# THE IAS GAZETTE

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## INDIA CANADA RELATIONS

**Other topics**

- NABARD All India Rural Financial Inclusion Survey (NAFIS) for 2021-22
- Cyber Slavery
- Rise of Mount Everest
- Stubble Burning and Right to Healthy Environment
- New Classical Languages of India

# CONTENTS



Sources

THE HINDU · The Indian EXPRESS · livemint · ET · PIB · PRS Legislative Research · NITI Aayog · BusinessLine · Government Reports

## 4. DEFENCE & SECURITY



### SHORT ARTICLES



## 5. ENVIRONMENT & ECOLOGY



### SHORT ARTICLES



## 6. SCIENCE & TECHNOLOGY AND HEALTH



### SHORT ARTICLES

## 7. CULTURE & HISTORY

**SHORT ARTICLES**



## 8. GEOGRAPHY & DISASTER MANAGEMENT



**SHORT ARTICLES**

# 1. POLITY & GOVERNANCE

## 1.1 LITIGATION IN INDIA

### Context

- The President of India has recently highlighted the issue of court delays in her speech.

### About Litigation

- It is the **process of settling disputes through the court system**, it helps in maintaining law and order by allowing individuals and entities to seek justice.
- **Civil litigation covers issues like contract violations, property disputes, and family matters**. Criminal litigation includes cases where the law has been broken, leading to prosecution by the government.
- **Public Interest Litigation (PIL) allows individuals or groups to file petitions in court** on behalf of the public interest to address issues that impact society at large. For example, the **Vishaka v/s State of Rajasthan** case led to the establishment of guidelines for preventing sexual harassment at the workplace.

### Challenges in the Judicial System

- Corruption in the judiciary can **undermine the legal system's credibility. Transparency is important for building trust in the judicial system and preventing political influence.**
- The **court process is often slow and costly**, making justice seem inaccessible to citizens. Marginalized groups may have difficulty accessing justice.
- The number of **pending cases is especially high in lower levels of the judiciary**, where there are also fewer judges.
- There may be a lack of coordination between institutions like the police, prosecutors, and forensic labs.

### Way Forward

- **The government has established several committees including the Malimath Committee and Venkatachaliah Committee;** they have recommended valuable recommendations like increasing the number of judges, simplifying procedures, and encouraging alternative dispute resolution methods to make the judiciary more accessible and efficient.
- **India has one of the lowest judge-to-population ratios globally**; 21 judges per million people. **Increasing the**

**Pendency of Case**

- **More than 51 million cases pending in 2024,** including 180,000 cases pending for more than 30 years in district and high courts. Most of these, nearly 87%, are in district courts.
- **A 2018 report by Niti Aayog suggested that, at the current rate, it would take over 300 years to clear the backlog.** The delay not only affects victims and accused individuals awaiting justice, but it also impacts India's economy, costing an estimated 1.5% to 2% of the country's GDP.

**Recent steps**

- The government has introduced new criminal laws to replace colonial era and outdated laws:
  - Bharatiya Nyaya Sanhita (BNS) 2023 replaced the Indian Penal Code (IPC) 1860.
  - Bharatiya Nagarik Suraksha Sanhita (BNSS) 2023 replaced the Code of Criminal Procedure (CrPC) 1973.
  - Bharatiya Sakshya Adhiniyam (BSA) 2023 replaced the Indian Evidence Act 1872.
- The government has **launched the National Judicial Data Grid**; to track pending cases and improve transparency.

**number of judges at all levels can reduce case backlogs**. Upgrading court infrastructure to help handle cases more efficiently.

- **E-courts, video conferencing, and case management software can bring transparency and speed up the judicial system.** Digitizing court records, and allowing virtual hearings to make the process more accessible.
- **Expanding fast-track courts and creating specialized benches for special types of cases;** like family disputes, environmental cases, or commercial issues, can streamline cases based on their nature, it will reduce the burden on traditional courts and speed up decisions for specific matters.
- **There is an immediate need to** expand the scope of initiatives like legal aid clinics to provide free legal support and increase awareness to ensure that the justice system remains accessible to all.

## 1.2 CRACKDOWN ON NGOS IN INDIA

### Context

- The Income Tax (IT) Department has started a probe against several NGOs over the allegation of violations of the Foreign Contribution Regulation Act (FCRA).

### Details

- Foreign funding-receiving NGOs are scrutinized due to **concerns over foreign influence**. Officials argue that foreign funds are **potentially used to support protests, legal battles, or campaigns that go against national interests.**
- The Intelligence Bureau reported that **some NGO activities had an economic impact on India**, as they were allegedly stalling big development projects.

### About FCRA

- The **Foreign Contribution Regulation Act (FCRA) was introduced in 2010 to regulate foreign donations** to ensure that foreign funds are used responsibly and do not interfere with India's internal affairs.

#### Key Provisions

- Organizations **must register with the Ministry of Home Affairs (MHA)** if they want to accept foreign contributions.
- NGOs have to submit annual returns details related to the amount of foreign funds they received, where it came from, and how it was spent.
- The money should only be used for the stated purposes and not for anything speculative or different from the organization's goals.
- **NGOs can't transfer foreign funds to another NGO** unless that NGO also has FCRA approval.

Failing to follow these rules can lead to serious consequences, including fines, cancellation of registration, or even imprisonment.

#### 2020 FCRA amendment

- It introduced strict restrictions on NGOs receiving foreign funds
- Now, public servants, including those who work for the government or perform public duties cannot accept foreign donations.
- **Key members of organizations must now provide Aadhaar numbers** to ensure transparency.
- **All foreign funds must go through a designated FCRA account in New Delhi**, separate from other funds.
- **NGOs can now spend only 20% (previously 50%) of foreign funds on administrative costs.** This means that the rest must go directly towards their projects.
- **NGOs have to renew their registrations within six months of expiration**, and the government has the authority to investigate before renewing.

### Challenges

- Mandatory use of SBI main branch bank accounts in New Delhi creates challenges for smaller NGOs and those working in remote areas.
- **Limitations over receiving foreign funding and spending create difficulties for many NGOs** to manage resources.
- Many NGOs are reducing or halting operations, this affects the communities that depend on them for healthcare, education, and social welfare are feeling the pinch. Jobs within these organizations are also at risk.
- India's strict FCRA rules have faced international criticism, and many foreign governments and organizations have expressed their concerns about the possible impact on human rights and democratic freedoms.

### Way Forward

- **Promoting discussions between NGOs and government officials bridges misunder-standings and creates trust,** in this way, both can understand each other's intentions and work collaboratively.
- Simplifying the registration, reporting, and renewal processes could help reduce the administrative burdens on NGOs, especially smaller ones.
- The government should **provide support for NGOs to improve their financial and operational processes,** this involves training programs or grants for building infrastructure.
- NGOs should maintain transparent accounting and regular reporting, while the government could enforce rules consistently and fairly.
- **NGOs should continue to engage with policymakers to shape government policies constructively**. Frequent conversations with lawmakers can ensure that the voices of civil society are heard.

## 1.3 AADHAR LINKING OF MGNREGA

### Context

- According to a recent LibTech report, nearly 3.9 million rural worker accounts under MGNREGS have been deleted due to Aadhaar linking issues.

Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)

- It was passed in 2005 to ensure that rural citizens have the right to work.
- It functions **under the Ministry of Rural Development (MoRD).**
- It **guarantees at least 100 days of unskilled manual** work per year to one member of each rural household.
- If employment is not provided within 15 days of applying, the government is required to pay an **unemployment allowance.**
- It ensures that **at least one-third of the jobs are reserved for women** to promote gender equality and gives equal opportunity to earn their own income.
- Implementation is the responsibility of the gram panchayats. They register households, issue job cards, and monitor the work of this program.
- **Work must be available within 5 kilometres** of the workers' homes to reduce travel time and costs.
- **Contractor involvement is prohibited** to ensure that benefits are delivered directly to workers without any middlemen.

### About Aadhaar-Based Payment System

- The Union government has made the **Aadhaar-based payment system (ABPS) mandatory for paying wages to MGNREGS workers in January 2023.**

  - Workers must link their Aadhaar numbers to their job cards and bank accounts to receive their wages directly.
- It is a **digital payment method** that allows workers to access banking services by providing their 12-digit Aadhaar number and biometric information (such as fingerprints or iris scans).
- The **National Payments Corporation of India (NPCI) developed this system** to improve people's access to financial services and promote digital transactions.

### Highlights of the Recent Report

- According to LibTech, nearly 3.9 million MGNREGS workers' payment accounts have been deleted due to Aadhaar linking issues.
- **Many genuine workers were wrongfully removed from the system**, raising questions about the fairness of the process.
- Currently, **about 27.4% of MGNREGS workers are ineligible for the Aadhaar-Based Payment System (ABPS)**. This has made it difficult for them to receive their due payments.
- Employment opportunities under MGNREGS are declining. The total number of person-days worked decreased by 16.6%, from 184 crore to 154 crore in the last one year. Employment fell in Tamil Nadu and Odisha, while it increased in Maharashtra and Himachal Pradesh.
- Assam and West Bengal are the only states where more than 10% of active workers are deemed ineligible for ABPS.

### Way Forward

- The findings of the report highlight a serious situation for rural workers who depend on MGNREGS. Many workers are denied the right to work and get compensated properly due to bureaucratic barriers associated with Aadhaar linking. LibTech's findings highlight the need for the government to better align its documentation requirements with the realities faced by these workers.

## 1.4 RIGHT TO UNIONISE

### Context

- Workers at the Samsung India plant in Sriperumbudur, Tamil Nadu, have been protesting for the right to form a Trade Union.

### Background

- The workers want the "Samsung India Workers Union (SIWU)" to be officially registered to provide them legal protection and allow them to engage in collective bargaining; it involves negotiating as a group for higher wages, safer working conditions, and fair treatment.

### What are the Legal Issues?

- **Workers have the right to form a union under the Trade Unions Act (1926)**, and registration requires only a few members. The law clearly states that the Registrar of Trade Unions is responsible for ensuring that trade unions are properly registered.
- The **Supreme Court in the case of B R Singh v/s Union of India (1989) case ruled that forming a trade union is a fundamental right under Article 19(1)(c) of the Constitution**; however, the court also emphasized that this right should only be restricted in extreme cases where public order, morality, or national security are threatened.

### Objection raised by Samsung

- Samsung has expressed concerns about using its name in the Samsung India Workers Union (SIWU), claiming that it violates the Trademarks Act of 1999. However, trade unions are not businesses. They are simply groups committed to protecting worker rights.

- International courts have also allowed **"nominative fair use", which means that unions can use the company name to identify themselves as long as they do so in a reasonable manner and do not cause confusion.**

### About the Right to Unionize

- **The Constitution under Article 19(1)(c), grants everyone the right to form associations or unions,** indicating that workers have a constitutional right to form or join a union. However, the government has the authority to limit this right if it threatens public order, morality, or national unity and integrity.
- **The Trade Unions Act (1926) allows unions to obtain official recognition**. It explains how unions can register and what their rights are. The act encourages workers and employers to resolve disputes peacefully.
- **Workers may form a trade union by registering with the Registrar of Trade Unions.** Although registration is not required, it provides legal protection and recognition.
- A registered union has the authority to negotiate on behalf of its members with the employer. They can demand higher pay, safer working conditions, and equal treatment.
- Workers have the right to strike as a form of protest, subject to certain legal requirements and procedures.

### Challenges

- Some employers oppose unions because they believe they interfere with business operations. They may oppose union efforts to avoid increased labour costs and loss of decision-making power.
- Traditional union models face challenges when dealing with gig and freelance work because these employees do not have the same protections and benefits as full-time employees.
- Some people believe that unions can become too powerful and make workplaces less flexible, which can harm businesses in the long term.

### Way Forward

- The government should **strengthen legal protections for union activities** and ensure timely registration of trade unions.
- To resolve conflicts and improve industrial relations, employers, employees, and unions must engage in dialogue.
- Trade unions should adapt to the changing labour market by finding new ways to represent gig and freelance workers while also ensuring fair treatment and benefits.
- Increasing awareness of the benefits of union membership and educating workers about their rights can help to strengthen India's union movement.
- **Learning from best practices around the world** and working with International Labour Organizations will help to improve the Trade Union's performance in India.

## 1.5 SC VERDICT ON CASTE BIAS, SEGREGATION IN PRISONS

### Context

- The Supreme Court ruled against caste-based discrimination in prisons to protect prisoners' fundamental rights.

### Highlights of the Supreme Court Judgement

- The court declared that **various jail manuals contain unconstitutional provisions that violate prisoners' rights and enforce caste discrimination**, especially for marginalized communities such as Scheduled

Castes (SC), Scheduled Tribes (ST), and Denotified Tribes (DNT). The court ordered the immediate removal of any caste-related references from prison records.

- It **ordered all states and Union Territories to update their prison manuals within three months** to ensure that no prisoner is subjected to caste-based labour or housing arrangements.
- It asked the Union government to **revise the Model Prison Manual 2016 and the Model Prisons and Correctional Services Act 2023** to eliminate discriminatory provisions.
- It criticized outdated terms such as "scavenger class," stressing that no group should be labelled in a way that reinforces stereotypes or social hierarchies.
- The order pointed out that **allocating low-wage jobs to specific castes reinforces historical injustices and violates constitutional rights,** especially Articles 21 (right to life and dignity) and 23 (prohibition of forced labour).

## Indian Prisons Challenges

- Prisons are overcrowded, with an **average occupancy rate of 130% across the country** and even higher in some states. Overcrowding creates inhumane living conditions, increases violence among prisoners, and impedes rehabilitation efforts.
- **More than 70% of prisoners are undertrial**, long-term detention of undertrials violates their right to a speedy trial.
- Insufficient prison staff impact prison administration and security, resulting in poor supervision, increased violence, and ineffective rehabilitation programs. It also puts extra pressure on limited staff, affecting their performance.
- Many prisons have inadequate health facilities and poor hygiene standards, leading to various health issues among prisoners.
- Ineffective rehabilitation and vocational training programs increase the likelihood of repeat offences among prisoners after release. Rehabilitation programs are critical for the reintegration of prisoners into society.
- **Women prisoners' needs for healthcare, childcare, and safety are often neglected.** Women prisoners

face unique challenges that require targeted interventions to ensure their safety and rehabilitation.

### Important Prison Reform Committees and their recommendations

#### Mulla Committee (1980–1983)

- Modernizing prison infrastructure.
- Improved training and recruitment for prison staff.
- Create a National Prison Commission to oversee prison administration.
- Implemented vocational training and educational programs for prisoners.

#### Krishna Iyer Committee (1987)

- Stress on the rehabilitation of prisoners.
- Alternatives to imprisonment for minor offences.
- Improvement in the living conditions of prisoners.
- Ensuring the rights and dignity of prisoners.

#### Justice Amitava Roy Committee (2018)

- Reducing overcrowding by speeding trials and granting bail to undertrial prisoners.
- Improve healthcare facilities in prisons.
- Implementation of modern technology to enhance prison management.
- Conduct regular prison inspections and audits to ensure standards are met.

#### Model Prisons Act 2023

- Security assessment and segregation of prisoners based on their risk levels.
- Separate wards for women and transgender inmates.
- Punishment for jail staff involved in misconduct.
- Introduction of rehabilitation and reintegration programs.

### Way Forward

- **Implementing fast-track courts and alternative dispute resolution methods** to speed up the judicial process and reduce the number of under-trial prisoners.
- **Promoting the use of bail for minor offences,** releasing under-trials who have served a significant portion of their potential sentence, and encouraging community service to reduce the prison population.
- Improving medical facilities and ensuring regular health check-ups for prisoners. Mental health services and counselling are required to address prisoners' psychological needs.
- **Expanding vocational training programs to equip inmates with job-ready skills upon release**. Establishing support systems for released prisoners, including job placement and housing assistance, to facilitate their reintegration into society.
- Implementing the Model Prisons Act, 2023 to modernize prison administration and protect prisoners' rights. Regular prison inspections and audits are required to ensure standard compliance and identify areas for improvement.
- Implement strict measures to prevent custodial torture and hold those responsible accountable for human rights violations. Organizing awareness campaigns for prisoners about their rights and legal options.

## 1.6 SPECIAL STATUS FOR LADAKH

### Context

- A protest led by climate activist Sonam Wangchuk called for including Ladakh in the Sixth Schedule of the Constitution.

## Background

- Ladhak was part of the Jammu and Kashmir state and was governed by Article 370 of the Constitution. In August 2019, the Union Government abolished Article 370 and divided the former state of Jammu and Kashmir into two union territories: **Jammu and Kashmir (with Legislative Assembly) and Ladakh (without Legislative Assembly).**

**About Asymmetrical Federalism**

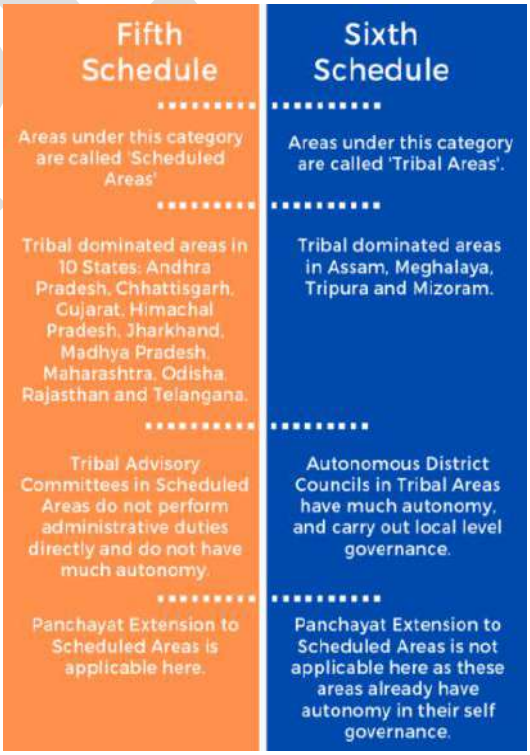
- **India's federal structure follows asymmetrical federalism;** some regions have more power and autonomy than others, especially areas with large tribal populations. The Fifth and Sixth Schedules were inserted into the Constitution in response to historical injustices suffered by tribal communities.

## Key Demands

- The demand for full statehood with its own legislature to increase autonomy and control over local government.
- Inclusion of Ladakh in the Sixth Schedule, given that over **97% of Ladakh's population is tribal, this inclusion will safeguard their cultural and economic interests.**
- **Increase the number of Lok Sabha seats** from one to two to ensure better representation for both the Leh and Kargil districts.

## Sixth Schedule

- The **Sixth Schedule governs tribal areas in the northeastern states of Assam, Meghalaya, Tripura, and Mizoram.** It provides significant autonomy to tribal communities in these areas, allowing them to govern themselves and maintain their cultural identity.
- **Autonomous District Councils (ADCs) are established in each tribal area under the sixth schedule;** they have legislative, administrative, and judicial powers. ADCs have the authority to enact laws on issues, including land, forest management, water resources, agriculture, and village administration.
- The central government funds ADCs for social and infrastructure development. They have the authority to levy and collect taxes, fees, and tolls within their jurisdiction.
- **The state governor has the authority to appoint and remove members of the ADCs**, approve or disapprove laws passed by the councils, and dissolve the councils as needed.




## Way forward

- Autonomy is usually more theoretical than practical. The Union government has the final say, which may hamper local governance. Many tribal habitations are not designated as scheduled areas, denying them constitutional protection.
- **Recognizing tribal communities' forest rights under the Forest Rights Act of 2006** is essential for their empowerment, and to prevent environmental degradation and managing natural resources.
- Developing infrastructure such as roads, schools, and hospitals is important for improving people's quality of life. However, this requires sufficient funding and planning.

- Traditional lifestyles may be at risk as tourism grows. **Balancing development and cultural preservation are Important for ensuring sustainable growth.**

## 1.7 CHILD BETROTHALS

### Context

- The Supreme Court has highlighted that child betrothals violate fundamental rights.

### About Child Betrothals

- In many parts of India, it is a **traditional practice to promise children to marry someone in the future.**
- Families planned these future marriages in order to build social connections and improve their standing in the community.
- **The actual marriage takes place when the children reach a certain age.**

### Highlights of the Supreme Court Verdict

- **The Court criticized the existing anti-child marriage law,** the Prohibition of Child Marriage Act (PCMA), for being ambiguous on child betrothals.
- They urged Parliament to clearly prohibit these practices and **classify children in marriages as "minors in need of care and protection" under the Juvenile Justice Act.**
- The court emphasized that, while girls bear the brunt of child marriage, boys also suffer. The ruling highlighted how social norms and peer pressure motivate boys to commit violence against their child brides, the court stated that both boys and girls have the right to a childhood free of these burdens.
- The court argued that **child marriage endangers minors,** particularly girls, by exposing them to sexual abuse, which is opposed to the objectives of the Protection of Children from Sexual Offences Act (POCSO), which seeks to protect children against sexual exploitation.

**UNESCO 2023 Report**

- In India, **nearly one-fourth of all young women (23%) marry before the age of 18.** India is home to over 216 million child brides, accounting for one-third of the global total.
- More than half of India's females who married as children live in five states: Uttar Pradesh, Bihar, West Bengal, Maharashtra, and Madhya Pradesh. Uttar Pradesh has the highest number.
- The prevalence of child marriage varies significantly by state. For example, in West Bengal, Bihar, and Tripura, more than 40% of young women married before the age of 18, compared to only 1% in Lakshadweep.
- Girls from rural areas and poorer households are more likely to marry as children.
- Education is important; girls who have little or no education are more likely to marry young.

### Challenges

- **Child betrothals deny children the right to make their own decisions about life and partners**, which results in early marriages that harm their health, education, and overall happiness.
- Girls suffer the most because they are usually married at a young age. This can lead to early pregnancies, health problems, and a lack of educational opportunities.
- **Even with laws in place, child betrothals and marriages continue in many parts of India,** mostly in rural areas where economic hardship and cultural beliefs encourage the practice.

- **Enforcing laws prohibiting child marriage is difficult due to a variety of factors**, including a lack of awareness about the laws, social acceptance of child marriage, and poor implementation of legal protections.

### Guidelines issued by the Supreme Court

- The court advocated for **age-appropriate, culturally sensitive sexual education in schools** to help children understand their rights and bodies.
- The court proposed a **'Child Marriage Free Village' campaign, similar to the 'Open Defecation Free Village' initiative** to raise awareness and mobilise local leaders against child marriage.
- The court recommended that the Home Ministry should establish an online portal for reporting child marriages to improve law enforcement efforts.
- The **Ministry of Women and Child Development must establish a compensation scheme** for girls who choose to leave child marriages and provide them with necessary assistance.
- The court suggested setting aside an annual budget to prevent child marriages and assist affected individuals.

## 1.8 2022 BENAMI LAW IS UNCONSTITUTIONAL

### Context

- The Supreme Court has changed its 2022 decision that declared some of the provisions of the Benami law as unconstitutional.

### About Benami Transactions (Prohibition) Act 1988

- **The act was passed to prevent people from involving in benami transactions,** where someone buys a house, land, or any asset, but registers it under another person's name, mainly to hide the ownership from legal authorities.

#### Key Provisions of the Act

- Any property held by benami is liable to be confiscated by the central government without paying any compensation.
- It denies the right to recover property; the real owner cannot reclaim the property from the benamidar (the person in whose name the property is registered).
- It **establishes an Adjudicating Authority** to deal with benami transaction cases. This authority has the power to attach and confiscate benami properties.
- **An Appellate Tribunal is set up** to hear appeals against the orders of the Adjudicating Authority. Appeals, and appeal against the orders of the Appellate Tribunal lie to the high court.
- **Special courts are designated** to handle the prosecution of offences under the Act.

### Amendments introduced in 2016

- It amended the **Benami Transactions (Prohibition) Act 1988** and renamed it as the **Prohibition of Benami Property Transactions Act, 1988**.
- It established four authorities to handle inquiries and investigations into benami transactions:
  - **Initiating officer to** investigate suspected benami transactions and issue notices.
  - **Approving Authority** to review the actions taken by the Initiating Officer.
  - **Administrator** to manage any properties that are identified as benami.
  - **Adjudicating Authority** to review the evidence to determine whether the property is benami.
- If a person is identified as a **benamidar**, the **Initiating Officer can issue a notice and hold the property for up to 90 days with the Approving Authority's permission**. The

Adjudicating Authority then reviews the case and decides whether the property should continue to be held as benami.

- The Act specifies that special courts must conclude trials related to these cases within six months from when a complaint is filed.
- If someone is found guilty of engaging in a benami transaction:
  - They can face strict imprisonment for at least one year, extending up to seven years.
  - They may also attract a **fine of up to 25% of the property's fair market value.**

### Supreme Court 2022 Judgment

**The Supreme Court declared two sections of the Prohibition of Benami Property Transactions Act, 1988 as unconstitutional.** These sections are:

- **Section 3(2)**, which prohibits benami transactions (i.e., property held under someone else's name as a cover).
- **Section 5**, which allows the government to acquire such benami properties.
- The court stopped the authorities from taking action based on these provisions. It also clarified that the law did not apply to past transactions before the 2016 amendment came into effect.

Recently, the court agreed with the government's argument that the validity of these sections wasn't directly in question before the previous bench, **therefore, the 2022 decision was recalled, and the matter will now be heard again by a different bench.**

The court stated that punishing people for something they did before the law was passed violated **Article 20(1) of the Indian Constitution, which says an individual can't punish someone for something that wasn't a crime when they did it.**

## 1.9 SHORT ARTICLES

# Jal Hi Amrit

### Context

- The **Jal Hi AMRIT Program** is a new initiative launched under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0 to help cities manage their water better.

### About Jal Hi AMRIT Program

- The program aims to **improve the quality of treated wastewater and promote its recycling.**
- States and Union Territories are encouraged to run sewage treatment plants more effectively. These plants clean used water before it goes back into the environment.
- Cities can choose sewage treatment plants in their areas to participate in this initiative and improve their performance.

### Implementation

- **Cities will earn points called "clean water credits,"** for doing a good job in treating wastewater. This will create competition among cities, making everyone work harder to improve.
- **Sewage treatment plants will be given stars based on their performance**. These stars will be valid for six months, allowing cities to show off their progress.
- The better a treatment plant does, the more rewards it can earn. This will motivate cities to treat their wastewater better.

### About AMRUT

- The **Atal Mission for Rejuvenation and Urban Transformation (AMRUT)** was **launched in 2015 to improve the basic infrastructure** like providing clean drinking water, better waste management, and creating parks in 500 cities across India.
- **AMRUT 2.0 was launched in 2021 to cover more cities and focus on better sewerage services**, water recycling, and conservation,

also includes plans for rejuvenating water bodies and improving urban planning.

## Central Drugs Standard Control Organisation (CDSCO)

### Context

- The Central Drugs Standard Control Organisation (CDSCO) has received praise from the World Health Organization (WHO) for its effective vaccine regulatory system.

### News in Detail

- The WHO has guidelines in place to ensure vaccines are of high quality. Recently a review by a group of international experts from WHO found that India's vaccine regulations meet their standards for safety, efficacy, and quality.
- WHO assessment examined how well India's regulatory system aligns with global standards, while India was initially evaluated in 2017, this recent re-evaluation confirmed that it maintains a maturity level of 3 and scores well in several areas.

> **India is a major vaccine producer and also supplies it to around 150 countries**, with the WHO recognition, it will be easier for India to export vaccines.

### About CDSCO

- It is the **main authority in India for regulating cosmetics, pharmaceuticals, and medical devices.**
- The **Drug Controller General of India (DCGI) heads the CDSCO** and plays an active role in approving new drugs, including vaccines and blood products. Companies must get DCGI approval before selling new prescription drugs in India.
- **The organization operates under the Ministry of Health and Family Welfare** and follows the rules mentioned under the Drugs and Cosmetics Act, 1940, and the New Drugs and Clinical Trials Rules, 2019.
- To assist in its work, the DCGI consults with; the Drug Technical Advisory Board (DTAB) and the Drug Consultative Committee (DCC).
- **Manufacturers are required to appoint an Authorized Indian Representative (AIR)** to manage communications with the CDSCO.

## National Commission for Protection of Child Rights (NCPCR)

### Context

- The National Commission for Protection of Child Rights (NCPCR) sent a letter to state officials suggesting them to stop funding to madrasas and to close Madrasa Boards over lack of quality education.

> Madrasas are educational institutions for Muslim students. According to the Ministry of Minority Affairs, there are around 38,000 madrasas in India, with Uttar Pradesh having about 60% of them.

### About NCPCR

- It is **a statutory body** established by the **Commission for the Protection of Child Rights (CPCR) Act of 2005**.
- It aims to protect and promote the rights of children in India. It monitors various laws aimed at safeguarding children, such as the:
  - Protection of Children from Sexual Offences (POCSO) Act, 2012
  - Juvenile Justice (Care and Protection of Children) Act, 2015
  - Right to Free and Compulsory Education (RTE) Act, 2009

### Composition

- The chairperson leads the commission and **serves for three years or until they reach the age of 65.**
- **There are six members**, including at least two women. They should have expertise in areas such as: Education, Child health and welfare, Juvenile Justice, Child psychology, Laws related to children
- Each member serves for three years or until the age of 60, with a limit of two terms.

- **The Central Government appoints the chairperson and members based on recommendations from a committee led by the Minister of Education.**

**Power**

- When investigating issues related to child rights, the **NCPCR has powers similar to a civil court**.
- After completing an investigation, the NCPCR can recommend actions, including prosecution or seeking directives from the Supreme Court or High Courts.

## Prime Minister Internship Scheme

**Context**

- **The Government announced the Prime Minister Internship Scheme** to provide internship opportunities for young people across India.

**About Prime Minister Internship Scheme**

- It was **announced by the Union Finance Minister during the 2024-25 Budget speech** in July and officially launched in October.
- It aims to provide internships to **one crore youth** in the **top 500 companies** over the next five years.

**Key Features**

- **It offers internships in various fields,** helping students gain practical experience and skills.
- Internships will be provided in leading business organizations, giving students exposure to high-quality work environments.
- **Internships continue for 12 months**, providing abundant time for learning and contributing.
- Interns will receive a **monthly stipend of ₹5,000**, which includes ₹4,500 from the government and ₹500 from the companies.
- Interns will be insured under the **PM Jeevan Jyoti Bima Yojana** and **PM Suraksha Bima Yojana**.

**Eligibility**

- Between **21 and 24 years old**.
- Have completed at least high school, an ITI diploma, or a degree like BA, BSc, BCom, BCA, or BBA.

**Not Eligible**

Candidates who fall into the following categories cannot apply:

- **Those who are fully employed or engaged in full-time education** (but online/distance learning students can apply).
- Graduates from prestigious institutions like IITs, IIMs, National Law Universities, IISER, NIDs, or IIITs.
- Those undergoing any skill or apprenticeship program under a government scheme.
- Candidates who have completed an apprenticeship under the National Apprenticeship Training Scheme (NATS) or National Apprenticeship Promotion Scheme (NAPS).
- **Candidates from families with an income exceeding ₹8 lakh** for FY 2023-24.
- Candidates whose family members are regular government employees (excluding contractual workers).

## Global Hunger Index 2024

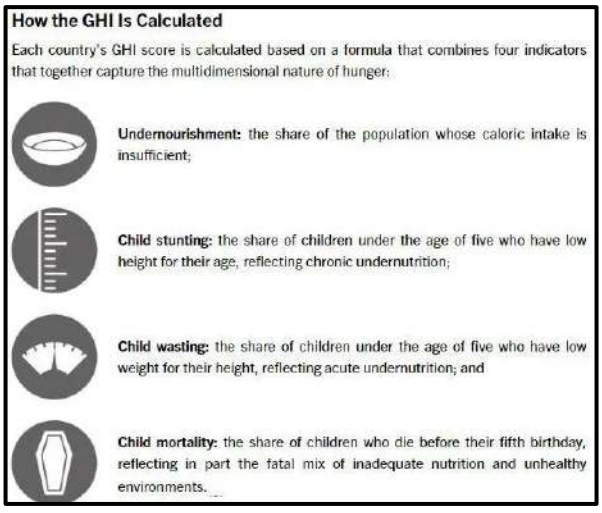
**Context**

- Global Hunger Index (GHI) 2024 ranked India at 105th with a score of 27.3, placing it in the "serious" category.

**About Global Hunger Index (GHI)**

- The **Global Hunger Index (GHI)** is an annual report that was first created in **2006** to compare hunger levels between different regions to identify the most critical areas needing attention.
- Originally, the report was published by the **International Food Policy Research Institute (IFPRI)** and **Welthungerhilfe**, a German aid organization. Later on, **Concern Worldwide**, an international humanitarian group, joined as a co-publisher.
- The four indicators used to score and rank countries are: **Undernourishment, Child Wasting**, **Child Stunting**, and **Child Mortality**.

A country is ranked on a scale from **0 to 100**; where 0 indicates no hunger, and 100 denotes extreme hunger.




**Key Highlights**

- More than **733 million people globally don't have enough food** daily, and **2.8 billion people** struggle to afford nutritious food. The most severe cases of hunger are found in war-torn areas, especially in some African nations like **Sudan** and **Gaza**.
- While some countries have made progress in reducing hunger, it's clear that the world is still struggling to achieve the **United Nations' Sustainable Development Goal** of ending hunger by **2030**.
- Countries like **Mozambique** and **Nepal** have shown that progress is possible, since **2016**, they have significantly improved their GHI scores.
- **India ranked 105th out of 127 countries in the 2024 index**, which categorized it as a country with serious hunger issues.
    - **13.7% are undernourished**, they don't get enough food daily.
    - **35.5% of children under five are stunted** (too short for their age), a sign of chronic undernutrition.
    - **18.7% of children under five are wasted** (too thin for their height), indicating extra undernutrition.
    - **2.9% of children in India die before they reach five years old** due to malnutrition and poor living conditions.
- The data shows that India is one of **42 countries** categorized as having "serious" hunger levels, along with its neighbours **Pakistan** and **Afghanistan**. Meanwhile, **Bangladesh, Nepal,** and **Sri Lanka** are in the "moderate" category, indicating they are doing better in addressing hunger.

## MPLAD and MLA-LAD

**Context**

- The Delhi government has increased the MLA-LAD funds from ₹10 crore to ₹15 crore each year, the highest amount of MLA-LAD funds in the country.

**About MPLADS**

- MPLADS (Members of Parliament Local Area Development Scheme) was **launched in 1993, under the Ministry of Rural Development, however, in 1994, it was transferred to the Ministry of Statistics and Programme Implementation (MoSPI).**

**Key Highlights**

- The scheme focuses on developing local projects based on community needs, such as drinking water, education, public health, sanitation, and roads.
- Each **Member of Parliament (MP) receives ₹5 crores per year.** It is **non-lapsable, if they don't use all the money in the year, it can be carried over to the next year.**
- **MPs suggest projects to the District Collector (DC) or District Magistrate (DM).** The DC/DM checks if the projects are feasible and then approves them. **Local authorities or implementing agencies carry out the projects.**
- Lok Sabha MPs can recommend projects in their constituencies, while Rajya Sabha MPs can choose projects in any district within their state. Nominated MPs can select any district in India.

### About MLA-LAD

- **MLA-LAD is a similar scheme at the state level,** allowing Members of the Legislative Assembly (MLAs) to recommend development projects in their areas.
- It was **first introduced in Karnataka in 2001-02** and has since been adopted by other states to help MLAs address local needs.
- The a**mount each MLA gets varies by state.** In Delhi, it is ₹15 crore per year, while in Uttar Pradesh, it's ₹5 crore.
- Similar to MPLADS, MLAs propose projects to the DC/DM, who reviews them for feasibility. Once approved, local authorities implement the projects.

## Food Safety Laws in States

### Context

- The Guidelines by the Uttar Pradesh (UP) government require all food businesses to display the names and addresses of their owners and employees.

### Food Safety Regulations in India

- Initially, each state had its own food safety laws. However, these state laws were not consistent; to address this, **the Food Safety and Standards Act (FSSA) was passed in 2006.**
- It consolidated various food safety regulations and established the **Food Safety and Standards Authority of India (FSSAI) under the Ministry of Health and Family Welfare.**

### About Food Safety and Standards Authority of India (FSSAI)

- It regulates food safety regulations. Anyone who operates a food business must register or obtain a license from the FSSAI.
- Small businesses, including street vendors and food stalls, must register with the FSSAI. **After registering, they will receive a certificate and a photo ID that must be visible in their premises or vehicles.**
- If a food business operates without a license, it may face up to six months in jail and a fine of up to ₹5 lakh.
- The Food Safety and Standards Act (FSSA) empowers state governments to develop rules to ensure food safety in their states.
  - According to Section 94(1) of the FSSA, state governments can create rules but must first obtain approval from the FSSAI.
  - The law allows state food safety commissioners to conduct surveys and enforce regulations.
  - New rules must be submitted to the state legislature for approval.

## PM Mudra Yojana

### Context

- The loan limit under the PM Mudra Yojana has been increased from Rs 10 Lakh to Rs 20 Lakh.

**Present Status of PMMY**

- Nearly Rs 23.2 lakh crore were provided under the PM Mudra Yojna.
- Around 68% of beneficiaries are women entrepreneurs.
- Nearly 51% of the beneficiaries belong to the SCs/STs and OBCs categories.

### About Pradhan Mantri Mudra Yojana (PMMY)

- It was **launched in April 2015 by the Union Finance Minister** to provide financial support to micro and small enterprises.
- **Under the scheme, loans are offered through various lending institutions** such as Commercial Banks, Regional Rural Banks (RRBs), Small Finance Banks, Non-Banking Financial Companies (NBFCs), and Micro Finance Institutions (MFIs).
- **The main objective is to "fund the unfunded"** by providing loans to **non-corporate, non-farm, small and micro enterprises** to expand their business.
- 3 categories of loan:
  - Loans up to Rs 50,000 under Shishu.

- Loans between Rs 50,000 and Rs 5 lakh under Kishore.
- Loans between Rs 5 lakh and Rs 10 lakh under Tarun.

**Recent Announcement**

- In the Union Budget 2024-25, the finance minister announced to increase in the loan limit under PM Mudra Yojana from Rs 10 lakh to Rs 20 lakh, **the expansion introduced a new category "Tarun Plus".**
- **Entrepreneurs who have earlier taken and successfully repaid loans under the tarun category** are eligible to get loans up to Rs 20 lakh under the new "Tarun Plus" category.

## Appointment of Chief Justice of India (CJI)

**Context**

- The President of India appointed Justice Sanjiv Khanna as the 51st Chief Justice of India (CJI).

**How CJI is appointed?**

- There is **no procedure for appointing the Chief Justice of India in the Constitution.**
  - Article 124 (1) of the Constitution states that "There shall be a Supreme Court of India consisting of a Chief Justice of India."
  - In the absence of a constitutional provision, the procedure for appointing CJI is based on convention.
- **By convention, the Supreme Court's senior-most judge becomes the Chief Justice of India**. This principle is codified in the Memorandum of Procedure (MoP) formed in 1999, which details the process of appointing Supreme Court judges.
- The **process begins when the Union Minister of Law and Justice requests a recommendation from the existing Chief Justice** of India on who will succeed him.
- After the recommendation is accepted, the **Union Minister presents it to the Prime Minister, who advises the President on the appointment**. Although the final decision rests with the government, it generally follows the CJI's recommendation.

**Eligibility and tenure**

- The outgoing CJI recommends his successor based on seniority. However, senioritis are determined by the number of years a judge has served in the Supreme Court, not by age.
- To be eligible, individuals must be Indian citizens and have at least five years of experience as a judge or advocate in a High Court or two or more courts in succession.
- **The CJI's salary and working conditions are determined by Parliament** under the Supreme Court Judges (Salaries and Conditions of Service) Act of 1958.
- The tenure of a CJI is until they attain the age of 65 years.

## Lady Justice

**Context**

- The Chief Justice of India released a new statue of Lady Justice.

**About Lady Justice**

- The image of Lady Justice has its origins in Greek and Roman mythology, as a goddess of justice, wisdom, and good counsel.
- She normally appears **holding scales in one hand and a sword in the other, representing balance and the ability to enforce justice.**
- The concept of a blindfold was popularized by a woodcut from the 15th century, it was originally a critique of justice, but with time, the blindfold became a symbol of impartiality.
- **India adopted the "Lady Justice" image during British rule**, and it remains in the country's court even today.

**About new statue of "Lady Justice"**

- The new Lady Justice is **not wearing a blindfold, suggesting that the judicial system sees and considers the circumstances of each case.** This reflects a shift away from a

previous belief that "justice is blind" and toward a new one: justice should be aware and sensitive to each situation.

- The new statue is **dressed in a saree,** offering it a unique Indian appearance and connecting Lady Justice to Indian culture.
- **Instead of a sword, the statue now holds India's Constitution**, stressing the Constitution's importance in Indian legal systems.
- The scales remain the same, indicating that the court's decisions are balanced and fair.

## Section 6A of The Citizenship Act

### Context

- The Supreme Court upheld the constitutionality of Section 6A of the Citizenship Act of 1955 with a 4:1 majority decision.

### Highlights of the Judgement

- The Supreme Court emphasized the principle of fraternity defined in the Constitution and pointed out that it should not be applied selectively.
- The **Court argued that if denying citizenship disenfranchises a large number of people, then the values of fraternity and inclusion must be prioritized.**

### About Section 6A of the Citizenship Act 1955

- It was **introduced as part of the 'Assam Accord'** to address illegal immigration in Assam while also protecting the Assamese people's cultural and social identity.
- It allows Bangladeshi immigrants living in Assam to apply for Indian citizenship.
    - Foreigners who entered Assam before 1st January 1966, were considered "ordinarily resident", they were granted full citizenship rights to vote and participate in all aspects of Indian society.
    - Those who entered Assam between January 1, 1966, and March 25, 1971, were also granted citizenship rights, but with one condition: they could not vote for ten years.
    - Those who **entered after March 25, 1971, are ineligible for citizenship under Section 6A.**

## Serious Fraud Investigation Office (SFIO)

### Context

- Officials from the Serious Fraud Investigation Office (SFIO) have recorded the statement of the Kerala Chief Minister's daughter.

### About the Serious Fraud Investigation Office (SFIO)

- Established in January 2003 and received statutory status under the Companies Act of 2013.
- It works **under the Union Ministry of Corporate Affairs.**
- It was **established based on the recommendations of the Naresh Chandra Committee on Corporate Governance.**
- It investigates white-collar crimes in India.
- Includes experts from various fields, including accountancy, law, banking, information technology, and more.
- Once a case is assigned to the SFIO, **no other investigative agency can investigate it.**
- **Headquartered in New Delhi** and has offices in major cities including Hyderabad, Mumbai, Kolkata, and Chennai.

### Cases Investigated by SFIO:

- The Department of Company Affairs has identified a serious issue.
- A company passes a special resolution requesting investigation.
- Central or state government departments can request an investigation.

## SARTHI

### Context

- The SARTHI system was launched to reduce post-harvest losses.

### About Solar Assisted Reefer Transportation with Hybrid Controls and Intelligence (SARTHI)

- It is an innovative system developed by the National Institute of Food Technology

Entrepreneurship and Management (NIFTEM) **under the Ministry of Food Processing Industries (MoFPI).**

- It aims to reduce post-harvest losses in the transportation of perishable foods such as fruits and vegetables.
- It has **two compartments for storing fruits and vegetables at optimal temperatures**; fruits are stored at 0-5°C, and vegetables at 7-12°C.

**How the system will work?**

- **The system uses sensors to measure temperature, humidity, ethylene, and CO2 levels;** data from the sensors is transmitted to a mobile app, allowing for real-time quality assessment and decision-making during transportation.
- **Transporters can make informed decisions**, such as rerouting produce to closer markets if spoilage is detected, which helps to reduce energy waste and carbon footprint.

## Samarth Scheme

**Context**

- The Ministry of Textiles launched the "Samarth" Scheme to assist people in the textile industry.

**About Samarth**

- The Scheme for Capacity Building in the Textile Sector (SCBTS), also known as Samarth, **was launched in 2017-18 by the Ministry of Textiles.**
- The government has extended the scheme for another two years, until March 2026 to train about 3 lakh people.
- **It offers people the skills needed to work in various areas of the textile industry** (excluding spinning and weaving).
- It also supports traditional industries such as handlooms, handicrafts, silk, and jute.

**Who conducts the training?**

- The Scheme **operates through Implementing Partners (IPs)**, which include textile industry groups, state and federal government agencies, and specialized organizations such as the Central Wool Development Board and the Central Silk Board.

## Unified Genomic Chip

**Context**

- The Prime Minister has introduced the Unified Genomic Chip to identify high-quality cattle.

**About the Unified Genomic Chip**

- The objective is to assist farmers in identifying high-quality cattle for better breeding decisions to improve livestock quality.
- The chip was **created by the Department of Animal Husbandry and Dairying (DAHD),** under the Union Ministry of Animal Husbandry, Dairying, and Fisheries.
- **The chip comes in two versions:**
  - Gau Chip is designed specifically for cattle. It aids in the identification of high-quality bulls and cows for breeding, thus boosting the genetic quality.
  - Mahish Chip assists in selecting superior buffaloes for breeding purposes.

**How will it work?**

- **The chip analyzes DNA from cattle and buffalo through genomic selection techniques** to predict the potential of young animals to become high-quality breeders.
- Farmers can use the chip's information to make informed decisions about breeding and culling to maintain high-quality livestock and increase productivity.

> Out of the 3.27 lakh people trained so far, 2.6 lakh (79.5%) have found employment. Women make up 2.89 lakh (88.3%) of the trained individuals.

## Abetment of Suicide

**Context**

- The Supreme Court emphasized the importance of avoiding "unnecessary prosecutions" in cases of assisted suicide.

### What is Suicide Abetment?

- Abetment of suicide refers to actions that encourage or assist someone in committing suicide.
- Abetment is defined in Section 107 of the Indian Penal Code (IPC); defines abetment as **promoting someone to commit a crime, conspiring with others to do so, or deliberately assisting in the act through action or inaction.**

### Highlights of the Court Judgement

- The court separates personal and professional relationships.
  - In cases involving personal ties, the standard for establishing abetment may be lower, as emotional conflicts can lead to rash behaviour.
  - Professional relationships are governed by rules and regulations, requiring more concrete evidence of intention to harm.
- The Court clarified that a difficult workplace environment or argument does not necessarily result in abetment. There must be clear evidence demonstrating that the accused intended to drive the person to suicide.

## Ni-Kshay POSHAN YOJANA

### Context

- The Union Health Ministry increased the monthly support for TB patients under the Ni-Kshay Poshan Yojana.

### About Ni-Kshay Poshan Yojana

- The **Ministry of Health and Family Welfare launched the Ni-Kshay Poshan Yojana in April 2018** to provide nutritional support to tuberculosis (TB) patients.
- **To receive benefits, TB patients must first register on the Ni-Kshay portal.** This portal aids in the tracking and management of tuberculosis data collection.
- The financial incentive should be provided through Aadhaar-enabled bank accounts to ensure that the funds reach the intended beneficiaries directly.

### Updates on Ni-Kshay Poshan Yojana

- The monthly nutrition support for TB patients **increased from Rs 500 to Rs 1,000.**
- Ni-Kshay Mitras are volunteers or organizations that help TB patients and their families.
  - They will now adopt TB patients' household contacts and distribute food baskets to them in order to reduce out-of-pocket expenses for patients and their families.
- The Pradhan Mantri TB Mukt Bharat Abhiyaan has expanded to include household contacts of TB patients.
- The ministry has introduced Energy Dense Nutritional Supplementation for underweight TB patients whose BMI is less than 18.5 $kg/m^2$ at the time of diagnosis.
  - About 12 lakh underweight patients will receive this special nutritional support for the first two months of treatment.
- **All TB patients will now receive nutritional support** ranging from Rs 3,000 to Rs 6,000 under the Yojana.

## Zero FIR

### Context

- The Union Ministry of Home Affairs has issued guidelines to Union Territories requiring that "zero FIR" registrations in the local language must be supported by an English-translated copy when forwarded to another state.

### About Zero FIR

- The criminal justice system uses a First Information Report (FIR) as the first step in conducting an investigation. Normally, a FIR must be filed at the police station that covers the location of the crime.
- For serious crimes like rape or murder,

**India aims to eliminate TB by 2025**, which is five years earlier than the global target set by the Sustainable Development Goals (SDGs).

a **Zero FIR can be filed in any police station, regardless of jurisdiction.**

- Once a zero FIR is registered, it is transferred to the appropriate police station (based on jurisdiction) for investigation.
- It was **introduced based on the Justice Verma Committee's (2013) recommendations.**

**New guidelines from the Ministry of Home Affairs**

- **An English-translated copy of the Zero FIR must be attached when forwarding to another Police Station** to ensure that the efficiency of the investigation process is not hampered by the language barrier.
- A translated copy of Zero FIR in English will help to avoid misunderstandings or confusion caused by language barriers as the accuracy of the document is essential for ensuring that the legal process runs smoothly and transparently.

**Zero FIR v/s Regular FIR**

- Registering a Zero FIR is similar to regular FIRs.
- Zero FIRs are assigned a number of 0 by the police station that registered them.
- When a case is transferred to the appropriate jurisdiction, the police station will assign it a number, similar to a regular FIR.

## 1.10 SNIPPETS

| Topics | Details |
|---|---|
| **E-SHRAM** | • The Union Minister for Labor and Employment has introduced the "e-Shram one-stop solution."<br>• The platform **allows unorganized sector workers to register and get access to various government welfare schemes.**<br>• The e-Shram portal was **launched in 2021 to create a comprehensive database of workers**.<br>• Each registered worker will be given a unique Universal Account Number (UAN) to access government services.<br>• Workers can register themselves through a self-declaration process. |
| **Humsafar Policy** | • The Union Road Transport Minister launched the Humsafar Policy.<br>• Humsafar Policy aims to make travel safer and more enjoyable, it plans to **introduce a variety of facilities at fuel stations along highways**, including: Toilets, Baby care rooms, Electric vehicle (EV) charging stations.<br>• The Ministry plans to establish around **950 wayside amenities** mainly on major highways with four lanes or more. These facilities will be located every **40 to 60 kilometres**. |
| **Employees' Deposit Linked Insurance Scheme (EDLI)** | • The government has extended the benefits under the EDLI scheme without a specified end date.<br>• The Scheme was launched in **1976 to** provide financial security to the families of workers registered under the **Employees' Provident Fund Organisation (EPFO)** if they pass away while employed.<br>• In **2021**, the government changed the insurance benefits; the **minimum benefit** increased **to Rs 2.5 lakh**, and the **maximum benefit** increased **to Rs 7 lakh**. |

| | |
|---|---|
| **Free To Think 2024** | • The Report "Free to Think 2024" by Scholars at Risk (SAR) highlights major concerns regarding academic freedom worldwide.<br>• **India's academic freedom score fell** from 0.6 in 2013 to 0.2 in 2023. This marks the lowest score since the mid-1940s.<br>• The report depicts India's academic environment as "completely restricted," suggesting that students and staff have severe restrictions on their ability to explore, express, and discuss ideas. |
| **Anna Darpan** | • The Food Corporation of India (FCI) started a new project called Anna DARPAN to make its work easier and faster.<br>• **It will link internal and external parts of the food supply chain**. This will help everyone, from farmers to FCI employees, stay updated and connected.<br>• The **FCI was set up in 1965 and works under the Ministry of Consumer Affairs, Food, and Public Distribution.**<br>• FCI purchases food grains at Minimum Support Prices (MSPs) from farmers, stores them, and distributes them to states at Central Issue Prices (CIPs), which are lower than market rates. |
| **National Centre Of Excellence For AVGC** | • The Union Cabinet has approved the National Centre of Excellence (NCoE) for Animation, Visual Effects, Gaming, Comics, and Extended Reality (AVGC-XR) establishment in Mumbai.<br>• AVGC stands for Animation, Visual Effects, Gaming, and Comics. This sector **uses technology to create content** like animated movies, special effects in films, video games, and even digital comics.<br>• The **NCoE will help people develop new skills**, and will also support businesses that want to create content inspired by Indian stories and culture. |

## 1.12 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| 10 Years Of Swachh Bharat Mission | 3rd October |
| Marital Rape In India | 5th October |
| Should States That Spend Irresponsibly Be Penalised? | 7th October |
| Organ Donation And Transplantation In India | 17th October |
| India's Sdg Focus And Its Human Development Issues | 19th October |
| Minimum Dietary Diversity | 26th October |
| The Burgeoning Expenditure Of Elections | 30th October |

# 2. INTERNATIONAL RELATIONS

## 2.1 SHANGHAI COOPERATION ORGANISATION (SCO)

### Context

- The External Affairs Minister represented India at the 2024 Shanghai Cooperation Organization (SCO) summit in Islamabad, Pakistan.

### Key highlights of the SCO Summit


- Indian representatives expressed the need to combat terrorism, separatism and extremism for SCO member countries. He highlighted that **cooperation among countries depends on mutual trust and respect, urging nations to respect territorial integrity and sovereignty.**
- China and Pakistan urged SCO members to view the Belt and Road Initiative positively, highlighting its potential benefits for regional economies' connectivity. India remains the only SCO member that hasn't supported the BRI due to territorial concerns.
- Member countries discussed the negative impact of Western sanctions, mainly on Russia and Iran, and criticized trade trade protectionism and advocated for smoother industrial and trade connections.

### Shanghai Cooperation Organization (SCO)

- It is an **intergovernmental organization** that focuses on political, economic and security cooperation among its member countries.
- It **originated as the "Shanghai Five" in 1996**, It initially involved China, Russia, Kazakhstan, Kyrgyzstan and Tajikistan. The objective was to improve military trust and border security among its members.
- Uzbekistan joined the group in 2001, and then the organization was **renamed as Shanghai Cooperation Organization (SCO).**
- The **SCO Charter was adopted in 2003**, which outlines the goal and principles of the organization, and also stresses on regional security, Economic Cooperation and cultural exchanges.
- It is the world's largest regional organization in terms of geographic scope and population, **covering approximately 24% of the area of the world and 42% of the world's population.** As of 2024, its **combined GDP accounts for around 36% of the world's total.**

#### Membership

- The SCO **currently has 10 member states**: China, Russia, India, Pakistan, Kazakhstan, Kyrgyzstan, Tajikistan, Uzbekistan, Iran (joined in July 2023), and Belarus (joined in July 2024).
- Afghanistan and Mongolia hold observer status in the SCO.
- SCO includes several dialogue partners including Turkey, Armenia and Azerbaijan.

## Structure

- **The Council of Heads of the State is the highest decision-making body of the SCO,** which meets annually.
- The Council of Foreign Ministries manages issues concerning the organization's day-to-day operations and prepares the meetings for the Council of the Head of State.
- Regional Antiterrorist Structure (RATS) based in Tashkent (Uzbekistan) is central to the security agenda of the SCO, which coordinates efforts among members to combat terrorism, extremism and separatism.
- The **headquarters is located in Beijing, China.**

## Role and Interest of India in SCO

- **India joined the group in 2017** and plays an important role in addressing terrorism and extremism within the SCO framework by **participating in joint military exercises and intelligence sharing.**
- It provides India with the **opportunities to promote energy security, connectivity projects, and trade relations.** India aims to improve its economic ties with Central Asian countries by utilizing the SCO platform to boost trade and investment.
- The participation of India in SCO allows it to **balance its relations with China and Russia while enhancing its regional influence**. By engaging with other member countries, India can promote its strategic interest and contribute to a multipolar world order. The **SCO also offers a platform for India to address regional security concerns and promote its foreign policy objectives.**
- Promoting India's cultural heritage and strengthening people-to-people ties with member countries can enhance India's engagement with SCO. Through culture exchanges, educational programs and tourism initiatives, India can promote mutual understanding and goodwill among SCO member states.

## Challenges of SCO

- **Continuous border disputes between India & China and India & Pakistan** present a challenge to the SCO's unity and effectiveness.
- **Member countries have different geopolitical interests**, which can lead to conflicting priorities. For example, Russia and China may have different approaches to regional issues compared to Central Asia and South

Asian countries.

- **Different levels of economic development of member countries** make it difficult to align on a comprehensive economic agenda. Some countries may prioritize security, while others may focus on trade and development.
- The SCO has struggled to develop a unified economic agenda and effective implementation mechanism, which limits the organization's ability to achieve its economic goal.
- The rise of Western alliances and the Indo-Pacific framework present challenges for the SCO. These current developments can influence the organization, strategic direction, and effectiveness.

### Way Forward

- The SCO should **focus on promoting trade, investment and connectivity projects that benefit all member nations.** This includes reducing trade barriers and promoting economic interactions.
- Strengthening the capabilities of RATS and improving intelligence sharing among member nations can strengthen SCO's security framework. Conducting joint anti-terrorism training will also improve Cooperation.
- **The SCO should promote diplomatic dialogue mechanisms to manage internal conflicts and resolve bilateral tensions.** Encouraging back-channel diplomacy and confidence-building majors can help mitigate disputes.
- Expand cultural exchange events, educational programmes and youth forums to deepen mutual understanding and goodwill among Member States.
- **The SCO should create structural and functional mechanisms** to increase its operational effectiveness. This includes streamlining the decision-making process and improving coordination among member countries.

## 2.2 INDIA AND MALDIVES RELATIONS

### Context

- India and Maldives have signed several important agreements to strengthen their bilateral relations.

### Highlights of the recent agreements

- India and Maldives have signed a **currency swap agreement of value of $400 million** to help the Maldives to manage its foreign exchange reserve efficiently.
  - A currency swap is a financial agreement between two parties to exchange principal amounts and interest payments in different currencies over a specific period.
- Both countries have agreed to initiate discussions on a free trade agreement to improve economic ties.
- The Prime Minister of India and the President of Maldives have **launched the RuPay card in Maldives to promote financial transactions between the two countries.**
- India has announced that the Greater Malay Connectivity project completed soon and India will support the development of a **new commercial port in Thilafushi.**
- India handed over 700 social housing units to the Maldives, which were built under the Exim Banks buyers' credit facilities.
- Several infrastructure projects were inaugurated, including a **new runway at Hanimadhoo International Airport.**

### India-Maldives Relations

- The Maldives is an island nation located southwest of India, it is an **important part of India's maritime neighbourhood policy and**

**'Security and Growth for All in the Region' (SAGAR) policies.**

- Its strategic location in the Indian Ocean region makes it a significant partner for India's maritime security and regional influence.
- The formal diplomatic relations between both countries were established in 1966.


## Strategic Partnership

- India and Maldives have a comprehensive security partnership, which includes anti-terrorism collaboration and joint defence exercises.
  - **"Exercise Ekuverin" is an annual joint military exercise** to enhance cooperation between 2 nations and improve their capabilities in counterterrorism operations.
- **Both countries have signed several bilateral agreements for joint maritime surveillance, intelligence sharing, and counterterrorism.** These agreements help to ensure the safety and security of the Indian Ocean region.
- In 1988, when a group attempted to overthrow the Maldivian government, then on request, **India launched "Operation Cactus" for military intervention to save the Government from Coup.**
  - The event highlighted India's role as a security provider in the region and strengthened the Security ties between India and Maldives.
- Both countries work together in multilateral forums like the Indian Ocean Rim Association (IORA) and the South Asian Association for Regional Cooperation (SAARC) to address regional challenges and promote economic and security cooperation.

## Economic Relations

- In 2023-24, the **bilateral trade was almost $1 billion, with India's exports at $ 892 million and imports at $86.84 million.**
- India exports petroleum products to the Maldives, which are essential for the island nation's energy needs.
  - India supplies various food items, including rice, wheat, and vegetables, to the Maldives.
  - Indian machinery and equipment are crucial for the Maldives' infrastructure and development projects.
- The Maldives exports fish and fish products, which are a major part of its economy. Other exports include minerals and textiles, though these are on a smaller scale compared to fisheries.
- India is actively investing in Maldives, mainly in infrastructure, energy and technological sectors. Indian projects include the redevelopment of Hanimadhoo International Airport and the construction of the Ministry of Defence building.
- India is a major source of tourists for Maldives. Tourism Is a major part of the Maldivian economy, contributing nearly 30% of the GDP and generating more than 60% of foreign exchange.

## Challenges

- **Increasing Chinese investment in Maldives,** mainly in infrastructure projects, has raised concern in India about its strategic intentions in the Indian Ocean region. The Maldives' participation in China's Belt and Road Initiative has complicated the regional dynamics.

- The politics of Maldives have both pro-India and pro-China fractions. **The "India-Out-Campaign",** which calls for reducing Indian influence in the Maldives has gained momentum during the last few years. This campaign has created diplomatic challenges and affected relations between the two countries.
- The strategic location of Maldives and its vulnerability to radicalization poses significant se**curity concerns for India.** The rise of extremism and the potential for terrorist activities in the region are important issues, which both countries need to address.
- **Counter-terrorism efforts face challenges due to the complex security situation in the region.** Ensuring effective intelligence sharing, joint surveillance and coordinated counter-terrorism operations are essential to curb the rise of extremism and maintain the result be security.

### Way Forward

- Regular visits and dialogues between the leaders of India and Maldives can help to address mutual concerns and promote stronger relations.
- **Economic opportunities must be grabbed by finalizing the free trade agreement**, which will enhance bilateral trade by reducing tariffs and other trade barriers, this will also diversify the economy and create new opportunities for businesses.
- Promoting defence and counter-terrorism collaboration is essential. **Joint military exercises like "Ekuverin" and "Dosti" should be expanded to include more comprehensive engagement.**
- Collaboration in maritime surveillance and capacity building is important. Joint efforts in patrolling the Indian Ocean region and sharing maritime intelligence can ensure the safety and security of maritime routes.
- **Joint research partnerships on climate action can be launched** to mitigate the impact of rising sea levels and extreme weather events. Strengthening cooperation in disaster management and response can ensure timely and effective assistance during natural calamities.
- **India needs to develop strategies to counterbalance Chinese influence in Maldives.** India can provide alternatives to Chinese investment, and ensure that the Maldivian sovereignty and strategic autonomy are to be respected. **By offering competitive investment opportunities and promoting Economic Cooperation, India can strengthen its position as a reliable partner.**

## 2.3 INDIA CANADA RELATIONS

### Context

- The Canadian Prime Minister accused agents from the Indian government of involvement in the murder of Hardeep Singh Nijjar, a Sikh separatist leader who was shot dead in Canada in June 2023.

### Details

- Canada claims that Indian diplomats gathered information on Canadians involved in the Khalistan movement, and this information was shared with India's intelligence agency, the Research and Analysis Wing (RAW), and passed on to criminal networks in India.
- India has strongly denied these allegations calling them baseless and part of a political agenda. India argues that it's committed to respecting Canada's sovereignty, but it has long raised concerns about the presence of Khalistan supporters within Canada.

## About India-Canada Relation

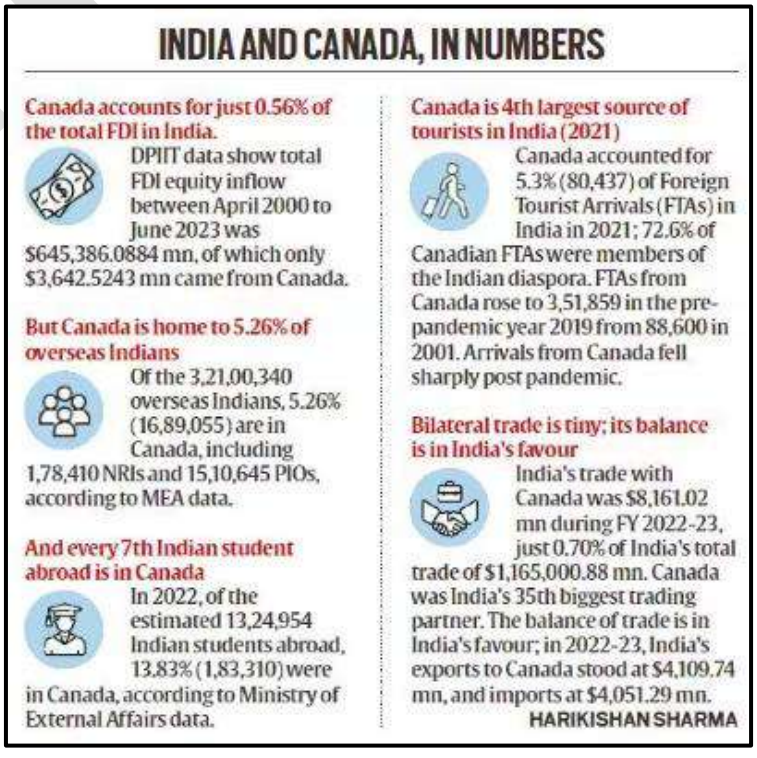
- The **diplomatic relations between India and Canada were established in 1947**. Both countries share common values of democracy, pluralism and commitment to a rule-based international order.
- Both countries cooperate in various multilateral forums such as the United Nations, G20 and Commonwealth to promote global peace, security and development.

### Economic Relations

- **In 2023, bilateral trade between India and Canada was valued at $9.36 billio**n with the Indian exports to Canada worth $5.56 billion and Canadian exports to India valued at $3.80 billion.
- Major export items from India include gems, pharmaceuticals, and machinery, while Canada exports items like pulses, wood pulp, and chemicals to India.
- According to the National Investment Promotion & Facilitation Agency, **Canada ranks as the 18th-largest foreign investor in India, with a total investment of $3.31 billion from 2020-21 to 2022-23.**
  - Canadian investments account for 0.5% of India's total foreign direct investment (FDI), with services and infrastructure comprising 41% of these inflows.
- Canadian pension funds have played an important role in investing in India. **As of 2023, Canadian Pension Funds had invested around $55 billion in India.**
- The ongoing negotiations for a comprehensive economic partnership agreement (CEPA) aim to enhance trade and investment by reducing trade barriers and promoting economic Cooperation.

### About Khalistan Movement

The **Khalistan movement began in the 1980s with the demand for a separate Sikh state carved out of Punjab**. This movement led to a period of violence and unrest in India, but today, the most vocal Khalistan supporters are in Canada, where there's a significant Sikh community. With around 1.5 million people of Indian origin, the Sikh population in Canada has a strong influence in certain political circles.


## Why India is Important for Canada?

- India is an **important trade partner for Canada** and strengthening economic ties with India can help Canada to diversify its market, and reduce dependency on traditional partners.
- **India's strategic role in the Indo-Pacific aligns with Canada's regional interests.** Therefore, collaborating with India will enhance Canada's geopolitical influence and support its objectives in maintaining a free and

open Indo-Pacific region.

### Why Canada is Important for India?

- Investment from Canada in the infrastructure and energy sector **supports India's growth needs.** Canadian pension funds and companies are significantly investing in Indian projects and helping in economic development.
- Access to natural resources (like coal, wood pulp, Uranium) of Canada is **important for India's energy security.** Therefore strengthening bilateral ties will ensure a stable supply of these resources to support growing energy demand.
- Advanced technological development in Canada, mainly in the fields of clean energy, artificial intelligence and digitalization, is Important for India's development, and collaborating with Canada in these areas can drive innovation and technological advancement in India.

### Challenges

- **The pro-Khalistani movement in Canada has been a continuous source of tension** between India and Canada.
- There are **regulatory and bureaucratic challenges that obstruct the growth of trade,** these barriers include tariffs, non-tariff barriers and a complex business environment that makes it difficult for businesses to operate smoothly.
- **Current events and Sensational news reportings of sensitive diplomatic issues have increased misunderstandings and stereotypes** between the people in both countries, which promoted a lack of trust between the two nations.

### Way Forward

- Increasing high-level diplomatic efforts can help strengthen relations and maintain trust by addressing mutual concerns. Regular meetings between leaders and officials can provide a better understanding and cooperation.
- **Finalizing the Comprehensive Economic Partnership Agreement and reducing trade barriers can strengthen economic ties.** Both nations should work towards creating a positive environment for trade and investment.
- **Strengthening counterterrorism measures and addressing mutual security concerns can promote trust and collaboration**. Joint efforts in cybersecurity and intelligence sharing can improve security cooperation.
- Promoting people to people connections through education, tourism and media can bridge cultural gaps and promote mutual understanding. Cultural exchange programmes and initiatives can help build stronger connections between the two Countries.

## 2.4 ISRAEL ATTACK ON IRAN

### Context

- Israel conducted airstrikes to target military sites in Iran in response to Iran's ballistic missile attack.

### About Israel and Iran Relations

- Iran and Israel once shared common interests, mainly on non-Arab states. **This alliance ended after the 1979 Iranian Revolution, which brought Ayatollah Khomeini to power and transformed Iran into an Islamic State with an anti-Israel stand.** Iran started viewing Israel as a colonial power, and calling it "Zionist regime" and cutting diplomatic relations with it.

- **To counter Israel's influence, Iran has supported militant groups like Hezbollah in Lebanon and Hamas in Gaza.** For Iran supporting these groups aligns with its anti-Israel policy and also strengthens its influence over regional politics.
    - Iranian leaders use this support to gain favour among the Sunni Arab population by positioning themselves as a defender of the Palestine cause.
- Israel has taken various steps to curb Iran's influence and prevent it from acquiring nuclear weapons. The **Israeli military frequently targets Iranian military camps** and arms transfers in Syria to prevent weapon transfer to Hezbollah.
    - **Israel has also conducted covert operations** including the assassination of an Iranian nuclear scientist to disrupt Iran's nuclear development, as Israel sees nuclear-armed Iran as a threat.

## Key Actors in the conflict

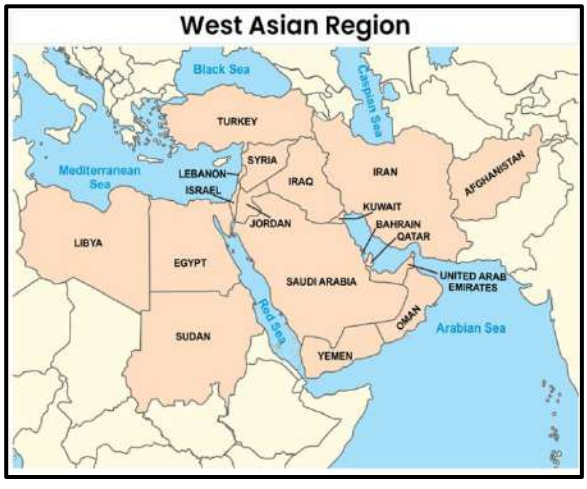
| Israel's Allies | Iran's Allies |
|---|---|
| • **The United States** is the most powerful ally which provides military aid and diplomatic support.<br>• **The United Kingdom and France** support Israel diplomatically and militarily.<br>• **Saudi Arabia, Jordan and UAE** raise concern about Israeli action in public, however, they do not support Hamas and on some occasions have coordinated with Israel against Iranian-supported groups. | • Hamas and Hezbollah to counterbalance Israeli influence.<br>• Iran supports Houthis in Yemen, as they have launched attacks against Israel.<br>• **Syria and Iraq host Iran-supported militant groups** that support attacks on Israel and target US and allied forces assets. |

## Implications of the Conflict

- Middle East is an important oil-producing region and any escalation in the Israel-Iran conflict can **disrupt oil supplies, which will increase crude oil prices globally,** and affect economies by raising transportation and goods costs.
- The conflict can increase tension in the region and potentially involve other countries like the USA and Russia, which will make the situation more complex. This instability can affect global security and international relations.
- **The conflict can lead to economic uncertainty**. The stock market may become volatile and businesses might delay investments due to an unpredictable environment.

## Impact on India

- India imports more than 85% of its crude oil, and a significant portion comes from the Middle East, therefore, disruption in oil supply due to conflict will increase the oil price in India, which will **impact India's energy security and also push inflation.**
- **The conflict can affect important shipping routes like the Red Sea, Persian Gulf, and Strait of Hormuz,** Which are important for global trade, the disruption can increase shipping costs and affect businesses in India.
- **Higher oil prices and increased Inflation can slow down economic growth.** The Reserve Bank of India



might have to adjust its monetary policy to manage inflation, which will affect interest rates and economic stability.
- India has a large diaspora in the Middle East, and any escalation in conflict poses risks to their safety and security.
- The conflict can **complicate India's diplomatic effort to balance its relationship with both Israel and Iran,** The emerging situation will require a new approach to maintain good relations with both countries.

### Way Forward

- The international community, including major powers and the United Nations, should **increase diplomatic efforts to mediate the Iran- Israel conflict.** Establishing a dialogue channel can help to reduce tension and mitigate the risk of increasing regional conflict.
- Organisations like the Gulf Corporation Council can **encourage decisions to promote peace and stability in the region.** Regional Peace Forum can achieve a more stable and cooperative environment to resolve issues among member nations.
- **Economic initiatives for peace that are combined with sanctions against conflicting parties can pressure both sides towards negotiation**. This approach could also mitigate the economic impact on global markets by decreasing hostile actions.
- Strengthening International Security cooperation, including intelligence sharing and joint military exercise can help to address the expansion of hostilities and prevent further escalation. **United Nations peacekeeping mission in the conflict zone could also support a ceasefire and protect civilians.**

## 2.5 SHORT ARTICLES

## World Telecommunication Standardization Assembly (WTSA)

### Context

- The World Telecommunication Standardization Assembly (WTSA) was organized by the International Telecommunication Union in New Delhi.

### Details

- For the **first time the event is organised in the Asia Pacific region.**
- The assembly discussed several important issues including 6G, Artificial Intelligence (AI), Internet of Things (IoT), big data, cybersecurity, machine-to-machine (M2M) communication and quantum technologies.
- The Global Standards Symposium (GSS) was also organized during the WTSA. The GSS is a high level platform to discuss Policies and technologies.

### World Telecommunication Standardization Assembly (WTSA)

- It is held **every four years.** It was first organized in 2002.
- It **acts as the governing conference for the ITU Telecommunication Standardization Sector (ITU-T).** It defined the work program, working methods and structure of ITU-T.
- It **plays an important role in setting global telecommunication standards,** which are crucial for ensuring interoperability and encouraging innovation in the telecommunication sector.

### International Telecommunication Union (ITU)

- **It was established in 1865 as the International Telegraph Union** and **became a specialized agency of the United Nations in 1947.**
- It coordinates between governments and private sector bodies to ensure the global standardization and development of telecommunication and ICT services.

- It has a membership of 193 countries and more than 1000 companies, universities, and international and regional organizations.
- The **headquarters is located in Geneva, Switzerland.**

## BRICS Summit

### Context

- The Indian Prime Minister participated in the BRICS Summit in Russia.

### About BRICS

- BRICS (Brazil, Russia, India, China, and South Africa) is an alliance of the world's most influential emerging economies. **It was originally established in 2001 as BRIC**; the term first used by Goldman Sachs. **South Africa joined in 2010, transforming BRIC into BRICS.**
- The objective of the group is to promote economic cooperation among its members and reshape the global economic dynamics in favour of emerging economies.
- The BRICS expansion was formalized at the 2023 summit in South Africa.
- **Iran, Egypt, Ethiopia, and the United Arab Emirates attended their first summit as member states at the 2024 summit in Russia.**
- The group **represents about 30% of the world's land surface and 45% of the world's population.**

### India's Strategic Goals in BRICS

- India's objective within BRICS **aligns closely with its broader foreign policy goal, which is centred on multilateralism and empowerment of the Global South.**
- India can benefit from the collaborative projects under BRICS, which support its development goal and also contribute to regional stability.
- India aims to challenge the dominance of Western-led institutions like the World Bank and IMF by promoting a more equitable global governance framework. **BRICS serve as a counterbalance allowing India to push for reforms in multilateral platforms** to give more voice to developing countries.
- Technology exchange with the member countries can support India's sustainable goals.

### Challenges and opportunities for India within BRICS

- **The member nation holds divergent views on issues like relations with the Western countries.** For example, while Russia and China take a more aggressive stand, India adopts a more balanced approach. This diversity can create friction but it also creates an **opportunity for India to exercise diplomatic skills to achieve consensus.**
- Border issues and strategic competition with China present a unique challenge within the group, however, it also offers a diplomatic platform to both countries to engage in dialogue and work towards strengthening relations by minimizing conflict.

## Israel UN Relations

### Context

- Israel announced a ban on United Nations Secretary-General António Guterres, which means he's not allowed to enter Israel.

> Experts say the only similar case happened in 1950 when the USSR (now Russia) threatened to veto the UN Secretary-General's re-election over a disagreement during the Korean War.

### Why Israel Banned the UN Secretary-General

- Israel's Foreign Minister gave two main reasons for the ban:
  1. **Iran's Missile Attacks:** Israel felt Guterres didn't clearly condemn missile attacks from Iran against Israel.
  2. **Hamas's Attack on Israel:** Israel felt Guterres's statements on a Hamas attack from October 7 last year, which caused many Israeli casualties, were too mild. Even though he did condemn the violence, Israel wanted him to be more forceful in his words.

### About Israel-UN Relationship

- Israel joined the UN in 1949, a year after becoming an independent country. Since then, Israel's interactions with the UN have often been challenging, particularly around Israel's actions in the Palestinian territories.
- **Resolution 181 (1947) was a UN proposal to divide Palestine into two separate states – one for Jews and one for Arabs**. While the Jewish community agreed, Arab countries rejected it, and this led to conflicts.
- After Israel's victory in the Six-Day War (1967), the **UN called for Israel to withdraw from the territories it had captured in exchange for peace with its neighbours.** Discussions around this resolution are still not finalized.
- The **UN General Assembly has passed many resolutions that criticize Israel's military actions,** especially in Palestinian territories like the West Bank. Many countries, mainly those in the Arab region, have condemned Israel for human rights violations.
- Israel also has strong support, mainly from the United States. The U.S. often vetoes Security Council resolutions critical of Israel, claiming these resolutions are biased.

## UK-Mauritius Treaty on Chagos Archipelago, Diego Garcia

### Context

- United Kingdom to transfer the sovereignty of the Chagos Archipelago to Mauritius.

### Details

- The United Kingdom announced that it would transfer sovereignty of the Chagos Archipelago, including Diego Garcia, back to Mauritius, **however, the UK will still operate the U.S. military base on Diego Garcia for the next 99 years.**

### About Chagos Archipelago

- It is a group of 58 small islands located around 500 kilometres south of the Maldives in the Indian Ocean.
- These islands were uninhabited until the late 1700s when the French brought people from Africa and India to work on coconut plantations.
- In 1814, after the Napoleonic Wars, Britain took control of the islands from France.
- In 1965, the **UK created the British Indian Ocean Territory (BIOT), which included the Chagos Islands, keeping them as a separate territory when Mauritius became independent in 1968**.

### About Diego Garcia

- **Diego Garcia is a U.S. military base in the Indian Ocean,** it provides intelligence, surveillance, and logistics support for the U.S., helping them to maintain security and peace in the Indian Ocean region.


## G20 Pandemic Fund

### Context

- The Government of India has launched a $25 million G20 pandemic fund to prevent Zoonotic diseases.

### What is the G20 Pandemic fund?

- It is a **financial initiative established by G20 countries at the G20 Summit held in Indonesia in 2022.**
- Its objective is to **reduce risks from epidemics and pandemics** in the most vulnerable parts of the world and contribute to a healthier and safer world.
- It aims to **provide long-term financing for "Pandemic Prevention, Preparedness and Response (PPR)"** and address gaps through

investments and technical support at the national, regional, and global levels.
- It also incentivizes countries to prioritize this agenda and increase their own efforts.
- The fund has US$1.4 billion in seed funding committed by donors, including India.
- It is **supported by the Asian Development Bank (ADB), the World Bank and the Food and Agriculture Organization (FAO).**

Zoonotic Diseases are infections that transfer between animals and humans. It is **caused by various pathogens such as viruses, bacteria, parasites or fungi.** For example; Bird flu is transmitted from infected birds, and the COVID-19 virus originated in bats.

### What is the G20 pandemic fund launched by India?

- The government announced Pandemic fund is **part of a $1.4 billion initiative to provide financial support (grants and low-interest loans) to countries that need assistance in pandemic preparedness.**
- It aims to **upgrade the animal health laboratories network** across India to allow faster and more accurate disease detection in animals to prevent transmission to humans.
- It will **promote cross-border collaboration to ensure timely information** about disease threats and encourage a cooperative approach with other countries to identify and respond to zoonotic disease risks.

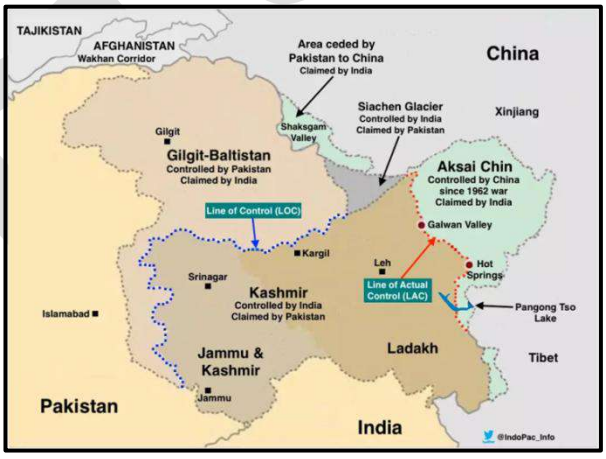
## India to resume patrolling along LAC

### Context

- The Border Patrolling Agreement between India and China along the Line of Actual Control (LAC) is an important step to restore peace.

### Background

- The Line of Actual Control (LAC) is an **unofficial boundary between India and China** Spanning about 3,488 kilometres. It is a **disputed border where both countries have different claims.**
- In the **violent clash in Galwan Valley in June 2020**, both Indian and Chinese troops suffered casualties, after the incident, both nations deployed more troops and heavy weaponry along the LAC, which increased the possible risk of serious conflict.
- There are 7 disputed points in eastern Ladakh; **PP 14 (Galwan), PP 15 (Hot Springs), PP 17A (Gogra), north and south banks of Pangong Tso, Depsang Plains, and Charding Nullah.**
- Multiple rounds of Corps Commander Level discussions were held in eastern Ladakh to resolve the tension along the LAC.




### About the Recent Agreement

- The recent agreement resumed patrolling in eastern Ladakh**. Indian troops will be allowed to patrol up to PP 10 to PP 13 in the Depsang region and Charding Nullah in Demchok.**
  - Depsang Plain is located near the strategic **Daulat Beg Oldie (DBO) airstrip; close to the Karakoram Pass.**
  - Demchok is the location where **both countries have built infrastructure, which results in occasional conflicts.**
- Both countries have **established a framework for patrolling up to the previously agreed point along LAC.** Patrols will be conducted twice a month and each patrol to include only

14-15 troops to avoid large gatherings that could lead to conflict.

- **Monthly commander-level meetings and case-specific discussions** will be held to address issues regarding the progress of the patrolling agreement.


## International Atomic Energy Agency (IAEA)

### Context

- The International Atomic Energy Agency published its report on climate change and nuclear power.

### Key highlights of the report

- Nuclear energy is a reliable low-carbon option that can complement other renewable energy sources like solar and wind, to **reduce carbon emissions and achieve targets under the Sustainable Development Goals (especially SDG 7: Affordable and clean energy).**
- The report highlighted that countries need to increase funding for nuclear energy to achieve net zero emissions by 2050. It indicated that **if sufficient investment is provided the global nuclear capacity could increase 2.5 times by mid-century.**
- Investment in nuclear energy between 2017 and 2023 was around $50 billion per year on average, however, the report highlighted that the **number needs to increase to $125 billion annually to meet the expansion goals.**
- The report suggested policy reforms to attract investment and build the essential infrastructure. **Recommendations included:**
  - Strengthening regulatory frameworks.
  - Developing new project delivery models
  - Promoting international partnerships to bridge the finance gap.

### About the International Atomic Energy Agency (IAEA)

- It is an **autonomous organization within the United Nations System.**
- It was **established in 1957 to promote the peaceful use of nuclear energy** and aims to prevent its misuse for military purposes.
- It reports to the United Nations General Assembly (UNGA) and the UN Security Council.
- It monitored nuclear programs and conducted Inspections to verify that nuclear materials are not diverted to military use.
- It establishes safety standards and provides guidelines to ensure the safe handling of nuclear materials and the secure operation of nuclear facilities.
- **Countries that ratify the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) need to agree to IAEA inspection** of domestic nuclear facilities.
- It supports innovation in nuclear science and technology to promote new applications in health, agriculture and environmental management.
- **In 2005, IAEA received the Nobel Peace Prize** for their effort to promote peaceful nuclear energy.
- The current membership is 178 countries, and the **headquarters is in Vienna, Austria.**

## 2.6 SNIPPETS

| Topics | Details |
|---|---|
| **Shadow Fleets** | • Western media has accused India of hosting "shadow fleet" to help Russia to evade sanctions imposed by the West.<br>• A **shadow fleet consists of ships that operate secretly to avoid detection and regulation.**<br>• They engage in activities that violate international sanctions, such as transporting oil from sanctioned countries like Iran, Venezuela or Russia.<br>• To avoid detection, **these ships regularly change their names, flags and registration details.**<br>• Sanctions are imposed by countries or international organizations to restrict or penalize certain activities of a country, entity, or individuals. |
| **Nobel Peace Prize** | • The 2024 Nobel Peace Prize has been awarded to the Japanese organization "Nihon Hidankyo".<br>• **Nihon Hidankyo, a Japanese organization, represents the survivors of the atomic bomb attack on Hiroshima and Nagasaki during World War II.** These survivors, known as Hibakusha, have devoted their lives to sharing their experiences to promote peace and the elimination of nuclear weapons.<br>• The **prize is awarded by the Norwegian Nobel Committee appointed by the Parliament of Norway.** Candidates are nominated by qualified individuals and organizations, and the committee reviews these nominations to select the laureates. |
| **Nobel Literature** | • South Korean poet and novelist “Han Kang“won the 2024 Nobel Prize in Literature.<br>• **Han Kang became the first Korean to win the Nobel Prize Win in Literature.**<br>• She was praised for her powerful writing that tackles human struggles and fragile emotions.<br>• The Nobel Prize in Literature was started in 1901 and is given to authors who create outstanding works that have an idealistic direction.<br>• The prize is decided by the Swedish Academy, after going through the writer's entire body of work, not just one book.<br>• Traditionally, the **Literature prize is the last one given during the Nobel Prize ceremony.** |
| **Universal Postal Union** | • The Universal Postal Union announced plans to study the Unified Payment Interface (UPI) to explore the possibilities of integrating it into international money transfers.<br>• It is a s**pecialized agency of the United Nations.**<br>• It was established by the Treaty of Bern in 1874.<br>• It coordinates postal policies among member nations and sets rules for international mail exchanges.<br>• Any member country of the United Nations can become a member of UPU, and **non-UN countries can also join.**<br>• It has 192 member countries and its headquarters is located in Bern, |

| | |
|---|---|
| | Switzerland. |
| **Anaconda Strategy** | • China is reportedly using the Anaconda strategy against Taiwan.<br>• The "anaconda strategy" is a **military strategy designed to slowly press an opponent until they have no choice but to surrender.**<br>• The term originated during the American Civil War.<br>• China's Anaconda strategy against Taiwan is to encircle by both sea and air to increase pressure on Taiwan to surrender its sovereignty.<br>• Recently **China conducted "Operation Joint Sword 24B" near Taiwan in the South China Sea.** |
| **Hand-In-Hand Initiative** | • The Hand-in-Hand initiative was launched by the Director General of the Food and Agriculture Organization (FAO) of the United Nations.<br>• The Hand-in-Hand initiative **aims to bridge the financial gap in the Agri-food sector by focusing on vulnerable regions,** including small island developing states, and countries facing food crisis.<br>• The Hand-in-Hand Investment Forum 2024 was organized in Rome, Italy, during the World Food Forum. It attracted more than $3 billion in investment in the Agri-food sector. |
| **Musaned Initiative** | • Musaned Initiative is a digital platform launched by Saudi Arabia.<br>• Musaned Initiative is a **digital platform, which provides a stable working environment by making the employment process more transparent and secure.**<br>• Workers can check their work agreements through the app, which will help them to understand their rights and responsibilities. |

## 2.7 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| Principles Of Un Charter | 4th October, 2024 |
| India And West Asia | 5th October, 2024 |
| A Year Of War In West Asia | 9th October, 2024 |
| Asean-India And East Asia Summit | 14th October, 2024 |
| International Ngos And The Perils Of Outsourcing Development | 14th October, 2024 |
| Conflict In Korean Peninsula | 17th October, 2024 |
| Why No Indian Has Won Nobel Prize In Science In Last 94 Years? | 19th October, 2024 |
| China Taiwan Issue And India | 23rd October, 2024 |
| India's Cautious Approach In Trade Agreements | 23rd October, 2024 |
| The Commonwealth Realm | 25th October, 2024 |
| Comparison Of India And US Election | 26th October, 2024 |
| Blue Helmet | 26th October, 2024 |
| India – Spain Bilateral Relationship | 29th October, 2024 |
| Global Supply Chains And Security | 29th October, 2024 |
| India China Bilateral Relations | 29th October, 2024 |

# 3. ECONOMY AND AGRICULTURE

## 3.1 NON-BANK FINANCE COMPANIES (NBFCS)

### Context

- The Reserve Bank of India (RBI) has barred many non-bank finance companies (NBFCs) for violation of multiple rules.

### Definition

- They are a company **registered under the Companies Act, 1956 or the Companies Act, 2013.**
- They are engaged in financial activities like loans, investments, leasing, etc.

### Conditions to Register as NBFC

- The NBFCs must be registered as a company under the Companies Act, 1956, or the Companies Act, 2013.
- **Their minimum capital or Net Owned Fund requirement is Rs. 2 crores.**
- More than 50% of their total assets and gross income must come from financial activities.
- **At least 1 Director of NBFCs should be from the financial field or a senior banker.**

### How does an NBFC work?

- They operate by raising funds via **deposits, loans, or other financial instruments, excluding traditional demand deposits.**
- They lend to individuals, businesses, or other entities in their specific sectors or niches.
- They earn revenue through interest on loans, fees, and other financial services.

### What they cannot do?

- They cannot accept demand deposits.
- They are not part of payment systems and they cannot issue cheques.

### Types of NBFCs in India

**Based on regulation:**

- ***NBFCs registered and regulated by RBI***
  - These are NBFCs that are involved in providing financial activities and are required to obtain a registration with RBI.
  - **PNB Housing Finance (PNBHF), Bajaj Finance, Mahindra & Mahindra Finance Services (Mahindra Finance), and Shriram Finance are some examples.**
- ***NBFC Not Registered and regulated under RBI***
  - These are NBFCs that are involved in providing financial activities but they are not required to obtain a registration with RBI.
  - These types of entities are regulated by other financial sector regulators and they do not need to obtain an NBFC License from RBI to avoid dual regulation.
  - **Types:**
    - ✓ **Insurance Companies:** These are regulated by the Insurance Regulatory and Development Authority of India (IRDA),
    - ✓ **Housing Finance Companies:** They Are regulated by the National Housing Bank (NHB),
    - ✓ **Stock-Broking Companies and Merchant Banking Companies:** These companies are under the regulation of the Securities and Exchange Board of India (SEBI),
    - ✓ **Mutual Funds:** They are also regulated by SEBI.
    - ✓ **Venture Capital Companies:** SEBI is the regulatory authority,
    - ✓ **Collective Investment Schemes:** They are also regulated by the SEBI.
    - ✓ **Chit Fund Companies:** These are regulated under the Chit Fund Act by the respective State Governments,
    - ✓ **Nidhi Companies:** They are regulated by the Ministry of Corporate Affairs (MCA).

**Based on deposits, NBFC is broadly classified as**

- ***(NBFC-D)-Deposit-taking Non-Banking Financial Company:*** Deposit Accepting NBFCs have been registered with RBI as per the provisions in the RBI Act, 1934.
- ***(NBFC-ND)-Non-Deposit taking Non-Banking Financial Company***
  - They also need to register themselves under RBI. The guidelines for NBFC-D and NBFC-ND are different.
  - **Within the above broad categorization, the NBFCs can, be further, broadly divided into:**
    - ✓ **Asset Finance Company (AFC):** They have a primary business of financing physical assets. AFCs can finance tractors, motorcycles, buses, and trains.
    - ✓ **Investment Company (IC):** They are engaged in the acquisition of securities, as its principal business.
    - ✓ **Loan Company (LC):** They provide loans, as its principal business.
    - ✓ ***Infrastructure Finance Company (IFC):*** Extends at least 75% of its total assets in infrastructure loans. They have minimum 300 crore rupees of NOF (Net Owned Funds) with a credit rating of not less than "A".
  - **NBFC-ND(Non-Deposit taking Non-Banking Financial Company) is further sub-categorized into 2 parts-**
    - ✓ ***Systemically Important NBFC-ND:***
- They are NBFCs with assets of ₹ 500 crore or more.
- These NBFCs are considered significant because their activities can impact the overall financial stability of the economy.
  - ✓ ***Other NBFC-ND:*** It includes all NBFCs which do not fall under NBFC-SI.

## 3.2 NAFIS FOR 2021-22

### Context

- The National Bank for Agriculture and Rural Development (NABARD)'s **'NABARD All India Rural Financial Inclusion Survey (NAFIS) for 2021-22'** noted that 57% of rural households in the country were engaged in agricultural activities.

### NABARD All India Rural Financial Inclusion Survey (NAFIS) for 2021-22

- It is a **financial inclusion survey conducted by the Department of Economic Analysis & Research of NABARD.**
- It provided a detailed study on the status of the rural population in themes which are livelihood and financial inclusion.
- It provides a detailed study of various other indicators which include: savings, credit, insurance and pension, remittances, and financial literacy.

**Coverage:**

- **Covered 10,000 village blocks and 710 districts spanning 28 states and Union Territories (UTs) of Jammu & Kashmir (J&K) and Ladakh, including** both agricultural and non-agricultural households in the study area.
- **Included the rural and semi-rural areas of India including Tier-3 to Tier-6 centres having a population of less than 50,000.**

## Key Findings of NAFIS 2021-22

### Average Monthly Income Increase:

- The average monthly income of households increased substantially by 57.6% over a five-year period, from Rs. 8,059 in 2016-17 to Rs. 12,698 in 2021-22.
- **Agricultural households earned Rs. 13,661 while non-agricultural households earned Rs. 11,438.**

### Income Sources:

- **Government/private sector salaries:** 37% of total income for all households.
- **For agricultural households:**
- Agricultural Cultivation: 33%
- Government/private services: 25%
- Wage labor: 16%
- Other works or enterprises: 15%
- **For non-agricultural households:**
- Government/private services: 57%
- Wage labor: 26%

### Income Growth by Land Size trend was:

- Less than 0.01 hectare: 23.5% to 26.8%
- 0.41-1 hectare: 38.2% to 42.2%
- 1.01-2 hectares: 52.5% to 63.9%
- More than 2 hectares: 58.2% to 71.4%

### State-Wise Variations in Income

- **High Agricultural Employment States:** Chhattisgarh (63.8%), Madhya Pradesh (61.6%), Uttar Pradesh (55.9%), and others show higher reliance on agriculture.
- **Low Agricultural Employment States:** Goa (8.1%), Kerala (27%), and Punjab (27.2%) report significantly lower agricultural employment.

### Average Monthly Expenditure Increase:

- The average monthly expenditure of rural households significantly increased from Rs. 6,646 in 2016-17 to Rs. 11,262 in 2021-22.

### Financial Savings Increase:

- The annual average financial savings of Indian households increased from Rs. 9,104 in 2016-17 to Rs. 13,209 in 2021-22.
- **Overall, 66% of households reported saving money in 2021-22, compared to 50.6% in 2016-17.**

**Agricultural vs. Non-Agricultural Savings:**

- 71% of agricultural households saved, compared to 58% of non-agricultural households.

**Variations in Savings among States**

- High savings: Uttarakhand (93%), Uttar Pradesh (84%).
- Low savings: Goa (29%), Kerala (35%).

**Kisan Credit Card (KCC):**

- The KCC proved to be a key tool for promoting financial inclusion in the agricultural sectors **with a total of 44% of agricultural households possessing a valid Kisan Credit Card (KCC).**
- **Among the landholders with more than 0.4 hectares or the agricultural loan takers from banks in the past year, 77% had a valid KCC.**

**Insurance Coverage Increase:**

- The percentage of households with at **least one member covered by insurance has seen an increase from 25.5% in 2016-17 to 80.3% in 2021-22.** This implies that four out of every five households have at least one insured member.

**Pension Coverage increase:**

- The **percentage of households with at least one member recipient of pension viz. old age, family, retirement, or disability has seen an increment from 18.9% in 2016-17 to 23.5% in 2021-22.**
- Overall, 54% of households with at least one member over the age of 60 years were reported receiving a pension.

**Financial Literacy Increase:**

- The percentage of people showing good financial literacy rose by 17 percent, from 33.9% in 2016-17 to 51.3% in 2021-22.

## Conclusion

- The NAFIS 2021-22 results show remarkable improvements in rural financial inclusion since the last survey in 2016-17. Rural households have experienced significant increases in income, savings, insurance coverage, and financial literacy.

# 3.3 WORLD ECONOMIC OUTLOOK

## Context

- The International Monetary Fund (IMF) released the October edition of the World Economic Outlook.

## International Monetary Fund (IMF)

- It is an International Organization which promotes global economic growth, financial stability, international trade, and poverty reduction.
- It was **founded in 1945 after the Bretton Woods conference.**
    - The Bretton Woods conference **was held in 1944 after the conclusion of World War II.**
    - The Agreement in the conference **established the International Bank for Reconstruction and Development, which later became part of the World Bank Group and the International Monetary Fund (IMF).**

**Roles**

- **The original goal of the organisation was to coordinate international economies and prevent currency devaluations** to boost global exports.
- Its current role **shifted to become the lender of last resort for countries facing severe currency crises.**

**Key publications of IMF:**

- **Global Financial Stability Report:** A biannual report like WEO to assess the stability of the global financial system and markets.
- **World Economic Outlook.**

## World Economic Outlook (WEO)

- It is a **biannual report of the IMF published twice a year.** One report is published in April and the other one in October.
- **The report is about the estimates and forecasts of the IMF for global output and inflation trends in the 190 member countries of the IMF, grouped by region and development status.**
- The data is generally drawn from IMF consultations with member countries.

## WEO October 2024 findings

### Global Economic Status:

- The recession which was much feared globally has been avoided.
- **Inflation is under control and the global fight against inflation is almost won with steady growth. Inflation to fall further to 4.3% by 2025. Inflation moderation is due to the decline in shocks from COVID-19, the Ukraine war and tight monetary policies.**
- **The United States is expected to grow faster in 2024 than Europe, whose growth has declined.**
- The IMF has forecasted a 3.2% global growth in both 2023 and 2024.
- In the long term, the IMF, however, projects global growth at a mediocre 3.1% in five years which is below pre-COVID trends.

### Developing and Emerging Asia Outlook:

- The growth prospects for **West Asia, sub-Saharan Africa, and Central Asia have been downgraded due to conflicts and unrest.**
- **However, higher public investments in China and India will improve growth prospects.**
- High food prices in some emerging markets and high inflation in services remain concerns.

### Economic Outlook of India:

- Maintained the GDP **growth estimate of India at 7% for 2024-25 and 6.5% in the following year, as the pandemic-driven pent-up demand will fade after 2024-25.**
- However, the GDP growth of India for Q2 is forecasted at 6.8%, higher than 6.7% in Q1 by the Reserve Bank of India. A good monsoon and improved rural incomes might further enhance the growth.
- **Headline inflation** (the total inflation rate in an economy, including all categories of goods and services) in India is expected to ease at **4.4% for FY 2024-25** and **4.1% for FY 2025-26**.

**Pent-Up Demand**

- It is a situation where demand for products or services is strong due to the general public's return to consumerism after a period of decreased spending

### Policy Recommendations Suggested by the WEO Report

- **Structural Reforms:** Policymakers should prioritize reforms in health, education, labor markets, and digitalization to address productivity bottlenecks and enhance long-term growth .
- **Social Acceptability Framework:** Effective reform design should incorporate public consultations, build trust, and ensure clear communication to foster social acceptance.
- **Fiscal Policy Adjustments:** Countries need gradual and credible fiscal adjustments to ensure debt sustainability while avoiding sharp cuts that could harm growth. **Public investments, particularly in digital and infrastructure sectors, should continue for growth support.**
- **Climate Resilience and Green Investments:** Expanding climate financing, particularly for vulnerable countries, and implementing carbon pricing policies with WTO-compliant green subsidies are crucial steps to advancing the green transition .
- Overall the Global economic outlook is moderate, however, sluggish exports and investment flows along with inflations might impact the trend.

# 3.4 WORLD ENERGY OUTLOOK 2024

## Context

- As per the World Energy Outlook, India will face a higher increase in energy demand than any other country over the next decade due to rising demand from all sectors.

### About the Report

- Flagship publication International Energy Agency, an autonomous intergovernmental organisation.
- It is an annual report and it has been published every year since 1998 with the aim to **offer crucial insights into the world's energy demand and supply**.

## Findings of the Report

### General findings

- **Decarbonisation Progress**: Momentum for **decarbonisation is building with record renewable energy rollout and electric vehicle adoption but the world is still far from limiting global warming to 1.5°C.**
- **Warming Projections**: With current policies the world is at a warming trajectory of 2.4°C by 2100.
- **$CO_2$ Emission**: The $CO_2$ emissions will peak by 2025 and China's emissions are projected to peak around 2025.
- **Renewable Energy Growth**: Over 560 GW of renewable capacity added in 2023 and it is projected to reach 10,000 GW by 2030. Emissions reduce but will fall short of the 1.5°C targets.
- **Investment Trends**: Global investment in clean energy increased by 60% since the Paris Agreement and it is estimated to be USD 2 trillion annually. Investment in clean energy is nearly double that for oil, gas, and coal supply together in 2024.

## India Specific Findings

### Energy Demand in India

- Total energy demand forecast in India **will increase by nearly 35% by 2035 and the electricity generation capacity is expected to triple to 1,400 GW.**

### Drivers of Energy demand from India

- **Economic Growth:** India was the **fastest-growing major economy in 2023, with a 7.8% increase in GDP from the previous fiscal year and it is on track to become the third-largest economy by 2028.**
- **Population**: India overtook China in 2023 as the most populous country, with a declining fertility rate below replacement level.
- **Infrastructure and Vehicle Growth:** India is **projected to add over 12,000 cars daily until 2035, while the built-up space is expected to increase by over 1 billion square metres annually, which is higher than total built space in South Africa.** This ensures better accommodation for vehicles.
- **Industry Growth: Iron and steel production is set to grow by 70% by 2035 and cement output is projected to rise by nearly 55%.** Air conditioner stock is expected to grow 4.5 times, which will further increase the electricity demand.
- **Electric Mobility:** A rapid rise in electric mobility will result in increased oil consumption and it will peak in the 2030s. **Coal use in industry will also peak with the increase in electricity and hydrogen usage.**

## Role of coal in the economy

- Coal will remain **significant and nearly 60 GW of new coal-fired capacity will be added by 2030. Coal generation is projected to rise over 15%.**
- **Coal supplied 40% of industrial energy needs in 2023 and it is expected to grow by 50% by 2035.**

### Other findings

- **Renewable power generation:** Renewable power generation in India will be nearly 20% higher than current policy projections by 2035.
- **$CO_2$ Emissions:** India's projected **$CO_2$ emissions will reach 2.5 billion tonnes by 2035, which is 25% below current expectations.**
- **Fossil Fuel Supply:** Oil and gas is expected to be in surplus which will lead to cheaper prices of the oil and gas in the second half of the decade.

## 3.5 21ST LIVESTOCK CENSUS OF INDIA

### Context

- The Union Minister of Fisheries, Animal Husbandry and Dairying will present the 21st edition of The Livestock Census in New Delhi.

### Livestock Census

- The Livestock census is the **Headcount of domesticated animals, poultry, and stray animals across India or the species, breed, age, sex, and ownership status of animals** conducted in both rural and urban areas **every five years.**

#### Coverage:

- Over 87,000 enumerators visit independent homes, apartments, enterprises, and institutions such as e.g., gaushalas, dairy farms, veterinary colleges, etc. and cover around 30 crore households in India.

#### Historical Background

- The First Census was initiated in 1919.
- So far a total of 20 Censuses have been Conducted: with the last in being conducted 2019.
- The 19th livestock census was conducted decades ago in 2012.
- The upcoming Census or the 21st census is scheduled for October 2024 to February 2025.

### About the 21st Livestock Census

- **16 key animal species,** including cattle, buffalo, Mithun, yak, sheep, goat, pig, camel, horse, ponies, mule, donkey, dog, rabbit, and elephant will be counted in the census.
- **219 indigenous breeds** recognized by the Indian Council of Agricultural Research-National Bureau of Animal Genetic Resources (ICAR-NBAGR)will be counted in the census.
- Poultry to be covered includes fowl, chicken, duck, turkey, geese, quail, ostrich, and emu.

#### Innovations in the 21st Livestock Census

- **Complete digitalisation:** The 21st Livestock Census implements the fully digitised process for data collection via mobile app, digital dashboard, GPS tagging, etc.
- **New Data Points:**
  - Pastoral Animals will also be included and Pastoralists and their Socio-economic data and livestock contributions will be featured.
  - Granular Data such as the Income dependence on livestock and gender data for stray cattle will also be included.
- **Gender Roles:** Data on all genders or the primary person who is involved in the livestock rearing process will be captured for the first time.

### Importance of the Livestock Census

#### Economic relevance:

- The livestock sector contributes around 30% of the Gross Value Added (GVA) in agriculture in India.
- Overall, **livestock Gross Value Added (GVA) in India is 4.7% of the national economy. This makes livestock census necessary for overall information about them for informed decision-making.**

- **Policy Formulation:** Data from the livestock census aids in policy development for sustainable growth in the livestock sector.
- **SDG Tracking:** The livestock senses support **SDG Goal 2 of Zero Hunger and Target 2.5 of genetic diversity in food. Apart from this the census also tracks indicator 2.5.2 which is the Risk status of local livestock breeds.**

## The 2019 Livestock Census

- This was the 20th census in series and it **found 535.78 million total livestock population of India, showing an increase of 4.6% over Livestock Census-2012.**

### Cattle Population:

- National cattle population rose by 0.8%, driven by cross-bred cattle and female indigenous cattle.
- Uttar Pradesh saw the maximum decrease despite cattle conservation efforts.
- West Bengal observed the highest increase of 23%, followed by Telangana (22%).

### Exotic/Crossbred Cattle:

- Exotic/crossbred cattle population grew by 27%.
- Cross-bred animals contributed 28% to India's milk production in 2018-19.

### Indigenous Cattle Decline:

- Indigenous cattle population declined by 6%, despite Rashtriya Gokul Mission initiatives.
- States with strict cow slaughter laws (Uttar Pradesh, Madhya Pradesh, Rajasthan, Maharashtra) showed the sharpest declines.

### Milch Animal Trends:

- Total milch animals increased by 6%.
- Foreign breeds, favored for higher milk yields, now constitute over half the milch animal population.
- Approximately 75% of cattle are female, reflecting dairy farmers' preference for milk production.
- **Backyard Poultry Surge:** Backyard poultry increased by 46%, signifying a shift in rural economies and potential poverty alleviation.
- **Overall Bovine Population:** Total Bovine population (cattle, buffalo, mithun, yak) **rose by about 1%.** Populations of sheep, goat, and mithun grew, while horses, ponies, pigs, camels, donkeys, mules, and yaks declined.

# 3.6 COST OF TRANSITIONS AWAY FROM COAL

## Context

- According to a study conducted by the environment and climate change research think-tank iForest (International Forum for Environment, Sustainability and Technology), the cost of just transitioning away from coal is very high for India.

## What is Just Transition?

- It is a concept which **ensures that no one is left behind during the transition process from a fossil fuel-dependent economy to a more sustainable and low-carbon economy.**

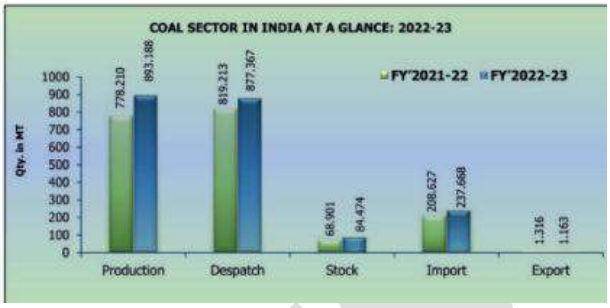
## Need for Just Transition for India

- There is a huge dependence of the Indian economy on coal and Coal is the most important fossil fuel in India, **accounting for 55-61% of the country's energy needs as per the ministry of Power reports.**
- This makes it necessary to shift away from coal to diversify the energy basket of India.

### Rising consumption demand:

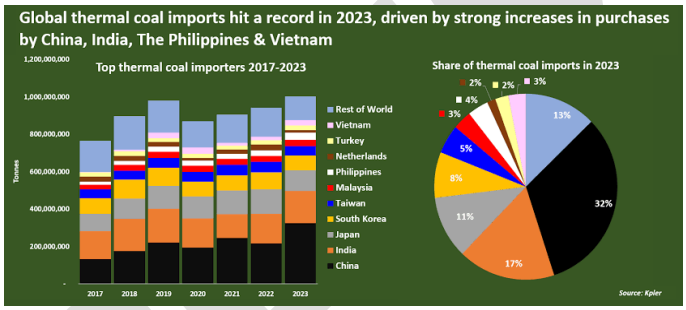
- **Commercial energy consumption in India has seen a growth of about 700% in the last four decades.**

- The current **per capita commercial energy consumption in India is about 350 kgcal/year,** however this is poised to increase due to rising population, expanding economy and improved standard of life.




## Import dependency:

- The total India **Production of coal in 2023-24 was 997.83 MT with a growth of 11.71%.** Total coal import in the same period of 2023-24 was 261 million tonnes.
- **However, India exported just 1.316 million metric tons of coal in 2021–2022 and it shipped 1.163 million MT in the 2023-23 period.**
- **Among the G20, India is the third-largest importer of coal. Furthermore, 12% of the world's imports of coal are accounted for by India only.**
- **Large Employment in the Coal Sector:** Over 369,000 people are employed in public sector coal enterprises only and there are additional jobs in the associated sector.




- **Mitigation of the Impact of Climate Change:** The IPCC's Special Report Global Warming of 1.5 °C states that in order to keep global warming to 1.5 °C, coal must be phased out by 2050.
- **Health benefits: Coal contributes significantly to air pollution and causes over 800,000 premature deaths annually worldwide**. Millions fewer incidences of serious and mild illnesses will result from the phase-out of coal.
- **As per the iForest (International Forum for Environment, Sustainability and Technology) study, Coal will remain central to India's energy mix for at least another decade due to high dependence on the coal sector in the Indian Economy**. This also increases the cost of just transition.

## India's coal reserves and production

- The total **estimated coal reserve of India is 378.21 billion tonnes as of March 2023, according to the National Coal Inventory of 2023.**
- Presently, India ranks **second** in the world for coal production and has the world's **fifth-largest coal reserves**. India is home to about 7% of the world's proven coal reserves.
- More than **48.3% of India's energy mix comes from the coal industry.** On the other hand, about 44.3% of India's energy comes from renewable sources.

## Just Transition Away from Coal in India

- **Funding Requirement: As per the iForest (International Forum for Environment, Sustainability and Technology) study**, the **cost of just transition for India is over $1 trillion or Rs 84 lakh crore, which is required over the next 30 years.**
    - **Cost Components of the Just Transition:** Mine closures and repurposing, Retirement and repurposing of coal plants, Labour skilling for green jobs, Economic diversification, Community support, Green energy investments, Revenue substitution for states and Planning costs.

- **Investment**: Green Investments of approximately 48% of the $1 trillion allocated for energy infrastructure in India would be required for just transition.
- **Funding Sources:** Just transition **requires a mix of Public and Private Contributions. A combination of grants, subsidies, and private investments focused on energy costs will be needed.**
- **Utilising The Existing Resources: District Mineral Foundation Funds have nearly $4 billion available along with Corporate Social Responsibility (CSR)** funds for community support. This fund is channelled for just transition in India.

### International Approaches- Case Studies

- **South Africa:** South Africa has **developed a framework called Just Energy Transition Investment Plans (JET-IP) for transitioning away from coal to reduce reliance on fossil fuels. It sought to invest $98 billion over the next 20 years, with $8.5 billion allocated for the initial period of 2023-2027. The majority of the funding will be given towards green energy investments, supporting communities affected by coal phase-out, and reskilling workers.**
- **Germany:** Germany enacted laws to phase out coal by 2038 to ensure a structured and fair transition in coal-dependent regions. **The government has sanctioned over $55 billion for closing the coal mines and plants at the same time ensuring economic development in affected areas.** The transition plan of Germany emphasises social protection for workers and investment in alternative economic activities to replace coal sector jobs.

## 3.7 MIDDLE INCOME TRAP

### Context

- The World Development Report 2024 by the World Bank has called for attention to the phenomenon of the "middle-income" trap.

### What is the Middle Income Trap?

- It is a **situation where a country has developed until GDP per capita has reached a middle level of income, but the country does not develop further and does not attain high-income country status.**
- The World Bank introduced the term in 2007. **As of September 2024, the World Bank estimates that 108 countries are stuck in the middle-income trap, including Brazil, China, and South Africa.**
- These countries are home to 6 billion people and generate 40% of the world's GDP.

### Findings of the World Development Report 2024 about the "middle-income" trap

- The World Bank has estimated that there is, in almost all scenarios, **a stagnation of income per capita when economies reach a level of per capita incomes 11% of that of the U.S.** This stagnation hinders their journey to high-income status.
- Over the last 34 years, **only 34 middle-income economies defined as economies with per capita incomes between $1,136 and $13,845 — have transitioned to higher income levels.**

### Reasons for the trap

- **Lack of Innovation:** Due to a lack of funding for research and development, nations like Brazil and Mexico find it difficult to advance beyond basic manufacturing. For example, **R&D expenditures in Mexico account for approximately 0.5% of GDP, but in South Korea they account for over 2.4%.**
- **Ineffective Educational Systems:** The quality of education is low in many middle-income nations. For instance, while having high enrolment rates, only **25% of students in nations like India and Indonesia master**

**fundamental math, which reduces their competitiveness in the labour market.**

- **Political instability:** Foreign investment may be discouraged by political concerns. Economic volatility and ambiguous policies have resulted in stagnating growth rates in nations like Argentina, keeping them from rising to the level of high-income nations.
- **Poor Infrastructure:** Businesses are less efficient when there is insufficient infrastructure. For example, **Brazil's logistics cost is about 13% of GDP, significantly higher than the global average of around 8%, affecting trade and economic growth.**
- **Weak Institutions:** Corruption and weak legal systems can stagnant growth. Transparency International ranks many middle-income countries poorly on corruption perceptions, which makes it difficult for businesses to operate effectively and attract investment.

## Challenges for India

- **Scepticism in state:** The **power of billionaires in the Indian economy has increased, and they are seen as being close to the state.** **Stagnation of the manufacturing sector:** The process of **structural transformation has reversed and the manufacturing sector has stagnated, although after the pandemic, employment in low-productive sectors like agriculture has increased.**
- **Wage increase: Wages have not kept pace with the government's estimate of a real GDP increase of roughly 7% in recent years.** The PLFS estimates that between April and June 2023–24, the nominal salaries of regular wage workers increased by **only about 5%, while the nominal wages of casual wage workers increased by about 7%.**
- **The inherent issue in democracy:** Chile and South Korea's growth was driven by the authoritarian regime. For instance, **South Korea's export strategy was overseen by a military government that ruled till the 1980s, when the government frequently quelled labour unions.**

## What can India learn from other countries?

- **European Union:** Most countries that broke the trap were part of the European Union. **The EU facilitated growth and mobility of capital and labour for its members.** India can explore ways to create EU-like institutions that aid free factor mobility for whom capital inflows are liberalised.
- **South Korea:** An important **non-European country that managed to escape the trap is South Korea. Successful companies were rewarded with access to new technologies and other supportive measures, while firms that did not perform were allowed to fail.** The presence of powerful business houses such as **Chaebols in South Korea can promote growth provided they invest, ensure the adoption and infusion of new technologies, and innovate.** South Korean business houses, or chaebols, are among the innovation leaders today.

## Way Ahead

- **Boosting Innovation and R&D:** Governments need to spend more money on research and development. For instance, the **government of South Korea enacted a provision for R&D funding to more than 4% of GDP,** which led to the country's booming technological industry and notable economic growth.
- **Enhancing Education and Skill Development:** Investing capital into high-quality education and career training as in **Germany's dual education system, which successfully blends classroom instruction with real-world experience, produces a highly trained labour force and low rates of youth unemployment.**
- **Enhancing Institutions and Governance:** Creating institutions that are responsible and transparent can help to improve the business climate. **Singapore has effectively mitigated corruption and optimised regulatory**

**frameworks and has drawn huge international capital.**

- **Investing in Infrastructure:** Increasing the **energy and transportation infrastructure as in** China **can boost productivity.**
- **Encouraging Export Diversification:** Creating new products and markets can help lessen reliance on a small number of industries. Vietnam, for instance, increased its GDP growth rate dramatically by diversifying its economy from low-cost manufacturing to electronics and technology exports.

## 3.8 SHORT ARTICLES

### Spotted Locusts

**Context**

- Farmers in Idukki in Kerala are now suffering due to the menace of Spotted locust infestation.

**About**

- It is a grasshopper species native to South and Southeast Asia and belongs to the family Pyrgomorphidae.
- ***Scientific name:* *Aularches miliaris***
- It is **It has two subspecies:** *A. miliaris miliaris Linnaeus*- India to Indo-China and *A. miliaris pseudopunctatus Kevan* - Pakistan
- Their presence in soil is indicative of soil health and they contribute to soil aeration through egg-laying, promoting biodiversity.
- However, they have been **misidentified by farmers as locusts, which has led to panic among farmers.**

**Locusts**

- They are short-horned grasshoppers of the Acrididae family, **which comprise some 10,000 of the 11,000 species of** grasshoppers.
- **Locusts have two phases**
  - **Solitary Phase:** It shows Camouflage colouration during this phase and has a low metabolic rate and sluggish behaviour.
  - **Gregarious Phase:** It shows bright black and yellow or orange colouration and has a high metabolic rate, and active and social behaviour during this phase.
- **Crowding of locusts in one place triggers a shift from solitary to gregarious phase and they swarm in the direction of the storm, largely impacting agricultural fields.**
- **Control measures:**
  - Once established, **locust plagues are difficult to control. Because of this, they should be killed in the early stages by destroying egg masses.**
  - They can be trapped in trenches.
  - Hopper Dozers for collecting locusts are also used.
  - Insecticides are applied to aircraft in Middle East regions.

### Rabi Crops and MSP Estimation

**Context**

- The Cabinet Committee on Economic Affairs (CCEA) has increased the Minimum Support Price for rabi crops for the 2025-26 marketing season.

**Rabi crops**

- **Also known as winter crops,** Rabi crops are agricultural crops that are sown in winter and harvested in the spring in India, Pakistan and Bangladesh.
- **The kharif crop, which is grown after the rabi and zaid crops, are harvested one after another respectively.**

**Difference among Rabi, Kharif and Zaid Crops in India**

- India has three cropping seasons namely **Rabi, Kharif and Zaid.**
- As per ministry of agriculture data, Rabi season contributes nearly 50% of the food grain production in India.

### Minimum Support Price (MSP)

- The Minimum Support Price (MSP) is a **government scheme that guarantees a minimum price for certain agricultural products to farmers.**
- It is a form of market intervention **to protect farmers from sharp drops in prices**. The government buys the entire quantity of a commodity from farmers if the market price falls below the MSP.
- The MSP helps farmers avoid distress sales and also helps the government procure food grains for public distribution.

**MSP rate determination:**

- The **Commission for Agricultural Costs & Prices (CACP) gives recommendations to set the Minimum Support Price (MSP) for crops to the government.**
- The CCEA makes the final decision on MSP levels after receiving recommendations from the Commission for Agricultural Costs and Prices (CACP).
- The **M S Swaminathan committee recommends that the MSP should be at least 50% more than the weighted average cost of production.**

**How is MSP Calculated?**

- The government currently sets the MSP at 1.5 times the Cost of Production (CoP), which is A2+FL. **The all-India weighted average cost of production in agriculture in India is calculated using three formulas: A2, A2+FL, and C2.**
- **A2**: The costs incurred by the farmer for the production of a specific crop, including seeds, fertilizers, chemicals, hired labour, fuel, and irrigation.
- **A2+FL**: The costs incurred by the farmer plus the value of unpaid family labor.
- **C2**: A comprehensive cost that includes A2+FL plus the imputed rental value of owned land and interest on fixed capital, plus rent paid for leased-in land.

## Rice Fortification Initiative

### Context

- Universal **supply of fortified rice under the National Food Security Act was extended by the Union Cabinet to December 2028** for all central government programs that provide free food grain.

### What is Rice Fortification?

- Rice fortification is the **addition of micronutrients to rice after the harvest for the restoration of the micronutrients which have been lost during processing and to increase the level of vitamins and minerals by adding other vitamins and minerals like iron, folic acid, etc, which may not originally be present in rice.**

**The process by which rice is fortified:**

- Various technologies, such as **coating, dusting, and 'extrusion', are available to add micronutrients to regular rice.**
- Extrusion technology involves the production of fortified rice kernels (FRKs) from a mixture using an 'extruder' machine. It is a widely used technology in India.

**Rice Fortification Initiative in India**

- **New India @75 of Niti Aayog:** It was the first document to advocate mandatory fortification of food-grains and their inclusion in government programs like Integrated Child Development Services (ICDS), PM POSHAN, and Targeted Public Distribution System (TPDS).
- **Pilot Scheme (2019-2022):** Centrally Sponsored Pilot Scheme was launched with a ₹174.64 crore budget. By March 2022, 4.30 Lakh Metric Tonnes of fortified rice were distributed in 11 states.
- **Under TPDS:** The Cabinet Committee on Economic Affairs (CCEA) approved the phased national rollout and supply of Fortified rice under **targeted public distribution system (TPDS) and Other Welfare Schemes (OWS) as Central Sector Initiative with 100% GoI funds up to 30th June 2024 with a proposed finance of Rs.4269.76 cr.**

- The distribution will follow the standards set by the Food Safety and Standards Authority of India (FSSAI).
- **It was implemented in 3 phases:**
  - ✓ **Phase I (2021-2022):** Covered ICDS and PM POSHAN.
  - ✓ **Phase II (2022-2023):** Added TPDS and OWS (Other welfare Schemes) in 291 districts.
  - ✓ **Phase III (2023-2024):** Extended to remaining districts.

**Aim of rice fortification in India**

- The rice fortification aims to "address anaemia and micro-nutrient deficiency" in India.
- This initiative provides vulnerable populations with enhanced nutrition by distributing fortified rice enriched with essential micronutrients such as iron, folic acid, and vitamin B12.

**Identification mark:**

- Fortified rice is packed in jute bags with the logo ('+F') and the line "Fortified with Iron, Folic Acid, and Vitamin B12".

**Nutrient Content in Fortified Rice:**

- According to FSSAI standards, 1 kg of fortified rice contains: Iron: 28 mg-42.5 mg, Folic acid: 75-125 micrograms, and Vitamin B12: 0.75-1.25 micrograms.

## New GI Tags from Assam

**Context**

- The Geographical Indications Registry has granted the GI tag to eight products from the Assam region.

**Bodo Jou Gwran**

- It is a **fermented alcoholic beverage prepared by the Bodo tribe and It is prepared from various rice varieties that are locally available**; therefore, it can be categorized as rice beer.

**Maibra Jou Bidwi**

- It is a **welcome drink by most Bodo tribes and it is prepared by fermenting half-cooked rice called mairong with less water**, and adding a little 'amao', which is a potential source of yeast, to it.

**Bodo Jou Gishi**

- It is also a **traditionally fermented rice-based alcoholic beverage** and It is prepared by grinding soaked rice grains and plant materials in a mortar and pestle called uwal and gaihen, respectively.

**Bodo Napham**

- It is an important and favourite **dish of fermented fish prepared anaerobically in a tightly sealed container in a process that requires about two-three months.**
- The Bodo people preserve fish using different techniques, including smoking, drying, salting, fermentation, and marination.

**Bodo Ondla**

- It is a rice powder curry flavoured with garlic, ginger, salt, and alkali.

**Bodo Gwkha**

- The 'Bodo Gwkha' is locally also known as 'Gwka Gwkhi' and It is prepared during the Bwisagu festival.
- Bwisagu is the springtime festival of the Bodo community that marks the beginning of the New Year.

**Bodo Narzi**

- It is a **semi-fermented food prepared with jute leaves also known as Corchorus capsularis, a rich source of Omega 3 fatty acids**, vitamins and essential minerals, including calcium and magnesium.

**Bodo Aronai**

- Aronai is a small Bodo/Boro Traditional Scarf-Muffler, used both by Men and Women. It is a small, beautiful cloth.
- In the ancient period, Boro warriors used Aronai as a belt in the battlefield.

## Sveriges Riksbank Prize in Economic Sciences

**Context**

- The Royal Swedish Academy of Sciences awarded the Sveriges Riksbank Prize in Economic Sciences to Daron Acemoglu,

Simon Johnson, and James A. Robinson"for studies of how institutions are formed and affect prosperity."

**The work of Daron Acemoglu, Simon Johnson, James A. Robinson**

- The awardees have demonstrated the importance of societal institutions for a country's prosperity.
- Societies with weak legal systems and institutions that take advantage of their citizens don't develop or improve. The Laureates helped us understand that.

**Societal institutions**

- By Societal institutions, the laureates refer to the **broad set of rules that govern the behaviour of individuals in a society or a country.**
- Societies with a poor rule of law and institutions that exploit the population do not generate growth or change for the better.
- The three laureates have distinguished between **inclusive and extractive institutions.**
- **An inclusive institutional framework is characterised by the existence of democracy, law and order, protection of property rights, among others.**
- On the other hand, **an extractive institutional framework is characterised by the lack of rule of law, of power being concentrated in the hands of a few, which we call autocracy or dictatorship, and the associated risks of expropriation.**

**How do these two institutions lead to different results?**

- **The two opposite types of institutional frameworks (inclusive and extractive) lead to completely different incentives for people in an economy or society.**
- For example, **if people have assurance that their property will not be taken away at will, or that their incomes and their profits will be protected for generations, they will work to focus on boosting long-term growth and prosperity.**
- But when there is a lack of an inclusive institutional framework, the incentives collapse, undermining longer-term prosperity.

**About Nobel Prize in Prize in Economic Sciences**

- It was formerly known as the Bank of Sweden Prize in Economic Sciences.
- It was established **by the central bank in 1968 as a memorial to the 19th-century Swedish businessman and chemist who invented dynamite.**
- The prize is not one of the five Nobel Prizes established by Alfred Nobel's will in 1895. **Five Nobel Prizes— medicine, physics, chemistry, literature and peace was established by him.**
- The Royal Swedish Academy of Sciences, Stockholm, Sweden, awards economic sciences prizes according to the same principles as for the Nobel Prizes that have been awarded since 1901.

## High-Performance buildings (HPBs)

**Context**

- High-performance buildings (HPBs) could be the next step towards a sustainable future.

**High-performance buildings (HPBs): What Are They?**

- High-performance buildings (HPBs) **build upon the notion of green buildings, which focus on decreasing environmental impact through energy efficiency, water conservation, and sustainable materials but they go beyond the objectives of green buildings.**
- Green buildings are often accredited by design and sustainability outcomes assessment programs.
- By **utilizing cutting-edge technologies like energy-efficient HVAC (heating, ventilation, and air conditioning) systems, smart lighting controls, and real-time monitoring through building management systems (BMS), HPBs go beyond these concepts and achieve peak efficiency in energy, water use, and occupant comfort.**

- Examples of HPBs include Unnati in **Greater Noida, which employs a solar-optimized façade, and Indira Paryavaran Bhawan in New Delhi, with its innovative HVAC system.**

**Difference between Green and High-Performance**

| Green Buildings | HPB |
|---|---|
| Energy efficiency, water conservation, and ethical material sourcing are among the primary sustainability goals prioritized by green buildings. | Beyond simple sustainability, HPBs strive for peak performance in a number of areas, such as energy, water, and occupant comfort. |
| Cutting-edge technologies may or may not be used. | HPBs use cutting-edge technology including energy-efficient HVAC systems and smart lighting to boost operating efficiency. |
| Green buildings are usually assessed by a number of certification systems such as Green Building Codes that determine whether or not they satisfy predetermined sustainability standards. | There is no comprehensive certification mechanism for HPBs. |
| Examples are **Suzlon One Earth, Pune Green Buildings In India, Rajiv Gandhi International Airport, and Hyderabad. Green Buildings In India, Infinity Benchmark, Kolkata. Green Buildings In India, CII- Sohrabji Godrej Business Centre, Hyderabad.** | Infosys' **Bengaluru campus serves as an example of how HPBs** use building management systems (BMS) for real-time monitoring and performance tracking. |

## National Agriculture Code

**Context**

- The Bureau of Indian Standards (BIS) is formulating a National Agriculture Code (NAC), on the lines of the existing National Building Code and National Electrical Code.

**About**

- It is code being formulated by BIS in order to fulfil the need for a **comprehensive standards framework**, for agriculture practices like preparation of fields, micro irrigation and water use.

**Objectives**

- To develop a **workable national code that includes guidelines for agricultural practices that take into account the nation's socioeconomic variety, crop types, agroclimatic zones, and the entire agrifood value chain;**
- To support the development of a quality culture in Indian agriculture by giving legislators, agriculture agencies, and regulators the references they need to include the NAC's provisions in their plans, policies, and regulations;
- To **integrate pertinent Indian Standards with suggested agricultural practices and to develop a thorough guide for the farming community to promote efficient decision-making in agricultural activities.**
- To deal with the horizontal facets of agriculture, including sustainable farming, traceability, recordkeeping, SMART farming; and
- To support the agriculture extension services and civil society organizations' capacity-building initiatives.

**Parts**

- **The code will have two parts.** The first will contain **general principles for all crops, and the second will deal with crop-specific standards** for the likes of paddy, wheat, oilseeds, and pulses.

**Coverage**

- **All agriculture processes and post-harvest operations, such as crop selection, land preparation, sowing/transplanting, irrigation/drainage, soil health management,**

**plant health management, harvesting/threshing, primary processing, post-harvest, sustainability, and record maintenance.**

- It will cover standards for agriculture machinery and will also include standards for **input management, like use of chemical fertilisers, pesticides, and weedicides, as well as standards for crop storage and traceability.**
- All new and emerging areas like natural farming and organic farming, as well as the use of Internet-of-Things in the field of agriculture.

## Monetary Policy Committee (MPC)

### Context

- The Central government appointed new monetary policy committee members with immediate effect.

### About

- A **six-member committee that sets India's benchmark interest rate and is responsible for maintaining price stability.**
- The Urjit Patel Committee first proposed the establishment of the Monetary Policy Committee (MPC).
- The primary objective of the MPC, empowered by the **RBI Act, of 1934**, is to determine the policy interest rate required to achieve the inflation target.

### Establishment

- The MPC **came into force on June 27, 2016, replacing the Technical Advisory Committee.** The Finance Act of 2016 amended the RBI Act to establish the MPC and identify price stability as the primary objective of monetary policy.

### Purpose

- To **keep inflation within a specified target level by fixing the benchmark policy rate, also known as the repo rate.**

### Composition

- **Three members from the Reserve Bank of India (RBI) and three appointed by the government. The RBI governor chairs the committee.** Each member appointed by the governor has a tenure of four years.

### Meetings

- The MPC meets at least quarterly and publishes its decisions after each meeting.

### Decision making

- The MPC makes decisions by majority vote, with the RBI governor casting the deciding vote in case of a tie.

### Silent-period

- To maintain confidentiality, **members observe a "silent period" of seven days before and after rate decisions, during which they do not discuss the policy or potential decisions publicly.**

## Auction vs. Administrative Allocation of Spectrum

### Context

- The government has decided to allocate satellite communication spectrum on an administrative basis.

### Airwaves or Spectrum

- Airwaves or Spectrum are a range of electromagnetic frequencies called radio waves, which are used for communications by a variety of services and industries.
- **The range of radio spectrum varies from 1 Hz to 3000 GHz (3 THz).**
- The Electromagnetic spectrum includes a variety of other waves including X-ray waves, infrared waves and light waves. The electromagnetic spectrum is divided according to the frequency of these waves, which are **measured in Hertz (i.e. waves per second).**

### Auction vs administrative allocation of spectrum

- **The allocation of spectrum takes place through two main methods:** Auctions and Administrative assignments.

| Auctions | Administrative assignments. |
|---|---|
| An auction is a **competitive bidding process where the government sells spectrum licences to the highest bidder.** | It involves the **government directly assigning spectrum licences to selected entities without a bidding process.** |
| This method is **designed to allocate scarce resources efficiently and transparently.** | This method is often **used when auctions are impractical or less beneficial.** |
| Participants submit bids for spectrum licences and the highest bid wins the licence. | The government sets eligibility criteria and grants licences accordingly. |
| Auctions are **favoured for their market efficiency, as the spectrum is allocated to those who value it most to ensure optimal usage.** | Administrative **allocation typically involves a nominal fee that covers administrative costs rather than reflecting the full market value of the spectrum.** |
| They are more transparent than administrative methods, reducing the potential for favouritism or corruption. | This method provides flexibility and is particularly useful for sectors where competition is less relevant, such as national security or public interest services. |
| This method is primarily used **for commercial telecommunications spectrum, especially in competitive markets where multiple entities vie for access.** | Administrative allocation is **commonly used for government-related services or specialised sectors where demand is low or sharing frequencies among multiple users is feasible.** |

## 3.9 SNIPPETS

| Topics | Details |
|---|---|
| **Input Tax Credit** | • The Supreme Court declared that **real estate companies can claim Input Tax Credits (ITC) under the Goods and Services Tax (GST) regime**, on costs of construction for commercial structures intended for renting or leasing purposes.<br>• **Tax that a business pays on a purchase and that it can use to reduce its tax liability when it makes a sale.** In other words, **businesses can reduce their tax liability by claiming credit to the extent of GST paid on purchases.**<br>• **GST-registered entities are also eligible to claim ITC for:**<br>  ○ **Input Tax Credit for Capital Goods: For capital goods purchased from a registered supplier(s) provided it is for business purposes.**<br>  ○ **Input Tax Credit for Raw Materials: For raw materials used in any production processes or services which it might provide.**<br>  ○ **Input Tax Credit for Input Services: For availing services that are utilized for business purposes.** |

## 3.10 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| A Case for Food Subsidies: An Investment, Not A Waste | 28th October |
| Digital Public Infrastructure(DPI) | 27th October |
| Liberalised Mutual Funds Lite (MF Lite) Framework | 26th October |
| BRAP and B Ready Index | !8th October |

| | |
|---|---|
| India's Power Sector | 15th October |
| Pradhan Mantri Rashtriya Krishi Vikas Yojana (PM-RKVY) and Krishonnati Yojana (KY) | 9th October |
| New SEBI rules to curb futures & options (F&O) Frenzy | 7th October |
| Annual Survey of Industries (ASI) for 2022-23 | 5th October |
| 2nd Generation IBC reforms | 4th October |
| Container Shortage of India | 16th October |

# 4. DEFENSE & SECURITY

## 4.1 CYBER SLAVERY

### What is Cyber Slavery?

- According to the **Cyber Peace Foundation**, cyber slavery is a modern form of slavery "that begins with online deception and evolves into physical human trafficking."

### The Modus Operandi of Cyber Slavery

- Cyber criminals typically **target young Indians, often in their 20s and 30s**, by advertising enticing job opportunities in data entry or customer service.
- Once victims arrive in countries **like Cambodia and Laos, they face harsh realities.**
- **Their passports are confiscated**, and they are coerced into making fraudulent calls, primarily targeting their fellow countrymen back home.

### Government Measures

#### Telecom Ministry's Response

- The Indian government has disconnected **21.7 million** mobile phone connections linked to cyber slavery operations and blocked approximately **226,000** handsets to disrupt communication channels used by scammers.

#### Inter-Ministerial Panel

- An inter-ministerial panel has been established, comprising members from various ministries, including the **Home Ministry** and the **National Investigation Agency (NIA)**, to coordinate efforts against cyber slavery.

#### Blocking Spoofed Calls

- Telecom operators are tasked with blocking incoming international calls that display Indian mobile numbers, which constitute a significant portion of fraudulent communication.

#### Data Monitoring

- The government is actively monitoring Indian mobile numbers that are roaming in Southeast Asian countries to trace and assist individuals in distress.

### Cyber Peace Policy Recommendations

#### Collective Action Against Cybercrime:

- **Social media companies and regulatory authorities** must collaborate to address emerging cybercrimes and develop robust preventive measures against misuse of technology.

#### International Collaboration:

- Enhance international cooperation to **tackle jurisdictional challenges** and anonymity issues in cyber human trafficking.
    - **Implement strong legislation** addressing both national and international human trafficking, with strict penalties for offenders.

#### Public Awareness:

Raise awareness among netizens about cybercriminal tactics, such as **fake job offers.**

- Encourage individuals to **stay vigilant and verify information from authentic sources** to protect themselves from trafficking.

#### Capacity Building:

- Promote support **mechanisms through government entities**, cybersecurity experts, and NGOs to empower citizens in online safety.
    - **Establish helplines or help centers for reporting suspicious activity**, fostering a safer internet experience while enhancing defenses against cyber threats.

## Conclusion

- The Indian government's **proactive measures to address cyber slavery** are a step in the right direction, but the issue requires sustained attention and coordinated efforts across various sectors.
- **As the digital landscape evolves**, so too must the strategies to combat cybercrime and protect vulnerable populations from exploitation.

# 4.2 AEW&C AIRCRAFT IN INDIA

## Airborne Early Warning and Control (AEW&C) System

- It is an airborne radar early warning system **designed to detect aircraft, ships, vehicles, missiles and other incoming projectiles at long ranges,** as well as performing command and control of the battlespace in aerial engagements by informing and directing friendly fighter and attack aircraft.
- **AEW&C units are also used to carry out aerial surveillance** over ground and maritime targets, and frequently perform **battle management command and control (BMC2).**

## General characteristics

### Detection Range

- Can detect aircraft up to 400 km (220 nmi) away, out of range of most surface-to-air missiles.

### Coverage with Multiple Aircraft

- Three aircraft in overlapping orbits can cover the whole of Central Europe.

### Proximity Detection

- Indicates both close and far proximity range on threats and targets.

### Sensor Extension

- Helps extend the range of sensors, aiding in offensive operations by making aircraft harder to track.

### Radar Stealth

- Reduces the need for offensive aircraft to keep their own radar active, minimizing enemy detection.

### Communication Capabilities

- Communicates with friendly aircraft, directing fighters towards hostile or unidentified flying objects.

## What Distinguishes AWACS From AEW&C?

| Feature | AWACS | AEW&C |
|---|---|---|
| *Full Form* | Airborne Warning and Control System | Airborne Early Warning and Control |
| *Aircraft Types* | Installed in E-3 and Japanese Boeing E-767 | Independently created by India |
| *Rotation Capability* | 360° (Phalcon, imported from Israel) | 270° |
| *Coverage Area* | Wider coverage area | Limited coverage area |
| *Durability and Longevity* | More durable and long-lasting | Less durable in comparison |
| *Technology Sophistication* | More advanced | Less sophisticated than AWACS |
| *Purpose* | Covers enemy territory with superior range | Covers enemy territory, but with limitations |

| | | |
|---|---|---|
| *India presently operates two types* | **Phalcon AWACS**: It is Developed by **Israel**. Provides **360-degree radar** and exceeds **400 kms**. India currently **operated 3 Phalcon**. | **Netra AEW&C:** Developed by **DRDO** in collaboration with IAF. Provides **240-degree** coverage of airspace and over **200 km range.** |

## 4.3 RULES RELATED TO EXTRADITION

### What is Extradition?

- Extradition is the process where one state hands over an alleged or convicted criminal to another state upon request for prosecution or punishment. The International Crimes Tribunal (ICT) of Bangladesh, established in 2009, investigates and prosecutes war crimes committed during the 1971 Bangladesh Liberation War by the Pakistan Army and its collaborators.

**According to Oppenheim**, *Extradition is the delivery of an accused or convicted individual to the state on whose territory the alleged criminal happens to be or the time being.*

### International Model Laws on Extradition

| | |
|---|---|
| **The Geneva Conventions and their Additional Protocols (1949)** | It recognised the **state's cooperation in extradition**. Thereafter, most countries have signed several **multilateral and bilateral treaties** on extradition. **E.g. United States of America has signed extradition treaties with over 100 countries.** |
| **The United Nations Model Treaty on Extradition (1990)** | It firmly emphasised international cooperation in extradition-related matters. It has 18 Articles, dealing with the **grounds for refusal of extradition requests, Rule of Specialty,** etc. However, it prioritises the discretion of the territorial State. |
| **The United Nations Model Law on Extradition (2004)** | It is inspired by the **UN Model Treaty** and aims to enhance international cooperation in extraditions.<br>It also aims to act as a supplementary statute in cases of countries where extradition treaties are absent. **Sections 5 and 6 of the Model Law** explicitly provide that **extradition shall not be granted** if, in the view of the territorial State, the extradition is requested for torturing or punishing the fugitive based on his **caste, ethnic origin, race, etc.** |

### Extradition under Indian Laws

#### The Extradition Act (1962)

- **The Act provides for** the extradition of fugitive criminals both from and to India. **The extradition may take place in accordance with any extradition treaty with the requesting or territorial state.**
- **However, the Act also provides that**, in absence of any such treaty, **any** Convention **to which India and such requesting or territorial state are parties can be treated as the extradition treaty for that matter.**
- **The** Act imposes no explicit restriction on the extradition of Indian nationals **to the requesting State; however, the bar on extradition varies from treaty to treaty.**

***NOTE- Currently, India has extradition treaties in force with the following 48 countries***

## Procedure for extradition in India

- The extradition process in India starts when a request is sent by the requesting state through diplomatic channels to the CPV Division of the Ministry of External Affairs.
- The GOI directs a Magistrate to issue an arrest warrant if the fugitive's identity and extraditability are established based on evidence.
- After the arrest, a judicial inquiry is conducted, and a report is submitted to the GOI.
- If satisfied, the GOI issues a warrant for the fugitive's custody and transfer to the requesting state.

## Procedure for extradition to India

- The process for the extradition of a fugitive criminal to India from the territorial state begins when the juridically competent Magistrate in India sends a request to the CPV Division of MEA, GOI, upon the *prima facie* establishment of a case against the fugitive criminal. The Magistrate sends the request along with relevant evidence and an open-dated arrest warrant.
- **The request is then formally sent to the territorial state through diplomatic channels, from where it is forwarded to an Inquiry Magistrate. Such a Magistrate will ascertain:**
  - The identity of the fugitive criminal;
  - Whether the offence committed or alleged to have been committed is extraditable;
  - Whether the fugitive criminal is extraditable.
- Upon such determination, the Inquiry Magistrate in the territorial state issues a warrant to arrest the fugitive criminal. **His arrest is intimated to the CPV/ Indian Embassy**. Finally, concerned Indian law enforcement personnel travel to the territorial state to escort the fugitive criminal back to India.

## Landmark cases on extradition

### Savarkar's case

- **In 1910, Vinayak Damodar Savarkar was being brought to India from Britain via a vessel named Morea, for his trial on a charge of treason and murder (Emperor v. Vinayak Damodar Savarkar (1910)).**

### Vijay Mallaya's case

- The case of Mr. Vijay Mallaya, the business tycoon and owner of Kingfisher Airlines and United Breweries Holdings Ltd., is arguably the most well-known extradition case in India (*Dr Vijay Mallya* v. *State Bank Of India* (2018)).

### Re Castioni's case

- In this case of 1891, a murderer escaped from Switzerland to England. The government of England rejected the extradition request of Switzerland.

### Re Meunier's case

- In this case of 1894, a fugitive criminal escaped from Paris to England after blasting a bomb in a public place in Paris.

### Conclusion

- Extradition is an essential tool not only to render justice but also to test diplomatic ties. However, the absence of extradition treaties with many countries becomes the loophole that fugitive criminals exploit. There is a need to bring about a comprehensive international law relating to extradition.

## 4.4 AI FOR SECURITY AND SECURITY FOR AI

### Context

- IBM's 2024 Cost of a Data Breach report revealed that 34% of data breaches studied in India involved data stored on public clouds and 29% across multiple environments (including public cloud, private cloud, and on-prem).

**FACTS**

- **The global average cost of a data breach in 2024 has a 10% increase over last year and the highest total ever.**
- **1 in 3 share of breaches that involved shadow data, showing the proliferation of data is making it harder to track and safeguard.**
- **40% of data breaches involved data stored across multiple environments.**
- **75% of the increase in average breach costs in this year's study was due to the cost of lost business and post-breach response activities.**

### What is AI security?

- AI security is the **process of using AI to enhance an organization's security posture**. With AI systems, organizations can automate threat **detection, prevention, and remediation to better combat cyberattacks and data breaches.**
- The most common AI security tools use machine learning and deep learning to analyze vast amounts of data, including **traffic trends, app usage, browsing habits, and other network activity data.**

### Applications of AI in Cybersecurity

- **Threat Detection and Prediction:** AI can analyze large datasets to identify activity patterns indicative of potential malicious behavior. **For example**, machine learning

algorithms can be trained to identify patterns in network traffic.

- **Behavior Contextualization and Conclusion**: AI can contextualize and draw conclusions from incomplete or new information.**For example,** AI-powered firewalls can analyze network traffic in real-time.
- **Remediation Strategy Development**: AI tools can suggest viable remediation strategies to mitigate threats . **For example,** machine learning algorithms can be used to identify commonalities in attack patterns.
- **Automation and Augmentation**: AI can automate various cybersecurity tasks, including alert aggregation, sorting, and response.

## What are the types of attacks or risk against AI?

- **The AI Pipeline as an Attack Surface:** The whole data pipeline is vulnerable to assaults since AI systems rely on data. Attackers can exploit these processes to **obtain access, modify data, or introduce malicious inputs**.
- **Production Data in the Engineering Process:** Using real-world production data in AI engineering is risky. If not appropriately **managed, sensitive production data** could leak into model training datasets, resulting in privacy violations, data breaches, or biased model outputs.
- **Attacks on AI models or adversarial machine learning:** Adversarial machine learning attacks trick AI models by altering input data. Attackers can subtly alter **visuals or text to misclassify or forecast**.

## How is AI used in security?

### Advanced Threat Detection:

- **Anomaly Detection:** AI identifies unusual patterns indicating potential threats.
- **Signatureless Detection**: Recognizes new and unknown threats based on malicious behavior.

### Network Protection:

- **Intrusion Detection and Prevention**: AI quickly detects and responds to network intrusions.
- **Firewall Optimization:** Analyzes network traffic to optimize firewall rules and identify vulnerabilities.

### Endpoint Security Enhancement:

- **Endpoint Protection:** AI-driven antivirus and anti-malware detect and prevent malware infections.
- **Zero-Day Threat Detection**: Identifies unknown threats by monitoring endpoint behavior.

## How does AI improve security?

### Advanced Threat Detection and Real-time Monitoring:

- AI analyzes data for unusual patterns and behaviors, enabling early threat detection.
- Real-time monitoring and alerts help identify and respond to security incidents promptly.
    - **Reduced False Positives:** AI minimizes false alarms, allowing security teams to focus on genuine threats.
    - **Threat Intelligence and Predictive Analytics**: AI processes threat intelligence data and predicts emerging threats, bolstering proactive defense measures.
    - **Phishing and Zero-Day Protection**: AI detects phishing attempts and zero-day vulnerabilities, enhancing email and system security.

## Conclusion

- The duality of AI for security and security of AI is an intersection that requires careful consideration to ensure that the benefits of AI are not overshadowed by the risks it poses. **While AI has the potential to greatly enhance security measures,** it also poses new security challenges that must be addressed.

## 4.4 INDIA LAUNCHES 4TH SSBN

### Context

- India's fourth nuclear-powered ballistic missile submarine (SSBN), referred to as S4, was launched into water at the Ship Building Centre in Visakhapatnam.

| Submarine | Name/Class | Missile Type | Missile Range | Status |
|---|---|---|---|---|
| S1 | INS Chakra | Not known | Not known | First leased nuclear submarine |
| S2 | INS Arihant | K-15 ballistic missile | 750 km | On deep sea patrol |
| S3 | INS Arighaat | K-4 ballistic missile | 3,500 km | Commissioned in August 2024, on deep sea patrol |
| S4 | INS Aridhaman | K-4 ballistic missile | 3,500 km | To be commissioned in 2025 |

**INS Aridhaman:**

- It is a stretched variant of the INS Arihant, with an estimated additional displacement of 1,000 tons compared to the earlier Arihant class submarines. The increased displacement enhances the vessel's capacity to accommodate more **Submarine Launched Ballistic Missiles (SLBMs),** providing greater fireworks and extending India's second-strike capability.
- The submarine is expected to be equipped with a **combinationof longer-range K-4 missiles (with a range of 3,500 km) and potentially the newer K-5 missiles**, which are under development and rumored to have a **range exceeding 5,000 km.**

### About ballistic missile submarine (SSBN)

- It is a submarine capable of deploying **submarine-launched ballistic missiles (SLBMs)** with nuclear warheads.
- These submarines became a major weapon system in the Cold War because of their nuclear deterrence capability.
- **They can fire missiles thousands of kilometers** from their targets, and acoustic quieting makes them difficult to detect (see acoustic signature), thus making them a survivable deterrent in the event of a first strike and a key element of the mutually assured destruction policy of nuclear deterrence.
- **The deployment of ballistic missile submarines** is dominated by the United States and Russia (following the collapse of the Soviet Union).

## 4.6 SHORT ARTICLES

### Israel Air Defence System

**Context:**

- Israel's air defence system is designed to protect against missiles fired from short distances (like by Hamas) to longer ranges (missiles that fly outside the Earth's atmosphere) likely to be fired by nations further away from Israel, such as Iran).

**What are the different tiers of Israel's missile defence system?**

- Israel has several air defence systems, each one designed to intercept incoming missiles at different altitudes and distances.
- Iron Dome, the most well-known of Israel's missile shields, is designed to **intercept short-range rockets, as well as shells and mortars, at ranges of between 4km and 70km from the missile launcher.**

**Key Facts About Israel's Air Defense System:**

**Key Components**

- Iron Dome, David's Sling, Arrow, and Barak-8

**Iron Dome**

- **Purpose**: Short-range missile defense.
- **Range**: Up to 70 km.
- **Features**: Intercepts rockets and artillery shells, operational since 2011.

**David's Sling**

- **Purpose**: Medium-range missile defense.
- **Range**: 40-300 km.
- **Features**: Designed to intercept tactical ballistic missiles and larger aerial threats.

**Arrow**

- **Purpose**: Long-range missile defense.
- **Range**: Up to 1,500 km.
- **Features**: Targets incoming ballistic missiles, part of Israel's multi-tiered defense.

**Barak-8**

- **Purpose**: Naval and land-based air defense.
- **Range**: 70 km.
- **Features**: Developed for short- to medium-range aerial threats, effective against drones and missiles.

**Technology**

- **Radar Systems**: Advanced radar for tracking and target acquisition.
- **Command and Control**: Integrated systems for real-time threat assessment and response.

**Operational Strategy**

- **Multi-Layered Defense**: Uses a tiered approach to intercept various threats at different altitudes and ranges.
- **Collaboration**: Works with U.S. defense systems for enhanced capability.

## Dragon drones

**Developed by**

- **Ukraine's Ministry of Defense and private defense manufacturers like Steel Hornets**

**Purpose**

- Incendiary unmanned aerial vehicle (UAV) used to burn down natural barriers and fortifications, targeting military personnel and equipment

**Main technology**

- Sprays molten thermite to destroy targets

**Development**

- Developed by private manufacturer Steel Hornets; thermite capable of burning through 4 mm of metal in under 10 seconds

**Payload**

- **Thermite** (powdered iron oxide and aluminum)- developed a century ago to weld railroad tracks.

**Legal Status**

- Legal for military use; illegal against civilians.
- **Protocol III of the Convention on Certain Conventional Weapons:** Incendiary weapons like thermite are limited to military targets due to their indiscriminate nature and the severe burns they cause.

## T90 Bhishma Tank

**Introduced in Indian Army**

- 2003

**Three Crew**

- Commander, Gunner, Driver

**Main Gun**

- 125 mm smoothbore gun

**Anti-Aircraft Gun**

- Mounted, 2 km range, **800 shells per minute**

**Speed**

- **60 km/h**

**Maneuverability**

- Capable of quick movement through forests, mountains, and marshy terrains

**Thermal Sighting System**

- Advanced, detects targets up to **8 km away**, day or night

**Origin**

- Developed from T-72, Russian main battle tank

**Indian Variant**

- T-90S Bhishma

## THAAD

**Type**

- It is US Anti-ballistic missile defense system. It is designed to intercept and destroy short- to medium-range ballistic missiles during their final flight phase.

**Designed by**
- Lockheed Martin

**Operational Interception**
- UAE - first operational **interception of medium-range ballistic missile**

**Countries Deployed**
- United Arab Emirates, Israel, Romania, South Korea

**Missile Type**
- Kinetic Kill (**Does not rely on warheads**, uses kinetic energy for destruction)

**Missile Range**
- Estimated 150-200 km

**Radar System**
- X-Band Active Electronically Scanned Array Radar

**Components**
- Six launcher vehicles with eight missiles each
- Two mobile Tactical Operations Centers (TOCs)
- Ground-Based Radar (GBR)

**Key Technologies**
- Hit-to-Kill Technology
- Kinetic Kill Mechanism
- Infrared Scene Generation for Countermeasures.

## Next Generation Missile Vessels (NGMV)

**What are LM2500 engines?**
- The General Electric LM2500 is an **industrial and marine gas turbine produced by GE Aviation**. The LM2500 is a derivative of the General Electric CF6 aircraft engine.The LM2500 was first used on the **US Navy GTS Admiral W. M. Callaghan in 1969.**
- The LM2500+ is an evolution of the LM2500, delivering 28.6 MW of electric energy when combined with an electrical generator. Two of such **turbo-generators have been installed in the superstructure** near the funnel of **Queen Mary 2, the world's largest transatlantic ocean liner,** for additional electric energy for the liner to reach higher sea speeds.

**About Next Generation Missile Vessels (NGMV)**

**Programme**
- Maritime Capability Perspective Plan

**Objective**
- Acquire six advanced missile corvettes for the Indian Navy

**Primary Purpose**
- Surface warfare capabilities, advanced stealth features (low radar cross section, acoustic, magnetic, and infrared signatures), armed with anti-ship or land-attack missiles. The NGMVs' primary weapon is anticipated to be the **BrahMos supersonic cruise missile**, capable of striking targets at long ranges.

**Range**
- Minimum 5,185 km at sustained economical speed

**Maximum Speed**
- Not less than 35 knots (approximately 65 kmph)

**Propulsion**
- Adequate power-to-weight ratio for the ship's operations
- Greater endurance for low-speed regimes during Low-Intensity Maritime Operations (LIMO) or EEZ patrols

**Weapons**
- Minimum 8 **surface-to-surface missiles (SSM)-** SSM or ground-to-ground missile (GGM) is a missile designed to be launched from the ground or the sea and strike targets on land or at sea.
- Fitted with **Point Defence Missile System (PDMS)** for near 360-degree anti-missile defence coverage.

## INS Samarthak

**Type**
- Multi-Purpose Vessel (MPV)

**Design and Construction**
- It has been designed and constructed in-house by L&T in keeping with Government of India's **'Make in India' initiative and 'Aatmanirbhar Bharat' vision**.

**Primary Functions**

- Development and testing of next-generation weapons and sensors for the Indian Navy.

**Maximum Speed**

- 15knots

## 4.7 SNIPPETS

| Topic | Details |
|---|---|
| KAZIND | **It is a joint military exercise between** India and Kazakhstan **that focuses on enhancing their military capabilities for** counter-terrorism operations**. The exercise also aims to improve interoperability and coordination between the two armies, and to share best practices in tactics, techniques, and procedures.** |
| HARPOON | It is **an all-weather, over-the-horizon, anti-ship missile** manufactured by **McDonnell Douglas (now Boeing Defense, Space & Security). The AGM-84E Standoff Land Attack Missile (SLAM)** and later **AGM-84H/K SLAM-ER (Standoff Land Attack Missile – Expanded Response)** are cruise missile variants.<br>The regular Harpoon uses active radar homing and flies just above the water to evade defenses. |
| Akashteer | It is an Advanced **Air Defence Control and Reporting Systems (ADCRS).** It aims to improve the capability of the Indian Army's Corps of Army Air Defence troops by providing them with a tactical command and control system. It is developed by the **Bharat Electronics Limited (BEL).** |
| Fattah 2 | **Iran developed a hypersonic missile** that can travel between **Mach 5 and Mach 20**. It has a range of about 1,500 kilometers and can change its trajectory **mid-flight to avoid defenses**. The Fattah-2 was recently used in a missile attack against Israel, marking its first operational deployment in a military context. |
| Taurus | **The Taurus KEPD-350 is a** German-Swedish air-launched cruise missile**, manufactured by Taurus Systems and used by** Germany, Spain, and South Korea**.** |
| Hellfire missile | It was developed by in 1972 to counter **Soviet tanks**and is used against armored vehicles. Hellfire is an **air-to-ground, laser-guided, subsonic missile** with significant **anti-tank capacity**.It can also be used as **an air-to-air weapon** against helicopters or **slow-moving fixed-wing aircraft.** |
| Yars nuclear missile | **It is a** Russian-made mobile nuclear intercontinental ballistic missile (ICBM) **that can be mounted on truck carriers or deployed in silos. The** first production of Yars began in 2004. **It is believed to have entered into service in February 2010.** |
| SIMBEX | The exercise began as **'Exercise Lion King' in 1994**, and has since evolved into one of the most significant bilateral maritime collaborations between the **Indian Navy and the Republic of Singapore Navy (RSN).** The exercise will be conducted in two phases - **the Harbour Phase** at Visakhapatnam and the **Sea Phase** in the Bay of Bengal. |
| C295 Aircrafts | It is a new-generation light and medium tactical airlifter from Airbus is designed for versatile roles, including troop and cargo transport, surveillance, and medical evacuation. |

## 4.8 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| Talwar, INS Nirdeshak | 14th October |
| Predator drones | 16th October |
| India-Singapore defense relations | 22nd October |
| Fake Bomb Threats in Aviation | 23rd October |
| Warfare in news | 29th October |
| Online scams in the news | 29th October |
| Digital payment gateways | 30th October |

# 5. ENVIRONMENT & ECOLOGY

## 5.1 STUBBLE BURNING AND RIGHT TO HEALTHY ENVIRONMENT

### Context

- The Supreme Court observed that stubble burning is the violation of fundamental rights **under Article 21 of the Constitution.**

### Right to the environment in the Indian constitution

- Environment has been defined in **The Environment (Protection) Act, 1986 as The water, air and land and the interrelationship among them and the human beings, other living creatures, plants, microorganisms and property.**
- There are various constitutional and legal frameworks to ensure the right to the environment.

### Constitutional Provisions:

**Article 21**

- The Supreme Court in the **Maneka Gandhi vs. The Union of India case held that Article 21 guarantees the fundamental right to life.**
- **Article 21 of the Constitution covers the right to live with dignity, the right to survive as a species, the right to livelihood, and the right to a healthy environment.**
- Article 21 of the Indian Constitution also prevents the deprivation of one's life or personal liberty except by following procedures established by law.
- **In Subhash Kumar v. State of Bihar, 1991** the Supreme Court held that Article 21 covered the right to environment and the same verdict was reiterated in Virender Gaur v. State of Haryana case of 1994.

**Directive Principle of State Policy**

- **Article 47** outlines the state's duties to improve public health, nutrition, and the standard of living.
- **Article 48-A** directs the states to endeavour for the protection and improvement of the environment and to safeguard the forests and wildlife in the country.
- **The National Green Tribunal in Sher Singh vs State of Himachal Pradesh 2014,** held that the State has a constitutional obligation to protect and strive towards the protection of the environment.
- **In M.C. Mehta vs Union of India, 2002**, The Supreme Court established the principle of "absolute liability", which holds corporations in hazardous industries strictly liable for any mishaps in industries.

**Fundamental Duties:**

- **Article 51A(g)** imposes a fundamental duty upon the citizens of India to protect and preserve the environment.

### Legal Framework:

- **Environment (Protection) Act, 1986, Water (Prevention and Control of Pollution) Act, 1974, Forest Conservation Act, 1980, Wildlife Protection Act, 1972, Air (Prevention and Control of Pollution) Act, 1981, Biological diversity Act, 2002, Plastic waste management rules**

### What is Stubble Burning?

- Stubble burning is the **process of removing paddy residue from fields after the harvest to prepare for the next crop.**
- **Farmers in northwest India burn 23 million tonnes of rice straw annually.**
- As per the Ministry of Agriculture, **80% of 20 million tonnes of stubble generated in Punjab is burnt annually due to cost and time constraints.** It is commonly practised in areas which use the combine harvesting machines, which leaves residue behind.

### Reason behind Stubble Burning

- Stubble left behind has no use for farmers and delays the next sowing season. This makes farmers obliged to burn the stubbles.
- **The short time of 20-25 days between rice harvesting and wheat sowing also causes farmers to burn stubble.**
- **Punjab's 2009 Subsoil Act, mandatorily delaying the transplantation of paddy, further delays paddy transplantation.**

### Risks associated with Stubble Burning

- **Environmental Risks:** Reduces soil nutrients such as nitrogen, phosphorus, and potassium and kills beneficial microbes in the soil.
- **Health Risks:** Releases huge amounts of harmful pollutants **such as CO2, CO, NOx, SOx, CH4, and particulate matter which includes PM2.5 and PM10, which are the major causes of respiratory and cardiovascular diseases.**

### Way ahead

- **Technological Interventions:** Machines such as the **Happy Seeder, Zero-till seed drill, Rotavator, and Paddy Straw Chopper** help to manage residue without burning. **The Turbo Happy Seeder for instance cuts stubble and sows wheat simultaneously and covers the seeds with straw as mulch.**
- **Waste Decomposer:** A bio-concoction has been developed by the **National Centre for Organic Farming to compost crop residue in situ. The compost can be used as manure in farms to further enhance productivity.**
- **The Chhattisgarh Model of Gauthan** applies a sustainable approach where crop residue is collected and turned into organic fertiliser. This reduces the stubble burning and also provides rural employment.
- **Combine Harvester Redesign:** Incentivise the private players to modify the combine harvester design to cut closer to the base.
- **Agri-Waste Collection Centers:** Set up Agri-Waste Collection Centers to sell stubble for additional income.
- **Incentives for Industries:** The union and state governments can support industries to convert stubble into valuable products like cattle feed or fuel.
- **Crop Diversification: Incentivise the farmers to plant crops like maize, beans, and lentils which can reduce the need for burning as they are harvested by hand and have earlier harvest windows.**

## 5.2 GLOBAL ECOSYSTEM ATLAS

### Context

- Global Ecosystems Atlas was launched at the 16th Conference of Parties (COP16) to the United Nations Convention on Biological Diversity (CBD).

### Global Ecosystems Atlas (GEA)

- It has been developed by the **Group on Earth Observations (GEO) as the first global tool for ecosystem mapping and monitoring.**
- The atlas targets the major challenges such as biodiversity loss, climate change, and land degradation globally.

### Objectives

- Its atlas aims to transform the understanding and protection of vital natural systems in the world.
- It will provide **crucial data on ecosystem health and risks associated with the ecosystem.**

- The atlas aims to enable countries in informed decision-making for sustainable management of ecosystems.

### Technology features used

- GEA will utilise the **Earth observation, artificial intelligence, and field data to fill data gaps in ecosystem management.**
- The atlas map has been aligned with the **Global Ecosystem Typology for consistency for the International Union for Conservation of Nature.**

### IUCN Global Ecosystem Typology

- It is a detailed **classification framework for Earth's ecosystems which helps us to identify ecosystems that are important for the conservation of biodiversity, research, and human well-being.**

### Classification

- It classifies ecosystems based on their functional characteristics and species assemblages and has **six levels in it.**
- **Upper levels:** It Classifies ecosystems based on their functional characteristics like water regime, climatic regime, and food web structure. **This level includes realms, functional biomes, and ecosystem functional groups.**
- **Lower levels:** It Classifies ecosystems based on their species assemblages. The lower levels of typology include biogeographic **ecotypes, global ecosystem types, and sub globular local ecosystem types.**

**Definitions**

- **Realm:** Broadest biogeographic division of the land surface on Earth based on the distribution patterns of terrestrial organisms.
- **Biome:** A biome is a community of flora and fauna that have common characteristics in the environment they exist in. **They're distinct geographical regions and have specific climate, vegetation, and animal life.**
  - Examples: **Tundra, taiga, temperate deciduous forest, temperate rainforest, temperate grassland, chaparral, desert, savanna, and tropical rainforest.** The freshwater biomes are lakes, rivers, and wetlands, while the marine biomes include coral reefs and the oceans.
- **Ecosystem Functional Group:** They are groups of functionally related ecosystems within a biome sharing common ecological drivers. They are grouped based on the role they play in an ecosystem. Primary producers, herbivores, carnivores, genera, species, domains, etc. are examples of functional groups.
- **Biogeographic ecotype:** A biogeographic ecotype is a group or population of organisms which are adapted to local conditions and which can be found in patches in different regions. **Ecotypes are different from different subspecies, as they can exist in multiple habitats, and they also have no taxonomic rank.**
- **Global ecosystem types:** they are complexes of organisms and their associated physical environment within a large area, which are occupied by an ecosystem functional group.
- **Subglobal ecosystem types:** These are the subunits or nested groups of subunits within a global ecosystem type.

## Importance of the Atlas for Stakeholders

- **Governments: It is an essential** tool for **countries, businesses, communities, and institutions for ecosystem conservation, planning and** monitoring framework under the **Kunming-Montreal Global Biodiversity**
- **Framework:** It also guides the countries in compliance with the Convention on Biological Diversity(CBD) obligations on ecosystem protection.
- **Businesses:** Businesses and corporations can incorporate environmental risks into their business strategies.

- **Local Communities:** Local communities can also access data for conservation and restoration in their areas.
- **Financial Institutions:** The atlas helps FIs to make informed investments and align their projects with sustainability goals.
- **Academics and Researchers:** Open data access of the Atlas will help academics and researchers for better research on ecosystems at global and regional levels.

### Conclusion

- The atlas will thus prove to be an instrumental tool for global ecosystem management.

## 5.3 BLACKBUCK AND BISHNOIS

### Context

- The recent murder of an NCP leader has led to an escalation of threats to Salman Khan, who had killed Blackbucks in 1998.

### The Bishnoi community

#### About

- **The Bishnois are a Hindu religious sect** residing in the Western Thar desert and some northern states of India.
- It was **founded by Guru Jambheshwar, who was also known as Jambaji, around the 15th century.**
- **Guru Jambhesvara was born in 1451 AD at Pipasar village of Nagore district in Western Rajasthan.**

#### Principles

- They are guided by 29 principles given by Jambaji and **the 29 rules laid down by the founder, are what give the community its name- bish (20), noi (9).**
- Out of the 29 rules, **eight were about protecting the environment including the non-sterilisation of bulls**, the prohibition against the killing of animals, prohibition against cutting down trees. The other rulers were about social behaviour and personal hygiene.
- Jambaji's teachings are preserved in the form of 120 statements known as sabdas.
- The 29 rules along with the 120 sabdas define the religious duty of the Bishnoi, or what is known as their 'Dharma'.

#### Why do Bishnois protect Blackbuck?

- The 29 principles of **Bishnois and the teachings of Guru Jambheshwar and their principles emphasise the protection and preservation of wildlife and vegetation.**
- They worship the blackbuck in the form of **reincarnation of their spiritual guru, Jambheshwar.**
- However, The Bishnoi community's bond with Blackbucks goes beyond spiritual reverence.
- It is a **deep cultural and environmental relationship because, for centuries, Bishnois have lived in harmony with these animals**, sharing their resources with them.

#### Bishnoi movement

- In 1730, **as many as 362 Bishnois were killed in the village of Khejarli, near Jodhpur**, when they were protecting trees from being cut down.
- The massacre was ordered by the Maharaja Abhai Singh of Jodhpur.
- **Maharaja Abhai Singh of Jodhpur had sent his soldiers to fell khejri trees for wood to build a new palace, but the Bishnoi community, led by a woman named Amrita Devi, resisted.**
- Amrita Devi and others led a resistance by hugging trees and this event became a precursor to **the Chipko movement of 1973.**

## About Blackbucks

**About**

- The **blackbuck**, also known as the **Indian antelope**, is a medium-sized antelope native to India and Nepal.
- It inhabits grassy plains and lightly forested areas with perennial water sources.

**Scientific Name**

- ***Antilope cervicapra***

**Blackbuck**

- Blackbuck is a herbivorous animal.

**Habitat**

- The blackbuck mostly **lives in open grasslands, dry scrub areas, and thinly forested areas.**
- **Blackbucks cannot sustain a cold climate.**

**Distribution**

- Blackbucks are found **only in the Indian subcontinent.**
- The animals are mainly seen in three broad clusters across India-northern, southern, and eastern regions.

**Threats**

- Blackbucks were highly **hunted in the princely states of India before the independence due to which their population has been declining continuously.**
- They are hunted for their skin.

**Conservation**

- **IUCN status: 'Least Concern'**
- **Wildlife Protection Act, 1972: Schedule I**
- Hunting and poaching blackbucks is a non-bailable offence and can invite a jail term of up to six years.

# 5.4 THE EMISSIONS GAP REPORT 2024

## Context

- The Emissions Gap Report 2024 has flagged that if countries continue with the present environmental policies, it would **result in 3.1 degrees Celsius warming over pre-industrial levels.**

## Emissions Gap Report

- It is an **annual report by the United Nations Environment Programme (UNEP) being published since 2010.**
- The report assesses the **gap between current emissions and the reductions needed to limit warming to below 2°C or 1.5°C of the Paris Agreement goals.**
- It provides science-based insights on future global emissions trends and their comparison with the climate goals.
- Each edition of the report highlights the key opportunities to bridge the emissions gap in the countries.
- The report is released annually before the UN Climate Change Conference (COP) to guide global negotiations.

## Findings of the Emissions Gap Report 2024

**Urgent Need for Emission Reductions**

- **Governments need to cut annual greenhouse gas emissions by 42% by 2030 and 57% by 2035 in order to meet the 1.5°C goal.**
- There will be a temperature rise between 2.6°C and 3.1°C by 2100 if current trends continue among the countries.
- **To stay within the 1.5°C limit, the emissions must decline by 7.5 per cent annually until 2035.**

**Difficulty in meeting the targets:**

- Even the **lowest projected 2.6°C increase in temperature would result in severe impacts on human lives, economies, and biodiversity.** Delayed action requires greater emission cuts later and this will make it harder to meet climate goals.

**Required Actions and Global Coordination**

- Global mobilisation of funds and awareness for policy actions on a massive scale is necessary to strengthen climate pledges.

- **Countries must submit the updated NDC before COP30 in Brazil to enhance their ambition.**
- **Achieving Paris climate goals will require a 6 times higher mitigation investment.**

### Proposed Emission Reduction Pathways:

- **Reducing emissions by 52% by 2030 and down to 41 gigatons by 2035 is absolutely achievable at a cost below 200 dollars per ton of CO2.**

### Common but Differentiated Responsibilities

- G20 countries (excluding the African Union) contributed 77% of global emissions in 2023 and six of the largest emitters accounted for 63% of emissions globally. Largest emitters, especially the G20 countries, historically bear more responsibility.

### Current Policy Projections and Conditional NDCs

- Full implementation of **unconditional and conditional NDCs by the countries will only bring an emission reduction of 10% by 2030 and likely lead to a 2.6°C warming.** Even with only the conditional NDCs, temperatures will reach 2.8°C by the end of the century.
- **Unconditional targets** are the targets which are implemented using domestic resources, while **conditional targets** are the targets which require international support, such as financial resources, technology transfer, or capacity-building support.

### India's emission

- India's FY23 Green House Gas emissions increased by 6.1% which is the highest among all the years and among all the countries.
- **This is followed by China at 5.2%, while the US and EU emissions decreased by 1.4% and 7.5% respectively.**
- **India's total emissions will remain lower than that of China at 16,000 $MtCO_2e$ and the US at 5,970 $MtCO_2$.**
- India's per capita GHG emissions in 2022 were **2.9 t $CO_2$, significantly lower than China (11 t$CO_2$) and the US (18 t$CO_2$).**
- Developed countries have per capita emissions about three times the global average (6.6 $tCO_2e$), while India, African Union, and least developed countries remain below it.

## 5.5 COP 2016

### Context

- The world leaders have gathered in Cali, Colombia, for the 16th meeting of the Conference of the Parties to the Convention on Biological Diversity (CBD COP16).

### What is COP16?

- It is the 16th meeting of the **Conference of the Parties to the United Nations Convention on Biological Diversity (CBD) commonly called COP16 or Conference of the Parties to the Convention on Biological Diversity, 16.**
- It is taking place in Cali, Colombia from October 21 to November 1, 2024.
- It's the **first meeting since the adoption of the Kunming-Montreal Global Biodiversity Framework (GBF) in COP15 in Montreal.**
- Its theme for 2024 is "**Make Peace with Nature**" which calls for decisive governmental action.

### Main Agenda of COP 16:

- To review the progress of the Kunming-Montreal Global Biodiversity Framework.

### The Kunming-Montreal Global Biodiversity Framework (GBF)

- The GBF is often dubbed the "Paris Agreement for Nature," and it aims to protect

ecosystems and halt the progress of biodiversity loss.
- It contains four goals and 23 targets.

**4 Global Goals for 2050:**

1. **Preserve and restore ecosystems, stop human-induced extinction,** tenfold reduce the risk of species extinction, and ensure healthy populations of wildlife.
2. **Ensure sustainability in biodiversity use and restore ecosystem services for sustainable development.**
3. **Fair sharing of benefits arising from genetic resources,** which are specially derived from indigenous communities, and protect traditional knowledge and resources.
4. **Secure financial and technical resources** to implement the framework and to fill the $700 billion biodiversity finance gap.

**23 Targets for 2030, grouped into:** Reducing biodiversity threats, Sustainable use and benefit-sharing, and Tools for implementation

**30 x 30 Target:** Target 3 of the 23 targets is called 30*30 because It has the following objectives-

- To conserve 30% of the world's lands and oceans by 2030 and
- To restore 30% of degraded land and marine ecosystems by 2030.

## Key topics to be discussed at the meeting

**Linking biodiversity and climate action:**

- COP16 will primarily focus on the need to protect ecosystems which are potential for capturing carbon and reducing the impacts of climate change

**Protecting the ocean**

- COP16 will confront the challenge of protecting 30% of the world's ocean, which is vital for marine biodiversity and the billions of people who depend on it.

**Biodiversity beyond National Jurisdiction Agreement (BBNS)**

- **Only 1 % of the high seas is legally protected and there is growth of unchecked activities like shipping and mining in high seas which have the potential to affect Ocean ecosystems.**
- Climate change has led to ocean acidification and loss of coral reefs.
- To safeguard the oceans there was a need for a treaty.
- Established in 2023 BBNS or High Seas Treaty provides a legal framework for ocean and sea activities. It is legally binding for all signatories.
- The High Seas Treaty allows states and regional economic integration organizations to become parties to the agreement.

**Marine Protected Areas (MPAs)**

- The United Nations has set a **target to protect 10% of the ocean with MPAs by 2020. However, only 3.6% of the ocean falls under MPAs.**

**Equitable forest protections:**

- At COP26, the World leaders have committed to halt and reverse forest loss and land degradation by 2030.
- **This pledge was supported by $12 billion in public funding and $7.2 billion from private funding. CEOs from over 30 financial institutions have also committed to stopping investing in activities that are responsible for deforestation.**

**Monitoring and reporting**

- The monetary framework which was adopted by the Conference of the Parties (COP) to the CBD at its 15th meeting in 2022 is inadequate.
- **The Ad Hoc Technical Expert Group (AHTEG) to advise on the operationalization of the COP framework is not sufficient.** The COP16 will address it in detail.

**Mechanisms of finance**

- To mobilise $200 billion per year by 2030 for biodiversity conservation is one of the 23 targets of the Kunming-Montreal Framework:
- **Of 200 billion dollars, $20 billion annually will be channelled from developed countries to developing nations for their biodiversity**

**efforts.** The financing mechanism of this will be discussed in detail here at COP16.

## 5.6 CLIMATE FINANCE INITIATIVES

### Context

- The 29th Conference of the Parties (COP29) of the United Nations Framework Convention on Climate Change (UNFCCC) has key climate finance issues at the top of its agenda.

### What is Climate Finance?

- Climate finance is a regional, **national or transnational financing made from public, private and any other alternative sources of financing to support mitigation and adaptation actions to address climate change.**

### Evolution of Climate Financing

- **1992: UNFCCC Established:** The origin of climate finance dates back to 1992 when the United Nations Framework Convention on Climate Change (UNFCCC) was established.
- **1997: Kyoto Protocol:** The protocol **introduced the Clean Development Mechanism (CDM) which allowed the developed countries to invest in emission reduction projects in developing nations for carbon credits.**
- **2007: Bali Action Plan:** This action plan shifted focus to long-term financing for **mitigation and adaptation and called for a fund to mobilize $100 billion annually by 2020.** It also established the Adaptation Fund for adaptation financing.
- **2009: Copenhagen Accord:** Though not a legally binding accord, it recognized the importance of climate finance and here the developed countries pledged to provide $30 billion from 2010-2012.
- **2010: Green Climate Fund (GCF) Established:** It became the primary funding mechanism under UNFCCC. It aimed to support developing countries to mitigate emissions and adapt to climate impacts.
- **2015: Paris Agreement:** It solidified global commitment to combat climate change and **reaffirmed the developed countries' pledge of $100 billion annually by 2020.**
- **2019: GCF Initial Resource Mobilization:** By 2019 the developed countries successfully **mobilised $9.8 billion in pledges and it marked the progress towards the $100 billion target.**
- **2021: Glasgow Climate Pact (COP26):** It proposed the **establishment of a Loss and Damage fund** for countries which face irreversible climate impacts such as small Island Ocean Countries.

### Major Climate Finance Funds in the World

#### Green Climate Fund (GCF)

- **It is the largest dedicated climate finance fund established in 2010 under the UNFCCC that supports low-emission and climate-resilient projects in developing countries.**
- **To obtain the financing under it, the project proposals must be submitted through accredited entities.**
- **Accredited Entities are organizations which partner with the Green Climate Fund to implement GCF-financed projects.**
- AEs can be private, public, non-governmental, sub-national, national, or regional. They work with countries to develop project ideas, submit funding proposals, and manage and monitor projects

#### Adaptation Fund (AF)

- **It was established in 2001 under the United Nations Framework Convention on Climate Change (UNFCCC).** It finances adaptation projects in vulnerable developing countries.
- **It is governed by the Adaptation Fund Board and allows direct access for countries like Least Developed Countries (LDCs).**

### Climate Investment Funds (CIF)

- **They were established in 2008 to finance pilot projects in developing countries and** provides financing for renewable energy, energy efficiency, and climate resilience.
- **It includes the Clean Technology Fund (CTF) and the Strategic Climate Fund (SCF).**

**Clean Technology Fund (CTF)**

- It supports financial resources to invest in clean technology projects in developing countries.
- The CTF focuses on low-carbon technologies with the potential to reduce greenhouse gas emissions, such as renewable energy, energy efficiency, and clean transport.

**Strategic Climate Fund (SCF)**

- It provides dedicated funding to new pilot projects to address climate change challenges.
- It supports seven targeted programs that include the Forest Investment Program, Pilot Program for Climate Resilience, and Scaling Up Renewable Energy Program in Low-Income Countries

### Global Environment Facility (GEF)

- **It was established before the 1992 Rio Earth Summit and includes 184 countries and international institutions, civil society organisations, and the private sector.**
- It offers grants and concessional financing through programs like the Special Climate Change Fund and the Least Developed Countries Fund.

### Loss and Damage Fund (LDF)

- **The fund was established at the 2022 UNFCCC Conference (COP27) held in Egypt. It is overseen by a Governing Board and the World Bank serves as the interim trustee for four years.**

## 5.7 2024 GLOBAL NATURE CONSERVATION INDEX

### Context

- India has been labelled among the worst performers in the 2024 Global Nature Conservation Index.

### Global Nature Conservation Index (NCI)

- It is an index which examines various factors like protected area coverage, species at risk, conservation laws, and future trends for assessing the **effectiveness of conservation efforts in various countries.**
- This **360-degree view of the index helps countries to find problems, track progress, and make informed decisions to protect our planet and promote sustainable development.**
- Developed by the **Goldman Sonnenfeldt School of Sustainability and Climate Change at Ben-Gurion University of the Negev along with BioDB.com.**
- Its objective is to aid governments, researchers, and organisations to identify and improve conservation policies.
- **Indicators:**
  - 25 key indicators on biodiversity and conservation progress across 180 countries in the world.
- **Markers: It assess conservation efforts globally using four markers-**
  - land management, threats to biodiversity, capacity and governance, and future trends in biodiversity loss.

### Global Nature Conservation Index (NCI) 2024

- India has scored 45.5 out of 100 in the index and scored a Global Rank of 176th out of 180 countries.
- Best performers: Rank1-Luxembourg (70.8), Rank2- Estonia(70.5) and Rank3-Denmark(69).
- Worst Performers included India, Kiribati (180), Turkey (179), Iraq (178) and Micronesia (177). This makes India one of the worst performers.

### Reasons for India's Low Rank

- **Land Management Issues:** Inefficient land use has been found to be the major issue with 53% of land converted for urban, industrial, and agricultural uses in India.
- **Marine Conservation:** In India, the report noted that the **protected areas cover only 0.2 per cent of national waterways.**
  - There is a lack of adequate marine protection within India's Exclusive Economic Zone (EEZ)
- **Biodiversity Threats:** High levels of soil pollution, fertility loss, poor Nutrition nitrogen index of 0.77 due to high pesticide usage are posing threats to biodiversity.

## Biodiversity Threats in India

**Habitat Loss and Fragmentation:**

- The habitat loss and land fragmentation in India are driven by unsustainable agriculture, urbanisation, infrastructure development, and climate change among others. **The report highlights that 23,300 square Kilometres of tree cover was lost between 2001 to 2019.**

**Climate Change Impacts:**

- Climate change is severely affecting sensitive ecosystems like alpine regions and coral reefs in India, especially in coastal regions.

**Species Decline:**

- **40% of marine species and 65% of terrestrial species located in Protected Areas of India have seen a decline.**
- Overall there was a significant **decline in marine species and terrestrial species accounting for 67.5% and 46.9% of their total populations.**

**High Population Density:**

- The doubling of the population of India since the late 1970s has strained the ecological resources in India.

**Illegal Wildlife Trade:**

- In terms of illegal wildlife trade, **India ranks 4th globally and the sales value is around 15 billion pounds annually.** This calls for stronger enforcement and international cooperation to curb the wildlife trade.

**Sustainable development threats in India:**

- In regard to Sustainable Development Goals (SDGs) SDG 14 (Life Below Water) and SDG 15 (Life on Land) are the areas where major challenges remain.

## Way ahead

- **Ecosystem-based Management:** India should shift to ecosystem-based conservation and focus on protecting entire ecological networks rather than isolated areas. Ex. **The 2018 eco-sensitive zone around Mudumalai Tiger Reserve is a step forward.**
- **Community-led Conservation:** Engaging communities in conservation has proven successful, like **Uttarakhand's Van Panchayats and Kuno's 'Cheetah Mitra',** Malhotras' SAI Sanctuary in Karnataka, etc.
- **Sustainable Agriculture:** As agriculture covers 60% of land of India, it plays a vital conservation role. Scaling up Zero Budget Natural Farming and Incentivizing crop diversification should be done.
- **Technology-driven Conservation:** Technology could be used for conservation, like Satellite and AI for habitat monitoring, eDNA for non-invasive aquatic biodiversity checks. Ex. Drones for tiger monitoring in Sundarbans.
- **Biodiversity Financing:** Funding is key for sustainability. India can expand the compensatory Afforestation Fund for biodiversity projects and promote green bonds dedicated to conservation.
- **Climate-adaptive Conservation:** Climate change demands adaptive conservation. Steps such as Vulnerability assessments of ecosystems and developing climate-resilient protected areas can be taken.

## 5.8 SHORT ARTICLES

# King Cobra

**Context**

- **Scientists have recategorised the King Cobra Snakes into 4 distinct species.**

**King Cobra**

- It is the world's **longest venomous snake** and is capable of growing up to 19 feet long and living for as long as 25 years.
- It is the **national reptile of India**.
- It is a highly venomous snake and any envenomation from this species leads to rapid onset of neurotoxic and cytotoxic symptoms.
- It is listed in **CITES Appendix II.**
- **In India, it is placed under Schedule II of the Wildlife Protection Act, 1972. T**his means that killing a king cobra is punished with imprisonment of up to six years.
- They are endemic to Asia and in **Asia, spanning from the Indian Subcontinent through Southeastern Asia to Southern China, the king cobra is widely distributed.**

**Details of the new King Cobra species**

**Northern King Cobra**

- ***Scientific name: Ophiophagus hannah***
- **Details:** It is the world's longest venomous snake and among the heaviest in the King Cobra family.
- **Distribution**: Northern India, Eastern India, Nepal, Bhutan, China, Myanmar, and parts of Southeast Asia.

**Sunda King Cobra**

- ***Scientific name: Ophiophagus bungarus***
- **Details**: It has a **steel-blue color with whitish bands or half-rings and has similarities with kraits in morphology or behaviour**. Due to this, it has been kept as the same genus of kraits Bungarus. ( More research is underway)
- Distribution: Southern Thailand, West Malaysia, Singapore, Sumatra, Borneo, Java, Bali, and southern Philippines.

**Western Ghats King Cobra**

- ***Scientific name: Ophiophagus kaalinga***
- **Details**: It is a venomous snake native to the Western Ghats of India. It has been named kaalinga which comes from the Kannada word which implies the snake's dark colour.
- **Distribution**: The Western Ghats of India including Tamil Nadu, Kerala, Karnataka, Goa, and parts of Maharashtra.

**Luzon King Cobra**

- ***Scientific name: Ophiophagus salvatana***
- **Details: Their Length is slightly shorter than Northern King Cobra. They are however, highly venomous as other King cobras.**
- **Distribution**: They are found only on Luzon Island in the northern Philippines.

# Bilmukh Bird Sanctuary, Benog WLS

**Context**

- Bordoibam-Bilmukh Bird Sanctuary of Assam is now facing an alarming biodiversity crisis and many bird and butterfly species were sighted during the 8th edition of the Uttarakhand Bird Festival at Benog Wildlife Sanctuary.

**Bordoibam-Bilmukh Bird Sanctuary**

- It is a large **freshwater lake** located near Lakhimpur in Assam and **formed as a result of the 1950 earthquake.**
- **It was originally part of the River Subansiri.**
- **Vegetation: Both aquatic and semi-aquatic vegetation.**

**Avifauna:**

- It is **rich in avifauna with over 181 recorded bird species, including the migratory birds that are common in winter, escaping harsh northern Asian climates.**
- Spot-billed Pelican, Lesser Adjutant, Greater Adjutant, and Pallas's Fish-Eagle are some of the bird species found here.

**Other fauna: Fishing Cat, Hog Deer, and** Smooth Indian Otters.

**Flora**

- **Aquatic:** Arundo donax and sedges are found in dried areas.
- **Semi-aquatic:** Barringtonia acutangula are also prevalent along lake fringes.

### Benog Wildlife Sanctuary

- It is a sanctuary situated at **Mussoorie in Dehradun district, Uttarakhand, India and is part of Rajaji National Park.**
- It was declared as a protected area on 2 September 1993.
- **Vegetation:** Mix of wetland border or marshes, sedge meadow calcareous fen complex, moist prairie and mesic to dry woodland-type vegetation.
- **River**: Aglar River, which is a tributary of the Yamuna River flows via the sanctuary.
- **Flora**: Moist temperate forests such as deodar, oak, rhododendron trees and pines, cedar, and abundant medicinal plants.

**Fauna**:

- **Mammals**: **Leopards, Himalayan goats, Indian elephants, Bengal tigers, lion-tailed macaques, and antelopes.**
- **Bird**: Mountain quail, red-breasted partridge, brahminy kite, red-billed blue magpie, White Capped Water Redstart, etc.

## Coral Triangle

### Context

- A serious threat is being posed by fossil fuel expansion to the Coral Triangle, which is one of the most biodiverse marine areas in the world.

### Details

- It is a roughly triangular area surrounding the tropical waters of **Indonesia, Malaysia, Papua New Guinea, the Philippines, Solomon Islands, and Timor-Leste.**
- It covers 5.7 million sq. km or 2.2 million sq. mi between the Pacific and Indian Oceans.


**Coral and Marine Diversity**

- It is **home to 76% of the world's shallow-water reef-building coral species and is also known as the "Amazon of the seas" due to its rich marine biodiversity.**
- About 95% of the Coral Triangle's diversity is distributed in Bird's Head Peninsula of Indonesia, with 574 coral species.

**Significant Coral Sites**

- **Raja Ampat Archipelago** with 553 coral species) and Verde Island Passage in the Philippines are important biodiversity centres.
- **Tubbataha Reef Natural Park** in the Philippines and Raja Ampat Islands in Indonesia are other important sites, which are also UNESCO World Heritage Sites.

**Marine Species Diversity**

- It hosts over **52% of Indo-Pacific reef fish and 37% of global reef fish species. Out of these over 3,000 are bony fish species.**

**Mangrove and Seagrass**

- Corals are the **largest mangrove forest globally and they are essential for biodiversity.**
- There are 21 species of seagrass of four families i.e. Hydrocharitaceae, Cymodoceaceae, Zosteraceae and Ruppiaceae.

**Threats**

- The unsustainable **fishing practices, pollution from coastal development**, oil spills and climate change promoted coral bleaching pose significant threats to the corals here.

**Conservation**

- World Wide Fund for Nature's Coral Triangle Program (2007) addresses ecological threats.

# Living Planet Report 2024

## Context

- The World Wildlife Fund in the Living Planet Report 2024 found that since 1970, the average size of monitored wildlife populations has dropped by 73%.

## World Wildlife Fund's (WWF) Living Planet Report 2024

- It is a biennial report, produced by the Zoological Society of London.
- It measures how species respond to pressure in the environment due to biodiversity loss and climate change.
- Among 5,495 species in the world, the Living Planet Index (LPI) 2024, monitored close to 35,000 populations.
- Zoological Society of London, founded in 1826, is an international conservation charity working for wildlife conservation.

## Key findings of Living Planet Report 2024

- Monitored global wildlife populations have declined by 73 per cent in the last 50 years, owing to habitat loss, degradation, impacts of climate change and invasive species.
- Populations in freshwater decreased by 85%, Populations on land decreased by 69% and The number of marine species fell by 56%.

## Regional Declines

- There was a 95% reduction across Latin America and the Caribbean, Africa witnessed a decrease of 76%, Asia-Pacific was in for a 60% drop., The reduction in North America was 39% and A 35% decrease was noted across Europe and Central Asia.

## Conservation initiatives led to the stabilization or expansion of certain populations:

- From 2010 to 2016, the number of mountain gorillas in East Africa increased by almost 3% per year.
- Between 1970 and 2020, the number of bison in central Europe increased from 0 to 6,800.

## Main risks:

- Two of the biggest risks are habitat loss and degradation. Habitat loss was driven by unsustainable agriculture, fragmentation, logging, mining, etc.
- Overharvesting is a serious problem which mostly affects the world food system.
- Wildlife populations are threatened by invasive species, Diseases affect wild animals and many die without care and Climate change has led to the fragmentation of habitat.

## India specific Findings

- It positioned India as a global model for sustainable eating. India's consumption patterns are the best worldwide and will need less than one Earth by 2050.
- The reports noted that **if other countries adopted India's dietary habits, the environmental burden of food production would be dramatically reduced.**
- In contrast, countries like the United States and Argentina were found to have comparatively less sustainable consumption patterns. Argentina's dietary footprint was found requiring an unsustainable 7.42 Earths.
- The report emphasised that adopting more sustainable diets globally could prevent land degradation and aid nature restoration.

## 5.9 SNIPPETS

| Topics | Details |
|---|---|
| Indian Skimmer | • For the first time, around 150 to 200 rare Indian Skimmer birds were spotted at Lower Manair Dam.<br>• They are freshwater birds also called **Indian scissors-bill belonging to the Laridae family,** which includes terns, gulls, noddies, skimmers, and kittiwakes.<br>• ***Scientific Name: Rynchops albicollis*** |

| | |
|---|---|
| | • ***Distribution:*** **Widespread numbers in winter in coastal estuaries of western and eastern coastal plains.**<br>• ***Conservation Status:***<br>  ○ **IUCN Status:** Endangered<br>  ○ **Wildlife Protection Act, 1972:** Schedule I<br>  ○ They are not listed in CITES. |
| **Asiatic Golden Cat** | • The Asiatic golden cat which was last sighted in 2007 has returned to Assam's Manas National Park.<br>• They are **solitary, diurnal and carnivorous animals** having a stocky build body.<br>• ***Scientific Name: Catopuma temminckii***<br>• ***Distribution:*** Northeastern part of the Indian subcontinent, Southeast Asia, and China.<br>• ***Conservation Status:***<br>  ○ **Conservation Status (IUCN):** Near Threatened<br>  ○ **Wildlife Protection Act:** Schedule I |
| **Barnawapara Wildlife Sanctuary** | • Two wild buffalo calves were born in Barnawapara Wildlife Sanctuary in Chhattisgarh kindling hope of conservation of the highly endangered animal species in Chhattisgarh.<br>• Barnawapara Wildlife Sanctuary is **located in the district of Raipur of Chhattisgarh.**<br>• **The Balmedhi, Jonk, and Mahanadi rivers flow beside the sanctuary.**<br>• **Teak, Sal, and mixed forests make up the majority of the sanctuary's vegetation.**<br>• Fauna includes **Chital, Sambhar, Nilgai, Wild Boar, Bison, Sloth Bears, Wild Dogs, Porcupines, Foxes, Striped Hyenas, and Barking Deer.**<br>• **AviFauna includes Peafowl, Jungle Fowl, and Crow Pheasant are a few of them.** |
| **African Penguin** | • As per the new research, Artificial nests may enhance the success in breeding of endangered African penguins.<br>• Flightless bird **native to southern African waters and** also known as the Cape penguin or South African penguin.<br>• ***Scientific Name: Spheniscus demersus***<br>• They **distributed along the coasts of South Africa and Namibia.**<br>• They are classified as **Critically endangered by the IUCN.** |
| **Tibetan Antelope** | • Tibetan Antelope was spotted in Karakoram Wildlife Sanctuary.<br>• **They are locally called Chiru and** inhabit the high alpine steppes of the Tibetan Plateau and fed on low alpine grasses, forbes, and shrubs.<br>• **They are hunted for their fur underneath.**<br>• **The underfur is called shahtoosh locally. It is used to weave luxury shawls.**<br>• **IUCN status – Near Threatened** |
| **Caenorhabditis elegans** | • During his Nobel prize speech, Gary Ruvkun highlighted the significance of the nematode ***Caenorhabditis elegans*** in his scientific discovery<br>• They are living transparent nematodes, which lack respiratory or circulatory systems. |

| | |
|---|---|
| | • They are Unsegmented pseudocoelomates, which **have a fluid-filled body cavity separating the gut from the body wall but it is not lined by mesoderm.**<br>• They are primarily hermaphroditic and **have both male and female reproductive organs.**<br>• It was the first organism to complete its connectome, which is the **comprehensive map of the brain's neural connectivity to better understand the structural and functional relationship of the brain.**<br>• **Nematodes: Nematodes** are **roundworms or eelworms of the phylum Nematoda, whose** body is bilaterally symmetrical and the head is radially symmetrical. |
| **Anguiculus dicaprioi** | • Scientists have found a new species of snake in the Western Himalayas, which have been named **Anguiculus dicaprioi** after Hollywood star Leonardo Di Caprio.<br>• **It is a new species of snake of the family** Colubridae, **which is the largest family of snakes on the planet, discovered in the Eastern Himalayas.**<br>• **The term "dicaprioi" is a patronym to honour Leonardo DiCaprio, who has actively worked to create awareness about increased biodiversity loss, and human health issues due to the pollution explosion.**<br>• **Distribution: Chamba, Kullu and Shimla regions of Himachal Pradesh, Nainital district in Uttarakhand and Chitwan National Park in Nepal.**<br>• **IUCN Status:** Data Deficient |
| **Nilgiri tits** | • **A** rare and endemic butterfly species **recorded for the first time using Eulophia epidendraea as a host.**<br>• This is a rare and endemic butterfly species **recorded for the first time using Eulophia epidendraea as a host near the Kallar horticultural garden.**<br>• It is a terrestrial orchid found on rocky slopes in humid areas and they are associated with various grasses.<br>• ***Scientific Name: Hypolycaena nilgirica***<br>• ***Distribution:*** Western Ghats surrounding Nilgiris and in Sri Lanka.<br>• Conservation Status: Schedule II of the Wildlife Protection Act. |
| **Crepidium assamicum** | • A new species of orchid, called Crepidium assamicum, was discovered in Dibru-Saikhowa National Park in Assam.<br>• It is a new **species of orchid discovered in Dibru-Saikhowa National Park in Assam.**<br>• Their numbers are approximately 500–600 individuals in the wild.<br>• They have a **large flower cover and blooming period from July to August.**<br>• These orchids are **confined to the open grassland near the riverbank of Dibru-Soikhowa river in Assam.**<br>• They have been provisionally assessed as Near Threatened per IUCN Red List of endangered species in 2024. |
| **Gandhi Sagar Wildlife Sanctuary** | • Gandhi Sagar Sanctuary will see the reintroduction of Cheetah in order to promote tourism in the region.<br>• **It is a wildlife sanctuary located in Madhya Pradesh and Rajasthan around the Gandhi Sagar reservoir.** |

| | |
|---|---|
| | • The Chambal River, **which is a right-bank tributary of the Ganga, passes through the sanctuary dividing it into two parts.**<br>• **Deciduous vegetation such as Khair (*Acacia catechu*), Salai, Kardhai, Dhawda, Tendu, Palash, etc., are found here.**<br>• **Chinkara or Indian gazelle, Nilgai and Sambar, the Indian leopard, langur, Indian wild dog, peacock, otter, and Mugger crocodile are major fauna.** |
| **Hornets** | • A species of hornet can tolerate liquor without any side effects, at levels higher than any known animal.<br>• They are a species of wasps belonging to the insect **family Vespidae, which contains all species of hornets as well as wasps like yellow jackets, potter wasps, paper wasps, and pollen wasps.**<br>• ***Scientific Name: Vespa orientalis***<br>• **Distribution**<br>  ○ Typically found in Asia, Europe, Africa and North America.<br>• The northern giant hornet, or Asian giant hornet is native to Asia and it is the largest known wasp species in the world. |
| **Chupacabra** | • Whether Chupacabra could be both Coyote or raccoon is being researched by scientists.<br>• Chupacabra, meaning goat-sucker in Spanish, is a **cryptid(believed to have existed somewhere in the wild) from folklore in the Americas and it is known for allegedly attacking and drinking the blood of livestock.**<br>• Its physical descriptions vary. For instance, in Puerto Rico, it is considered to be reptilian, heavy, bear-sized, and spun back.<br>• Their sightings were reported from the US to Chile and beyond, including Russia and the Philippines. |
| **Water chestnut** | • Wular Lake yields water chestnut, one of the main sources of income for families in its vicinity in Bandipora.<br>• The grass-like sedge is an aquatic vegetable grown in the Wular Lake due to its edible corms.<br>• ***Scientific Name : Eleocharis dulcis***<br>• **Distribution**: It is native to Asia, tropical Africa, and Oceania.<br>• **Harvest**: The harvest typically begins in late September.<br>• **Threats**: Dry weather and increasing marshy land around the Wular Lake caused a decline in the production. |
| **Komodo Dragon** | • The home of the Komodo dragon, Komodo Island, is under pressure from tourists.<br>• It is the largest living species of lizard and is the last representative of a relic population of large lizards that once lived across Indonesia and Australia.<br>• **Habitiat:** Komodo Island, clear island waters, marine and reef ecosystems for swimming are suitable habitats.<br>• **Threats**: Delicate ecology of Komodo National Park in Indonesia due to growing numbers of visitors, leading to increased trash and pollution.<br>• IUCN Red list: Endangered |

| | |
|---|---|
| **Tenkana Jayamangali** | • A new species of spider has now been recognised as a new genus by arachnologists.<br>• It is a new jumping spider discovered at the Devarayanadurga Reserve area, where the Jayamangali River originates.<br>• Jayamangali River is a tributary of Pennar River in Karnataka.<br>• **Jayamangali Genus Types:** T Jayamangali and T Arkavathi.<br>• **Habitats**: They are ground-dwelling spiders found in marshes, forests, agricultural lands, etc.<br>• **Distribution**: Southern Indian states and northern Sri Lanka. |
| **Giant Salmon Carp** | • They are a species of **fish commonly called the Mekong Giant Salmon Carp, with fewer than 30 individuals recorded since its formal identification in 1991.**<br>• ***Scientific Name: Aaptosyax grypus***<br>• **Distribution**: Middle reaches of the Mekong River in Northern Cambodia, Laos and Thailand.<br>• **Threats**: Overfishing, habitat degradation, and other threats such as noise from ships and industrialisation in the Mekong River.<br>• **IUCN Red List:** Critically Endangered. |

## 5.10 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| International Energy Efficiency Hub | 5th October 2024 |
| Fruit fly | 6th October 2024 |
| Envistats 2024 | 7th October 2024 |
| Global Framework On Chemicals | 8th October 2024 |
| 2024 Forest Declaration Assessment | 16th October 2024 |
| Reserve Bank Climate Risk Information System (RB-CRIS) | 17th October 2024 |
| Honey badger | 18th October 2024 |
| European Union Deforestation Regulation (EUDR) | 19th October 2024 |
| National Biodiversity Strategies and Action Plans (NBSAPs) Tracker | 27th October 2024 |
| Swallowtail Butterflies | 28th October 2024 |

# 6. SCIENCE & TECHNOLOGY AND HEALTH

## 6.1 NOBEL PRIZES 2024

### Context

- Nobel Prizes in various categories were recently announced.

### 2024 Nobel prize in Medicine

**Awarded to**

- Victor Ambros and Gary Ruvkun

**Awarded for**

- "Discovery of a fundamental principle governing how gene activity is regulated."

**Awarded by**

- Nobel Assembly at the Karolinska Institute, Sweden

**Details**

- Victor Ambros and Gary Ruvkun **discovered microRNA, a new class of tiny RNA molecules that play a crucial role in gene regulation.**
- MicroRNA can inhibit the expression of specific genes.
- Gene regulation by MicroRNA **guarantees that cells carry out their assigned responsibilities efficiently.**
- Diabetes and cancer are two conditions that can result from improper gene control by m-RNA

### Nobel Prize in Physics 2024

**Awarded to**

- John J. Hopfield and Geoffrey E. Hinton.

**Awarded for**

- "For foundational discoveries and inventions that enable machine learning with artificial neural networks".

**Awarded by**

- "Royal Swedish Academy of Sciences".

**Details**

- **John Hopfield** invented a neural **network that uses a method for saving and recreating patterns. We can imagine the nodes as pixels.**
- **This network utilises physics that describes a material's characteristics due to its atomic spin – a property that makes each atom a tiny magnet.**
- **Geoffrey Hinton used the Hopfield network as the foundation for a new network** that uses a different method: the **Boltzmann machine.**

**Boltzmann machine:**

- **The Boltzmann machine can learn – not from instructions, but from being given examples.**
- A trained Boltzmann machine **can recognise familiar traits in information it has not previously seen.**

**Neural Networks**

- **Inspired by biological neurons in the brain, artificial neural networks are large collections of "neurons", or nodes, connected by "synapses", or weighted couplings, which are trained to perform certain tasks.**

### Nobel Prize in Chemistry 2024

**Awarded to**

- David Baker, Demis Hassabis and John M. Jumper

**Awarded for**

- "For computational protein design" and Demis Hassabis and John M. Jumper "for their collaborative work titled "protein structure prediction"

**Awarded by**

- Royal Swedish Academy of Sciences in Stockholm

**Details**

- **Jumper and Hassabis developed an AI model AlphaFold, that is able to predict protein shapes with about 60% accuracy.**
- **Baker developed Rosetta, a software to predict protein structures.**
- This allowed them to create entirely new proteins.

- Today, a variety of new proteins with various functions can be created in labs.

## 6.2 ISSUES IN TREATMENT OF RARE DISEASES

### Context

- The Delhi High Court has issued directions to improve the availability of "orphan drugs", which are medications used to treat "rare diseases".

### What are Rare Diseases?

- Rare diseases are defined by the World Health Organization (WHO) as a serious, lifelong condition that affects 1 or fewer people in 1,000.

#### Global burden of Rare Diseases

**According to The landscape for rare diseases in 2024 report by Lancet Global Health:**

- More than 7000 types of rare disease are in existence globally.
- To date, approximately 300 million people live with rare diseases.
- Around 80% of rare diseases have a genetic cause and almost 70% of which present in childhood.
- About 95% of rare diseases lack approved treatments.
- The average time for an accurate diagnosis is 4·8 years; and about 30% of children with a rare disease die before age 5 years.

#### Status of India's Rare Disease

- **About 55 rare diseases exist** such as Gaucher's disease, Lysosomal Storage Disorders (LSDs), Whipple's disease, Gaucher's disease, Mucopolysaccharidosis type 1, and spinal muscular atrophy.
- India is responsible for **one-third of the occurrence of rare diseases worldwide.**
- 14,472 rare disease patients nationwide are included in the National Registry for Rare and Other Inherited Disorders (NRROID), which was established by the Indian Council of Medical Research (ICMR).

#### Challenges in tackling the rare diseases

- **Availability of therapies:** Available for **less than 5% of rare diseases, less than 1 in 10 patients receiving disease-specific care.**
- **Expensive treatment :** Existing treatments are often very expensive. **As per WHO, the average cost of treating a rare disease patient in the US is $32,000 per year, but can be over $100,000 in one third of cases.**
- **Accessibility issues:** While the Centre provides financial assistance to various Centres of Excellence (CoE) for treatment, there are challenges in accessing funds.
- **Red-tape:** AIIMS and other CoEs import the drugs through distributors for patients, and the delay in US and other countries' regulators in the approval process impacts treatment.
- **Cost of orphan drugs:** Most rare disease treatments and medications are patented. Pharmaceutical companies find it unprofitable to produce orphan drugs due to their small market and high development cost.

### National Policy for Rare Diseases 2021

- The National Policy for Rare Diseases (NPRD) was introduced in 2021.
- **Centre of Excellence:** The policy offers patients undergoing treatment at a **designated CoEs financial aid of up to Rs 50 lakh.**
  - The Institute of Postgraduate Medical Education and Research at Kolkata's SSKM Hospital, PGIMER in Chandigarh, and AIIMS in Delhi are among the CoEs.
  - In order to jointly address important issues and develop healthcare solutions, each CoE will focus on a distinct field of study.
- **Health Minister's Discretionary Grants (HMDG):** Provides financial assistance to poor

patients for treatment of life-threatening diseases in government hospitals. This includes rare diseases covered under the Rashtriya Arogya Nidhi (RAN).

- **National Registry for Rare Diseases:** National Registry for Rare and other Inherited disorders (NRROID) collects useful data on demography, phenotype, natural history, evolution and outcomes of specific diseases with/ without treatment.
- **National Rare Diseases Committee:** It is responsible for implementing the National Policy for Rare Diseases (NPRD).

### Way Ahead

- **Invest in R&D:** There isn't enough research and development in the field of rare diseases. There is a need to negotiate with pharma companies and boosting domestic efforts could help lower costs of treatment.
- **Tax rebates:** The government should lower taxes on commercially available medications in an effort to lower the cost of rare disease medications. For personal use, the government may also exempt imported medications from GST and customs duties.
- **CRDC concept:** The Comprehensive Rare Disease Care (CRDC) concept, which attempts to close the gap between patients and families impacted by genetic etiology (gene abnormalities), should be put into practice by the government. A technical and administrative road plan for hospitals is established by the CRDC concept.
- **Centralised Laboratory:** A centralized laboratory for rare disease detection and a national registry should be established by the Union Government.
- **Other measures:** Central government should formulate a standard definition of rare diseases, enhance budgetary outlays, dedicate funding for drug development and therapy, and augment the number of CoEs and also ensure better coordination and responsible utilisation of funds.

## 6.3 RADARS

### Context

- The Union Ministry of Earth Sciences approved an X-band radar to be installed in the Wyand district of Kerala.

### What is a Radar?

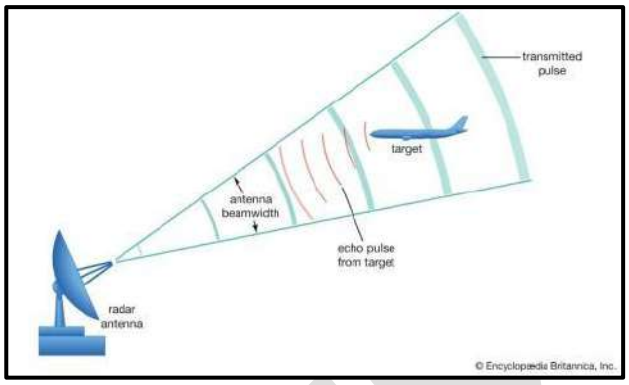
- **Radio Detection and Ranging are the instruments that use radio waves to determine the distance and velocity of the targets they hit.**
- A radar system typically consists of a transmitter that emits radio signals and a receiver that detects any reflected energy from targets.

### How does radar work?

- **Employs radio waves to calculate the distance, velocity, and physical properties of objects in its vicinity.**
- **Transmission:** Transmitter emits a narrow beam of radio waves in brief bursts.
- **Reflection:** Objects reflect waves in their path, and some of the energy returns to the radar.
- **Reception**: Receiver calculates how long it takes for the pulse to be transmitted, hit a target, then return to the radar.
- **Calculation**: The radar calculates the distance, velocity, amplitude, etc., to the target by measuring the time it takes the pulse to return. The radar can also calculate the target's velocity by measuring the phase and amplitude of the pulse.
- **Information** : The radar may use reflected energy to calculate the target's distance, direction, speed, shape, and range.

## Radar Frequency bands

- **Air surveillance and air defence:** Very High Frequency band (30 to 300 MHz).
- **Modern air surveillance radars with a long detection range:** Up to 2 gigahertz (GHz).
- **Weather radar and monitoring the sea surface:** The C-band (4 to 8 GHz)
- **Following are the radar frequency bands of different Radars:**




| Radar Frequency Bands | | |
|---|---|---|
| **Band Designation** | **Frequency Range** | **Typical Usage** |
| VHF | 50-330 MHz. | Very long-range surveillance |
| UHF | 300-1,000 MHz. | Very long-range surveillance |
| L | 1-2 GHz. | Long-range surveillance, enroute traffic control |
| S | 2-4 GHz. | Moderate-range surveillance, terminal traffic control, long-range weather |
| C | 4-8 GHz. | Long-range tracking, airborne weather |
| X | 8-12 GHz. | Short-range tracking, missile guidance, mapping, marine radar, airborne intercept |
| $K_u$ | 12-18 GHz. | High resolution mapping, satellite altimetry |
| K | 18-27 GHz. | Little used ($H_20$ absorption) |
| $K_a$ | 27-40 GHz. | Very high resolution mapping, airport surveillance |
| mm | 40-100+ GHz. | Experimental |
| *Source: AIAA (American Institute of Aeronautics and Astronautics)* | | |

### Applications

- Air traffic control, Weather observation, Remote sensing, Aircraft and ship navigation, Speed measurement, Space surveillance and Planetary observation.

## What is an X-band radar?

- An X-band radar is radar that **emits radiation in the X-band of the electromagnetic spectrum: 8-12 GHz, corresponding to wavelengths of around 2-4 cm, which is in the microwave part of the spectrum.**
- In Wayanad, the new radar **will track the movements of particles like soil to provide landslide warnings.**
- **Pros:** The radar's narrower wavelengths allow it to provide higher-resolution images. **To see tiny particles such as raindrops or fog, a radar must employ lower wavelength radiation, such as in the X-band.**
- **Cons:** The higher the frequency of certain radiation, the faster it will attenuate. As a result, X-band radars have a **reduced effective range.**

# 6.4 INDUSTRIAL ALCOHOL

## Context

- The Supreme Court in U.P. vs. M/S. Lalta Prasad Vaish case held that states have the power to tax industrial alcohol.

## The State of U.P. vs. M/S. Lalta Prasad Vaish case

- This is a case related to the rights of states to regulate industrial alcohol.
- SC, in this case, held that the term intoxicating liquor in Entry 8 of the **List II or**

**State List** of the **Seventh Schedule** of the Indian Constitution will also include industrial alcohol.

- Also overruled **Synthetics & Chemicals Ltd. v. State of U.P. case** judgement which had held that "intoxicating liquor" can refer only to **potable alcohol** and that States have no right to tax industrial alcohol.

### Regulation of Alcohol in India

- The Union government presently regulates industrial alcohol under the **Industries (Development and Regulation) Act, of 1951**.

**There is an overlapping entry in the Seventh Schedule:**

- Entry 8 of the State List in the Seventh Schedule of the Constitution of India gives state governments the power to legislate on intoxicating liquors: **production, manufacture, possession, transport, purchase, and sale.**
- While Entry **52 (Union List) a**llows the Centre to regulate industries deemed necessary for the public interest.

### Industrial Alcohol

- Industrial alcohol, which is also known as denatured alcohol, is ethanol (with chemical formula $C_2H_5OH$) with added impurities.
- Sometimes isopropyl alcohol (isopropanol), which is a **colorless, flammable organic compound with a pungent alcoholic odor,** is also referred to denote it.
- Generally unfit for human consumption due to the presence of impurities.
- Ingesting industrial alcohol can lead to severe health consequences and even death due to its poisonous nature.
- It is different from **usable alcohol or absolute alcohol** which are predominantly called **ethyl alcohol** (ethanol).

### Difference between Usable and Denatured or Industrial Alcohol

| Aspect | Absolute Alcohol | Denatured Alcohol |
|---|---|---|
| *Composition* | They are pure ethanol with chemical formula $C_2H_5OH$ having minimal or no additives. | They are also ethanol ($C_2H_5OH$) but have a high concentration of additives. |
| *Consumable* | They are drinkable. However, they must be consumed with high caution. | They are poisonous and thus unfit for consumption. |
| *Impurities* | It contains or may contain trace amounts of impurities. | It contains high amounts of additives including methanol, which is a toxic alcohol. |
| *Applications* | They are used in the laboratory for:<br>• disinfecting surfaces<br>• extracting chemicals,<br>• medical applications such as sterilising instruments | They have Industrial use as a fuel, cleaning solvents, etc and they cannot be used in medical or laboratory premises due to toxicity. |
| *Odour & Taste* | They have a characteristic odour of alcohol and slightly sweet taste. | They have a foul odour and bitter taste. |

## 6.5 FLUORESCENT NANODIAMONDS (FNDS)

### Context

- Scientists have successfully recorded the Berry phase by the rotation of spin qubits inside the nanodiamonds at ultra-high speeds.

### Nanodiamonds (NDs)

- They are **carbon nanomaterials with a size of a few nanometers to micrometres that have many potential applications.**
- They are produced in a high-temperature and high-pressure process.

- They **can be doped with nitrogen atoms to form nitrogen-vacancy (NV) centres, which host electron spin qubits.**
- Just like a binary bit is the basic unit of information in classical (or traditional) computing, a **qubit (or quantum bit) is the basic unit of information in quantum computing.**

## Properties of NDs:

- **Fluorescence and non-blinking:** Fluorescence is the **property of some materials to emit light of a lower frequency when irradiated with light of a higher frequency.** But unlike many other nano-scale fluorescent materials, NDs don't blink when irradiated for a long time.
- **Stability:** Their fluorescence **lifespan is greater than 10 nanoseconds (ns), a relatively long duration, which makes them better than quantum dots.** They are stable under light, non-toxic, and capable of maintaining fluorescence for long periods.

**Quantum dots:**

- They are nanoparticles **with diameters in the range of 2-10 nanometers and made from semiconducting materials. The dots show quantum effects because of their small size.**
- This means that electrons inside the dot are trapped and can only occupy defined energy levels.

**Quantum Spin**

- Spin is **one of the basic features of the building blocks of matter, like electrons and nuclei and** at any given moment, its value is a combination of two states called up and down.
- If the down component is zero, the spin will be up, and vice versa.
- **A computer can map these values to 0s and 1s and use the electrons to encode information. Manipulating the spin forms the basis of quantum computing.**

**Berry Phase**

- The Berry phase is a **geometric phase acquired throughout a cycle when a system's parameters are varied and then returned to their original values.**
- Electrons exhibit both particle and wave characteristics. As waves, they possess properties such as frequency, wavelength, and phase, which can change depending on external conditions.
- **The Berry phase reflects changes in an electron's wave phase when cycled through different quantum states.**
- Electrons can be manipulated by altering energy levels through magnetic fields. **This allows researchers to create a cycle of states, which helps in the measurement of the Berry phase.**
- The Berry phase generated by the rotation of the NDs could be applied to create a gyroscope for rotation sensing.

## Applications

- NDs are **stable under light and aren't toxic to living things, so they have many applications in high-resolution imaging, microscale temperature sensing, and correlative microscopy, among others.**
  - **Progeny tracking:** In biology, scientists use NDs to track cells and their progeny over long periods.
  - **Biomedicine**: NDs are biocompatible and can be used for cell labelling and imaging, targeted drug delivery, and cancer therapy.
  - **Electronic applications:** NDs are used in thin-film electronics, photovoltaic devices, energy storage devices, and electrochemical sensors.
  - **Quantum engineering:** NDs are used in quantum optics and nano-magnetometry.

## Conclusion

- Levitating NDs in a high vacuum and spinning them very fast sounds like a simple, even comical, feat but is quite difficult. And now

that it has been successfully demonstrated, **it paves the way for multiple applications in industry, especially as sensors, and in fundamental research.**

## 6.6 SHORT ARTICLES

### The Laser Interferometer Space Antenna (LISA) Mission

**Context**

- The National Aeronautics and Space Administration (NASA) has revealed the first full-scale prototype of six telescopes of The Laser Interferometer Space Antenna (LISA) mission.

**The Laser Interferometer Space Antenna (LISA) Mission**

- It is a collaborative effort between NASA and the European Space Agency (ESA) set to launch in the mid-2030s.

**Configurations**

- **The space mission consists of three spacecraft** which are separated by millions of miles and flying **in a triangular formation behind the Earth and the Sun.**
- The spacecraft will be placed in a **heliocentric orbit** at a distance of 50 million km from Earth at a distance of 2.5 million km between each spacecraft.
- All three spacecraft will carry **two telescopes each**.

**Purpose:**

- **To search for gravitational wave signatures which emerge from distortions in spacetime** caused by massive objects like black holes.
- To measure changes which are smaller than the diameter of a helium nucleus over a distance of a million miles.

**Detection Mechanism:**

- **Uses Laser Beam Technology to relay laser beams to measure shifts in the positions of the objects due to gravitational waves.**

**LISA Pathfinder Mission:**

- It is a **proof-of-concept mission** launched on December 3, 2015 **to test technologies developed for LISA** and it reduced noise levels by a factor of 100, which is higher than the target requirements.

**Gravitational Waves:**

- **They are the disturbances in space and time caused by massive accelerating objects such as the black hole mergers.**

**Significance of Gravitational Waves**

- Offer **insights into the astrophysical phenomena which are not visible to traditional astronomy, which are mostly light waves based.**
- **Enables the exploration of black holes, the Big Bang, and other unknown cosmic objects such as neutron stars.**
- They are the source of the **origin of our universe and detecting them can be used to understand the evolution, origin and disturbances in galaxies.**

### Moonlight Programme

**Context**

- The European Space Agency (ESA) launched the Moonlight Lunar Communications and Navigation Services (LCNS) programme at the International Astronautical Congress.

**About**

- It is a programme by the European **Space Agency(ESA)** to make Europe's first-ever dedicated satellite constellation for telecommunication and navigation services for the Moon.
- It will establish a constellation of about five lunar satellites for the Moon.

**First Launch**

- **Lunar Pathfinder, a communications relay satellite built by Surrey Satellite Technology LTD,** is the first satellite of the programme which is scheduled for launch in 2026.

**Operational Timeline**

- Its initial services are expected by the end of 2028 and it is expected to be fully operational by 2030.

**Focus Area**

- The programme will focus on the Moon's South Pole.
- **The South Pole is crucial because the mountain peaks near the South Pole are illuminated for large periods of time, which provides a source of energy.**
- **The South Pole also contains water ice, which could be a valuable resource for drinking water, cooling equipment, and producing fuel and oxygen.**

**Significance**

- The mission will do away with the need to have a standalone communication system and countries can now concentrate on astronauts and robotics.
- Moonlight will **provide the testing of instruments and facilities in lunar conditions and will help us better understand the performance of these facilities in environments other than Earth.**
- It will enable data transfer to over 250,000 miles or 400,000 kilometres, between Earth and the Moon.

## Salience Network

**Context**

- A recent study has found the expansion of the salience network in individuals with depression.

**About**

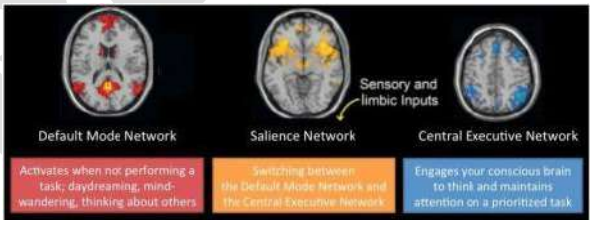
- It is a **large-scale network within the human brain primarily composed of the anterior insula (AI) and the dorsal anterior cingulate cortex (dACC).**
- The AI and dACC are brain regions that integrate information to guide human behaviour.

**Functions**

- The **salience network detects and filters the salient stimuli to guide attention and regulate emotional responses.**
- It also processes pain, emotion, reward, and motivation.

**How does it work?**

- It moderates switching between the default mode network (DMN) and the central executive network (CEN), which **are two of the brain's main control networks, and they work in opposition to each other. That is:**
- DMN is active when the brain is at rest or awake and daydreaming.
- CEN is active when the brain is processing information externally or during cognitively and emotionally challenging tasks.
- **The DMN and CEN form a part of the brain's triple network model along with the salience network.**
- These three interact with each other and an imbalance in their activity is linked to mental health disorders in humans.




**Correlations with Mental health**

- Network strength: The strength of the salience network is linked to depression-related symptoms.
- Network Expansion: The network encroachment in areas related to decision-making leads to a deficit in motivation and depression.

**Significance**

- As the network consistently enlarges in depressed individuals, it may serve as a potential biomarker for depression.

## Malaria and Malaria Free Countries

**Context**

- Egypt has been officially declared as a 'malaria-free' country by the World Health Organization (WHO).

**Process of Malaria Elimination Certification:**

- The World Health Organization (WHO) **certifies a country as malaria-free when nationwide malaria transmission has been interrupted for at least 3 consecutive years and the country has a fully functional surveillance and response mechanism to prevent the re-occurrence of indigenous transmission.**

### Malaria free countries

- The WHO has so far awarded the malaria-free certification to 43 countries and 1 territory, which does not include India.
- In the South East Asian Region, the Maldives (2015) and Sri Lanka (2016) are the only countries certified malaria-free by WHO.

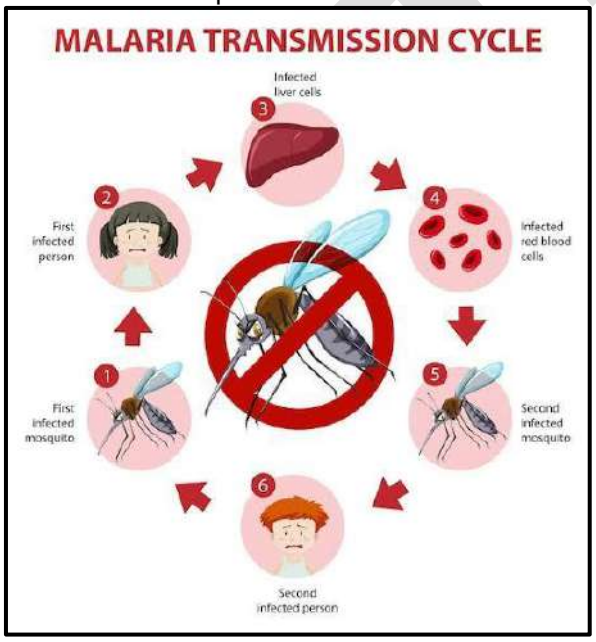
### Malaria

**Cause**

- Malaria is caused by **single-celled microorganisms belonging to the Plasmodium group parasites.**

**Transmission**

- It is spread by an infected female Anopheles mosquito **bite, which injects the parasites from the mosquito's saliva into a person's blood and the parasite grows in the blood.**
- Parasites then travel to the liver where they mature and reproduce.




**Species**

- **Five species of Plasmodium can infect and spread in humans:** P. falciparum causes most deaths in humans; P. vivax, P. ovale, and P. malaria cause milder forms of malaria; and P. knowlesi rarely causes any disease in humans.

**Vaccine**

- Malaria is preventable and curable with **RTS, S/AS01 (Mosquirix) vaccine, which is administered to children and protects children aged 6 weeks to 17 months against malaria caused by P. falciparum.**

## Starch

### Context

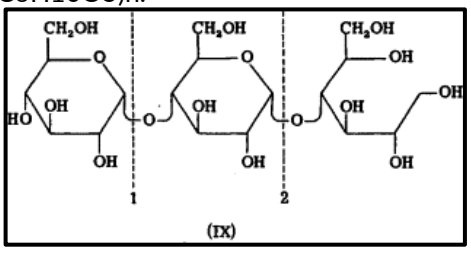
- New studies have revealed that our ancestors started carrying more amylase genes in many waves lasting several hundred thousand years.

**About**

- **Tasteless and fluffy white powder which is insoluble in cold water, alcohol, and other solvents.**
- It is a non-reducing sugar which means it does not test positive for reducing sugars.

**Structure and formula**

- It is a polysaccharide made up of 1,4 linkages between glucose monomers.
- The chemical formula of starch is $(C_6H_{10}O_5)_n$.




**Composition**

- **Starch is made up of two major components: Amylose,** the linear polymer, the basic form of starch and **Amylopectin,** the branched form.
- The ratio of amylose to amylopectin **can range from 17–70% amylose and 30–83% amylopectin.**

**The type of starch is determined by the ratio of amylose to amylopectin:**

- Waxy starches: They contain less than 15% amylose
- Normal starches: Contain 20–35% amylose
- High amylose starches: Contain more than 40% amylose.

**Role of starches**

- **Energy Storage:** Helps plants store energy. **Plants use the glucose produced by photosynthesis for immediate energy and convert the excess glucose into starch for storage.**
- **Dietary Source:** In animals, starch primarily serves as a source of sugar.
- **Enzymatic Breakdown:** Amylase found in saliva and pancreas breaks down starch for energy.

**Uses**

- **Nutritional Benefits: S**tarch is broken down into glucose, and provides essential nutrients such as B vitamins, iron, calcium, and folate and serves as fuel for the body.
- **Pharmaceutical Applications:** Used as a binder in wet granulation processes for tablets and capsules.
- **Dietary Function: S**tarch converts glucose into energy and glucose is the primary carbohydrate utilized by the body.
- **Culinary Uses:** Act as a thickener and stabilizer in foods (e.g., puddings, soups, sauces, gravies, pie fillings) and in noodle and pasta production.

## Trojan asteroids

**Context**

- Scientists have discovered a Trojan asteroid for Saturn.

**Trojan asteroids**

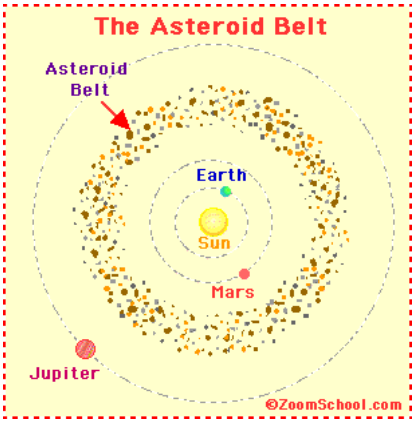
- They are a type of asteroid that occupy a **stable Lagrange Point in its orbit around the sun and** orbit around the sun is the same as the orbit of the planet they are associated with.
- **They are usually found around L4 or L5 points, which makes these asteroids gravitationally stable.**
- **Two groups of Trojan asteroids exist which are:** The **Greeks** which leads Jupiter in its orbit, and the **Trojans** which follow the Greeks from behind.
- Trojan asteroids remain gravitationally stable for long periods of time and they are **ancient remnants from the early days** of the solar system. Due to these reasons studying them can provide useful understanding about the evolution of the solar system.

**Lagrange points**

- According to NASA, **Lagrange Points are positions in space where objects can "stay put" despite the influence of gravitational forces.**
- **The gravitational forces of two larger objects balance with the motion of the smaller object in this position.**
- Five Lagrange Points exist for all celestial objects. These are L1, L2, L3, L4 and L5.
- L1, L2, and L3 are unstable, and L4 and L5 are stable.

**Asteroids**

- Asteroids are rocky, airless remnants left over objects from the early formatory year of our solar system about 4.6 billion years ago.
- **For their rocky nature they are sometimes also called minor planets.**
- **Their total mass** of all the asteroids combined is less than that of Earth's Moon.
- **Most asteroids orbit the Sun between Mars and Jupiter within the main asteroid belt.**




- Asteroids range in size from Vesta which has size of about 329 miles in diameter to bodies that are less than 33 feet.

- **Vesta is the second most massive body in the main asteroid belt and accounts for almost 9% of the total mass of all asteroids.**
- Only dwarf planet Ceres is more massive in the asteroid belt.

## Space Docking Experiment (SPADEX)

### Context

- Ananth Technologies handed over satellites to the Indian Space Research Organisation(ISRO) for the Space Docking Experiment.

### Space Docking Experiment(SPADEX)

- **Mission** initiated in 2016 **by the Indian Space Research Organisation (ISRO) to develop technologies related to orbital rendezvous, docking, formation flying, and proximity operations.**
- The mission will be useful for future Indian space stations (Bhartiya Antariksha Station), Gaganyaan spaceflight missions and Chandrayaan-4, which is a lunar sample retrieval mission.

**Testing and Launch Preparations**

- Satellite Assembly and Integration done by **Ananth Technologies Limited and the testing to be completed by November 2024.**
- It will be **launched by Polar Satellite Launch Vehicle (PSLV-C60)** in mid-December 2024 from Satish Dhawan Space Centre.

**Mission Details**

- **Satellites Involved:** Two IMS class-2 satellites of 200 kg each with one satellite will act as the Chaser and the other as the Target will be involved in the mission.
- **Launch Configuration:** Both satellites will be launched as co-passengers or auxiliary payloads to the main satellite.
- **Orbit:** Two satellites will be placed in two slightly different orbits.

**Orbital rendezvous**

- A **set of orbital maneuvers to** allow satellites to be at a constant distance, **when two spacecraft( Most often one is a space station), arrive at one orbit and approach at near distance or within visual contact.**
- The process requires a precise calculation and match of the orbital velocities and position vectors of both the spacecraft. **Space docking**
- Docking or berthing are procedures to bring the spacecraft into physical contact to create a link between them.
- Two spacecraft physically joined after meeting at a predetermined location, speed, and time.

**Formation flying**

- It is a set of techniques which involves coordinating the motion of two or many satellites to achieve a common goal.

## Betelgeuse

### Context

- Research has uncovered surprising findings about Betelgeuse, which is one of the brightest stars in the night sky.

### Betelgeuse

- It is a **Red giant, 100,000 times brighter and 400 million times larger than the Sun.**
- **Second-brightest star in the Orion constellation. The Orion's brightest star being Rigel.**
- Astronomers found the **stage of the red giant star Betelgeuse** by studying the **pulsations, which is** the **periodic expansion and contraction of the outer layers of a star, which causes change in luminosity.**

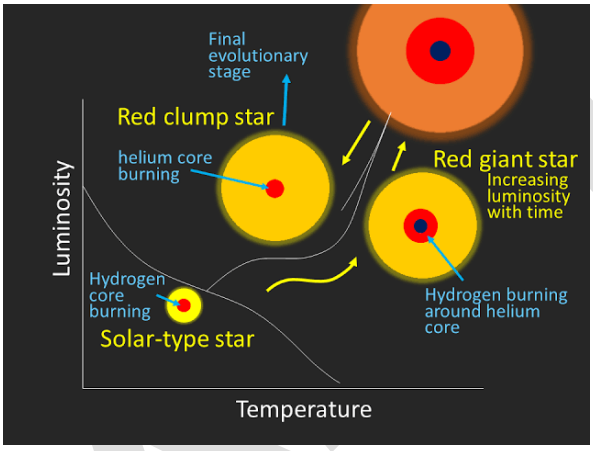
- Pulsations in the star suggest Betelgeuse is approaching a supernova explosion.
- It has **two pulsation cycles, one over a year and another around six years.**

**Orion constellation**

- Set of stars, named to mean a hunter in Greek mythology and seen during winter in the northern hemisphere.
- Its two brightest stars are Rigel and Betelgeuse. Both are among the brightest stars in the night sky and both are supergiants.

**Red giants**

- Stars which have **run out of hydrogen fuel for nuclear fusion(Fusion of two hydrogen isotopes to form helium in stars.)**
- The core of the star collapses, and the plasma shell around the core warms up enough to fuse hydrogen.
- This extra heat causes the dramatic expansion of the star's outer layers making it a giant red star.




# Polio

**Context**

- **Pakistan Is seeing a surge in polio cases.**

**About**

- **It is a viral infectious disease caused by poliomyelitis virus, which affects the nervous system.**
- The virus mainly affects children under 5 years of age.

**Types of Poliovirus**

- **Three strains of poliovirus in the market:** Wild Poliovirus type 1 (WPV1), Wild Poliovirus type 2 (WPV2), and Wild Poliovirus type 3 (WPV3).

**Spread**

- **Transmitted by faecal-oral route or contaminated food or water and multiply in the intestines.**

**Symptoms**

- **Often asymptomatic,** however, **minor symptoms include fever, nausea, and headache and in rare cases it leads to permanent paralysis or fatal respiratory muscle paralysis.**

**Prevention and treatment**

- **There is no cure for polio.** However, it can be **prevented through immunisation.**

**Vaccines**

- **Oral Polio Vaccine (OPV): G**iven at birth, with 3 doses at 6, 10, and 14 weeks, and booster doses at 16-24 months.
- **Injectable Polio Vaccine (IPV): Given with the 3rd dose of DPT (Diphtheria, Pertussis and Tetanus) under the Universal Immunisation Programme (UIP).**

**India & Polio**

- **Declared polio-free by the World Health Organization(WHO) in 2014; last wild poliovirus case: recorded in 2011.**

**Global Eradication measures**

- **Global Polio Eradication Initiative (GPEI): It was launched in 1988 by WHO.**
- **World Polio Day: It is observed on October 24 to raise awareness about Polio.**

**Indian Eradication Measures**

- **Pulse Polio Programme: Launched by the union government with the aim for 100% OPV coverage in India among** children under five years of age.
- **Intensified Mission Indradhanush 2.0:** Nationwide immunisation **organised from 2019 to 2020** to mark 25 years of Pulse Polio.
- **Universal Immunization Programme (UIP): Launched in 1985 by the union government** to provide free vaccines to all children against vaccine-preventable diseases, which are:

diphtheria, pertussis, tetanus, hepatitis B, and Hib (Haemophilus influenzae type b)

## Diphtheria

### Context

- A three-year-old girl recently died in Punjab is suspected to have died due to diphtheria.

### About

- It is a fatal bacterial infection caused by **Corynebacterium diphtheriae** known to affect the mucous of the nose and throat and even the skin.
- Symptoms are Swollen glands in the neck, Fever and chills, Nasal discharge, Sore throat and hoarseness, etc.

**In case of no treatment or delay in treatment**

- The toxin produced by the bacteria will affect the heart, kidneys, nerves, and blood cells.
- **Myocarditis will be caused. It is the inflammation of the heart muscle leading to abnormal heart rhythms, heart failure, and death.**
- **Peripheral neuropathy or damage to the nerves can cause paralysis of the limbs, eye muscles, and diaphragm (the muscle in the lungs that helps breathing). This might lead to respiratory failure.**
- **Proteinuria or protein in the urine might be caused leading to kidney failure, and death.**
- Children under 5 years old and adults over 60 years old are highly vulnerable to dying from severe diphtheria if they are not treated on time.

**Prevention**

- **The diphtheria vaccine is often given in combination with other vaccines, such as tetanus, pertussis, hepatitis B, and inactivated polio.**
- The World Health Organization (WHO) recommends a total of six doses of the diphtheria vaccine, starting at six weeks of age and continuing through adolescence.

**Treatment**

- **Antibiotics such as** erythromycin or penicillin G. a**nd diphtheria antitoxin are used to treat diphtheria**.

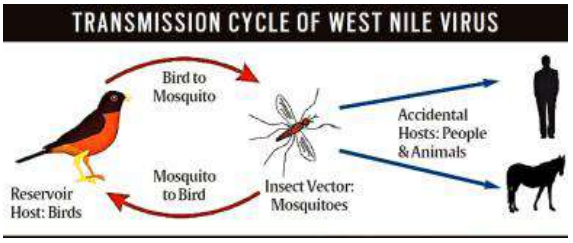
## West Nile Virus

### Context

- A severe outbreak of West Nile virus (WNV) has grappled Ukraine with high death tolls and casualties.

### West Nile Virus

- WNV is a **RNA virus** of the **flavivirus genus** that causes neurological disease in people.
- Common members of the **Flavivirus Family are Yellow Fever virus, Dengue virus, Zika virus, West Nile virus, Japanese Encephalitis virus, Tick-Borne Encephalitis virus, Kyasanur Forest virus, Alkhurma virus and Omsk virus.**
- It was **first isolated in a woman in the West Nile district of Uganda in 1937 and today it** commonly affects people in Africa, Europe, the Middle East, North America and West Asia.
- In India, **antibodies against WNV were first detected in humans in Bombay in 1952.**
- **Transmission:** Culex mosquitoes are the main vectors for this and Birds serve as the primary reservoirs for WNV.




- **Symptoms:** Infection is either **asymptomatic with no symptoms occurring in around 80% of infected people, or can lead to West Nile fever or severe West Nile disease.**
- **Diagnosis:** Enzyme-linked immunosorbent assay (ELISA), Neutralisation assays, Viral detection by reverse transcription polymerase chain reaction (RT-PCR) assay, and Virus isolation by cell culture.
- **Vaccine:** There is No Vaccine Available for its prevention.

## Hyperuniformity

### Context

- Researchers have explored the mechanism behind the emerging property of matter, known as "hyperuniformity".

### About

- **Property of certain substances where the density fluctuations in the long-wavelength range decay to zero.**
- Density fluctuations refer to the **variations in the number of particles per unit volume in a fluid or plasma, or to small variations in the density of matter in the universe.**

### Properties

- Hyperuniform materials **exhibit a suppression of density fluctuations at large scales.**
- Hyperuniform **matter has the character of crystals on large-length scales but is an isotropic-like liquid.**
- These unique properties can give rise to novel physical properties in these materials and could have applications in technology and biology.

### Where are they found?

- **Quasicrystals** (a solid material with an ordered but non-periodic arrangement of atoms),
- **Universe structures** such as galaxies, planets, stars, etc.
- **Biological emulsions**(a mixture of two or more liquids that are stabilized by biosurfactants, which are nontoxic, biodegradable compounds synthesized by microorganisms.) and
- **Colloids** (A mixture, consisting of microscopically dispersed insoluble particles suspended in another substance)

### Applications

- **Energy-efficient photonic devices for optical data transmission.**
- Technological solutions to control of physiological functions in biological systems.

### Isotropic and Anisotropic materials

- Properties of **Isotropic materials remain the same when tested in different directions. Common isotropic materials include glass, plastics, and metals.**
- Anisotropic Materials are **those materials whose properties vary depending on direction. For example, wood, graphite, carbon fiber, and composite materials are anisotropic.**

## Space Based Surveillance Mission 3, Phoba-3 Mission, LEAP-3 Mission

### Context

- Indian Space Research Organization is preparing to launch Space Based Surveillance Mission 3, Phoba-3 Mission, LEAP-3 Mission.

### Mission: Space-Based Surveillance (SBS) Mission

#### Description

- It is a mission for better land and maritime domain awareness for civilian and military applications and it is **managed by the National Security Council Secretariat and Defence Space Agency under the Ministry of Defence.**
- Under the mission, **52 satellites will be launched over the next decade in low earth orbit (LEO) and geostationary orbit and** 21 of them will be built by ISRO and the remaining 31 will be constructed by private companies.
- **Separate satellites will be allocated to the Army, Navy, and Air Force for land, sea, and air-specific missions.**
- **Previous phases were: SBS 1,** launched in 2001 and included 4 satellites- Cartosat 2A, Cartosat 2B, Eros B, and Risat 2 in space and **SBS 2,** launched in 2013 and included 6 satellites- Cartosat 2C and Risat 2A in orbit.

### Mission: Proba-3 mission

#### Description

- **It** is the **European Space Agency's (ESA) and the world's first precision formation flying mission to demonstrate** the **formation flying and rendezvous technologies using two satellites flying in a fixed configuration.**
- It will study the corona more closely to the solar corona than ever before by **placing two**

**satellites, Coronagraph spacecraft and Occulter spacecraft in perfect alignment to study the corona of the sun.**

- It **demonstrates a precise formation flying technology to achieve a millimeter precision without ground guidance.**
- **The Coronagraph spacecraft,** weighing 340 kg and **Occulter spacecraft** weighing 200 kg will have a separation distance of approximately 144 meters.
- **Formation flying validated by Proba-3 will aid Earth observation, satellite servicing, and Mars Sample Return missions in future.**

**Mission: LEAP 3**

**Description**

- LEAP-3 is the third mission in the **Launching Expeditions for Aspiring Payloads (LEAP) series,** scheduled for launch in late 2025.
- It is a collaborative project between **Dhruva Space (Hyderabad) partners with Manastu Space (Mumbai)** to integrate green propulsion technology in space missions.
- It utilises Dhruva Space's P-30 platform, which is optimised for Low Earth Orbit (LEO) missions and supports payloads up to 50 kg.
- **It has Green Propulsion System** developed by Manastu Space and utilises a hydrogen peroxide-based fuel for propulsion.
- It is 20 times more agile and 50 percent more efficient and 60% more than other launchers, which leads to a 60% reduction in operational costs.

## Hutchinson–Gilford syndrome (HGPS)

**Context**

- Sammy Basso, who was the **longest-living survivor of the rare genetic disease progeria, has died at the age of 28.**

**Hutchinson–Gilford syndrome (HGPS)**

- Progeria, also known as Hutchinson–Gilford syndrome (HGPS), **causes people to age rapidly, leading them to appear older than they are.**
- The person affected has a life expectancy of only 13.5 years without treatment.

**Symptoms:**

- **Prominent eyes, a thin nose with a beaked tip, thin lips, a small chin, protruding ears, hair loss (alopecia), aged-looking skin, joint abnormalities, and a loss of fat under the skin (subcutaneous fat).**

**Causes:**

- Mutations in the ***LMNA*** **gene cause Hutchinson-Gilford progeria syndrome.**
- **The *LMNA* gene provides instructions for making a protein called lamin A., which** plays an important role in determining the shape of the nucleus within cells.
- The **altered protein makes the nuclear envelope unstable and progressively damages the nucleus, making cells more likely to die prematurely.**

**Inheritance:**

- **It is considered an autosomal dominant condition, which means one copy of the altered gene in each cell is sufficient to cause the disorder.**

**Frequency:**

- This condition is very rare and affects one in every eight million people born and has a worldwide incidence of one in every 20 million.

**Treatment:**

- There's currently **no cure for progeria, but researchers are studying several drugs to treat the condition.**
- Progeria treatment includes the use of a drug called **lonafarnib (Zokinvy).** Originally developed to treat cancer, lonafarnib has been shown to improve many aspects of progeria.

## EOS 6 and Insat 3DR

**Context**

- ISRO is monitoring Cyclonic Storm 'Dana' with the satellites named **EOS 6 and Insat 3DR.**

**Details**

- EOS-6, also known as **Oceansat-3 is an earth observation satellite with a focus on the study of ocean and coastal zones** launched on November 26, 2022 **by Indian Space Research Organisation (ISRO)** in the PSLV-C54 launch vehicle.
- Applied for ocean surface studies, coastal zone management, and marine weather forecasting in the Indian ocean region.
- **It has lowing four payloads:** Ocean Color Monitor (OCM-3), Sea Surface Temperature Monitor (SSTM), Ku-Band Scatterometer (SCAT-3) and ARGOS.
- ***PSLV-C54*** is the 56th mission of the ISRO's Polar Satellite Launch Vehicle (PSLV), with **four stages: First stage (PS1) with** solid rocket motor and six solid strap-on boosters, **Second stage (PS2) with** liquid rocket engines, **Third stage (PS3) with** a solid rocket motor and **Fourth stage (PS4) with** liquid rocket engines.
- Weather monitoring, meteorological services, search and rescue information satellite launched into Geostationary transfer orbit by the Indian Space Research Organisation (ISRO) in GSLV Mk II on September 8, 2016.
- **It has three payloads:** Data Collection Service (DCS), Advanced Aided Search & Rescue (SAS&R), and Sounder
- Has applications in Meteorological data collection, terrestrial data collection, search and rescue services, etc.
- GSLV Mk II is an **Indian Space launch vehicle designed to pace communication satellites into geosynchronous transfer orbit (GTO).**
- **It has three stages: First Stage (GS1) with** Solid motor and four liquid strap-on boosters, **Second Stage (GS2) with** Vikas engine and the **Third Stage (CUS):** Cryogenic engine.

## 6.7 SNIPPETS

| Topics | Details |
|---|---|
| **Scurvy** | • Scurvy is making an unexpected comeback with the recent reports of cases from Western Australia and Canada.<br>• Scurvy **is a disease caused by severe deficiency in vitamin C.**<br>• A deficiency in vitamin C **leads to a lack of collagen production, which leads to tissue breakdown.**<br>• This is evident in fragile blood vessels, bruising, poor wound healing, and swollen gums in humans.<br>• Symptoms include fatigue, irritability, weight loss, anemia, nausea, bleeding gums, joint pain and slow healing of wounds.<br>• Preventive measures include Vitamin C supplements, lifestyle adjustments, Citrus fruits like oranges, and lemons, vegetables which include broccoli, and bell peppers. |
| **Nemaline Myopathy** | • The Chief Justice of India recently spoke about the genetic condition called nemaline myopathy.<br>• Rare congenital disease which affects the skeletal muscle and characterised by Muscle weakness, Hypotonia, Reduced or absence of reflexes and Weakness in breathing and swallowing the muscles.<br>• **Results from a disruption in myofibril in muscle, which is a contractile structure within a muscle fibre responsible for muscle contraction.** |

| | |
|---|---|
| | • Some patients also show monoclonal gammopathy, a **condition in which abnormal proteins or antibodies are found in the blood.**<br>• There is **no definitive cure for this disease.** |
| **Pink cocaine** | • Pink cocaine has made headlines due to its links to big-name celebrities.<br>• **Tusi** is a recreational drug, typically **found as a pink-coloured powder and** commonly referred to as pink cocaine, **tusi, tusibi, tuci, or tucibi.**<br>• Contains a **mix of substances such as ketamine, methamphetamine, MDMA, opioids, synthetic drugs, benzodiazepines, hallucinogens, caffeine, or bath salts.**<br>• Due to the lack of **standardized proportions for the drugs mixed in tusi, each batch is highly risky.**<br>• Consumption leads to extreme side effects such as **hallucinations**, heart attacks, high blood pressure, etc. |
| **Venture Capital Fund for Space Sector** | • The Union Cabinet approved a Rs. 1000 crore Venture Capital Fund for the space sector under the Indian National Space Promotion and Authorization Centre (IN-SPACe).<br>• **Venture Capital Fund for the space sector** is a support scheme for Space technology startups in India to be operationalised by the Indian National Space Promotion and Authorization Centre (IN-SPACe).<br>• The fund will function as an **Alternative Investment Fund under SEBI regulations.**<br>• **IN-SPACe** is an **autonomous agency** established in 2020 to operate under the Department of Space, Government of India **to facilitate private sector participation in India's space sector.**<br>• **Alternative Investment fund** is a privately pooled investment vehicle which often invests in alternative asset classes including private equity, venture capital, hedge funds, real estate, commodities, and derivatives. |
| **Pseumenes siangensis** | • The new species, **Pseumenes siangensis,** have been discovered in Upper Siang valley in Arunachal Pradesh.<br>• This is a species of **wasp** recently discovered in Arunachal Pradesh's Upper Siang District.<br>• It was **named after the Siang Valley, where it was discovered.**<br>• **Distribution: Sino-Indian biogeographic region, a region that includes South Asia, Southeast Asia, and southern China.**<br>• They play a crucial role in pest control, with its larvae feeding on caterpillars and other insects. |
| **Trachoma** | • **After Nepal and Myanmar,** India has become the third country in the South-East Asia Region to eliminate Trachoma.<br>• Trachoma is a **bacterial infection** caused by ***Chlamydia trachomatis***.<br>• It is the ***world's leading infectious cause of blindness*** and is one of the conditions known as neglected tropical diseases.<br>• Neglected tropical diseases (NTDs) **are** Viral, parasitic and bacterial diseases that mainly affect the world's poorest people **in low-income people in developing nations in Asia, Africa, and the Americas.**<br>• Due to their near-complete absence from the global health agenda, they are referred to as "neglected." |

| | |
|---|---|
| **Brown Dwarf** | • As per the new study, the Brown dwarf known as Gliese 229B discovered 30 years ago is actually twins orbiting each other.<br>• Celestial objects in between the size of a giant planet like Jupiter and a small star.<br>• Generally **any object between 15 times the mass of Jupiter and 75 times the mass of Jupiter.**<br>• **Unable to sustain the fusion of hydrogen like a regular star.**<br>• **Named not from the colour of light they emit but because their size falls between white dwarf stars and dark planets.**<br>• Clouds **are likely made up of hot silicate particles unlike the water particles which make up our clouds.**<br>• **White dwarfs** are the end products of most stars and they have a short lifespan, while the **Red dwarfs** are normal low mass stars with **hydrogen fusion capability and they** have a long lifespan. |
| **Respiratory syncytial virus (RSV)** | • The World Health Organization **recommended vaccinating pregnant women and administering infants with an antibody to prevent severe respiratory syncytial virus (RSV) infection in newborns.**<br>• Respiratory syncytial virus (RSV) is a common respiratory virus that **causes cold-like symptoms.**<br>• **It is the leading cause of severe infection in babies 12 months and younger (infants), especially premature infants, older adults, people with heart and lung disease, or anyone with a weak immune system (immune-compromised).**<br>• **Disease doesn't often require treatment.**<br>• Pfizer's RSV shot, **sold as Abrysvo, for use in pregnant women and AstraZeneca's Beyfortus for toddlers are the only vaccines available.** |

## 6.8 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| Solar Eclipse | 4th October 2024 |
| International Medical Device Regulators Forum (IMDRF) | 5th October 2024 |
| Mpox | 8th October, 2024 |
| Biopolymers | 16th October 2024 |
| Bone Ossification Test | 17th October 2024 |
| Global digital framework for ethical use of technology | 17th October 2024 |
| Bioacoustics | 25th October 2024 |

# 7. CULTURE & HISTORY

## 7.1 SHORT ARTICLES

### Battle Of Walong

**Context**

- The Indian Army is observing the 62nd anniversary of the Battle of Walong.

**About the Battle of Walong**

- The battle was **fought near Walong town in Arunachal Pradesh during the Indo-China War of 1962.**
- The **Chinese army slowly deployed nearly 15,000 soldiers**, while the **Indian army had only 800 soldiers**, the situation gave an advantage to the Chinese army.
- The battle was fought in high altitudes ranging from 3,000 to 14,000 feet, the **area was isolated, with no road network.**
- **Indian Soldiers were under-equipped as compared to the Chinese army**, in spite of that t**hey put up a strong defense for nearly a month**.
- By **November 16, Indian forces received orders to withdraw, after which the** Chinese took control of Walong.
- The **Sino-Indian War ended with China declaring a ceasefire on November 21, 1962**.

### National Maritime Heritage Complex (NMHC)

**Context**

- The Union Cabinet has approved the development of the National Maritime Heritage Complex (NMHC) at Lothal, Gujarat.

**About National Maritime Heritage Complex (NMHC)**

- It will be **developed by the Ministry of Ports, Shipping & Waterways (MoPSW),** it is said to become the **tallest lighthouse museum in the world.**

**About Lothal**

- It is a significant archaeological site **located in the Bhal region of Gujarat.**
- It was **one of the southernmost sites of the Harappan civilization**
- It is known as the **world's earliest docks**, which was **connected to the ancient river course of Sabarmati, and promoted trade and communication.**
- It was discovered in 1954 by archaeologist S.R. Rao.
- Lothal was nominated as a **UNESCO World Heritage Site** in 2014, however, the confirmation is still pending.

### Veeragallu

**Context**

- A 13th-century stone description, also known as "Veeragallu" was discovered during the renovation of the ancient Kaleshwar temple in Karnataka.

**About Veeragallu**

- It is a **stone inscription** that provides valuable information about the **history of the Sevuna dynasty, also known as the Devagiri Yadavas.**
- The inscription dated back to 1283 AD is **made of charcoal stone** and measures about 4 feet long and 2.3 feet wide.

- **It includes a 5 line inscription about Ramachandra Chakravarti**, ruler from the Sevuna dynasty, who **held the title of "Yadava Narayana Bhujbala Praudhapratapa Chakravarti".**
- The inscription depicts:
  - The **lower part of the stone shows two brothers, Bhoja Narayana and Vambhava, in the battle.** Carvings of cows nearby symbolize the cattle they were defending.
  - I**n the middle area of the stone, the brothers are shown on a journey to Kailasa**; here, heavenly spirits lift a vimana, while musicians follow, celebrating the brothers' bravery.
  - At the top of the stone, the **scene highlights the Shivaloka, where the brothers are depicted in Anjali mudra (a pose of respect) worshiping a Shivalinga.**

**About Sevuna dynasty**

- It was a **Kannada-speaking Kingdom that ruled in the part of present-day Karnataka and Maharashtra.**
- **Initially they served the Kalyana Chalukyas**, then they established an independent kingdom in the 12th century.
- Ramachandra Chakravarti ruled from 1271 to 1312 AD. He was known for his military victories and cultural contributions, he also **constructed the Lakshmi Narayan temple near the Harihareshwar temple in Harihara.**

**About Kalleshwar Temple**

- It is **situated in the Vijayanagar district of Karnataka.** It is **dedicated to Lord Shiva.**
- The construction of the temple spans the rule of;
  - The **Rashtrakuta dynasty initially started the construction** of the temple during the mid-10th century.
  - **Western Chalukya Empire developed the temple around 987 AD** during the rule of King Tailapa II.
- The **main building material of the temple is soapstone**, which is known for its durability and ease of carving.
- It is **protected as a monument of national importance by the Archaeological Survey of India.**

## Rani Durgavati

**Context**

- The Madhya Pradesh government has approved the construction of a memorial and garden for Rani Durgapati on Madan Mahal hill in Jabalpur.

**Who was Rani Durgapati?**

- She was a **member of the Chandela Rajput family**, after the death of King Dalpat Shah in 1550, Rani Durgavati took over the administration.
- She **moved the capital from Singorgarh Fort to the Chauragarh Fort in the Satpura range.**

**Conflict with the Mughals**

- In 1562, Mughal defeated Baz Bahadur (ruler of Malwa), and aimed to conquer Rani Durgavati's kingdom.
- Despite warnings about the Mughal strength, she chose to fight rather than surrender.
- **She bravely fought and pushed back the Mughal forces three times**, but continuous battle drained her resources, and **ultimately the Mughal force dominated her troops.**

- **Facing defeat, she chose to take her own life rather than be captured**. She killed herself on June 24, 1564.

## New Classical Languages of India

### Context

- The Union Cabinet has recognized 5 new languages; Marathi, Pali, Prakrit, Assamese and Bengali as classical languages.

### How classical languages status are decided?

- In 2004, the Union Government specified criteria for the classical language **based on the committee of linguistic experts set up by the Ministry of Culture.**
- **Criteria to decide classical language status**
  - Early texts/recorded history **over a period of 1500-2000 years.**
  - A body of ancient literature/texts considered a valuable heritage.
  - The literary tradition should be original and not borrowed from other languages.
  - The **classical language and literature should be distinct from modern forms.**
- Currently 11 languages are classified as classical languages; **Tamil (first to get the status)**, Sanskrit, Telugu, Kannada, Malayalam, Odia, Marathi, Pali, Prakrit, Assamese, and Bengali

### What are the benefits of classical language status?

- **Two major international awards** (the Presidential Award of Certificate of Honour and the Maharshi Badrayan Samman Award) are given each year to recognize excellence in classical Indian languages.
- **A center of excellence for studies** in the classical language is established to promote research and enhance learning about the language.
- The University Grants Commission creates **professional chairs for classical languages in central universities** to support scholars to gain recognition and support for their work.

## Raigad Fort

### Context

- India has officially nominated the "Maratha military landscape", including Rigard Fort for the UNESCO World Heritage Site list for 2024-25.

### About Maratha Military Landscape

- It is a **group of 12 historic forts located in the Sahyadri mountains, Konkan Coast, Deccan Plateau, and Eastern Ghats.** These forts were **constructed between the 17th and 19th century.**

| List of Nominated Forts | | | | | |
|---|---|---|---|---|---|
| 1. Salher<br>2. Shivneri | 3. Panhala<br>4. Vijaydurg | 5. Raigad<br>6. Sindhudurg | 7. Khanderi<br>8. Lohagad | 9. Rajgad<br>10. Suvarnadurg | 11. Pratapgad<br>12. Gingee |

### About Raigad Fort

- It is **located in the Raigarh district of Maharashtra.**
- It was **originally known as "Rairi".** Shivaji, the founder of the Maratha empire **captured the fort in 1656 from the Mores dynasty and fortified it.**
- In 1674, after the coronation of Shivaji as the first Chhatrapati of the Maratha Kingdom, **Rigard was made the capital.**
- Due to its strategic location, it earned the nickname of "Gibraltar of the East".

### Architectural Highlights of Raigad Fort

- The **Rajsadar (Hall of Public Audience), Ranivasa (Queens' Palace), and Naqqar Khana (Drum House).**
- **Jagadishwar Temple** is dedicated to Lord Shiva.

- **Takmak Tok**, the cliff from which prisoners were executed.

### About UNESCO World Heritage Sites

- India has ratified the 1972 Convention for World Heritage. Currently, **India has 43 recognized World Heritage sites;** 35 are cultural, 7 are natural, and one, Khangchendzonga National Park is of mixed type.
- Each country **first prepares a tentative list of important cultural and natural sites.**
    - **Sites from the tentative list are selected and evaluated** by the International Council of Monuments and Sites and the World Conservation Union.
    - The **World Heritage Committee evaluates and decides on the nominations and announces the final decision** about the inclusion of the site.
- World Heritage status is **not a permanent status,** and a site may lose its status if it is not maintained or protected adequately.

## Kittur Vijayotsava

### Context:

- The Department of Post has released a commemorative postage attempt to celebrate the 200th anniversary of Kittur Vijayotsava to honor Rani Chennamma.


### Rani Chinnamma

- She was **born in a noble Lingayat family in present-day Karnataka.**
- After the death of her husband and son, **she became the queen of the Kittur.**
- The **British East India Company rejected the adopted son of Rani Chinamma as the next heir.** The increased tension resulted in war.
- She **defended her Kingdom and won the first battle on 23 October 1824. This victory is celebrated as Kittur Vijayotsava.**
- The Britishers again attacked with a large army, this time the **queen was captured and imprisoned in Bailhongal Fort, where she died in 1829.**

**Kittur Fort**

- It was **built by Allappa Gowda Sardesai of the Desai dynasty** between 1650 and 1681.
- The Fort includes several temples and spiritual sites, including **Nathapanthi Matha.**

## National Manuscript Mission

### Context

- The Government of India to relaunch the National Manuscript Mission (NMM) to preserve ancient texts.

### News in Detail

- **Currently, the NMM works under the Indira Gandhi National Centre for Arts, but there are plans to form a new autonomous body,** likely called the National Manuscripts Authority, under the Ministry of Culture.

### About National Mission for Manuscripts (NMM)

- The **Ministry of Tourism and Culture launched the mission in 2003** with the Indira Gandhi National Centre for the Arts as the executing body.
- It aims to survey, discover, protect and promote manuscripts.
- By digitizing manuscripts, it makes these texts accessible online through a digital archive known as **Kritisampada, which serves as the National Database of Manuscripts.**

- It created data for 5.2 million manuscripts and digitized about 300,000 titles, **nearly 75% of these manuscripts are in Sanskrit, and the remaining 25% are in regional languages**.

**About Manuscripts**

- A manuscript is a **handwritten record created on materials like paper, palm leaves, clothes, or even metal.**
- To be categorized as a manuscript, it **must be at least 75 years old** and hold meaningful scientific, historical, and aesthetic value.
- **Manuscripts contain knowledge rather than direct historical events.**

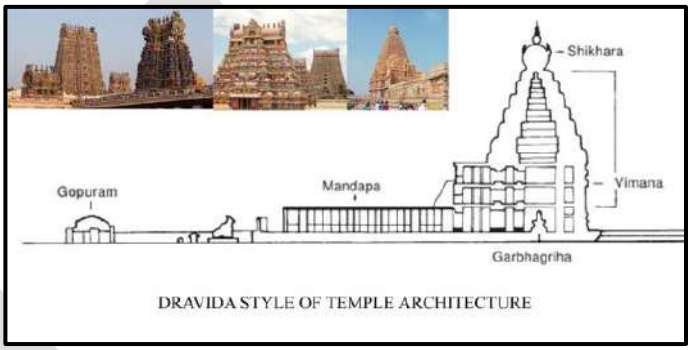
## Sri Singeeswarar Temple

**Context**

- Two copper plates from the 16th century linked to the Vijayanagara Kingdom were discovered at the Sri Singeeswarar Temple in Tamil Nadu.

**More Details about the Discovery**

- The copper plates discovered are **connected by a ring holding the royal seal of the Vijayanagara Kingdom.**
- The **inscriptions (dated 1513 CE) were written in Sanskrit using the Nandinagari script, which was commonly used in Vijayanagara records** during Krishnadevaraya's rule.
- These inscriptions recorded King Krishnadevaraya's donation of the village of Vasalabattaka to a group of Brahmins, after which the **village was renamed "Krishnarayapura" to honor the king.**




**About the Sri Singeeswarar Temple**

- It was **dedicated to Lord Shiva and built around 976 AD.**
- It was **originally built by Aditya Karikalan II,** father of the Chola emperor Rajaraja Cholan.
- Under the Vijayanagara Empire, **Dalavai Ariyanadha Mudaliar (a viceroy of Krishnadevaraya) added Rajagopuram** (main tower) and the 16-pillar Mandap in 1501.
- **Dravidian style with a five-tier Rajagopuram** centered around a Shiva Lingam in the sanctum.

**About the Vijayanagara Kingdom**

- It was **founded in 1336 by brothers Harihara I and Bukka Raya I of the Sangama dynasty.**
- The capital was Vijayanagara, present-day Hampi in Karnataka.
- **A well-organized monarchy with provinces governed by local Nayakas (governors).**
- Famous for temple architecture, including the famous **Virupaksha and Vittala temples in Hampi**, now recognized as UNESCO World Heritage Sites.
- Despite being **weakened by the Battle of Talikota in 1565 against the Deccan Sultanates**, the empire continued in a reduced form until 1646.

## Mera Hou Chongba

**Context**

- The Mera Hou Chongba was organized in Manipur as a symbol of unity and harmony among the indigenous people.

### What is Mera Hou Chongba?

- The festival is **celebrated among the Meitei community,** however, it extends beyond any single group and **involves communities from the hill and valley such as —such as the Meitei, Naga, and Kuki.**
- T**Men dress in dhotis, and women wear "phaneks and innaphis",** which are Indigenously designed garments highlighting Manipur's textile artist work.
- The festival **starts with sacred rituals at Kangla Uttra, where ceremonies like Men Tongba and Yenkhong Tamba are performed.**
- The ritual honours both the ancestors and the gods, which highlights respect for tradition.
- **"Maiba", a local priest, leads a prayer.**
- The celebration includes the demonstration of **Thang Ta, a traditional martial art of Manipur.**
- T**hey perform the "Thabal Chongba" dance**, where people hold hands and dance in a circle to the beat of traditional instruments like the pung (a drum) and pena (a string instrument).

## 7.2 SNIPPETS

| Topics | Details |
|---|---|
| **National Ayurveda Day** | • The National Ayurveda Day is observed on 29th October.<br>• The Union government in 2016 has designated October 29 as the National Ayurveda Day.<br>• It is celebrated to mark the birth anniversary of Dhanvantri, known as the Father of Ayurveda.<br>• The **theme for 2024 is "Ayurveda Innovation and Global Health".** |
| **Indian Council For Cultural Relations (ICCR)** | • The Indian Council for Cultural Relations (ICCR) organized a conference in Colombo, Sri Lanka.<br>• It is an **autonomous body under the Ministry of External Affairs.**<br>• It was **founded in April 1950 by the 1st Education Minister of India**, Maulana Abul Kalam Azad.<br>• It **organizes events in India and abroad** to highlight Indian art, heritage and traditions.<br>• It **provides funds to cultural institutions** across India to support their work to preserve Indian culture. |
| **Sohrai Painting** | • The Prime Minister of India presented Sohrai Painting to the Russian President.<br>• It is a wall painting that **originated in Hazaribagh district, Jharkhand.**<br>• It is closely associated with the **Sohrai festival, which is celebrated after Diwali.**<br>• The term "Sohrai" originated from the Mundari verb "Soroi," which means 'to whip with a stick.'<br>• The main themes include animals, birds, and nature.<br>• **Painting Process**<br>  ○ The **wall surface is coated with a mixture of soil and manure, which is followed by a layer of white clay.**<br>  ○ The designs are created on partially dry clay using these brushes or fingers.<br>  ○ In the paintings, **red lines signify ancestors or fertility, black lines represent Shiva, and white lines symbolize food.** |

| | |
|---|---|
| **Mother of Pearl Seashell Vase** | • The Indian PM gifted a Mother of Pearl Seashell Vase to the President of Iran.<br>• It highlights the coastal craftsmanship of Maharashtra.<br>• Artisans transform seashells into luxurious art forms. |
| **Warli Painting** | • The Prime Minister of India presented Warli Painting to the President of Uzbekistan.<br>• It is an art form from the **Warli tribe, practiced in the North Sahyadri Range of Maharashtra.**<br>• Its origins date back to around the 10th century CE. **It uses shapes as symbolic signs:**<br>  ○ Circles represent the sun and moon.<br>  ○ Triangles symbolize mountains and conical trees.<br>  ○ Squares indicate human-made spaces or sacred enclosures.<br>• The **central element is called "chauk" or "chaukat,"** highlighting the mother goddess, and representing unity and family.<br>• It depicts scenes of hunting, farming, and festivals, with the Tarpa Dance.<br>• **Painting Process**<br>  ○ Painted on the walls of clay huts **made from branches, earth, and red brick**, creating a natural ochre background.<br>  ○ **White Pigment made from rice flour mixed with water and gum** is used. |
| **Abhidhamma** | • The Prime Minister of India participated in the International Abhidhamma Divas in New Delhi.<br>• Abhidhamma Divas was **organized by the Government of India and the International Buddhist Confederation.**<br>• Gautam Buddha's teachings were **recorded in the Pali language in the Tipitaka,** which includes:<br>  ○ **Vinaya Pitaka (monastic rules)**<br>  ○ **Sutta Pitaka (Buddha's discourses)**<br>  ○ **Abhidhamma Pitaka (Buddhist philosophy and psychology)**<br>• The teaching of Abhidhamma **explains things more deeply, and uses a more technical way of expressing reality.**<br>• It **talks about birth, death, and how our minds work,** to help followers to understand life in a more detailed way. |

## 7.3 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| Social Justice Movement | 8th October |

# 8. GEOGRAPHY & DISASTER MANAGEMENT

## 8.1 MOUNT EVEREST RISE

### Context

- Mount Everest, standing at 8.85 kilometres above sea level, continues to rise, according to a recent study published in Nature Geoscience.
- *Isostatic rebound (also called continental rebound, post-glacial rebound or isostatic adjustment) is the rise of land masses that were depressed by the huge weight of ice sheets during the last ice age.*

### Geological Processes behind Isostatic Rebound

#### 1. Loading and Unloading of the Crust

- **Glacial Isostatic Adjustment (GIA):** When large ice sheets form during glaciations, their immense weight pushes the Earth's crust downward.
- **River Erosion:** Similar to glacial melt, rivers that continuously erode rock and soil also reduce the weight pressing on the crust.

#### 2. Mantle Response and Buoyancy

- **The Earth's mantle behaves like a very viscous fluid over geological time scales.** When the crust is unloaded, the mantle beneath slowly flows back into the space, allowing the crust to rise. This process is relatively slow, occurring over thousands of years.
- **The crust acts like a buoyant object on the mantle**. When mass is removed (either through erosion or ice melt), the crust becomes lighter and is pushed up by the mantle, similar to how a boat rises higher in water when cargo is removed.

#### 3. Thermal Contraction and Expansion

- **Changes in temperature can also influence isostatic adjustments**. In colder periods, the crust can contract and subside, while in warmer periods it can expand and rise.
    - This thermal effect can interact with other factors like erosion and tectonics to modify the rate of uplift.

#### Example of Isostatic Rebound in Action:

- **Scandinavia**: Following the melting of large ice sheets from the last Ice Age, parts of Scandinavia are still rising at rates of up to 1 cm per year as the crust adjusts to the loss of glacial weight.
- **Himalayas:** In regions like the Himalayas, rivers such as the Arun can erode material from the mountain bases, **triggering isostatic rebound**, which contributes to the ongoing rise of peaks like Mount Everest.

#### 4. Tectonic Interactions

- Isostatic rebound often works in tandem with tectonic processes, which are the movements of the Earth's plates.
- While tectonic forces are primarily responsible for large-scale changes like **mountain formation, isostatic rebound provides localized adjustments.**
- **For example**, after erosion or glacial melt, tectonic activity can interact with isostatic processes to further influence elevation changes.

### About ARUN RIVER

**Name**

- Arun River

**Countries**

- Nepal, China, India

**Source**

- **Tibetan Plateau** in the Zhangzangbo Glacier, near Mount Everest (China)

**Mouth**

- Confluence with the **Saptakoshi River** in Nepal

**Length**

- Approximately **480 km (300 miles)**

**Elevation at Source**

- Around **6,000 meters (20,000 feet)**

**Drainage Basin**

- Part of the **Koshi River system**, which eventually merges with the Ganges

**Major Tributaries**

- Barun River, Sun Kosi, Dudh Kosi

**Passage Through**

- Flows through the **Himalayas** and **Makalu-Barun National Park** in Nepal

**Significance**

- Important river in the **Koshi River** system
- Provides water for irrigation and hydropower projects.

## 8.2 DUST-DRIVEN OCEANFERTILIZATION

### Context

- Dust carried by wind from drought-stricken southern Africa caused a bloom of marine phytoplankton off the southeast Madagascar coast from November 2019 through February 2020.

### About Ocean fertilization

- **Ocean fertilization or ocean nourishment is a type of technology for carbon dioxide removal** from the ocean based on the purposeful introduction of **plant nutrients to the upper ocean** to increase marine food production and to **remove carbon dioxide from the atmosphere**.
- Ocean nutrient fertilization, **for example iron fertilization**. More than a **dozen open-sea experiments** confirmed that adding iron to the ocean increases photosynthesis in phytoplankton by up to 30 times.

### About Iron Fertilization

- Iron fertilization is the intentional introduction of **iron-containing compounds (like iron sulfate)** to **iron-poor areas** of the ocean surface to **stimulate phytoplankton production**.
- This is intended to enhance biological productivity and/or **accelerate carbon dioxide (CO2) sequestration** from the atmosphere. Iron is a trace element necessary for photosynthesis in plants.
- It is **highly insoluble in sea water and in a variety of locations** is the limiting nutrient for phytoplankton growth.

**Sources of Dust:**

- The primary sources of dust are large desert regions, **such as the Sahara in Africa, the Gobi in Asia, and** the **deserts of Australia**. Winds lift dust particles into the atmosphere, where they can travel thousands of kilometers across continents and oceans.
- The most well-studied dust transport is from the **Sahara Desert to the Atlantic Ocean**, including regions as far away as the Caribbean and the Amazon basin.

**Mechanism of Ocean Fertilization:**

- When dust settles on the ocean surface, iron and other nutrients dissolve in seawater and become available to phytoplankton.
- **This fertilization stimulates the growth of these microorganisms**, leading to an increase in primary production.
- **Phytoplankton, through photosynthesis**, absorb carbon dioxide from the atmosphere, thus playing a critical role in the global carbon cycle. The enhanced growth of phytoplankton can lead to **increased sequestration of carbon as they die and sink to the ocean floor**, trapping carbon in the deep ocean for long periods.

### Impact on Marine Ecosystems:

- **Enhanced Phytoplankton Growth:** Dust-driven ocean fertilization can lead to phytoplankton blooms, particularly in high-nutrient, **low-chlorophyll (HNLC) regions** where iron is the limiting factor. This enhances the marine food web, supporting higher trophic levels, including zooplankton, fish, and marine mammals.
- **Carbon Sequestration:** The increase in phytoplankton growth facilitates greater carbon capture from the atmosphere. This process, known as the **"biological pump,"** has implications for mitigating the effects of climate change.
    - However, the efficiency of this process in **long-term carbon sequestration** is still a subject of scientific research.
- **Nitrogen Fixation:** Certain types of phytoplankton, such as **cyanobacteria**, are nitrogen fixers, meaning they can **convert atmospheric nitrogen into a form usable by other marine organisms**.
- **Algal Blooms:** While dust deposition can have positive effects on marine productivity, excessive fertilization can lead to harmful algal blooms (HABs).

### Regional Impact:

- **North Atlantic:** The **Sahara Desert is the largest source of dust to the North Atlantic Ocean**. This dust provides significant iron input to the Atlantic, influencing phytoplankton productivity and carbon cycling.
- **Southern Ocean:** Dust from Patagonia and **Australia fertilizes the Southern Ocean**, a key region for global carbon sequestration. Here, iron is often the limiting nutrient for phytoplankton growth, making dust input particularly important.
- **Pacific Ocean:** The **Gobi Desert is a major source of dust to the North Pacific Ocean**. Dust-driven fertilization in this region can affect marine productivity, particularly in areas where iron is the limiting nutrient.

## What Is Climate Change?

- Climate change refers to long-term shifts in temperatures and weather patterns. Such shifts can be natural, due to changes in the sun's activity or large **volcanic eruptions. But since the 1800s**, human activities have been the main driver of climate change, primarily due to the burning of fossil fuels like coal, oil and gas.

### Climate Change and Dust Transport:

- Climate change is likely to affect both dust production and transport patterns. Changes in temperature, precipitation, and wind patterns may alter the amount of dust available for ocean fertilization.

### Artificial Ocean Fertilization:

- There has been growing interest in artificially replicating the process of ocean fertilization as a geoengineering solution to combat climate change. Proponents argue that adding iron to the ocean could enhance **phytoplankton growth and carbon sequestration, potentially reducing atmospheric $CO_2$ levels.**
- **International regulations, such as the London Protocol**, currently restrict large-scale iron fertilization experiments in the ocean due to the potential environmental risks.

## Conclusion

- Dust-driven ocean fertilization plays a significant role in regulating marine ecosystems and the global carbon cycle. While natural dust deposition contributes to **ocean productivity and carbon sequestration**, the implications of altering this process, either through climate change or artificial means, remain a topic of ongoing research.

## 8.3 SHALE GAS RESERVES IN INDIA

### About Shale Gas

- Shale gas is an **unconventional natural gas trapped within shale formations. Shale is a fine-grained, sedimentary rock formed as a result of the compaction of clay, silt, mud and organic matter** over time and is **usually considered equivalent to mudstone**. Shales were deposited in **ancient seas, river deltas, lakes and lagoons** and are one of the most abundant sedimentary rock types, found at both the Earth's surface and deep underground. It consists of **70 to 90 percent methane** ($CH_4$), the main hydrocarbon target for exploration companies.
- **Shale gas is natural gas found in shale deposits**, where it is trapped in microscopic or submicroscopic pores. This natural gas is a **mixture of naturally occurring hydrocarbon gases produced** from the decomposition of **organic matter (plant and animal remains).** This is the gas used for **generating electricity and for domestic heating and cooking.**
- Shale gas has become an increasingly important source of **natural gas in the United States** since the start of this century, and interest has spread to potential gas shales in the rest of the world. **China is estimated to have the world's largest shale gas reserves.**

**About Hydrocarbons**

- A hydrocarbon is an organic compound consisting entirely of hydrogen and carbon. Hydrocarbons are examples of group 14 hydrides. In the fossil fuel industries, hydrocarbon refers to naturally occurring petroleum, natural gas and coal, or their hydrocarbon derivatives and purified forms.

## 8.4 CARBON SINK

### About Carbon Sink

- A carbon sink is a **natural** or **artificial reservoir that absorbs and stores the atmosphere's carbon** with physical and biological mechanisms. **Coal, oil, natural gases, methane hydrate and limestone** are all examples of carbon sinks.
- According to research conducted by NASA, in 1959, natural carbon sinks removed **about 60% of the $CO_2$ produced by human activities. Today, this number has dropped to around 55%.**

### Need for Carbon Sink

- These sinks form an important part of the **natural carbon cycle**. An overarching term is carbon pool, which is all the places where carbon on Earth can be, i.e. **the atmosphere, oceans, soil, florae, fossil fuel reservoirs and so forth**.
- A carbon sink is a type of carbon pool that has the capability to take up more carbon from the atmosphere than it releases.
- Carbon sinks are essential in **maintaining the balance of the carbon cycle** and regulating the Earth's climate.
- **They help offset the billions of tons of $CO_2$ emitted by human activities** each year, preventing drastic increases in global temperatures.
- However, human activities such as **deforestation, land-use changes, and pollution are damaging these natural carbon sinks**, reducing their capacity to absorb $CO_2$ and potentially turning them into carbon sources.

## Types of Carbon Sink

| Natural carbon sinks | Artificial carbon sinks |
|---|---|
| • **Forests:** Trees and plants absorb CO2 during **photosynthesis**, storing carbon in their biomass (**trunks, branches, leaves, and roots**) and soil.<br>  ○ **Forests are some of the largest and most efficient carbon sinks**, playing a vital role in the global carbon cycle.<br>• **Oceans:** The world's oceans absorb CO2 from the atmosphere through physical and biological processes.<br>  ○ **Phytoplankton in surface waters** use CO2 for photosynthesis, while physical processes like the **dissolution of CO2** in seawater also play a significant role.<br>• **Soil:** Soils store carbon from decaying plant and animal matter, with microorganisms and soil fauna contributing to the sequestration process. | • **Landfill sites:** Although primarily known for waste **disposal, modern landfill sites** can act as carbon sinks by trapping organic waste that decomposes anaerobically, producing methane that can be captured and used as an energy source.<br>• **Carbon capture and storage (CCS):** This technology involves capturing CO2 emissions from industrial sources or the atmosphere and storing it underground in geological formations.<br>  ○ **Significance: CCS will play an important role in reducing industrial carbon footprints** and mitigating climate change, however, much of the technology is still in development or struggles to get sufficient funding to scale up. |

## Case Study

- The Amazon, the world's largest tropical forest, is often described as the **Earth's lungs due to its significant role in absorbing CO2**. Unfortunately, deforestation for agricultural land and logging is severely impairing the **Amazon's ability to function as a carbon sink.** Researchers warn that the damage could be so severe that the Amazon might become a carbon source as early as the next decade, exacerbating global warming.

| Carbon Reservoir | Description |
|---|---|
| **Atmospheric carbon** | • Carbon exists in the atmosphere primarily as **carbon dioxide (CO2).**<br>• Plants absorb **CO2 through photosynthesis**, converting it into organic matter and releasing oxygen, which is essential for **life and forms** the basis of the **food web.** |
| **Carbon in the biosphere** | • **Plants, animals, and microorganisms** contain carbon. When plants and animals die, their organic matter decomposes, returning carbon to the soil.<br>• **Microorganisms break down this matter**, releasing CO2 back into the atmosphere. |
| **Carbon in the oceans** | • Oceans act as major carbon sinks, absorbing CO2 from the atmosphere. Marine organisms like **phytoplankton use CO2 for photosynthesis**.<br>• Carbon is also stored in ocean depths, both in dissolved form and as part of marine sediments. |
| **Geological carbon** | • Over millions of years, carbon is stored in fossil fuels such **as coal, oil, and natural gas**, which are formed from ancient plant and animal matter.<br>• Carbon is released through **volcanic eruptions** and the weathering of rocks. |
| **Human impact** | • Activities like **burning fossil fuels and deforestation** release large amounts of CO2, disrupting the carbon cycle. |

| | |
|---|---|
| [redacted] | • This **excess CO2 in the atmosphere** contributes to global warming and climate change. |

### Consequences of rising CO2 levels

- **Global warming:** Increased atmospheric CO2 levels enhance the greenhouse effect, leading to higher global temperatures.
- **Extreme weather events:** Rising temperatures contribute to more frequent and severe weather events, such as **hurricanes, droughts, and floods.**
- **Disruption of weather patterns:** Climate change alters **global weather patterns**, impacting ecosystems and biodiversity.
- **Threat to life:** The effects of climate change pose significant risks to the survival of various species, including humans, by disrupting food and **water supplies and increasing the frequency of natural disasters.**

### Way Forward

- The Earth's forests absorb as **much as 2.6 billion tonnes of carbon dioxide** each year, but they are increasingly threatened by human activities.
- **Sustainable forestry practices:** Implementing sustainable forestry practices involves managing forest resources in ways that maintain their **biodiversity, productivity, and ecological processes**.
- **Reforestation and afforestation:** Reforestation involves planting trees in deforested areas, while afforestation entails planting trees in regions that were not previously forested. Both practices help restore **carbon-absorbing vegetation** and improve biodiversity.
- **Transition to renewable energy:** Shifting from fossil fuels to **renewable energy sources** such as **wind, solar, and hydropower** can significantly reduce carbon emissions and help stabilize global temperatures.
- **Energy efficiency:** Improving energy efficiency in **buildings, transportation, and industry** can reduce the overall demand for energy and lower emissions.

### Conclusion

- Carbon sinks are a vital part of the **carbon cycle and are crucial** when it comes to preventing further rises in our global average temperature and the rapid deterioration of our climate.
- **Governments, companies, and individuals** across the world must take action to reduce our reliance on harmful fossil fuels and transition to a **more sustainable way of existence -** one that protects our natural carbon sinks and respects the **Earth's natural processes**.

## 8.5 SHORT ARTICLES

# Mount Adams

**Location and key facts**

- Washington State, United States**. Adams has not erupted in more than 1,000 years; it is not considered extinct. It is the** second-highest mountain in Washington, after Mount Rainier.

**Volcanic Field**

- Adams is one of the **long-lived volcanoes in the Cascade Range**.

**Rivers**

- Adams is the source of the headwaters for two major rivers, the **Lewis River and White Salmon River.**

**Glaciers**

- Over 10 active glaciers**(e.g. The Pinnacle, White Salmon, and Avalanche glaciers)**

### Water Supply

- Glaciers provide water to forests, streams, and meadows

## Jordan valley

### Location and key facts

- **Middle East, Southwestern Asia. Upper Jordan Valley is not considered part of the Jordan Valley.**

### Geological Feature

- Rift Valley, part of the East African Rift System

### Boundaries

- Stretches from the **Sea of Galilee**(It is also called Lake Tiberias or Kinneret, is a freshwater lake in Israel. It is the lowest freshwater lake on Earth and the second-lowest lake in the world) in the **north** to the **Dead Sea in the south**

### Water Body

- Located along the Jordan River, along Jordan's western border with Israel and the West Bank

## Salt Pan

### Context

- The Maharashtra government has issued a GR (Government Resolution) allocating 255.9 acres of salt pan land.

### What are Salt Pan Lands?

- **Salt pan lands are ecologically important salt marshlands**. They are low-lying areas around the shore that are used for salt cultivation. **They act as holding ponds and work as a sponge** for the absorption of rain. **They are a coastal area's natural defence against flooding**. They help intertidal activity, and are home to diverse flora and fauna.

**Definition**

- Flat expanses of ground covered with salt and minerals, usually shining white under the sun. Found naturally in deserts.

**Formation**

- Formed by evaporation of water bodies like **lakes or ponds** in areas where evaporation exceeds precipitation, typically in deserts.

**Process**

- Water pools remain on the surface due to inability to drain, and as they evaporate, minerals, mainly salts, are left behind. Over time, these minerals accumulate.

**Threat**

- Salt crusts can conceal mud traps, posing a danger to vehicles and people. **Example**: The Qattara Depression in the Sahara Desert.

**Examples**

- **Bonneville Salt Flats, Utah**: Known for setting land speed records.
- **Etosha Pan, Namibia**: Located in Etosha National Park.
- **Salar de Uyuni, Bolivia**: The world's largest salt pan, rich in lithium resources.
- **Rann of Kutch, India**: A salt marsh in wet season and salt pan in dry season.

## Chenchus

### About Chenchus:

- The **Chenchus of Penukumadugu** have lived in the dense Nallamala forests for centuries, their existence intertwined with the wilderness around them. However, their **inability to keep up with the relentless** pace of **modernisation** has led to dwindling work opportunities under the MGNREGA.
- Chenchus are caught between an **ancestral past and an uncertain future**and are grappling with isolation, poverty, and an erosion of their traditional way of life.

| Region | Andhra Pradesh, Telangana, Karnataka, Odisha |
|---|---|
| Language and lifestyle | Chenchu language **(Dravidian language family)** |
| Lifestyle | Traditionally based on **hunting and gathering.**<br>The Chenchus collect jungle products like roots, fruits, tubers, beedi leaf, mohua flower, honey, gum, tamarind and green leaves and make a meagre |

| | |
|---|---|
| | income. |
| **Interaction with Non-Tribal People** | **Largely symbiotic relationship**; some specialize in collecting forest products for sale to non-tribal people |
| **Habitat** | Nallamala forest of **Telangana and Andhra Pradesh** (sparse and deciduous forests) |
| **Primitive Tribal Group** | **Identified as a Primitive Tribal Group**, still dependent on forests, hunting for livelihood and not engaged in cultivation |

## Negro River

### Significance

- **One of the largest tributaries of the Amazon River; one of the world's largest rivers in terms of discharge.**

### Origin

- Several headstreams, including the Vaupés (Mapés) and the Guainía in the rainforest of eastern Colombia.

### Course

- Flows along the Colombia-Venezuela border, enters Brazil, becomes the Rio Negro, then flows to Manaus where it meets the Solimões River to form the Amazon.

### Countries It Passes Through

- Colombia, Venezuela, Brazil

## Lipulek pass

### Location

- **High-altitude mountain pass located in the Kumaon region of Uttarakhand, near the trijunction of India, Nepal, and China.**

### Connectivity

- Links the Indian state of Uttarakhand with the Tibet rgion of China.

### Geographical Setting

- Situated in the Vyas Valley of Pithoragarh district in Uttarakhand.

## Lake Kivu

### Location

- **Between Democratic Republic of Congo (DRC) to the west and Rwanda to the east**

### Significance

- Rwanda's largest lake and the sixth largest in Africa

### Geographical Position

- In the Albertine Rift, part of the western branch of the East African Rift

### Shoreline Features

- Irregular shores with inlets, peninsulas, and numerous waterfalls

### Drainage

- Empties into the Rusizi River, flowing southwards into Lake Tanganyika

### Feature

- Home to Idjwi Island, the tenth largest inland island in the world

## State of Global Water Resource Report

### Context

- According to the State of Global Water Resource Report by the World Meteorological Organization (WMO), the year 2023 marked the driest year for global rivers in over three decades.

### Key facts of the report:

#### Glacier Mass Loss

- **Largest mass loss in five decades**; 2023 marked the second consecutive year with glacier ice loss in all regions.

#### Hydrological Events

- Influenced by the transition from **La Niña to El Niño** and human-induced climate change.

#### Water as a Climate Indicator

- **WMO Secretary**-General highlighted that water acts as a signal of climate change, with extreme events like floods and droughts.

#### Hydrological Cycle

- **Rising temperatures** accelerated the hydrological cycle, making water conditions more erratic and unpredictable.

#### Data Deficiency

- Lack of comprehensive data on global freshwater resources, requiring improved monitoring and **data-sharing efforts**.

**Water Scarcity**

- 3.6 billion people face water scarcity for at least a month per year, projected to increase to **5 billion by 2050.**

**2023 Hydrological Extremes**

- **La Niña to El Niño transition** and Indian Ocean Dipole impacted extreme weather in 2023.

**Floods Impact**

- **Africa suffered most casualties**; Libya's dam collapses in September killed over 11,000 people.

**Droughts Impact**

- **Southern USA, Central America, Argentina, and Brazil** faced severe droughts, impacting the economy and water levels.

**River Discharge Trends**

- **Over 50% of global river catchment** areas experienced drier-than-normal conditions.

**Groundwater Levels**

- **South Africa, India, and Australia** experienced above-normal groundwater levels, while North America and Europe saw depletion.

**Soil Moisture**

- Below-normal levels across **North America, South America, North Africa, and the Middle East** during peak dry months.

**Glacier Ice Loss**

- **Over 600 Gigatonnes lost**, the worst in 50 years, with Europe's glaciers particularly affected.

**Challenges in Data Collection**

- **Africa, South America, and Asia** remain underrepresented, requiring better hydrological monitoring in these regions.

## Warming of Antarctica

**Key Findings:**

**Study Conducted By**

- **University of Exeter, University of Hertfordshire, British Antarctic Survey**

**Greening Growth (1986-2021)**

- Vegetation cover grew from less than one square kilometer to nearly 12 square kilometers

**Temperature Increase**

- Significant warming in the past 60 years, particularly in the West Antarctic and Antarctic Peninsula regions

**Acceleration of Greening**

- 30% increase in the last five years, with 400,000 square meters of new greens every year

**Environmental Impact**

- Greening is evidence of the effects of anthropogenic climate change

**Broader Climate Change Impact**

- Localized greening indicates global climate changes, affecting sea levels and carbon cycling

**Future Implications**

- The greening of Antarctica may signal future anthropogenic warming and environmental shifts

**Call for Action**

- Urgency for international cooperation to address climate change and prevent ecosystem imbalance

**About the Antarctic Peninsula**

- The Antarctic Peninsula, known as **O'Higgins Land in Chile and Tierra de San Martín** in **Argentina**, and originally as Graham Land in the **United Kingdom** and the Palmer Peninsula in the **United States**, is the northernmost part of mainland Antarctica.
- The Antarctic Peninsula is part of the larger peninsula of **West Antarctica, protruding 1,300 km (810 miles)** from a line between **Cape Adams (Weddell Sea)** and a point on the mainland south of the **Eklund Islands.**

**Impacts of Warming on the Antarctic Environment:**

- **Melting Ice Sheets and Glaciers:** One of the visible impacts of Antarctica's warming is the increased melting of its ice sheets and glaciers. The **West Antarctic Ice Sheet** has

shown substantial **ice loss**, contributing to rising global sea levels.

- **Sea-Level Rise:** Antarctica holds **about 70% of the world's freshwater in its ice sheets.** As these ice masses melt, the water flows into the oceans, causing sea levels to rise.
- **Greening of Antarctica:** As temperatures rise, some areas of Antarctica have increased vegetation growth, in the form **of mosses and lichens.** While this might seem like a positive development for biodiversity, the **"greening" of Antarctica could also upset the region's delicate** ecological balance.
- **Impact on Marine Life**: The warming of Antarctic waters is affecting marine life, species that rely on sea ice for survival. **Krill, a species in the Antarctic food chain**, depends on sea ice for its habitat.

### Global Implications of Antarctica's Warming:

- **Sea-Level Rise and Coastal Vulnerability**: The melting of Antarctic ice contributes to global sea-level rise, which poses a severe threat to **coastal cities and low-lying nations.**
- **Ocean Circulation and Weather Patterns**: The **arrival of cold, fresh water** from melting Antarctic ice has the potential to disrupt the circulation of the world's oceans.

### Way Forward

- **Addressing the warming of Antarctica** requires a global effort to mitigate climate change and reduce greenhouse gas emissions.
- **The international community must work together** to meet the goals of the **Paris Agreement**, which aims to limit global temperature increases to **well below 2°C above pre-industrial levels.**

### Conclusion

- The warming of Antarctica is an indication of the broader impacts of climate change on our planet. Its consequences, from rising sea levels to the disruption of ecosystems, will have global repercussions that cannot be ignored.

## Spraying diamond dust to cool Earth

### Context

- A new study has argued that spraying millions of tonnes of diamond dust in the Earth's upper atmosphere every year could help cool down the Earth and combat global warming.

**Proposal**

- Injecting five million tons of diamond dust annually into the stratosphere to cool the Earth.

**Potential Temperature Reduction**

- 1.6 degrees Celsius

**Inspiration**

- Past volcanic eruptions caused global cooling by releasing particles into the atmosphere.

**Concept**

- Diamond dust in the stratosphere would reflect sunlight, reducing heat on Earth.

**Geoengineering Context**

- Similar to methods like ocean iron dumping and space mirrors to fight global warming.

**Method**

- Solar geoengineering – Stratospheric Aerosol Injection (SAI)

**Diamond Dust Findings**

- Reflects radiation effectively, remains airborne longer, doesn't produce acid rain.

**Cooling Effect**

- Injecting 5 million tons of diamond dust annually could reduce global temperature by 1.6°C.

**Alternative Option**

- Sulfur dioxide – cheaper but has harmful environmental impacts.

### About Stratospheric Aerosol Injection (SAI)

- It is a **proposed method of solar geoengineering** (or solar radiation modification) to reduce global warming. This would introduce aerosols into the stratosphere to create a cooling effect via global dimming and increased albedo, which occurs naturally from volcanic winter.
- It **appears that stratospheric aerosol injection**, at a moderate intensity, could

counter most changes to temperature and precipitation, take effect rapidly, have low direct implementation costs, and be reversible in its direct climatic effects.

- The **Intergovernmental Panel on Climate Change** concludes that it "is the most-researched [solar geoengineering] method that it could limit warming to below 1.5 °C (2.7 °F).

## Kadar tribe

### Context

- In first, the Kadar tribe of Vazhachal, Kerala, has taken on active restoration of natural forests degraded by invasive alien species.

### About Kadar Tribe

**Location**

- **It is predominantly found in the forests of** Kerala and Tamil Nadu**, southern India.**

**Classification**

- **Particularly Vulnerable Tribal Group (PVTG)** by the Government of India.

**Etymology**

- The name "Kadar" is derived from the word "**kaadu**," meaning forest in **Tamil and Malayalam,** reflecting their deep connection with the forest.

**Language**

- Speak a **Dravidian language** known as Kadar, influenced by **Tamil and Malayalam**.

**Traditional Occupation**

- Historically **nomadic**, an **aboriginal tribe** known for their **hunter-gatherer lifestyle**. They rely on gathering honey, fruits, tubers, and medicinal plants from the forest. Hunting was once significant.

**Modern Occupation**

- Some have adopted **small-scale agriculture and wage labor**, but forest produce remains vital for their livelihood.

**Relationship with Nature**

- They have a symbiotic relationship with nature, believing in the coexistence of **Kadar and Kaadu (forest).**

**Social Structure**

- Organized around extended families, living in small settlements called "**hamlets**" or "**oorus**," made of bamboo, leaves, and other forest materials.

**Religious Beliefs**

- Worship jungle spirits, a kindly creator couple, and local forms of Hindu deities.

## Hasdeo Arand Mining issue

### Context

- The Hasdeo forest in Chhattisgarh saw villagers clash with the police earlier this month, after tree-felling for mining of coal resumed in the green belt.

### What is the Hasdeo Arand Forest?

- It is a forest in the state of Chhattisgarh in central India. The forest is **170,000 hectares** in area and is home to a diverse ecology and Adivasi communities such as the **Gonds**. It is on top of the Hasdeo Arand coalfield in the north of Chhattisgarh. The Government of India proposed to mine the coal, which would have destroyed the forest.
- The **Hasdeo River** runs through the forest. The forest comes under the **Korba, Surajpur, Surguja districts of the state**. It is home to nine protected species under Schedule I of the **Wildlife Protection Act, of 1972**, including: **Elephants, leopards, sloth bears, Indian grey wolves, and Indian pangolins.**

### Key Details:

**Project**

- Parsa East and Kanta Basan (PEKB) coal blocks

**Deforestation Impact**

- 137 hectares of biodiverse forest cleared
- Impact on Hasdeo River
- Escalation of human-elephant conflicts
- Harm to local biodiversity

**Stage of Deforestation**

- Second stage of clearances for PEKB
- First stage included clearance of open mine for coal extraction

**Purpose of Coal Extraction**

- Supply electricity to Rajasthan and neighbouring states

**Affected Indigenous Families**

- 700 families from villages like Sahli, Tara, Janardhanpur, Ghatbarra, Fatehpur, and Hariharpur

**Tribal Rights Protests**

- Protests led by Hasdeo Aranya Bachao Sangharsh Samiti, Save Hasdeo Forest Committee, and Gram Sabha leaders
- Protesting the deforestation and displacement

**About Hasdeo Arand Coal Field (HACF) Region:**

- The Hasdeo Arand coalfield is spread over an area of 1,879.6 $km^2$, and comprises 23 coal blocks. This region is home to 20,000 Adivasi (indigenous) people. The reserve contains 18 identified coal mines, and the existing Parsa East-Kete Basan (PEKB) mine has already destroyed vast swaths of land.

## Pradhan Mantri Vanbandhu Kalyan Yojana (PMVKY)

**Context**

- The Pradhan Mantri Vanbandhu Kalyan Yojana (PMVKY) is a landmark initiative that was launched on October 28, 2014.

**About Scheme:**

- The Government of India, **Ministry of Tribal Affairs has launched Pradhan Mantri Vanbandhu Kalyan Yojana (PMVKY)** for welfare of Tribals The scheme has been approved for implementation during **2021-22 to 2025-26** with a total cost of Rs. 26135.46 crores.
- PMVKY aims at **holistic development of tribal communities and tribal areas** across the country focussing on integrated development of villages and capacity building through interventions in education and livelihood in convergence.
- It **covers all tribal people** and all areas with tribal population across the country.

**Objectives**

- Improving the quality of life in tribal areas
- Improving the quality of education
- Qualitative and sustainable employment for tribal families
- Bridging infrastructure gaps with focus on quality
- Protection of tribal culture and heritage

**Scheme Components:**

| Scheme | Objective | Target Group | Funding Structure | Key Components |
|---|---|---|---|---|
| **Development of Particularly Vulnerable Tribal Groups (PVTGs)** | Socio-economic development of PVTGs while retaining their culture and heritage | PVTG families | Financial assistance provided to State/UT Governments based on proposals | Safe housing<br>Clean drinking water<br>Sanitation<br>Education<br>Health and nutrition<br>Livelihood opportunities |
| **Pradhan Mantri PVTG Development (PM-PVTG) Mission** | Improve socio-economic conditions by providing basic facilities to PVTG families and habitations | PVTG families | Budgetary allocation by Government of India | Housing<br>Drinking water<br>Sanitation<br>Education<br>Health<br>Telecom and road connectivity |

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| | | | | Sustainable livelihood |
| **Support to Tribal Research Institutes (TRIs)** | Research, documentation, and promotion of tribal development | Tribal research institutions | Funds provided to State/UT Governments based on proposals | Research Documentation of tribal heritage and culture |
| **Pre-Matric Scholarship for ST Students** | Financial assistance to ST students studying in Std. IX and X | ST students (Std. IX and X) | 75% by Govt. of India, 25% by State (90:10 for NE and hilly states, 100% for UTs without Legislative Assembly) | Financial aid for education of ST students |
| **Post-Matric Scholarship for ST Students** | Financial assistance to ST students studying in Std. XI and above | ST students (Class XI and above) | 75% by Govt. of India, 25% by State (90:10 for NE and hilly states, 100% for UTs without Legislative Assembly) | Financial aid for higher education of ST students |

## 8.6 SNIPPETS

| Topics | Details |
|---|---|
| **Baku Caspian Sea** | • **Baku is the capital and largest city of Azerbaijan** and the **largest city on the Caspian Sea** and in the Caucasus region. It is the lowest-lying **national capital in the world** and also the largest city in the world below sea level.<br>• It lies **on the southern shore of the Absheron Peninsula**, on the Bay of Baku. Baku is situated on the western coast of the Caspian Sea. |
| **Korowai tribe** | • The Korowai, also called the Kolufo, live in southeastern Papua in the Indonesian provinces of South Papua and Highland Papua. The Korowai are **hunter-gatherers and horticulturalists** who practice shifting cultivation. The Korowai have a few **gender-specific activities, such as the preparation of sago** and the performance of religious ceremonies in which **only the male adults** are involved. **There is no particular hierarchy system**; they value equality and harmony among the tribe members. |
| **Bihta dry port** | • It is a PPP project developed by Pristine Magadh Infrastructure Private Limited and the Bihar State Industry Department, with full approval from the Department of Revenue, Union Ministry of Finance. |
| **Lake Eerie** | • It is the **fourth-largest lake** by **surface area of the five Great Lakes in North America** and the eleventh-largest globally. It is the **southernmost, shallowest, and smallest by volume** of the Great Lakes. It is located on the International Boundary between **Canada and the United States**. It is an important link in the **St. Lawrence Seaway.** |
| **Pong dam** | • Pong Dam Lake (also known as **Maharana Pratap Sagar**) is a manmade |

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| | reservoir formed due to the construction of **Pong Dam on Beas River** in the wetland zone of **Shivalik hills in Kangra district of Himachal Pradesh.** The Pong Dam is the highest earth-fill dam in India and was constructed in **1975.** It was designated a **Ramsar site in 2002** under the Ramsar criteria 5 and 8. |
| **Mormugao Port** | • This is a port on the **western coast of India**, in the coastal state of **Goa**. Commissioned in **1885** on the site of a natural harbour, it is one of India's oldest ports. It has a naturally protected **open-type harbour,** that lies on the southern part of the mouth of the **river Zuari**. |

## 8.7 ADDITIONAL TOPICS FOR READING FROM IASGYAN WEBSITE

| TOPIC NAME | UPLOADED ON IAS GYAN WEBSITE ON |
|---|---|
| English channel | 8th October |
| Pashtuns, B'nei Menashe | 8th October |
| Mangroves and cyclones | 8th October |
| Need for FGD regulations in Indian TPPs | 8th October |
| Triton Island, Sambhar Lake, Sea of Oman | 9th October |
| Hurricane Milton | 9th October |
| Chaukhambha Peak, Saryu River, Congo basin | 14th October |
| Katkari tribe | 14th October |
| Mt Marapi, Koel River, Mt Fuji | 14th October |
| Bishnoi Community | 15th October |
| Reconstruction of the population history of South Asia | 17th October |
| Macao | 17th October |
| Roopkund | 18th October |
| Coastal flooding | 18th October |
| Bushveld Igneous Complex | 18th October |
| Global water crisis | 18th October |
| Algeria, Mauritania, and Malawi | 19th October |
| Malawi | 19th October |
| Petra | 19th October |
| Global coral bleaching event expands | 23rd October |
| What do the Atlantic Ocean hurricane forecasts foretell for India? | 24th October |
| Nature restoration law | 25th October |
| Cloud chamber | 26th October |
| Black sea | 26th October |
| Central Asian Mountains | 28th October |
| Caspian Sea | 28th October |
| Weather forecast at Panchayat level | 29th October |
| Protected areas and biodiversity decline | 30th October |