

# CURRENT AFFAIRS

WEEKLY



## MAINS ARTICLE

### GS-I

- RAJA RAJA CHOLA I

### GS-II

- SOUTH CHINA SEA DISPUTE AND INDIA'S STAND
- WHITE HOUSE ON ADANI BRIBERY CASE
- INTERNATIONAL CRIMINAL COURT (ICC)
- ISRAEL-HEZBOLLAH CEASEFIRE DEAL
- GLOBAL ALLIANCE AGAINST HUNGER AND POVERTY
- GELEPHU MINDFULNESS CITY
- GAUTAM ADANI BRIBERY CASE
- SOCIALISM MEANS 'WELFARE STATE' IN INDIAN CONTEXT: SC
- ROLLING OUT LABOUR CODES
- PARLIAMENTARY SECRETARY APPOINTMENTS

### GS-III

- AIR POLLUTION CRISIS IN INDIA
- SCIENCE & TECHNOLOGY (GS-III)
- PS5 PRO'S AVAILABILITY IN INDIA
- MAJOR ATMOSPHERIC CHERENKOV EXPERIMENT (MACE) TELESCOPE
- INDIA'S SPACE JOURNEY

## PRELIMS ARTICLE

### GEOGRAPHY

- Cyclone Fengal
- Bomb Cyclone
- Earth's Axis Tilted
- Pennaiyar Basin

### INTERNATIONAL RELATIONS

- India, Australia firm up air-to-air refueling agreement

### POLITY & GOVERNANCE

- Adjournment Motion
- India marks 75 years of Constitution
- AB PM-JAY and ABHA health cards
- Pradhan Mantri Vidyalaxmi Scheme
- 'One Nation One Subscription' (ONOS) Initiative
- Pradhan Mantri Awas Yojana (Gramin) (PMAY-G)
- Basic Animal Husbandry Statistics 2024
- PAN 2.0 Project
- Controversy around the Sambhal Mosque

### ECONOMY

- Non-Banking Financial

Company (NBFC)

- Niti Aayog Recommends Including Coking Coal in Critical Minerals List

### ENVIRONMENT

- Himalayan Glacial Lakes
- Fish kill in Ashtamudi Lake
- \$300 Billion Climate Deal
- Ranthambore Tiger Reserve
- Farm Fire Data and Satellite Monitoring
- Impact of climate change on Aquaculture

### SCIENCE & TECHNOLOGY

- ESA's Proba-3 Mission
- Tupolev Tu-160 (White Swan)
- Electronic Stability Control (ESC) Test Track
- Sjögren's Disease
- Intercontinental Ballistic Missile (ICBM)
- Oreshnik, Russia's New Nuclear-Capable Hypersonic Missile

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**T**he current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

# CONTENT

4<sup>th</sup> WEEK - NOVEMBER, 2024

## SECTION - A

### HISTORY (GS-I)

- Raja Raja Chola I ..... 01

### INTERNATIONAL RELATIONS (GS-II)

- South China Sea Dispute and India's Stand ..... 02
- White House on Adani bribery case ..... 03
- International Criminal Court (ICC) ..... 03
- Israel-Hezbollah Ceasefire Deal ..... 04
- Global Alliance Against Hunger and Poverty .. 06
- Gelephu Mindfulness City ..... 06

### POLITY & GOVERNANCE (GS-II)

- Gautam Adani Bribery Case ..... 07

- Socialism Means 'Welfare State' ..... 08  
In Indian Context: SC
- Rolling Out Labour Codes ..... 10
- Parliamentary Secretary Appointments ..... 10

### ENVIRONMENT (GS-III)

- Air Pollution Crisis in India ..... 11

### SCIENCE & TECHNOLOGY (GS-III)

- PS5 Pro's Availability in India ..... 12
- Major Atmospheric Cherenkov Experiment (MACE) Telescope ..... 13
- India's Space Journey ..... 13

## SECTION - B

### GEOGRAPHY

- Cyclone Fengal ..... 16
- Bomb Cyclone ..... 17
- Earth's Axis Tilted ..... 17
- Pennaiyar Basin ..... 18

### INTERNATIONAL RELATIONS

- India, Australia firm up air-to-air refueling agreement ..... 18

### POLITY & GOVERNANCE

- Adjournment Motion ..... 19
- India marks 75 years of Constitution ..... 19
- AB PM-JAY and ABHA health cards ..... 20
- Pradhan Mantri Vidyalyaxmi Scheme ..... 21
- 'One Nation One Subscription' (ONOS) Initiative ..... 22
- Pradhan Mantri Awas Yojana (Gramin) (PMAY-G) ..... 23
- Basic Animal Husbandry Statistics 2024 ..... 23
- PAN 2.0 Project ..... 24
- Controversy around the Sambhal Mosque ..... 24

### ECONOMY

- Non-Banking Financial Company (NBFC) ..... 24
- Niti Aayog Recommends Including Coking Coal in Critical Minerals List ..... 25

### ENVIRONMENT

- Himalayan Glacial Lakes ..... 26
- Fish kill in Ashtamudi Lake ..... 27
- \$300 Billion Climate Deal ..... 28
- Ranthambore Tiger Reserve ..... 28
- Farm Fire Data and Satellite Monitoring ..... 29
- Impact of climate change on Aquaculture ..... 29

### SCIENCE & TECHNOLOGY

- ESA's Proba-3 Mission ..... 30
- Tupolev Tu-160 (White Swan) ..... 32
- Electronic Stability Control (ESC) Test Track ..... 32
- Sjögren's Disease ..... 33
- Intercontinental Ballistic Missile (ICBM) ..... 33
- Oreshnik, Russia's New Nuclear-Capable Hypersonic Missile ..... 34



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## SECTION -A

## MAINS ISSUES

## RAJA RAJA CHOLA I

## Context

The birth anniversary of the legendary **Chola emperor Raja Raja Chola I** (985 to 1014 CE) is being celebrated with great fervour and devotion during the annual **Sadhaya Vizha in Thanjavur, Tamil Nadu**.

## About Raja Raja Chola I:

- Born as **Arulmozhi Varman** in 947 CE, Raja Raja Chola I ascended the throne in 985 CE and became one of the most revered and powerful emperors in Indian history.
- He was born to **Parantaka Chola II** and **Vanavan Mahadevi**.
- His leadership transformed the Chola Empire into a dominant force in South and Southeast Asia. He conquered the kingdoms of southern India, his empire expanding as far as Sri Lanka in the south and Kalinga (Orissa) in the northeast.
- He is often called "Raja Raja the Great" for his military and administrative achievements.
- **Militaristic and Administrative Vision:** His reign is remembered for extensive military campaigns that expanded the Chola empire to Sri Lanka and the Maldives. His administration is also known for its organizational reforms, including the efficient management of the empire's revenue and military systems, and the consolidation of his territorial gains.
- **Cultural Contributions and Temple Building:** Raja Raja Chola was responsible for constructing the **largest Hindu temple** of its age: the **Bhrihadishvara temple (commonly known as the Tanjore temple)** in Thanjavur, completed in 1013.
  - It is one of the largest temples in India and is an

example of **Dravidian architecture** during the Chola period. The temple turned 1014 years old in 2014.

- The temple is part of the **UNESCO World Heritage Site** known as the "**Great Living Chola Temples**", with the other two being the **Gangaikonda Cholapuram** and **Airavatesvara temple**.

## Important Achievements of Raja Raja Chola I

## ■ Military Conquests:

- **Kandalur War (994 CE):** Raja Raja Chola defeated the **Chera king Bhaskara Ravi Varman Thiruvadi** and destroyed the Chera fleet, establishing Chola dominance over the southern seas.
- **Defeat of Pandya King Amarabhujanga:** Raja Raja captured the **port of Virinam** and defeated the Pandya king, further expanding his empire's influence in southern India.
- **Expansion of the Chola Empire:** Raja Raja assumed the title **Mummudi Chola** after conquering territories of the **Cholas, Pandyas, and Cheras**, symbolizing his rule over these three kingdoms.

## ■ Conquest of Sri Lanka (993 CE):

- **Invasion of Anuradhapura:** Raja Raja invaded Sri Lanka, destroyed the ancient capital Anuradhapura, and established Chola control over the northern part of the island, renaming the capital as **Jananathamangalam (Polonnaruwa)**.
- **Construction of Siva Temple in Polonnaruwa:** Raja Raja commemorated his victory by constructing a Siva temple in Polonnaruwa, cementing the Chola presence in Sri Lanka.

## Chalukyan and Southern Conquests:

- ▶ **Defeat of the Nolambas and Western Chalukyas (998 CE):** Raja Raja annexed Gangapadi, Nolambapadi, and Tadigaipadi, regions previously under the Nolamba feudatories of the Rashtrakutas. His victory over the **Western Chalukyas** laid the foundation for Chola expansion in the Deccan.
- ▶ **Conflict with Eastern Chalukyas (Vengi):** After defeating Jata Choda Bhima, Raja Raja Chola placed Saktivarman I on the throne of Vengi, reasserting Chola control over the Vengi kingdom.
- ▶ **Confrontations with Hoysalas:** Raja Raja's general Aprameya defeated the Hoysala forces in battles near Narasipur and Channapatna, reinforcing Chola authority.

## Naval Power and Maritime Expansion:

- ▶ **Naval Campaigns:** Raja Raja recognized the importance of a strong navy and conducted successful campaigns, including a naval conquest of the Maldives, strengthening Chola influence in the Bay of Bengal and beyond.
- ▶ **Invasion of Srivijaya:** Raja Raja's naval supremacy allowed his son, Rajendra Chola, to carry out raids in Southeast Asia, particularly in Srivijaya, marking the height of Chola naval power.



### FACT BOX

#### Chola Dynasty (9<sup>th</sup>-13<sup>th</sup> Century)

- **Founded by:** Vijayalaya
- The reign of the Cholas began in the 9th century when they defeated the Pallavas to come into power.
- This rule stretched over for over five long centuries until the 13th century. This magnificence lasted until the arrival of the Pandyas in the early 13th century.
- **Location:** Fertile Kaveri River delta (present-day Indian state of Tamil Nadu)
- **Reach:** The Chola Dynasty, at its height in the eleventh century, ruled much of south India and as far as Sri Lanka and the Maldiv Islands. Diplomatic missions reached Burma (Myanmar), Malaysia, and China.

## SOUTH CHINA SEA DISPUTE AND INDIA'S STAND

### Context

India has emphasized the importance of **freedom of navigation and peaceful commerce** in the **Indo-Pacific**, particularly in the **South China Sea**, a vital waterway for global trade. India's Defence Minister, Rajnath Singh, stressed at the ASEAN Defence Ministers' Meeting that a proposed **Code of Conduct (COC) for the South China**

**Sea** must follow international law, particularly the **UN Convention on the Law of the Sea (UNCLOS)**. This aligns with India's stance that the code should respect the rights of all nations, even those not directly involved in the dispute.

### What is the South China Sea?

- The South China Sea is a crucial waterway between the Indian Ocean and Northeast Asia. It connects ports of countries like **China, Japan, Korea, and Russia**.
- Nearly **USD 5.3 trillion worth of goods** pass through it every year, making it one of the world's most important trade routes.
- It is also rich in fishing resources, and over half of the world's fishing vessels operate here.
- **The Territorial Dispute:** Several countries, including **China, Vietnam, the Philippines, Malaysia, and Brunei**, have competing territorial claims over parts of the South China Sea.
  - ▶ They argue over the **Paracel** and **Spratly** islands and the waters surrounding them.
  - ▶ These islands are mostly uninhabited but may contain natural resources like oil and gas.

### China's Claims and Others' Disagreement

- **China's Nine-Dash Line:** China claims nearly the entire South China Sea, demarcated by the **"nine-dash line"** which dates back to a 1947 map. China argues that these islands and waters have been part of its territory for centuries. Taiwan, which also claims the area, mirrors China's position.

### Disputes from Other Countries:

- ▶ **Vietnam** contests China's claims, saying it has ruled the Paracels and Spratlys since the 17th century and has documents to prove it.
- ▶ **The Philippines** also claims the Spratlys, emphasizing its proximity to the islands and also claims the **Scarborough Shoal**, which China disputes.
- ▶ **Malaysia and Brunei** claim parts of the sea within their Exclusive Economic Zones (EEZ), defined by international law (UNCLOS).
- **International Legal Developments: The 2016 UN Arbitration Ruling:** In 2013, the Philippines took China to court over its claims. The **Permanent Court of Arbitration** in The Hague ruled in **favor of the Philippines** in 2016, declaring that China's claims based on the **nine-dash line** were illegal. This ruling was grounded in the **United Nations Convention on the Law of the Sea (UNCLOS)**, an international treaty governing maritime laws, which China, despite being a signatory, rejected.

### Code of Conduct (COC) Negotiations

- The **Code of Conduct** is an agreement that aims to regulate the behavior of countries in the South China Sea, particularly regarding military and maritime activities. It is being discussed by countries involved in the territorial dispute, such as **China, the Philippines, Vietnam, Malaysia, Brunei, and Taiwan**.

- **ASEAN's Role:** The **Association of Southeast Asian Nations (ASEAN)**, which includes countries like **Indonesia, Thailand, Singapore**, and others, is also involved in the negotiations, even though they are not direct claimants to the area. ASEAN wants to ensure peaceful use of the sea and prevent conflict.
- **India's Stance:** India, along with other countries like the US, Japan, and Australia, has an interest in the COC outcome because the South China Sea is vital for international trade and security. India supports the idea that any COC must be **consistent with international law** and not infringe upon the rights of countries not involved in the dispute.
- **India as the World's Largest Democracy:** The U.S. values India's democratic system, and they often emphasize their shared democratic ideals. The U.S. sees India as a "natural ally" because both countries are democracies—India is the world's largest, and the U.S. is one of the oldest.
  - ▶ However, despite this shared democratic identity, their approaches to democracy can differ. India generally avoids promoting democracy abroad and often has a more pragmatic stance compared to the U.S. on issues concerning non-democratic countries.
  - ▶ India's own democracy has faced challenges, but the 2024 parliamentary elections have helped reaffirm its democratic credentials.

### Global Stakes in the Dispute

- **Global Importance of the Sea:** The South China Sea is crucial for **global trade** and the **movement of naval forces**. The **Sea Lines of Communication (SLOCs)** passing through this region are vital for the peace and prosperity of countries in the Indo-Pacific.
- **Global Powers' Reactions:**
  - ▶ **United States:** The US has conducted **freedom of navigation operations (FONOPS)** to challenge China's territorial claims. The US has also supported Southeast Asian countries in countering China's expansion in the region.
  - ▶ **Japan and Australia:** These countries have been strengthening their **maritime security ties** with the Philippines and Vietnam to help counter China's assertive territorial claims.
- **India as a Bulwark Against China:** The U.S. sees India as a **counterbalance to China**, especially as tensions between India, the U.S., and China have risen. India's relationships with China and the U.S. have been in competition, particularly over issues like territorial disputes and the **South China Sea**.
  - ▶ India has become more involved in U.S.-led initiatives and has deepened defense cooperation with the U.S., but it still seeks to maintain strategic autonomy. This means India avoids forming strong alliances with any one country, including the U.S.
  - ▶ India's relationship with China is complex, as it has economic ties with China and military reliance on Russia, which limits its willingness to fully align with the U.S. in potential conflicts, like over Taiwan.
- **India as an Engine of Global Growth:** The U.S. sees India as a key player in global economic growth, especially in areas like **technology and manufacturing**. India's economy is growing rapidly, it has the world's largest population, and it's expected to become the **third-largest economy** in the next decade.
  - ▶ The U.S. also sees India as an alternative to China in terms of economic partnerships, especially with the trend toward reducing reliance on China in global supply chains.
  - ▶ However, India's growth faces challenges. It has struggled to expand its manufacturing sector, and issues like infrastructure, labor, and protectionism hold back its economic potential. India is unlikely to replace China's central role in global supply chains in the near future.

## WHITE HOUSE ON ADANI BRIBERY CASE

### Context

The White House has expressed confidence in its '**strong ties**' with India amidst the ongoing controversy surrounding allegations against the **Adani Group**.

### The issue

- The US Department of Justice issued a press release detailing allegations on the Adani Group for paying over USD 250 million (approximately Rs 2,100 crore) in bribes to Indian officials in exchange for favourable terms for solar power contracts.
- If the case proceeds badly for Adani, it will further damage his position in India. It will be difficult for Indian business and State institutions to disentangle themselves from Adani as he is heavily present in the infrastructure and energy sectors (most favoured sectors).

### India-US Relations

The relationship between the United States and India has grown significantly over the last 30 years, with cooperation in key areas such as defense, technology, and international initiatives. The engagement has been built around three main pillars:

## INTERNATIONAL CRIMINAL COURT (ICC)

### Context

The **International Criminal Court (ICC)** has issued an arrest warrant for Israeli Prime Minister Benjamin Netanyahu, accusing him of criminal responsibility for **war crimes and crimes against humanity in Gaza**. This decision is linked to Israel's military actions, especially after the October 7, 2023, attack by Hamas, with charges including murder, persecution, and using starvation as a weapon of war.

## What is the ICC?

- **Located in:** The Hague, Netherlands
- The **International Criminal Court (ICC)** was established July 17, 1998, under the **Rome Statute**, an international treaty, and came into force in July 2002.
- It prosecutes individuals for crimes like genocide, war crimes, crimes against humanity, and aggression.
- **Types of Crimes:** The Court's founding treaty, called the Rome Statute, grants the ICC jurisdiction over four main crimes:
  - ▶ Crimes against humanity
  - ▶ Genocide
  - ▶ Crimes of aggression
  - ▶ War crimes
- The court **does not have its own policing body** and relies on other countries for support in "making arrests, transferring arrested persons to the ICC detention centre in The Hague, freezing suspects' assets, and enforcing sentences.
- Under the **Rome Statute**, ICC member states are obligated to arrest a person who is in their territory and subject to an arrest warrant.

The ICC has 124 state parties, including 33 from Africa, 19 from Eastern Europe and 25 from Western Europe and others such as Canada.

- ▶ The United States is not a state party and neither is Israel. Though Israel is not a member of the Rome Statute, the court has jurisdiction over this case due to Palestine's status and the context of the situation.
- ▶ Russia and Ukraine are also not members of the ICC.

## The Arrest Warrants:

- The ICC issued warrants for **Netanyahu, Israel's former Defence Minister Yoav Gallant**, and **Hamas military chief Mohammed Deif**. The warrants cite crimes related to Israel's actions in Gaza after Hamas's attack on Israel in October 2023. The specific crimes include **murder, persecution, and using starvation as a weapon**.
- **Israel's Position:** Israel rejects the ICC's jurisdiction, as it is not a member of the Rome Statute. It argues that it has the right to self-defense and refuses to recognize the ICC's authority over its actions.
- **International Reactions: The United States and Israel's allies** reject the ICC's ruling, arguing that the court lacks jurisdiction and supporting Israel's right to defend itself.
  - ▶ **Human rights groups and some countries**, like **Turkey**, support the arrest warrants, seeing them as important for justice.
  - ▶ Some countries, including the **Netherlands**, say they will comply with the ICC's ruling, while others, like the **UK**, express support for Israel's self-defense.

## Impact of the Warrants:

- While Israel does not recognize the ICC, the warrants could affect Netanyahu's ability to travel internationally. If he travels to any of the 124 countries that are part of the Rome Statute, he could face arrest.

- However, enforcement of such warrants can be inconsistent, as some countries have previously failed to arrest individuals under similar warrants.
- The warrants may not lead to immediate arrests, as the ICC does not typically prosecute individuals in absentia unless in rare circumstances.

## Crimes

- **Genocide:** The crime of genocide is characterised by the specific intent to destroy in whole or in part a national, ethnic, racial or religious group by killing its members or by other means: causing serious bodily or mental harm to members of the group; deliberately inflicting on the group conditions of life calculated to bring about its physical destruction in whole or in part; imposing measures intended to prevent births within the group; or forcibly transferring children of the group to another group.
- **Crimes against humanity:** They are serious violations committed as part of a large-scale attack against any civilian population.
  - ▶ The 15 forms of crimes against humanity listed in the Rome Statute include offences such as **murder, rape, imprisonment, enforced disappearances, enslavement** – particularly of women and children, sexual slavery, torture, apartheid and deportation.
- **War crimes:** They are grave breaches of the **Geneva conventions** in the context of armed conflict and include, for instance,
  - ▶ the use of child soldiers
  - ▶ the killing or torture of persons such as civilians or prisoners of war
  - ▶ intentionally directing attacks against hospitals, historic monuments, or buildings dedicated to religion, education, art, science or charitable purposes
- **Crime of aggression.** It is the use of armed force by a State against the sovereignty, integrity or independence of another State. The definition of this crime was adopted through amending the Rome Statute at the first Review Conference of the Statute in Kampala, Uganda, in 2010.

## ISRAEL-HEZBOLLAH CEASEFIRE DEAL

### Context

US President Joe Biden has announced a **ceasefire deal** to end **13 months of fighting between Israel and with Hezbollah**, the Lebanese militia supported by Iran.



### The Agreement

- The agreement was “**designed to be a permanent ceasefire**”.
- Under the terms of the ceasefire, over 60 days Hezbollah will remove its fighters and weapons from the area between the **Blue Line** - the **unofficial border between Lebanon and Israel** - and the **Litani river**, about 30km (20 miles) to the north.
- Hezbollah fighters will be replaced by **Lebanese army forces** in that area, who will ensure that infrastructure or weaponry is removed and that it cannot be rebuilt.
- Over the same 60 days, Israel will gradually withdraw its remaining forces and civilians, it would enable civilians on both sides of the border to return to their homes.
- The agreement largely tracks **UN Security Council resolution 1701**, which ended the 2006 war between Israel and Hezbollah.
  - ▶ Under resolution 1701, areas south of the **Litani** should be free of any armed personnel or weapons other than those of the Lebanese state and the UN peacekeeping force (Unifil).
  - ▶ But both sides claimed violations of the resolution.

- Supported by Iran, Hezbollah aims to resist Israeli presence and influence in the region.
- Its animosity toward Israel has persisted since the latter’s occupation of **southern Lebanon**, which lasted until 2000.
- **Political Role:** Hezbollah has significant political influence in Lebanon, holding 13 seats in Parliament, but faces increasing opposition domestically amid economic struggles.
- It is considered a **terrorist organization** by the U.S. government.

### About Location

#### ▢ Middle East

- The Middle East is a geographical region primarily located in **western Asia**, extending into parts of **northern Africa and southeastern Europe**.
- **Geographical Boundaries**
  - ▶ **Western Border:** The Mediterranean Sea, which separates the region from European countries like Greece and Italy.
  - ▶ **Northern Border:** Countries such as **Armenia, Azerbaijan, and Georgia** are often associated with the region, though their classification can vary between Europe, Asia, or as a separate region.
  - ▶ **Southern Border:** The **Red Sea and the Arabian Sea** surround countries like Saudi Arabia, Yemen, and Oman.
  - ▶ **Central Feature:** The Persian Gulf, a key body of water, shapes the region’s center and includes nations such as the **United Arab Emirates, Qatar, Bahrain, Kuwait, and Iran**.



### FACT BOX

#### What is Hezbollah?

- Hezbollah (meaning “Party of God”) is a **militant group** founded in Lebanon in 1982 during the 15-year **Lebanese Civil War**. It has evolved into a significant political and military force within the country.



Figure No. 01

## Lebanon

- ▶ Lebanon is a country located in the **Middle East**, in the western part of the Asian continent.
- ▶ It is situated on the eastern shore of the **Mediterranean Sea**.
- Lebanon shares borders with several neighboring countries.
  - ▶ To the north and east, it is bounded by **Syria**
  - ▶ To the south, it shares a border with **Israel**
  - ▶ To the west, it is bordered by the **Mediterranean Sea**.

## GLOBAL ALLIANCE AGAINST HUNGER AND POVERTY

### Context

The **G20 Leaders' Summit** held in **Rio de Janeiro, Brazil** was headlined by the official launch of the **Global Alliance Against Hunger and Poverty** ("the Alliance").

### About the Alliance:

- The Global Alliance Against Hunger and Poverty, an initiative crafted by the **Brazilian Presidency of the G20**.
- It aims to offer an ambitious and urgent platform for accelerating progress towards achieving the international pledges of eradicating poverty and hunger by **2030 (Sustainable Development Goals 1 and 2)** as well as to **reduce inequalities (SDG 10)**.
- Any member country can access **proven best practices** from other members and identify potential partners willing to assist in the development of its **own national model**.
- Assistance may be in the form of **technical expertise or financial support**.
- The Alliance has identified an **evidence-based policy basket**, which comprises more than 50 policy instruments that member countries can avail support for.
  - ▶ Of particular importance are the **six "Sprints 2030"**, high-impact areas which will see target-oriented initiatives catering to the most vulnerable. These include:
    - ◆ school meals
    - ◆ cash transfers
    - ◆ smallholder and family farming support programs
    - ◆ socio-economic inclusion programs
    - ◆ integrated maternal and early childhood interventions
    - ◆ water access solutions
- **Funding:** Unlike many initiatives, the Alliance does not boast an exclusive fund. Rather it envisions playing a

matchmaking role, connecting countries in need with motivated donors and technical support. The \$2-3 million required annually for its operations will come from member countries and institutions such as the **Food and Agriculture Organization (FAO), UNICEF, and the World Bank**.

- **Participants:** 81 countries (including India), 26 international organisations, 9 financial institutions, and 31 philanthropic foundations and non-governmental organisations have already joined the Alliance.
- **Headquarters:** The Alliance may be headquartered in Brasilia, or some other Global South country. It will also likely have an office at the FAO headquarters in Rome.

### What was the need of the alliance?

- In 2015, all **193 UN Member States** adopted the '**2030 Agenda for Sustainable Development**' which aimed to, among other things, end poverty and hunger, and achieve food security and improved nutrition by 2030.
- **Pandemic:** But the Covid-19 pandemic led to **significant reversals** in the progress made towards these ends, as extreme poverty rose and nutrition standards fell, especially in the **Global South**.
- **Global conflicts:** The uneven economic recovery since, along with a rise in **global conflicts**, and the harmful impacts of climate change, have further weakened the fight against hunger and poverty.
- **Climate change:** Extreme weather events are having devastating effects on every corner of the planet. Social, racial, and gender inequalities are deepening in the wake of a pandemic that has claimed more than 15 million lives.
- **Slow progress:** As things stand, progress is too slow to meet the 2030 targets.
  - ▶ Current projections indicate that 622 million people will live below the extreme poverty line of \$ 2.15 per day by 2030 — double the target level
  - ▶ If current trends persist, 582 million people will live in hunger by 2030, approximately the same number as in 2015"
- It is in this context that Brazil chose to launch the Alliance during its G20 presidency.

## GELEPHU MINDFULNESS CITY

### Context:

Prime Minister Modi expressed support for Bhutan's project (**Gelephu 'Mindfulness City'**), calling it a significant global initiative. This mega project has the potential to redefine not just how sustainable living can be achieved, but become a global model unlike any other in the world today.

### What is Gelephu Mindfulness City?

- The Gelephu Mindfulness City (GMC) is a **major international co-operative project** backed by India and aimed at promoting sustainable urban development.
- The Gelephu city is designed to blend technology, finance,

and knowledge with mindfulness and sustainability.

- It aims to be a hub where every citizen of Bhutan participates as a shareholder and stakeholder in the project, embodying the co-operative spirit.
- The city, covering an area of 2,500 square kilometers, is designed to be a **“Zero Carbon” city**, promoting sustainability, mindfulness, and cooperation.
- **Gelephu Mindfulness City** is Bhutan’s **biggest “co-operative project.”**
  - ▶ India has over **8 lakh co-operatives**, and India has plans to expand co-operatives to every village in India, with a focus on modernizing and making **Primary Agricultural Credit Societies (PACS)** tech-enabled.
- It is a **Special Administrative Region (SAR)**.
- The Gelephu ‘Mindfulness City’ will have two protected areas - **a national park and a wildlife sanctuary**.
- It will have rivers that will have the potential to generate 4,000 to 5,000 megawatts of electricity through renewable energy. It has forests, biological corridors and is teeming with wildlife. It has its own agricultural hubs and small towns.
- Gelephu Mindfulness City (GMC) is going to be the first of its kind special administrative region (SAR) in Bhutan based on a **“two systems, one country” policy**.
- This transformation aims to turn Gelephu into an economic and a strategic corridor bringing India and Bhutan closer, without disturbing Thimphu’s comfortable relationship with its other neighbour, China.
- Once built, Bhutan’s ‘Mindfulness City’ will cover nearly **2.5% of the entire country’s landmass and will be bigger than all of Singapore**.
- The city will be entirely based on **Bhutan’s Gross National Happiness** philosophy which has been praised the world over
- **Vision:** The ‘Mindfulness City’ project has been envisioned by the **King of Bhutan, Jigme Khesar Namgyel Wangchuck**. The idea is to build a **“Silicon Valley of the East,”** where technological progress aligns with nature and spirituality.

**Significance for India**

- The ‘Gelephu mindfulness city’ would “directly benefit India” in many ways since this city has been “purposely placed along the border with India in Assam.”
- The town is strategically situated on the Assam border. It offers convenient access to other districts within Bhutan as well.
- It has long been a passage between Bhutan and India, serving as an important **trading post and transit point** for monks and traders moving between the Indian plains and Bhutanese highlands.
- Its serves as a lifeline and strategic location on the fertile plains, in contrast to the mountainous terrain that dominates much of the Himalayan kingdom.
- **Bridge connecting India and Southeast Asia:** The GMC is seen as a bridge connecting Bhutan to India

and Southeast Asia, promoting economic growth while maintaining Bhutan’s neutrality and peaceful relations with both India and China.

- **Economic development:** The project is expected to boost the economy of both Bhutan and India, especially in the border region, with increasing land prices and new business opportunities.
- **Strong ties:** The GMC will also promote cross-border cultural ties, as the region has historically had strong familial and cultural connections between Bhutanese and Indians, especially in towns like Gelephu.



**Concept of Mindful City**

- Mindful city is an **urban environment** deigned with the **principles of mindfulness** at its core.
- The concept integrates **elements of urban planning, architecture, and community development** to foster a space that promotes **well-being, health, and sustainable living**.
- It describes the key elements of mindfulness city as an urban entity with all the necessary infrastructure that promotes **harmony between man and nature**.

Polity & Governance (GS-II)

**GAUTAM ADANI BRIBERY CASE**

**Context**

Gautam Adani, the chairman of the Adani Group, faces serious charges in the United States for allegedly paying bribes to Indian officials. These bribes were supposedly given to secure contracts for a large solar power project in India. The total amount of the bribes is said to be over **\$250 million**. The project in question is related to a bid won by Adani Green Energy, a part of the Adani Group, to supply **8 gigawatts of solar power** to a state-owned company in India.

**What are the Charges?**

- The criminal charges against Gautam Adani in the U.S. are as follows:
  - ▶ **Foreign Bribery:** Paying bribes to foreign officials (Indian officials) to secure business deals.
  - ▶ **Securities Fraud:** Providing false or misleading information to investors about the company’s activities.
  - ▶ **Wire Fraud Conspiracy:** Involving the use of electronic communications to carry out fraudulent activities.
- Under U.S. law, companies can be charged for bribing foreign officials, even if the bribery takes place outside the U.S., especially if they are raising money from U.S.-based investors.

**The Issue: The Solar Power Project**

- In June 2020, **Adani Green Energy** won a major bid to

supply **8 gigawatts of solar power** to a state-owned electricity company in India.

- However, there was a problem—**local power companies** did not want to buy the power at the prices set by the government, which could have led to the deal collapsing.
- To fix this problem, U.S. authorities allege that Gautam Adani decided to bribe local officials to persuade them to buy the electricity. The **bribes were allegedly worth \$250 million**, and the money was meant to secure the solar contracts.

### How the Alleged Scheme Unfolded?

- **2020-2021:** Adani Green Energy and another company, Azure Power, were awarded major contracts for solar power projects. Local power distributors did not want to buy the power at the agreed prices, which delayed the deal. Adani's associates (including his nephew Sagar Adani) allegedly discussed paying bribes through encrypted messages (like WhatsApp) to push the local distributors to buy the power.
- **August 2021:** Gautam Adani reportedly promised a \$228 million bribe to officials in the southern state of Andhra Pradesh to get them to agree to buy the power.
- **December 2021:** The Andhra Pradesh government agreed to buy the power, and other states followed suit. The sudden success of the project raised suspicions in the market about how the deals were signed.
- **2022:** The **U.S. Securities and Exchange Commission (SEC)** and Justice Department began investigating the payments. They found evidence of misleading statements made to investors about anti-bribery practices.

### Legal Actions in the U.S.

- **U.S. Authorities:** The **Justice Department** and **SEC** allege that Adani's companies raised **billions of dollars** from international investors (including U.S. investors) between 2021 and 2024.
- They say that in the process, Adani's companies lied to investors, falsely claiming that they had not paid any bribes. This, according to the U.S. authorities, was **fraud**.
- In **March 2023**, the FBI seized devices from **Sagar Adani**, Gautam Adani's nephew, as part of their investigation.
- In **October 2024**, a **grand jury indictment** was issued against **Gautam Adani**, his nephew **Sagar Adani**, and others involved. The **indictment** was made public in **November 2024**, causing a major drop in the value of Adani's companies (a loss of **\$27 billion**).
- **The Extradition Issue:** Gautam Adani is **believed to be in India** and not in U.S. custody. If U.S. authorities want to charge him, they would have to request his **extradition** (send him to the U.S. for trial).
  - ▶ **Extradition** would be complicated, as India would have to decide whether the charges apply under Indian law and whether any political or human rights issues exist.



### FACT BOX

#### World's largest solar award

- The project, which required **Adani Green** to develop 8 GW of solar capacity and 2 GW of solar manufacturing, was hailed as a milestone for **India's Atma Nirbhar Bharat initiative**.
- Adani Green Energy's solar project was expected to displace 900 million tonnes of CO<sub>2</sub> and create 400,000 jobs, positioning it as a leader in India's renewable energy transition.

#### Extradition under Indian Law

- **Extradition** refers to the formal process by which one country requests the surrender of an individual to face criminal charges or serve a sentence in the requesting country. **International law** governs extradition agreements between states, and it ensures that countries cooperate in handling criminal matters that cross national borders.
- The **Extradition Act, 1962** regulates the law relating to India's extradition of fugitive criminals. A fugitive criminal is a person who is accused or convicted of an extradition offence in a foreign country.
- India has entered into extradition treaties with certain other countries like the UK, USA, Bangladesh, etc.

## SOCIALISM MEANS 'WELFARE STATE' IN INDIAN CONTEXT: SC

### Context

The **Supreme Court** of India has reserved its judgment on a case challenging the inclusion of the words "**socialist**" and "**secular**" in the **Preamble** of the Indian Constitution. The court is considering several petitions filed by individuals including **Subramanian Swamy**, **Vishnu Shankar Jain**, and **Ashwini Kumar Upadhyay**, who argue that these terms should not be part of the Preamble.

### Background (What's the issue?)

- **The 42nd Amendment (1976):** The terms "**socialist**", "**secular**", and "**integrity**" were added to the Preamble by the **42nd Amendment** during the **Emergency period** (1975-77) under the government of Prime Minister **Indira Gandhi**.
- The petitioners argue that these words were added in a controversial period (the Emergency) and should be removed, claiming that the amendment was unconstitutional. Though the petition is not against the principles of "**socialism**" or "**secularism**", but objects to their inclusion in the **Preamble** itself.
  - ▶ The petitioners argue that the inclusion of these terms in the Preamble was unnecessary and that the **Preamble** should remain as it was originally written by the **Constituent Assembly**.

**Court's Observations:**

- The **Supreme Court bench** noted that the **42nd Amendment** had already been **subjected to judicial reviews** in the past and had been **upheld** by the courts.
- The bench emphasized that it cannot declare the Parliament's actions during the Emergency as invalid. In other words, they rejected the idea that the changes made during the Emergency were **illegitimate**.
- The bench also **refused** to refer the case to a larger bench, as requested by the petitioners, and clarified that **"socialism"** in India refers to a **"welfare state"**, which is different from the concept of socialism in other countries.
- **The Role of Parliament and the Constitution:** The court highlighted that under **Article 368**, Parliament has the **power to amend the Constitution**, which includes the **Preamble**. This power was exercised during the 42nd Amendment.
  - The bench made it clear that it would not entertain arguments claiming that the **Preamble** could not be amended, as **Article 368** grants Parliament the authority to do so.

**Understanding 'India's' Socialism**

- **Socialism in India:** The court stated that **"socialism"** in India is **understood as a welfare state**—meaning the state's role is to ensure the welfare and equality of its citizens, not necessarily to control all industries or eliminate private enterprise. The private sector has grown successfully in India, and **socialism** in India has not stopped this growth.
- **Secularism in India:** The court referred to its earlier decision in the **1994 SR Bommai case**, where it had already ruled that **"secularism"** is a fundamental part of the Constitution, meaning the state must remain neutral and not favor any religion.

**Why Is This Ruling Important?**

- **Socialism in India:** After **Independence**, India adopted a model of **democratic socialism**, characterized by central planning and state control over major industries. In the 1960s and 70s, this led to **nationalization** of banks, increased taxes, and regulations, reflecting characteristics of a **mixed economy**.
  - From **1991**, the economy began shifting towards a **market-oriented model**, leading to rapid growth. Despite this, **socialist values** continue to guide government programs aimed at reducing poverty and inequality, like **MGNREGA**, **food subsidies**, and **direct benefit transfers**.
  - The Court emphasized that **socialism** today involves using government resources to support the poor, while allowing private enterprise to flourish.
- **Secularism in India:** India's **secularism** is rooted in the idea of **unity in diversity**. The state does not support any religion but ensures the **freedom to practice** any religion. The Court highlighted that the **secular nature of the state** guarantees **equality** for all religions, without any form of discrimination.

- **Reflecting India's Constitution:** The ruling reinforces that the Constitution is not a static document. It adapts to changing societal needs while remaining true to the principles of justice, equality, and fraternity. The Court's interpretation helps preserve the **core values** of the Constitution, ensuring that **socialism** and **secularism** continue to shape India's future governance.

**Preamble**

- The Preamble to the Indian Constitution serves as a concise statement of the fundamental principles and objectives that guide the nation.
- Adopted on November 26, 1949, it outlines the aspirations of the Indian people and sets the tone for the entire constitutional framework.
- The Preamble declares India to be a sovereign, socialist, secular, democratic, and republic nation.
- **Amendment:** As per Article 368 of the Constitution of India, the Preamble of the Constitution of India can be amended.

**Key Words in the Preamble**

<b>Sovereign</b>	The term 'Sovereign' which is proclaimed by the Preamble means that India has its own independent authority and it is not a dominion of any other external power. In the country, the legislature has the power to make laws which is subjected to certain limitations.
<b>Socialist</b>	The term 'Socialist' was added in the Preamble by <b>42nd Amendment, 1976</b> which means the achievement of socialist ends through democratic means. It is basically a 'Democratic Socialism' that holds faith in a mixed economy where both private and public sectors co-exist side by side.
<b>Secular</b>	The term 'Secular' was incorporated in the Preamble by 42nd Constitutional Amendment, 1976 which means that all the religions in India get equal respect, protection and support from the state.
<b>Democratic</b>	The term 'Democratic' implies that the Constitution of India has an established form of Constitution which gets its authority from the will of the people expressed in an election.

### Key Words in the Preamble

#### Republic:

The term 'Republic' indicates that the head of the state is elected by the people directly or indirectly. In India, the President is the head of the state and he is elected indirectly by the people.

## ROLLING OUT LABOUR CODES

### Context

The **Union Labour Ministry** recently informed Parliament that several states in India have not yet published the **draft rules for the labour codes** passed in 2019 and 2020. Specifically, four states have not released the draft rules for the **Code on Wages (2019)**, while five states have yet to release the draft rules for the **Industrial Relations Code, the Code on Social Security, and the Occupational Safety, Health and Working Conditions Code**, all of which were passed in 2020.

### What are the Labour Codes?

- India's labour laws had historically been fragmented, with over **29 laws governing various aspects of labour**, many of which had been in place since the **British colonial era**.
- These laws had become increasingly irrelevant in a modern, dynamic economy, and compliance with them was cumbersome for both employers and workers.
- Thus, the previous 29 laws were condensed into four main codes (the new Labour Codes):
  - The Code on Wages (2019):** The code ensures all workers receive minimum wages and timely payments, with a **uniform definition of "wages"** across all codes to avoid multiple interpretations and reduce litigation.
  - The Code on Social Security (2020):** It focuses on expanding social security benefits to all workers, including **gig and platform workers**. It introduces a **Re-skilling Fund** and allows the government to extend benefits through the **Employees' State Insurance Corporation (ESIC) and Employees' Provident Fund Organization (EPFO)**.
  - The Occupational Safety, Health and Working Conditions Code (2020):** It improves workplace safety by including provisions for annual health check-ups and requiring employers to formalize employment contracts by issuing appointment letters. This enhances job security and ensures access to statutory benefits.
  - The Industrial Relations Code (2020):** It simplifies compliance for businesses while safeguarding workers' rights, including dispute resolution mechanisms and protections for collective bargaining.

- The four labour codes aim to strike a balance between easing labour market restrictions and enhancing workers' rights and welfare.

### Unemployment Rates and Youth Employment:

- According to the **ILO's Global Report Trends for Youth (2022)**, the worldwide youth unemployment rate was 15.6% in 2021. By 2023, the global youth unemployment rate had decreased to 13.3%.
- For India, the official data on employment and unemployment comes from the **Periodic Labour Force Survey (PLFS)** conducted by the **Ministry of Statistics and Programme Implementation (MoSPI)**.
  - The PLFS data for 2023-24 showed that the unemployment rate for youth aged 15-29 in India was 10.2%, which is lower than the global average.
- Additionally, the **Worker Population Ratio (WPR) for youth**, which indicates the level of employment, improved from 31.4% in 2017-18 to 41.7% in 2023-24. This suggests a positive trend in youth employment in India.

### Role of State and Central Government

- Under the Constitution of India, **labor is a subject in the Concurrent List** where both the central and state governments are competent to enact legislation subject to certain matters being reserved for the central government.
- However, in cases where central and state laws conflict, the central law prevails **unless the state's law receives Presidential assent**.
- States are responsible for drafting rules to address areas not fully covered by the codes, such as working hours, overtime, and trade union processes.

## PARLIAMENTARY SECRETARY APPOINTMENTS

### Context

The Supreme Court issued notice on a plea filed by Himachal Pradesh government challenging an order of the high court, which nullified a **2006 state law** permitting the state to appoint **members of the state Legislative Assembly** as parliamentary secretaries.

### Background:

- In 2006, Himachal Pradesh passed a law called the **Himachal Pradesh Parliamentary Secretaries (Appointment, Salaries, Allowances, Powers, Privileges and Amenities) Act, 2006**.
  - This law allowed the state government to appoint **Members of the Legislative Assembly (MLAs)** as **Parliamentary Secretaries**.

- ▶ These Parliamentary Secretaries were given several benefits, including official powers, salaries, and allowances similar to those of government ministers.

### High Court's Actions:

- Now, the **Himachal Pradesh High Court** struck down this 2006 law. The court ruled that the state legislature **did not have the authority** to pass such a law, and it was **unconstitutional**. The court's main reasoning was that this law violated the **Constitution of India** in two key ways:
  - ▶ **Office of Profit:** The court held that being appointed as a Parliamentary Secretary effectively gave an MLA the same duties and privileges as a minister, even though they were not formally ministers. This meant they were holding an **Office of Profit**, which is not allowed for elected representatives unless certain conditions are met.
  - ▶ **Violation of Article 164(1-A):** This article limits the size of the **Council of Ministers** in each state. The court found that the Parliamentary Secretaries were performing tasks that were akin to ministers but were not officially recognized as such, thus violating this constitutional provision.
- The **High Court** also declared the appointments of **six Congress MLAs** as Parliamentary Secretaries (made in **January 2023**) to be **illegal** and **unconstitutional**.
- The court ordered that these MLAs could be **disqualified** due to holding an **Office of Profit**.
- The court also ruled that certain protections given to these appointees under the **Himachal Pradesh Legislative Assembly Members (Removal of Disqualifications) Act, 1971** were also illegal.

### Supreme Court's Involvement:

- The **State of Himachal Pradesh** disagreed with the High Court's ruling and appealed to the **Supreme Court**. Now, the **Supreme Court** issued a **notice** on this appeal, meaning it will examine the case in detail.
- The Supreme Court also took the following actions:
  - ▶ **Stayed (paused) the High Court's order:** The Supreme Court paused the High Court's direction to start disqualification proceedings against the MLAs who were appointed as Parliamentary Secretaries. This means that for now, the MLAs won't be disqualified.
  - ▶ **Issued a temporary ban on new appointments:** The Supreme Court ordered that no new MLAs should be appointed as Parliamentary Secretaries while the case is pending.

## AIR POLLUTION CRISIS IN INDIA

### Context

Increasing pollution is causing damage to people's lungs. Even teenagers' lungs are now resembling those of lifelong smokers, a stark sign of the widespread harm from urban pollution.

### Pollution as a National Health Crisis

- According to the **United Nations Environment Programme (UNEP)**, pollution levels are rising quickly in India, with emissions increasing by more than 6% from the previous year.
- Air pollution is now the leading environmental cause of premature death in India. In 2021, nearly 2 million deaths were attributed to pollution-related health issues.
- Vulnerable groups **like pregnant women, children, the elderly, and those with pre-existing health conditions** are most affected by air pollution, which increases the risk of respiratory infections, heart diseases, and other health complications.
- **Impact on Children's Health:** Air pollution is severely affecting children's lung development, leading to chronic conditions like asthma. These aren't just temporary issues; they can result in lifelong health problems.

### Impact of Air Pollution on Specific Organs

Air pollution affects several key bodily systems and organs, contributing to a wide range of health problems:

#### ▣ Respiratory System

- ▶ **Asthma & Allergic Rhinitis:** Pollutants aggravate respiratory conditions like asthma and allergic rhinitis (hay fever), leading to more frequent attacks and worsening symptoms.
- ▶ **Chronic Obstructive Pulmonary Disease (COPD):** Long-term exposure to air pollution can damage the lungs, leading to COPD, a group of diseases that obstruct airflow and make breathing difficult.
- ▶ **Lung Cancer:** Pollutants, especially **carcinogens** in the air, increase the risk of lung cancer.
- ▶ **Pneumonia & Lung Infections:** Air pollution can also increase susceptibility to **acute respiratory infections** like pneumonia, particularly in vulnerable groups such as the elderly and children.

#### ▣ Cardiovascular System

- ▶ **Heart Disease:** Fine particulate matter (PM2.5) in the air is linked to **heart disease**, including an increased risk of heart attacks, **strokes**, and **heart failure**.
- ▶ **Hypertension:** Long-term exposure to air pollution can cause **high blood pressure** (hypertension), a leading risk factor for cardiovascular diseases.
- **Cognitive Decline & Dementia:** Air pollution is also associated with cognitive impairments, including **early cognitive decline, dementia, and Alzheimer's disease**. Pollutants can negatively affect brain function, accelerating the onset of neurological diseases.

#### ▣ Skin

- ▶ **Dermatitis & Eczema:** Pollution can lead to **skin conditions** such as **dermatitis** and **eczema**, causing redness, irritation, and inflammation.

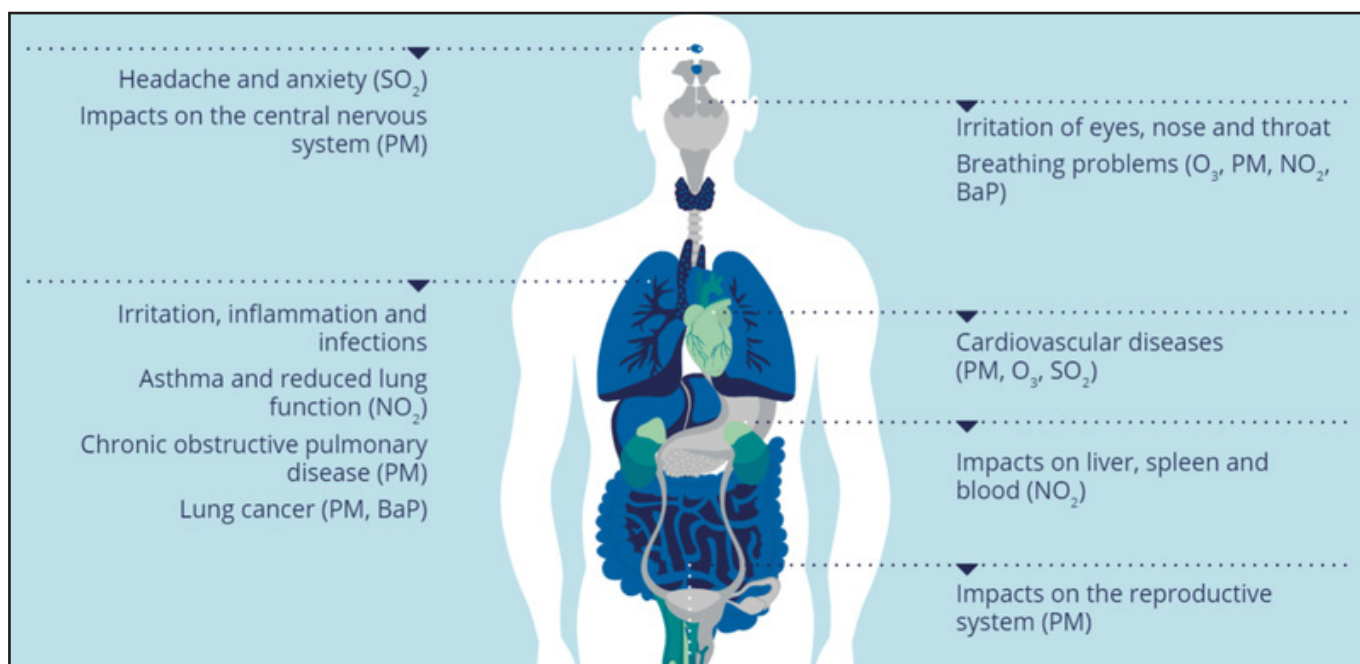


Figure No. 02

- ▶ **Premature Skin Aging:** Exposure to pollutants accelerates the aging process of the skin, leading to **wrinkles**, **loss of elasticity**, and **pigmentation changes**.
- **Internal Organs**
  - ▶ **Kidney & Liver Damage:** Air pollution can also affect internal organs like the **kidneys** and **liver**, potentially leading to **chronic kidney disease** and liver dysfunction. The toxins in polluted air may cause inflammation and damage to these vital organs.

## PS5 PRO'S AVAILABILITY IN INDIA

### Context

The **PS5 Pro** console was recently released globally, but **India** was not included in the initial list of markets. Sony announced that the PS5 Pro won't be available in countries like India due to a specific issue with **Wi-Fi 7** technology, which uses a **6GHz frequency band**. This band is currently **not allowed** for Wi-Fi use in India.

### Wi-Fi Bands and Their Evolution:

- **Wi-Fi bands** are frequency ranges used for wireless internet. These bands were available for public use in India starting in **2002**.
  - ▶ **2.4GHz and 5GHz** are the most common Wi-Fi bands used globally, including in India.
  - ▶ **2.4GHz** offers a larger coverage area but slower speeds.
  - ▶ **5GHz** provides faster speeds but covers a smaller area.

### Introduction of Wi-Fi 6 and Wi-Fi 6E:

- In **2020**, **Wi-Fi 6** was introduced, which can use both 2.4GHz and 5GHz bands more efficiently, improving speeds.
- **Wi-Fi 6E** was launched in **2021**, introducing a **third band**—the **6GHz band**—to provide even faster internet speeds (up to 9.6Gbps).
  - ▶ This 6GHz band is important because it can carry much higher speeds compared to the older bands.

### What is 6GHz Band?

- **6GHz spectrum** is the frequency range between **5,925 MHz and 7,125 MHz**. It allows for faster internet speeds and less congestion since it's a new, unoccupied band.
- Many countries, including the **US, UK, South Korea**, and **UAE**, have allowed this band for Wi-Fi, but **India** has not yet opened it up for use.
- The **International Telecommunications Union (ITU)** usually tries to create global agreements about how wireless spectrum should be used, but countries like **India** and **China** are still deciding what to do with this band.
- **The 6GHz Band in India:** In India, the **6GHz band** is currently used by the **Indian Space Research Organisation (ISRO)** for satellite communication. However, **satellite use** is unlikely to interfere with Wi-Fi use.
  - ▶ **Telecom companies** in India are pushing for the 6GHz band to be used for **5G and 6G** networks, while **tech companies** (such as **Google, Meta**, and **Amazon**) want it to be allocated for **Wi-Fi** instead, like in the US.
  - ▶ There is a debate in India about whether the entire 6GHz band should go to telecoms or be shared for Wi-Fi as well. **Australia** has already made half of the 6GHz spectrum available for Wi-Fi, and India might follow this example.



**Impact on PS5 Pro and Wi-Fi 7 in India:**

- **Wi-Fi 7**, which is the next generation of Wi-Fi technology, requires the **6GHz band** for full performance.
- In **India**, since this band isn't available for Wi-Fi use yet, the **PS5 Pro**, which supports Wi-Fi 7, cannot fully utilize the 6GHz band here.
- However, **Apple** and **Samsung** phones also support Wi-Fi 6GHz but are programmed to avoid using it in India, as the band is not allowed here. Sony could do something similar with the **PS5 Pro**.

**MAJOR ATMOSPHERIC  
CHERENKOV EXPERIMENT  
(MACE) TELESCOPE**

**Context**

The MACE telescope in Hanle, Ladakh, represents a significant leap in India's gamma-ray astronomy capabilities, building on over five decades of involvement in this field. MACE is poised to answer fundamental questions in **high-energy astrophysics** and **particle physics**, particularly regarding the nature of dark matter and WIMPs.

**About MACE**

- The **Major Atmospheric Cherenkov Experiment (MACE)** telescope, inaugurated in **Hanle, Ladakh**, is a **state-of-the-art gamma-ray telescope** designed to study high-energy cosmic phenomena.
- **Highest Imaging Cherenkov Telescope:** Located at around **4.3 km above sea level**, MACE is the highest of its kind in the world.
- **Largest Dish in Asia:** With a **21-meter-wide dish**, it is the largest imaging Cherenkov telescope in Asia and the second-largest globally.
- Key Features:
  - **Gamma Rays and Cherenkov Radiation:** Gamma rays have the shortest wavelength and highest energy in the electromagnetic spectrum. While they are harmful to living organisms, Earth's atmosphere blocks most gamma rays. When these rays hit the atmosphere, they produce **Cherenkov radiation**—a faint blue light—caused by charged particles traveling faster than light in air.
  - **Imaging Atmospheric Cherenkov Telescope (IACT):** MACE is an IACT, capable of detecting Cherenkov radiation to study high-energy gamma rays from cosmic sources.
  - **Collaboration and Construction:** The facility was built by major Indian institutions, including the **Bhabha Atomic Research Centre (BARC)**, **Tata Institute of Fundamental Research (TIFR)**, **Electronics Corporation of India Ltd. (ECIL)**, and the **Indian Institute of Astrophysics (IIA)**.

**Technology:**

- **Light Collector and Mirrors:** MACE uses **356 mirror panels**, each with four smaller mirrors arranged in a honeycomb pattern. This design enhances stability and reflective area while reducing empty space between mirrors. Similar designs are used in other space observatories like the **James Webb Space Telescope**.
- **High-Resolution Camera:** The telescope is equipped with a camera containing **1,088 photomultiplier tubes** that detect and amplify faint light signals. Data processing is done in real-time through specialized electronics.
- **Mobility and Mount:** MACE's 180-ton telescope moves along a **27-meter-wide curved track**, with an **altitude-azimuth mount**, allowing it to adjust its view both vertically and horizontally.

**Scientific Goals:**

- **High-Energy Gamma Ray Study:** MACE primarily aims to study gamma rays with energies above **20 billion eV**. This includes investigating **black holes**, **gamma-ray pulsars**, **blazars**, and **gamma-ray bursts**.
- **Search for Dark Matter:** One of MACE's significant goals is to explore the elusive particles that make up **dark matter**, which is believed to account for more than **85%** of the universe's mass. One candidate for dark matter particles is **WIMPs (Weakly Interacting Massive Particles)**. When WIMPs collide and annihilate each other, they may produce high-energy gamma rays, which MACE is designed to detect.

**INDIA'S SPACE JOURNEY**

**Context:**

November 21 marked the **61st anniversary of India's space programme**, which began on this date in **1963** with the launch of the **Nike-Apache sounding rocket** from **Thumba, Kerala**. This event marked the start of India's journey in space exploration. Over time, this has led to the establishment of the **Indian Space Research Organisation (ISRO)**, now a global leader in space technology.

In recent developments, India launched its **first satellite** aboard a **SpaceX rocket**, marking a milestone as the private sector gets more involved in space missions.

**Recent Developments and Launches:**

- **GSAT-N2 Satellite Launch:**
  - **NewSpace India Ltd.**, a government company, launched the **GSAT-N2/GSAT-20** satellite from **Florida, USA** aboard a **SpaceX Falcon 9 rocket**.
  - The **GSAT-N2** satellite weighs **4,700 kg** and will improve **broadband services** in remote areas like the **northeast**, **Andaman & Nicobar Islands**, and **Lakshadweep**.
  - The satellite will also support services like **in-flight internet** and **Smart Cities Mission**.

- ▶ **GSAT-N2** was launched using a **SpaceX rocket** because it was too heavy for India's **LVM-3 rocket** (India's most powerful, which can carry up to 4,000 kg).

### Upcoming Launches:

- ▶ **ISRO's PSLV-C59 mission** will launch **Proba-3**, a European mission to study the Sun, on **December 4, 2024**.
- ▶ **Shubhanshu Shukla**, India's astronaut-in-training, is preparing for a mission to the **International Space Station (ISS)** in **2025**.

### Milestones in Indian Rocketry:

- **Satellite Launch Vehicle (SLV-3) – 1980:** India joined a select group of nations with the launch of its **Satellite Launch Vehicle-3 (SLV-3)**. On **July 18, 1980**, it successfully placed the **Rohini satellite** into orbit, making India the **6th nation** to have this capability (after the U.S., Soviet Union, U.K., France, and Japan).
- **The Evolution of ISRO's Rockets:** After the SLV-3, India developed a series of other rockets:
  - ▶ **ASLV (Augmented Satellite Launch Vehicles)**
  - ▶ **PSLV (Polar Satellite Launch Vehicle)**, which became ISRO's workhorse for most missions.
  - ▶ **GSLV (Geosynchronous Satellite Launch Vehicle)** for heavier payloads.

**PSLV**, in particular, became **reliable** and **widely used** for launching satellites into various orbits for communication, weather, and navigation purposes.

### ISRO's Current Role:

- **Today, India is a global leader in space technology.** **ISRO** has developed and launched a variety of satellites for remote sensing, weather forecasting, communication, navigation, surveillance, and deep-space exploration (**studying the Moon, Mars, and the Sun**).
- **ISRO's rockets are capable of launching satellites into different orbits, and India has** ensured reliable access

**to space, a statement made by S. Ramakrishnan, a renowned rocket technologist.**

### Private Sector Involvement:

India's **private space sector** is also growing rapidly with several companies preparing to launch their own missions:

- **Pixxel:** This **Indian-American company** is preparing to launch '**Fireflies**', a constellation of **6 hyperspectral satellites** in **early 2024**. These satellites will monitor things like **crop diseases, water scarcity, deforestation, and ocean pollution**.
- **GalaxEye Space:** This company will launch its **Tech Demo** satellite on a **PSLV rocket's Orbital Experimental Module (POEM)** platform to test **synthetic aperture radar (SAR)** technology for Earth observation.
- **PierSight Space:** '**Varuna**', another private satellite, will demonstrate an **antenna technology** and test **SAR and avionics** on a **PSLV POEM** mission.
- **HEX20:** This company will launch its '**Nila**' satellite (5 kg) onboard **SpaceX's Transporter-13 mission** in **February 2025**. The satellite will offer **data processing services**.

### Other Developments in Space and Science:

- **Catalyx Space:** **SR-0**, a satellite launched by Catalyx Space, successfully completed its mission onboard India's **Small Satellite Launch Vehicle**. The satellite re-entered Earth's atmosphere on **November 3**.
- **AAKA Space Studio:** India's **first Space Analog Mission** was launched in **Leh, Ladakh**, with **collaboration between ISRO, IIT-Bombay, and University of Ladakh**. This mission will test **habitat sustainability** for future space missions, simulating conditions on **Mars** or the **Moon**.
- **SatSure:** This company is working with the **Ministry of Electronics** on a program called **Svamvita** to map rural properties using **drones**. This will help capture high-resolution images for better planning and development.

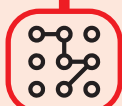


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## SECTION - B

## QUICK BYTES

## CYCLONE FENGAL

## Context:

A depression over the Bay of Bengal has intensified into a deep depression, bringing heavy rainfall to Chennai and several districts in Tamil Nadu. The Indian Meteorological Department (IMD) has predicted that the system will further intensify into a cyclone (Cyclone Fengal).

## Cyclone:

- A cyclone is a mature, organized system of clouds and thunderstorms featuring a clearly defined circulation pattern.
- They are caused by **atmospheric disturbances** around a **low-pressure** area distinguished by swift and often destructive air circulation.
- They form over warm ocean waters and are characterized by low pressure at the center, called the **"eye,"** surrounded by strong, rotating winds.

## Cyclones are classified as:

- ▶ extra tropical cyclones (also called temperate cyclones)
- ▶ tropical cyclones
- **Worldwide terminology:** Cyclones are given many names in different regions of the world. They are known as:
  - ▶ **Typhoons** in the China Sea and Pacific Ocean
  - ▶ **Hurricanes** in the West Indian islands in the Caribbean Sea and Atlantic Ocean
  - ▶ **Tornados** in the Guinea lands of West Africa and southern USA.
  - ▶ **Willy-willies** in north-western Australia
  - ▶ **Tropical cyclones** in the Indian Ocean



## FACT BOX

## Exposure of Indian subcontinent to Cyclones

- The Indian subcontinent (**8041 kilometres**) is one of the worst affected regions in the world.
- It is exposed to nearly 10 per cent of the world's tropical cyclones.
- Of these, the majority of them have their initial genesis over the **Bay of Bengal** and strike the East coast of India. On an average, five to six tropical cyclones form every year.
- More cyclones occur in the **Bay of Bengal than the Arabian Sea and the ratio is approximately 4:1.**
- Cyclones occur frequently on both the coasts (the West coast - Arabian Sea; and the East coast - Bay of Bengal).
- Tropical cyclones occur in the months of **May-June and October-November.**

## Key Concepts:

- **Depression:** A depression is a **low-pressure** area in the atmosphere where the air pressure is lower than the surrounding regions.
- This typically leads to the movement of air from high-pressure areas to low-pressure areas, causing clouds, moisture accumulation, and rainfall.
  - ▶ Depressions are the weakest form of cyclonic systems and are associated with moderate to heavy rainfall, but they are not yet severe enough to be classified as cyclones.

- ▶ Depressions are common in tropical regions and form over warm oceans.
- **Deep Depression:** When a depression intensifies further, it becomes a deep depression.
  - ▶ In this stage, the system is characterized by stronger winds (usually around 55-75 km/h), more defined low-pressure areas, and increased rainfall.
  - ▶ While still not as severe as a full-fledged cyclone, a deep depression can cause significant weather disturbances, including heavy rainfall, strong winds, and flooding in affected areas.

- This can happen when a cold air mass collides with a warm air mass, such as air over warm ocean waters.
- The vast majority of such storms occur over the ocean. The storm can be tropical or non-tropical in nature.
- The term 'bomb cyclone' was first used around the 1940s.
- **Effects of a bomb cyclone:** The band of intense pressure can create heavy winds, blizzard conditions, heavy snow that can possibly reduce visibility and rainfall. Heavy precipitation can also cause coastal flooding.
- **Hot spots for Bomb Cyclone:** There are four active regions which are hot spots for Bomb Cyclone
  - ▶ The Northwest Pacific
  - ▶ The Northern region of the Atlantic Ocean
  - ▶ The Southwest Pacific
  - ▶ The Southern region of the Atlantic Ocean

## BOMB CYCLONE

### Context

A powerful bomb cyclone approached the Pacific Northwest and Northern California, causing high winds, heavy rain and snow.

### What is a bomb cyclone?

A bomb cyclone, also known as **bombogenesis**, is a **fast-developing storm** (low pressure area) that occurs when atmospheric pressure drops at least 24 millibars over a 24-hour period.

- A millibar is a way of measuring pressure. The lower the pressure, the more powerful the storm. In order to approximately qualify, the pressure needs to drop about 1 [millibar], or more, every hour over a 24-hour period.
- A bomb cyclone occurs when **atmospheric pressure** at the center of the cyclone drops rapidly.

## EARTH'S AXIS TILTED

### Context

The Earth's axis has tilted by **31.5 inches (about 80 centimetres)**, new research has found. The research blames human activity (pumping groundwater on a large scale) for impacting the planet's rotation.

### What has the study found?

- Researchers studied data from **1993 to 2010** to discover that **pumping 2,150 gigatonnes of groundwater** has led to a change in Earth's tilt of nearly 31.5 inches. This is equivalent to .24 inches of sea level rise.

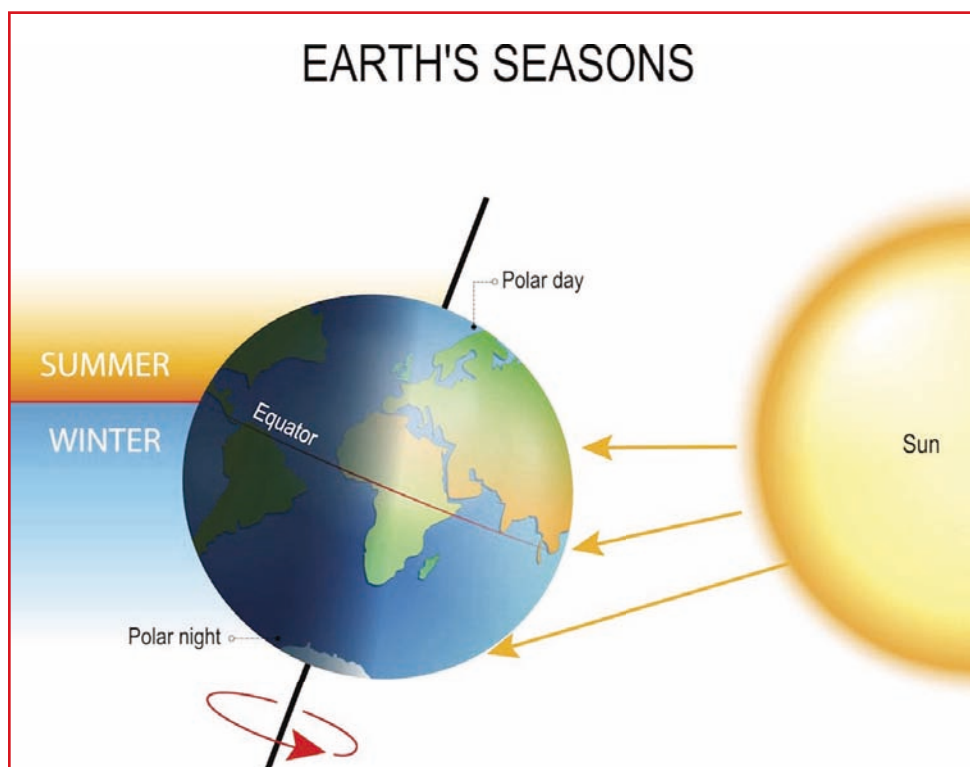


Figure No. 03

- The pumping is mainly for irrigation and human consumption, with the groundwater subsequently moving to the oceans.
  - Redistributing water from the **midlatitudes** had the biggest impact on the Earth's rotation, as per the study. Researchers identified water movement from western North America and northwestern India as playing a key role in the Earth's tilt.
- ### How Does Earth's Tilt Change?
- The **axis of rotation of the Earth** is tilted at an angle of **23.5 degrees** away from vertical, perpendicular to the plane of our planet's orbit around the sun. The tilt of the Earth's axis is important, in that it governs the warming strength of the sun's energy.
  - Due to this **axial tilt**, the sun shines on different latitudes at different angles throughout the year. This causes the seasons.
  - **Earth's tilt, or axial precession**, is influenced by the distribution of mass (in this case water) across the planet.
  - The melting of glaciers and polar ice sheets from Greenland and Antarctica contributes significantly to this redistribution.
  - As ice melts, the water flows toward the equator, altering Earth's balance and causing its axis to shift - a process akin to how a figure skater's spin slows when their arms extend outward.
  - The Pennaiyar river, once called **Dakshina Pinaki river**, is the only water source for Tamil Nadu's industry-heavy town of Krishnagiri.
  - The river enters Tamil Nadu in Krishnagiri and flows through districts like **Cuddalore, Villupuram, Dharmapuri, Tiruvannamalai and Kallakurichi**, irrigating more than four lakh acres.
  - Pennaiyar river basin lies within the **tropical monsoon zone**.
  - The Pennaiyar river is having 14 tributaries, namely: **Chinnar West, Chinnar East, Markandanadhi, Kambainallur, Pambar, Vaniyar, Kottaipatti, Kallar, Valayar Odai, Ramakkal, Pambanar, Aliyar, Musukundanadhi and Thuringalar**.
  - The Basin is bounded on the North -West and South by various ranges of the Eastern Ghats like the **Velikonda Range, the Nagari hills, the Javadu hills, the Shevaroy hills, the Chitteri hills and the Kalrayan hills** and in the East by the **Bay of Bengal**.

## INDIA, AUSTRALIA FIRM UP AIR-TO-AIR REFUELING AGREEMENT

### Context

India and Australia have signed an arrangement to enable **the Indian armed forces and the Royal Australian Air Force (RAAF)** to **conduct air-to-air refuelling** of their aircraft.

### Key Highlights

- India and Australia have firmed up an **air-to-air refueling agreement**. This will allow the **Indian Air Force** to refuel its planes during operations using the **Royal Australian Air Force's KC-30A multi-role tanker transport aircraft**.
- The refueling arrangement will significantly enhance the Indian Air Force's operational capabilities, allowing it to extend its reach and efficiency in the Indo-Pacific region, which is vital for both nations' strategic interests.
- The deal is aimed at improving interoperability between the Indian and Australian air forces, enabling both nations to operate more effectively in diverse military scenarios.
- The partnership builds on the growing defense ties between India and Australia under their **Comprehensive Strategic Partnership**, reflecting a shared interest in ensuring **Indo-Pacific stability**.
- In addition to the air-to-air refueling arrangement, the Royal Australian Air Force continues to train and engage with India on the **P-8I Neptune surveillance aircraft**, further deepening defense cooperation.



### FACT BOX

#### Groundwater

- Groundwater is **water present in the cracks and spaces in rock, soil and sand**. It is replenished by rain and snow melt that seeps beneath the land's surface.
- Groundwater is stored in underground reservoirs called **aquifers**.

(See Figure No. 03 on previous page)

## PENNAIYAR BASIN

### Context

The Supreme Court asked the Union government to file within two weeks a report on negotiation committee formed over a dispute related to distribution of **Pennar river water**.

### About Pennaiyar Basin

- Pennaiyar Basin is the **second largest interstate East flowing river basin** among the 12 basins lying between **Pennar and Cauvery basins**.
- It covers a large area in the State of Tamil Nadu besides the areas covered in the states of Karnataka and Andhra Pradesh.

## ADJOURNMENT MOTION

### Context

The **winter session of Parliament** got underway but both houses faced early adjournments after opposition demanded discussions on various issues.

### What is Adjournment Motion?

- A motion for an adjournment of the business of the House is moved for discussing a **“definite matter of urgent public importance”**, with the Speaker’s consent.
- The notice for this is to be given before 10 am on a given day to the Lok Sabha Secretary-General. This is **not a provision available in the Rajya Sabha**.
- An adjournment suspends the work of a sitting for a specific period, which could be for hours, days, or even weeks. The time for reassembly is clearly specified.
- **Difference between Adjournment and Adjournment Sine Die:**
  - **Adjournment:** Suspends a sitting and sets a time for reassembly.
  - **Adjournment Sine Die:** Terminates a sitting indefinitely, with no set date for reassembly.
- **Power of Adjournment:** The presiding officer of the House (e.g., the **Speaker** in the Lok Sabha) has the power to adjourn the sitting.
- **Termination of a Sitting:** A sitting can end in several ways:
  - Adjournment
  - Adjournment sine die
  - Prorogation
  - Dissolution

### Other Parliamentary Procedures:

- **Recess:** The period between prorogation and the start of a new session is called recess.
- **Calling Attention:** A Member of Parliament (MP) draws attention to an urgent matter of public importance, after which the relevant Minister makes a brief statement, and MPs may ask clarifications.
- **Crossing the Floor:** A breach of parliamentary etiquette occurs when a member passes between the Speaker and the person addressing the House.
- **Motion of Thanks:** A formal motion expressing gratitude to the President for their address to Parliament under Article 87(1) of the Constitution.
- **Point of Order:** A question raised about the interpretation of the Rules of Procedure or constitutional provisions relating to parliamentary business, which is referred to the Chair for decision.
- **Un-starred Question:** A question not called for oral answer in the House, with a written answer laid on the Table of the House.

- **Sessions of Parliament:** A session refers to the period during which Parliament meets almost every day to conduct its business.
  - **Budget Session:** February to May
  - **Monsoon Session:** July to September
  - **Winter Session:** November to December

## INDIA MARKS 75 YEARS OF CONSTITUTION

### Context

Government of India announces the commencement of a **historic year-long celebration to commemorate the 75 years of the adoption of the Constitution of India**, a milestone that reflects the remarkable journey of our democracy and the enduring legacy of our founding principles and Constitutional values starting on **Constitution Day (Samvidhan Diwas), 26th November 2024**.

### Key-highlights

- These celebrations are being conducted under the campaign tagline **“Hamara Samvidhan, Hamara Swabhimaan”** and aim to honour the contributions of the Constitution’s makers while reiterating the core values enshrined in it.
- **Constitution Day, or ‘Samvidhan Divas,’** is observed annually on **November 26** to mark the adoption of the Constitution of India.
- On this day in 1949, the Constituent Assembly of India adopted the Constitution, which came into force on January 26, 1950.
- On November 19, 2015, the **Ministry of Social Justice and Empowerment** announced the Government of India’s decision to observe **November 26 as ‘Constitution Day’** each year, with the aim of promoting the values enshrined in the Constitution among citizens.

### Constitution of India

- India, also known as Bharat, is a **Union of States**. It is a **Sovereign Socialist Secular Democratic Republic** with a **Parliamentary system of government**.
- **Adoption and Enforceability:** The **Constitution of India** was adopted by the **Constituent Assembly** on **26th November, 1949** and came into force on **26th January, 1950**.
- **Structure of Government:** The Constitution provides for a **Parliamentary form of government** that is **federal in structure** with certain **unitary features**.
  - The constitutional head of the **Executive of the Union** is the **President**.
- **Parliament of India:** As per **Article 79**, the Parliament of the Union consists of:
  - **The President**
  - **The Council of States (Rajya Sabha)**
  - **The House of the People (Lok Sabha)**

- **Council of Ministers:**
  - **Article 74(1)** of the Constitution mandates that there shall be a **Council of Ministers** headed by the **Prime Minister**, which **aids and advises the President** in the exercise of his/her functions.
  - The **real executive power** is vested in the **Council of Ministers**, with the **Prime Minister** at its head.

### Key-features of Indian Constitution:

- **Longest:** The Constitution of India is the longest of all the written Constitutions of the world. It is a very comprehensive, elaborate and detailed document.
  - The Indian Constitution originally consisted of 395 articles divided into 22 Parts and 9 Schedules. Presently, it consists of a Preamble, **448 articles (as of the 105th Constitutional Amendment)**, divided into **25 Parts and 12 Schedules**.
- **Parliamentary system:** The Constitution of India has opted for the British Parliamentary system of Government. The Parliamentary system is based on the principle of co-operation and co-ordination between the legislative and executive organs while the Presidential system is based on the doctrine of separation of powers between the two organs.
- **Flexible:** Indian Constitution has a unique blend of rigidity and flexibility.
- **Fundamental Rights:** The Constitution guarantees fundamental rights. Part III of the Indian Constitution guarantees six fundamental rights to all the citizens—
  - Right to Equality (Articles 14-18)
  - Right to Freedom (Articles 19-22)
  - Right against Exploitation (Articles 23-24)
  - Right to Freedom of Religion (Articles 25-28)
  - Cultural and Educational Rights (Articles 29-30)
  - Right to Constitutional Remedies (Article 32)
- **Directive Principles of State policy:** The Directive Principles of State Policy contained in **Part of the Constitution** set out the aims and objectives to be taken by the state in the governance of the country.
- **Fundamental Duties:** By **Forty-second Amendment Act, Part IVA** has been added to the Constitution which enumerates certain fundamental duties of the citizens. Originally, ten duties were enlisted in clause (a) to (j) of article 51A. Clause (k), which imposes duty on parents/wards has been added by the **Constitution (86th Amendment) Act, 2002**.
- **Federal system of Government:** Article 1 describes that India "is a Union of States" which implies two things:
  - **Firstly** – Indian federation is not the result of an agreement by the States
  - **Secondly** – no State has the right to secede from the federation
    - ◆ The Constitution of India establishes a federal system of Government. It contains all the usual features of a federation viz., two governments, division of powers, written Constitution, Supremacy of the Constitution, rigidity of Constitution, independent judiciary and bicameralism.

- **Adult Suffrage:** In India every person, male or female, who has obtained the age of 18 years, is entitled to vote in elections to Parliament or State Legislatures. Originally this age limit was 21 years but after the 61st Amendment Act, 1988 it was reduced to 18 years.
- **Independent Judiciary:** Independence of Judiciary is essential for impartial adjudication of disputes between individuals, between Union and State, between Union/State and individuals, between Union and States or between States inter se.
- **A Secular State:** The Constitution of India stands for a secular State. Hence, it does not uphold any particular religion as the official religion of the Indian State. The term 'Secular' was added to the Preamble of the Indian Constitution by the 42nd Amendment Act, 1976. Articles 25-28 of the Constitution give concrete shape to this concept of secularism.
- **Single Citizenship:** Every citizen is the citizen of India and enjoys the same rights of citizenship no matter in which State he resides.
- **Separation of Powers:** This doctrine was for the first time properly formulated by the famous **Jurist Montesquieu** in his **Esprit Des Lois** and exercised great influence on the French legal system. Doctrine of separation of powers implies that powers of the three organs of the government viz., **Legislative, Executive and Judiciary** should be kept separate from each other.

## AB PM-JAY AND ABHA HEALTH CARDS

### Context

Following the extension of the AB PM-JAY health insurance scheme to all senior citizens, there is some amount of confusion over which card to apply for (AB PM-JAY or ABHA health cards).

### What is AB-PMJAY?

- **Launched in:** 2018
- Ayushman Bharat Pradhan Mantri Jan Arogya Yojana (AB PM-JAY) is Central Government's flagship health insurance scheme.
- The scheme (earlier called the National Health Protection Scheme) is touted as the **largest health assurance scheme** in the world, and offers Rs 5 lakh insurance coverage to a family per year for secondary and tertiary hospitalisation in any government hospital or at any empanelled private hospital across the country.
- The scheme targeted over 12 crore poor and vulnerable families (approximately 55 crore beneficiaries) that form the bottom 40% of the Indian population.

**Extension (Ayushman Bharat Vay Vandana):** In September this year, the Centre announced that the scheme would now be extended to all senior citizens aged 70 and above, irrespective of their income status. This extended scheme is



known as the **Ayushman Bharat Vay Vandana**, and is part of the **PM-JAY** scheme.

- This was to benefit approximately 4.5 crore families, with six crore senior citizens, with Rs 5 lakh free health insurance cover on a family basis.
- All senior citizens of the age 70 and above, irrespective of their socio-economic status, are eligible to avail of this.
- A separate beneficiary card (orange and white) is given to beneficiaries of **AB-Vay Vandana**.

### What is the ABHA card?

- The **ABHA card (a blue and white card)** is not a health insurance card but a digital health account to store medical records.
- It includes a **14-digit Health ID** linked to a digital account where health information is stored such medical history, prescriptions, and hospitalizations.
- **Usage:** It is used to access and share medical records digitally across various healthcare services in India.
- **The Correct Process:**
  - To avail health insurance coverage under the **AB PM-JAY** scheme, seniors must apply for the **AB PM-JAY health insurance card**, which provides up to Rs 5 lakh coverage.
  - The **ABHA card**, which is a digital medical account, is helpful for storing and sharing medical records but does not offer insurance or cashless treatment at hospitals.

The **AB PM-JAY** card is **health insurance card** (for cashless treatment). The **ABHA** card is **digital health ID** (to store and access medical records).

Parameters	AB PM-JAY Card	ABHA Card
<b>Purpose</b>	Health insurance cover of Rs. 5 lakh per year for a family.	A digital repository that provides access to all health records.
<b>Eligibility</b>	Designed initially as a scheme for poor and vulnerable families. Now extended to all senior citizens over 70 irrespective of income status	Available to all Indian citizens, irrespective of income status.
<b>Benefits</b>	Provides cashless hospitalisation and health insurance coverage to the extent of Rs. 5 lakh per year, per family	Provides a unique 14-digit identification number and a dedicated email address for access to digitally-stored medical records

## PRADHAN MANTRI VIDYALAXMI SCHEME

### Context

Education loans have been growing at a notable pace in recent years and a further boost is expected with the newly launched 'Pradhan Mantri Vidyalexmi scheme'.

### What is the PM Vidyalexmi Scheme?

- The PM Vidyalexmi Scheme is a new initiative launched by the government to provide **financial support to students** for higher education.
- It aims to ensure that financial barriers do not prevent deserving students from pursuing their dreams of studying at top institutions.
- Under this scheme, eligible students can get **collateral-free, guarantor-free loans** to cover tuition fees and other expenses for their courses.
- **Eligibility:** The scheme is available to students who have been admitted to **Quality Higher Educational Institutions (QHEIs)**, which are ranked highly according to the **National Institutional Ranking Framework (NIRF)**.
  - **Top 100 Institutions (Overall, Category, Domain-specific NIRF rankings):** These are the leading government and private institutions.
  - **State Government Institutions (Ranked 101-200):** These institutions also qualify.
  - **All Institutions under the Central Government:** These are automatically eligible.
  - Each year, the list of eligible institutions will be updated based on the latest NIRF rankings. The scheme will initially include **860 institutions**, covering over **2.2 million students**.

### Key Benefits of the Scheme

- **Collateral-Free Loans:** Students can get loans to cover the full cost of their education, including tuition fees, without needing any security or a guarantor.
- **Loan Guarantee:** For loans up to **Rs 7.5 lakh**, there will be a **75% credit guarantee** for the banks, reducing their risk of defaults.
- **Interest Subsidy:**
  - Students with a family income of up to **Rs 8 lakh** (who are not eligible for other government scholarships) can get a **3% interest subsidy** on loans up to **Rs 10 lakh**.
  - The subsidy will apply during the **moratorium period** (the period before the loan repayments begin).
  - This subsidy will benefit **100,000 students per year**, with priority given to those from **government institutions** and those pursuing **technical/professional courses**.
  - The government has allocated a budget of **Rs 3,600 crore** for the period from **2024-25 to 2030-31**.

## 'ONE NATION ONE SUBSCRIPTION' (ONOS) INITIATIVE

### Context

The Union Cabinet approved the '**One Nation One Subscription**' (ONOS) initiative for centralised access to research articles and journal publication for government higher education institutions and **research and development (R&D)** laboratories of the central government.

### What is ONOS?

- ONOS is a plan to consolidate researchers' subscriptions to prominent academic journals and other similar publications.

- Once in place, the ONOS initiative will provide access to journal articles to all individuals in India for one "**centrally negotiated payment**". The ONOS will replace individual institutional journal subscriptions.

### Need of the initiative:

Subscriptions to scientific journals are a costly affair. According to a research, India spent around Rs 1,500 crore on subscription for electronic and print journals in 2018. Institutions also spent around Rs 30-50 crore on access to SCOPUS and Web of Science, which are popular citation databases.

The Indian government spent around Rs 995 crore on journal subscriptions in 2022.

**CABINET DECISION**  
25<sup>TH</sup> NOVEMBER, 2024

## One Nation One Subscription

- ◆ Cabinet approves **One Nation One Subscription** - Central Sector Scheme for providing country-wide access to scholarly research articles and journal publication
- ◆ Scheme to be administered through a simple, user friendly and fully digital process
- ◆ **Rs.6,000 crore** has been allocated for **One Nation One Subscription** for 3 calendar years viz **2025, 2026 and 2027**
- ◆ Benefits to be provided to all Higher Educational Institutions under the **Central or State Government** and **R&D Institutions of Central Government**




Figure No. 04

- ▶ This included “the spending by the ten library consortia funded by different ministries/ departments and self-subscriptions by individual government academic and R&D institutions”.
- ▶ Overall, the total expenditure for 2019-2022 was estimated to be around Rs 2,985 crore.
- ▶ The ONOS initiative is also expected to include concessions on fees that authors have to pay to have their work published in open access journals.
- ▶ The central government has allocated Rs 6,000 crore for ONOS until 2027.
- ▶ All higher education institutions under central or State governments and R&D institutions of central government can avail the benefits of the initiative through a national subscription.

- ◆ Families with inadequate housing (kutchas houses).
- ◆ Beneficiaries must meet the **socio-economic criteria** defined by the government, such as income, land ownership, and other specific guidelines.
- **Scheme Implementation:** The implementation of PMAY-G is done by **Panchayat Raj Institutions and District Rural Development Agencies (DRDAs)** in coordination with the **State Rural Development Departments**. The **Block Development Officers (BDOs) and Zonal Deputy BDOs** play a key role in the identification and verification of beneficiaries.

## PRADHAN MANTRI AWAS YOJANA (GRAMIN) (PMAY-G)

### Context:

Several officials from the **Rural Development and Panchayat Raj Department** in **Tiruvarur district**, Tamil Nadu, have been **booked for fraud** related to the **Pradhan Mantri Awas Yojana (Gramin) (PMAY-G)**. These officials are accused of **fraudulently disbursing funds** to 43 **ineligible individuals** under the scheme, causing a financial misappropriation of approximately **Rs 73 lakh**.

### About the Pradhan Mantri Awas Yojana (Gramin) (PMAY-G):

- The **Pradhan Mantri Awas Yojana (Gramin)**, launched in **2016**, is a flagship scheme of the **Government of India** aimed at providing **affordable housing** to rural households.
- It is part of the ‘**Housing for All**’ mission and focuses on ensuring that every homeless or houseless family in rural areas gets a **pucca house** with basic amenities.
- Key Features of PMAY (G):
  - ▶ **Objective:** The main goal of PMAY-G is to provide **adequate housing** with **safe living conditions** to all eligible families in rural areas by 2022.
  - ▶ **Financial Assistance:**
    - ◆ Under the scheme, **₹1.2 lakh** is provided for the construction of a new house (in plain areas), and **₹1.3 lakh** is provided in hilly, difficult, and tribal areas.
    - ◆ The government also provides **financial support** for constructing toilets and basic amenities.
  - ▶ **Funding Pattern:** The scheme is funded on a **60:40** ratio between the **Centre** and the **State** for most states, while for **special category states** (like Jammu & Kashmir, Himachal Pradesh, and others), it is on a **90:10** ratio.
  - ▶ **Eligibility Criteria:**
    - ◆ Families without a permanent house (pucca house).

## BASIC ANIMAL HUSBANDRY STATISTICS 2024

### Context:

India’s **milk production** has increased by **3.78%** to reach **239.30 million tonnes** in **2023-24**, according to the latest **Basic Animal Husbandry Statistics 2024 (BAHS)**, released on **November 26 (National Milk Day)**. Alongside milk, there has been an increase in **meat** and **egg** production as well. While milk growth has slowed in recent years, India continues to be the **world’s largest producer** of milk.

### Key Highlights:

#### □ Milk Production:

- ▶ **Milk production** in India grew by **3.78%**, reaching **239.30 million tonnes** in **2023-24**.
- ▶ Despite this increase, growth has slowed compared to previous years (5.77% in 2021-22 and 3.83% in 2022-23).
- ▶ **India remains the world’s largest producer of milk**, but officials stress the need to boost **dairy exports**.
- ▶ **Milk production from exotic/crossbred cattle** increased by **8%**, while **indigenous cattle** saw a larger growth of **44.76%**.
- ▶ However, **milk production from buffaloes** dropped by **16%** in the same period.
- **Meat Production:** **Meat production** grew by **4.95%** and is estimated to reach **10.25 million tonnes** in **2023-24**. India has been experiencing growth in its **meat production**, contributing to its position as a significant player in global markets.
- **Egg Production:** **Egg production** increased by **3.17%**, reaching **142.77 billion eggs** in **2023-24**. India remains the **world’s second-largest producer of eggs**, with an average of **103 eggs per person annually**.
- **Wool Production:** India’s total **wool production** stands at **33.69 million kg**.

### Government Initiatives

- Rashtriya Gokul Mission
- National Programme for Dairy Development
- Dairy Processing & Infrastructure Development Fund (DIDF)
- National Livestock Mission
- Animal Husbandry Infrastructure Development Fund
- Livestock Health and Disease Control Programme

## PAN 2.0 PROJECT

### Context

The Union Cabinet has approved the Rs 1,435 crore PAN 2.0 Project aimed at modernizing the Permanent Account Number (PAN) system.

### What is PAN 2.0 Project?

- This initiative will transform PAN into a “**common business identifier**” for government agencies, offering **QR-enabled cards, enhanced cybersecurity, and a unified digital portal**.
- The system will allow for paperless services, improved grievance redressal, and faster services for taxpayers.
- Existing PAN holders won't need to apply for a new card but can opt to upgrade to the new PAN 2.0 card free of charge.
- The upgrade will provide enhanced features like QR codes and mandatory PAN Data Vaults.
- The project ensures better data consistency, eco-friendly processes, and quicker services for users.
- All PAN cards issued to date remain valid even after the rollout of PAN 2.0.

## CONTROVERSY AROUND THE SAMBHAL MOSQUE

### Context:

A petition was filed in the district court of **Sambhal, Uttar Pradesh**, claiming that the **Jama Masjid in Sambhal** was built on the site of an ancient **Hari Har Mandir** (temple). This is similar to the ongoing legal disputes regarding other places of worship, such as the **Gyanvapi Mosque** in Varanasi and the **Eidgah Masjid** in Mathura. The Jama Masjid in Sambhal is a **protected national monument**.

### Historical Background of the Jama Masjid, Sambhal:

- The **Jama Masjid in Sambhal** was built during the **Mughal period**, around **1528**, by **Mir Hindu Beg**, a general under **Emperor Babur**.
- The mosque is considered one of three mosques built by Babur's empire, the other two being the **Babri Masjid in Ayodhya** and the mosque in **Panipat**.

- Some historians argue that the mosque was originally built during the **Tughlaq era**, and Babur added features to its structure.
- **Hindu tradition** claims the mosque incorporates parts of an ancient **Vishnu temple**, and some believe that the **tenth avatar of Vishnu (Kalki)** will appear at this site in the future.

### The Places of Worship (Special Provisions) Act, 1991:

- The **Places of Worship Act, 1991**, was passed to maintain the religious status of all places of worship as they existed on **August 15, 1947**. This Act prohibits the conversion of places of worship from one religion to another.
- The Act was created to prevent ongoing disputes over religious sites, with the only exception being the **Babri Masjid-Ram Janmabhoomi** dispute, which was specifically excluded.
- **Section 3 of the Act** clearly forbids the conversion of any place of worship into a place of worship of a different religion.
- **Challenge to the Act:**
  - ▶ The **petitioners in the Sambhal case** are asking the court to change the religious character of the mosque, which is in **contravention of the Places of Worship Act**.
  - ▶ They cite a statement made by **Justice D.Y. Chandrachud** in 2022, suggesting that the **ascertainment of religious character** of a place might not violate the Act's provisions.
  - ▶ The **Supreme Court** is already hearing challenges to the Places of Worship Act in relation to the **Gyanvapi Mosque** in Varanasi, the **Eidgah Masjid** in Mathura, and the **Kamal-Maula Masjid** in Dhar, Madhya Pradesh.
  - ▶ The **Supreme Court** has not yet ruled on these challenges or on the constitutionality of the **Places of Worship Act** itself.

## NON-BANKING FINANCIAL COMPANY (NBFC)

### Context

A combination of factors, including rising interest rates, regulatory action and funding scarcity, could moderate growth in the non-banking financial company (NBFC) sector from 18 per cent in 2024 to 13-15 per cent in the coming year, according to rating agency ICRA.

### What is an NBFC?

- An NBFC (Non-Banking Financial Company) is a financial institution that provides financial services similar to banks but does not hold a banking license.
- NBFCs play an important role in the economy by providing credit and other financial services to parties usually not served by traditional banks.

- In India, NBFCs are regulated by the Reserve Bank of India (RBI) and must comply with specific regulatory norms.
- They primarily raise funds through public deposits, borrowings from banks, and capital markets.
- No Deposit Insurance: Unlike banks, deposits made in NBFCs are not insured by the Deposit Insurance and Credit Guarantee Corporation (DICGC).
- They play a crucial role in the financial system, offering services such as: Loans and Credit, Investment Services, Financial Leasing, Microfinance, Insurance and Asset Management

### Different types of NBFCs in India

- Asset Finance Companies (AFCs) primarily finance the purchase of physical assets like automobiles or industrial machinery.
- Investment Companies (ICs) focus on acquiring securities and stocks to build investment portfolios.
- Loan Companies (LCs) engage primarily in providing loans and advances.
- Infrastructure Finance Companies (IFCs) lend to infrastructure projects.
- Microfinance Institutions (MFIs) provide small loans to low-income individuals and groups.

### Challenges faced by NBFCs

The Reserve Bank of India (RBI) is nudging NBFCs to grow prudently and focus on long-term sustainability to avert stress in any segment.

- In November 2023, it increased the risk weights for loans to NBFCs by 25 basis points, making bank borrowing more expensive for them.
- Other challenges:
  - ▶ tightening liquidity conditions intensify margin pressures
  - ▶ restrict access to credit, especially for smaller and mid-sized players
  - ▶ rising cost of credit
  - ▶ limited bargaining power, especially for smaller NBFCs

## NITI AAYOG RECOMMENDS INCLUDING COKING COAL IN CRITICAL MINERALS LIST

### Context

The government must include coking coal in the list of critical minerals and provide special dispensation to enhance the domestic production of the key raw material for steel production, according to a Niti Aayog report.

### Key Highlights of the Report:

- The Niti Aayog report titled "Enhancing Domestic Coking Coal Availability to Reduce the Import of Coking Coal" emphasizes the importance of coking coal for India's

steel production and infrastructure development.

- **Coking Coal as a Critical Mineral:** The report recommends that the Indian government include coking coal in the list of critical minerals due to its central role in the cost of steel production.
  - ▶ Coking coal constitutes approximately 42% of the cost of steel, which is essential for infrastructure development and employment generation in downstream industries.
- **High Import Dependence:** India's import dependence on coking coal is about 85%, which is much higher than that of the EU (approximately 62%). Despite having significant domestic reserves of coking coal, India continues to rely heavily on imports, which raises concerns over national security and cost control for its steel industry.
- **Underutilization of Domestic Reserves:** India holds substantial geological reserves of coking coal, including 16.5 billion tonnes of medium coking coal. However, these reserves remain underutilized, with low capacity utilization in public sector washeries.
- **Challenges in the Coking Coal Washing Process:** The report points out that the capacity utilization of public sector coking coal washeries was below 32% in FY 2022-23, resulting in low yields of washed coal (35-36%). In contrast, private sector washeries performed better with higher yields and utilization rates. This discrepancy indicates inefficiencies that need to be addressed to optimize production.

### Policy Recommendations:

- ▶ The report advocates for the amendment of the Coal Bearing Areas (CBA) Act, 1957, to allow private sector participation in coal exploration and washing while maintaining public-private partnerships.
- ▶ The government should also enable policy changes to allow joint venture companies to sell byproducts from coking coal washeries (such as middling and tailing), which would help reduce costs for steel plants by passing on the profits from these byproducts.
- **EU's Declaration of Coking Coal as Critical:** The European Union has already declared coking coal as a critical raw material, recognizing its strategic importance for the steel industry and broader economic development.
- **Economic and Strategic Importance of Coking Coal:** Coking coal is vital for steel production, which is essential for India's infrastructure development and employment generation. By improving domestic production, India can reduce its import bills and achieve greater self-sufficiency, which aligns with its broader economic and energy security goals.

### About Coking coal (or metallurgical coal)

- Coking coal (or metallurgical coal) is a bituminous coal with a suitable quality that allows the production of metallurgical coke.
- Coke is the main product of the high-temperature carbonisation of coking coal.

- It is an essential input material in steelmaking as it is used to produce pig iron in blast furnaces acting as the reducing agent of iron ore and as the support of the furnace charge.
  - Steel is cited as a strategic material in all industries related to the low-carbon transition. About 780 kg of coking coal is needed to produce 1 ton of steel.
- By-products of coke production such as tar, benzole, ammonia sulphate and sulphur are used for the manufacture of chemicals, as well as coke oven gas used for heat and power generation.



## FACT BOX

### Critical Mineral:

- Critical minerals are resources that are essential for the functioning of a nation's economy and are considered vital for national security.
- Government has released a list of 30 critical minerals for India.
  - These minerals are Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.

## HIMALAYAN GLACIAL LAKES

### Context

The **National Green Tribunal** has issued notice to the Centre and others in a matter regarding the rapid expansion of the **Himalayan glacial lakes**, raising concerns over the **increasing risk of natural disasters**.

### What's the issue?

- The **main issue** revolves around the **rapid expansion of Himalayan glacial lakes** caused by the **melting of glaciers** due to the **rising global temperatures**.
- The expansion of these glacial lakes poses a major environmental and disaster risk, particularly the potential for **glacial lake outburst floods (GLOFs)**.
- These are floods that occur when a **glacial lake dam** (often made of ice or debris) suddenly fails, releasing **massive amounts of water downstream and causing floods, landslides, and damage to infrastructure**.

### Key details about the issue:

- Increase in Glacial Lakes:** A report shows that the surface area of glacial lakes in India has **increased by 33.7%** from 2011 to 2024, with **10.81% growth in the last 13 years** alone. This growth is linked to the accelerated **melting of glaciers** due to climate change.

- High-Risk Lakes:** The report identifies **67 glacial lakes** in India that have expanded by over **40% in surface area**, making them highly vulnerable to **GLOFs**. Regions like **Ladakh, Himachal Pradesh, Uttarakhand, Sikkim, and Arunachal Pradesh** are particularly affected.
- Potential Disasters:** The expansion of these lakes significantly increases the risk of **glacial lake outburst floods (GLOFs)**, which can be **catastrophic** for downstream communities, infrastructure, and biodiversity. These floods have the potential to destroy villages, disrupt transport networks, and cause severe environmental damage.
- Legal and Environmental Concerns:** The NGT has raised concerns about potential violations of environmental laws, including the **Biodiversity Act, Water (Prevention and Control of Pollution) Act**, and the **Environment Protection Act**. The rapid growth of these lakes without adequate monitoring and management is seen as a violation of these laws.



## FACT BOX

### Glacial Lake Outburst Flood (GLOF)

- Glacial lakes are large bodies of water that sit in front of, on top of, or beneath a melting glacier.
- As they grow larger, they become more dangerous because glacial lakes are mostly dammed by unstable ice or sediment composed of loose rock and debris.
- When the boundary around unstable glacial lake breaks, and huge amounts of water rush down the side of the mountains, which could cause flooding in the downstream areas.
- This is called **glacial lake outburst floods or GLOF**.

### Factors causing GLOF:

- GLOF can be triggered by several reasons, including earthquakes, extremely heavy rains and ice avalanches.
- These lakes are also often found in steep, mountainous regions, which means landslides or ice avalanches can sometimes fall directly into the lakes and displace the water, causing it to overtop the natural dam and flood downstream.

### Features of GLOF:

- They involve sudden (and sometimes cyclic) releases of water.
- They tend to be rapid events, lasting hours to days.
- They result in large downstream river discharges (which often increase by an order of magnitude).

(See Figure No. 6 on next page)

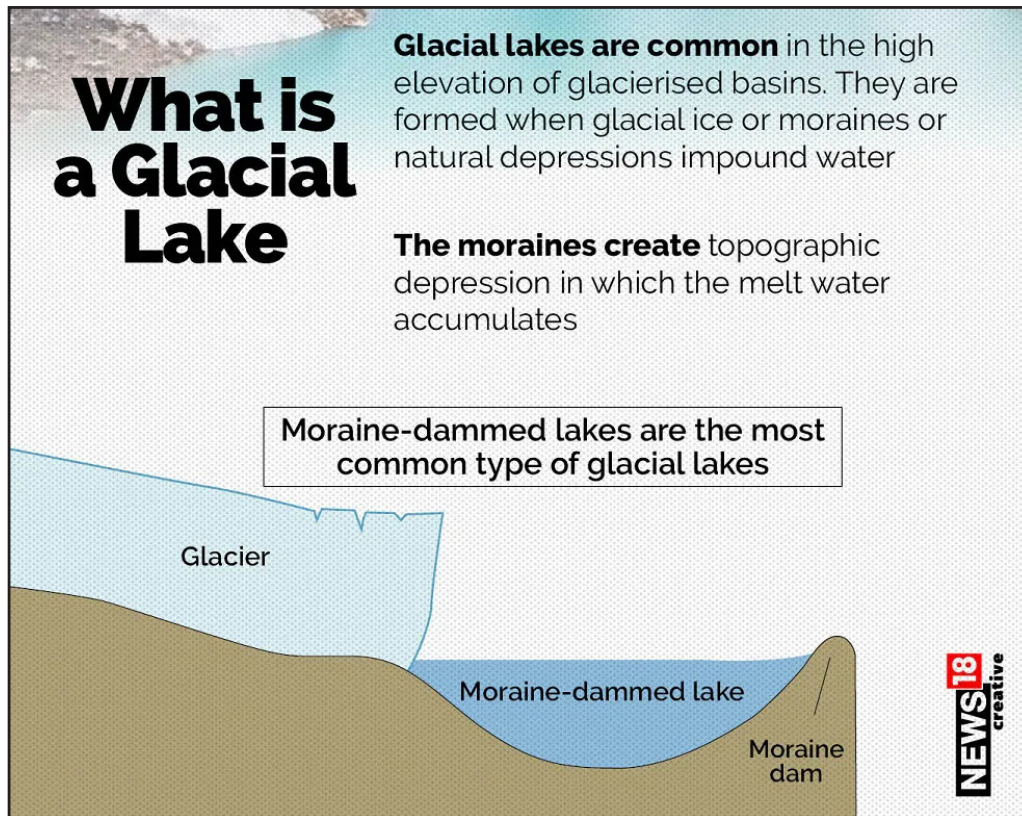


Figure No. 06

## FISH KILL IN ASHTAMUDI LAKE

### Context

A large number of dead fish were found floating on **Ashtamudi Lake** in Kollam, Kerala. This event attracted attention due to the suspected causes and its environmental implications. The lake, covering 5,700 hectares, is an ecologically important site recognized by the **Ramsar Convention**.

### Factors Responsible for Killing Fish in Ashtamudi Lake

- ▶ Algal blooms deplete oxygen in the water, suffocating fish and other aquatic life. This causes widespread mortality of aquatic organisms.
  - ▶ The presence of harmful bacteria like E. coli and streptococci in water samples confirms contamination from human and animal waste.
- **Algal Bloom:** Algal bloom occurs when there is an overload of nutrients (especially nitrogen and phosphorus) in the water. These nutrients primarily come from pollution, particularly untreated sewage and agricultural runoff.
  - **Sewage Contamination:** The lake has been heavily polluted by untreated sewage from nearby households and establishments. A significant percentage of sewage is directly discharged into the lake, increasing the nutrient load and contributing to algal blooms.
  - **Plastic Pollution:** A high concentration of microplastics has been found in the water, fish, and sediment of Ashtamudi Lake. Plastics pose direct threats to aquatic organisms by causing physical harm and introducing toxins into the ecosystem.
    - ▶ Plastic waste comes from various sources, including fishing activities, aquaculture, and municipal solid waste dumping.
  - **Other Pollutants:** Along with plastics, the lake is contaminated by abattoir waste, poultry waste, and chemicals from various industrial and agricultural activities. These pollutants further degrade water quality and disrupt the aquatic ecosystem.
  - **Sediment Build-up:** Sedimentation in the lake, especially from poor waste management practices, reduces water flow, affecting oxygen levels and overall water quality. This contributes to the degradation of habitats for aquatic species.
  - **Invasive Species:** The spread of water hyacinth, an invasive aquatic plant, is also limiting fishing areas. It blocks the flow of water and interferes with fishing practices, adding to the challenges faced by local fishermen.
  - **Deforestation and Encroachments:** Illegal encroachments and deforestation around the lake's fringes have further disrupted its ecosystem. Encroachments restrict natural water flow and contribute to pollution.

## \$300 BILLION CLIMATE DEAL

### Context

Countries at the COP29 summit in Baku adopted a USD 300 billion a year global finance target to help poorer nations cope with impacts of climate change, a deal its intended recipients criticised as woefully insufficient.

### What is the finance deal struck at COP29?

- Delegates at COP29 agreed to provide additional funding to developing countries to fight and adapt to climate change.

The wealthy nations, who are historic emitters, offered USD 300 billion a year by 2035, much less than what the developing world was hoping to receive.

- Under a framework established by the UN in 1992, 23 developed countries -- and the European Union -- historically responsible for most planet-heating emissions are obliged to contribute to climate finance.
- Source:** The deal states that the money will come directly from a "wide variety of sources" including government budgets, private sector investment, and other financing. It also cites "alternative sources" -- a reference to potential global taxes under discussion on the aviation and maritime industries, and the rich.
- It's part of the plan to keep cutting pollution with new targets every five years, which the world agreed to at the **UN talks in Paris in 2015**.

The Paris Agreement set the system to keep warming under **1.5 degrees Celsius** above pre-industrial levels. The world is already at **1.3 degrees Celsius** and carbon emissions continue to rise.

### India's Stand

- India has rejected the new USD 300 billion climate deal for the **Global South**, saying it was too little and too late.
- India does not accept the goal proposal in its present form. The amount that is proposed to be mobilised is abysmally poor. It is a paltry sum. It is not something that will enable conducive climate action that is necessary for the survival of our country.
- USD 300 billion does not address the needs and priorities of developing countries. It is incompatible with the principle of **CBDR (Common but Differentiated Responsibilities)** and equity, regardless of the battle with the impact of climate change.
- The negotiations were also the scene of disagreements within other developing world.
  - The **Least Developed Countries (LDCs) bloc** had asked that it receive \$220bn per year, while the **Alliance of Small Island States (AOSIS)** wanted \$39bn – demands that were opposed by other developing nations.
  - The figures did not appear in the final deal. Instead, it calls for tripling other public funds they receive by 2030.

- The next COP, in Brazil in 2025, is expected to issue a report on how to boost climate finance for these countries.

## RANTHAMBORE TIGER RESERVE

### Context

A recent tragic incident unfolded in **Uliyana village** of **Sawai Madhopur district**, Rajasthan, located adjacent to the **Ranthambore Tiger Reserve**. This incident involved the death of a villager, **Bharat Lal Meena**, and the subsequent killing of a tiger, **Chirico (T-86)**, which was allegedly involved in the attack. This event highlights a critical issue of **human-wildlife conflict** in the region, drawing attention to the complexities surrounding the protection of both human lives and tiger conservation.

### Human-Wildlife Conflict in Ranthambore

- Human Casualties:** From 2019 to 2024, there have been **five human fatalities** in tiger attacks, with **2,000+ cattle killed** by tigers in the same period. However, tiger-related deaths are not officially recorded, leading to an underestimation of the severity of the conflict.
- Missing Tigers:** A report surfaced that **25 out of 75 tigers** in Ranthambore were reported missing, raising concerns about **poaching, migration, and natural deaths**. Of these, 14 were missing for less than a year, and 11 for over a year. The National Tiger Conservation Authority (NTCA) has directed the **Wildlife Crime Control Bureau (WCCB)** to investigate this issue.
- Historical Tension:** The long-standing distrust between villagers and the Forest Department is rooted in the belief that the **Ranthambore Tiger Reserve** prioritizes wildlife conservation and tourism at the expense of the local population's safety and livelihoods.
- Past Incidents:** Villagers remember the **1980s** when **Fateh Singh Rathore**, a key figure in the reserve's conservation efforts, was attacked by Uliyana villagers. This event was driven by frustration over forced relocation for the reserve's expansion, highlighting a history of tensions in the region.
- Compensation Issues:** The Forest Department provides compensation for cattle losses due to tiger attacks, but the process is often cumbersome and bureaucratically challenging for the villagers.

### Increasing Human-Tiger Conflict

- Changing Behavior of Tigers:** Historically, tigers in the region would prey mostly on **cattle**, but in recent years, there has been an increase in **human attacks**. Some villagers report that tigers now show **more aggression**, especially in the **buffer zones** and agricultural fields near forests.
- Changing Livelihoods:** The fear of tiger attacks has led to changes in how villagers manage their livestock. Many have started selling their cattle at a loss, fearing the tigers' predation. The community also faces financial hardship due to these losses, which impacts their livelihoods from dairy and agriculture.



**Conservation vs. Human Safety**

- ▶ **Forest Reserve Overcrowding:** Experts believe that **Ranthambore Tiger Reserve** is **overcrowded**, with tigers outgrowing the available territory. This overcrowding may force tigers into more frequent encounters with human settlements in search of food or territory.
- ▶ **Unresolved Issues:** Despite representations from villagers, the **boundary walls** separating the forest from agricultural land are inadequate, with gaps that allow tigers to easily cross into human areas. The Forest Department has not taken enough action to address these gaps or prevent crop and livestock loss, further exacerbating the situation.

**Ranthambore National Park**

- The park is located in the Sawai Madhopur district of southeastern Rajasthan.
- Ranthambore National park is surrounded by the **Vindhya and Aravalis hill range**.
- It was declared as **Project Tiger reserves** in the year 1973. In 1980, it was declared a national park, while the forests located beside it were named **Sawai Man Singh Sanctuary & Keladevi Sanctuary**.
- **Vegetation:** Tropical dry deciduous and tropical thorn type due to its hilly track, water is confined from narrow valleys and some lakes.
- **Lakes:** Padam Talab, Raj Bagh Talab, and Malik Talab.
- **Other Tiger Reserves in Rajasthan:** Sariska Tiger Reserve, Mukundara Hills Tiger Reserve, Ramgarh Vishdhari Tiger Reserve, and Dholpur-Karauli Tiger Reserve. Rajasthan will soon have sixth tiger reserve (Kumbhalgarh Wildlife Sanctuary).

**FARM FIRE DATA AND SATELLITE MONITORING**

**Context**

The **Indian government** is working to improve the way it tracks and measures farm fires (specifically stubble burning) in states like **Punjab and Haryana**. This is because there are issues with the current satellite systems that are used to monitor these fires, and **gaps in data collection** have been identified.

**Why the Problem Exists**

- **Farm Fire Data Issues:** Satellites, particularly **polar-orbiting satellites** (like those used by **NASA**), are currently used to detect farm fires by capturing images of the Earth as they pass over the regions. However, these satellites can only capture data when they pass overhead, meaning they miss some fires happening in between these passes. This creates a problem called **“undercounting bias,”** where some farm fires are not being counted.

- **Supreme Court’s Involvement:** The issue of **undercounting** was brought to the attention of the **Supreme Court of India**.
  - ▶ The court was informed that **data from NASA satellites** might be missing some farm fires in **Punjab and Haryana**, which is important for understanding the extent of air pollution caused by these fires. The court then directed the **Centre** (Indian government) and the **Commission for Air Quality Management (CAQM)** to use **other satellites**, including **geostationary satellites**, in addition to NASA’s polar-orbiting ones.

**Efforts to Improve the System**

- To address this problem, government agencies like the **Indian Agricultural Research Institute (IARI)**, the **National Remote Sensing Centre (NRSC)**, and **remote sensing centers** from **Punjab and Haryana** have come together to develop a new methodology to better track farm fires.
  - ▶ These agencies are working on a **pilot project** to test and improve the system during this **Kharif season** (the season when rice is harvested),
- The agencies are now using the **Sentinel-2** satellite from **Europe**, which has a better resolution of **20 meters** and passes over the region **every 5 days**.
  - ▶ This satellite provides images in multiple wavelengths (optical, near-infrared, and short-wave infrared), which helps detect burned areas more accurately.

**Challenges with Satellites:**

- **Thermal Imaging Satellites:** While these satellites are good at detecting heat (and therefore fires), even those with fine resolution cannot capture every single fire. They only detect fires when the satellite is overhead, meaning some fires will still be missed.
- **Impact of Smog:** The presence of **smog** or smoke in the air can also make it harder for satellites to detect fires accurately.
- **Geostationary Satellites (Like GEO-KOMPSAT 2A):** Another important satellite, the **GEO-KOMPSAT 2A** (a **Korean satellite**), can pick up farm fires that happen after the NASA satellite has passed. However, the scientists pointed out that **geostationary satellites** have **lower resolution** and are not as sensitive to small fires, which may still limit their effectiveness in detecting all farm fires.

**IMPACT OF CLIMATE CHANGE ON AQUACULTURE**

**Context:**

The **Food and Agriculture Organization (FAO)** of the United Nations is offering technical expertise to help India tackle the impact of **climate change** on its **aquaculture** (fish farming) and **fishing industry**. These industries are crucial for India’s food security, nutrition, and livelihoods, especially in coastal regions.

## Key Issues Identified:

- **Impact of Climate Change on Fisheries:** Climate change will reduce ocean productivity and affect the types of fish available for catch. Fish populations and catch compositions will change.
  - ▶ The **blue economy**, which includes the fishing and aquaculture sectors, is vital for food security but faces constraints like **overfishing** and **overcapacity**.
- **Aquaculture Growth:** Aquaculture is the **fastest-growing food production sector globally**, and in India, it's growing faster than the global average. However, to fully realize its potential, India needs to ensure sustainable and equitable growth in aquaculture.
- **Adapting to Changing Fish Species:** With changing climate conditions, **India needs to adapt** its fishing practices. This includes using **new fishing gears** and catching different species of fish. This would also involve **marketing new varieties** of fish to consumers, so they are not just accustomed to traditional types but are open to newer, climate-resilient fish species.
- **Focus on Small and Medium Players:** Many **micro, small, and medium-sized enterprises (MSMEs)** in India's fishing and aquaculture sectors face difficulties, such as lack of access to resources, and are often excluded from decision-making processes.
  - ▶ The FAO emphasizes the importance of including these smaller players because they contribute significantly to global fish production (about 40% of global marine fisheries) and provide livelihoods to millions of people.

### FAO Report on Aquaculture (2022):

- For the first time, **global aquaculture production** exceeded the catch from traditional fisheries.
- In 2022, aquaculture produced **130.9 million tonnes**, out of which **94.4 million tonnes** were aquatic animals. This represents **51%** of the total aquatic animal production globally.
- **Top 10 Aquaculture-Producing Countries: 10 countries** dominate aquaculture production, accounting for nearly **90%** of global output:
  - ▶ China
  - ▶ Indonesia
  - ▶ India
  - ▶ Vietnam
  - ▶ Bangladesh
  - ▶ Philippines
  - ▶ South Korea
  - ▶ Norway
  - ▶ Egypt
  - ▶ Chile

- **India's Role in Aquaculture:** India is the **second-largest producer of aquaculture shrimp** in the world, producing **900,000 tonnes** in 2022, just behind Ecuador.
- Aquaculture has been the **fastest-growing food production system** in the world for the last **50 years**. This growth is essential to meet the food needs of a rising global population.
- **Per Capita Consumption of Aquatic Animal Foods:** The **global per capita consumption of aquatic animal foods** reached **20.7 kg** in 2022, up from **9.1 kg** in 1961. This is expected to continue rising in the future as demand for fish-based protein increases.
- **Challenges in Global Fisheries:** Despite growth in aquaculture, the **capture fisheries** (wild fish catches) have remained stable, at **92.3 million tonnes** in 2022. However, there is concern over **overfishing**, with **37.7% of fish stocks** in global marine fisheries classified as overfished in 2021. This is a continuous, growing trend from 10% in 1974.

## ESA'S PROBA-3 MISSION

### Context

The Indian Space Research Organisation (ISRO) is all set to launch the European Space Agency's Proba-3 mission on its PSLV rocket to study the solar corona.

### About Proba-3:

- Proba-3 is the **latest solar mission in ESA's Proba suite of missions**.

Its predecessors Proba-1 (also launched by ISRO) and Proba-2 were launched in 2001 and 2009, respectively.

- Developed at an estimated cost of 200 million euros, Proba-3 has an **expected mission life of two years**. It will be launched into a **highly elliptical orbit** measuring around 600 x 60,530 km and have an orbital period of 19.7 hours.
- **First-ever "precision formation flying:** The mission is designed with two satellites that will be launched together, separate from each other and then fly in tandem.
  - ▶ They will then form a **solar coronagraph**, an instrument that helps block out the bright light emitted by the Sun to reveal the objects and atmosphere around it.

### What will Proba-3 study?

- ▶ Due to the corona's temperature, going up to **2 million degrees Fahrenheit**, it is difficult for any instrument to observe it closely. However, it is important for scientific study, as all space weather and its associated turbulences — **solar storms, solar winds**, etc. — **originate from the corona**.
- ▶ These phenomena influence **space weather** and can potentially interfere with the smooth operations of

all satellite-based communications, navigation, and power grids on Earth. To study these, Proba-3 will have three instruments onboard:

- ◆ **Association of Spacecraft for Polarimetric and Imaging Investigation of the Corona of the Sun (ASPIICS)** or the coronagraph. Its field of view is between the Sun's outer and inner corona, a circular belt normally observable during solar eclipse events. The instrument has a 1.4-metre diameter occulting disk mounted on it, to block the Sun's light and facilitate a close-up view of this belt.
- ◆ **Digital Absolute Radiometer (DARA)** will maintain a continuous measurement of the Sun's total energy output, known as the total solar irradiance.
- ◆ **3D Energetic Electron Spectrometer (3DEES)** will measure electron fluxes as it passes through Earth's radiation belts, providing data for space weather studies.

**Why is Proba-3 unique?**

- The two satellites — **Occulter Spacecraft (weighing 200 kg)** and the **Coronagraph Spacecraft (weighing 340 kg)** — will mimic a natural solar eclipse. They will **manoeuvre precisely in Earth's orbit** so that one satellite casts a shadow onto the other.
- A naturally occurring solar eclipse allows solar physicists to observe and study the **Sun's corona for 10 minutes**, across an average of about 1.5 eclipse events per year.
- Proba-3 will give six hours, equivalent to 50 such events annually, which will help deepen understanding of the Sun's corona like never before.
- Both the Occulter and the Coronagraph will face the Sun at all times. They will maintain a formation of a few millimetres and then move to a position where they will be 150 metres apart for six hours at a time.

- One satellite will act as a viewing telescope, kept at the centre of a shadow cast by the other satellite positioned 150 metres away. This positioning will facilitate observing the Sun's corona and will be autonomously achieved through precise flight formation.
- If done successfully, the Occulter will create an **artificial yet stable eclipse**, by masking large parts of the Sun. As a result, the **Sun's blinding light** will get blocked and only the **solar corona** will be visible to the **coronagraph**, which will photograph and facilitate studies of the lesser-known features.



**FACT BOX**

**Solar Corona**

- Solar corona is the **outermost and hottest part of the Sun's atmosphere**. The corona is much hotter (because of the **electromagnetic radiation** that it emits) than the Sun's surface, about 1 million °C compared to 5,500 °C (9,940 °F).
- The corona is usually hidden by the bright light of the Sun's surface. That makes it difficult to see without using special instruments.
- It can only be seen when the **disk of the Sun is blocked off in a total solar eclipse** (adjacent image), or by using a special instrument called a **coronagraph (or coronameter)** that artfically blocks the disk of the Sun so that it can image the regions surrounding the Sun.

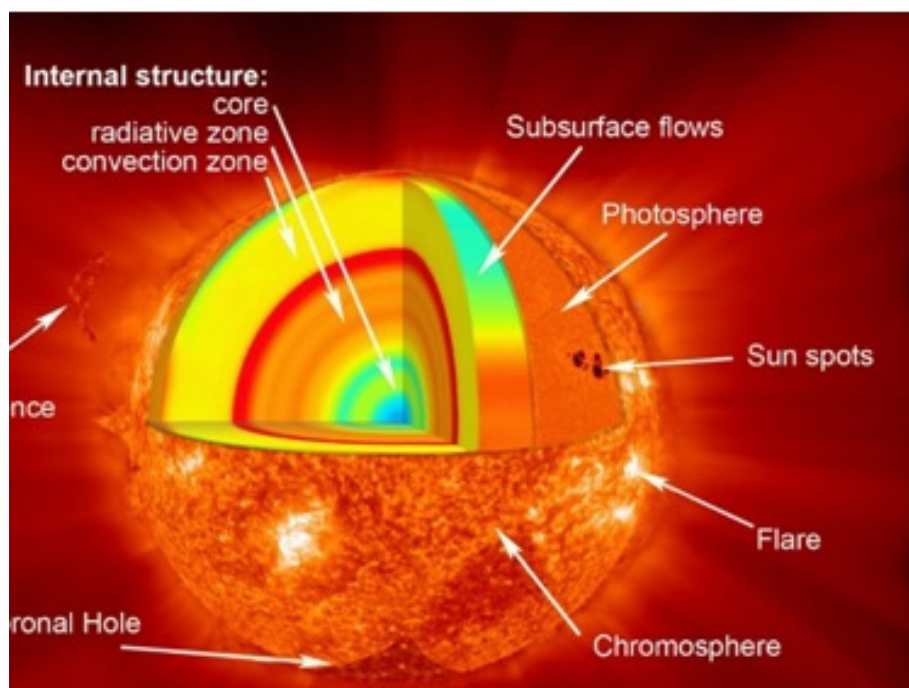


Figure No. 06

## TUPOLEV TU-160 (WHITE SWAN)

### Context

Russia has reportedly offered India the opportunity to procure the **Tu-160M strategic bombers**, known as the **"White Swan,"** which could substantially boost the IAF's aerial capabilities.

### About Tupolev Tu-160

- The Tu-160M, often called the **'White Swan'**, is a **large strategic bomber** with an impressive ability to fly up to 12,000 kilometers without needing to refuel. This makes it highly capable of covering long distances during missions.
- It was designed by the Tupolev Design Bureau in the 1970s during the Soviet era.
- It is still the **largest and heaviest combat aircraft in the world**.
- It can also fly at **supersonic speeds**, making it extremely powerful and fast.
- The modernized variant, the **Tu-160M**, incorporates significant upgrades over its predecessor.
- Equipped with advanced avionics, enhanced navigation systems, and state-of-the-art **NK-32-02 engines**, the Tu-160M is designed to improve operational efficiency and extend mission capabilities.
- Each aircraft can carry up to **12 long-range cruise or nuclear missiles**, enabling precision strikes far from home bases.
- The model's design allows for high-speed, low-altitude flight and quick acceleration, granting it a unique operational profile suitable for conventional and strategic missions.
- **India's present capabilities:** Presently, India relies on fighters like the Sukhoi Su-30MKI and Dassault Rafale for long-range strikes. While versatile, these aircraft do not match the range and payload of the Tu-160M, which can carry nuclear-capable Kh-101 and Kh-102 cruise missiles.

**Supersonic speed** refers to traveling faster than the speed of sound, which is about 1,236 kilometers per hour (767 miles per hour) in air. It allows aircraft to move extremely quickly.

## ELECTRONIC STABILITY CONTROL (ESC) TEST TRACK

### Context:

ZF Commercial Vehicle Solutions (CVS) India has recently inaugurated an **Electronic Stability Control (ESC) test track** in **Chennai**, India. This facility enables ZF to test and refine advanced **vehicle stability systems**, with a focus on ensuring enhanced **safety, agility, and handling** of vehicles, which is critical for reducing accidents and improving performance.

### About the ESC Test Track:

- The **ESC test track** provides a **controlled environment** where vehicles can be evaluated under various conditions that simulate real-world scenarios, including sharp turns, slippery surfaces, and emergency braking situations.
- The goal is to test the **Electronic Stability Control (ESC)** system, a crucial safety feature that helps prevent skidding or loss of control in vehicles by automatically applying brakes to individual wheels when needed.

### Key Features:

- ▶ **200-meter diameter dynamic pad:** This area allows testing of vehicle stability under extreme stress and friction conditions (with a surface friction of 0.9  $\mu$ ).
- ▶ **600-meter approach roads:** Simulate real-world driving conditions, providing a comprehensive test environment for testing vehicle handling and ESC systems.
- ▶ **Wide range of vehicles tested:** The facility is versatile, supporting the testing of various vehicles, including **two-wheelers, passenger cars, and heavy commercial vehicles**.

### Significance of the Facility:

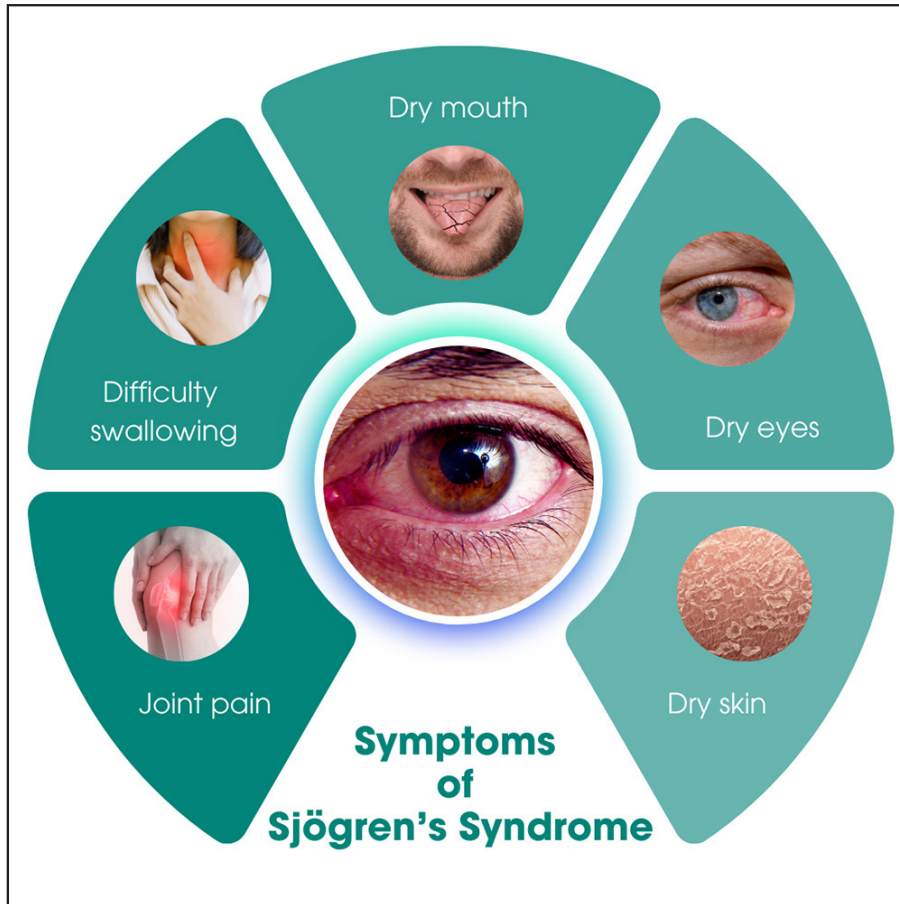
- ▶ **Safety Innovation:** The test track plays a pivotal role in the development and testing of advanced safety systems, such as **ESC**, which is becoming increasingly important in modern vehicles to prevent accidents caused by loss of control.
- ▶ **Independent Testing:** The track is **certified by TÜV Rheinland and ARAI**, which ensures that it meets high industry standards. It is also available for use by **third-party customers**, providing an independent platform for testing, which could help improve safety standards across the entire automotive industry.
- ▶ **Industry-wide Collaboration:** The facility allows ZF to collaborate with **industry experts** and other organizations to drive innovations in automotive safety. This will also help in identifying further development opportunities for safety systems to enhance **vehicle performance** and potentially **save lives** on the road.



### FACT BOX

#### Bharat New Car Assessment Programme (Bharat NCAP)

- The Bharat NCAP is India's very own automobile safety performance assessment programme. In this programme, vehicles sold in the domestic market will be tested and graded on several measures.



- **Aim:** to enhance road safety by elevating vehicle safety standards for up to 3.5-tonne vehicles in India.
- The Bharat NCAP is aligned with **global crash test protocols**.

## SJÖGREN'S DISEASE

### Context:

Sjögren's disease has been gaining attention in India as an **under-recognized autoimmune condition** that remains largely undiagnosed or misdiagnosed, often for years.

### About Sjögren's disease

- Sjögren's disease is a **multisystem autoimmune disorder** where the body's immune system attacks moisture-producing glands, leading to symptoms like **dry eyes, dry mouth, joint pain, and fatigue**.
- It can also affect other organs, including the **lungs, kidneys, and nervous system**, causing a range of health complications.
- Despite its prevalence, especially among **women** (it is about **10 times more common in women** than men), there is a significant **lack of awareness**, resulting in frustration for patients who often visit multiple doctors before getting a proper diagnosis.
- The disease's impact goes beyond the physical symptoms—it also takes an emotional and social toll,

- as patients often struggle with **chronic fatigue** and symptoms that may not be immediately visible to others, contributing to a sense of **isolation**.
- Thus, there is an ongoing push to address **misconceptions** and ensure that **quality care** is accessible to all those affected.
- This is why Sjögren's disease is being discussed more frequently in the media, as it has become increasingly recognized as an **important health issue** that needs more focus in terms of both **clinical attention** and **patient advocacy**.

## INTERCONTINENTAL BALLISTIC MISSILE (ICBM)

### Context

In an escalation of the **Russia-Ukraine war**, Russia fired **longer-range intercontinental ballistic missile (ICBM)** on the Ukrainian city of Dnipro.

### What is an ICBM?

- **ICBMs** (Intercontinental Ballistic Missiles) are long-range missiles designed primarily to carry **nuclear warheads** and can travel distances of over **3,400 miles**.
- These missiles are **strategic weapons** used as part of a country's **nuclear deterrence**.
- **ICBMs are powerful and difficult to intercept** because they travel at extremely high speeds (up to **4,000 mph**),

making them challenging for defense systems like **Patriot** to stop.

- The use of an ICBM in this conflict is seen as **escalating** the war because it signals the potential use of **nuclear capabilities** and could lead to a broader confrontation.

### The RS-26 Rubezh ICBM:

- According to reports, the missile fired at Dnipro was likely a **RS-26 Rubezh**, a relatively new and **experimental ICBM**.
  - ▶ **Range:** The RS-26 can travel up to **5,800 km** (about **3,600 miles**), making it capable of reaching distant targets.
  - ▶ **Speed:** It can reach **supersonic speeds**, around **4,000 mph**, making it nearly impossible for current missile defense systems to intercept.
  - ▶ **Payload:** The missile can carry a **warhead weighing up to 1,200 kg**, which is equivalent to **three Iskander missiles**.
- **Challenges:** The RS-26 is still in the testing phase, and its use in combat could result in **inaccurate strikes** and **collateral damage** due to the missile's **unproven technology**.

### Russia's ICBM Arsenal:

- Russia has around **306 strategic ICBMs**, capable of carrying a total of **1,185 nuclear warheads**.
- **Some of Russia's ICBMs include:**
  - ▶ **Topol-M (SS-27 Mod 1)** and **Yars (SS-27 Mod 2)**, both capable of carrying multiple warheads.
  - ▶ **Sarmat (SS-X-30)**, a new missile under development, larger and more capable than previous ones.
  - ▶ **Avangard**, a **hypersonic glide vehicle** under development, designed to evade missile defenses.
  - ▶ The **Sarmat ICBM**, also called **Satan II** in the West, has recently been deployed and can replace older Soviet-era missiles.

### International Implications:

- The use of an ICBM by Russia in the Ukraine conflict raises fears of **nuclear escalation**, though this strike did not carry a nuclear warhead.

- The West, especially countries like the U.S. and NATO members, have been cautious about commenting on the use of such missiles, fearing it could **worsen** the conflict.
- Although the **RS-26 Rubezh** is part of Russia's nuclear deterrence, its use in this conflict indicates the possibility of **further escalation** if tensions increase.

## ORESHNIK, RUSSIA'S NEW NUCLEAR-CAPABLE HYPERSONIC MISSILE

### Context

Russia tested a hypersonic intermediate-range missile in an assault on the Ukrainian city of Dnipro, Ukraine.

### About Oreshnik

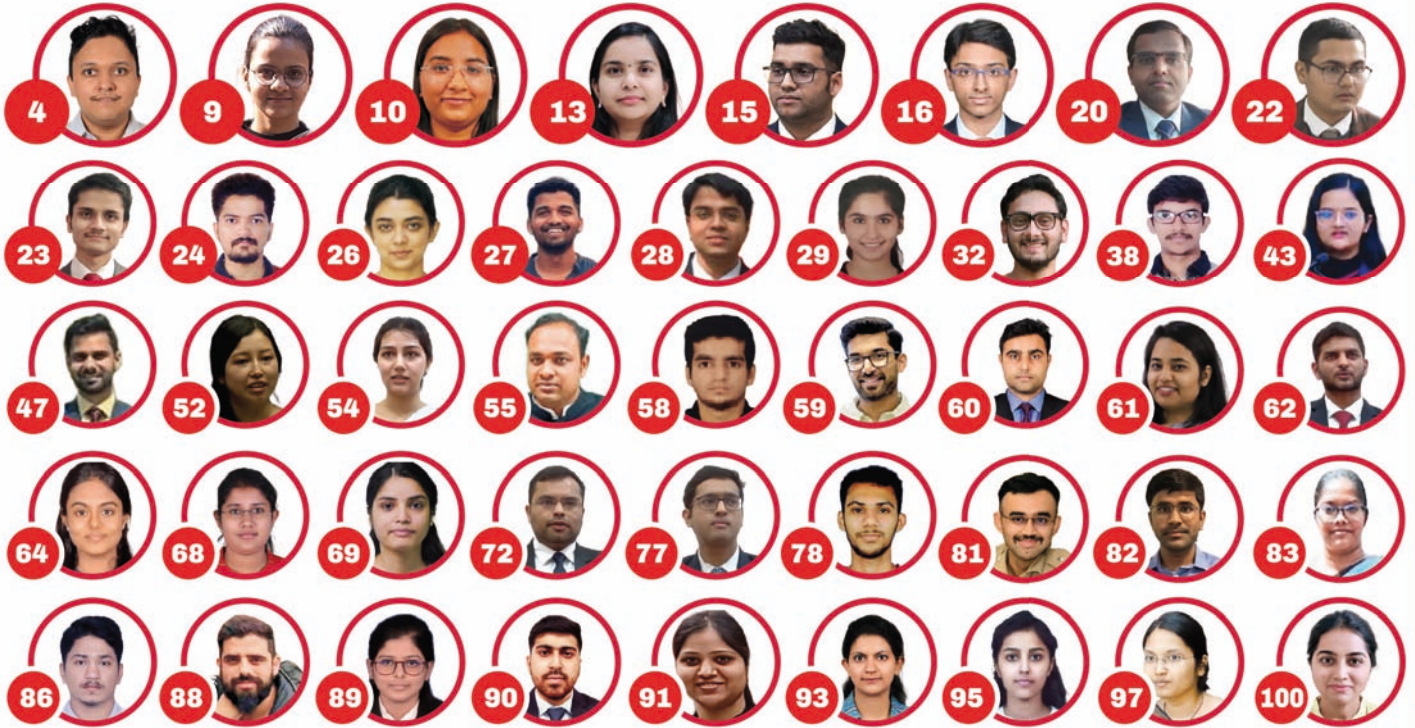
- The new intermediate-range ballistic missile, **Oreshnik**, which means hazel tree in Russian, is a nuclear-capable weapon that has not been previously mentioned publicly.
- It is based on the "**RS-26 Rubezh**" **intercontinental ballistic missile (ICBM)**.
  - ▶ An intercontinental ballistic missile (ICBM) has a range of 1,000-5,500km (621 to 3,418 miles), a level below that of an intermediate-range ballistic missile.
- It is a new **intermediate-range ballistic missile** that officials said was experimental, and it is believed that Russia only possesses a few.
- The hypersonic missiles can change direction mid-flight, making them extremely difficult to track and intercept with air defenses.
- It is believed to have a theoretical range of below 3,420 miles, meaning it could reach past Ukraine and into Europe from where it was launched.
- Hypersonic missiles travel at speeds of at least **Mach 5** – five times the speed of sound – and can **manoeuvre mid-flight**, making them harder to track and intercept.
- The missile can have three to six warheads.





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