminality and muscle power of candidates may require legislative reforms, although no specific laws have been enacted in this regard.

## 19. Early clinical trial sheds light on regulatory T cell therapies

Results from a new clinical trial shed light on the performance of infusions of immune-calming regulatory T cells for children with type 1 diabetes.

### Results of the trials:

The trial shows that a single dose of the cells can transfer over efficiently in children but does not show signs of preserving insulin-releasing cells in the pancreas.

### T cells:

- T cells are so called because they are predominantly produced in the **thymus**.

- They recognise foreign particles (antigen) by a surface expressed, **highly variable, T cell receptor (TCR)**.
- There are two major types of T cells: **the helper T cell and the cytotoxic T cell**.
- As the names suggest, helper T cells 'help' other cells of the immune system, whilst cytotoxic T cells kill virally infected cells and tumors.
- The severity of disease can depend on the strength of these T cell responses.

### What are the different types of T-cells?

There are two main types of T-cells:

#### Cytotoxic T-cells:

- **Cytotoxic T-cells** are also called CD8+ cells because they have a CD8 receptor on their membranes.
- These cells get their name from "cyto," which means cell, and "toxic," which means poisonous or harmful.
- Cytotoxic T-cells kill cells infected with viruses and bacteria, and they also destroy tumor cells.

#### Helper T-cells:

- **Helper T-cells** are also called CD4+ cells because they have a CD4 receptor on their membranes.
- Unlike cytotoxic T-cells, helper T-cells don't kill cells directly.
- Instead, they send signals that tell other cells in your immune system how to coordinate an attack against invaders.
- Helper T-cells signal cytotoxic T-cells, B-cells and another type of white blood cell called a macrophage.

#### T-cell therapy(TCRs) and CAR T-cell therapy(CARs):

- Unlike CARs, which use portions of synthetic antibodies that can recognize specific antigens only on the surface of cells, TCRs use naturally occurring receptors that can also recognize antigens that are inside tumor cells

### 20. Speakers' power over MLA's resignations

A split verdict was delivered by the Himachal Pradesh High Court on whether the court can impose a timeline on the Speaker for accepting MLA resignations.

## What is the case?

- The case revolves around the resignation of three independent MLAs who joined the BJP after submitting their resignations to the Speaker of the Himachal Pradesh Assembly.
- The Speaker, instead of immediately accepting the resignations, issued show-cause notices and directed an inquiry to ascertain the voluntariness of the resignations.
- The Speaker said that action could be taken under anti-defection law could be taken against the 3 independent MLAs as they joined another party before the acceptance of their resignation.
- In response to the delay in acceptance of their resignations, the three independent MLAs filed a petition in the Himachal Pradesh High Court seeking to quash the show-cause notices and prompt acceptance of their resignations.

## What is Anti-defection law?

- **Anti-defection law**- It punishes individual MPs/MLAs for leaving one party for another.
- **10<sup>th</sup> Schedule**- It was added by 52nd Constitutional Amendment Act as the Tenth Schedule in 1985.
- It was a response to the toppling of multiple state governments by party-hopping MLAs after the general elections of 1967.
- **Deciding authority**- The Presiding Officer of the House is empowered to make rules to give effect to the provisions of the 10th schedule.
- **Role of judiciary**- The decision can be challenged before the higher judiciary.
- **Exemptions**- The law allows a group of two-third MP/MLAs to join (merger) another political party without inviting the penalty for defection.
- If a person is elected as the Speaker of Lok Sabha or the Chairman of Rajya Sabha, then he could resign from his party and re-join the party once he demits the post.
- **91st Amendment Act, 2005**- It deleted the exemption from disqualification in case of split by 1/3rd members of legislature party.

## What does the law say about MLAs resignation?

### Article 190

- Article 190(3)(b) of the Constitution of India outlines the process for an MLA's resignation and the subsequent vacancy of their seat.
- **Resignation process**-An MLA can resign by submitting a written resignation addressed to the Speaker or the Chairman (as applicable).

- **Vacant seat-** If the Speaker or Chairman accepts the resignation, the seat becomes vacant.
- **Speaker's discretion-** The Speaker has the authority to inquire into the resignation.
- **Acceptance-** If the Speaker is satisfied that the resignation is voluntary and genuine, they may accept it immediately.
- **Non-acceptance-** If there are doubts about the voluntariness or genuineness, the Speaker can choose not to accept the resignation.

### **Rule 287 of the Rules of Procedure and Conduct of Business in Himachal Pradesh Legislative Assembly**

- It provides guidelines for the Speaker's powers.
- **Speaker's role-** If the resignation letter is personally handed over to the Speaker members confirm its voluntariness and genuineness, the Speaker may accept it promptly.
- Otherwise, the Speaker has discretion to withhold acceptance.

### **What lies ahead?**

- The case may be escalated to a larger bench of the Himachal Pradesh High Court for a final decision.
- Alternatively, the MLAs could appeal to the Supreme Court for resolution.

## **21. Significance of United Nations-linked Global Alliance of National Human Rights Institutions**

The United Nations-linked Global Alliance of National Human Rights Institutions (GANHRI) deferred the accreditation of the National Human Rights Commission-India (NHRC) for the second consecutive year. This decision holds implications for India's representation and voting rights at the Human Rights Council and certain UN General Assembly bodies.

### **Reasons for Deferral:**

- Lack of transparency in appointing NHRC members.
- Appointment of police officers to oversee human rights investigations.
- Insufficient gender and minority representation on the NHRC member panel.

### **Impact and Significance:**

- Potential loss of voting rights and representation at international human rights forums.
- Undermines India's credibility in upholding human rights standards on the global stage.
- Raises concerns about the independence and effectiveness of the NHRC in addressing human rights violations within the country.

### **Challenges Faced:**

- Structural changes and suggestions from GANHRI are difficult to implement during India's election process.
- Civil society organizations and human rights activists expressing concerns to the global body regarding India's human rights record.

### **Solutions and Future Prospects:**

- NHRC needs to address the issues raised by GANHRI regarding transparency, independence, and inclusivity.
- Undertake necessary structural changes to ensure the NHRC operates free from government interference.
- Enhance gender and minority representation within the NHRC to reflect the diversity of India's population.

### **Historical Context:**

- NHRC was established under the Protection of Human Rights Act in 1993.
- Previously accredited as an 'A' Status NHRI since 1999, with periodic reviews and deferments.
- This marks the first time India's 'A' status has been suspended for two consecutive years, following deferments in 2023 and 2024.

## **22. Impact of Vaccination on Children's Lives**

- Over 50 years, vaccinations have saved the lives of approximately 150 million children worldwide.
- Measles vaccination alone has accounted for saving 94 million lives, constituting 60% of the total impact.
- The reduction in deaths from vaccine-preventable diseases is attributed to global immunization program expansions.

### **Progress in Vaccination Coverage:**

- Measles vaccination rates surged from below 20% in 2000 to 70% by 2021 globally.
- Similar progress was observed for DTP3 vaccination, increasing from less than 5% to over 80% by 2021.
- Noteworthy advancements include the Western Pacific region, with measles vaccination coverage rising from 2% in 2000 to 91% in 2021.

### **Initiatives and Partnerships:**

- The Essential Programme on Immunization was established by the World Health Assembly in 1974 to combat vaccine-preventable diseases.
- Gavi, the Vaccine Alliance, formed in 2000, facilitated partnerships between organizations like the Bill and Melinda Gates Foundation, WHO, Unicef, and the World Bank to address vaccination gaps.
- Despite progress, disparities persist, especially in Africa and Asia, necessitating continued investment and coordinated efforts to ensure universal vaccine coverage.

### **Remaining Challenges and the Way Forward:**

- Despite progress, millions still die annually from diseases like tuberculosis, measles, tetanus, whooping cough, meningitis, and hepatitis B.
- Achieving universal vaccine coverage requires addressing scepticism and fear towards vaccination, along with increased government investment and coordination in immunization programs.
- Continued advocacy and action are crucial to saving more lives and eradicating vaccine-preventable diseases globally.

## **23. Significance of the Chabahar port for India?**

India and Iran recently signed a 10-year contract for the operation of a Shahid Beheshti terminal at the Chabahar port in Iran.

### **Where is Chabahar port located?**

- **About-** It is a deep-water port in Sistan-Balochistan province of Iran, on the Gulf of Oman.

It serves as Iran's only deep sea oceanic port.



- **Ports-** It consists of two separate ports
  - Shahid Kalantari
  - Shahid Beheshti.
- **Geographical proximity-**The port is closer to Afghanistan, Pakistan, India and International North-South Transport Corridor (INSTC) gives it the potential to develop into one of the most important commercial hubs.
- **Chabahar day-** Maritime India 2021 celebrated March 4, 2021 as "Chabahar Day", this signifies the strategic importance of the port to India.

### What are the stakes of India?

- **Strategic investment-** In 2013, India committed to investing 100 million dollars towards the development of Chabahar port. A Memorandum of Understanding to develop the port is signed in May 2015.
- **Trilateral agreement-** In 2016, a trilateral agreement to establish the International Transport and Transit Corridor (Chabahar Agreement) is signed by India, Iran, and Afghanistan.
- **Objectives of the agreement-**
  - India was granted a 10-year lease to develop and operate two terminals and five berths, access to the Chabahar free trade zone.
  - India got the opportunity to build the 628 km rail line from Chabahar to Zahedan, just across the border from Afghanistan.
- **Assistance-** India has so far supplied 6 mobile harbour cranes two with a lifting capacity of 140 tonnes each and 4 with a capacity of 100 tonnes.
- **New Delhi declaration-** India and Iran signed a long-term contract for the operation of its Shahid Beheshti Port terminal.
- **Long term contract-**The contract is signed by **India Ports Global Ltd (IPGL) and Iran's Ports and Maritime Organisation (PMO)**.
- **Replaced 2016 agreement-**The new pact that signed recently replaces a 2016 agreement, which covered India's operations at Shahid Beheshti terminal in Chabahar port and was renewed annually.
- **Strategic convergence-** The New Delhi Declaration signed by the India and Iran recognized that the countries growing strategic convergence need to be underpinned with a strong economic relationship.

This is the 1<sup>st</sup> time India will take over the management of an overseas port.

Counter mechanism – **It is serving as India's counter to the Pakistan's Gwadar Port and China's Belt and Road Initiative.**

- **Geostrategic location-** Chabahar port has geographic proximity to countries such as Afghanistan, Pakistan, and India.

- **Access Afghanistan-** India can bypass Pakistan which does not allow India land access for trade with Afghanistan and Central Asia.
- **Infrastructure development-** The Zaranj-Delaram road constructed by India in 2009 can give access to Afghanistan's Garland Highway, setting up road access to four major cities in Afghanistan - Herat, Kandahar, Kabul and Mazar-e-Sharif.
- **Gateway to Central Asia-** It will boost India's access to Iran, the key gateway to the International North-South Transport Corridor (INSTC) that has sea, rail and road routes between India, Russia, Iran, Europe and Central Asia.

INSTC is a multi-modal transportation project linking the Indian Ocean and Persian Gulf to the Caspian Sea via Iran, and onward to northern Europe via St Petersburg in Russia.

- **Counter China-** It will be beneficial to India in countering Chinese presence in the Arabian Sea which China is trying to ensure by helping Pakistan develop the Gwadar port.

Gwadar port is located in Pakistan and is less than 400 km from Chabahar by road and 100 km by sea.

- **Defence ally-** The port being developed and operated by India, Iran also becomes a military ally to India.
- **Reduce import bill-** There will be a significant boost in the import of iron ore, sugar and rice to India.
- The import cost of oil to India will also see a considerable decline.
- **Connectivity hub-** It will ensure in the establishment of a politically sustainable connectivity between India and Afghanistan leading to better economic ties between the two countries.
- **Diplomatic engagement-** The port could be used as a point from where humanitarian operations could be coordinated.

## 24. Global Report on Neglected Tropical Diseases 2024

The World Health Organization (WHO) released the **Global Report on Neglected Tropical Diseases 2024**, emphasizing strides toward the **2030 road map** for NTD elimination.

### About the Report:

- This is the **second report** monitoring advancements toward the NTD road map.

- It offers a **quantitative overview** of progress on all designated indicators.
- Includes **qualitative insights** across three key areas: **programmatic action**, **cross-cutting approaches**, and **country ownership**.
- Showcases successes at both **regional** and **national levels**.

### Key Highlights of the Report:

- In 2023, **5 countries** eradicated one NTD, while **1 country** successfully eliminated two.
- A total of **50 countries** have now eradicated at least one NTD.
- Record-setting **2.1 billion NTD treatments** were distributed in 2023 through donation programs.
- Enhanced **integration** of NTD interventions into national health frameworks and essential service packages.
- The report marks **Noma (cancrum oris)** as a newly recognized NTD in 2023.
- **1.62 billion individuals** required NTD interventions in 2022, marking a decline from earlier years yet insufficient to meet the 2030 objectives.

### India Specific Findings

- **40.56%** of India's population needed interventions against NTDs in 2022.
- Historical milestones include India being declared free from **dracunculiasis** in 2000 and **yaws** in 2016.

### Key Challenges:

- **Post-COVID-19 recovery lags** and **uncertainties in funding** obstruct progress.
- **Geopolitical disruptions**, **climate change effects**, and a **lack of comprehensive data** exacerbate challenges.
- Persistent **gaps** in knowledge, development tools, and R&D need addressing.
- Issues of **inadequate reliable data**, **underdiagnosis**, and **under-reporting** due to weak surveillance and detection systems are prominent.
- **Inadequate funding** and slow uptake of new interventions hinder advancements.
- High **out-of-pocket costs** disproportionately affect impoverished populations.

### Key Recommendations:

- Advocacy for increased **resource mobilization** and heightened **public awareness** is crucial.
- Urgent need to **accelerate implementation** of programs, especially in regions with high disease burdens.

- **Strengthening data collection** and improving reporting mechanisms are essential for accurate assessments.
- Continued efforts are required for the **development of innovative tools** and interventions.
- NTDs should be **repositioned** within global health discussions, including health emergencies and pandemic prevention frameworks.
- Formulation of a **detailed work plan** for the period 2025–2030, specifying clear **goals and timelines**.

## 25. Key proposals of draft digital competition bill?

India proposes a new law to prevent anti-competitive practices by tech giants like Google, Facebook, and Amazon.

**Aim-** To curb market dominance by tech companies and prevent anti-competitive practices before they occur, drawing inspiration from European Union's Digital Market Act.

- **Predictive regulation-** The bill introduces a forward-looking, preventive, and presumptive law (an ex ante framework) to foresee potential harms that can arise from antitrust issues and prescribes pre-determined no-go areas.
- **Associate Digital Enterprises (ADEs)-** The bill aims to regulate not just the primary tech giants but also their associated companies within a conglomerate.
- **Criteria for ADE designation-** If a subsidiary or related entity benefits from data collected by a core service of the conglomerate, it could be designated as an ADE.
- **Obligation-** Once designated, ADEs would be subjected to the same regulatory obligations as SSDEs.
  - Example: Google Maps could be designated as an ADE if it benefits from data gathered by Google Search.
- **Systematically Significant Digital Enterprise (SSDE)-** The bill proposed that the Competition Commission of India (CCI) should designate companies as SSDE based on various quantitative and qualitative parameters.
- **Penalty-** If the provisions are violated it could result in fines of up to 10% of the company's global turnover.

Competition Commission of India would designate the firms as SSDE and ADE

**What are the concerns raised by tech companies regarding the bill?**

- **Compliance burdens-** The ex ante requirements might impose significant compliance burdens, diverting resources from innovation and research to regulatory compliance.
- **Operational efficiency-** Industry executives are worried about the operational impact of such regulations.
- **Concerns with EU's Digital Markets Act-** It has led to a significant increase in the time required for basic operations, such as finding information via Google search.
- **Arbitrary definitions-** There is concern over the broad definitions of significant platforms and the discretionary power given to the Competition Commission of India (CCI) in designating SSDEs and ADEs.
- **Impact on startups-** Critics fear this could lead to arbitrary decision-making and potentially impact startups.
- **Impact global competitiveness-** As firms navigate complex regulatory landscapes, they might struggle to compete with counterparts in regions with more flexible regulatory frameworks.
- **Regulatory uncertainty-** Companies may be unsure about their status and obligations under the new law, leading to hesitancy in business expansion and investment.
- **Impact on venture investments-** Internet and Mobile Association of India (IAMAI) argues that the ex ante regulatory framework proposed by the bill could deter venture investments in tech startups.
- **Impact scalability-** IAMAI argues that the stringent thresholds and pre-emptive regulations might limit the scalability of businesses, as these rules could act as a ceiling on growth potential.

### What is the stand of the government?

- **Historical anti-competitive practices-** Government argue that tech giants have a history of engaging in anti-competitive practices.
- **Fine on Google-** The fine imposed on Google (Rupees 1.337 crore) by the Competition Commission of India (CCI) for its anti-competitive behavior in the android ecosystem serve as evidence of ongoing issues.
- **Foster digital competition-** Innovation is largely confined to a few major tech companies, primarily from the US.
- **High market barriers-** It is created by dominant players which make it difficult for new entrants to challenge their supremacy.

## 26. Significance of Prevention of Money Laundering Act (PMLA)

The Supreme Court of India recently upheld the right to personal liberty, limiting the Enforcement Directorate's (ED) power to arrest individuals accused under the Prevention of Money Laundering Act (PMLA).

- This landmark judgment, delivered by a bench of Justices A.S. Oka and Ujjal Bhuyan, asserts that individuals summoned by special courts need not seek bail under the stringent conditions of the PMLA unless specific grounds for custody are presented.

### Key Highlights of the Judgment:

- **Presumption of Liberty:** The court held that individuals summoned by a designated special court are presumed to be not in custody. Thus, they need not apply for bail under the PMLA's draconian conditions.
- **Custody Requirements:** The ED must separately apply for the custody of an accused who appears in court, showing specific grounds for necessitating custodial interrogation.
- **Section 88 Bonds:** The special court can require the accused to furnish bonds under Section 88 of the Code of Criminal Procedure (CrPC). Accepting such a bond does not equate to granting bail, and hence, the stringent conditions of Section 45 of the PMLA do not apply.
- **Exemption from Personal Appearance:** An accused who appears in the special court could be exempted from future personal appearances unless they fail to appear, leading to the issuance of bailable or non-bailable warrants.

### Case Background:

- The judgment stemmed from an appeal by Tarsem Lal, who was denied anticipatory bail by the Punjab and Haryana High Court. The Supreme Court's decision clarifies significant aspects of the bail process under the PMLA, impacting the treatment of accused individuals.

### Challenges Posed by Section 45 of PMLA:

- **Stringent Bail Conditions:** The twin conditions under Section 45 require the accused to prove prima facie innocence and assure the court of not committing any offense while on bail, making it nearly impossible for the accused to secure bail.

- **Burden of Proof:** The burden lies entirely on the accused, who often lacks the resources to counter the state's might, leading to prolonged incarceration without bail.

### Implications of the Judgment:

- **Enhanced Personal Liberty:** This ruling strengthens the right to personal liberty, ensuring that individuals are not unduly detained without just cause.
- **Judicial Oversight on ED's Powers:** By requiring the ED to seek court approval for custody, the judgment introduces a layer of judicial oversight, potentially curbing misuse of power.
- **Easing Bail Conditions:** Allowing bonds under Section 88 without invoking the stringent PMLA bail conditions provides a more humane approach to pre-trial detention.

### Recommendations for Further Reforms:

- **Review of PMLA Provisions:** Regular review and possible amendments of the PMLA to balance enforcement with individual rights.
- **Strengthening Judicial Guidelines:** Clear guidelines for the judiciary to uniformly apply the principles laid out in this judgment.
- **Enhanced Training for Law Enforcement:** Training for ED officials on the legal boundaries of their powers and the importance of safeguarding personal liberties.

## 27. Hypertension as the new silent killer: Issues and possible solution

- Hypertension is the leading risk factor for early deaths, causing approximately 10.8 million preventable deaths annually.
- The World Health Organization (WHO) reported 1.3 billion adults with hypertension, with nearly half unaware of their condition.
- In India, 311 million adults (one in three) have hypertension, triple the number of people with diabetes (101 million).

### Dietary Salt and Cardiovascular Health:

- Excessive salt intake (over 5 grams per day) is a major risk factor for hypertension and contributes to 2 million cardiovascular deaths globally in 2019.
- Reducing salt intake can lower cardiovascular disease risks by 30% and mortality by 20%.

- Indian adults consume 8-11 grams of salt daily, double the WHO's recommended intake, causing an estimated 175,000 deaths in India.

### **Interventions and Strategies:**

- **India Hypertension Control Initiative (IHCI):**
  - Launched in 2017, IHCI follows five strategies: simplified treatment protocols, strengthened drug supply, team-based care, patient-centric services, and information systems for monitoring.
  - Expanded to 140+ districts, IHCI won the 2022 UN Interagency Task Force and WHO Award.
- **Effective Approaches:**
  - Raising awareness about hypertension and its complications.
  - Scaling up evidence-based interventions like IHCI to control other lifestyle diseases.
  - Addressing non-modifiable risk factors (family history, age, pre-existing conditions) in healthy adults.

### **Preventive Measures:**

- **Reducing Dietary Salt:** Implement WHO's 'SHAKE the salt habit' strategy: surveillance, industry reform, standard labelling, education, and promoting healthy environments.
- **Multi-sectoral Actions:** Revisiting and intensifying India's multi-sectoral plan for non-communicable diseases.
- **Informed Citizens:**
  - Enhancing food labelling and consumer education on salt content.
  - Enforcing food regulations and higher taxation on high salt, sugar, and fat products.
- **Regular BP Checks:**
  - Encouraging regular blood pressure monitoring in public places, workplaces, and during every healthcare visit.
  - Ensuring access to BP apparatus in public locations and promoting routine BP checks.

### **Conclusion:**

- Controlling hypertension requires comprehensive strategies, including public awareness, dietary changes, systematic health interventions, and regular BP monitoring.
- Achieving these goals can prevent millions of deaths and significantly reduce the burden on healthcare systems.



## 28. Supreme Court lays out 7 Sub-Rights of Right to Property

The Supreme Court's ruling **safeguards landowners** from **arbitrary government acquisition**, emphasizing adherence to Article 300A, ensuring the constitutional right to property and sub-rights compliance.

### Procedural Sub-Rights under Right to Property

These seven rights are foundational components of a law that is in tune with Article 300A, and the absence of one of these or some of them would render the law susceptible to challenge:

1. **Right to Notice:** Individuals must be informed about the intention to acquire their property.
2. **Right to Be Heard:** Affected individuals have the right to voice objections.
3. **Right to a Reasoned Decision:** The government must justify the acquisition with a reasoned decision.
4. **Public Purpose Justification:** Acquisitions must serve a demonstrable public purpose.
5. **Right of Restitution or Fair Compensation:** Landowners are entitled to fair compensation for their property.
6. **Right to An Efficient and Expeditious Process:** Acquisition procedures should be efficient and adhere to set timelines.
7. **Right of Conclusion:** The process concludes with the physical transfer of property; failure to take possession renders the acquisition incomplete.

### Right to Property in India

- The Right to Property was **initially a fundamental right** under the Constitution of India, included in Part III (Articles 19 and 31).
- Through the **44th Amendment Act of 1978**, this right was **removed from the list of fundamental rights**. It was reclassified as a **constitutional right under Article 300A**.

### About Article 300A:

- Article 300A was introduced to the Constitution, stating that "No person shall be deprived of his property save by authority of law."
- **Legal Framework:** This implies that the **government can still acquire private property**, but this acquisition must be **done through a law that justifies the acquisition** and provides for **fair compensation** to the affected parties.

### Current Legal Status

- **Not a Fundamental Right:** The Right to Property is no longer a fundamental right, which means it cannot be directly enforced through the Supreme Court or High Court under Article 32 or Article 226. However, it remains a constitutional right.
- **Protection under Law:** Any person deprived of his property under any state enactment can approach a High Court challenging the legality of the act under Article 300A.

**Legal Recourse:** Affected individuals have the right to legal recourse if they believe that the acquisition was not justified or that the compensation was inadequate.

### Recent Judgment: Human Rights

- **Case Background:** The judgment supported a Calcutta High Court decision that dismissed an appeal by the Kolkata Municipal Corporation regarding the acquisition of private land.
- **Court's Order:** The Corporation was ordered to compensate with ₹5 lakh for costs within 60 days.
- **Human Rights Perspective:** The right to property is not only protected as a constitutional right but has also been recognized as a human right by a “Bench of Justices P.S. Narasimha and Aravind Kumar”.

### Legal Interpretations and Clarifications

- **Justice Narasimha** clarified that the phrase ‘authority of law’ in Article 300A extends beyond the state’s power of eminent domain.
- It necessitates a **proper legal framework** for property acquisition.
- The ruling underscored that **mere possession of eminent domain power** and the provision of compensation **do not justify compulsory acquisition** if due processes are not followed.

## 29. Juvenile Justice (Care and Protection of Children) Act, 2015

The Supreme Court delivered a judgement on the interpretation of the **Juvenile Justice Act** in the case of “**Child in Conflict with Law (CCL) through his mother v. State of Karnataka**”.

### Key Highlights of the Judgement:

#### Appeal Process:

- Appeals against preliminary assessment orders of the Juvenile Justice Board (JJB) should be filed before the **Children's Court** where available, **not the Sessions Court**.
- There is a **30-day time limit** for filing such appeals.

#### **Preliminary Assessment Timeline:**

- The court clarified that the **3-month period for completing preliminary assessments** is not mandatory but **directory in nature**.

#### **Juvenile Justice (Care and Protection of Children) Act, 2015:**

- **The Juvenile Justice (Care and Protection of Children) Act** was enacted in **2015**, replacing previous juvenile delinquency laws and the Juvenile Justice Act of 2000.
- It aims to **amend and consolidate laws relating to children in conflict with law (CCL) and children in need of care and protection (CCP)**.
- **Children in Conflict with Law (CCL)** refers to children below 18 years who are alleged or found to have committed an offence.
- The Act **mandates the establishment of Juvenile Justice Boards (JJBs) in every district** to handle cases involving CCLs.
- **Juvenile Justice Boards are crucial** as they assess whether minors aged 16-18 involved in heinous crimes can be tried as adults.
- This preliminary assessment by the JJB is critical to determine the **capacity of the child to commit the crime** and understand the consequences of their actions.
- Following the assessment, **the Children's Court has the authority to decide if the child can be tried as an adult**.
- **Adoption laws were also revised under the JJ Act, 2015**, making it easier for orphans, abandoned, and surrendered children to be adopted.
- It replaces outdated adoption laws such as the **Hindu Adoptions and Maintenance Act (1956) and the Guardians of the Ward Act (1890)**.
- **The Central Adoption Resource Authority (CARA)** has been established as the statutory body to oversee adoption procedures.
- All Child Care Institutions (CCIs), whether run by the state or non-governmental organizations, **must register within six months from the commencement of the Act**.
- **The Act emphasizes the importance of timely registration of CCIs** to ensure compliance with the new legal framework and safeguard the welfare of children.
- **The Juvenile Justice Act, 2015, plays a vital role in the care and protection of children**, providing a structured approach to both juvenile justice and child welfare.

### 30. Global Alliance of National Human Rights Institutions

Recently the UN recognised Global Alliance of National Human Rights Institutions (GANHRI) has deferred National Human Rights Commission's accreditation for the second time in the row.

- **Launch year-** In 1993 at Tunis, Tunisia as the International Coordinating Committee of National Human Rights Institutions, it later got changed to GANHRI in 2016.
- **Headquarters-** Geneva, Switzerland.
- **Vision-** A world where everyone and everywhere fully enjoy their human rights.
- **Tripartite partnership-** GANHRI-UNDP-OHCHR (Office of the United Nations High Commissioner for Human Rights) aims to strengthen NHRIs in their capacity to promote and protect human rights, individually and through their regional and global networks resulting in increased fulfilment of human rights for all people.
- **Members-** 115 National Human Rights Institutions (NHRIs) from all regions of the globe and provides leadership and support in the promotion and protection of human rights.
- **Uniqueness-** It is the only non-UN body whose internal accreditation system is based on compliance with the 1993 Paris Principles that grants access to UN committees.
- **Paris Principles, 1993-** It is the set of international standards which frame and guide the work of NHRIs, it was adopted by UN General Assembly (UNGA).
- **Rating-** The rating is based on the subcommittee consisting of one A status NHRI representative from each of the regional networks.
- **Sub-Committee on Accreditation-** It is a peer review process for initial accreditation, and re-accreditation every five years is managed by the subcommittee.
- **India's status-** GANHRI has deferred National Human Rights Commission's reaccreditation due to concerns regarding its compliance with the Paris Principles.

India being accredited in 1999 had retained its A ranking in 2006 and 2011, while its status was deferred in 2016 and restored after a year

**What are the concerns raised by GANHRI?**

- **Lack of diversity-** There is a lack of representation from marginalized groups, and the selection process does not maximize the inclusion of candidates from various backgrounds.
- **Gender disparity-** Despite recommendations to ensure at least 1 woman in its leadership, the NHRC has historically failed to achieve significant gender representation.
- **Opaque appointment process-** The process for appointing members to the NHRC is not transparent, raising questions about the fairness and integrity of the selections.
- **Limited cooperation-** The commission has been criticized for not engaging constructively with NGOs and Human Rights Defenders (HFDs) which is essential for effective human rights advocacy
- **Conflict of interest-** The involvement of police personnel in investigations may lead to biases and conflicts of interest.
- **Inadequate response-** NHRC is perceived as being ineffective in addressing and responding to increasing human rights violations.

### Consequences of losing 'A' rating

- **Lose voting rights-** The NHRC would no longer have voting rights within GANHRI.
- **Loss of representative role-** It would also lose its role as a representative at the United Nations Human Rights Council.
- **Diminish influence-** It would reduce India's influence in international human rights forums.
- **Impact on credibility-** The credibility and effectiveness of human rights protections within India could be undermined.

### What lies ahead?

- The need of the hour is to address the key concerns raised by GANHRI as it is crucial for India to maintain its 'A' rating and ensure robust protection and promotion of human rights.
- Substantial reforms in the appointment process, greater independence from government influence, enhanced engagement with civil society and improved diversity are the essential steps towards restoring the credibility and functionality of the NHRC.

## 31. Israel – India Relations

- Spain has refused entry to the Denmark-flagged cargo ship Marianne Danica, which was transporting arms from Chennai to Israel.
- This decision aligns with Spain’s critical stance on the Israeli offensive in Gaza and its recent suspension of arms export licenses to Israel.

### Incident Overview

- **Ship and Cargo Details:** The Marianne Danica departed from Chennai on April 8, carrying 27 tonnes of explosives and was scheduled to make a port call at Cartagena, Spain, en route to Haifa, Israel.
- **Spanish Stance:** Spain’s Foreign Minister José Manuel Albares emphasized the decision as part of a consistent policy to reject any ship carrying arms to Israel from docking at Spanish ports.

### Context and Reactions

- **Humanitarian Concerns:** Spain and Belgium have suspended arms export licenses to Israel due to the increasing civilian casualties in Gaza.
- **International Response:** Amnesty International Spain welcomed the decision, highlighting the adherence to the Arms Trade Treaty and Spanish law.
- **Indian Response:** The Ministry of External Affairs of India acknowledged the report and indicated that further investigations would clarify the nature of the cargo and its intended recipient.

### Issues

#### Humanitarian Impact

- **Civilian Casualties:** Rising civilian deaths in Gaza have prompted countries like Spain and Belgium to reconsider their arms export policies to Israel.
- **Displacement:** The ongoing Israeli ground offensive has led to significant displacement of Palestinians, with the UNRWA reporting at least 630,000 people forced out of Rafah since May 7.

#### Legal and Diplomatic Concerns

- **Arms Export Regulations:** Compliance with international treaties like the Arms Trade Treaty and national laws regarding arms exports is a crucial consideration.
- **Bilateral Relations:** The decision could impact diplomatic relations between the involved countries, particularly between Spain, India, and Israel.

### Policy Consistency

- **Spain's Firm Stance:** This marks the first instance of Spain enforcing its policy to reject arms shipments to Israel, demonstrating a commitment to its stance on peace in the Middle East.
- **Global Precedent:** Spain's actions could set a precedent for other countries to adopt similar measures in response to humanitarian crises.

### Ethical and Moral Responsibility

- **Advocating Peace:** By refusing entry to arms shipments, Spain signals its support for peaceful resolutions over military escalations in conflict zones.
- **Humanitarian Advocacy:** The decision underscores the importance of prioritizing humanitarian concerns in international policy decisions.

### Solutions

#### Enhanced Monitoring and Compliance

- **Stringent Inspections:** Implement stricter inspection protocols for cargo ships at ports to ensure compliance with international and national arms export regulations.
- **Transparent Reporting:** Encourage transparent reporting and documentation of arms shipments to avoid misuse and ensure accountability.

#### Diplomatic Engagement

- **Multilateral Dialogues:** Promote multilateral dialogues involving all stakeholders to address underlying issues and work towards a peaceful resolution in conflict regions.
- **Humanitarian Aid:** Increase humanitarian aid and support for displaced populations to mitigate the impact of conflicts and promote stability.

## 32. Renew the Generalized System of Preferences

It is widely believed that renewing the **Generalised System of Preferences (GSP) program** would pave the way for comprehensive **U.S.-India trade** negotiations, potentially elevating the bilateral trade relationship to new heights.

### 'Generalised System of Preferences (GSP)' Program about?

- The Generalised System of Preferences (GSP) is a trade initiative by **developed countries to aid developing countries.**
- Nearly all developed countries have their versions of the GSP, tailored to their economic and policy goals.
  - It involves **reducing tariffs on imports** from these countries, aiming to stimulate their economic development. (It is not formally part of the World Trade Organization).
- **Origin and its Evolution:**
  - **During the 1960s:** The idea of the GSP emerged during the 1960s as part of broader efforts within the **United Nations Conference on Trade and Development (UNCTAD)** to help developing countries gain better access to markets in developed countries.
  - **During 1968:** UNCTAD proposed the GSP as a mechanism to offer non-reciprocal, non-discriminatory tariff preferences to developing countries, aiming **to promote their economic growth and industrialization.**
  - **During 1974:** The **US** officially established its GSP program under the **Trade Act of 1974**. This act authorized the U.S. **to provide duty-free treatment** for selected products imported from designated beneficiary developing countries (BDCs).



### The Significance of Renewing the GSP:

- **US Factor:** The GSP program is unique because it requires **periodic reauthorization by Congress**. This program of the U.S. **expired in 2020** and has not yet been renewed, despite bipartisan support.
- **For Stability in the Market:** Renewal is challenging in a polarized political environment but is crucial for maintaining stable market access for developing countries.
- **For Diversification:** The GSP supports small businesses and women-owned enterprises, encouraging economic empowerment and diversification away from Chinese imports.
- **To bring Reform:** It will promote labor and environmental reforms and reduce tariff costs for American businesses, particularly small and medium-sized enterprises.

### Significance of US - India Trade Relationship:

- **Broader the Trade agreement:** The U.S. and India have a significant trade relationship, with bilateral trade worth around \$200 billion. Renewing the GSP could facilitate further negotiations and potentially lead to a broader trade agreement.
- **Need for GSP renewal:** Before the GSP expired, the U.S. and India were close to a trade deal covering various sectors including medical devices, agriculture, ethanol, and IT products.
  - Despite ongoing trade dialogues, the U.S. is currently not negotiating new Free Trade Agreements (FTAs), making GSP renewal a key tool for enhancing trade relations.
  - A renewed GSP could cover multiple areas such as labour rights, environmental laws, and regulatory practices, fostering a more robust and ambitious trade partnership.
- **Strategic Importance:**
  - In the Indo-Pacific region.
  - It can significantly boost trade and economic cooperation between the two countries.
  - It would signal a mutual commitment to deepening their trade relationship and addressing broader economic and regulatory issues.

### Way forward:

- **Utilize GSP as a Negotiation Tool:** Leverage GSP renewal as a platform to initiate broader trade negotiations between the U.S. and India, potentially leading to a more comprehensive trade agreement.

- **Focus on Strategic Sectors:** Identify and prioritize sectors such as technology, pharmaceuticals, and agriculture where both countries have mutual interests and complementary strengths.

### 33. Need for a peace deal on the Russia- Ukraine conflict

- Two years after Russia's invasion of Ukraine, Switzerland is organising a peace conference to broaden global consensus on the war.
- Switzerland aims to involve countries that have not yet joined the Western coalition.
- India, a close partner of Russia, BRICS and SCO member, and Global South leader, is a key invitee.

#### Swiss Diplomatic Efforts:

Swiss Foreign Secretary Alexandre Fasel visited Delhi, following visits by two Swiss Ministers and Ukrainian Foreign Minister Dmytro Kuleba.

- The conference will be held in Bürgenstock on June 15-16, with about 50 confirmed attendees, primarily from the EU, NATO, G-7, and U.S. allies.
- Russia has not been invited; Swiss diplomacy aims to involve BRICS leaders (excluding Russia) to later engage Russia in future talks.

#### Challenges and Criticisms:

Convincing non-Western countries to join a seemingly pro-Ukraine platform is challenging.

- Switzerland's neutrality is questioned due to its sanctions on Russia, suggesting another venue might appear more impartial.
- The conference agenda includes building a peace framework, food security, navigation freedom, nuclear safety, and humanitarian issues.
- Progress is unlikely without both Russia and Ukraine participating, as both believe they can gain more on the battlefield.

#### India's Position:

If the conference aims to pressure Russia into a ceasefire or territorial concessions, it is unlikely to succeed, similar to the UN General Assembly's resolutions.

- India has not joined any statements overtly critical of Russia and maintains strong ties with Moscow.

- India may prefer to wait for a more balanced and inclusive peace effort before committing to a definitive stance.

### 34. Status of Aviation Sector in India

India has one of the fastest-growing aviation sectors, with very serious safety issues.

- **Growth-** India's aviation industry has experienced significant growth in the past 9 years.
- **Aviation market-**India has become the third-largest domestic aviation market in the world and is expected to overtake the UK to become the 3<sup>rd</sup>-largest air passenger market by 2024.
- **GDP contribution-**Indian aviation also contributed 5% of the GDP, creating a total of 4 million jobs. In addition to it, there is a 72 billion dollars gross value-added contribution to GDP by this industry.

The International Air Transport Association (IATA) projects that India will become the world's 3<sup>rd</sup> largest civil aviation market by 2026.

- **Increase in operational airports-** The number of operational airports in the country has doubled from 74 in 2014 to 148 in April 2023.
- **Increase in passengers-** The number of domestic passengers has also doubled from 60 million in 2014 to 143 million in 2020, and the number of international passengers has increased by almost 50%.

India's airport capacity is expected to handle 1 billion trips annually by 2023

#### What are the concerns?

- **Lack of trained pilots -** There is a shortage of trained pilots, which can impact safety and cause delays.
- **Safety concerns-** Aircraft Accident Investigation Bureau has recommended for Runaway End Safety Area at Kozhikode's Karipur airport following an air crash in 2020, this recommendation is still not implemented.
- **Inadequate airline infrastructure -** Airport infrastructure needs to be upgraded to handle the increase in air passengers, and aircraft need to be periodically maintained.
- **Complex regulatory framework -** The regulatory framework involves multiple agencies, which can lead to unclear policies and delays in obtaining permits.

- **High fuel costs** - Fuel costs are high due to high taxes on Air Turbine Fuel (ATF), and operating larger aircraft on long-haul routes is expensive.
- **High training costs** - Training costs are high, and training facilities are outdated, which can lead to a skills mismatch.
- **Financial stress** - It would have meant a drop in income by almost 50% for a young pilot who has invested over a crore of rupees to obtain his licence to fly.

### What should be done?

- **Adopt ICAO standards** - India should adopt the ICAO Standard, allows a member state to recognise another ICAO licence and issue an Indian licence on the basis of only an Air Law examination and a Class I medical.
- **Experienced captains** - There will be hundreds of qualified and experienced Indian captains working abroad who will return to India if the hurdles are demolished.
- **Instructor as pilot** - The DGCA, in collusion with airline management pilots, has a rule that makes it mandatory for an instructor or an examiner to be an active pilot.
- However, they will accept a retired pilot working in a training centre abroad to carry out the mandatory checks on Indian pilots.
- **Retired pilots** - They can be utilised for simulator training. Such a step will also release a large number of trained pilots for active flying.
- **Reforms in all sectors**- It is critical to understand that for passenger airlines to grow, there have to be reforms in all areas of aviation - air cargo, airports, aviation fuel taxes and Maintenance, Repair and Overhaul (MRO).
- **Updated laws**- India's Aircraft Act, 1934 and Aircraft Rules, 1937 need to be updated to keep pace with modern technology in aerospace, increasing costs to the industry and ultimately affecting passenger growth.
- **Overhaul DGCA** - India's statutory regulatory authority, the Directorate General of Civil Aviation (DGCA), needs to be modernized, well-staffed, motivated and incentivized.

### 35. PM Gati Shakti

The Labour and Employment Ministry has boarded the **PM Gati Shakti portal** to identify and bridge gaps in social security coverage across the country.

#### About PM Gati Shakti:

- It was **launched by the Prime Minister in October 2021.**

- **PM Gati Shakti** is recognized as the **National Master Plan for Multimodal Connectivity**.

### **Purpose and Objectives of PM Gati Shakti:**

- It integrates **16 ministries**, including **Railways and Roadways**, to ensure cohesive infrastructure development.
- **PM Gati Shakti** aims for integrated planning and coordinated implementation to optimize infrastructure projects.
- It strives to **reduce logistics costs** from the current **13-14% of GDP to 7-8%**, aligning with developed economies.
- **PM Gati Shakti** enhances the **ease of doing business** and boosts the global competitiveness of Indian products.
- It achieves **multimodal connectivity** to reduce travel times for both people and goods.

### **Key Features of PM Gati Shakti:**

- **Digital Platform:** PM Gati Shakti includes a **centralized GIS-based portal** that allows for real-time monitoring of projects.
- **Holistic Planning:** It combines the efforts of various ministries to mitigate project delays and cost overruns.
- **Six Pillars:** PM Gati Shakti emphasizes comprehensiveness, prioritization, optimization, synchronization, analytical, and dynamic nature of planning and implementation.
- **Integration of Schemes:** It incorporates existing schemes like **Bharatmala, Sagarmala, and UDAN**, and develops economic zones including **industrial and defence corridors**, as well as **textile clusters**.

### **Implementation Mechanism of PM Gati Shakti:**

- **Network Planning Group (NPG):** PM Gati Shakti includes representatives from key ministries for integrated project planning and streamlined approvals.
- **GIS-Based Tools:** It utilizes spatial planning tools and satellite imagery to enhance project monitoring and updates.
- **Inter-Ministerial Coordination:** PM Gati Shakti promotes synergy among different departments to minimize redundant work and optimize resource utilization.

### **Major Projects Under PM Gati Shakti:**

- **Delhi-Mumbai Expressway:** Partially completed, it spans **1,386 km** across multiple states.

- **Bengaluru-Chennai Corridor:** Currently under implementation, it extends 262 km.
- **Delhi-Amritsar-Katra Corridor:** Also under implementation, it covers 669 km.

## GS 3 : Economy, Science and Technology, Environment

### 1. SEBI board approves amendment to Mutual Funds rules

- The Securities & Exchange Board of India (SEBI) has recently approved amendments to SEBI (Mutual Funds) Regulations, 1996, aimed at **enhancing the regulatory framework** for Asset Management Companies (AMCs).
  - These amendments mandate AMCs to establish institutional mechanisms to deter potential market abuse, including front-running, following recent instances observed by the market regulator.

#### Mutual Funds

- A mutual fund is a **pool of money** managed by a professional Fund Manager.
- It is a trust that collects money from a number of investors who share a **common investment objective** and invests the same in equities, bonds, money market instruments and/or other securities.
- And the income / **gains** generated from this collective investment is **distributed proportionately** amongst the investors after deducting applicable expenses and levies, by calculating a scheme's "Net Asset Value" or NAV.
- SEBI regulates mutual funds through the **SEBI (Mutual Funds) Regulations, 1996**.

#### Categories of Mutual Funds:

1. **An actively managed fund** is a mutual fund scheme in which the fund manager "actively" manages the portfolio and continuously monitors the fund's portfolio, deciding on which stocks to buy/sell/hold and when, using his/her professional judgement, backed by analytical research.
2. **A passively managed fund**, by contrast, simply follows a market index, i.e., in a passive fund, the fund manager remains inactive or passive inasmuch as, he/she does not use his/her judgement or discretion to decide as to which stocks to buy/sell/hold, but simply replicates / tracks the scheme's benchmark index in exactly the same proportion.

## Fund Structure

- Mutual funds in India operate under a three-tier structure, comprising the
  1. Asset Management Company (AMC),
  2. Trustees, and
  3. Custodians.
- The AMC manages the fund's investments, the Trustees oversee the operations, and the Custodians safeguard the fund's assets.

## Key highlights of the recent update:

- **Institutional Mechanism:** AMCs are required to implement enhanced surveillance systems, internal controls, and escalation processes to identify and address specific types of misconduct, such as front-running, insider trading, and misuse of sensitive information.
- **Whistleblower Mechanism:** To foster transparency, AMCs are mandated to have a whistleblower mechanism.
- **Recording of Communication:** SEBI has exempted face-to-face interactions during market hours from the requirement of recording all communication by dealers and fund managers. This exemption will be effective upon the implementation of the institutional mechanism by AMCs.
- **Prudential Norms for Passive Schemes:** SEBI has streamlined prudential norms for passive schemes, allowing equity passive schemes to invest up to the weightage of constituents in the underlying index, subject to a 35% cap on investment in sponsor group companies.

## 2. Alternate Wetting and Drying (AWD)

Vietnam farmers are adopting the **alternate wetting and drying (AWD)** technique to reduce methane emissions from rice paddies.

### Alternate Wetting and Drying (AWD):

- **AWD** is a water-saving strategy designed for lowland rice farmers to manage water use more efficiently in irrigated fields.
- This method involves **irrigating the field after a specified number of days** following the disappearance of **ponded water**, leading to **periods of flooding** alternated with drying.
- The intervals between irrigation can range from **1 to over 10 days**, depending on the soil's characteristics.

- A crucial component of AWD is the use of a **perforated tube** inserted into the soil, which helps farmers monitor the water level that should be maintained at about **15 cm below the soil surface**.
- AWD is a relatively **simple and low-cost approach** that effectively reduces water usage in rice cultivation by **30%**.

### Benefits of Alternate Wetting and Drying (AWD)

- **Significantly lowers methane emissions** by 30-70%, contributing to a reduction in greenhouse gases without impacting rice yields.
- The precision in water management helps maintain the productivity of rice fields while **saving on water and production costs**.
- Utilizing drones for fertilization not only reduces labor costs but also enhances the **precision of fertilizer application**.
- Accurate fertilizer application helps avoid excessive use, preventing the release of nitrogen gases that can exacerbate global warming.

### 3. Marrakesh Agreement

World Trade Organization (WTO) is celebrating 30 years of the **Marrakesh Agreement**.

#### Marrakesh Agreement:

- The **Marrakesh Agreement** is the foundational treaty of the **World Trade Organization (WTO)**, which was signed by **123 countries** in Marrakesh, Morocco, in 1994.
- This agreement succeeded the General Agreement on Tariffs and Trade (GATT). It significantly changed how international trade rules and organizations were managed.

#### Objectives of Marrakesh Agreement:

- One key objective is to **reduce trade barriers** to boost economic growth.
- It aims to promote **fair competition** on an international scale.
- The agreement seeks to ensure **full employment** and increase effective demand across the globe.
- Another goal is to expand the production and trade of goods and services.
- It focuses on optimizing the use of world resources to foster **sustainable growth**.



### Key Features of Marrakesh Agreement:

- The agreement established the **World Trade Organization (WTO)** as the global authority on trade rules.
- It expanded trade regulations to include not just goods but also services and intellectual property, under the General Agreement on Trade in Services (GATS) and the Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS).
- The **Dispute Settlement Understanding (DSU)** was instituted to resolve trade disputes legally.
- The **Trade Policy Review Mechanism** was introduced to enhance transparency and ensure compliance in trade policies.
- The WTO was structured with governance bodies like the Ministerial Conference and the General Council to oversee these regulations.

### 4. SEBI board approves amendment to Mutual Funds rules

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- It is a trust that collects money from a number of investors who share a **common investment objective** and invests the same in equities, bonds, money market instruments and/or other securities.
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- SEBI regulates mutual funds through the **SEBI (Mutual Funds) Regulations, 1996**.

### Categories of Mutual Funds:

1. **An actively managed fund** is a mutual fund scheme in which the fund manager "actively" manages the portfolio and continuously monitors the fund's portfolio, deciding on which stocks to buy/sell/hold and when, using his/her professional judgement, backed by analytical research.

2. A **passively managed fund**, by contrast, simply follows a market index, i.e., in a passive fund, the fund manager remains inactive or passive inasmuch as, he/she does not use his/her judgement or discretion to decide as to which stocks to buy/sell/hold, but simply replicates / tracks the scheme's benchmark index in exactly the same proportion.

### Fund Structure

- Mutual funds in India operate under a three-tier structure, comprising the
  1. Asset Management Company (AMC),
  2. Trustees, and
  3. Custodians.
- The AMC manages the fund's investments, the Trustees oversee the operations, and the Custodians safeguard the fund's assets.

### Key highlights of the recent update:

- **Institutional Mechanism:** AMCs are required to implement enhanced surveillance systems, internal controls, and escalation processes to identify and address specific types of misconduct, such as front-running, insider trading, and misuse of sensitive information.
- **Whistleblower Mechanism:** To foster transparency, AMCs are mandated to have a whistleblower mechanism.
- **Recording of Communication:** SEBI has exempted face-to-face interactions during market hours from the requirement of recording all communication by dealers and fund managers. This exemption will be effective upon the implementation of the institutional mechanism by AMCs.
- **Prudential Norms for Passive Schemes:** SEBI has streamlined prudential norms for passive schemes, allowing equity passive schemes to invest up to the weightage of constituents in the underlying index, subject to a 35% cap on investment in sponsor group companies.

## 5. Economic inequality trends in India

French economist Thomas Piketty's recent findings on economic inequality trends in India underscore the gravity of the issue. While the data reveals alarming levels

of inequality, the proposed solution of wealth redistribution through taxation warrants scrutiny.

### Issues

- **Income and Wealth Inequality:** Piketty's research highlights a significant disparity in income and wealth distribution in India, with the top 1% holding a disproportionate share of total wealth and income compared to the bottom 50%.
- **Regressive Tax System:** The analysis critiques India's tax system, primarily based on income, as regressive, calling for a wealth tax targeting the affluent. However, this approach overlooks crucial aspects of economic dynamics and may have unintended consequences.

### Significance

- **Economic Growth Trends:** Income and wealth inequality escalated notably from the 1980s onward, coinciding with India's shift towards market-oriented policies. Despite the widening gap, overall economic growth has surged since the 1990s, leading to an expansion of the economic pie.
- **Economic Freedom Disparity:** The stark contrast in income levels between different segments of society underscores the limited economic freedom for the bottom 50%. Barriers such as access to capital and high costs of education hinder their ability to compete in the market.

### Solutions

- **Promoting Economic Freedom:** Rather than imposing higher taxes on the wealthy, fostering economic freedom for the disadvantaged is proposed. Liberalizing sectors like finance and education can enable individuals to pursue high-paying opportunities, thus narrowing the income gap organically.
- **Addressing Special Privileges:** Concentrated wealth is often attributed to government-endorsed privileges that shield the affluent from market competition. Eliminating such advantages and fostering a competitive environment would naturally reduce wealth disparities.

## 6. Impact of Bathymetry on Indian Ocean Circulation

Recently, a study titled 'Impact of bathymetry on Indian Ocean circulation in a nested regional ocean model' was undertaken by scientists from the **Indian National Centre for Ocean Information Services (INCOIS)**.

- **Bathymetry** involves mapping the depths of various water bodies, including rivers, seas, and oceans.

### Key Findings of the Study:

- **East India Coastal Current (EICC):** At depths of 1,000 meters and 2,000 meters, the EICC flows in the opposite direction to surface currents. This finding contradicts previous models and highlights a more accurate representation of the EICC's behavior at depth.
- **Equatorial Under Current (EUC):** The EUC, influenced by the presence of the Maldives Islands, extends westward and displays significant seasonal variations. During the northeast monsoon, it's centered on the equator and can be found as deep as 150 meters.
- **Currents along Andaman and Nicobar Islands:** A significant boundary current was identified at a depth of 2,000 meters along the coast of these islands, indicating complex deep-sea dynamics not previously recognized.
- **Salinity and temperature:** The study confirmed that salinity and temperature measurements of the upper ocean are very close to observed values near the coast, validating the improvements in ocean modeling.
- The study's insights are crucial for **improving weather and climate forecasts**, which affect not only environmental understanding but also maritime and economic activities.

## 7. Strengthening of Rupee

From 2014, the rupee has depreciated by 27.6% against the US dollar, from Rs 60.34 to Rs 83.38.

### What is currency depreciation?

- **Currency depreciation-** It refers to a decrease in the value of a country's currency relative to other currencies in the foreign exchange market.
- It means that the currency can buy fewer units of another currency or goods and services in international markets.
- **Trade imbalance-** If India's imports exceed exports, there is higher demand for foreign currencies (like the US dollar) to pay for these imports, this increased demand for foreign currency that can lead to depreciation of the domestic currency.
- **Differential inflation rates-** If India's inflation rate is higher than that of its trading partners, the purchasing power of the rupee decreases relative to other currencies.

- **Interest rate differentials-** If interest rates in the US are higher than in India, investors may seek higher returns by investing in US assets. This can increase demand for US dollars, causing the rupee to depreciate.
- **Market speculation-** Investor perceptions of India's economic and political stability, as well as global economic trends, can influence currency markets.
- **Capital flows-** In times of uncertainty or when there are better investment opportunities abroad, capital may flow out of India, increasing demand for foreign currencies and putting downward pressure on the rupee.
- **External factors-** Events such as changes in global oil prices, geopolitical tensions (Russia-Ukraine war, Israel Hamas conflict etc.) or monetary policy decisions by major central banks can also impact the value of the rupee against the US dollar.
- **Effective Exchange Rate (EER)-** India trades with countries other than US, hence the strength or weakness of rupee is a function of its exchange rate with not just US dollar but also with other global currencies.

The types of effective exchange rate are Nominal Effective Exchange Rate (NEER) and Real Effective Exchange Rate (REER)

### How does effective exchange rate impact trade?

- The EER is an index of the weighted average of the rupee's exchange rates vis-à-vis the currencies of India's major trading partners.
- The currency weights are derived from the share of the individual countries to India's total foreign trade, just as the weights for each commodity in the CPI are based on their relative importance in the overall consumption basket.

### Impact on Exports

- **Depreciation-** A depreciation of the domestic currency (a decrease in its value relative to other currencies) can make exports cheaper for foreign buyers.
- This is because foreign buyers need to spend less of their own currency to purchase goods and services denominated in the depreciated currency.
- Therefore, a weaker exchange rate (both NEER and REER) tends to boost exports by enhancing their competitiveness in international markets.
- **Appreciation-** It can make exports more expensive for foreign buyers, potentially leading to a decrease in export competitiveness.

### Impact on imports

- **Depreciation-** It makes imports more expensive for domestic consumers, this is because domestic consumers need to exchange more of their own currency to purchase goods and services denominated in foreign currencies.

- As a result, a weaker exchange rate (both NEER and REER) tends to reduce imports by increasing their costs for domestic consumers.
- **Appreciation**- It makes imports cheaper for domestic consumers, potentially leading to an increase in import levels.
- Overall, while both NEER and REER influence a country's trade balance by affecting the competitiveness of exports and the cost of imports, REER provides a more accurate assessment by considering inflation differentials.

## 8. Marine Cloud Brightening (MCB)

Scientists are testing a geoengineering technique called marine cloud brightening that involves using machines to inject tiny saltwater particles into marine stratocumulus clouds, aiming to increase their reflectivity and cool the Earth.

- The Brightening clouds is one of several ideas to push solar energy back into space – sometimes called solar radiation modification, solar geoengineering, or climate intervention.

### Marine Cloud Brightening (MCB):

- It is a scientific initiative that explores how altering atmospheric particles (aerosols) can impact cloud reflectivity.
- By releasing tiny aerosol particles into the atmosphere, researchers aim to enhance cloud brightness, leading to increased sunlight reflection.
- Aerosols of the right size and concentration could significantly increase the reflectivity of specific types of clouds.
- This phenomenon is visible in satellite images of clouds brightened by ship emissions (known as “ship tracks”).

### Goals of the Marine Cloud Brightening Program:

- It helps in better understanding of the present-day effects of pollution aerosols on clouds.
- Investigate whether aerosol particles made from sea salt could be used to intentionally reduce near-term climate warming while greenhouse gas concentrations are brought down to safer levels.
- It aims to understand the benefits, risks, and efficacy of the intentional use of aerosols to reduce warming through different implementations of marine cloud brightening.

### Concerns/Challenges associated with Marine Cloud Brightening (MCB):

- MCB involves the large-scale spraying of seawater into the atmosphere at significant altitudes, which presents engineering complexities in terms of design, cost, maintenance, and operation of the spraying devices.
- Alterations in cloud patterns and precipitation due to MCB could affect regional climate and hydrological cycles, potentially causing unintended consequences like droughts or floods. Changes in clouds over broad regions affect the circulation of the atmosphere, weather, and precipitation. Both marine cloud brightening (MCB) and pollution aerosols can change clouds, which in turn affects regions both nearby and far from where the brightening occurs.
- MCB raises ethical dilemmas about human intervention in natural processes and the governance and decision-making processes surrounding its implementation.
- MCB might lead to complacency among policymakers and the public, diminishing their commitment to reducing greenhouse gas emissions and adapting to climate change.

## 9. World Coral Conservatory Project

Self-bred corals from the **World Coral Conservatory Project** are now among **Europe's largest coral reefs at Burgers' Zoo** in the Netherlands.

### World Coral Conservatory Project:

- **Launched in 2019** during Monaco Ocean Week, the World Coral Conservatory Project focuses on preserving a vast array of coral species.
- The project's primary **aim** is to safeguard a **global collection** of most coral species and strains, maintained as living colonies.
- It functions as a modern-day "**Noah's Ark**," dedicated to the **survival of coral ecosystems**.
- The **method** employed involves taking coral samples from their natural settings. These samples are then **cultivated** and **distributed** among a network of both public and private aquariums.

### Key objectives:

- Protecting the **biodiversity** of coral reefs.
- Enhancing the ability of reef organisms to **tolerate stress**.
- Providing valuable insights about corals and coral reefs to both the **general public and policymakers**.

## 10. Significance and Challenges of Hydropower Energy

Recent droughts in Colombia and Ecuador have severely hampered energy supplied by hydropower.

### Significance of hydropower energy

Hydropower functions by harnessing the movement of water flowing through a turbine, which generates electricity as it spins.

- **Renewable source-** It's a renewable form of energy, relying on the water cycle, which is driven by the sun, ensuring sustainability.
- **Clean energy-**Hydropower uses water as its fuel, making it a clean energy source that doesn't produce air pollution or toxic byproducts.
- **Energy independence-** It allows for domestic energy production, reducing dependence on imported fuels and enhancing energy security.
- **Flexibility-**Hydropower plants can quickly adjust their output to match demand, providing essential backup power during electricity outages.
- **Scalability-** Hydropower projects can range from small-scale systems suitable for powering individual homes or communities to large-scale projects that provide electricity for entire regions or countries.
- **Multipurpose use-** Hydropower projects often involve the construction of dams and reservoirs, which can serve multiple purposes such as water storage for irrigation, flood control and recreational activities like boating and fishing.
- **Combat weather change-** Hydropower plants are built to respond to changes in the weather such as storing water in the rainy season to use when it becomes dry.
- **Cost-effective-** It provides low-cost electricity and has a long lifespan, which can offset initial construction costs.
- **Supports other renewables-** Hydropower can be used in conjunction with other renewable sources, like wind and solar, to provide stable energy supply.
- **Eco-friendly-** Hydropower is a key element in creating secure and clean electricity supply systems and reaching global net-zero targets.
- **Expansion potential-** Hydropower is expected to expand because it provides cheap power at a large scale.
- **Renewable leadership-** While wind and solar energy are on the rise, the International Energy Agency acknowledges that hydropower will remain the world's largest source of renewable electricity generation through the 2030s.

To limit global temperature increases to 1.5°C, hydropower capacity needs to double by 2050.



## What are the challenges faces by hydropower energy?

- **Global decline-** Hydropower, despite being the world's largest renewable electricity source, experienced a historic 8.5% drop in global output in the first half of 2023.
- **Climate change vulnerability-** Climate change poses a significant threat to hydropower infrastructure, as altered precipitation patterns, increased temperatures, and more frequent extreme weather events can affect water availability and hydrological cycles.

A study from 2022 indicates that over a quarter of hydropower dams are located in areas at risk of water scarcity by 2050.

- **Drought impact-** A drought fuelled by the El Nino weather phenomenon has reduced reservoir water levels in hydropower plants, which Ecuador and Colombia rely on for most of their electricity.
  - **Ecuador-** The country declared a state of emergency and instituted power cuts.
  - **Colombia-** The water has been rationed in the capital and the country has halted electricity exports to Ecuador.
- **Impact on China-** China, which is the largest producer of hydroelectric power, saw significant power shortages due to droughts, leading to electricity rationing.
- **Over reliance-** Countries with a high dependence on hydropower, like those in Africa (around 80% of energy), are especially vulnerable to the impacts of climate change, which can cause severe droughts and affect electricity generation.
- **Limited alternatives-** Many of the over-reliance countries lack sufficient capacity for alternative power generation and have limited infrastructure to import power.
- **Environmental impacts-** Constructing dams and reservoirs alters the natural environment as it can disrupt ecosystems, impact wildlife migration, and change water quality.
- **Water allocation-** Water is a finite resource, and competing demands for water use, including agriculture, industry, and ecosystem needs, can create conflicts over water rights and allocation.
- **Social disruptions-** Large scale hydropower projects often involve the resettlement of communities living in the project area, leading to loss of livelihoods and cultural heritage.
- **Cultural impact-** Indigenous peoples may have spiritual or cultural connections to the affected rivers and lands where the dam would be built, leading to conflicts over land and resource rights.

- **Geological hazard-** Hydropower infrastructure is vulnerable to geological hazards such as landslides, earthquakes, and volcanic eruptions, which can damage dams, tunnels, and other structures, leading to safety risks and operational disruptions.
- **Joshimath slide-** A sanctioned hydropower project in Dhauliganga-Alaknanda basin punctured an aquifer in 2009 that resulted in Joshimath slide.
- **High cost-** While hydropower is considered cheap, building large-scale hydroelectric plants is expensive and resource-intensive.

### What lies ahead?

- The International Hydropower Association (IHA) promotes a combination of water, wind, and sun to achieve sustainable energy goals.
- Ghana and Kenya are successfully moving from high reliance on hydropower towards a more “robust portfolio of technologies”.
- There’s significant potential in placing floating solar panels on reservoirs in hydropower plants, it is already explored by countries like China and Brazil.
- There is a need to move away from mega dams toward medium-scale plants, it can help mitigate climate risks associated with overdependence on large infrastructure projects.

## 11. Impacts of warming of Indian Ocean

A new study published in journal Science Direct has said that Indian Ocean is experiencing unprecedented and accelerated warming, which may continue throughout the century unless greenhouse gases (GHGs) are reduced immediately.

### What are the key highlights of the study?

- **Rapid warming-** The study has predicted that between 2020 and 2100, the Indian Ocean could warm at a rate of 1.7-3.8°C increase per century if greenhouse gas emissions are not reduced.

The future increase in heat content is equivalent to adding the energy of one Hiroshima atomic bomb detonation every second, all day, every day, for a decade.

- **Ocean basin heat-** The study examined the Indian Ocean’s warming over the past century, finding that the ocean basin heated at a rate of 1.2°C per century between 1950 and 2020.

- **Expansion of Indian Ocean Warm Pool-** The study found that the area of the IOWP characterized by Sea Surface Temperature values exceeding 28°C, has expanded notably, particularly in the south-central basin.
- **Variability in Net Primary Production-** NPP exhibited large interannual variability in northern and central regions of Indian Ocean, while some northern regions shows slightly decreasing trends in NPP.

Net Primary Production represents the net amount of energy that is stored by primary producers and made available to the rest of the ecosystem for growth and consumption.

- **Decline in chlorophyll-** The productivity and surface levels of chlorophyll are also expected to decline by 2100, with the greatest reduction in the western Arabian Sea, where levels could fall by 8-10% from their current state.
- **Temporal patterns-**
- **Changes in Indian Ocean Dipole (IOD)-** The study predicts an increase in the frequency of extreme IOD events by 66%, while the frequency of moderate events is projected to decrease by 52% by the end of the century. These changes could further exacerbate the variability in monsoon rainfall patterns and impact regional climate dynamics.
- **Increase in heat content-** The current rate of increase in heat content within the first 2,000 meters below the ocean surface is 4.5 zettajoules per decade. However, future projections suggest a substantial rise to 16-22 zettajoules per decade.
- **Vulnerability-** The north-western parts of the Indian Ocean, including the Arabian Sea, experienced the most significant warming, while the south-eastern parts of the ocean, off the coasts of Sumatra and Java, experienced the least warming.
- **Change in pH level-** The bio-geochemical characteristics of the Indian Ocean are also expected to change due to the warming, for instance the pH levels of the ocean's waters are projected to decrease from about 8.1 currently to 7.7 by the end of the century.

### What are the impacts of warming of Indian Ocean?

- **Monsoon changes-** The southwest monsoon, crucial for India's rainfall, could be affected by the increased heat content in the ocean's surface and subsurface layers.

- **Extreme weather events-** Heavy rainfall events and extremely severe cyclones have already become more frequent since the 1950s and are projected to increase further with rising ocean temperatures.
- **Sea level rise-** Thermal expansion of seawater contributes significantly to rising sea levels, which could lead to coastal erosion, flooding, and displacement of populations in the 40 countries bordering the Indian Ocean.
- **Changes in marine ecosystem-** The warming of the Indian Ocean is expected to disrupt marine ecosystems, leading to coral bleaching, loss of biodiversity, and habitat destruction.
- **Acidification-** The projected changes in pH may be detrimental to the marine ecosystem since many marine organisms particularly corals and organisms that depend on calcification to build and maintain their shells as they are sensitive to the change in ocean acidity.
- **Decline in productivity-** Decline in chlorophyll levels could further affect marine productivity and food chains.
- **Marine heatwaves-** The frequency and intensity of marine heatwaves are expected to rise that could cause severe cyclones, they also lead to habitat destruction through coral bleaching, seagrass loss and the degradation of kelp forests, adversely affecting the fisheries sector and also

### What lies ahead?

- The study underscores the urgency of reducing greenhouse gas emissions to mitigate the impacts of ocean warming.
- The findings emphasizes the importance of building climate-resilient infrastructure, conserving marine ecosystems, and enhancing forecasting capabilities to adapt to the changing conditions.

### 12. Why there is a need of balanced fertilisation?

Capping consumption of urea and DAP to correct worsening plant nutrient imbalance is likely to be a key policy goal for the government post the Lok Sabha polls.

- **Overutilization-** Fertiliser use has seen a tremendous increase in India and in other parts of the world with the spread of Green Revolution technology.

India's urea consumption in 2024 is 16.9% higher than the urea consumption in 2013-14

- **Imbalance use-** Over the years, the usage ratio of NPK (Nitrogen (N), Phosphorus (P), and Potassium (K)) has become more imbalanced, in 2012-13 it had raised to 8.2:3.3: 1 which indicates a higher use of N that can lead to reduced efficiency of fertilizer use and potential environmental issues.

The ideal NPK ratio, which stands for nitrogen (N), phosphorus (P), and potassium (K), is indeed considered to be 4:2:1 in India.

- **Concerns with Nutrient Based Subsidy-** It aimed at promoting balanced fertilization, initially led to a decline in the consumption of certain fertilizers like DAP and MOP, but it failed to control urea consumption due to its exclusion from the subsidy scheme.
- **Price control-** Recent price controls on non-urea fertilisers have led to nutrient imbalances, with DAP becoming the “new urea” due to its lower price compared to other complex fertilisers.
- **Proper regulation-** Balanced fertilisation aims to encouraging the use of nutrients in correct proportions and discouraging excessive use of fertilisers like urea, di-ammonium phosphate (DAP) or muriate of potash (MOP).
- **Success of neem coated urea-** Neem oil acts as a nitrification inhibitor allowing more gradual release of nitrogen, this improved the nitrogen use efficiency and reduced the quantity of urea needed per acre.
- **Increased usage-** Though the government has regulated urea usage through compulsory neem-coating and sulphur-coated urea (37% Nitrogen and 17% Sulphur) the consumption of urea has still continued to increase.

Sulphur coated urea reduced the standard urea bag size from 50kg to 40kg with 12.5% price hike for optimizing nutrient utilization

- **Import dependency** - India heavily relies on imports for fertilisers, including finished products and raw materials. Hence the change in price can impact India's foreign exchange outflow and the government's subsidy burden.
- **Drop in prices-** The price of urea, DAP and MOP has been dropped significantly in 2022-23 due to Russia-Ukraine war and Houthi rebel attacks in Red Sea.

Ships carrying DAP and rock phosphate from Morocco's Jorf Lasfar port now take 40 days instead of the usual 24-26 days to reach India.

- **Opportunity for India-** The cooling international prices provides flexibility for next government to rationalize MRPs of fertilizers, it could bring urea under NBS system and adjust subsidy rates for other nutrients.

### What lies ahead?

- Establishing a proper price hierarchy among fertilizers is essential to incentivize balanced fertilization. This could involve pricing DAP higher, MOP lower, and complexes in between to reflect their nutrient content and encourage optimal usage.

- Promoting the use of complex fertilizer (mix of nutrients in balanced proportion) can help provide a balanced nutrient profile tailored for a wider range of crops and soil types.
- Exploring innovative fertilizers like sulphur-coated urea can offer additional options for balanced fertilization as they provide a gradual release of nutrients, reducing the risk of leaching and optimizing nutrient uptake by plants.
- The government can encourage farmers to adopt more sustainable and efficient fertilization practices, leading to improved crop yields, reduced environmental impact, and greater resilience in the agriculture sector.

### **13. Exports from key labour-intensive sectors decline 12% compared to pre-pandemic levels**

During the last financial year, when overall goods exports shrank 3 per cent, the outbound shipments of textiles, leather, gems and jewellery and marine products saw a much steeper 9 per cent decline to \$78 billion against \$86.32 billion in FY23.

Details:

- While India's exports have been largely flat, the country's exports from labour intensive sectors such as textiles, leather, gems and jewellery and marine products are seeing a sharp dip. India's shipments from these **four high jobs generating sectors** have declined nearly 12 per cent compared to the pre-pandemic levels five years ago (FY18) amid an overall weakness in demand from developed nations and stiff competition from **Vietnam and Bangladesh**.
- During the last financial year, when overall goods exports shrank 3 per cent, the outbound shipments of textiles, leather, gems and jewellery and marine products saw a much steeper 9 per cent decline **to \$78 billion against \$86.32 billion in FY23**. The comparable number in **FY18 and FY19 stood at \$90 billion and \$88.14 billion** respectively, as per commerce and industry ministry data.
- During the last seven years, India's textile and garments exports have remained flat at around \$35 billion, while Vietnam and Bangladesh have gained market share on the back of free trade agreements (**FTAs**) and **Least developed countries (LDC) status that amount to 10-15 per cent concession on duty**.
- As per Global Trade and Research Initiative (GTRI) report in 2023, China exported \$114 billion worth of garments, followed by the European Union

(EU) with \$94.4 billion, Vietnam with \$81.6 billion, Bangladesh with \$43.8 billion, and India with just \$14.5 billion.

- India significantly trails behind China and the EU and is also falling behind smaller countries like Bangladesh and Vietnam.
- From 2013 to 2023, Bangladesh's garment exports grew by 69.6 per cent, Vietnam's by 81.6 per cent, but India's grew by only 4.6 per cent. As a result, India's global market share in garment trade has declined from 2015 to 2022. The share of knitted apparel dropped from 3.85 per cent to 3.10 per cent, and the share of non-knitted apparel decreased from 4.6 per cent to 3.7 per cent
- Another sector witnessing considerable stress is the gems and jewellery sector that employs nearly 50 lakh people according to the union government's estimates. The exports from the gems and jewellery sector declined over 20 per cent to \$32.7 billion compared to \$41.54 billion in FY18.

### What reforms government has brought?

- To make the industry more globally competitive, however, the Union government had launched **Mega Investment Textiles Parks (MITRA) programme** in 2021 to increase investment and acquire a competitive edge over global competitors.
- The commerce and industry ministry, in its reply to a query, said that remission of duties and taxes under **Remission of Duties and Taxes on Exported Products (RoDTEP)** scheme were extended to 18 items to support the textiles sector.

### Positive developments

- Rerouting of petroleum products and the PLI-led push for electronic manufacturing has shown increased value addition, but job creation particularly in the tech-intensive phone manufacturing sector has remained lower than government's projected employment generation estimates from the PLI scheme.
- While exports of electronic goods jumped 288 per cent between FY18 and FY24, imports during the same period jumped 61 per cent, official data showed. In the case of petroleum products, the exports between FY18 and FY24 jumped 127 per cent but imports during the same period surged 65 per cent.

## 14. Artificial General Intelligence

Is the development of machines capable of human-like thought and learning a boon to society, or does it pose a risk to our very existence?

### Artificial General Intelligence

Artificial General Intelligence (AGI) also commonly known as Strong AI or Deep AI is basically the hypothetical intelligence of machines.

- **AGI-** It refers to a machine or a software that can perform any intellectual task that a human can do.
- **Origin-** The idea of AGI first emerged in the 20th century with a paper written by **Alan Turing**, widely considered to be the father of theoretical computer science and artificial intelligence.
- **Turing test-** It is a means to evaluate machine intelligence, the test suggests that if a machine can engage in a conversation with a human in such a way that the human cannot distinguish whether they are conversing with another human or a machine, then the machine can be considered to possess human-like intelligence.
- **Aim-** To emulate human cognitive abilities such that it allows it do to unfamiliar tasks, learn from new experiences, and apply its knowledge in new ways.
- **Functions-** AGI performs reasoning, common sense, abstract thinking, background knowledge, transfer learning, ability to differentiate between cause and effect, etc.,
- **Learn from experience-** AGI can adapt to new situations, and acquire new knowledge and skills without explicit programming for each task.
- **Problem solving-** AGI can understand complex problems, reason through them using logic or intuition, and generate solutions or make decisions based on available information.
- **Understand natural language-** AGI can comprehend and generate human language, enabling effective communication and interaction with users.
- **Creativity-** AGI may exhibit creativity by generating novel ideas, solutions, or artifacts beyond what they have been explicitly programmed for.
- **Autonomy-** AGI has a degree of autonomy in decision-making and problem-solving, capable of operating independently within its defined scope.

### Applications of AGI

- **Healthcare-** AGI could revolutionize the medical field by integrating and analysing extensive datasets to improve diagnostics, treatment planning, and personalized medicine.



- **Finance-** It could automate complex processes and enhance decision-making by providing real-time analytics and accurate market predictions, potentially transforming industries with its advanced computational abilities.
- **Education-** It has the potential to transform educational systems by creating adaptive learning platforms tailored to individual student needs which could democratize education, making personalized learning accessible to students worldwide, regardless of their location or background.
- **Autonomous systems-** It could enable the development of highly advanced autonomous systems, including self-driving cars, drones, robots, and smart infrastructure
- **Scientific research-** It could accelerate scientific research by analysing vast amounts of data, conducting simulations, this could aid scientists in solving complex problems in fields such as physics, chemistry, biology, and astronomy.
- **Sustainability-** AGI could play a crucial role in addressing global challenges such as climate change, resource management, and environmental conservation by analysing environmental data, optimize energy usage, and develop sustainable solutions for mitigating environmental impact.
- **Existential threat-** Stephen Hawking said, "The development of full artificial intelligence could spell the end of the human race."

### What are the challenges of AGI?

- **Environmental impact-** The immense computational power required for AGI development raises concerns about its environmental impact, particularly in terms of energy consumption and the generation of electronic waste.
- **Employment disruption-** AGI's potential to automate tasks across various sectors could lead to significant job displacement, potentially exacerbating socio-economic disparities.
- **Power imbalance-** The concentration of power in the hands of entities that control AGI raises concerns about socio-economic inequality and the potential for misuse or exploitation.
- **Security risks-** The development of AGI may introduce unforeseen security vulnerabilities, posing risks to data privacy, cybersecurity, and even national security.
- **Ethical considerations-** AGI's unprecedented capabilities raise ethical questions regarding its impact on human society, autonomy, and values.
- **Loss of human control-** The possibility that AGI could outpace human understanding and control, leading to unpredictable or undesirable outcomes.

### What lies ahead?

- There is a need for robust regulation, international cooperation and interdisciplinary research to ensure that AGI development proceeds responsibly and in alignment with human values and safety standards.
- It's essential to approach AGI development with a comprehensive understanding of its potential risks and benefits, prioritizing the well-being of humanity as a whole.

## 15. Inclusive Growth and issues arising from it

- Election discourse in India has revolved around the concept of redistribution, with allegations of wealth confiscation and redistribution dominating political debates.
- Economic inequality is a pressing issue globally, necessitating discussions on bridging the wealth gap for a more just society.
- There are two primary approaches to addressing inequality: making the rich poorer, making the poor richer, or a combination of both.

### Debating Redistribution:

- **Misconceptions:** Despite accusations of redistribution in political rhetoric, the actual manifesto lacks explicit mentions of such measures.
- **Fundamental Issue:** The widening economic gap between the rich and poor demands attention, irrespective of political affiliations or blame games.

### Philosophical Differences in Approaches:

- **Pareto Optimum vs. Growth:** Developed nations often adopt a “Pareto” path due to slow growth, while developing nations have the potential for faster growth, influencing their approach to inequality.
- **Systemic Fixes vs. Wealth Tax:** Addressing inequality through taxing the wealthy or fixing corrupt systems presents differing perspectives on economic fairness.

### Addressing Inequality in India:

- **Economic Growth and Taxation:** India's inequality stems from imbalanced economic growth and taxation, with jobless growth exacerbating disparities.
- **Policy Solutions:** Rebalancing capital-labor dynamics through targeted policies like apprenticeships, employment incentives, and promoting labor-intensive activities.
- **Taxation Reforms:** Overhauling the taxation system to reduce the burden on the common person while ensuring equitable contributions from all sectors.

- **Social Security Nets:** Implementing welfare programs to support the poor until they can benefit from economic growth, funded through a combination of growth, tax reforms, and efficient welfare delivery.

### Conclusion:

- Bridging the rich-poor gap in India requires a multifaceted approach, emphasizing economic growth, job creation, equitable taxation, and social welfare.
- Punitive taxation of the rich is deemed impractical and counterproductive, with a focus instead on making the poor richer without diminishing the wealth of the affluent.

## 16. E-Commerce Surge in India

A report by Invest India said India's e-commerce landscape is poised for a monumental gain by 2030.

### E-commerce in India:

- By 2030, India is projected to become the **third largest online retail market globally**.
- The sector was valued at **\$70 billion in 2022**, making up about 7% of India's total retail market.
- The digital economy is on track to expand to **\$800 billion by 2030**.

### E-commerce Models

- **Inventory-Based Model:** Here, the inventory is owned by the e-commerce entity selling directly to consumers. **Foreign Direct Investment (FDI) is not allowed** in this model.
- **Market-Based Model:** This model serves as a platform connecting buyers and sellers and permits **100% FDI** under the automatic route.

### Drivers of E-commerce

- In 2022, **52%** of Indians had internet access, making India the world's second-largest internet user base with **881 million users**.
- Notable infrastructures include eKYC and Unified Payments Interface, which facilitated **\$1.5 trillion in transactions in 2022**.
- More than **60%** of e-commerce demand is expected to come from tier 2-4 towns and rural areas of India by **2026**.

- It is projected that over **80%** of the Indian population will own smartphones by **2026**.
- Approximately **73%** of internet users prefer content in Indian languages, engaging a user base of **540 million**.
- By 2025, **87%** of Indian households are expected to have internet access, with the cost of 1 gigabyte of data at approximately **\$0.17**.

### Key Challenges

- Challenges include **digital divides**, **piracy**, issues with **counterfeit products**, and **domination by foreign entities** like Amazon.

### Trends

- The market size is expected to grow to \$5.5 billion by 2025.
- **Government Initiatives** include the Government e-marketplace (GeM) with a Gross Merchandise Value of **\$2011 billion** in FY 2022-23, Jan Dhan Yojana, and the BharatNet Project.

## 17. Coral Bleaching in the Lakshadweep

The ICAR-Central Marine Fisheries Research Institute (CMFRI) has found that coral reefs in the Lakshadweep Sea have undergone severe bleaching due to prolonged marine heatwaves since October 2023.

### Coral reefs

- **Nature-** They are largest living structures on Earth crucial for underwater ecosystems formed by skeletons of colonial marine invertebrates known as coral polyps.
- **Formation of coral reefs-** Over thousands and millions of years, the stony skeletons of hard corals accumulate and form the complex structures known as coral reefs.
- These reefs are among the most diverse ecosystems on the planet, hosting thousands of marine species and supporting vibrant marine life.
- **Sessile Nature of Corals-** Corals are stationary marine animals that permanently attach themselves to the ocean floor. This sessile lifestyle allows them to form colonies and build intricate structures over time.
- **Symbiotic relationship-** Corals have a symbiotic relationship with single-celled algae called zooxanthellae which provide corals with food and nutrients through photosynthesis, while corals offer shelter and nutrients to the algae. This symbiotic relationship offers vibrant colour to corals.

- **Rainforests of sea-** Coral reefs are often referred to as the "rainforests of the sea" due to their high biodiversity and ecological significance.
- They provide habitat and shelter for a vast array of marine organisms, including fish, invertebrates, and algae.
- **Ecosystem services-** They provide services such as coastal protection, shoreline stabilization, and support for fisheries and tourism.
- **Lakshadweep's coral atolls-** The majority of the islands in the Lakshadweep archipelago are coral atolls, characterized by low-lying islands surrounded by coral reefs.
- The soil composition of these islands is largely derived from the accumulation of coral skeletons over time, highlighting the close relationship between the islands and the surrounding coral reef ecosystems.
- **Coral bleaching-** It occurs when corals experience stress due to factors such as changes in temperature, pollution or high levels of ocean acidity.
- **Warm temperature-** Coral bleaching occurs when water temperatures become too warm, leading corals to expel the microscopic algae, known as zooxanthellae, which live within their tissues.

Zooxanthellae algae are essential for the corals' survival as they provide them with nutrients through photosynthesis.

- **Consequences-** Without their algae, corals' tissues become transparent, revealing their white calcium carbonate skeleton. While bleached corals are not immediately dead, they are at risk of starvation and disease. Without intervention, bleached corals can ultimately die.

### Why there is coral bleaching in Lakshadweep?

- **Thermal stress-** Corals experience thermal stress when sea surface temperatures exceed the maximum mean temperature by 1°Celsius, prolonged high temperature exacerbates this stress.
- **Degree Heating Week (DHW)-** It is used to measure accumulated heat stress over 12 weeks which sums temperatures exceeding the bleaching threshold calculated in Celsius-weeks.

DHW values above 4°C-weeks cause significant coral bleaching.

- **Lakshadweep sea-** It has been experiencing temperatures 1°C above the norm since October, 2023 which has led to significant coral bleaching surpassing events in 1998, 2010 and 2015.
- **Marine heatwaves-** They are driven by various factors, including excessive atmospheric heat due to global warming and shifts in ocean currents.

- These heatwaves are becoming more frequent and severe in the Indian Ocean region, with significant implications for coral reef ecosystems.
- **Study by IITM (Pune)**- A study by the Indian Institute of Tropical Meteorology (IITM), Pune, reported an increase in marine heatwaves in the Indian Ocean.
- The western Indian Ocean region, including areas near the Lakshadweep islands, has experienced a significant rise in marine heatwaves, leading to widespread coral bleaching events
- **Impact beyond Lakshadweep**- Coral bleaching events are not limited to Lakshadweep alone but affect coral reef ecosystems throughout the Indian Ocean region.
  - For example, the Gulf of Mannar near the Tamil Nadu coast experienced extensive coral bleaching after a marine heatwave in 2020, underscoring the widespread nature of the problem.
- **Consequences**- The heat waves threaten livelihoods of coastal communities, tourism and fisheries sectors, and critical marine habitats, including seagrass meadows.
- **Ecological impact**- The degradation of seagrass meadows and kelp forests can have cascading effects on marine ecosystems, affecting species interactions, food webs, and overall ecosystem resilience.

### What lies ahead?

- Lakshadweep is formed by coral reefs and hence the health of reefs are important for the very structure of the islands.
- Coral reef health is intertwined with the health of the entire marine ecosystem hence the coral reef must be protected for ecosystem resilience and biodiversity conservation.

## 18. Endosymbiotic Theory and Symbiogenesis

- The endosymbiotic theory suggests that tiny structures in cells called **mitochondria and chloroplasts were once independent bacteria**.
- A biologist named Lynn Margulis came up with the idea that **cells merged with bacteria**, challenging the usual belief that evolution happens mainly through genetic changes.

### Endosymbiotic Theory

- The endosymbiotic theory proposes that organelles like **mitochondria and chloroplasts were once free-living bacteria** engulfed by recipient cells.

- American biologist Lynn Margulis introduced **Symbiogenesis**, challenging the **Neo-Darwinist consensus** on genetic mutations driving evolution.
- Margulis's Struggle:
  1. Margulis's manuscript on symbiogenesis faced rejection by academic journals before finally being published in The Journal of Theoretical Biology in 1967.
  2. It took years for mitochondria and chloroplasts to be acknowledged as former free-living bacteria turned endosymbionts.

### Recent Discoveries and Endosymbiotic Theory

- Recent papers published in Science and Cell have reignited interest in the endosymbiotic theory.
- The focus is on **nitrogen fixation, crucial for proteins** and DNA in living organisms.
- Despite abundant atmospheric nitrogen, **plants lack** the means to utilize it efficiently.
- Legumes host **nitrogen-fixing bacteria in root nodules**, aiding in ammonia production for plant use.

### Evolution of Nitroplast

- Cyanobacterium UCYN-A was **found in marine algae**, establishing a symbiotic relationship.
- Nitroplast, a **new organelle**, co-evolved with its host cell, satisfying criteria for organelle classification.
- **Nitroplast integrates into host cell function** and architecture, imports host cell proteins, synchronizes growth, and is inherited during cell division.
- Nearly **half of nitroplast proteins are derived from the host cell**.

### Significance of the Nitroplasts

- **Agriculture:** Nitroplasts offer potential solutions for reducing the harmful effects of industrial ammonia production.
- **Biotechnology:** Biotechnological applications may include engineering host cells and nitroplasts for efficient nitrogen fixation in plants.

## 19. Role of wildlife corridors in tiger conservation

Sahyadri-Konkan wildlife corridor will play a crucial role in translocating tigers from Tadoba-Andhari Tiger Reserve to Sahyadri Tiger Reserve in Maharashtra.

### Why Maharashtra plans to translocate tigers to Sahyadri Tiger Reserve (STR)?

STR comprises of Chandoli National Park and Koyna Wildlife Sanctuary.

- **Historical challenges-** Tiger population in Sahyadri region has faced many challenges such as poaching, habitat loss, and a depleted prey base, have led to a decline in tiger numbers.
- **Need of intervention-** Despite the establishment of Sahyadri Tiger Reserve, the tiger population has not increased significantly.
- **Population stagnation-** The reserve has struggled to attract breeding tigers, further exacerbating decline in population.
- **Occasional evidence-** The reserve has limited evidence of tiger presence such as pugmarks indicates a small number of tigers moving within the reserve this underscores the urgency of action to revitalize the tiger population within the reserve.
- **Improve genetic diversity-** Translocation of tigers presents a strategic opportunity to infuse new genetic diversity into the population and potentially catalyse breeding efforts.
- **Sahyadri-Konkan wildlife corridor-** The corridor must be secure enough and free from human disturbance to achieve the objective of translocation.

### What role do wildlife corridors play in conservation?

- **Facilitate gene flow-** It enable tigers to traverse human-dominated landscapes safely, minimizing the risk of human-wildlife conflicts and increasing their chances of successful dispersal and breeding.
- **Sustainable infrastructure-** Measures such as the construction of underpasses, wildlife crossings, and overpasses are increasingly implemented to safeguard tigers and other wildlife from the impacts of linear infrastructure projects that fragment habitats.



- **Preserve migratory routes-** The construction of overpasses on NH-7 between Kanha and Pench Tiger Reserves, ensures the safe passage of tigers and other wildlife underneath the elevated stretches, preserving their migratory routes.
- **Mapping of corridors-** National Tiger Conservation Authority and Wildlife Institute of India's mapping of 32 major tiger corridors is a significant step towards understanding and preserving these essential habitats.

### What can be done for tiger recovery?

- **Habitat improvement-** It involves restoring degraded habitats to enhance their quality and resilience in activities such as reforestation, soil conservation, water management, and invasive species control.
- **Prey base enhancement-** Increasing the populations of natural prey species like deer and wild boar creates a healthier ecosystem.
- **Mitigate human-tiger conflict-** Increasing the natural prey would reduce the need for tigers to venture into human settlements for food, enhancing both human safety and the ecological integrity of the forest.
- **Corridor strengthening-** Wildlife corridors are crucial for allowing tigers to move between habitat patches, which can aid in recolonization of areas where tigers have become locally extinct and help maintain genetic diversity.
- **Anti-poaching measures-** Implementing rigorous anti-poaching efforts such as increased patrolling, enforcement of wildlife protection laws and collaboration with law enforcement agencies to combat illegal hunting and trade of tigers and their prey species. ★
- **Community engagement-** Engaging local communities in tiger conservation efforts through education, awareness programs, and livelihood support initiatives can foster greater support and participation in conservation activities.
- **Research-** Conducting scientific research to better understand tiger ecology, behaviour, and population dynamics is essential for informing conservation strategies and monitoring the effectiveness of conservation efforts over time.
- **Project tiger-** It is a flagship conservation program launched in 1973 aimed at conserving and increasing tiger population in India
- **International cooperation-** Collaborating with neighbouring countries and international organizations to address transboundary conservation challenges is crucial for ensuring the long-term survival of tigers.
- **Translocation-** It should be considered as a last resort, it should be based on thorough scientific assessments and community consultations.

## 20. Mass Coral Bleaching in Lakshadweep Sea

Extreme heatwaves along the Indian coast, coupled with marine heatwaves, have triggered Mass Coral Bleaching events in the Lakshadweep Sea.

### Heatwaves Toll on Lakshadweep's Coral:

Researchers from the ICAR-Central Marine Fisheries Research Institute (CMFRI) conducted surveys across various Lakshadweep Islands.

- - The **Degree Heating Week (DHW) indicator** in Lakshadweep has **soared above 4 °C-weeks**, as per the National Oceanic and Atmospheric Administration (NOAA).
    - This elevation in DHW levels poses a **substantial risk of coral bleaching**, posing a severe threat to the region's marine ecosystems.
  - Should **DHW surpass 12 °C-weeks**, it could trigger an unprecedented **biodiversity crisis**, leading to multispecies mortality.
  - Prolonged **marine heatwaves since October 2023** have inflicted substantial stress on the coral reefs, exacerbating bleaching phenomena.
    - A **marine heatwave** is characterized by **seawater temperatures exceeding a seasonally-varying threshold** (often the 90th percentile) for at least **5 consecutive days**.

### Lakshadweep's Coral Treasure: Agatti Reef

- Agatti Island is part of the Lakshadweep archipelago, situated in the Arabian Sea.
- The island is surrounded by extensive coral reefs, making it a popular destination for **snorkeling and diving** enthusiasts.
- The coral reefs around Agatti Island are composed of various coral species, including branching corals like **Acropora**, table corals like **Acropora Hyacinthus**, and massive corals like **Porites**.
- These corals form **intricate reef structures** that provide habitat and food for numerous marine organisms.

### What causes Coral Bleaching?

- When exposed to conditions like **heat stress, pollution, or high levels of ocean acidity**, the zooxanthellae start producing reactive oxygen species not beneficial to the corals.
- So, the **corals kick out the colour-giving algae** from their polyps, exposing their pale white exoskeleton and leading to coral starvation as corals cannot produce their own food.
- Severe bleaching and prolonged stress in the external environment can lead to **coral death**.

## 21. Need for better forecast of heatwaves

- Heatwaves are becoming more frequent, intense, and longer in duration, drawing increased attention due to climate change.
- Predicting heatwaves accurately is challenging, especially at a hyperlocal scale, crucial for disaster management.
- Heatwaves occur as anomalies, exceeding expected seasonal temperatures, which is a vital point for public comprehension.

### Limitations of Total Temperature Maps:

- Total temperature maps, often used by reputable scientific organizations, can be alarming but may also be misleading.
- These maps depict absolute temperature values rather than anomalies, which are essential for understanding heatwaves.
- Anomalies, derived by subtracting long-term average temperatures from recorded values, provide clearer insights into heatwave patterns.

### Importance of Anomaly Maps for Disaster Management:

- Anomaly maps offer crucial information for disaster management by highlighting location-specific heatwave patterns.
- Such maps enable more effective and efficient disaster preparedness and response, especially in resource-constrained settings.
- Forecasts and early warning systems, based on anomaly maps, can be improved through downscaling techniques, enhancing accuracy and relevance.

### Addressing Challenges and Moving Forward:

- Downscaling forecast models to neighbourhood scales using AI and machine learning can enhance the precision of early warnings.

- Utilizing anomaly maps instead of total temperature maps can prevent unnecessary alarms and ensure credibility in weather forecasting.
- Continuous improvement in forecasting systems and early warning mechanisms is essential for mitigating the impact of heatwaves and other extreme weather events.

## 22. Challenges in the treatment of typhoid in India

- The accurate diagnosis and management of typhoid fever pose significant challenges in India, primarily due to the widespread use of the Widal test. Despite its prevalent use, the test's limitations obscure the true burden of typhoid in the country, leading to misdiagnoses and inappropriate treatment practices.

### Issues with the Widal Test

- **Inaccuracy and Misinterpretation:** The Widal test, though widely utilized, often yields erroneous results. A single positive or negative report does not reliably confirm or rule out typhoid infection, leading to diagnostic ambiguity and potential mistreatment.
- **Lack of Standardization and Quality Control:** Variability in test kits and protocols exacerbates the problem, with different manufacturers specifying distinct cut-off values and reagents. This lack of standardization undermines the reliability and consistency of test results.
- **Economic Burden and Overuse of Antibiotics:** Patients, often unaware of the test's limitations, incur significant costs for tests and subsequent treatments. The overreliance on the Widal test fuels unnecessary antibiotic prescriptions, exacerbating antimicrobial resistance (AMR) and adding to patients' financial strain.

### Significance

- **Mismanagement of Typhoid Fever:** Inaccurate diagnosis and inappropriate treatment regimens can lead to severe complications and fatal outcomes, particularly in cases of delayed or missed diagnoses. The widespread reliance on the Widal test obscures the true burden of typhoid, hindering effective public health interventions.
- **Antimicrobial Resistance (AMR) Concerns:** The indiscriminate use of antibiotics based on flawed diagnostic tests contributes to the rise of AMR, posing a significant threat to public health. Addressing the misuse of the Widal test is crucial in combating AMR and preserving the efficacy of antibiotic therapies.

### Solutions

- **Development of Alternative Diagnostic Tools:** Efforts should be directed towards researching and implementing alternative point-of-care diagnostic tests that offer greater accuracy and reliability than the Widal test. These tests should consider regional variations and incorporate best-practice heuristics to guide diagnosis and treatment decisions.
- **Enhanced Surveillance and Data Sharing:** Improving surveillance systems to monitor AMR patterns and typhoid prevalence is essential. Establishing regional hubs for sample processing and data generation can facilitate timely data collection and analysis, informing evidence-based interventions and treatment protocols.
- **Focus on Preventive Measures:** Emphasizing preventive strategies such as ensuring access to clean water, safe food practices, and sanitation facilities is paramount. Addressing the root causes of typhoid transmission can mitigate the reliance on diagnostic tests and reduce the disease burden.

### 23. Climate Migration

The issue of climate migration has garnered significant attention, yet the world still lacks a comprehensive legal framework to protect individuals forced to flee their homes due to increasingly severe weather disasters.

- According to the International Organization for Migration (IOM), “climate migration” refers to the movement of a person or group of people who are predominantly forced to leave their homes due to sudden or gradual environmental changes caused by climate change. This movement can be temporary or permanent and can occur within a country or across borders.
- This definition highlights that climate migrants are primarily those who have little choice but to leave their homes due to the impacts of climate change.

#### Causes of Climate Migration:

- Reports by the UN Office for the Coordination of Humanitarian Affairs (OCHA) highlight that sudden-onset disasters like floods, hurricanes, and earthquakes often cause significant internal displacement. People flee to safer grounds within their countries, but returning home can be difficult due to destroyed infrastructure and livelihoods.
- The UN Refugee Agency (UNHCR) emphasises how disasters often disproportionately affect vulnerable populations. These populations, lacking resources or living in high-risk areas, are more likely to be displaced and struggle to recover.

- The IOM reports that slow-onset disasters like droughts, desertification, and salinisation degrade land and water resources. This makes it difficult for people to sustain their livelihoods, pushing them to migrate in search of better opportunities.
- Reports by the Intergovernmental Panel on Climate Change (IPCC) warn of rising sea levels threatening coastal communities. This can lead to permanent displacement as homes and farmland become submerged.
- The UN Department of Economic and Social Affairs (UNDESA) acknowledges that migration due to climate change is rarely caused by a single factor. Poverty, political instability, and lack of social safety nets often combine with disasters to force migration.
- World Bank highlights the challenges in accurately quantifying climate migration. This makes it difficult to develop effective policies to support displaced people and build resilience in vulnerable communities.

### **Issues/Challenges Faced by the Climate Migrants:**

- The International Labour Organization (ILO) warns that climate migrants often lose their skills and assets due to displacement. This makes it difficult for them to find new jobs and rebuild their livelihoods in unfamiliar environments.
- The UN Refugee Agency (UNHCR) reports that climate migrants often end up in informal work sectors with low wages and poor working conditions. They may also be more vulnerable to exploitation due to their precarious situation.
- The World Bank highlights that climate migrants often struggle to access basic services like healthcare, education, and housing in their new locations. This can lead to social exclusion and marginalisation.
- The IOM emphasises the difficulties climate migrants face adapting to new cultures and languages. This can hinder their ability to integrate into new communities.
- Reports by the UN Office of the High Commissioner for Human Rights (OHCHR) point out that there's no clear legal framework to protect climate migrants. They don't qualify for refugee status under current international law.
- The Journal of Environmental Law claims that climate change-induced displacement can lead to statelessness, particularly for those who move across borders. In 2021, the World Bank, in its Groundswell report, estimated that by 2050, some 216 million people worldwide would be internally displaced due to the impacts of climate change.
- The WHO highlights the psychological distress and trauma climate migrants experience due to displacement and loss. Access to mental health services is often limited, further exacerbating their struggles.

- Climate migrants may be exposed to new health risks in their new locations, such as infectious diseases or extreme weather events. This is especially concerning for children and the elderly.

### Way Forward:

- IPCC emphasises the importance of aggressive mitigation strategies to reduce greenhouse gas emissions and slow climate change.
- The UN Framework Convention on Climate Change (UNFCCC) promotes adaptation strategies to help communities become more resilient to climate impacts and reduce displacement risks.
- The UN Office for Disaster Risk Reduction (UNDRR) emphasises the importance of disaster preparedness plans, early warning systems, and risk reduction measures to minimise displacement caused by sudden-onset disasters.
- The UN Refugee Agency (UNHCR) and the IOM advocate for developing legal frameworks to protect climate migrants. This could involve extending refugee status or creating a new protection category for those displaced due to climate change.
- The World Bank's Groundswell Report acknowledges that some communities will become permanently uninhabitable due to climate change. Planned relocation and resettlement programs may be necessary in these extreme cases.
- The UN Department of Economic and Social Affairs (UNDESA) emphasises the importance of investing in sustainable development and climate-smart agriculture. This can create opportunities for people to adapt to climate change and reduce the need for migration.
- Encouraging labour migration among countries as an adaptation measure for climate-displaced populations can help mitigate the impacts of climate change on vulnerable communities.

### 24. Plastic treaty talks conclude in Ottawa with little progress

- The **fourth round** of the **Intergovernmental Negotiating Committee (INC-4)** to negotiate a **Global Plastics Treaty** concluded in **Ottawa, Canada**, with **192 member countries** deliberating on a **legally binding agreement to end plastic pollution**.

### Details:

- The next meeting, expected to be the final one, is scheduled for **November 2024** in **Busan, South Korea**.

- Despite high expectations, the talks **failed** to establish a timeline for halting primary plastic production.
- The discussions **aimed** to address the challenges posed by the **widespread use of plastics** linked to **oil economies, extensive manufacturing sectors, and the absence of affordable alternatives.**
- The negotiations highlighted the **difficulties in curbing the production of plastics**, which are **major pollutants in marine and terrestrial ecosystems** due to their **non-biodegradable nature.**

#### India's Position:

- India's stance in the negotiations was to **oppose restrictions on producing primary or virgin plastic polymers**, arguing that **production reductions** were **beyond the scope of the United Nations Environment Assembly (UNEA) resolutions.**
- **Indian** delegates emphasized the **need for decisions on chemical usage in plastics to be based on scientific evidence** and conducted through a **transparent and inclusive process.**
- In **2022, India** implemented the **Plastic Waste Management Amendment Rules**, which **banned 19 categories of single-use plastics**, though enforcement remains uneven across the country.

#### Instances of other nations:

- Many **plastic and petrochemical-producing countries** including **Saudi Arabia, Iran and China**– known collectively as the **group of Like-Minded Countries**– have **opposed mentioning production limits.**
- Meanwhile, the **60-nation "High-Ambition Coalition"**, which includes **EU countries, island nations, Japan and the UAE**, wants to **end plastic pollution by 2040.**
  - Backed by some environment groups, this coalition has called for **common, legally binding provisions to "restrain and reduce the production and consumption of primary plastic polymers to sustainable levels."**
  - They also are proposing measures such as **phasing out "problematic" single-use plastics** and **banning certain chemical additives** that could carry health risks.
- The **U.S.** wants to **end plastic pollution by 2040.** But unlike the **High-Ambition Coalition**, it **wants countries to set their plans** and send updates regularly to the **United Nations.**

#### Considerations in the New Global Plastics Pollution Treaty:



- Focus on elements like **global objectives to tackle marine and other types of environmental pollution** and their impact, and worldwide obligations and measures throughout the **lifecycle of plastics**, right from product design to waste management.
- **Mechanisms for providing scientific information relevant to the policies of the resolution**, and for helping with **financial support** for its implementation.
- The treaty might require the **testing of certain chemicals present in plastics** to ensure safety and environmental protection.
- **Identifies the importance of indigenous communities and their age-old practices** to keep the **environments pollution-free** and calls for the knowledge of these communities to be taken into account by the INC.
- **National action plans and national and international cooperative measures** towards achieving the goal of eliminating plastic pollution.
- **Progress assessment** for member states.

#### **Intergovernmental Negotiating Committee (INC):**

- Established by the **United Nations Environment Programme (UNEP)** in **2022** to develop an **international legally binding agreement on plastic pollution**.
- Its **mandate** is to develop an instrument that addresses the **entire life cycle of plastic**, including in the **marine environment**, and could **include both voluntary and binding approaches**.
- The **INC-1** started in **November 2022** in **Punta del Este, Uruguay**. The **INC-2** occurred in **May-June 2023** in **Paris, France**. The **INC-3** convened in **Nairobi, Kenya** in **December 2023**.

#### **Plastic pollution:**

- While **plastic waste** has become a **global menace** polluting landscapes and waterways, **producing plastics involves releasing greenhouse gas emissions**.
- The **plastic industry** now accounts for **5% of global carbon emissions**, which could **grow to 20% by 2050** if current trends continue.
- **Plastic production** is on track to **triple by 2060** – unless the treaty sets production limits, as some have proposed.
- **Most virgin plastic is derived from petroleum**.

#### **25. Orangutan uses Plant to treat wound**

An **orangutan** was observed treating a wound with medicine from a tropical plant, showcasing how some animals employ natural remedies to alleviate their ailments.

- This behavior, documented in a recent study published in Scientific Reports, represents a novel instance of self-medication among wild animals.

## Orangutans

- Orangutans, are distinguished by their vivid red fur, are the **largest arboreal mammals** and spend the majority of their time in trees and forests.
- The name “orangutan” translates to “**man of the forest**” in Malay.
- They possess long, powerful arms and grasping hands and feet that facilitate movement through the branches.
- Highly intelligent, these great apes share **96.4% of genetic makeup of modern man**.
- Orangutans primarily inhabit the **tropical rainforests of Southeast Asia**, specifically on the islands of Borneo and Sumatra.
- **Conservation Status: Critically Endangered (IUCN Red list)**
- **Population:** Bornean (Approximately 104,700); Sumatran (Approximately 13,846); Tapanuli (Around 800);
- **Behavioral Features:**
  - These apes **lead mostly solitary lives** in the lowland forests, dining on wild fruits such as lychees, mangosteens, and figs, and drinking water collected in tree cavities.
  - Orangutans are mainly **frugivorous**, they primarily eat fruits, and consume leaves, bark, insects, and occasionally small animals.
  - They **construct nests in trees** with vegetation for sleeping at night and resting during the day.
  - And, now they are found treating a wound with medicine from a Tropical plant.

## 26. Steps taken to protect Aravalis

The Aravalli Hills are an ecologically sensitive mountain range spanning several Indian states. The Supreme Court’s recent order addresses concerns about environmental degradation due to mining activities in the Aravallis.

### Issues

- Illegal mining and unregulated mining practices have damaged the Aravalli ecosystem.
- Different states have varying definitions of the Aravalli range, hindering effective regulations.

## Supreme Court Order

- The court has placed a ban on granting new mining leases or renewals in the Aravallis across Delhi, Rajasthan, Haryana, and Gujarat.
- Existing valid mining leases are not affected.
- States can process applications but require Supreme Court approval for final permission.
- A committee has been formed to establish a common definition of the Aravalli Hills.

## Significance

- Protects the ecological integrity of the Aravallis, a vital ecological zone.
- Promotes sustainable mining practices and prevents environmental damage.

## Solutions

- Effective implementation of the Supreme Court order by all concerned states.
- Development of a comprehensive mining policy that balances economic needs with environmental protection.
- Exploring alternative sources of minerals and promoting sustainable mining technologies.

## 27. Threat to cybersecurity in AI world

### Introduction: The Impact of Generative AI on Cybersecurity

- The incident of a frantic mother receiving an ominous call from supposed kidnappers, actually hackers using generative AI, highlighted the erosion of human perception between reality and AI-generated content.
- Generative AI's integration into various sectors has transformed cyber-risk paradigms, leading to a surge in cyber threats such as phishing and credential theft.
- With organizations and individuals increasingly vulnerable to cyber-attacks, collaborative efforts are necessary to safeguard confidential information and identities.

### Emerging Cyber Threats from Generative AI:

- Cybersecurity professionals report a significant increase in cyberattacks attributed to generative AI, with phishing incidents and credential theft on the rise.
- Advanced threats include cognitive behavioural manipulation and exploitation of voice-activated devices, posing risks to privacy and security.
- Real-time biometric identification systems, like facial recognition, further endanger privacy rights and personal security.

### Challenges and Responses in Cybersecurity:

- Despite generative AI's productivity benefits, organizations face challenges such as undetectable phishing attacks, increased attack volumes, and privacy concerns.
- Identification of hacker groups utilizing generative AI underscores the need for robust cybersecurity initiatives.
- Efforts such as the Bletchley Declaration and policy-led approaches aim to combat cyber threats by enhancing AI-generated content identification and implementing realistic regulatory frameworks.

### Fostering Digital Awareness and Collaboration:

- Corporate initiatives should prioritize digital awareness and literacy training to empower employees in navigating the digital landscape and verifying sources.
- Collaboration between governmental, institutional, and industrial stakeholders is crucial in drafting effective cybersecurity regulations.
- Non-governmental and outreach organizations play a vital role in promoting cyber literacy among individuals, contributing to a more resilient defense against evolving cyber threats in an AI-driven world.

## 28. Endosymbiotic Theory

Research papers related to **nitrogen fixation** and **nitroplast** have sparked renewed interest in the **endosymbiotic theory**.

### Endosymbiotic Theory:

- The **endosymbiotic theory** explains the evolution of **eukaryotic cell organelles**, such as mitochondria and chloroplasts, suggesting they were once **free-living prokaryotes**.
- A significant step in this evolution was the **ingestion of prokaryotic microbes** by amoeba-like eukaryotic cells, which later developed a **symbiotic relationship** within the host.

## Origin of the Endosymbiotic Theory

- The theory proposes that the **first eukaryotic cells** were amoeba-like, obtaining nutrients through **phagocytosis** and harboring a nucleus formed by the inward pinching of the cytoplasmic membrane.

## Development of Organelles

- **Mitochondria** evolved from bacteria that were capable of **aerobic respiration** and were ingested by these early eukaryotes.
- **Chloroplasts** originated from the ingestion of **photosynthetic bacteria**. These bacteria eventually lost their cell wall and much of their DNA, as these were not beneficial within the host cell.

## Evolutionary Significance

- Over millions of years, mitochondria and chloroplasts have become indispensable to the cell, evolving into specialized organelles that **cannot survive independently outside the cell**.
- The theory highlights how a large host cell and its ingested bacteria could become interdependent, leading to a **permanent endosymbiotic relationship**.

## 29. I-T clause to ensure MSMEs are paid on time creates hurdle

Amendments to the **Income-Tax Act** in the **Finance Act, 2023** were implemented to ensure prompt payments to **Micro, Small, and Medium Enterprises (MSMEs)**. However, these amendments led to unintended consequences.

### Highlights of the Amendments:

- **Implementation Date:** Effective from April 1, 2024.
- **Payment Mandate:** Payments must be made to MSMEs within 45 days as per a written agreement. Without a written agreement, payments must be completed within 15 days.
- **Tax Deduction:** Entities failing to comply will not qualify for tax deductions until the payment is made.
- **Applicability:** Applies to transactions involving goods/services purchased from entities registered under the MSME Act, 2006.

### Consequences:

- **Cancelled Orders:** Large companies have cancelled orders with registered MSMEs and shifted their business to unregistered ones.
- **Competition:** The provision has sparked competition between registered and unregistered MSMEs, leading some to deregister to avoid losing business opportunities.
- **Reclassification:** MSMEs are reclassifying themselves from a "manufacturing entity" to a "trading entity" and other forms.

### 30. Drip Pricing

The Department of Consumer Affairs has issued a warning against **drip pricing**.

#### Drip Pricing:

- **Drip pricing** is a pricing strategy where firms initially advertise only part of a product's price, revealing additional charges as the customer progresses through the buying process.
- This technique is distinguished from partitioned pricing because it introduces extra costs, such as **delivery, service, or booking fees**, later in the transaction, rather than displaying them upfront with the **base price**.
- It commonly attracts customers with a low **advertised price**, but as they proceed, the total cost increases due to these additional fees.
- Various industries employ drip pricing, including **internet sellers, automobile dealerships, financial institutions, and rental car companies**. Recently, **restaurants** have also begun using this method more frequently.
- The method complicates price comparison, leading consumers to often pay more than they expected. This not only **undermines price transparency** but also affects their ability to make efficient purchasing decisions.
- Due to its deceptive nature, drip pricing is considered a "**dark pattern**" under the **Guidelines for Prevention and Regulation of Dark Patterns, 2023**. These are tactics that mislead people into paying for items or services they did not initially intend to purchase.
- By obscuring the full price, it encourages customers to spend more than planned, hindering competition and disadvantaging businesses that practice transparent pricing.

### 31. Illegal sand mining case

The **Supreme court** recently requested a report from the **Enforcement Directorate (ED)** regarding illegal **sand mining** in **Tamil Nadu**.

#### About Sand:

- The second-most used resource on Earth after water, sourced from rivers, lakes, reservoirs, and coastal areas.
- It's a non-renewable resource rapidly exploited for construction.
- **Illegal mining** is driven by organized crime (sand mafia), lack of sustainable alternatives, and high demand for construction.

#### Regulations in India:

- The **Mines and Minerals (Development & Regulation) Act, 1957** (MMDR Act) defines sand as a "**minor mineral**."
- **State Governments** are authorized to regulate quarry leases, mining leases, and prevent illegal mining, transportation, and storage.
- **Environmental Impact Assessment, 2006** under the Environment Protection Act, 1986 requires environmental clearance for **mining leases >5 hectares**.

### 32. MQ-9B Predator Drone

The Army and the Indian Air Force will likely have their MQ-9B Predator Drones in Gorakhpur and Sarsawa.

#### MQ-9B Predator drone:

- The MQ-9B Predator drone is an unmanned aerial vehicle, also known as "Predators."
- It includes two variants: SkyGuardian and SeaGuardian.
  - SkyGuardian is a remotely piloted aircraft system (RPAS) that serves as the next generation of RPAS.
  - SeaGuardian, used by the Indian Navy since 2020, is a maritime-focused version of the SkyGuardian.
- The MQ-9B series are High Altitude Long Endurance (HALE) drones, capable of flying for over 40 hours in all types of weather, utilizing a satellite.
- Total of 31 MQ-9B Predator drones are distributed as follows:

- Indian Navy has 15 SeaGuardian drones.
- The Army and the Indian Air Force each have eight SkyGuardian drones.
- Equipped with advanced technologies such as Multi-mode Radar and an electro-optical/infrared (EO/IR) sensor.
- Capable of multiple roles, including:
  - Offensive missions
  - Surveillance
  - Reconnaissance
  - Intelligence operations
  - Over-the-horizon targeting
  - Airborne early warning
  - Electronic warfare

### 33. First India-made Microcontroller Chip

Mindgrove Technologies launches **Secure IoT**, India's first high-performance **System-On-Chip (SoC)**, developed by an IIT-Madras incubated startup.

- It will reduce dependency on imported chips, enhancing self-sufficiency in the semiconductor sector.

#### System-On-Chip (SoC):

- An **SoC** integrates multiple electronic components into a single chip, functioning like a **mini-computer**.
- Embedded into the **printed circuit board (PCB)** of various devices, enhancing their compactness and efficiency.
- **Secure IoT** runs at **700 MHz**, positioning it as a high-performance microcontroller.

#### Key Features

- **Cost-effective:** Costs **30% less** than other chips in the same category.
- **Versatility and adaptability:** Designed to be flexible for use in a wide range of applications.
- **Security:** Features top-notch security measures suitable for modern demands.
- **High computing power:** Capable of managing complex operations across various devices.
- **Programmability:** Allows for customization according to specific requirements of devices.



## Applications

- Used in **deep embedded applications** like smart locks, fans, speakers, and wearables.
- Applicable to **smart city devices**, such as connected systems for electricity, water, and gas metering.
- Enhances features of **automotive technologies**, including EV battery management systems.
- Suitable for **IoT devices** across different sectors including vision technologies and home automation.

## 34. Decoding C. Elegans Worm: A Remarkable Discovery

Researchers at Princeton University found that **Caenorhabditis elegans** can inherit the 'knowledge' to avoid a disease-causing bacterium, *Pseudomonas vranovensis*, across several generations after initially consuming it.

### About C. Elegans Worm

- *C. elegans*, or *Caenorhabditis elegans*, is a small, **transparent nematode (roundworm)** widely used in scientific research.
- It is about **1 mm in length**, making it easy to study under a microscope.
- It has a **simple body plan**, which simplifies many types of biological research.
- *C. elegans* was the **first multicellular organism to have its entire genome sequenced** in 1998.

### Key Features of C. Elegans Worm

- **Short lifespan and quick regeneration:** It has a short lifespan of about 2-3 weeks and develops from an egg to an adult in just 3-5 days. This allows for quick generation turnover and facilitates studies on genetics and developmental biology.
- **Transparency:** It allows researchers to easily observe its internal structures and developmental processes in real time.
- **Genetic information:** This has provided a wealth of genetic information and made it a powerful tool for genetic studies.
- **Consistent Somatic Cell Count:** Adult *C. elegans* have exactly 959 somatic cells, and their lineage has been fully mapped, providing a consistent model for studying cell development and death.

### 35. India need to rebuild its Free Trade Agreement policy

India needs a clear **Free Trade Agreement policy**, especially in dealing with **International Trade and Foreign Investment Laws**.

For Comprehensive Economic Treaties: **Combining trade and investment negotiations provides India with clear negotiating leverage to strike beneficial deals.**

- It allows India to leverage concessions in trade for advancements in investment, and vice versa. This approach enhances India's bargaining power in FTA negotiations.
- **For Scope Expansion:** India should expand the scope of investment issues by incorporating provisions for protecting foreign investors under international law, ensuring their confidence in investing in India.
  - It will help India to establish an efficacious dispute settlement mechanism under international law to resolve investment disputes effectively.
  - Providing enforceable legal protection to foreign investors is crucial for boosting their confidence, especially amidst declining foreign direct investment levels in India.
- **For addressing the drop in FDI Levels:** The policy should address the decline in foreign direct investment levels in India by instilling confidence among foreign investors through robust legal protection and dispute resolution mechanisms.

#### **Investment lessons from the India-EFTA Trade deal:**

- The India-EFTA FTA includes a **comprehensive investment** chapter, which is missing in recent Indian FTAs with countries like Australia, UAE, and Mauritius.
- The agreement includes provisions wherein EFTA countries commit to making honest endeavors to increase FDI to India and facilitate job generation, codifying an **obligation of conduct** rather than an obligation of result.
- Economic theory highlights the close linkage between trade and investment. While earlier Indian FTAs included both binding trade rules and investment protection, recent ones **decoupled international trade law from international investment law**.
- The India-EFTA FTA, emphasizes combining trade and investment negotiations in one comprehensive economic treaty, that is 'FTA 3.0

**Approach'**, which represents a departure from the decoupling approach seen in recent FTAs.

**Way Forward:**

- **Capacity Building:** Enhance the capacity of Indian negotiators and policymakers to understand complex trade and investment issues, including legal frameworks, dispute resolution mechanisms, and international best practices.
- **Integrated Negotiation Approach:** Adopt an integrated approach to FTA negotiations, wherein trade and investment aspects are negotiated together within a single agreement, ensuring coherence and synergy between the two.

