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Focus Article

Supreme Court's Judgment on Sub-classification of SCs/STs

News: A 7-judge Bench of the Supreme Court has allowed for the sub-classification of SCs/STs with a 6:1 majority judgment.

What is the Supreme Court's Verdict on Sub-Classification of SCs and STs?

- **Permission for Sub-Classification**: The Court has ruled that **States can create sub-classifications** within SCs and STs to **better target support** for the most disadvantaged groups.
  - This will allow for **separate quotas within the existing 15% reservation for SCs**. It can be aimed at addressing varying levels of backwardness among these communities.
- **Sub-classification on an Empirical Basis**: The Judgment emphasizes that any sub-classification must be based on **empirical data** and **historical evidence** of **systemic discrimination**.
  - The sub-classification can't be arbitrary or for **politically motivated reasons**. The Court has stressed the need for States to substantiate their classifications with **quantifiable data**.
- **Decisions on Sub-classification Subject to Judicial Review**: The Court highlighted that decisions of States regarding sub-classification are subject to judicial review to prevent potential misuse for political gains.
- **Generational Limit to availing Reservation**: The Court noted that reservation benefits should be limited to the **first generation of beneficiaries**. If any family member has already availed of these benefits and **achieved a higher social status**, subsequent generations may not qualify for availing reservation.

Background the Case

Year	Details
1975	• The Government of Punjab issued a notification giving first preference in SC reservations to the **Balmiki and Mazhabi Sikh communities**, two of the most backward communities in the State.
2000	• **Andhra Pradesh Scheduled Castes** (Rationalisation of Reservations) **Act**, **2000** provided an expansive list of Scheduled Caste communities in the State and the quota of reservation benefits provided to each of them.
2004	• *E V Chinnaiah v State of Andhra Pradesh*: The 5 Judge Supreme Court Bench stuck down the APSC Act, 2000. • The Court declared that **SCs constitute a homogenous group** and that **sub-classification** within this group was **unconstitutional** for violating **Article 14**.
2006	• *Dr. Kishan Pal v State of Punjab*: Based on the 2004 Supreme Court Judgment, the Punjab & Haryana High Court struck down the 1975 notification.
2006	• **Punjab Scheduled Caste and Backward Classes (Reservation in Services) Act, 2006**: To overturn the 2006 HC Judgment, the Act was passed. • **Section 4(5)** of the Act mandated that **50% of vacancies reserved for SCs** in direct recruitment be **offered to Balmikis and Mazhabi Sikhs** subject to availability.
2020	• *State of Punjab vs Davinder Singh*: A 5-judge Bench of the Supreme Court said that the **2004 *Chinnaiah* Judgement** requires to be revisited by a larger Bench as it had failed to consider significant aspects having a bearing on the issue.
2024	• A 7-Judge Bench of the Supreme Court overturns the 2004 Judgment.

What major issues were considered in the Judgment?

Issue	Judgment
Issue 1 Are all castes in the SC list to be treated similarly? (Article 341*: President has the power to specify the castes, races or tribes in a State, deemed to be SCs in relation to that State or UT).	***E V Chinnaiah v State of Andhra Pradesh (2006)*** • SCs must be **treated identically** since the Constitution envisaged the same benefits for them, without taking into account their individual relative backwardness. ***State of Punjab vs Davinder Singh (2024)*** • The Court rejected this premise, stating that "*The inclusion [in the Presidential list] does not automatically lead to the formation of a uniform and internally homogenous class which cannot be further classified*".
Issue 2 Can States 'tinker' with or sub-classify the Presidential list? (**Articles 15(4)** of the Constitution gives states the power to make "any special provision" for the advancement of SCs. **Article 16(4)** gives States the power to provide reservations of appointments or posts in favour of any backward class of citizens which are not adequately represented in the services of the State).	***E V Chinnaiah v State of Andhra Pradesh (2006)*** • Once reservations have been provided to SCs as a whole, "**it is not open to the State to sub-classify a class** already recognised by the Constitution and allot a portion of the already reserved quota amongst the State-created sub-class" within the SC list. ***State of Punjab vs Davinder Singh (2024)*** • The State in exercise of its power under Articles 15 and 16 is free to identify the **different degrees of social backwardness** and **provide special provisions** (such as reservation) to achieve the specific degree of harm identified. • Equality of opportunity (Article 16) must **account for the varying social positions of different communities**. When the same opportunities are provided to SC communities that are on different footings it "*can only mean aggravation of inequality*".
Issue 3 What is the yardstick for sub-classification?	***State of Punjab vs Davinder Singh (2024)*** • The majority opinion drew stringent redlines for States on how to work out the sub-quotas. • States will have to **demonstrate a need for wider protections**, **bring empirical evidence**, and have a "**reasonable**" **rationale** for classifying sub-groups. This reasoning can be further be tested in Court.
Issue 4 Does the 'creamy layer' principle apply to Scheduled Castes?	***State of Punjab vs Davinder Singh (2024)*** • Only the opinion of 1 Judge bats for **introducing the** '**creamy layer**' exception for SCs (and STs) that is already followed for Other Backward Classes (OBCs). This concept places an **income ceiling** on reservation eligibility, ensuring that the beneficiaries are those in a community that need quotas the most.

*(Refer EPIC July 2024 for States Can't Alter the Scheduled Caste List Published Under Article 341: SC)

What is the significance of the Supreme Court Judgment?
- **Enhanced Social Justice by targeted Reservations**: The Court aims to ensure that the most marginalized groups within the SC and ST categories receive appropriate support by allowing sub-classification.
  - This can lead to **more effective reservation policies** that address the unique challenges faced by different sub-groups. This will ultimately promote greater **social equity**.

- **Constitutional Validation**: The verdict asserts that sub-classification does not violate **Article 14** (Right to Equality) or **Article 341** (List of SCs) of the Constitution.
  - The Court has clarified that States have the constitutional authority to identify different degrees of social backwardness and provide targeted reservations accordingly.
- **Acknowledgement of Social Reality**: The Judgment acknowledges that the **SCs/STs are very large baskets** that contain social groups of different status, based on different traditional occupations. They **vary in their degrees of disadvantage** and are **unequally placed to receive the benefits of reservation**.
  - According to the caste survey in Bihar, for every 10,000 persons, 124 persons from Dhobi community had a higher education degree, compared to 45 for Dusadhs and just 1 for the most poor Musahar community.
- **Need for Data-Driven Policies**: The Court's verdict has emphasized that any sub-classification must be backed by **quantifiable and demonstrable data**, preventing arbitrary or politically motivated decisions. This would ensure that any classifications for affirmative actions are **empirically determined** and demonstrated.
- **Precedent for Future Cases**: The Judgment sets a new legal precedent for administering reservations in India. It opens the door for States to implement sub-classification policies, potentially leading to more effective and equitable reservation strategies in the future.

What are the Challenges in ensuring Sub-Classification?
- **Data Collection for Sub-classification**: Conducting comprehensive surveys and studies to gather reliable, quantifiable and demonstrable data on the socio-economic conditions of different sub-castes is a **resource-intensive and time-consuming process**.
- **Criteria for Sub-Classification**: Determining the specific parameters, appropriate criteria and thresholds to measure backwardness, such as educational attainment, income levels, representation in Government jobs, and access to basic amenities, is a complex task.
- **Influence of Political Considerations**: There are concerns that sub-classification criterion can be **misused** for **electoral gains**. States can use it as a tool of political expediency.
- **Social Tensions**: Sub-classification might exacerbate existing social tensions within SC/ST communities, leading to **intra-community conflicts and divisions**.
- **Administrative Burden**: The process of creating, managing, and updating sub-categories would add a significant administrative burden on the Government agencies.

What should be the way forward?
- **Consensus Building**: Building consensus among various stakeholders like political parties, community leaders, and civil society organizations, is essential to ensure the successful implementation of sub-classification policies.
- **Effective Monitoring and Grievance Redressal Mechanisms**: States must put in place effective monitoring mechanisms and grievance redressal systems to prevent misuse and ensure that the most disadvantaged sub-groups receive adequate support.
- **Maintaining Social Harmony**: Addressing the concerns of other marginalized communities (who may feel left out or threatened by sub-classification) is crucial to maintain social harmony and prevent conflicts.
- **Strengthening the Administrative and Institutional Capacity of States**: Strengthening the administrative and institutional capacity of States to implement sub-classification policies effectively is essential. This includes training personnel, developing data management systems, and establishing dedicated agencies to oversee the implementation process.
- **Adequate Financial Resources**: Adequate financial resources must be provided to States for conducting surveys, implementing sub-classification policies, and monitoring their impact.

Substantive Equality

What is the meaning of Substantive Equality highlighted in the Judgment?

- In the Judgment, the Chief Justice of India (CJI) D Y Chandrachud emphasized "substantive equality".
- Substantive equality is a principle that seeks to **achieve genuine equality** by **recognizing and addressing the different needs**, **circumstances**, and **historical disadvantages** of various groups in society.
- Unlike formal equality, which **treats everyone the same regardless of their background**, substantive equality aims to **create fair outcomes by considering these differences**.

What are the Key Concepts of Substantive Equality?

- **Historical Context and Disadvantages**: Substantive equality acknowledges that certain groups have faced long-standing disadvantages and discrimination. These historical injustices impact their current opportunities and outcomes.
- **Different Treatment for Fair Outcomes**: To achieve fairness, different groups may need to be treated differently. This means implementing measures that specifically address the unique challenges faced by disadvantaged groups.
- **Beyond Formal Equality**: Substantive equality ensures that policies and laws do not just provide equal treatment but also result in **equal opportunities and outcomes**.
- **Addressing Systemic Inequalities**: Substantive equality involves identifying and dismantling systemic barriers that perpetuate inequality. This could include legal, social, economic, and cultural structures that disadvantage certain groups.
- Policies under substantive equality aim to reform these structures to promote inclusive and equitable development.

What are the examples of Substantive Equality in practice?

- **Affirmative action policies**, such as reservations in education and employment, are practical applications of substantive equality. These policies ensure that marginalized groups have a **fair chance to succeed** and **overcome historical disadvantages**.
- **Social programs** that target specific needs of disadvantaged groups, such as **scholarships** for students from **low-income families** or **healthcare initiatives** for rural populations, embody substantive equality.
- **Legal reforms** that protect the rights of marginalized groups and promote their inclusion in society are crucial for substantive equality. **Anti-discrimination laws**, **labour rights** for informal workers, and **land rights for indigenous communities** are examples of legal measures that promote substantive equality.

What is the importance of Substantive Equality?

- **Promotes Inclusive Growth**: By addressing the specific needs and challenges of disadvantaged groups, substantive equality fosters inclusive growth and development. It ensures that everyone has the opportunity to contribute to and benefit from economic and social progress.
- **Reduces Social Inequities**: It helps reduce social inequities by **creating fair opportunities for all**.
  It combats discrimination and promotes social justice, leading to a more cohesive and equitable society.
- **Strengthens Democracy**: A society that values substantive equality is more likely to have strong democratic institutions. When all individuals have equal opportunities and are treated fairly, it **enhances their participation in the democratic process** and strengthens governance.

General Studies Paper I

1. The Issue of Women Safety

News: The horrific incident of brutal rape and murder of a trainee female doctor in a hospital in Kolkata has reignited the debate on the issue of women safety and violence against women.

What are the safety issues faced by women in India? What are the data regarding women safety in India?

- The **National Crime Records Bureau** (NCRB) data indicate a rising trend of crime against women.
- The NCRB Report (for year 2022) indicates that the **crime rate per lakh women** rose from **64.5 in 2021** to **66.4 in 2022**.
  - The most prevalent cases are **Cruelty by husband** or **his relatives** (31.4%), **Abduction** and **kidnapping** of Women (19.2%), **Assault** on Women with intent to **outrage her modesty** (18.7%) and **Rape** (7.1%).
- However, the crimes reported under NCRB do not present the complete picture. A **lot of incidents** related to **harassment or eve-teasing in public spaces** (like public transport) **remain unreported** due to multitude of factors.

Crime Against Women

Year	Crime Against Women
2015	329,243
2016	338,954
2017	359,849
2018	378,236
2019	405,326
2020	371,503
2021	428,278
2022	445,256

Source: NCRB   Crime Against Women   Created by | ForumIAS©

- According to the **Women**, **Peace**, **and Security Index 2023**, India ranks 128th out of 177 countries.
- According to the National Family Health Survey (NFHS-5), around **30% women** in India between 15-49 years of age have experienced **physical**, **sexual** or **domestic violence**.
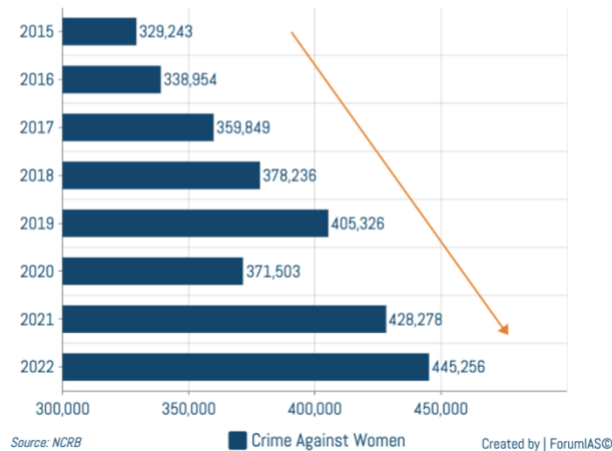
What are the reasons behind lack of safety for women in India?

- **Prevalence of Patriarchy**: There is deeply entrenched patriarchal culture in India. This perpetuates the belief in male superiority and normalizes violence against women. Violence against women is normalized by "*men will be men*" or "*boys make mistakes*" narrative.
- **Objectification of Women**: The degenerated portrayal of women in media and entertainment reduces them to objects. This objectification often leads to increased instances of harassment and violence.
  - Some experts have also pointed to the proliferation and easy access to pornographic videos and images in the digital age. Exposure to such content at a young age distorts the reality of gender relations. In a recent incident, a 13-year old boy assaulted his younger sister and killed her after watching one such clip on a mobile phone.
- **Cultural Stigma**: Cultural stigmas regarding sexual violence and harassment, leads to underreporting of crimes; many women fear societal backlash on account of reporting of harassment issues. In the case mentioned above, the family of the 13-year old tried to hide the case and mis-reported facts to the police.
- **Economic Dependency**: Feminization of poverty and high economic dependency on male family members, exacerbate the vulnerability of women. The lack of financial independence, makes it difficult for them to escape domestic abuses.
- **Lack of Awareness and Education**: Many women in India are unaware of the legal protections available to them, such as the Domestic Violence Act, Prevention of Sexual Harassment Act etc. This leads to a culture of violence and abuse against women.

- **Inadequate Safety in Public Places**: Inadequacies in public infrastructure, such as poorly lit streets, lack of safe transportation options, lack of CCTVs, increase vulnerability of women to crime.
- **Lack of Gender Sensitization**: Lack of structured gender sensitization in schools and families leads to normalization of issues like eve-teasing in public spaces.

What initiatives have been taken by the Government to prevent crimes against women?
Legal Protection

Nature of Crime	Act
Violence against Children	• The Prohibition of Child Marriage Act, 2006. • Juvenile Justice (Care and Protection of Children) Act, 2015. • The Commissions for Protection of Child Rights Act, 2005. • The Protection of Children from Sexual Offences Act, 2012.
Against Objectification of Women	• Indecent Representation of Women (Prohibition) Act, 1986.
Against Sexual Offences	• Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013. • Criminal Law (Amendments), Act 2013 for effective legal deterrence against sexual offences. • Criminal Law (Amendment) Act, 2018 for more stringent penal provisions including death penalty for rape of a girl below the age of 12 years.
Against Domestic Violence	• Dowry Prohibition Act, 1961. • Protection of Women from Domestic Violence Act, 2005.

Initiatives by the Union Government
- **Nirbhaya Fund**: The Government has set up Nirbhaya Fund for projects for safety and security of women.
- **Investigation Tracking System for Sexual Offenses**: The Union Ministry of Home Affairs (MHA) has launched it to monitor and track time-bound investigation in sexual assault cases in accordance with Criminal Law (Amendment) Act 2018.
- **National Database on Sexual Offenders (NDSO)**: The MHA has launched it to facilitate investigation and tracking of sexual offenders across the country by law enforcement agencies. NDSO has data of over 5 lakh sexual offenders.
- **Cybercrime Portal**: MHA has launched a cyber-crime portal to report obscene content. Cyber Crime Forensic Labs have been set up in several States.
- **Establishment of One Stop Centers**: Scheme of One Stop Centers has been launched to provide integrated support and assistance to women affected by violence.
- **Scheme of Universalization of Women Helpline**: It has been launched to provide 24 hours emergency and non-emergency response to women impacted by violence.

Initiatives by the State Governments and Others
- **Mission Shakti**: It has been launched by the Government of Uttar Pradesh to make improvements to women's safety, and reduce the consequent violence and exploitation faced by them.
- **Police Pink Booths**: They have been launched by the Government of Delhi. These booths are dedicated to addressing the grievances of women passersby.
- **Shakti Criminal Laws (Maharashtra Amendment) Act**: It was passed to approve death penalty for heinous offences of rape and gangrape.
- **Meri Saheli Initiative**: It has been launched by the Railway Protection force. This initiative ensures security of lady passengers that are traveling by train by a dedicated Mahila officers team.

- **Online Movements and Campaigns**: #CallItOut because #ItsNotOK campaign, #MeToo movement, have been launched to facilitate knowledge transfer and coordinate efforts towards the prevention of harassment against women.

What are the challenges in ensuring safety of women?

- **Delayed Justice**: The inefficiencies of the justice system, such as prolonged legal processes and lenient punishments for sexual offenders, undermines public confidence in law enforcement.
- **Laxity in Conviction Procedure**: Lack of time-bound investigations and ineffective collection of forensic evidence in sexual assault cases, leads to inordinate delays in conviction of sexual harassment cases.
- **Poor Implementation**: The SC has called out the authorities/management/employers for failing to ensure a "safe and secure work place" for women. It has been observed that the implementation of the Sexual Harassment of Women at Workplace (Prevention, Prohibition, Redressal) Act, 2013, has been lax.

Source: Medica Mondiale. Multi-faceted nature of violence against women. A pure law-and-order-centric approach may not be sufficient to address violence against women. Correcting biases and removing stereotypes through gender sensitive education is needed.

- **Ineffective Utilisation of Public Funds**: Even though the budgetary allocation of the Nirbhaya Fund has increased by 100% between 2013 to 2022, less than half of the allocation to the fund has been used.
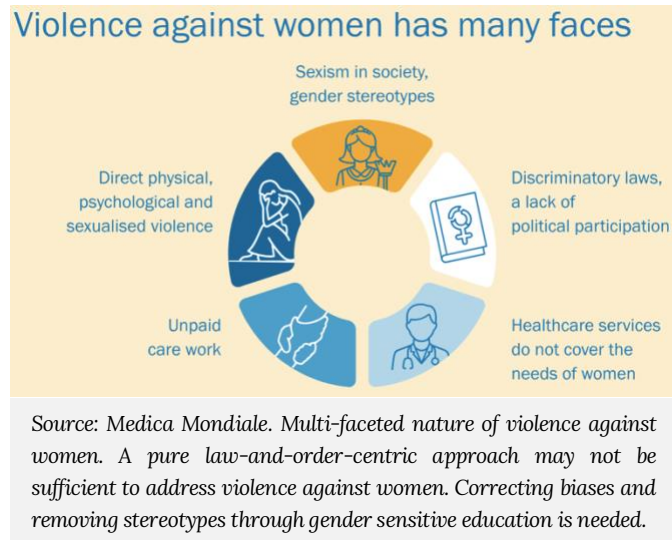
What are the implications of prevailing attitudes and crimes against women?

- **Workforce Participation:** Crimes against women is a major factor influencing India's chronically low female workforce participation rates. Safety issues limit women's mobility and career choices.
- **Chauvinistic Attitude**: Women are not encouraged by their families to seek financial or social independence in jobs or careers.
- **Gender Ratio**: Very poor gender ratio in certain regions leads to phenomena of "bride-buying" which is a contributing factor in human-trafficking and abduction of women.
- **Physical and Mental Health**: Victims of sexual violence experience severe physical injuries, which can lead to long-term health issues such as chronic pain, reproductive health problems, and increased susceptibility to sexually transmitted infections (STIs) including HIV.
- **Impact on Families and Children**: Children who witness violence against their female relatives often face the risk of developing emotional and behavioural problems. They may also become victims of abuse themselves, perpetuating a cycle of violence across generations.

What should be the way forward?

- **Gender Sensitization**: Gender sensitive education should be provided in the schools at a young age. Young boys must be taught to be respectful towards girls and women. Young girls must be taught to be more confident and forthcoming in speaking out against harassment of any kind.
- **Societal Change**: A lot of gender stereotypes related to women need to be changed. Women's participation in work or their financial independence must be encouraged.
- **Police Reforms**: There should be gender focused recruitment and training in police. There is a need to create women police stations and engagement of mahila police volunteers.

- **Judicial Reforms**: Fast track courts should be established and punishment should be enhanced in grave cases like rape. The dispensation of justice should be quick and without delay.
  - Further, the representation of women in judiciary must be enhanced.
- **Training and Capacity Building**: Manpower training and skill building programs for Investigation Officers, Prosecution Officers and Medical Officers must be stepped up.
  - Gender-sensitive training and monitoring in criminal law procedures must be promoted to ensure that staff handle cases with a trauma-informed approach.
- **Establishment of Rape Crisis Centres**: Rape Crisis Centres like those in Australia, Canada, UK etc, can be set up in India. These centres can provide the survivors of assault with medical help, counselling, and financial help by way of providing job opportunities etc.
- **Media Sensitivity**: Media must be sensitive to the plight of survivors of assault and avoid sensationalization in reporting. Media must highlight the convicts as it has potential to infuse a feeling of deterrence among potential offenders.
- **Civil Society**: Active participation of civil society in bringing about the social change is vital.

2. Women and Men in India, 2023 Report

News: The Ministry of Statistics and Programme Implementation has released the Women and Men in India, 2023 Report.

What is the significance of the Report?
- The Report is a comprehensive and insightful document that attempts to bring a holistic view of the **situation of women and men in India** and provides data on a wide range of topics such as **Population**, **Education**, **Health**, **Participation in Economy**, **Participation in Decision making** etc. among others.
- It presents data disaggregated by **gender**, **urban-rural divide**, and **geographical region**, which helps to **understand the disparities** that exist between different groups of women and men.
- The Report highlights the **progress made towards gender equality** as well as identifies the areas where significant gaps remain.

What are the key highlights of the Report?
- **Size of Population**: India's population is expected to reach 152.2 crore in 2036.
- **Gender Ratio**: The proportion of women in the population is expected to rise to 48.8% compared to 48.5% in 2011. Correspondingly, the gender ratio is expected to improve to 952 (2036) from 943 (2011).
- **Age Profile**: The proportion of population below 15 years is expected to fall due to declining fertility. The share of population above 60 years is expected to rise due to rising age expectancy.
- **Fertility Rates**: Between 2016 to 2020, **Age Specific Fertility Rate** (ASFR) in the age group of 20-24 and 25-29 has

Source: MoSPI. The Age Pyramid has will undergo a shift due to falling fertility rates (share of <15 years will fall) and rising life expectancy (share of > 60 years will rise).

reduced from 135.4 and 166.0 to 113.6 and 139.6 respectively. *(Refer EPIC October 2023 for Ageing Population in India)*.

o The ASFR for the age 35-39 years (2016-2020) has increased from 32.7 to 35.6 which shows that after settling in the life, women are thinking of expansion of family.

Age-Specific Fertility Rate
It is defined as the number of live births in a specific age group of women per thousand female population of that age group.

o **Adolescent Fertility Rate** was 33.9 for the illiterate population whereas 11.0 for the literate in 2020.

o This rate is considerably lower for even those who are literate but without any formal education (20.0) compared to illiterate women, reemphasizing the importance of imparting education to women.

- **Maternal Mortality Ratio (MMR)**: The MMR has come down to 97/lakh live births in 2018-20. It is expected that India will be able to achieve the SDG Target of 70 by 2030.

Maternal Mortality Ratio
It refers to the number of women who die as a result of complications of pregnancy or childbearing in a given year per 100,000 live births in that year.

- **Infant Mortality Rate (IMR)**: India's IMR has been decreasing over the years for both males and females. Female IMR had always been higher but in 2020, both male and female IMR were equal at the level of 28 infants per 1000 live births.

o The **Under-5 Mortality Rate** data show that it has decreased from 43 in 2015 to 32 in 2020.

- **Labour Force**: According to Periodic Labour Force Survey, the Labour Force Participation Rate of the persons aged 15 years and above has been increasing from 2017-18 onwards for both male and female population.

Labour Force Participation Rate (LFPR)
Labour Force Participation Rate (LFPR) is defined as the percentage of persons in the labour force in the population.

o Male LFPR has risen from 75.8 to 78.5 between 2017-18 and 2022-23 and female LFPR has increased from 23.3 to 37 during the same period.

- **Electoral Participation**: Till 1999, less than 60% of women electors participated in the General Elections. Men's turnout used to be ~8 percentage points higher.

o The 2014 elections marked a significant change, with women's participation increasing to 65.6%, and further rising to 67.2% in the 2019 elections. For the first time, the voter turnout percentage was marginally higher for women, **highlighting the impact of increasing literacy and political awareness among women**.

- **Entrepreneurship**: The Department for Promotion of Industry and Internal Trade

Source: MoSPI. The life expectancy has reached 68.6 and 71.4 years for males and females respectively during 2016-20 and is expected to reach 71.2 and 74.7 years respectively by 2031-36.

(DPIIT) has recognized a total of 117,254 start-ups since its inception in January 2016 up to December 2023. Among these, **55,816 start-ups (47.6%) are led by women**. This underscores the growing influence and contribution of women entrepreneurs in India's start-up ecosystem. (*Refer EPIC February 2024 for Demographic Changes in India and Impact, EPIC July 2023 for Demographic Transition and Impact on Women and Reproductive Autonomy and EPIC May 2023 for State of World Population Report, 2023 and India's Demographic Dividend*).

3. Purvodaya Initiative

News: The Budget 2024-25 has focused on the development of Eastern India through Purvodaya Initiative.

What is Purvodaya Initiative?

- It has been launched for the all-round development of the eastern region of India.
- Under the initiative, 5 Indian States will be provided **assistance to generate economic opportunities** to attain the vision of **Viksit Bharat 2047**. The States include Andhra Pradesh, Bihar, Jharkhand, Odisha and West Bengal. The dimensions of the initiative include:
  - **Human Resource Development**: Enhancing education and skill-building to better equip the workforce.
  - **Infrastructure Enhancement**: Upgrading infrastructure to improve connectivity and support economic activities.
  - **Economic Opportunities**: Creating jobs and fostering industrial and agricultural development to leverage the region's natural resources and strategic location. The **Amritsar Kolkata Industrial Corridor** will support the development of the **industrial node at Gaya**.
- The **regional revival** aims to **balance inclusive growth** with **competitive advantage**. Effective implementation of the initiative could transform the region and boost India's global prominence.

What is the significance of eastern India?

- **Mineral Wealth**: Eastern India contains most of the country's natural and mineral resources, including 80% of India's iron ore, all of its coking coal, and large reserves of chromite, bauxite, and dolomite etc.
- **Port Infrastructure**: Major ports located on the upper part of the eastern coast such as Paradip, Haldia, Vizag etc. account for over 30% of India's major port capacity.
- **Connectivity**: The region has 3 major national waterways and strong road and rail networks, boosting its strategic trade advantages.

What are the challenges faced by Eastern Indian States?

- **Economic Contribution**: In 2022-23, eastern States contributed only 17.26% to India's GDP and showed slower progress than other regions. With about 350 million people (27% of the country's population), these States face major economic challenges and are **not fully utilizing their resources**.
- **Stagnant Growth**: In the past 11 years, GDP per capita in these States has barely increased, with growth rates below the national average, except for Odisha and Andhra Pradesh, which grew by 5.5% and 6%, respectively.
- **Income Comparisons**: Bihar has one of the lowest per capita incomes in India, comparable to Somalia and Sudan, while Japan, with a similar population size, has a per capita income of about US$ 33,000. West Bengal's GDP per capita is around US$ 967, much lower than Vietnam's US$ 4,623.

What should be the way forward?

- **Need for Targeted Development**: The stagnation in eastern India over the past decade shows a need for focused development efforts. Strategies should be customized to **address the specific economic gaps** and unique challenges facing the region.
- **Focus on the Northeast**: The Northeast, contributing about 2.9% to India's GDP, faces challenges like isolation and socio-political issues that hinder development. However, its natural resources, cultural heritage, and strategic location near Southeast Asia offer significant growth opportunities that can help India reach its goal of becoming a developed economy by 2047.
- **Social Progress**: Slow economic growth is tied to lower social progress. There should be a renewed focus on improving education and healthcare, as they are essential for balanced and inclusive development.

4. Challenges in Exploration of Lithium

News: The Ministry of Mines had to cancel auction for a lithium block in J&K due to lack of interest from the mining companies.

What are the reasons behind low interest of miners?

- **Mineral Exploration/Classification**: The UN Framework Classification for Reserves/Resources (UNFC-1997) classifies **four stages of mineral exploration**: G4, G3, G2, and G1. Each level represents a **progressive step in exploration**, from **initial identification** to **detailed under-standing of resource potential**.
  - o The lithium reserves in J&K are currently classified as G3, (2nd preliminary exploration stage after Reconnaissance), indicating a **low level of confidence in the quantity**, **grade**, and the **estimates of mineral content**.

UN Framework Classification

The resources are categorized using the three essential criteria affecting their recoverability

- **The Three Criteria are**
  - o Economic and Commercial Viability (E)
  - o Field Project Status and Feasibility (F)
  - o Geological knowledge (G)
- **Economic**
  - o E1: Economic
  - o E2: Potentially Economic
  - o E3: Intrinsically Economic
- **Feasibility**
  - o F1: Mining Report or Feasibility Study
  - o F2: Pre-feasibility Study
  - o F3: Geological Study
- **Geological Knowledge**
  - o G1: Detailed Exploration
  - o G2: General Exploration
  - o G3: Prospecting
  - o G4: Reconnaissance Study
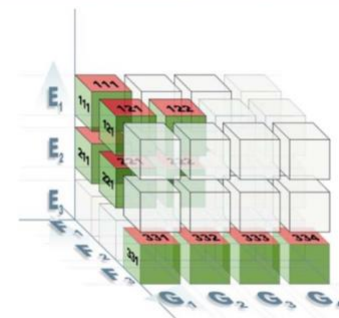
Classification Matrix based on 3 criteria: E (E1, E2, E3), F (F1, F2, F3) and G (G1, G2, G3, G4)

- **Geological Hurdles**: Lithium found in J&K is in the form of **clay deposits mixed with other minerals**, unlike **commercially viable brine or hard rock deposits** mined globally.
  - o Extracting lithium from such deposits is yet to be tested commercially, and India's mining industry lacks the required technical expertise.
  - o J&K is **ecologically sensitive** and falls under **seismic zone V** (most seismically active region). These factors make any industrial intervention in the area a challenging task.

Mineral Reserve	Probable Mineral Reserve	Proven Mineral Reserve
Economically mineable part of measured and/or indicated mineral resource.	**Economically mineable** part of indicated or in some cases, a measured mineral resource.	**Economically mineable** part of measured mineral resource.
Mineral Resource	**Measured Mineral Resource (331)**	**Indicated Mineral Resource (332)**
A Mineral Resource (Remaining/Additional Resource) is the balance of the Total Mineral Resources that have not been identified as Mineral Reserve.	That part of mineral resource for which tonnage, density, shape, physical characteristics, grade and mineral content can be estimated with a high level of confidence based on detailed exploration.	The tonnage, density, shape, characteristics, grade and mineral content can be estimated with reasonable level of confidence based on exploration, sampling, testing, location of pits etc.

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Inferred Mineral Resource: *Tonnage, grade and mineral content can be estimated with low level of confidence inferred from geological evidence.*

Note: *Resource is a broader and more general term than Reserve. Resource includes identified material that may be less well characterized, possibly of lower grade and less certain to be economically recoverable. Resources can be converted to Reserves by additional drilling or changes in economic factors, such as price or technology.*

- **Sensitive Location**: The location of the reserves close to the Line of Control and in an ecologically fragile Himalayan region, poses additional challenges due to potential political volatility and local resistance.

What is the significance of the domestic production of Lithium for India?

- **Lithium-ion Battery Demand**: India's lithium demand is projected to increase because of rising use of mobile phones, renewable energy batteries and electric cars. The demand for lithium in India is predicted to increase from 1,634 tonnes in 2022 to between 60,000 and 93,000 tonnes by 2050.
- **Reducing Import Dependence**: At present, India has no domestic lithium production. There is a heavy reliance on imports; which have surged from US$ 94 million in 2014-15 to ~US$ 3 billion in 2023-24.
- **Clean Energy Transition**: Lithium-ion batteries are key to store energy from sources like solar and wind power and keep the grid stable. Access to lithium reserves can help India **switch to cleaner energy**. Domestic production can lower the cost of batteries and help improve the adoption of EVs.

- **Strategic Importance**: China has large domestic reserves and has acquired mines in the resource rich lithium triangle. It has refining capacity of more than half of the world's lithium. In 2010, China had strategically exploited its access to Rare Earth Elements (REE) by cutting down their exports to Japan. It is vital for India to boost its domestic production to **reduce its dependence on China** which can use similar coercive tactics against India amidst border dispute in the Himalayas.

Steps Taken by the Government

- **Geological Surveys**: The Geological Survey of India (GSI) has been actively involved in **conducting geological surveys** and **explorations** to identify **potential lithium reserves** across different regions.
- **Policy Reforms**: The Government has introduced **policy reforms to encourage exploration and development** of **lithium** and other **critical minerals**. In 2023, the Ministry of Mines made a list called '**Critical Minerals for India**'. This list includes minerals that are crucial for **economic growth and national security**.
  - According to the **Mines and Minerals Act**, only Indian individuals or firms with Indian members can get licenses for mining. This prevents a situation witnessed in countries like Argentina or Chile, where foreign companies extract lithium, but the benefits are not reaped by the domestic country.
- **International Collaboration**: The Government has engaged in **international collaboration and partnerships** to leverage **global expertise and technologies** in the exploration and development of lithium reserves.
  - The Ministry of Mines, through the state-owned **Khanij Bidesh India Ltd** (KABIL), has entered into a draft exploration and development Agreement with **Argentinian miner CAMYEN** for acquisition and development of lithium blocks.
- **Mineral Security Partnership**: India has joined the Mineral Security Partnership (MSP), led by the US. MSP consists of 13 countries, including Australia, Canada etc.
  - The goal of MSP is to encourage both public and private investment in **global supply chains for critical minerals**.

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What should be the way forward?

- **Enhance Exploration Efforts**: The Government should **intensify efforts to explore and identify potential lithium reserves**. This includes conducting **more geological surveys**, using **remote sensing**, and drilling in areas where there might be possibility of finding lithium.
- **Promote R&D**: India should invest in research and development for lithium extraction. It should encourage academic and industrial research to **develop cost-effective and environmentally sustainable methods** for lithium extraction from various sources, such as pegmatites, brines, and clay deposits.
- **Supportive Regulatory Framework**: The Government should develop a comprehensive policy and regulatory framework with focus on simplifying the licensing process and offering financial benefits while ensuring environmental sustainability.
- **Foster International Cooperation**: India can engage in international cooperation and knowledge-sharing initiatives with countries that have established lithium industries. Australia has lithium reserves in hard rock form, similar to India's deposits. Australia's knowledge in processing hard rock lithium could lead to **technology transfer** and strengthen the positive political relationship between the two countries.
- **Strengthen Global Supply Chain**: India must also partner with like-minded countries such as the US, Japan, Australia and South Korea to strengthen global lithium supply chain management and reduce strategic vulnerabilities.
- **Leverage International Forums**: India should leverage fora like the **Mineral Security Partnership** and the Indo-Pacific Economic Framework to connect initiatives in mineral exploration and extraction. *(Refer EPIC February 2023 for Lithium Reserves in India: Strategic Significance and Challenges)*.

1. Governor's Immunity Under Article 361

News: The Supreme Court has agreed to examine the question of Constitutional immunity granted to the Governor of States under the Article 361.

What are the immunities provided to the Governor under Article 361?

- **Answerability to Judiciary**: **Article 361(1)** states that the President or the Governor of a State "shall not be answerable to any court for the exercise and performance of the powers and duties of his office".

Origins of Governor's Immunity

The protection given to the President/Governor can be traced to the Latin maxim "*rex non potest peccare*" or "the King can do no wrong". The provision of immunity is rooted in the **English legal traditions**.

- **Criminal Proceedings and Arrests**: The provision further adds, "no criminal proceedings whatsoever shall be instituted or continued" **(Article 361(2))**; and "no process for the arrest or imprisonment" **(Article 316(3))** can take place during the term of Office of the President, or the Governor.

- **Civil Proceedings**: Article 361(4) provides immunity against civil proceedings during the term of Office except on giving prior notice of two months duration. *(Refer EPIC January 2024 for Issues Related to the Office of Governor).*

- However, the **immunity is not absolute**, as it can be lifted for **impeachment proceedings against the President** and through civil suits for **actions done in personal capacity**. The Supreme Court is currently examining **whether the immunity should be interpreted more narrowly** to allow for criminal proceedings in cases involving **violations of fundamental rights**.

Judicial View on Article 361

- *Rameshwar Prasad vs. Union of India (2006)*: The Supreme Court held that the Governor enjoys "*complete immunity*" when exercising their powers under **Article 361(1)**. However, the Court can examine the validity of the action including on the ground of malafides (actions taken in bad faith).
  - The SC also examined the Governor's actions in discharging his **Constitutional powers**, which can be **placed on a higher threshold** compared to acts outside the discharge of Constitutional or any official duties.

- *Ram Naresh Yadav vs The State Of Madhya Pradesh (2015)*: The High Court of Madhya Pradesh held that Article 361(2) "*guarantees absolute protection* from any malicious campaign or publicity against the Head of a State, so as not to undermine the solemnity of that office".
  - The Court didn't allow filing of an FIR against the Governor till he held the Office

- *State (through) CBI vs. Kalyan Singh (2017)*: The Supreme Court held that the Governor "*is entitled to immunity under Article 361 of the Constitution as long as he remains Governor…*".
  - The SC **delayed the trial against the Governor** and held that the "*Court of Sessions will frame charges and move against him as soon as he ceases to be Governor*".

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*In the US, the **US Supreme Court recently held that former Presidents are entitled to** "**absolute immunity**" from criminal prosecution for **official acts** but not unofficial acts.*

What are the arguments in support of the immunity?

- **Dignity and Independence of the Offices**: It is intended to shield the President and Governors from frivolous and malicious prosecutions that can undermine their ability to discharge their Constitutional duties without fear or favour.
- **Prevent Misuse of Legal Process**: It aims to protect the President and Governors from harassment through vexatious litigation. It ensures that they are not distracted from their responsibilities by having to constantly defend themselves in courts.
- **Uphold the Principle of Separation of Powers**: The immunity recognizes the President and Governors as the Heads of the Executive and seeks to maintain a balance between Executive, Legislative, and Judiciary.
- **Continuity in Governance**: It provides stability and continuity in governance by ensuring that President and Governors can function without any threat of criminal prosecution during their term of office.

What are the arguments raised against the blanket criminal immunity?

- **Attack on Fundamental Rights**: Critics contend that the bar on criminal proceedings under Article 361(2) should not extend to **illegal acts** or those which 'strike at the roots' of a **citizen's fundamental rights** .
  o Actions violating fundamental rights like (Article 21) should be prosecuted.
- **Impediment to Justice**: The immunity effectively delays any investigation or legal proceedings against a sitting Governor, which could compromise with the **integrity of evidence**, the trial process and can lead to a **denial of timely justice** for victims.
- **Democratic Principles and Constitutional Morality**: The immunity has been criticized as being rooted in **outdated notions** ('the king can do no wrong'). This view is increasingly seen as incompatible with modern democratic principles and constitutional morality, which demand **accountability and transparency** from all public officials.
- **Illegal Acts**: There is a growing argument that the scope of immunity should not extend to **illegal acts** (like sexual harassment) **that do not pertain to the official duties of the Governor**.

What should be the way forward?

- **Appointments**: **Sarkaria Commission** (1988), **National Commission to Review the Working of the Constitution** (2002) and **Puncchi Commission** (2010) have recommended appointment of persons with eminent public life as Governors. This would help prevent the misuse of immunity.
- **Judicial Scrutiny**: The Supreme Court's willingness to review the interpretation of Article 361 reflects a recognition that the existing provisions may require re-evaluation. The court is considering whether the immunity should be absolute or if it should allow for judicial scrutiny in cases where fundamental rights are at stake. This indicates a potential **shift towards a more balanced approach** that respects both the dignity of the office and the rights of individuals.

2. Supreme Court's Judgment on Power of States to Levy Tax on Mineral Rights

News: A 9-judge Constitution Bench of the Supreme Court has upheld (with 8:1 majority) the power of States to levy tax on extraction of minerals from their land.

What was the dispute?

- **Section 9** of the **Mines and Minerals** (Development and Regulation) **Act**, **1957**, requires the mine leaseholders to "pay royalty in respect of any mineral removed" to the entity which leased the land to them.

- The question for consideration was **whether the royalties paid** by mine leaseholders to State Governments under the 1957 Act **should be classified as** "**tax**".
- The SC needed to determine whether the Centre could impose taxes or if the States possessed the sole authority to levy them within their jurisdictions.

Case Background

- In 1989, a 7-judge Bench of the SC (*India Cement Ltd. vs. State of Tamil Nadu*) had ruled that **States only have the power to collect royalties and not impose taxes on mining activities**.
  - o It pointed out that the **Union Government exercises overriding authority** over the "regulation of mines and mineral development" under Entry 54 of the Union List, as specified by law (the 1957 Act). Thus, States are not empowered to levy additional taxes on this subject.
- In 2004, a 5-Judge Bench of the SC (*State Of West Bengal vs Kesoram Industries Ltd.*) held that there was a typographical error in the 1989 Judgment and that the phrase "royalty is a tax" should be read as "cess on royalty is a tax". The Bench being smaller couldn't overrule the 1989 Judgment.
- In 2011, a similar case came up again, and the SC referred it to a 9-Judge Constitution Bench due to conflicting precedents.

What is the SC Judgment?

- The Supreme Court has affirmed that **States have the legislative authority to impose taxes on minerals** in addition to the royalty levied.
- The SC clarified that the power of State legislatures to tax mineral activities within their respective territories is **not constrained by the Mines and Minerals** (Development and Regulation) **Act**, **1957**.
- The majority ruling **clarified between royalty and tax**.
  - o It defined royalty as the "**contractual consideration**" paid by the mining lessee to the lessor (who may also be a private party) for the **right to extract minerals**.
  - o In contrast, a tax was characterised as an "**imposition by a sovereign authority**". The SC underscored that **taxes are determined by law** and can **only be levied by public authorities**. In contrast, royalties are paid to a lessor in exchange "for parting with their exclusive privileges in the minerals".

> "Indian federalism is defined as **asymmetric** because it **tilts towards the Centre**, producing a strong Central Government. Yet, it has **not necessarily resulted in weak State Governments**. The **Indian States are sovereigns within the legislative competence** assigned to them.
> In a federal form of government, **each federal unit should be able to perform its core constitutional functions with a certain degree of independence**. The Constitution has to be interpreted in a manner which **does not dilute the federal character of our constitutional scheme**. The effort of the Constitutional Court should be to ensure that **State legislatures are not subordinated to the Union in the areas exclusively reserved for them**".
> - *CJI DY Chandrachud*

What is the power of States to tax mining activities?

- **Entry 50** of the **State List** (Seventh Schedule) gives States the authority to make laws regarding "taxes on mineral rights".
- **Entry 54** of the **Union List** gives the Parliament the power to regulate "mines and mineral development"
  - o However, the power of States is **limited by laws passed by the Parliament** related to mineral development.
- During the proceedings, the Centre argued that Entry 50 in the State List had allowed Parliament to **impose** "**any limitations**" **on taxes on mineral rights** through laws relating to mineral development.
- The majority opinion reasoned that since royalties could not be classified as a tax, they do not fall within the category of "taxes on mineral rights".
  - o The SC clarified that **Centre's authority** (under Item 54) **does not include the power to impose taxes**, which is exclusively under the jurisdiction of the State legislatures.

o However, since Item 50 says "subject to any limitations imposed by the Parliament", this limitation can include a "prohibition"' against imposing taxes and the Parliament can divest States of their power to levy a tax.
- States have the **power to tax the land** where mines and quarries are located by virtue of Article 246 read with Entry 49 (taxes on lands and buildings) of the State List.

What was the dissenting opinion?
- Justice Nagarathna gave a dissenting opinion holding that royalties paid under the 1957 Act should be considered as tax for developing the country's mineral resources.
- Central legislation, like the 1957 Act, was intended to **promote mineral development**. This objective could be severely undermined if States were allowed to impose levies and cesses on top of the royalties.
- Allowing States to tax mineral rights can lead to an "***unhealthy competition between the States to derive additional revenue***". It can result in a steep, uncoordinated, and uneven **increase in the cost of minerals**.
- This may lead to **exploitation of the national market for arbitrage**, where differences in pricing could be manipulated for profit, **disrupting the market's stability**.
- It could **hinder the development of the nation's mineral resources** and disproportionately advantage mineral-rich States.

What is the significance of the SC Judgment?
- **Strengthens States' Power**: The ruling reinforces States' legislative authority to tax mineral rights and lands. Earlier, the power under Entry 50 (State List) was thought to be limited by Parliament's law.
- **Clarifies Taxation Limits**: It clarifies that the Mines and Minerals (Development and Regulation) Act, 1957, does not limit States' taxation powers.
- **New Revenue Avenue**: States gain a new taxation avenue, aiding their ability to fund welfare schemes and services.
- **Clarification on Royalty**: The Court determined that royalty is not a tax but a contractual consideration, allowing States more freedom.
- **Supports Fiscal Federalism**: This decision promotes fiscal federalism and States' autonomy in financial matters.

What are the associated concerns?
- **Unhealthy Competition**: Justice B.V. Nagarathna's dissent warns of States entering unhealthy competition to derive revenue.
- **Increased Costs**: Higher taxes and costs may affect purchasers. It can lead to increased prices for industrial products. (*Read more about Mining Sector in India*).

3. Economic Costs of Judicial Delays

News: According to the World Bank, it takes an average of nearly four years to enforce a contract in India. The delay in adjudication of cases has considerable costs for the economy.

What are the reasons behind judicial delays in India?
- **Government Litigation**: Government departments, especially revenue and labour, are involved in a large number of legal disputes. The lengthy duration of these cases has a major overall impact.
- **Government Legal Capacity**: Government legal departments struggle to handle litigation effectively, highlighting the need to build their capacity at both Central and State levels.

- **Structural and Procedural Reasons**: Factors like **high vacancies of judges**, **poor Judge-to-population ratio**, **delays in investigation by police**, **low police-to-population ratio**, procedural reasons like **frequent adjournments** add to judicial backlogs. *(Refer EPIC January 2023 for Reducing Pendency of Cases in Judiciary)*.
  - A former Chief Justice of India observed that **poorly drafted laws** result in **confusion and disputes** causing high litigation. **The Government is the biggest litigant** in the courts.

What are the economic implications of judicial delays?

- **Asset Lockup**: Delays in resolving cases tie up assets, land, and resources, preventing their effective use. In India, ~US$ 200 billion worth of assets are stuck in land disputes.
- **Legal Costs**: Long delays in cases result in **high legal fees** and take up a lot of management time, but calculating the exact costs is difficult due to the widespread nature of the problem.
- **Informal Economic Relationships**: Due to the difficulty of enforcing contracts, many economic relationships stay informal. This results in increased reliance on personal connections, the continued importance of community networks despite modernization, and **small businesses staying in the unorganized sector**.
- **Impact on Business Behavior**: Unethical practices may become common because delays prevent timely punishment. When enforcing contracts is difficult, businesses become more cautious and **focus on short-term goals**.
- **Economic Growth**: Studies estimate that **judicial delays reduce GDP growth by 1-2 percentage points each year**, especially affecting industries that are dependent on specific investments and contracts. Modern manufacturing, global trade, and investments depend on timely and fair contract enforcement, which is hampered by these delays.

National Litigation Policy 2010

- The Policy is based on the recognition that Government and its agencies are the predominant litigants. Its aim is to transform government into an **efficient and responsible litigant**.
- **Efficient Litigant** means:
  - Focusing on the core issues involved in the litigation and addressing them squarely.
  - Managing and conducting litigation in a cohesive, coordinated and time-bound manner.
  - Ensuring that good cases are won and bad cases are not needlessly persevered with.
  - A litigant who is represented by competent and sensitive legal persons: competent in their skills and sensitive to the facts that government is not an ordinary litigant and that a litigation does not have to be won at any cost.
- **Responsible Litigant** means:
  - That litigation will not be resorted to for the sake of litigating.
  - That false pleas and technical points will not be taken and shall be discouraged.
  - Ensuring that the correct facts and all relevant documents will be placed before the court.
  - That nothing will be suppressed from the court and there will be no attempt to mislead any court or Tribunal.
- **Salient Features**
  - To ensure government agencies being responsible while filing cases.
  - It instructs to place correct facts, all relevant documents before the court/tribunal and not to mislead them.
  - It proposed a monitoring and review mechanism to sensitize government in important cases and avoid delays.
  - Pending cases with government as party to be reviewed on priority basis to enable quick disposal. Created by | **ForumIAS**©

What should be the way forward?

- **Expansion of Judicial Positions**: Increasing the number of judges is important to reduce judicial delays, and this expansion will necessitate **investment in new courts**, **libraries**, and **administrative staff**.
- **Enhancing Infrastructure and Technology**: The use of new information technology mechanisms should be enhanced to streamline processes.

- **Administrative Reforms**: Frequent rotation of judges and lack of effective grouping of cases can hinder efficiency. Addressing these issues can help speed up case resolution and improve overall judicial efficiency
- **Need for Legal Reforms**: **Older laws** that are outdated or ineffective should be **revised or abolished**. Practices like **frequent adjournments** and misalignment of judges' expertise with case requirements need to be addressed. *(Refer EPIC March 2022 for Reducing Pendency of Cases by Procedural Reforms)*.
- **Coordination Approach**: The Government and Judiciary should work together to fix the coordination issues between them. The Government should also review its **Litigation Policy** to reduce the litigation.

4. Right to be Forgotten

News: The Supreme Court has agreed to hear the case related to the Right to be Forgotten. The SC stayed an order of Madras HC that had asked a law portal to remove a Judgment from its website.

What is the Right to be Forgotten?
- It is a right to **remove private information** about a person from Internet searches and other directories under certain circumstances.
  - It **empowers individuals** to ask organisations to **delete their personal data**.
  - It allows the individuals to determine the development of their life in an autonomous way without being perpetually stigmatized for a specific action performed in the past.
- **Global Precedent**: The Court of Justice of the European Union (CJEU) ruled in the "Google Spain case" that search engines **must remove outdated or irrelevant data**. This decision was based on Articles 7 and 8 of the **EU Charter** and Article 17 of the **General Data Protection Regulation** (GDPR).
  - Article 17 states that the data subject shall have the right to obtain the erasure of personal data concerning her from the controller (like Google). The controller has the obligation to erase personal data without undue delay. However, the Court ruled that the 'right to be forgotten' under European law would **not apply beyond the borders of EU member states** (hence not applicable to global database of Google).

How is the right interpreted in India?
- India **lacks a specific law** for the right to be forgotten. However, *K.S. Puttaswamy v. Union of India* (2017) case recognized the **right to privacy**, which includes individual's right to control her existence on the internet.
- Justice S.K. Kaul, in Puttaswamy case, mentioned that the right to be forgotten allows individuals to remove outdated or irrelevant personal data. However, it **does not apply to all past information** such as cases involving **public interest**, **legal requirements**, **public health**, **research**, and **legal claims**.
- **Section 8(7)** of the **Digital Personal Data Protection Act**, **2023** mandates the Data Fiduciary *(one who determines the means and purpose of data processing)* to erase personal data if the Data Principal *(individual to whom the personal data is related e.g., the users of social media platforms)* withdraws her consent unless retention is necessary for compliance with any law. But there is no explicit mention of the right to be forgotten.
- **Conflicting judicial views** and varied judgments have added to confusion. The Courts have **struggled to balance the right to privacy with public interest**. **Lack of clear legislative framework** is another major gap. This has provided a ground for **judicial overreach**.

What are the arguments in favour of the Right?
- It will uphold **an individual's privacy** under Article 21 of the Indian Constitution. This would enable her to fully enjoy the right to life and personal liberty.
- Some accused in criminal cases who are acquitted by the courts continue to face social stigma if the information is available in public domain (like copy of Judgment on legal portals). It hurts their reputation and their future prospects like getting jobs. The legal right will **prevent post-acquittal social stigmatization**.

o In the present case, an individual had approached the Madras HC to redact his name from a 2011 sexual assault case judgment, in which he was acquitted of all charges.

o The petitioner had argued that he was denied a visa to Australia because his name still appeared online in the case Judgment.

- It would help in maintaining **a veil of secrecy on the victim's identity,** especially in highly sensitive cases like sexual assault. This was observed by the Karnataka HC in *Sri Vasunathan v The Registrar General* (2017).
- Many articles on the internet are written based **on half-truths and mere accusations**. The media doesn't update its prior articles based on future verdicts.
- A lot of information is published without individual's consent which may cause severe harm to reputation and mental peace. It can include revenge porn or men falsely accused of harassment who are later acquitted. Making platforms and portals to remove such information protects individual's identity.

What are the arguments against the Right?

- It gets in conflict with the **right to information**, which is part of freedom of speech under Article 19(1)(a) of the Indian constitution. A criminal can't claim that he has a right to insist that his conviction should not be referred to by the media.
- It may impair the **right of media personnel** to do **independent reporting**. The freedom to criticize the public personalities for their public policies based on their past statements and activities will be in jeopardy.
- The removal of complete judgments may **restrict public scrutiny** of **judicial performance** to ascertain the fairness and objectivity in administration of justice. Further, judgments are an important source of learning for law students.
- The removal sometimes creates **a Streisand effect**. It is a social phenomenon that occurs when an attempt to hide, remove or censor information has the unintended consequence of **further publicizing it**.

What should be the approach?

- **Legislative Framework**: There is a need for a comprehensive legislation on the issue. The law should clearly define the scope of the right and its limitations to prevent conflicting judicial interpretations.
- **Supreme Court's Role**: The Supreme Court should provide clear guidelines to lower courts. One approach can be to redact the names or personal details of parties rather than complete removal of Judgments.
- The Parliament can also debate regarding **adding Privacy as a ground for reasonable restrictions** under Article 19(2) through a constitutional amendment for the effective implementation of Right to be Forgotten.
- The digital industry need to develop more **transparent policies** regarding handling of data. A US Court of Appeals recently decided to revisit class-action lawsuit against Google for **surreptitiously collecting private information** about users despite acknowledging to the contrary in the privacy policy. Industry should avoid such practices.

5. Lateral Entry into the Civil Services

News: The posting of 45 vacancies by UPSC (to be filled by lateral entry) for certain roles in 24 Ministries of the Union Government has led to a political storm. The opposition parties have called it violative of provisions of reservation. The advertisement has been withdrawn now.

What is Lateral Entry? What is the background to its introduction?

- Lateral entry into civil services in India refers to the **recruitment of professionals from the private sector** at the **middle and senior management levels of the Government**. It aims to **bring in specialized skills and expertise** that may not be present within the traditional bureaucratic framework.

- The lateral entry appointments are **generally done on a contractual basis**. The appointments are mainly made to the post of Joint Secretary, Deputy Secretary and Director positions in the Central Secretariat.
- At present, most positions are held by **career bureaucrats** from **All India Services/Central Civil Services**.

Background

Commission/Body	Recommendation
National Commission to Review the Working of the Constitution (2002)	• It advocated lateral entry. • It suggested that lateral entry, could help in specializing some generalist roles by bringing in professionals from the private sector.
2nd Administrative Reform Commission (2005)	• It recommended an **institutionalized and transparent process** for lateral entry at both the **Central and State levels**. • It highlighted the **necessity of infusing new talent** into the bureaucracy to enhance governance and policymaking.
NITI Aayog 3 year Action Agenda (2017)	• NITI Aayog supported the idea of lateral entry in its 3-year Action Agenda. • It emphasized that lateral entry has the potential to **improve governance** by **incorporating specialized knowledge** and skills from **private sector**.
Sectoral Group of Secretaries (SGoS) on Governance	• The group endorsed the lateral entry system. • It argued that lateral entry could **enhance the effectiveness of public services** by introducing professionals with relevant expertise.

What is the rationale behind Lateral Entry into civil services?

- **Need for Specialists and Fresh Talent**: The inclusion of professionals from diverse backgrounds can bring in new ideas and innovative approaches. The generalist civil servants may **lack domain specific knowledge** and fail to incorporate the views of other stakeholders such as the private sector or the NGOs etc.
- **Meeting the Shortage of Personnel**: The **Baswan Committee** (2016) had pointed to the **unwillingness of certain States** like Bihar, Madhya Pradesh and Rajasthan in sponsoring officers for **central deputation**, due to deficit of officers in their States. The lateral entry of officers can help in addressing the shortage of staff at the central level.
- **Strengthening Participatory Governance**: Lateral entry can strengthen participatory governance, by providing the private sector and NGOs an opportunity to participate in the governance process.
- **Improvement of Efficiency of Governance**: The recruitment of private individuals as consultants, officers on special duty by Union Government Ministries has given fruitful results in the past e.g., Appointment of Montek Singh Ahluwalia (Planning Commission), Vijay Kelkar (Ministry of Finance) and Nandan Nilekani (UIDAI) and Parmeshwaran Iyer (Swacch Bharat Mission). External expertise can improve efficiency.
- **Additional Avenue to Recruit Talent**: Many potential good administrators do no participate in the examination process for All-India Services for various reasons. Lateral entry provides an opportunity for them to be part of the governance machinery and contribute to nation building.
- **Promotion of Healthy Competitive Spirit**: Lateral entry aims to promote a sense of healthy competition in bureaucracy. It induces generalist civil servants to develop expertise in areas of their choice.
- **Bridging Public-Private Gap**: After the economic reforms in 1991, the Government has taken up the role of a facilitator of public services. Private sector has assumed a greater responsibility for capital expenditure, investment, and development. Lateral entry provides a platform for **greater collaboration between the Government and private sector**. It allows stakeholders like industry experts and non-profits to participate more directly in the governance process.

- **Global Best Practices**: Countries like US, Belgium, the UK, Australia and New Zealand have institutionalized the practice of lateral entry, as a permanent part of their system. In countries like the UK and Ireland, the selection of officers is on the criteria of work experience in the civil as well as the private sector.

What are the criticisms of lateral entry system?

- **Ambiguity in Process of Recruitment**: There are concerns regarding the ambiguities in the recruitment process such as determination of vacancies, shortlisting of candidates, evaluation criteria etc.
- **Application of Reservation Policy**: The process has been criticized because reservation policy is not applied for individual openings like it is applicable for bulk recruitment (e.g., through Civil Services Examination). It can lead to lower representation of reserved groups in higher bureaucracy. *(Read more about 13 point roster system)*.
- **Lack of Familiarity with Bureaucratic Processes**: The civil servants reaching top positions like Joint secretary level, serve 10-15 years at ground level and are fully well-versed with the bureaucratic process. The lateral entrants often lack an understanding of the bureaucratic system and its established protocols. It can reduce their effectiveness in the Government system.
- **Short Tenure**: Lateral entry positions are typically contract-based for a limited duration (3-5 years). The lateral entrants find it difficult to assimilate in the bureaucratic structure within their short time. This also reduces the probability of delivering optimum results within due time.
- **Potential Conflict of Interest**: There are concerns regarding potential conflict of interest arising in policy formulation. There may be tendency to favour the private sector interests or former employers.
- **Potentially Discouraging for Motivated Civil Servants**: Large-scale lateral induction may discourage motivated and talented bureaucrat officers by signalling that they are not competent to reach the senior positions in the Government.

What should be the way forward?

- **Balanced Approach**: The Government needs to maintain a fine balance between the career civil servants and the lateral entrants. The number of lateral entrants should be kept minimal and for **very technical roles** like digital economy/missions, infrastructure projects or medical personnel for health missions etc.
- **Phased Implementation**: The lateral entry program should be implemented in a phased manner by taking feedback and outcomes at each phase. This will ensure that the integration of private sector professionals is smooth and effective.
- **Reservation Policy**: The lateral entry system should confirm to the '13 point roster system' which provides for reservation. This will address the concerns of reserved communities about perceived marginalisation.
- **Transparent Process**: The recruitment process and service rules for lateral entry posts need to be clearly defined and made incentive-compatible. The criteria for selection should be in the public domain.
- **Prior Experience in the Government Sector**: A greater weightage can be provided for 'prior consultation work' with the Government. Persons having prior experience of working with the Government will face less difficulty in assimilation with the bureaucratic structure.
- **Exploration of Allocation of Cadres**: The option of allocating cadres for lateral entrants can be explored. The lateral entrants can be put for at least one year under State governments for field level training and exposure.

6. 5-Years of Abrogation of Article 370

News: August 2024 marked 5 years of abrogation of Article 370. The abrogation has resulted in many positives for J&K. Yet several challenges remain for complete normalization of circumstances.

What was Article 370 of the Constitution? How was it removed?

- Article 370 was added to the Constitution as a 'temporary provision' on October 17, 1949.

- It provided certain special provisions to J&K.
  - o It permitted the State of J&K to draft its own Constitution. The Constituent Assembly of Jammu & Kashmir was empowered to recommend which articles of the Indian Constitution should apply to the State.
- It **restricted the legislative powers of the Parliament** with respect to the State.
- **Article 35A**: Clause 3 of the Article 370 gave the President of India the power to amend its provisions and scope. Article 35A stemmed from Article 370 and was introduced through a **Presidential Order in 1954**, on the recommendation of the Constituent Assembly of J&K.
  - o Article 35A empowered the Jammu & Kashmir legislature to **define the permanent residents of the State**, and their special rights and privileges.
- **Presidential Proclamation Abrogating Article 370**: On August 05, 2019, President of India in the exercise of the powers conferred by Clause (1) of Article 370 of the Constitution had issued the Constitution (Application to Jammu and Kashmir) Order, 2019. The laws of the Parliament were made applicable to J&K. *(Refer EPIC December 2023 for Supreme Court's Judgment on Abrogation of Article 370).*

What was the rationale for the abrogation of Article 370?

- **National Integration**: Article 370 allowed a separate constitution, flag and powers to J&K, which created a sense of separate identity. This was exploited to misguide youth and created a demand of separatism among them. Abrogation of Article 370 was a means to **promote national integration**.
- **Aid in the Fight Against Terrorism**: Owing to cross border terrorism, ~42 thousand people had lost lives in J&K. The special status was considered an impediment in fight against terrorism. It was reasoned that abrogation of Article 370 has allowed for the **application of stringent anti-terror laws** like UAPA.
- **Reduction of Corruption**: Article 370 resulted in poor anti-graft architecture in the State. Anti-corruption agencies could not enter the State, which resulted in massive corruption, money laundering and hawala transactions. It was reasoned that abrogation of Article 370, allowed for the stringent application of acts like the PMLA and FEMA.
- **Economic Development**: Due to the application of Article 370, the land in the State could only be sold and bought by the permanent residents of the State. As a result, large corporates did not invest in the region. It was reasoned that repeal of Article 370, would **allow greater investments in J&K**.
- **Affirmative Policies**: Various affirmative legislations such as Right to Education, Right to Information were not available to the people of J&K. Also, the reservations benefits, to OBCs, SCs, STs were not available to the marginalized sections of the State. It was reasoned that abrogation of Article 370 would allow for effective implementation of affirmative policies.

What have been the positive developments post abrogation of Article 370?

- **Improvement in Governance**: There have been substantial gains in terms of governance with improvement in the **last-mile delivery of services**, digitisation of 1000 public utilities, near completion of major projects in the PM's development package.
- **Improved Economic Condition**: Improved governance has helped in attracting investments worth INR 6,000 crore. The number of tourists visiting J&K went up from 3.4 million in 2020 to 21.1 million in 2023.
- **Increased Trust in Electoral System**: The people of J&K have shown their faith in the ballot. The 2024 General Election was an incident-free poll, with voter turnout at 58.6%, the highest in 35 years.
- **Return Towards Normalcy**: The customary call for boycott, bandhs, civil unrest and incidents of stone pelting have reduced sharply since the abrogation of Article 370 in Kashmir.
- **Social Stability**: With the decline in violence and return towards normalcy, public and social life in J&K has returned to a more stable state. Events promoting peace and development are now being held in areas that were previously considered no-go zones.

What are the prevailing challenges after the abrogation of Article 370?

- **Changing Character of Conflict**: The infiltrators from across the border have become more active in the Jammu sector. Pakistan's partnership with China and its sponsorship of terror has increased in the region.
- **Bureaucratic Control**: The Constitutional Amendments, followed by legislative changes (UT status to J&K), and bureaucratic control has reduced the people's representation in governance and administration.
- **Political Challenges**: The abrogation has marginalized traditional political entities, causing a vacuum in local governance and representation. Mainstream political parties have struggled to regain their footing in the Jammu and Kashmir region.
- **Social and Human Rights Concerns**: Some human rights groups have raised concerns regarding internet blackouts, and the detention of political leaders and activists.

What should be the way forward?

- **Restoration of Political Engagement**: There is a need to reintegrate local political parties into the governance process. This can be achieved by facilitating dialogue between the central government and regional political leaders to address their grievances. Elections for the State Legislative Assembly have been announced. The Union Government should consider **restoration of full Statehood post-elections**.
- **Enhancing Security and Community Trust**: Building trust between security forces and local communities is necessary for restoration of normalcy in J&K. Initiatives that promote community policing can help in reducing tensions and fostering a cooperative environment.
- **Cultural and Educational Programs**: Initiatives that promote cultural exchange and education can help bridge divides between different communities within J&K. This includes support for local arts, crafts, and educational institutions that foster a sense of unity.
- **Addressing Human Rights Concerns**: The Government should be transparent in its actions and responsive to the concerns of the local population regarding security measures and civil rights.

7. Reservation for Persons with Disabilities

News: The controversy around fabrication of false certificates of disability by some candidates to receive benefits in Civil Services Exam has sparked a debate on reservations for persons with disabilities (PwDs).

Who are the persons with Disabilities in India? What are the provisions of reservations for PwDs?

- According to The UN Convention on the Rights of Persons with Disabilities (UN CRPD), Persons with disabilities are the ones who have **long-term physical**, **mental**, **intellectual** or **sensory impairments**, which **hinder their full and effective participation in society on an equal basis** with others.
- **The Rights of Persons with Disabilities Act, 2016**: It came into force in April 2017, and replaced the earlier Act passed in 1995. It uses the same definition as the UN CRPD to define persons with Disabilities.
  - '**Person with Benchmark Disability**': It further defines 'Person with Benchmark Disability' as 'a person with not less than 40% of a specified disability'.
- The Act increased the magnitude of reservation for PwDs from 3% to 4% in Government jobs and from 3% to 5% in higher education institutes.

What is the significance of reservations for PwDs?

- **Equitable Opportunities to PwDs**: Reservations aim to provide equal opportunities in employment to PwDs, who often face discrimination and barriers that hinder their access to jobs. This aligns with Article 16 of the Indian Constitution, which guarantees equality of opportunity in public employment.

o According to the 76th round of the National Sample Survey in 2018, only 23.8% of PwDs were employed in India, against the national average of Labour Force Participation Rate of 50.2%. Hence, reservation becomes an important tool to ensure their adequate representation.

- **Structural Issues of Discrimination**: The PwDs often face structural discrimination such as stigma and biases at the hiring stage; and lack of reasonable accommodation at the workplace. The education system, exam curricula and formats have been designed to suit and be used by the able-bodied individuals.

- **Challenging the Notion of Ableism**: Reservations help challenge the deep-rooted ableism in society by promoting the inclusion of PwDs in various roles. This helps in normalizing their presence in the workforce.

- **Career Progression**: Allowing reservations in promotions ensures advancement in their careers. This helps in preventing stagnation and frustration that can arise from limited career progression options. This is crucial for their economic independence and self-esteem.

Supreme Court Judgments on Reservation for PwDs

- *Indra Sawhney v. Union of India (1992)*: The SC established the framework for reservations, distinguishing between "**vertical**" and "**horizontal**" reservations. The SC noted that reservations for PwDs should be considered **horizontal reservations under Article 16(1)** which allows for a **separate quota of 3%** for PwDs. Such reservations do not interfere with the overall ceiling of 50% for vertical reservations.

- *Govt. of India vs Ravi Prakash Gupta (2010)*: The SC held that reservation policy for PwDs must be implemented in all Government jobs. The 3% reservation must be applied at all stages of employment, including promotions.

- *Union of India vs National Federation of the Blind (2013)*: The SC directed the Government to ensure a 3% reservation for PwDs in all categories of public sector employment. The Court emphasized the need for the government to **identify posts suitable for PwDs** and implement the reservation effectively.

- *Vikas Kumar vs Union Public Service Commission (2021)*: The SC ruled that the Government must provide **reasonable accommodations for PwDs** in **competitive exams**, including providing extra time and necessary facilities. This decision reinforced the principle of equality and non-discrimination in access to education and employment opportunities.

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What are the challenges in fair implementation of reservation for PwDs?

- **Flaws in Certification System for Disabilities**: The practice of quantifying disabilities by percentage followed in India is outdated. It is not supported by the UN Convention on the Rights of PwDs.

- **Structural Challenges in Assessment of Disability**: Lack of specialists to evaluate various disabilities, makes the disability certification process inaccessible and time consuming.
  o The complicated assessment guidelines prescribed by the States are often unrealistic to be examined at the level of district hospitals, which are constrained in terms of both infrastructure and resources.

- **Outdated Certification System for Psychosocial Disabilities**: The psychosocial disabilities, whose assessment are relatively more subjective, are assessed based on the outdated IDEAS (Indian Disability Evaluation and Assessment Scale) scale. Persons with invisible, hidden, or less apparent disabilities, such as blood disorders, often face rejection because they "do not look disabled", with tests not conducted properly.

- **Unconscious Ableism Bias**: There exists unconscious bias of ableism (physical fitness for fulfilment of duties) that exists within the public servants and corridors of public service which hinders effective implementation of reservation policies for PwDs. This was evident in case of Kartik Kansal and Ira Singhal who faced delay in allotment of service due to disability, despite both of them clearing the Civil Services Examination.

- **Exploitation of Benefits**: Incidents of individuals allegedly misrepresenting their disabilities to gain benefits have raised concerns about the integrity of reservation policies.

SC Guidelines to Prevent Stereotyping of PwDs

★ **Avoid Derogatory Language**: Avoid words that **cultivate institutional discrimination**, e.g., 'cripple' and 'spastic'. They lead to **negative self-image** and perpetuate discriminatory attitudes. Language and words that individualize the impairment and overlook disabling social barriers, like 'afflicted', 'suffering' and 'victim', should be avoided.

★ **Focus on Accurate Representation**: **Stereotyping** of differently abled persons in visual media and films must end. Creators must focus on providing an **accurate representation** of disabilities rather than mocking them. Creators should practice the principle of "**nothing about us, without us**" and involve PwDs in the creation and assessment of visual media content.

★ **Creative Freedom vs Marginalizing Portrayals**: **Creative freedom** of filmmakers cannot include the freedom to **stereotype, misrepresent** or **disparage marginalized communities**. If the overall message of the content **infringes upon rights of PwDs**, then the **right of creative freedom will not be protected**.

★ **Collaboration with Disability Advocacy Groups**: The SC has emphasized on **collaboration with disability advocacy groups** to gain insights and guidance on respectful and accurate portrayals. The training programmes for writers, directors, producers, and actors must be developed to emphasize the impact of portrayals on public perceptions and experiences of PwDs.

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What should be the way forward?

- **Change in Assessment Criteria**: Functional limitations, rather than medical percentages, should be the basis for assessment of disability and issuance of disability certificate and Unique Disability ID (UDID).
- **Addressing Structural Limitations**: The shortage of adequate medical staff, infrastructure at local hospitals must be addressed to make it convenient for the persons with disabilities to obtain their certificates.
- **New Model for Assessment of Psychosocial Disabilities**: A new model for the assessment of psychosocial disabilities must be developed to replace the old and outdated IDEAS scale (Indian Disability Evaluation and Assessment Scale).
- **Regular Review and Updates**: The list of specified disabilities must be regularly reviewed and updated to align with international standards and best practices. This would ensure that the system remains inclusive and responsive to the diverse needs of PwDs.
- **Robust Monitoring and Evaluation Mechanism**: A robust tracking mechanism needs to be developed for detection of fraud cases of disability. This can include regular audits, data collection, and stakeholder consultations. *(Refer EPIC January 2023 for Persons with Disabilities: Rights, Challenges and Solutions).*

8. Corporate Social Responsibility in India

News: Education continues to receive disproportionately high funding under CSR initiatives. There is a need for more even distribution of spending on CSR activities across sectors.

What is the meaning of Corporate Social Responsibility (CSR)?

- According to **UN Industrial Development Organization** (UNIDO), Corporate Social Responsibility is a management concept whereby companies **integrate social and environmental concerns in their business operations** and interactions with their stakeholders.
- It is a way of running the businesses by which corporate houses **contribute towards social good**.

- CSR is based on **sense of responsibility** of the companies **towards the community and the environment** in which they operate.
- It is **linked to sustainability** (creating economic, social, and environmental value) and ESG (Environmental, Social, and Governance). CSR is generally understood as being the way through which a company achieves a balance of economic, environmental and social imperatives ('**Triple-Bottom-Line- Approach**' i.e., **people**, **planet** and **profit**), while at the same time addressing the expectations of shareholders and stakeholders.
- CSR has evolved from 1950s' simplistic view of "obligation towards the society" to much wider dimensions in the 21st century to include the **improvement of the quality of life of citizens**; **human and labour rights**; **environmental concerns**; **issues relating to corruption**, **transparency** and **accountability**.

What is the CSR framework in India?

- **Legal Basis**: The concept of CSR in India is governed by **Section 135** and **Schedule VII of the Companies Act, 2013** and **Companies (CSR Policy) Rules, 2014**. The Rules provide the criteria for assessing the CSR eligibility of a company, implementation and reporting of their CSR Policies etc.
- **Criteria**: The Companies Act has made it mandatory for certain corporations to undertake CSR activities. The Act requires companies with: **(a)** Net worth of INR 500 crore or more or; **(b)** An annual turnover of INR 1000 crore or more or; **(c)** Net profit of INR 5 crore or more, to **spend 2% of their average net profits of 3 years on CSR**. Prior to that, the CSR clause was **voluntary for companies**, though it was mandatory to disclose their CSR spending to shareholders.
- The activities to be undertaken under CSR are prescribed by the Government in **Schedule VII of the Companies Act**.
- Activities undertaken for the benefits of the employees, one-off events (like marathons), statutory obligations (like compensation for land acquisition), political contributions and normal business activities do no fall under CSR Activities.
- **Penal Provisions**: In case a company fails to comply with the provisions relating to CSR spending, it shall be liable to a penalty of up to INR 1 crore. The officer of the company responsible for CSR can be fined up to INR 2 Lakhs. Earlier, there was a provision of imprisonment of up to 3 years, but it has been removed now.

Initiatives included under CSR (Schedule VII, Companies Act, 2013)

- **Eradicating hunger**, poverty and malnutrition, promoting health care and sanitation.
- **Promoting education**, employment enhancing vocation skills and livelihood enhancement projects.
- Promoting **gender equality**, empowering women, setting up homes/hostels for women and orphans; setting up old age homes, measures for reducing inequalities faced by socially/economically backward groups.
- Ensuring **environmental sustainability**, ecological balance, protection of flora and fauna, animal welfare, agroforestry, conservation of natural resources including contribution to the Clean Ganga Fund.
- Protection of **national heritage**, **art and culture**; setting up public libraries; promotion and development of traditional art and handicrafts.
- Measures for the benefit of **Armed Forces**, CAPF veterans, their dependents and widows.
- Training to **promote sports** (rural, paralympic and olympic sports.
- Contribution to the **PM's National Relief Fund/PM CARES Fund** or any other fund set up by the Union Govt.
- Contribution to **incubators** or **R&D projects** in the field of **science**, **technology**, **engineering** and **medicine**, funded by the Union/State Governments or PSUs; Contributions to public funded Universities;
- **Rural development projects** and Slum area development.
- **Disaster management**, including relief, rehabilitation and reconstruction activities.

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What are the benefits of CSR?

- **Sustainable Development Goals**: Corporates can apply their innovation to achieve sustainable development. Many companies are aligning their CSR focus areas according to SDGs to meet their CSR mandate like enhancing livelihoods through skill development of women (ending poverty and promoting gender equality).
- **CSR for Technology Incubators**: In September 2019, the Government expanded the scope of CSR to include contribution to incubators or to research and academic institutions. It can spur the R&D and innovation ecosystem in India.
- **Responsible Business Reputation/Customer Loyalty**: Corporate social investment can help to build a reputation as a responsible business, which can, in turn, lead to **competitive advantage**. It has been demonstrated that enhancing a company's image through CSR may **increase consumer loyalty** and **public trust**, which in turn enables firms to profit from these factors.
- **Costs Savings**: Reducing resource use, waste and emissions, will help the environment and save money. With a few simple steps, company may be able to lower their utility bills and achieve savings for their business.
- **Employee Retention**: Being a responsible, sustainable business may make it easier to recruit new employees or retain existing ones due to responsible behaviour and positive working environment. Longer employee retention will reduce the costs and disruption of recruitment and retraining.

Status of CSR in 2022-23. State-wise and Sectoral Spending in INR crore.

- **Attracting Responsible Investors**: Socially responsible investors (SRIs) seek out businesses that have shared values. The number of SRIs is rising rapidly. Good track record in CSR can help attract investments from SRIs.
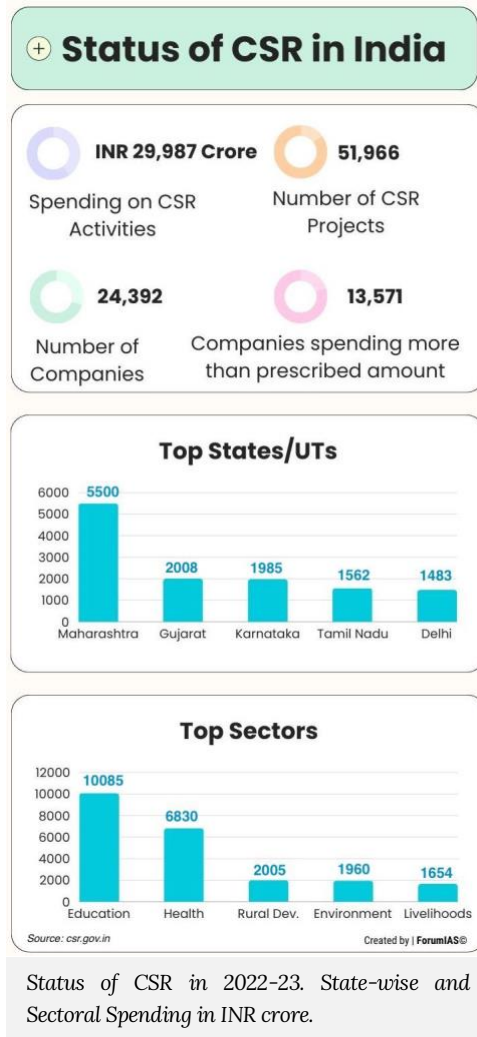
What are the challenges to CSR in India?

- **Regional Disparity**: Most of the CSR spending is concentrated in limited States/UTs. In 2022-23, top 5 States/UTs (Maharashtra, Gujarat, Karnataka, Tamil Nadu and Delhi) received ~42% of the funds.
- **Sectoral Disparity**: In 2022-23, more than **30% spending was on education**. Healthcare also receives large amount of funds. But sectors like Gender Equality, Welfare of Senior Citizens, Agro-forestry, Orphanages, Technology Incubators receive very less funding.
- **Lack of Transparency and Information**: Many corporates do not make adequate efforts to disclose relevant information. The Standing Committee on Finance has observed that the information regarding CSR spending by companies is insufficient and difficult to access.
- **Greenwashing**: Many companies still view CSR as a statutory obligation only. They engage in superfluous activities not having a direct measurable impact on communities or the environment. However, misleading communication is used to influence the perceptions of stakeholders and the general public.
- **Lack of Cooperation**: There is a lack of consensus among different local agencies and corporate entities which results in duplication of efforts by the firms in terms of CSR.

- **Lack of Community Participation**: Many companies are driving the CSR projects from top with **little involvement of the locals** who are the intended beneficiaries. Companies end up taking initiatives which they consider as important, rather than what is beneficial to the communities.
- **Lack of Strategic Planning**: Due to a lack of strategic planning and engagement, companies aren't able to make a meaningful impact through their CSR activities. Corporate houses must understand the challenges faced by its citizens and then invest properly.

What steps can be taken to address the challenges?

- **Centralized Platform**: The Ministry of Corporate Affairs (MCA) can curate a centralized national-level platform. All States can list their potential CSR-admissible projects on the platform. With this, companies can assess where their CSR funds would be most impactful across India. Invest India's '**Corporate Social Responsibility Projects Repository**' on the India Investment Grid (IIG) can serve as a guide for such efforts. This model would be very useful for **supporting deserving projects in the 112 aspirational districts** and projects identified by MPs under the Government's *Sansad Adarsh Gram Yojana*.
- **Sectoral Balance**: Companies need to prioritise environment restoration in the area where they operate, earmarking at least 25% for **environment regeneration**. This gains importance as impact of climate change are becoming evident in regions across India.
- **Community Participation**: All CSR projects should be selected and implemented with active involvement of communities, district administration and public representatives.
- **Enhanced Monitoring**: The High-level Committee's recommendations from 2018 should be added to the current CSR framework to **improve the monitoring and evaluating system** like mandatory independent third-party impact assessment audits. The MCA and the line departments need to **exercise greater direct monitoring and supervision** over the spending by companies.
- **Coordination with NGOs**: There is a need for pooling of resources and building of synergies by both Companies and Non-Governmental Organizations for more efficient and effective implementation of CSR activities.

9. India's Performance at the Olympics and Bid to Host Olympics 2036

News: India's performance at the 2024 Olympics was below expectations. The Government has enhanced spending on sporting facilities and infrastructure. Yet the gaps that still exist must be addressed to improve performance at the global events.

How was India's performance at the Paris Olympics 2024? What were the hits and misses?

- India won 6 medals (1 Silver and 5 Bronze medals). India was ranked 71st in the medals tally. In Tokyo Olympics (2020) India had won 7 medals, 1 Gold, 2 Silver and 4 Bronze. It was a performance below expectations.
- **Neeraj Chopra** won **Silver medal** in **Men's Javelin Throw**. He became the 3rd Indian to claim two consecutive individual medals.
- Shooters **Manu Bhaker** (25m sports pistol), **Swapnil Kusale** (50m rifle 3-position), and the mixed team pair of **Manu Bhaker** and **Sarabjot Singh** (10m air pistol) won **bronze medals**.
- Wrestler **Aman Sehrawat** won a **bronze medal**.
- The **Indian Men's Hockey team** secured a **bronze medal**. Indian hockey is on the rise again, with 2 back-to-back medals at the Olympics (Tokyo 2020-21 and Paris 2024).

Misses in India's performance

- Neeraj Chopra missed out on Gold medal. He was widely expected to win the Gold medal.
- The unexpected disqualification of **Vinesh Phogat**, after reaching the women's 50kg wrestling final, denied India a Gold or Silver medal.

- **Six 4th place finishes** denied India six potential bronze medals. These 4th place finishes were in Shooting, Skeet, Archery, Badminton and Weightlifting.
- 2 Athletes in Boxing too lost in the quarter-final stage, just one stage away from securing bronze medals.

What are the reasons behind India's under-par performance?

- **Performance Pressure**: The six 4th place finishes highlight the lack of consistency and the attitude of succumbing to performance pressure. Several athletes had leads in their matches but failed to convert them into victories due to performance pressure and lack of adequate mental strengthening.
- **Issues with Sports Federations**: Indian sports federations suffer from politicization, favouritism and corruption. Most federations are controlled by politically-connected persons who do not understand the nuances of sports or the requirements of athletes. It can lead to inefficiencies and poor selections.
- **Inadequate Training Facilities**: Indian sports typically suffer from challenges such as insufficient access to high-quality coaching, training programs, and competitive exposure, as compared with other top sporting nations.
- **Cultural and Systemic Barriers**: The cultural emphasis on academic success over sports has historically limited the pool of athletes pursuing sports as a career.
- **Inconsistent Government Support**: Despite improvements in sports funding and infrastructure, the prioritization of sports education and infrastructure remains low compared to other social issues. This lack of long-term investment in development of sports hinders the growth of a robust sports culture in India.

What Government initiatives have been launched to improve India's performance in Sporting Events?

Initiative	Details
Target Olympic Podium Scheme (TOPS)	• TOPS is a flagship initiative designed to provide comprehensive support to elite athletes. • It was launched in September 2014 and revamped in April 2018. The athletes receive monthly stipends of INR 50,000, along with funding for training camps, international competitions, and equipment.
Mission Olympic Cell (MOC)	• This dedicated body oversees the implementation of TOPS, regularly evaluates athletes' progress and needs, to provide necessary support.
Khelo India Scheme	• It was introduced to promote sports at the grassroots level and to build a strong foundation for sports in the country. Its key features include Infrastructure Development, Talent Identification, and Coaching and training.
International Exposure and Training Camps	• Athletes are provided opportunities for foreign training and competition. • This is crucial for gaining experience and improving performance on the world stage.

What should be the way forward?

- **Broad-basing into Other Sports**: India should also focus on medal-rich sports like swimming and athletics. The top athletes of badminton, weightlifting, wrestling, and boxing must keep up with their medal marks.
- **Ending Bureaucratic Dominance**: Indian sports bodies and federations must be de-politicized. The establishment of professionalism in the operations of these bodies will help in identification of right talent, their grooming and success at the highest level.
- **Mental conditioning**: The near-misses (six 4th-place finishes) need to be minutely analyzed for meltdowns under pressure. Players should be conditioned to handle pressure through appropriate measures and training.

- **Collaborative Effort**: Indian sports needs to go into a huddle. The important stakeholders; Federations, Sports Authority of India, Sports Ministry and other NGOs; need to pull together in the same direction. Olympic medals need a process and persistence with top names, at least over a couple of cycles.
- **Integration of Sports in the Curriculum**: Sports and physical education should be integrated into the school curriculum from an early age. As highlighted in the National Education Policy (NEP) 2020, sports should be seen as integral to experiential learning, promoting physical and psychological well-being.
- **National Sports Education Board**: Creation of a National Sports Education Board (NASECA) would help in standardization of sports education across the country. It can oversee the development and implementation of a national sports curriculum.
- **Promotion of a Sports Culture**: Sports culture is significant to shift societal attitudes to view sports as a legitimate career path. This can be instituted through community engagement, media campaigns, and school initiatives.

Why is India bidding for Host Country rights for Olympics 2036?

The Government has expressed interest to bid for hosting the Olympics in 2036.

- **Soft-Power**: Large sporting events like Olympics, FIFA Football World Cup etc. are seen as avenues to showcase and enhance soft power. (*Refer EPIC October 2022 for Using Sports to enhance Soft Power*).
- **India's Global Ambition**: After the historic hosting of the G-20 summit, India wants to successfully host the Olympics to elevate its position in global politics. It will help in building a strong case for greater role for India in geopolitics like India's candidature for permanent seat in the UNSC.
- **Push to Sporting Culture**: The Government has been providing the nudge to sports culture with schemes like Khelo India, which have shown benefits in Asian Games 2022 (2023, 107 medals) and Tokyo Olympics (7 medals). The world class infrastructure created for the Olympic games would give a further strong push to sporting culture in India.
- **Promotion of Investment and Tourism**: India's bid for hosting the Olympics can catalyse investment and tourism in the country.
- **Previous Experiences of Hosting Big tournaments**: India has successfully hosted several big tournaments in the past like the Asian Games (1982). With India's large growing economy, it can successfully host the biggest sporting tournament on the planet.

What are the challenges in successful hosting of the Olympics?

- **Cost Overruns and Financial Distress**: Almost all recent Olympic events have witnessed cost over runs and have caused financial distress in many countries. The cost of an Olympic event can exceed US$ 8-10 billion. Most prominent crisis was in Greece (Debt crisis) after the Athens Olympics 2004.
- **Limited Economic Benefit**: Some economists point out that the expected economic benefits through tourism etc. are limited. It has been estimated that Paris Olympics will add only 0.03% to France's GDP.

The Huge Costs Behind The Olympic Games

Estimated cost of hosting the Olympics since 1988*
(in billion U.S. dollars)

	Summer	Winter	Overrun (in %)
Calgary 1988		1.2	65
Albertville 1992		2.1	137
Barcelona 1992	11.6		266
Lillehammer 1994		3.4	277
Atlanta 1996	4.7		151
Nagano 1998		2.2	56
Sydney 2000	5.2		90
Salt Lake City 2002		2.7	24
Athens 2004	3.1		49
Turin 2006		4.7	80
Beijing 2008	8.3		2
Vancouver 2010		3.2	13
London 2012	16.8		76
Sochi 2014		28.9	289
Rio de Janeiro 2016	23.6		352
Pyeonchang 2018		3.4	2
Tokyo 2021	13.7		128
Beijing 2022		8.7	149
Paris 2024	8.7		115

Source: Statista. Recent Summer/Winter Olympics have witnessed cost overruns (right column, % overrun).

- **Expensive Bidding Process:** Bidding for Olympics is an expensive endeavour with countries spending close to US$ 50-100 million even for unsuccessful bids. Tokyo spent US$ 150 million for unsuccessful bid for 2016 Olympics.
- **Low capacity of Urban Local Bodies in India**: The majority of expenditure and the implementation of the Olympic games is done by the Urban Local Body of the host city. Urban Local Bodies in India lack the financial and organisation capacity for a big event like Olympics.
- **Corruption**: Commonwealth Games (2010) were plagued by corruption by organizers and administrators. There are challenges of politico-bureaucratic interference in successful conduct of the games.
- **Environmental Challenges**: Building of huge infrastructure for the games can prove to be detrimental to the local environment (like felling of trees).
- **Post-event Disuse of Infrastructure**: A significant amount of new infrastructure is required to be created for hosting the event like Olympic Village for players. Most such infrastructure has low utility after the event.

Hence, there is a need for greater discussion on the merits of bidding for and hosting Olympics. If the Government decides to go ahead, they must develop appropriate strategy to minimize the cost overruns, and sustainable utilization of the infrastructure post-Olympics. *(Read more on India's Bid to host Olympics)*.

10. Challenges Faced by Female Refugees

News: Female refugees face greater challenges than men due to various factors. Lack of adequate support and legal protections make them more vulnerable.

What is the current status of human displacement Worldwide?
- As of 2023, 11.73 crore people have been forcibly displaced globally due to conflict, persecution, and violence. Among these, 3.76 crore are refugees.
- Ongoing conflicts, like the Israel-Hamas war and Ukraine-Russia war, continue to increase displacement.
- Refugees face severe challenges, particularly women who **comprise 46% of refugees in India**.

What are the challenges faced by female refugees?
- **Sole Responsibility**: Female refugees often bear sole responsibility for children and elderly family members.
- **Increased Risk of Abuse**: They are highly vulnerable to **gender-based violence**, including sexual abuse and exploitation, especially in displacement camps.
- **Mental Health Issues**: Women refugees are more likely to suffer from **mental health problems** like PTSD and depression.
- **Limited Healthcare Access**: Refugee women have **restricted access to healthcare**, especially mental health services. They are mostly dependent on government hospitals, which are overcrowded and underresourced.
- **Legal Exclusion**: Although India has laws protecting persons with disabilities, refugee women with psycho-social disabilities are often **excluded from these protections**.
- **Social Stigma**: They face social stigma and isolation, especially in patriarchal societies, making it difficult to access necessary services and support.

What must be done to improve their situation?
- The Government should create a **uniform legal framework for refugees**, addressing their specific needs.
- This framework must **integrate the provisions of international commitments**, such as the **UN Convention on the Rights of Persons with Disabilities** (UNCRPD), to protect the rights of refugees with psychosocial disabilities. Refugee women must be included in mental health policies.
- India **lacks a legislation on refugee policy**. The Government must consult all stakeholders and articulate a policy or formulate a law on refugees in India. *(Refer EPIC March 2022 for The Need for an Asylum Law in India)*.

11. Political Upheaval in Bangladesh and the Possible Impact on India

News: The ouster of PM Sheikh Hasina by popular protests has created new challenges for Indian diplomacy in managing relationship with Bangladesh.

What are the reasons behind exit of Sheikh Hasina as Bangladesh's PM?

- **Student Protests**: Students were **protesting against reservation** for descendants of freedom fighters which galvanized into a **nationwide movement**. The Government deployed **forceful tactics to quell the movement** like arrests of students, strict curfews with 'shoot-at-sight' orders. The use of word 'Razakars' for students led to more widespread support for student protests. *(Razakar is used to refer to those individuals who collaborated with Pakistani Army against Bangladesh's Independence Movement in 1971 and is considered a derogatory term in contemporary Bangladesh).*
- **Slowing Economic Growth**: Bangladesh had made rapid economic progress under PM Sheikh Hasina. ~25 million people were lifted out of poverty in the last 20 years (World Bank). However, the economic growth had slowed down considerably after the Pandemic. The garment industry was badly hit. The increased unemployment, high inflation, and economic slowdown led to discontent against the Government.
- **Economic Inequalities**: The proliferation of Bank scams and an expanding list of defaulters, coupled with rampant corruption, fuelled public discontent against rising inequalities despite overall economic progress.
- '**Democratic Backsliding**': Human rights groups had been raising concerns regarding erosion of democratic values in Bangladesh and curbing of dissent against the Government. The election process since 2014 was considered to be unfair with several opposition leaders in jail, boycott by opposition parties and low turnout.
  - The Government increasingly relied on **hard power** to maintain control e.g., The Digital Security Act, 2018, became a potent weapon to silence critics and stifle freedom of online expression.

Evolution of India-Bangladesh Relationship

Period	Details
During Bangladesh's War of Independence (Phase of High)	• The foundation of India's relationship with Bangladesh was laid with the **1971 Bangladesh Liberation War**. • India provided critical **military and material support** to assist Bangladesh in its fight for independence from Pakistan. • The first Independent Government of Bangladesh, led by Sheikh Mujibur Rahman, was formed and administered from Theatre Road in Kolkata.
During the Military rule in Bangladesh (Phase of low)	• India-Bangladesh relations soured within a few years as **military regimes took control** after the assassination of Sheikh Mujibur Rahman in 1975. • There was a rise in **anti-India sentiment**, during the military rule of General Zia-ur-Rahman (1975-1981) and General H.M. Ershad (1982-1991), over issues ranging from **boundary disputes**, **insurgency** and **water-sharing**.
Return of Parliamentary Democracy in Bangladesh in 1991 (Phase of repair and towards high)	• After the return of Parliamentary democracy in 1991 and Sheikh Hasina coming to power in 1996, India and Bangladesh scripted a new chapter of **cooperation in bilateral ties** with a treaty on the sharing of Ganga waters. • Since then, India and Bangladesh have built cooperation in **trade**, **energy**, **infrastructure**, **connectivity** and **defence**.

What was the positive impact of Sheikh Hasina's tenure as PM on India-Bangladesh Relationship?

India-Bangladesh relationship prospered in several dimensions under PM Sheikh Hasina's rule.

- **Check on Extremism**: Bangladesh kept extremism in check. The anti-India terror groups that had operated under the previous regime (2001-06, of Bangladesh Nationalist Party led by Khaleda Zia) had been eradicated.

- **Bilateral Trade**: Trade improved several fold in the last decade and amounted to US$ 13 billion in 2023-24.
  - Bangladesh became India's biggest trade partner in the subcontinent. India is among top trading partners of Bangladesh.
- **Discussions on FTA**: India and Bangladesh had begun negotiations for a free trade agreement which would be beneficial for both the countries and further enhance bilateral trade.
- **Connectivity**: Connectivity infrastructure has improved considerably. These include: Akhaura-Agartala cross-border rail link, Khulna-Mongla Port rail line, 5 operational bus routes between India and Bangladesh (Kolkata, Agartala and Guwahati to Dhaka), Agreement for the usage of the Chittagong and Mongla ports to ease the movement of cargo between mainland India and the Northeast. India has extended 3 lines of credit to Bangladesh since 2016 worth US$ 8 billion for development of road, rail, shipping and port infrastructure.
- **Land Boundary Agreement (2015)**: India and Bangladesh swapped the disputed territory and allowed the inhabitants to choose their country of residence. This settled a major long-standing dispute.
- **Energy cooperation**: Bangladesh imports ~2,000 MW of electricity from India. The India-Bangladesh Friendship Pipeline, connecting Siliguri and Parbatipur, will transport High-Speed Diesel to Bangladesh.

What are the challenges posed by regime change in Bangladesh?

- **Security Challenges**: Although it is premature to conjecture, but there are high risks of return of anti-India terror groups in Bangladesh. This may worsen India's security challenges with possibility of revival of insurgency movements in the North-east.
- **Connectivity with North-east**: Worsening of situation in Bangladesh may disrupt the connectivity projects. It will hamper development in the North-eastern States of India.
- **Instability at Border**: There have been news of repeated attacks on minority communities in Bangladesh. They may be forced to leave Bangladesh and try to migrate to India.
- **Trade Ties**: The bilateral trade negotiations may be in jeopardy.
- **People-to-people Ties**: Anti-India sentiment has been fomented among the population in Bangladesh. The anger against Sheikh Hasina's hard tactics is also being directed against India due to India's support to her.
- **Geopolitical Challenges**: Pakistan and China will see the political change in Bangladesh as an opportunity to challenge India's presence in the country and try to tar it with a pro-Hasina brush.

What should be India's approach to deal with the Bangladesh Crisis?

- **Support to Popular Expression**: India as a vibrant multi-party democracy, should be seen as supporting the expression of popular will in Bangladesh.
- **Cooperate with New Interim Government**: India should extend full cooperation to the new interim Government in stabilizing the situation in Bangladesh.
- **Support Electoral Process**: India should support the conduct of free, fair and transparent elections in Bangladesh at the earliest.
- **Engage Opposition Parties**: India should also engage with the opposition parties in Bangladesh and assure them of no-change in India's approach towards fostering and strengthening friendly ties with Bangladesh.
- **Policy Correction**: Several foreign policy experts have pointed out that Indian policy often tends to develop relationship with only one political party in the neighbouring countries. This often gives opportunity to the other parties to **incite anti-India sentiment** for electoral benefits. It also causes deterioration of relationship when the other party comes to power. This has happened in Maldives and Nepal earlier, and now in Bangladesh *(India had limited engagement with BNP and was seen as favouring Awami League of Sheikh Hasina)*. In the longer term, there is a need for course correction and a **policy of transparent engagement with all political parties should be adopted**. *(Refer EPIC July 2024 for India-Bangladesh Relationship)*.

General Studies Paper III

1. Need for Reassessing the Inflation Management Framework

News: Food Inflation has remained high despite higher interest rates. Economic Survey has called for removal of food inflation from the inflation target for RBI.

What does recent data reveal about Inflation?

- Recent data indicate that **food inflation has remained consistently high**, exceeding 6% in both urban and rural areas since July 2023.
- In contrast, **non-food inflation has steadily decreased** and is now below 2%.
- Despite the decline in non-food inflation, **overall headline inflation remains above the 4% target** due to the persistent rise in food prices. *(Refer EPIC June 2024 for Combating High Inflation in India).*

What is the debate on Inflation Targeting?

- **Focus on Non-Food Inflation**: The Chief Economic Advisor has suggested that inflation targeting policy should be focused on non-food inflation (shift the target from headline inflation to core inflation). He argues that **monetary policy effectively controls** (through interest rates) **demand-driven inflation**, **unlike supply-driven food inflation**. *(Refer EPIC July 2024 for Importance of Buffer Stocks in Managing Inflation).*
- **Importance of Food Inflation**: The RBI Governor has argued that **food inflation significantly shapes the inflation expectations of the public**, as people primarily perceive inflation through food prices. Persistently high food inflation has kept headline inflation above 4% since July 2023.

How do high interest rates impact the economy?

- **Monetary Policy and Manufacturing Costs**: Restrictive monetary policy (high interest rates) increases the operational costs for domestic manufacturers (higher interest costs due to higher interest rates). This makes them less competitive compared to global manufacturers, as their products become more expensive to produce. This can **negatively impact the balance of trade**, which can lead **to increased tariffs**, **higher prices**, and **slower economic growth**.
- **Government Response to Trade Imbalances**: If the Government responds to trade imbalances by raising tariffs, it could lead to **higher domestic prices** (further fuelling inflation) and slower growth.
- **Lower Investments**: Higher interest rates makes it expensive to borrow and firms delay their investment decisions. It **slows down capital formation** leading to slowdown in the economy.

Thus, there is a case to align monetary policy with a more accurate inflation measure, especially when the Government is following a prudent fiscal strategy, to support economic growth.

What is the need for reassessment of measurement of inflation?

- **Outdated Weightage**: The Consumer Price Index (CPI) uses a weight basket from 2011-12. The **Household Consumption Expenditure Survey** (HCES) reveals a **decline in the share of food in total household expenditure** since 2011-12; from 36.4% to 34% in urban areas and from 54.2% to 45.7% in rural areas. This decline suggests that the **Consumer Price Index** (CPI) may be **overestimating inflation**, as the **weight for food might be outdated**. *(Refer EPIC March 2024 for All India Household Consumption Survey, 2022-23).*
- **Different Impact Across Income Groups**: The poorest 5% of urban households spend 44% of their income on food, compared to 27% for the richest 5%. This creates significant disparities in experienced inflation.
- **Monetary Policy Effectiveness**: Monetary policy is more effective in managing demand-driven inflation, not supply-side food inflation. Focusing on outdated CPI measures could misalign policy with economic realities, potentially hindering economic recovery and growth.

- **Perception vs. Reality**: Public perception often overestimates actual inflation, influenced by short-term changes in food prices, leading to potentially misguided policy decisions.

What should be the consideration of the Monetary Policy Committee?

- The Monetary Policy Committee should consider **readjusting the weights of items in the CPI using the latest HCES data** to better reflect current spending patterns. However, it would be imprudent to completely exclude food prices from inflation targeting framework (i.e., shift the target to core inflation).
- It should also recognize that monetary policy is less effective in controlling supply-side food inflation.
- The inflation targeting framework may **need to be updated to align better with actual economic conditions** rather than public perceptions.

2. Reforms Needed for India's Economic Growth

News: First Deputy Managing Director of the IMF, Gita Gopinath, has suggested several measures for India's economic growth during her visit to India.

What key reforms have been suggested by IMF's Deputy Director?

- The IMF's Deputy Managing Director has suggested several reforms for India to achieve the **status of a developed country and an advanced economy**.
  According to her:
  o India needs a more **skilled workforce**, an **increase in women's labour force participation** with critical **focus on safety**, **investment in infrastructure** along with **more structural changes**, especially **land and labour reforms**.
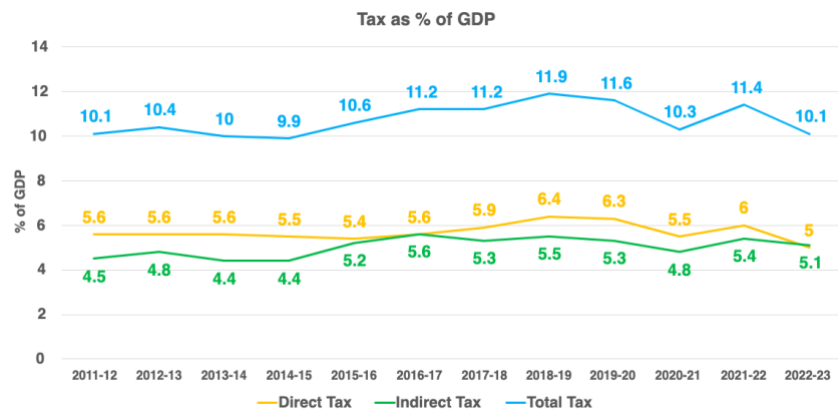
Data Source: Economic Survey. The Tax-to-GDP Ratio (Central Taxes) has remained nearly constant in the last 10 years

- **Tax Revenues**: To improve fiscal space for the Government, measures should be taken to improve India's revenue-to-GDP ratio. *(Refer EPIC September 2023 for Improving India's Tax-to-GDP Ratio).*
  o Fewer tax rates and **broadening of base under GST** (fewer exemptions) can result in additional revenues. This can add **1 percentage point to the GDP growth**.
  o **Tax leakages** should be checked and **Property tax regime** should be **made more robust** through use of technology.
  o Tax system should be made **more progressive** and **share of capital gains tax** in total tax revenues should be improved.
  o The Government shouldn't cut expenditures to meet fiscal deficit target. However, the **subsidies** (like fertilizer subsidies) **can be rationalized** and **made more targeted**. *(Refer EPIC August 2023 for Rising Debt Level of the Government).*
- **Skilled Workforce**: To become an advanced economy, an educated and skilled workforce is needed. Levels of education and skilling in India are much below G20 peers. India must **upgrade its education and skilling ecosystems**.

- **Job Creation**: India must create between 10 to 24 million jobs annually over the next decade. The jobs must be created in **diverse sectors that are more labour intensive**.
  - o **Women's participation** must be improved from the present level of ~35%. Government should facilitate female participation by **improving access of women to education**, **skilling** and **safe work environments**.
- **Infrastructure**: The Government has significantly improved capital expenditure on infrastructure. Yet a big gap exists between actual spending and spending required. Government must **promote participation of the private sector** to improve investment through appropriate investment models and policy changes.
- **Regulatory Reforms**: Improving regulatory environment, Ease of doing business, the efficiency of the judicial system are also going to be critical. *(Refer EPIC July 2024 for Issues with the Statutory Regulatory Authorities in India)*.
  - o **Land and labour reforms** will also play a crucial role in the elevation of India to high-income country. Much **greater flexibility is required in the labour markets**. In 2019-20, the Parliament had passed a new set of labour codes that provided a blend between achieving labour market flexibility while also protecting interests of the workers. The focus should now be on its effective implementation.
- **Rationalization of Tariffs**: On an average, tariff rates in India are higher than in its other peer economies. The tariff rates must be rationalized to improve India's integration into global supply chains.

3. Challenges Faced by Regional Rural Banks (RRBs)

News: Regional Rural Banks face several challenges related to outdated technology and poor infrastructure. There is a debate whether RRBs should be merged with their sponsor banks.

What is the importance of RRBs?

- **Purpose**: RRBs were established in 1975 to provide **banking and credit facilities in rural areas**, combining local familiarity with commercial professionalism. All Public Sector Banks (except Punjab and Sind Bank) support one or more RRB. J&K Bank is the only private sector bank that supports an RRB.
- **Wide Reach**: As of March 31, 2023, **43 RRBs** manage over **305 million deposit accounts** and **29 million loan accounts** across **21,995 branches**.
  - o **92% RRB branches** are in **rural or semi-urban areas**, showing their importance in **reaching underserved regions**.
- **Support for Government Schemes**: RRBs play a crucial role in expanding government schemes, **disbursing wages** under rural job guarantee schemes, and **distributing pensions**.
- **Vital for Rural Economy**: RRBs help support **agriculture and rural finance**, which are vital for India's rural economy. *(Refer EPIC March 2024 for Primary Agricultural Credit Societies (PACS))*.

What are the challenges faced by RRBs?

- **Outdated Technology**: RRBs are lagging in digital services, making it difficult to compete with private and small finance banks.
- **Poor Infrastructure**: Many RRB branches lack basic facilities. RRB branches often have no security guards, poorly maintained cash rooms, and inadequate air conditioning.
- **Slow Service Delivery**: Customers expect quick services like ATM cards and cheque books, but RRBs struggle to provide prompt services. This leads to customer dissatisfaction and migration to other banks.
- **Financial Struggles**: Despite capital infusion of INR 10,890 crore between 2021-23, RRBs continue to grapple with **non-performing assets** and mismanagement, **hindering their growth and competitiveness**.

What steps have been taken to improve the condition of RRBs?

- **Infusion of Capital**: The Government has infused INR 10,890 crore into RRBs during FY2021-22 and FY2022-23, significantly more than the total INR 28,393 crore infused from 1975 to 2020-21.

- **Technology Upgrades**: Efforts are being made to upgrade technology, with support from sponsor banks, which **helps reduce costs by sharing technology vendors**.
  - The Union Finance Minister has emphasized the need to enhance digital capabilities and increase the penetration of schemes like the Pradhan Mantri Mudra Yojana, targeting micro, small, and medium enterprises.

TECHNOLOGY ADOPTION BY RRBs (FY23)

31 Number of RRBs that have acquired a mobile banking licence

17 Number of RRBs that have acquired an internet banking licence (transaction facility)

26 Number of RRBs that have onboarded to BHIM-UPI

Should RRBs be merged with Sponsor Banks?
Argument Against Merging
- RRBs were created to focus on agriculture and rural finance, serving banking needs of rural citizens. They must remain functional to further financial inclusion.
- Merging might shift their focus away from rural areas, as **sponsor banks have broader commercial interests**. Merging might lead to rationalization of branches (for profitability) which can negatively impact access to services.
- Upgrading technology without merging could help RRBs maintain their rural focus while improving services.

Argument For Merging
- Merging could **address shortages of staff** and **update the skills of RRB employees**.
- All India Bank Officers' Confederation and Employees Association support merging to **reduce competition** and **financial waste** between RRBs and sponsor banks.
- Some customers have moved to private banks due to RRBs' outdated services. Merging may help in improving services and check the exodus of users.

What should be done?
- Experts suggest that RRBs should **receive an immediate technology upgrade**.
- While merging with sponsor banks is one option, many believe that **keeping RRBs independent** and improving their technology **would be better for maintaining their focus on rural development**.

4. Low Investment in Agriculture R&D

News: Low investments in R&D hampers the adaptation of agriculture sector to new challenges posed by stagnant productivity and climate change.

What are the challenges faced by Agriculture in India?
- Agriculture in India has typically suffered from issues like small landholdings, low availability of irrigation facilities, imbalanced use of fertilizers, subsistence farming, lack of mechanized farming, poor access to credit, poor supply chain and lack of adequate warehouse and marketing facilities, high crop losses etc.; all these factors contribute to **low productivity**, **low value addition** and **low income for farmers**.
- **Climate change has posed new threat to agriculture and allied activities**. Climate change is expected to cause more extreme weather events, uneven monsoons, floods, and droughts. The Economic Survey forecasts that **wheat yields could drop by 19.3% by 2050 and 40% by 2080**, worsening food insecurity and inflation as the population grows. Extreme weather, including irregular monsoons and supply-chain disruptions, are the key factors driving food inflation over the last 2 years.

What are the challenges in India's Agriculture R&D ecosystem?
- **Lack of Adequate Funds**: The total allocation to Agriculture and allied sectors in Budget 2024-25 rose by only 5% compared to last year. This is below the inflation rate.

o Budgetary allocation to **Department of Agricultural Research & Education** has remained even lower.
o Indian Agriculture Research Institute had a budget of INR 710 crore in 2023-24. Of this, INR 540 crore (~76%), went to salaries and pensions, and INR 98 crore (~14%) to administrative expenses. This leaves **limited funds for crucial areas like research**, **breeding**, and **acquiring modern equipment** such as DNA sequencers and high-throughput screening tools.

- **Misplaced Policies and Subsidies**: Much of the support for the agriculture, food, and rural sectors has been directed towards **welfare measures and subsidies**, such as food and fertilizer subsidies. These subsidies have boosted agriculture productivity but have also contributed to decline in soil fertility, depletion of ground-water, and increased emissions of nitrous oxide and methane.
  o They have also encouraged unhealthy diets rich in sugar and carbohydrates rather than fiber and protein, impacting public health negatively.

- **Agriculture Research Intensity (ARI)**: The ARI has decreased to 0.43% in 2022-23 from its peak of 0.75% in 2008-09 and is expected to decline further in 2024-25. This trend could impact food security and may lead to increased food inflation. In contrast, Brazil's ARI is 1.8%.

  > **Agriculture Research Intensity (ARI)**
  > ARI is the ratio of expenditure on Agriculture R&D to the value added by Agriculture in GDP/GVA.

  o The **budget for autonomous research bodies** under the Ministry was cut by 2% this year. This highlights a mismatch between the focus on improving agricultural research and the actual funding decisions.

- **Lack of Talent**: Due to the paucity of dedicated funds, they are not **able to attract specialized talent** in genome editing, blockchain, and artificial intelligence for agriculture.
- **Old Institutional Design**: The public agricultural research system, including the ICAR institutes and the State Agricultural Universities (SAUs) were established during the 1960s and 1970s and still work in those settings.
- **Comprehensive Research Approach**: ICAR has many institutes dedicated to specific crops and animals such as soybean, cotton, grapes, and camels. However, these institutes prioritize individual crops or animals rather than adopting a comprehensive research approach that fits diverse agro-climatic zones.
- **Lack of Protection for IP Rights**: The absence of **adequate protection of intellectual property rights** has contributed to the decline in cotton production and the stagnation of oilseeds production.

What steps should be taken to improve R&D in Agriculture?

- **One Time Fund**: A one-time fund of INR 5,000 crore can upgrade infrastructure and modernize research facilities at ICAR institutes and SAUs. This should be coupled with organizational restructuring and reforms.
- **Enhancing Institutional Autonomy**: The institutions should have the freedom to hire top talent and generate funds. This could be through partnerships with private entities, sponsored research, or earning royalties on seeds and technologies.
- **Prioritizing Agricultural Research**: The Union and State budgets should prioritize agricultural research in both the public and private sectors, alongside providing greater intellectual property protection for breeders and technology developers.
- **Rationalize Subsidies**: The research shows that each rupee invested in agricultural R&D returns 11.2 times, far more than the returns from fertilizer (0.88) and power subsidies (0.79). This indicates that **shifting funds from these subsidies to agricultural R&D** could be highly beneficial. Effective policymaking through re-orienting subsidies can enhance the allocation for better R&D initiatives in the Agriculture sector.

5. Small Modular Nuclear Reactors

News: The Government of India is planning to collaborate with the private sector to study and test Small Modular Reactors (SMRs).

Why is nuclear power needed to supplement renewable energy?

- The **transition to clean energy** from coal-fired power plants poses **multiple challenges**. Solar and wind energy alone will not be sufficient to provide affordable energy to everyone.
- Solar and Wind energy systems pose problems related to **costs and grid stability** (due to their **intermittent supply**). There is dependence on systems that can **quickly ramp-up/down the production** of electricity based on demand like hydropower or nuclear *(not considering thermal power plants for decarbonised electricity systems)*.
- The **grid integration costs of nuclear power plants** (NPPs) **are lower** than those associated with variable renewable energy (VRE) sources like solar and wind, because NPPs generate power 24×7 in all kinds of weather. *(Read more about India's Nuclear Energy Programme)*.

What are Small Modular Reactors?

- According to **International Atomic Energy Agency** (IAEA), the SMRs are advanced nuclear reactors with a **power generation capacity ranging from less than 30 MWe to 300 MWe**. SMRs are:
  - **Small**: Physically a fraction of the size of a conventional nuclear power reactor.
  - **Modular**: Making it possible for systems and components

SMR Technologies
- ★ **Land-based Water Cooled SMRs**: Water cooled SMR designs having different configurations of **Light Water Reactor** (LWR) and **Pressurized Heavy Water Reactor** (PHWR) technologies for on-land applications.
- ★ **Marine-based Water Cooled SMRs**: Water-cooled SMR designs for use in marine environments.
- ★ **High-temperature Gas-cooled SMRs (HTGRs)**: SMRs with very high temperature heat of more than **750 degrees Celsius** and thereby having **higher efficiency in electricity generation**.
- ★ **Liquid metal-cooled Fast Neutron Spectrum SMRs (LMFRs)**: Designs based on **fast neutron technology** with different coolant options including **helium gas** and **liquid metal coolants** like lead, sodium, and lead-bismuth.
- ★ **Molten Salt Reactor SMRs (MSRs)**: Based on **molten fluoride** or **chloride salt** as coolant.
- ★ **Microreactors (MRs)**: Very small SMRs designed to generate electrical power typically up to **10 MW**(e) with coolants like light water, helium, molten salt and liquid metal.

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   to be **factory-assembled** (located away from the nuclear power plant) and transported as a unit to the location of the plant for installation.
  - **Reactors**: Harnessing nuclear fission to generate heat for electricity production or direct application.
- At present, nearly **80 SMR designs** are under development and licensing stages, and a few of them are at deployment and operational stages globally.
- Both public and private entities are actively engaged to realize SMR technology's implementation before the end of this decade. Two SMR projects have reached at operational stage globally, 1 each in Russia and China.

How are Small Modular Reactors different from the conventional nuclear powerplants?

- SMRs are designed with a **smaller core damage frequency** (the likelihood that an accident will damage the nuclear fuel) and **source term** (a measure of radioactive contamination) compared to conventional NPPs.
- The design of SMR is **simpler** than those of conventional NPPs and includes several **passive safety features**, resulting in a **lower potential for the uncontrolled release of radioactive materials** into the environment.
- The amount of **spent nuclear fuel** stored in an SMR project will be lower than that in a conventional nuclear power plant.

What are the benefits of Small Modular Reactors?

- **SMRs are Adaptable and Scalable**: SMRs are adaptable and can be scaled up or down to supply higher or lower power. SMRs can also be used to supplement existing power plants with zero-emission fuel or to help **repurpose ageing thermal power stations**.
- **Refuelling Interval**: SMR-based power plants may require refuelling every 3-7 years, compared to every 1-2 years for traditional plants. Some SMRs are designed to operate for up to 30 years without refuelling.

- **Compact**: Land requirement in the case of SMRs is lesser compared to large reactors and renewable energy sources. SMRs are anticipated to reutilize parts of ageing and decommissioned fossil fuel based power plants.
- **Safety Features**: Extensive use of **passive safety features in SMR designs**, to shut down and cool the reactor under abnormal circumstances, provide inherent safety. In most cases, these technologies don't need a power supply and can handle accidents without the assistance of a person or a computer.

Source: IAEA. The image depicts that while SMRs and Microreactors can provide electricity to only smaller cities or factories, they require less space and can be set up in less accessible locations like hilly areas.

- **Economical**: SMRs require a low capital outlay. They have the adaptability to **allow co-generation** *(provide both electricity and heat (for industrial applications))*, supply heat for desalination and manufacturing etc.
- **Flexibility**: SMRs can be **integrated with renewable energy** to fulfil the need for flexibility, producing energy services, and low-carbon co-products. These can include electricity, hydrogen, synthetic fuels, hot process gases or steam. SMRs can be coupled with variable energy sources (like renewables), to **mitigate fluctuations** on a daily and seasonal basis.

What are the challenges associated with Small Modular Reactors?

- **Technology Choice Issue**: A large number of SMR technology alternatives are evolving in parallel. It can pose regulatory challenges and impact cost optimization. Industry developers should collaborate to narrow down the range of SMR designs.
- **Finance**: The industry has not yet realized a fully developed operational fabrication facility for large scale serial manufacturing of SMR components. Such facility may necessitate a very large investment. In addition, there are challenges in **mobilizing finance for technology development**, licensing and construction of prototype plants.
- **Safeguard and Licensing Challenges**: The lack of experience with innovative designs within the nuclear safety regulatory organisations presents a problem in examining and approving the safety standards.
  o Regulatory bodies have to develop robust safeguards for the novel technology.
  o The **Atomic Energy Act** will need to be amended to **allow the private sector to set up SMRs**.
- **Radioactive Waste**: SMRs also produce radioactive waste from spent fuel and require spent fuel storage and disposal facilities. Apart from the technological and cost aspects of such a requirement, this requirement can also lead to socio-political resistance.
- **Public Perception**: Nuclear power has faced opposition from some sections of the general public due to potential consequences of a nuclear disaster. Large scale deployment of SMRs may face popular opposition.

What should be the way forward?

- **Standardization of designs of components and modules** will facilitate adoption of SMRs at large scale.
- The existing **methodology of safety assessment should be updated** for the concept of multi-module designs and emergency planning zones of SMRs.

- Availability of **low-cost finance**, inclusion in **green taxonomy** and utilization of innovative financing instruments such as **blended finance**, **green bonds**, etc. are required to **catalyse private investment**.
- Availability of required **skilled personnel** must be ensured, across the value chain (engineering, design, testing, inspection, construction, erection and commissioning etc.) for multi-module plants.
- **Strategic partnerships** will be key to successful technological development and deployment of SMRs on a large scale. Collaboration among national laboratories and research institutions, academic institutions, private companies and Government departments is necessary.
  - These collaborative efforts would be required to be extended at the level of **International Atomic Energy Agency** to coordinate among countries for **developing an ecosystem** for greater benefits.

6. India's Strategy for AI Leadership

News: INDIAai mission aims to put India at the forefront of AI Technologies.

What is India's Strategy for AI Leadership?

- **Focus on Local AI Solutions**: The focus is on tailoring AI to address local needs, driving societal impact and economic growth.
- **Development of Foundational Models**: The approach is to invest in long-term AI capabilities for global competitiveness.
- **Public Private Collaboration**: The model involves **public sector funding** for GPUs and semiconductors, with **private sector innovation**.
- **Supportive Policies**: Laws like the **Digital Personal Data Protection Act** and frameworks like **Data Empowerment and Protection Architecture** (DEPA) are intended ensure data protection and privacy which will facilitate a secure environment for AI development.
- **Manufacturing Initiatives**: PLI schemes have been launched to boost local production of components, reducing dependence on imports e.g., PLI beneficiaries drove 82% of mobile phone exports in 2022-23.

What steps have been taken by the Government to promote AI?

- Government has announced an INR 10,371.92 crore package for the **National Mission for AI** (INDIAai).
- Under the fund, there is **viability-gap funding** of ~INR 4,500 crores for setting up 10,000 high-end **Graphics Processing Units** (GPUs).
- An "AI Marketplace" will be established, designed to **offer AI-as-a-service** and pre-trained model.
- It will **develop foundational models** with capacities exceeding **100 billion parameters**. It will be trained on datasets covering major Indian languages for sectors such as healthcare, agriculture, and governance.

Pillars of INDIAai Mission

- ★ **IndiaAI Compute Capacity**: The objective is to develop an **AI compute infrastructure** comprising **10,000 or more GPUs** via **partnerships between the public and private sectors**.
- ★ **IndiaAI Innovation Centre**: The Center will create and use its own **Large Multimodal Models** (LMMs) and domain-specific foundational models in critical sectors.
- ★ **IndiaAI Datasets Platform**: It will simplify access to high-quality, non-personal datasets for AI innovation and will offer startups a single platform for easy access to non-personal datasets.
- ★ **IndiaAI Application Development Initiative**: This initiative will promote AI applications in critical sectors by addressing problem statements obtained from Central Ministries and other sources.
- ★ **IndiaAI FutureSkills**: It aims to **reduce barriers to entry into AI programs** and will expand AI courses at undergraduate, master's, and Ph.D. levels. Data and AI Labs will be established.
- ★ **IndiaAI Startup Financing**: This pillar aims to help and speed up **deep-tech AI startups**, offering them **easier access to funding** for futuristic AI projects.
- ★ **Safe & Trusted AI**: This pillar will support the execution of responsible AI projects, which involves creating indigenous tools and frameworks.

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What is the Role of INDIAai Mission?

- **Enhancing Computational Capacity**: India's AI mission focuses on improving computational resources, which is crucial for AI development.
- **Fostering Innovation**: Establishment of dedicated AI centers will drive innovation and help create new applications of AI.
- **Developing Open Datasets**: Creation of extensive open datasets will support AI research and application development.
- **Upskilling the Workforce**: Training of individuals to develop and manage AI technologies, will ensure a skilled workforce.
- **Financing Startups**: Providing financial support to AI startups will attract entrepreneurs and promote innovation and growth in the AI sector.
- **Ensuring Safe AI Practices**: Implementing safe and trusted AI practices will build public trust in AI technologies.

What are the challenges in realizing full potential of AI in India?

- **Under-investment**: According to **Stanford's AI Index 2023**, the US has invested ~US$ 250 billion in 4,643 companies, China has invested US$ 95 billion in 1,337 AI startups. In contrast, India has invested only US$ 8 billion in 296 startups since 2013.
- **Lack of Sophistication in Microchip Manufacturing**: AI needs chips below 5 nm in size whereas the recently announced chip manufacturing plant in Dholera will manufacture chips in the size of 28-90 nm.
- **Graphics Processing Units (GPUs)**: India lacks GPUs that are crucial to train AI models and build indigenous Large Language Models (LLMs) and Large Multimodal Models (LMMs). The recently allocated money would be sufficient to fund only 1,000-1,500 high-end GPUs.
- **Inadequate Local LLMs**: While India has only a handful of local LLMs, China already has at least 130 LLMs, accounting for **40% of the global total**.
- **Lack of Digital Data for Indian Languages**: Most of India's 22 official Indian languages do not have digital data to train AI models. There is a lack of quality non-personal data.

What should be done going ahead?

- There should be **more sophistication in microchip manufacturing** to meet the demands of AI industry. **PLI scheme for IT hardware** should offer greater incentives to boost domestic manufacturing of advanced chips.
- **Policy Support**: The AI ecosystem needs sensible, clear regulation and legislation, and enabling policies:
  - A sensible customs and tax policy for **importing relevant hardware**.
  - A push to encourage local manufacturing of high-end equipment including semiconductors.
  - Since AI depends a lot on data, there is an urgent need to finetune the **processing and storage of both personal and non-personal data**.
- AI development in India should focus on **addressing India-specific problems** in agriculture, education, healthcare, climate change, waste management etc.

7. Energy Transition: Challenges and Solutions

News: The Government has been promoting renewable energy through several initiatives. However, the process of energy transition has several associated challenges.
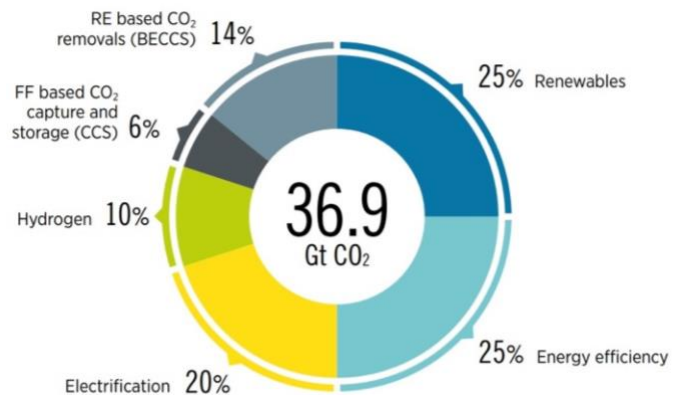
What is the meaning of Energy Transition?

- It refers to **transition of energy sector** from **fossils-based systems** of energy production and consumption to **renewable energy sources**.

- It involves a **shift in the energy mix** to reduce the emissions of greenhouse gases (GHGs).
- Energy transition has been made possible by **technological advancements** (like solar panels) and a societal and Governmental **push toward sustainability**. The process involves structural and permanent changes to energy supply, demand and prices.
- Past energy transitions included the **transition from wood** (as primary source of energy) **to coal** (17th-18th century) and **coal to oil** (19th-20th century, though both coexist). These shifts were accompanied by **structural shift in other sectors** like industry, transportation, energy generation etc.

What steps have been taken by India towards Energy Transition?

- **Climate Action under Nationally Determined Contributions (NDCs)**: India's climate action is aimed at reducing emission intensity of GDP, enhancing share of non-fossil fuel based energy resources, improving carbon sinks and promoting healthy Lifestyle for Environment (LiFE). *(Read more about India's climate targets)*.

- **Other Climate Action**: India intends to achieve Net Zero by 2070. India is aiming to become a **global hub for green hydrogen** production and exports and India targets to achieve **20% ethanol blending** in petrol by 2025-26 (earlier target year was 2030) *(Read more about Ethanol Blending)*.

- **Renewable Purchase Obligations (RPO)**: To expand capacity and adoption of renewable energy, a mandate of Renewable Purchase Obligation has been issued to the utility companies (*i.e., all electricity distribution licensees should purchase or produce a minimum specified quantity of their requirements from Renewable Energy Sources*).

Note: Abatement estimates include energy and process-related CO_2 emissions along with emissions from non-energy use. Renewables include renewable electricity generation sources and direct use of renewable heat and biomass. Energy efficiency includes measures related to reduced demand and efficiency improvements. Structural changes (*e.g.* relocation of steel production with direct reduced iron) and circular economy practices are part of energy efficiency. Electrification includes direct use of clean electricity in transport and heat applications. Hydrogen and its derivatives include synthetic fuels and feedstocks. CCS describes carbon capture and storage from point-source fossil fuel-based and other emitting processes, mainly in industry. BECCS and other carbon removal measures include bioenergy coupled with CCS in electricity, heat generation and industry.

CCS = carbon capture and storage; BECCS = bioenergy with carbon capture and storage; RE = renewables; FF = fossil fuel; $GtCO_2$ = gigatonnes of carbon dioxide.

Source: IRENA. 6 Technological Avenues to achieve Energy Transition by 2050 (Net Zero).

- **International Solar Alliance**: India has shown global clean energy leadership through initiatives such as the International Solar Alliance, which has ~119 member countries.

- **Policy Measures**: The Energy Conservation (Amendment) Act, Missions like National Green Hydrogen Mission, National Policy on Biofuels, Fiscal incentives, and market mechanisms (PAT Scheme, proposed Carbon Market *(Refer EPIC August 2022)*) indicate India's serious commitment to energy transition.

- **Other Government Initiatives**: **(a)** Subsidies on Petrol and Diesel have been removed in the last decade; **(b)** Subsidies are being provided to EVs; **(c) FAME Scheme** (Faster Adoption and Manufacturing of Electric Vehicles) was launched in April 2015 under the National Electric Mobility Mission; **(d)** Government has provided fuel gas for cooking to millions of households enabling a steady transition away from the use of traditional biomass such as burning wood etc.

What are the challenges to Energy Transition?

- **Policy and Regulation**: The present energy transition has largely been **driven by Government** policies and regulations. The previous energy transitions (wood to coal to oil and gas) had occurred through **inter-fuel competition**, efficiency of new fuels and **market forces** that accompanied the industrial development.

- o **Misplaced policies** can produce **undesirable effects** e.g., critics argue that carbon tax in developed economies (EU/US) has shifted the polluting manufacturing units to Asian economies where **regulation is lax**. This has **allowed MNCs to continue to emit GHGs**. Such policies haven't contributed to cut down in emissions, only **shifted the emissions from developed to developing countries**.
  - o Many policies pose new challenges e.g., the promotion of use of ethanol as fuel has led to **diversion of crops for fuel generation**. This has raised food prices and impacted food security.
- **Technology**: Energy transition faces several technological obstacles e.g., power generated through solar and wind energy is intermittent and poses challenges in **grid stability and load balancing**. Hence there is requirement of large storage capacity.
  - o Similarly, **hydrogen is highly explosive** in nature and will require **new technologies for safe production**, **storage**, **transportation** and **use**.
- **Finance**: Restructuring the energy systems and development of technological solutions require access to finance. The IEA has estimated that over the next decade **US$ 1-1.3 trillion will need to be invested in the power sector per annum** (in renewable energy and power networks). Banks and Financial Institutions will find it difficult to **finance risky investments in technology development**. Developing countries **lack access to finance** to support the energy transition.
- **Networks**: The present energy system has large and complex network of storage and distribution systems e.g., network of pipelines, shipping fleets, and distribution outlets. There is a risk of these assets ending up being stranded (i.e., rendered useless or without value). It will be difficult to adapt existing gas-based infrastructure for hydrogen as handling hydrogen requires more safety measures.
- **Impact on Consumers (Energy Justice and Access)**: Energy transitions could give rise to **intra-generational, inter-generational and spatial equity** concerns e.g., transition away from fossil fuels can affect near-term **fossil-dependent jobs**.
  - o Government's obligation for climate action can shrink the capacity to **spend on welfare programmes** and exacerbate **economic inequities**.
  - o Consumers may be impacted by higher costs of renewable energy. They may be **unwilling to adopt new systems** (like EVs) or to pay more in the short term for a product that can improve long-term welfare.
- **Differences about Transition Paths and Energy Mix**: Different countries and regions are starting from different positions in terms of their economic development, current energy mix, and carbon emissions. Different regions are endowed with different resources and will try to adapt according to their local circumstances. This has given rise to differences among

Just Transition ensures that **climate action**, particularly decarbonization, is **fair and inclusive**.
It aims to **distribute the benefits and burdens of climate efforts equitably**. The concept emerged in the 1970s to protect jobs threatened by environmental regulations. It was later adopted by the international trade union movement and included in the **2015 Paris Agreement**.
Initially, just transition focused on workers in **carbon-intensive industries** but has since expanded to include **vulnerable groups** like indigenous communities and women.

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countries (especially developed and developing) about which clean technologies should be adopted and how they should be financed.

- **Geopolitical and Energy Security Implications**: During the 20th century, geopolitics was centered around oil. The shift to new technologies has given rise to new concerns e.g., China has large reserves of materials used in new technologies and controls their supply chains. China has exploited its position for strategic purposes e.g., cutting down supply of materials to Japan.

What step can be taken to address the challenges to Energy Transition?

- **Accelerate Deployment of Renewable Energy**: Acceleration in deployment of renewable energy (RE) is necessary to match the pace of demand growth. It is critical to India's **Just Energy Transition** (JET). Meeting India's 2030 target requires accelerating non-fossil capacity addition. It can be achieved through measures like solarisation of agricultural electricity demand, decentralised RE for residential cooking and heating etc.

- **Finance and Technology Transfer**: Developed countries must enhance climate finance and technology transfer to fulfil their obligations under Paris Climate Agreement. It will ensure equity in energy transition.

Source: IRENA. Priority Areas and Actions for Energy Transition.

- **Global Coordination**: There is a need for global coordination to **establish standards with respect to energy transition** to ensure a uniform transition (e.g., with respect to EVs) without disruption.

- **Re-aligning Utilization of Coal**: In the long term coal will be phased out (phase down in the medium term). In order to ensure there is minimum disruption there is a need to re-align the current use of coal resources to **enhance efficiencies** until the period of complete phase-out. Coal-fired power plants could be better utilised if **located near coal mines** rather than in States with the highest energy demand. This is more efficient as coal transfer requires more energy and money than electricity transmission.

- **Government Support**: The Government should support decentralised renewable energy technologies such as utility-scale battery energy storage systems. It is imperative to set aside special 'transition funds' to assist coal-dependent regions in India, some of which are among the most impoverished regions.

- **Alternate Livelihood Opportunities**: People employed in fossil fuel-based energy systems (coal mines, power plants etc.) need to be reskilled and provided with **new employment opportunities**.

- **Decarbonising Heating and Cooling**: All new buildings must be energy efficient. Decarbonising heating and cooling will require changes to building codes, energy performance standards for appliances, and mandates for **renewables-based heating and cooling technologies** (like solar water heaters).

- **Demand-side Management**: Innovation, recycling, and the circular economy will play significant roles in the pursuit of efficiency over the medium and long term.

- **Private Funding**: Balancing private and public funding will be needed to meet investment requirements.

8. Disaster Management Act: Features, Working and Recent Amendments

News: The Government has introduced a Bill proposing several amendments to the Disaster Management Act 2005. The amendments aim to improve the operational efficiencies in response to a natural disaster.

What is the Disaster Management Act, 2005? What is the objective of the Act?

- It was enacted to provide a **comprehensive framework for disaster management** across India. The Act has 11 chapters and 79 sections, focusing on effective disaster management, risk reduction, and rehabilitation.

Objectives of the Disaster Management Act 2005 (DMA, 2005)

- **Disaster Management Policies**: The Act seeks to formulate and execute disaster management policies.
- **Disaster prevention and Mitigation**: The Act seeks to provide necessary measures for disaster prevention, mitigation, by enhancing preparedness and capacity building for the anticipated forthcoming calamities.

- **Disaster Relief**: It seeks to provide financial aid and assistance to the disaster-affected State and people.

Legal-Institutional Framework of the DM Act 2005

Institutions	Role	Composition
Tier I		
National Disaster Management Authority (NDMA) (Section 3)	Acts as the Central body for disaster management policies, plans, and guidelines (Section 6).	**Chairperson**: Prime Minister. **Members**: Ministers of State for Home Affairs, Agriculture, Atomic Energy, Science & Technology, and other relevant Ministries. **Other Members**: Nominated by Chairperson.
National Executive Committee (NEC) (Section 8)	Assist the NDMA in performing its functions and ensure compliance with the directions.	**Chairperson**: Union Home Secretary. **Members**: Secretaries to the Government of India in various departments, Chief of the Integrated Defense Staff of the Chiefs of Staff Committee.
National Institute of Disaster Management (NIDM) (Section 42)	Training, research, and capacity–building institution.	**Director**: Appointed by Central Government. **Members**: Experts and professionals in disaster management and related fields.
National Disaster Response Force (NDRF) (Section 44)	Special response force for disaster situations.	**Control**: Director-General appointed by the Central Government. **Composition**: Battalions CAPFs.
Tier II		
State Disaster Management Authority (SDMA) (Section 14)	Lay down the State Disaster Management Plan and Policies.	**Chairperson**: Chief Minister. **Members**: Ministers nominated by the CM.
State Executive Committee (SEC) (Section 20)	Ensure that the State's disaster management plan is implemented with coordination and monitoring.	**Chairperson**: Chief Secretary. **Members**: Department Secretaries, as determined by the State Government.
Tier III		
District Disaster Management Authority (DDMA) (Section 25)	Organize, plan, and carry out disaster management initiatives at the district level	**Chairperson**: District Magistrate. **Co-Chairperson**: Elected representative of the local authority. **Members**: Chief Medical Officer, SP, and additional district-level personnel nominated by the State Government.
Local Authorities (Section 41)	Execute disaster management procedures in compliance with district and state plans	**Composition**: Consists of town planning authorities, municipalities, district and cantonment boards, Panchayati Raj establishments, and other organizations in charge of urban development and planning.

Funding Framework Provided by the Disaster Management Act 2005
- **National Disaster Response Fund (NDRF)**
  - It has been established to provide timely financial assistance for immediate relief and rehabilitation during disasters.

o It is funded by the Central Government, and its utilization is governed by guidelines issued by NDMA.

- **State Disaster Response Fund (SDRF)**
  o The SDRF operates at the State level, complementing the NDRF. Each State Government is required to establish its own SDRF to address local disaster management needs.
  o The SDRF is funded through contributions from both the Central and State Governments.

What changes have been proposed through the Disaster Management (Amendment) Bill 2024?

Amendment	Details
Establishment of Urban Disaster Management Authorities	• The Bill seeks to establish an Urban Disaster Management Authority headed by the Municipal Commissioner for large metropolitan cities. • This can help in having a **unified and coordinated approach** towards city-level disasters such as **urban flooding**. *(Read more about Urban Flooding)*.
Mandatory for the States to raise SDRF	• The DMA 2005, did not make it mandatory for the States to raise State Disaster Response Force (SDRF). The size and capacity of the SDRFs in the States vary significantly. • The Bill makes it **mandatory for every State** to **raise and maintain an SDRF**.
Legal Status to National Crisis Management Committee (NCMC)	• The Bill gives legal status to the NCMC. • It **makes NCMC the nodal body** to deal with disasters with 'serious or national ramifications'.
Enhanced role of NDMA	• It proposes to significantly **expand the role and responsibilities** of NDMA. • It will take stock of the entire range of disaster risks to the country, including risks from emerging disasters.
Shift in responsibilities of preparation of Disaster Plans	• The NDMA and SDMAs will be responsible for **preparation of disaster plans** at the National and State levels. Earlier, the plans were prepared by the NEC and SECs.
Creation of Disaster Databases	• The NDMA will be required to create and **maintain a national disaster database** with information on the assessment of the disaster, fund allocation, expenditure, and preparedness and mitigation plans. • The SDMAs will need to create State-level disaster databases.
Guidelines for Compensation	• The Bill proposes that the NDMA should recommend guidelines for minimum standards of relief to be provided to people affected by disasters. • This includes a recommendation on compensation amounts in case of loss of lives, damage to homes and property, and loss of livelihoods.
Clarified definition of Disasters	• The Bill clarifies that the definition of Disasters **does not include man-made disasters** caused due **to law-and-order situations**.

What is the significance of the Disaster Management Act 2005?

- **Establishment of Legal-Institutional Framework**: The Act has led to the creation of the NDMA, SDMAs at the state level, a National Disaster Response Force (NDRF), and a National Institute of Disaster Management (NIDM). These institutions help in **mitigating disasters** by promoting disaster-related research, training, awareness, and capacity building.
- **Disaster Mitigation**: The institutional framework provided by the DMA, has helped in better dealing with natural disasters. Over the years, it has helped in saving thousands of lives, and has facilitated relief, rescue and rehabilitation services.
- **Emphasis on Disaster Risk Reduction**: The Act emphasizes the importance of disaster risk reduction by promoting the **integration of disaster management into development planning processes**.

- **Facilitation of Resource Allocation**: The Funds established under the Act (NDRF/SDRFs) ensure timely financial assistance for disaster response and relief operations.
- **Promotion of Community Participation**: The Act recognizes the importance of community participation in disaster management by emphasizing the role of community groups in disaster response and recovery.

What are the challenges associated with the Disaster Management Act?

Institutional Challenges

- **Absence of Vice-chairperson of NDMA**: The Office of Vice chairperson of NDMA has been vacant for about a decade. This has deprived NDMA of the leadership and the necessary political heft to coordinate with the States and other Government agencies.
- **Lack of Financial Powers**: NDMA lacks administrative financial powers, and routing of every small decision through the Home Ministry is an inefficient and time-consuming process.
  o The allocated funds are insufficient to meet the actual needs during large-scale disasters. This has led to delays in response and recovery. The disbursement process is often slow, hindering timely assistance to affected populations.
- **Shortage of Staff**: The NDMA is severely short-staffed. There are only 3 functioning members in NDMA. Earlier, the NDMA would have 6-7 members, with each in charge of a specific type of disaster.
- **Prompt Response during Major Crises**: The Act has been criticised for inadequate project planning and execution. NDMA was nearly invisible during major crises like the COVID-19 pandemic.

Functional Challenges

- **Low prioritisation of Disaster Risk Reduction (DRR) Efforts**: Disaster risk reduction efforts are critical for mitigating the impact of disasters. Absence of DRR efforts in development works make the infrastructure and people vulnerable to disasters causing loss of life as well as economic losses.
- **Public Health Crises**: The Act lacks functional provisions to comprehensively address the relief, rescue and rehabilitation in cases of epidemics and bioterrorism.
- **Man-made Hazards and Climate Change Risks**: The Act has not effectively addressed the systemic and cascading nature of climate-change related disasters and man-made disasters.
- **Centralised and Top-Down Functioning**: The centralized and top-down functional approach to disaster management has led to neglect of local and community-based interventions crucial for long-term resilience and recovery.

What should be the way forward?

- **Revision of Key Definitions**: Section 2 of the Act should be amended to include explicit definitions for 'hazards', 'prevention', and 'mitigation'. This will provide consistency and clarity throughout the Act.
- **Inclusion of Disaster Prevention**: Chapters that explicitly address disaster prevention and include comprehensive prevention plans should be introduced in the Act.
- **Enhanced Accountability**: Oversight to hold officials accountable for their actions under the Act must be enhanced. This would enhance transparency and effectiveness of the Act.
- **Modernization of Early Warning Systems**: The early warning and forecasting clauses must be updated to incorporate modern technologies such as GIS and AI. This would improve prediction accuracy and response to disasters.
- **Community Engagement**: Community awareness of disaster risks and management strategies should be enhanced. The active engagement of policymakers and stakeholders in supporting and implementing disaster risk reduction and management initiatives should be prioritised.
- **Resource Allocation**: Specific annual budget allocations for disaster management must be designated to ensure adequate funding for Disaster Management.

9. Landslides in India

News: Over 420 people died and another 400 were injured in deadly landslides in Wayanad, Kerala. This incident has brought focus on the ecologically sensitive Western Ghats.

What are Landslides? What is the status of India's vulnerability to Landslides?

- It is a phenomenon usually observed in hilly and steep mountainous regions where **large quantities of material**, composed of rock, boulders, loose mud, soil and debris, **are driven down the slope with force**.

Vulnerability of India to Landslides

Classification	Details
ISRO's Landslide Atlas of India	• According to ISRO's Landslide Atlas of India, India is among the top four countries with highest landslide risk. • At least **one death per 100 km² is reported in a year** due to a landslide event.
India Landslide Susceptibility Map (ILSM) by IIT Madras	• India accounts for about 8% of global fatalities due to landslides. • 13.17% area is susceptible to landslides, and 4.75% is 'very highly susceptible'. • Kerala has over 14 % of its land mass in the 'very high susceptibility' category.

What are the causes of landslides?

Natural causes

- **Heavy Rainfall**: The occurrence of heavy and continuous rainfall may cause the material on steep slopes to loosen up (water acts as a lubricating agent) and cause landslides. This was the major cause behind Wayanad and Uttarakhand landslides (2013).

- **Earthquakes**: The sudden shaking of earth's crust creates stress on materials resulting in their flow downwards. Tectonically active Himalayas are highly vulnerable due to high seismicity.

- **Nature of Rivers**: The youthful and mighty rivers increase the downcutting of earth on the mountain slopes. The increased flow in Chaliyar river caused heavy sediment erosion, resulting in the Wayanad landslide catastrophe.

Anthropogenic causes

- **Heavy Infrastructure**: Building of roads, railways, dams, etc. in the mountainous region, has resulted in increased landslides.

Source: ISRO. Landslide Inventory (1998-2022). Location of landslides in yellow.

- **Mining Activities**: It involves removal of the surface of the earth for mineral exploration, which **loosens the grip of material**. Iron ore, bauxite, manganese, chromite, and limestone mining in the western ghats has increased the risk of landslides.

- **Increased Deforestation**: The cutting down of trees for agricultural and industrial activities destabilizes the slopes and makes the region more vulnerable to landslides. Plantation agriculture in Western ghats has resulted in loss of native trees. Native trees hold the soil together, prevent erosion and reduce vulnerability.

- **Unsustainable Tourism**: The rising tourist influx in the Himalayan region and Western Ghats puts greater pressure on land, as more infrastructure and amenities are needed to accommodate them. This leads to more construction and greater risk of landslides.

- **Climate Change**: Anthropogenic activities have accelerated the pace of climate change, leading to increased glacial melts and rainfall. Warming of Arabian sea has resulted in increased rainfall in the Western Ghats region, leading to enhanced landslides.

What are the impacts of Landslides?

- **Loss of Lives**: Landslides cause large loss of life. In Wayanad, entire villages were completely wiped out. Total death toll has crossed 400.
- **Economic Losses**: Landslides erode away useful infrastructure like houses, buildings, roads etc. Large amount of spending is required for rebuilding the damaged structures and rehabilitating displaced people.
- **Restricted Movement**: Damage to roads creates barriers in critical transportation routes. This restricts the movement of goods and people.
- **Water Shortage and Flash Floods**: The accumulated mass of debris can result in the blockage of a river by creating a Landslide dam. It impairs the availability of water for nearby people. It also raises the threat of **flash floods** due to breach of dam/lake.
- **Land Degradation**: Mud slurry and debris damage vegetation leading to degradation and making the exposed slope more vulnerable to further landslides.
- **Displacement and Migration**: Landslides force communities to evacuate and migrate. This leads to social disruption and psychological stress among affected populations.

What initiatives have been taken to mitigate the risks due to landslides?

Initiative	Details
National Landslide Susceptibility Mapping (NLSM)	• The Programme was initiated by the Geological Survey of India in 2014 to map the landslide areas on a Macro Scale (1:50,000). • The goal is to map 0.42 million km^2 landslide-prone areas across India.
National Landslide Risk Management Strategy (2019)	• It addresses all the components of landslide disaster risk reduction and management, which includes: o Hazard mapping, monitoring, and early warning system, awareness programs, capacity building, training, regulations, policies, stabilization and mitigation.
National Disaster Management Authority (NDMA) Guidelines on Landslide Hazard Management (2009)	• The Guidelines propose measures that should be taken to avoid/mitigate the risk posed by landslide hazards. Some of the guidelines are: o Delineating areas susceptible to landslide hazards. o Encouraging implementation of successful remediation and mitigation technologies. o Developing institutional capacity and training for geoscientists, engineers, and planners for effective management.
National Institute of Disaster Management (NIDM)	• It is a premier institute that provides Capacity Building support to various National and State level agencies in the field of Disaster Management & Disaster Risk Reduction.

What are the challenges in implementation of measures proposed for mitigation od landslides?

- **Non-implementation of Gadgil and Kasturirangan Committee Reports**: The Gadgil committee report proposed to regulate developmental activities in the entire 1,60,000 km^2 stretch of the Western Ghats. K Kasturirangan Report recommended demarcation **of 37% of the Western Ghats** as an **ecologically sensitive area** (ESA) and complete ban on mining and quarrying in these protected zones. These reports have not been

implemented, with resistance by all States and parties across the political spectrum in the biodiverse region. *(Refer EPIC June 2024 for The Issue of Eco-Sensitive Areas in Western Ghats)*.

- **Lack of Landslide Mitigation Plan**: Many States that are vulnerable to landslides including Kerala, lack robust landslide mitigation plans. These maps and plans help to explain the route a landslide can take once it has been triggered. Accordingly, vulnerability along the predicted route can be minimized.
- **Insufficient Monitoring Systems**: Many regions lack effective monitoring and early warning systems, which are crucial for timely evacuation and disaster preparedness. The absence of real-time data lead to increased casualties and damages during landslide events. Besides it is difficult to precisely predict the accurate time and location of a landslide.
- **Policy and Regulatory Gaps**: Weak enforcement of land-use regulations and building codes exacerbate vulnerability to landslides.
- **Low Community Awareness and Participation**: Low levels of public awareness regarding landslide risks and preparedness measures impede community involvement in disaster management.

Factors behind the Wayanad Landslide

- Wayanad witnessed 140mm of rainfall, with some areas **reporting 300 mm rainfall**. The rainfall was ~5 times more than IMD's prediction.
- **Overflow in the Chaliyar** river swept more sediment downstream. This was due to heavy rains in 2020 that had caused the Chaliyar to strip its upstream areas of plant cover. This left more rocks and humus vulnerable to being displaced.
- The heavy rainfall caused the **water to flow between the soil and the rock layers**. This weakened the force that binds the soil to the rocks and **triggered the soil movement**.
- **Quarrying**, linear infrastructure development, and construction activities have compromised the ability of the ecosystem to cope with the changing natural conditions.
- **Monocropping**, has resulted in the **cut down of large**, **native trees**, which serve to **hold the topsoil to the bedrock**. The replacement of these native trees with big plantation crops, such as tea and coffee having shallow roots, has **increased the vulnerability to landslides**.
- According to a study in International Journal of Environment and Public Health, **Wayanad has lost 60% of its forests** between 1950-2018. The erosion of green cover has made Kerala susceptible to landslides.
- **Climate Change** has caused gradual warming of the Arabian Sea leading to the formation of a deep cloud system over parts of the Western Ghats.

What should be the way forward?

- **Drawing up Route Maps**: They map out the routes that landslides are likely to take after they have been triggered. Route maps help in marking out areas which should be **out of bounds for settlements or any activities**. The route maps need to be drawn at the earliest to complement the susceptibility maps.
- **Proper Environment Impact Assessment**: Proper implementation of Environmental impact assessment norms must be carried out before initiating activities like mining or construction of dams, in the ecologically fragile mountainous regions.
- **Demarcation of Ecologically Sensitive Areas in Western Ghats**: The demarcation must be done at the earliest. This will help in regulating large infrastructure projects more stringently.
- **Landslide Micro-zoning Procedure**: Landslide micro zoning procedures should be adopted for mountainous and other highly vulnerable regions. This will help the States in restoring denuded flora and soil cover.
- **Involvement of Locally-trained Manpower**: There should be involvement of locally available trained manpower to intensify the hazard reduction and public awareness programs.

10. Rising Incidents of Cloudbursts

News: The incidents of cloudburst have become a common occurrence in the Monsoon season.

What is a cloudburst?

- The IMD defines cloudburst as a **sudden**, **heavy rainfall event** with more than **10 cm rainfall** recorded **within an hour**. The spell of heavy rainfall is limited to a **very small geographical area** (20-30 km^2). Incidents of heavy rainfall **not meeting the above criteria are not classified as cloudburst events**.
- The **localized phenomenon** of cloudburst generally happens in **mountainous regions**. In India, cloudbursts are common **during monsoons in Himalayas**, **Western Ghats** and **north-eastern hill States**.

Source: Britannica. Orographic lift.
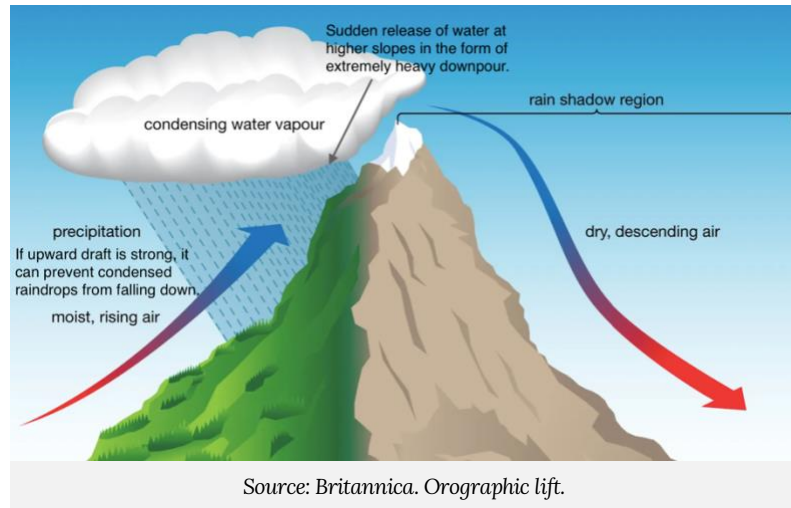
- Cloudburst is caused when **rising warm air prevents the condensing raindrops from falling to the ground**. A large amount of water may accumulate at higher levels. If the upward currents are weakened or the water drops become too heavy, the whole water falls at one time in the form of extremely heavy rainfall spell.
- **Warm rising air currents along steep mountain slopes** (**orographic lifting**) often provide conducive conditions for cloudbursts to occur.
- Cloudbursts are **very difficult to predict** due to their very small scale in space and time. The weather models are not advanced enough, nor is the network of radars dense enough to precisely monitor the cloud activity.
- **Impacts**: Cloudbursts cause **flash-floods** due to sudden heavy rainfall spell. Heavy rainfall can quickly saturate the soil on hilly slopes with water, **triggering landslides**. Landslides and flash floods often cause **large loss of life**, **property** and **infrastructure**.

What are the reasons behind rising cloudburst events?

- Scientists argue that **climate change** may be one of the reason for more frequent cloudbursts.
  o **Rising temperatures** in mountainous regions along with **more humidity** lead to heavy rainfall events.
- **Changing land-use pattern** in hilly areas; deforestation, more construction activities and spread of concrete structures have **altered the local micro-climate** on slopes, **making them warmer**. The warmer temperatures contribute to favourable conditions for cloudbursts.

How can the impact of cloudburst events be mitigated?

- **Early Warning Systems**: More advance weather models must be developed through analysis of conditions prevailing before recorded cloudburst events. Greater number of radars should be deployed in cloudburst-prone regions which can collect useful data for the predictive models. Based on the models, early warnings should be generated and disseminated quickly through various modes.
- **Land-Use Regulation and Urban Planning**: Land-use activities should be strictly regulated on sensitive slopes. Heavy and concrete structures should be minimized. Urban infrastructure must include systems for **stormwater drainage**, **rainwater harvesting** and **green spaces** to manage flow of floodwaters.
- **Restoration of Forest Cover**: Afforestation and reforestation activities should be undertaken by planting local floral/tree species. Cutting of trees should be allowed only under exceptional circumstances.

Polity

1. Government's Initiatives to Promote Understanding of the Constitution

News: The Government has implemented several initiatives to promote understanding of the Constitution and increase awareness about legal rights among the people.

About the Initiatives

Citizens' Duties Awareness Programme (CDAP)

- It was launched on November 26, 2019. It aimed to enhance awareness of the Constitution with a focus on **Fundamental Duties**.
- Through this program, over 48.6 crore citizens were reached using various tools, including **online Preamble reading** and pledge-taking, webinars, e-ticket messaging, and social media campaigns.
- A significant number of Ministries, Departments, Gram Panchayat representatives, and Special Gram Sabhas participated, along with a grassroots campaign in **1000 digital villages** across 16 states.

***Hamara Samvidhan Hamara Samman* Campaign**

- This has been initiated by the **Department of Justice** on January 24, 2024. This is to celebrate the 75th year of India as a Republic and to promote Constitutional principles.
- The **year-long campaign** involves regional events, sub-campaigns like "*Sabko Nyaya Har Ghar Nyaya*", "*Nav Bharat Nav Sankalp*", and "*Vidhi Jagriti Abhiyaan*" and activities such as reading the **Panch Pran Pledge** in regional languages, organizing *Nyaya Sewa Melas*, and online competitions.
- Law students and media partnerships further supported the campaign.

Designing Innovative Solutions for Holistic Access to Justice (DISHA) program

- The **Department of Justice** launched the Designing Innovative Solutions for Holistic Access to Justice (DISHA) program in 2021, reaching 15.30 lakh individuals through **community engagement** and **educational materials**.
- The **National Legal Services Authority** (NALSA) conducted extensive legal literacy and awareness programmes, including a 6-week Pan India Legal Awareness and Outreach Campaign in 2021, which covered 6.7 lakh villages and 4,100 municipal towns.
- The Empowerment of Citizens through Legal Awareness and Outreach campaign in 2022, aimed at **bridging gaps between institutions and the underprivileged**.
- NALSA also organized Legal Empowerment Camps to educate citizens on welfare legislations and provide **tailored legal assistance**, benefiting 11.46 lakh citizens in 2023-2024 alone.

These comprehensive efforts, supported by mass media and the distribution of accessible educational materials, underscore the Government's commitment to legal literacy and Constitutional education.

2. Bail Can't be Denied on Ground of Serious Charges: Supreme Court

News: The Supreme Court has emphasized that the seriousness of charges alone is not a sufficient ground to deny bail to undertrials. Courts must avoid imposing arbitrary and unreasonable bail conditions.

Key Highlights of the SC Judgment

- **Personal Liberty vs. Serious Charges**: The Court upheld the importance of an individual's personal liberty over the State's argument against easy bail for serious crimes.
- **Balance of Factors**: The seriousness of charges must be balanced with other factors such as the period of custody and the expected duration for trial completion.

- **Right to Speedy Trial**: The undertrial's fundamental right to a speedy trial must be respected.
- **Responsibility of Prosecution**: The prosecution must ensure that trials for serious offenses are concluded expeditiously.
- **Related Judgments**: In a similar decision, the same Bench of the SC had ruled that the State should not oppose bail if it cannot ensure a speedy trial. The SC had given this ruling in an appeal from an accused that had been denied bail by the Bombay High Court in a case registered under UAPA.
- **Constitutional Rights**: The Bench reinforced that Article 21 of the Constitution, which provides the right to personal liberty, applies regardless of the nature of the crime. *(Refer EPIC July 2022 for Supreme Court's Observations Regarding Provisions of Bail).*

3. Autonomous District Council (ADCs) and the 125th Constitutional Amendment Bill

News: The Chiefs of Autonomous District Councils have sought the passage of the 125th Constitutional Amendment Bill that provides for greater financial, executive and administrative powers to the ADCs formed under the Sixth Schedule.

About the Provisions of the 125th Constitutional Amendment Bill

The 125th Constitutional Amendment Bill was introduced in the Rajya Sabha in February 2019. The Bill was referred to a Standing Committee. The Report was submitted in March 2020. It has been pending since then.

- **Village and Municipal Councils**: The Bill seeks to establish **Village** (for (group of) villages) and **Municipal** (urban areas) **Councils** in addition to the District and Regional Councils.
  - The District Councils may make laws on various issues, including: the number of Village and Municipal Councils to be formed, and their composition; Delimitation of constituencies for election to the Village and Municipal Councils; powers and functions of Village and Municipal Councils.
- **Devolution of Powers**: The Governor may make rules for **devolution of powers and responsibilities to the Village and Municipal Councils** related to preparation of plans for economic development; implementation of land reforms; urban and town planning; regulation of land-use, among other functions.
- **State Finance Commission**: The Bill provides the appointment of a Finance Commission for these states, to review the financial position of District, Village, and Municipal Councils. The Commission will make recommendations related to distribution of taxes, grants-in-aid to these Councils (Village, Municipal and District) and measures to improve their financial position.
  - The Bill states that the Union Finance Commission will make recommendations on measures to augment the Consolidated Fund of a State to provide resources to District Councils, Village Councils, and Municipal Councils in tribal areas in the four Sixth Schedule States.
- **Elections**: All elections to the District Councils, Regional Councils, Village Councils, and Municipal Councils will be conducted by the State Election Commission appointed by the Governor, for these four states.
  - The Governor may make rules for the disqualification of such members on the grounds of defection.

4. Supreme Court's Judgment on Appointment of Aldermen in Delhi Municipal Corporation

News: The Supreme Court has confirmed that the Lieutenant Governor (L-G) of Delhi has the power to nominate Alderman to the Municipal Corporation of Delhi (MCD).

About the Supreme Court Judgment

- The Supreme Court has held that the authority of the Lieutenant Governor (L-G) of Delhi to **nominate 10 persons with special knowledge** of municipal administration to the Municipal Corporation of Delhi is a **statutory duty** attached to his Office.
- The power of the L-G is derived from **Section 3(3)(b)(1)** of the **Delhi Municipal Corporation Act**, **1957**.

- The power vested in the L-G, to **nominate 10 expert persons** to the MCD, aligns with the amendments made to Delhi Municipal Corporation Act in 1993. These amendments were intended to **incorporate constitutional changes in Articles 239AA** and **239AB** concerning municipal administration.
- The SC clarified that the L-G's power to nominate aldermen is independent and **not subject to the aid and advice of the Council of Ministers**.

About Aldermen

- The word "Alderman" comes from combining "old" and "man," meaning an experienced or senior person. Originally, it referred to elders or leaders within a clan or tribe. Over time, it evolved to denote high-ranking officials such as Viceroys of a King.
- By the 12th century, the word was used to refer to municipal officers who had both civil and military duties.

Aldermen in Delhi Municipal Corporation

- Aldermen do not have voting rights in the mayoral election but can vote in the election of zonal chairmen in 12 zones.
- Aldermen play a crucial role in electing the members of the standing committee, which controls the MCD's budget for any project worth over INR 5 crore.
- Just like councillors, aldermen too can get funds for development-related works. *(Refer EPIC February 2023 for Nominated Members Can't Vote in Delhi Mayor Election: Supreme Court).*

5. Maharashtra Special Public Security Bill, 2024

News: The Government of Maharashtra has introduced the Maharashtra Special Public Security Bill, 2024 in the Assembly.

About the Maharashtra Special Public Security Bill, 2024

- It has been introduced to combat the **increasing threat of Naxalism**, especially in **urban areas** through **Naxal-affiliated organizations**.
- The State has the authority to declare an organization as "unlawful". An advisory board of 3 qualified individuals (current/former/qualified High Court judges) will review such decisions.
- **Definition of Unlawful Activities**
  o The activities that threaten public order, peace, and tranquility.
  o Interference with the administration of law and public servants.
  o Acts of violence, vandalism, use of firearms, explosives, and disruption of transportation.
  o Encouragement of disobedience to laws and institutions.
  o Collecting funds or goods for unlawful activities.
- All offences under this law are **cognizable** and **non-bailable**. Investigations will be conducted by a police officer not below the rank of a Sub-Inspector.
- **Punishments**: The Bill prescribes punishments for members of unlawful organizations, their [unlawful organizations'] management or promotion, non-members aiding unlawful organizations, or committing, abetting, or planning unlawful activities with jail terms between 2-7 years and fine between INR 2-5 lakhs.
- **Seizure and Forfeiture**: If an organization is declared unlawful, the District Magistrate or Commissioner of Police can notify and take possession of any place used for its activities. The Government can forfeit money and assets intended for unlawful organizations.
- **Legal Review**: An advisory board must review the declaration of unlawful organizations within six weeks and submit a report within three months. The High Court can review Government actions through revision petitions.

Concerns Associated with the Bill

- **Vagueness**: Vague terms like "menace to the public order" and "encouraging disobedience" can lead to **subjective interpretation and misuse**.
- There are concerns that the provisions can be used to **supress dissent**. The power to seize property and forfeit money of unlawful organizations can be misused to target **political or rights organizations and activists**.

6. Article 311 of the Constitution

News: The J&K Lieutenant-Governor invoked Article 311 of the Constitution to terminate the services of 6 Government employees.

About Article 311 of the Indian Constitution

- Article 311 outlines the procedures and safeguards to be followed before a **Government employee can be dismissed**, **removed**, or **reduced in rank**.
- It acts as a **shield against arbitrary actions** by the Government and **upholds the principles of natural justice**.

Key Provisions

- **Opportunity to Defend**: No Government employee can be dismissed, removed, or reduced in rank except after an inquiry in which they have been informed of the charges against them and **given a reasonable opportunity to defend themselves**.
- **Authority for Action**: A civil servant can only be removed from their services by the authority who appointed them or by someone with the same authority or rank as the appointing authority.

Grounds for Dismissal

- An **employee's performance** or **conduct** must be found **unsatisfactory** or **detrimental** to the efficient functioning of the Government.
- An employee involved in **corruption**, **bribery**, **fraud**, or any other offense involving **moral turpitude** can be dismissed.

Procedure for Disciplinary Action

- The competent authority must **clearly state** the **allegations** and **grounds for disciplinary action**.
- The employee must be given a **reasonable opportunity to respond** to the charges and present their defense.
- An **impartial inquiry** should be conducted by a competent authority, allowing the employee to present their case and cross-examine witnesses or evidence.
- A report should be prepared after the inquiry, taking into account all evidence and submissions made during the inquiry.
- The competent authority should make a **reasoned decision** based on the inquiry report and communicate it to the employee. The decision must be reasonable, fair, and in accordance with principles of natural justice.

Exceptions to Article 311

- **Security of the State**: If the employee's activities are deemed **prejudicial to the security of the State**, the President or the Governor can dispense with the inquiry and take immediate action.
- **Efficiency in Public Service**: If the President or the Governor believes it is in the interest of security or efficiency of public service, they can dispense with the inquiry and take appropriate action.
- **Probationary Employees**: Probationary employees, who have not yet acquired the right to hold a permanent position, can be dismissed or removed without an inquiry.
- **Judicial Review**: Article 311 provides for judicial review of decisions made under its provisions. Remedies may include reinstatement, back wages, or any other relief deemed appropriate by the court.

7. Supreme Court's Judgment on Stray Dogs

News: The Supreme Court has prohibited indiscriminate killing of stray dogs by municipalities. Instead, the Court has mandated sterilisation as the humane and effective solution. The ruling aligns with the Prevention of Cruelty to Animals Act and the Animal Birth Control Rules.

About the Case
- The case was between the **Animal Welfare Board of India** and **People for Elimination of Stray Troubles**.
- The case was focused on whether local authorities could kill stray dogs to reduce their population, prevent rabies, and avoid conflicts.
- State and Municipal laws allow the killing of stray dogs, while Central law (Prevention of Cruelty to Animals Act, 1960) prohibited it. *(Read more about the Issue of Stray Dogs in India)*.

Judicial View on Killing of Stray Dogs
- **High Courts**: The High Courts of Bombay, Karnataka, and Himachal Pradesh allowed local authorities to kill stray dogs. The Kerala High Court opposed this, supporting the Central law.
- **Supreme Court**: The Supreme Court ruled that **municipalities cannot kill stray dogs indiscriminately**. They must follow the **Prevention of Cruelty to Animals Act** (1960), and the **Animal Birth Control Rules** (2023) which **advocate for sterilization over killing**.
  - The ruling emphasizes compassion and responsibility towards living beings as mandated by **Article 51A(g) of the Constitution**.
  - It reflects a shift towards **more humane treatment of animals**, advocating for sterilization as the only scientific and humane method to control the stray dog population.
  - The Court suggests that those opposing the ruling can challenge the new rules in the High Courts.
- A report by the WHO (2004) and a report by the Bombay Municipal Corporation (2014) supported sterilisation as effective. Killing 4.5 lakh dogs between 1984-1994 in Bombay did not reduce their population.

Policy

1. Equivalence Report by PARAKH

News: PARAKH has presented an Equivalence Report to the Ministry of Education in accordance with the National Education Policy (NEP) 2020.

Equivalence Across Boards
- Different school boards in India have **varying curriculums**, **exams**, and **administrative structures**, leading to **discrepancies in the perceived quality**.
- Equivalence means ensuring that all students, regardless of the board of affiliation of their school, receive a **standardized level of education** and **facilities**.

PARAKH
- PARAKH stands for **Performance Assessment, Review, and Analysis of Knowledge for Holistic Development**. It has been set up as an organization under the **NCERT**.
- It has been launched as part of the implementation of the **National Education Policy (NEP) 2020**. Its mandate is to work on **bringing the School Boards across States and UTs on a common platform**.
- Its functions include to **set norms, standards and guidelines for student assessment** and **evaluation for all recognized school boards of India**, to guide the State Achievement Survey (SAS) and to undertake the National Achievement Survey (NAS).
- It will **monitor achievement of learning outcomes** and encourage and help the school boards to shift their assessment patterns towards meeting the skill requirements of the 21st century.
- It will help **bring uniformity in assessments across States and UTs** and **remove disparities** among the marks of students enrolled in different school boards.

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Key Recommendations from PARAKH
Assessment and Evaluation

- The final Class 12 results will be based on a cumulative score, where Class 9 contributes 15%, Class 10 contributes 20%, Class 11 contributes 25%, and Class 12 contributes 40%.
- Introduce a **credit-based system for assessments**, including online courses and holistic evaluations such as self-assessments, teacher feedback, and peer reviews.
- Establish a **cadre of trained teachers** to ensure standardization in question papers in exams.
- Develop a **question bank** for Classes 9 and 11 and create blueprints for exam papers for Classes 10 and 12.

Administrative Improvements

- Update affiliation guidelines and ensure periodic reviews of affiliated schools, with affiliations valid for up to 3 years.
- Empower boards to recognize schools and take action against unrecognized institutions.
- Develop mechanisms to prevent cheating and handle exam papers securely.

Curriculum and Infrastructure

- Integrate digital literacy, including coding and cybersecurity into the curriculum and follow the National Curriculum Framework.
- Ensure all schools have essential facilities like toilets, internet access, libraries, strongrooms for exam papers, and ramps or elevators.

2. Vatsalya Scheme

News: The Government has introduced a new pension scheme Vatsalya for minors.

About the Vatsalya Scheme

- This scheme is a part of the National Pension Scheme (NPS).
- It aims to assist parents and guardians in preparing for future financial requirements for their children.

Key Features

- Parents or guardians can open an account for their minor children and contribute towards their retirement savings, which will accumulate until the child reaches 18 years old.
- Once the child reaches adulthood, the accumulated amount will be transferred to the standard NPS account.
- On attaining the age of majority, the plan can be converted seamlessly into a normal NPS account.
- It operates similarly to the existing NPS, which helps individuals build a retirement corpus by making regular contributions throughout their careers.
- NPS contributions are invested in market-linked instruments like stocks and bonds. This offers the potential for higher returns than traditional fixed-income choices.

Significance of Vatsalya Scheme

- It sets the foundation for responsible financial management from an early age.
- As these accounts transition into regular NPS plans when the child reaches adulthood, they ensure a smooth continuation of saving habits into adulthood.

3. National Cooperation Policy to be Introduced Soon

News: The Union Government will soon introduce a National Cooperation Policy to comprehensively develop the cooperative sector.

About the National Cooperation Policy

- A 48-member committee was set up to develop the New National Cooperation Policy. The Committee has drafted the policy report, which is now being finalized.

- The Objective of the Policy is to promote a cooperative-based economic development model where technology, skills and education work together.

Seven Golden Principles of Cooperation

✓ **Voluntary and Open Membership**: Cooperatives are voluntary organisations where membership is open to all persons **without any discrimination**.

✓ **Democratic Member Control**: Cooperatives are member-driven and member-controlled **democratic units**. Members **actively participate** in setting their policies and making decisions. In primary cooperatives, members have **equal voting rights** conforming to the norm of 'one member - one vote'.

✓ **Member Economic Participation**: Members contribute equitably to and control and utilise the capital of their cooperative to support their economic activities.

✓ **Autonomy and Independence**: Cooperatives are autonomous organisations and believe in self-help for maintaining their cooperative autonomy through democratic controls.

✓ **Education, Training and Information**: Cooperatives provide education and training for their members, elected representatives, managers and employees to **support development drives** of their units.

✓ **Cooperation Among Cooperatives**: Cooperatives extend efficient service support to their members and strengthen cooperative movement by working together through local, national, regional and international structures.

✓ **Concern for Community**: One of the major aims of cooperatives is to **ensure sustainable development** for their communities through adoption of appropriate policy measures.

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Recommendation of the Committee

- A **National Innovation Fund** be set up to **encourage entrepreneurship in agricultural credit societies** to strengthen rural economy.
- There is a need to **strengthen cooperative credit systems and financing**; build infrastructure and technology; promote quality education, training and research; and establish effective governance and networks *(Refer EPIC March 2023 for Plan to Strengthen the Cooperative Movement)*.

Significance

- It will help in realising the vision of '*Sahkar se Samriddhi*', promoting a **cooperative-based economic development model**. *(Read more on Cooperatives; Sahkar se Samriddhi)*.
- It will **bolster the cooperative movement** in the country and deepen its reach in the grassroots.

Other Steps Taken to Boost the Cooperative Sector

- The Ministry of Cooperation is collaborating with the State Governments in the spirit of cooperative federalism to promote the nationwide development of cooperative sector.
- The Ministry has urged NABARD (National Bank for Agriculture and Rural Development) to devise a scheme/action plan to establish new **District Central Cooperative Banks** (DCCBs) in districts with low or no coverage of DCCBs.
- The Government has approved a plan to set up new **multipurpose PACS** or primary dairy/fishery cooperative societies in all uncovered Panchayats/villages over the next 5 years. This initiative will integrate multiple Government of India schemes. *(Refer EPIC February 2023 for Primary Agricultural Credit Societies)*.

4. QCI Surajya Recognition and Ranking Framework

News: The Quality Council of India has recently launched the Surajya Recognition and Ranking Framework.

About the QCI Surajya Recognition & Ranking Framework
- The Quality Council of India (QCI) Surajya Recognition & Ranking Framework is an initiative aimed at **promoting excellence in governance** across various domains.
- Its objective is to drive excellence among States to improve citizens' quality of life for a Viksit Bharat.
- The Aims of the Framework include:
  o Channel the collective synergy of States as the driving force behind creating a Viksit Bharat.
  o Promote high standards and best practices in key sectors of India.
  o Celebrate States' commitment to quality and continuous improvement.

Pillars of the Initiative
- *Shiksha* **(Education)**
  o Enhancing the quality of education through robust accreditation and certification processes.
  o Uttar Pradesh leads with the highest number of accreditations, assessments, and ratings. Delhi ranks prominently among the UTs.
- *Swasthya* **(Health)**
  o Guaranteeing superior healthcare services and maintaining high medical care standards.
  o States excelling in *Ayushman Arogya Yojana* (NABH) certifications: Chhattisgarh, Karnataka, Kerala, Rajasthan, Mizoram, and Manipur.
  o Tamil Nadu and Maharashtra lead in **Medical Entry Level Testing Labs** (MELT) rankings.
  o Chandigarh (100% certification in Ayushman Arogya Yojana) and Jammu & Kashmir (71.43% certification rate) perform well among UTs. Delhi excels in MELT, followed by Jammu & Kashmir.
- *Samriddhi* **(Prosperity)**
  o Driving economic prosperity through quality assurance in manufacturing and industrial practices.
  o Leading States in **ZED certifications**: Gujarat, Karnataka, Rajasthan, J&K and Delhi achieved significant ZED certifications.
  o Top performers in the **MSME Competitive LEAN Scheme**: Maharashtra and Bihar.
- *Sushasan* **(Governance)**
  o It ensures transparent, accountable, and responsive governance.
  o The Sushasan category is to be featured in future editions of the rankings.

5. Nandini Sahakar Scheme

News: The National Cooperative Development Corporation has recently launched the Nandini Sahakar Scheme to support women entrepreneurs.

About the Nandini Sahakar Scheme
- It is a **women-focused framework** for financial assistance, project formulation, hand-holding, and capacity development.
- The scheme aims to **improve socio-economic status of women** and supports entrepreneurial dynamism of women through women cooperatives. It will converge critical inputs of women's enterprise, business plan formulation, capacity development, credit and subsidy and/or interest subvention of other schemes.
- The salient features include
  o **Financial Assistance**: The scheme provides financial assistance to women cooperatives for business model-based activities. There is no minimum or maximum limit on financial aid for projects.
  o **Project Formulation**: It assists women cooperatives in project formulation, ensuring their business plans are well-structured.

o **Capacity Development**: The scheme focuses on building the capacity of women cooperatives to effectively manage their enterprises.

o **Convergence**: It brings together critical inputs such as credit, subsidies, and interest subvention from other schemes to support women's enterprise.

6. ULPIN and Land Records

News: The Union Government has allocated INR 10,000 crore in incentives to States for implementing land-related reforms in both rural and urban areas for the financial year 2024-25.

About Land Related Reforms in Rural and Urban Areas

- **Rural Areas**: States are required to implement reforms such as the assignment of a **Unique Land Parcel Identification Number** (ULPIN or *Bhu-Aadhaar*) for all **lands**, **digitization of cadastral maps**, **surveys of map sub-divisions** according to current ownership, and the **establishment of a land registry**.
- **Urban Areas**: Fiscal incentives will be provided for the digitization of land records using **GIS mapping** and the creation of an **IT-based system for property record administration**, updating, and tax management.
- **Farmers' Registry**: An additional INR 5,000 crore will be allocated for creating a Farmers' Registry, which will include details of six crore farmers and their lands.

About Unique Land Parcel Identification Number (ULPIN)

- It is also referred to as **Bhu-Aadhaar.** It is a **unique identifier** assigned to **every land parcel in India**.
- This initiative is part of broader set of land reforms aimed **at improving land management and governance**.
- The purpose of ULPIN is to ensure a **standardized system** for the identification of land parcels across the country.

Key Features of ULPIN

- **Unique Identification**: Each land parcel will have a **unique 14-digit number** that can be used to access land records and other relevant data.
- **Digitization of Land Records**: ULPIN is part of the digitization drive that aims to make land records **easily accessible** and **more transparent**.
- **GIS Mapping**: The implementation of ULPIN involves the use of Geographic Information System (GIS) technology for **accurate mapping** and updation of land records.
- **Integration with Land Registry**: ULPIN will be integrated with existing land registries to ensure that all land parcels are accurately recorded and that **ownership details are up-to-date**.

Economy

1. Tax Simplification Measures in the Union Budget 2024-25

News: The Union Budget 2024-25 has proposed several tax simplification measures.

About Tax Simplification Measures

- A new version of the dispute resolution scheme, *Vivad se Vishwas* 2.0, will be introduced to provide a mechanism for the **settlement of direct tax disputes** and **reduce litigation**.
- Non-reporting of small foreign assets will be **decriminalised**.
- Limits for reassessments will be adjusted to **reduce disputes**.
- The Budget proposes legislative changes to **grant immunity** to *benamidars* or any person other than the beneficial owner who **turns approver under the Benami Transactions (Prohibition) Act**, **1988**.

- The Finance Bill will simplify the TDS rate structure, reassessment provisions, search provisions, and capital gains taxation.
- **Merger of Tax Regimes for Charitable Trusts**: The **two existing regimes** for trusts, funds, or institutions to claim exemption under the Income Tax Act **will be merged**.
  o The process will involve the **gradual transition of trusts** from the first regime to the second, along with rationalising of application procedures and timelines for registration and approval of benefits.
- Indian professionals working in multinationals who receive ESOPs and invest in social security schemes and other movable assets abroad face penal consequences under the Black Money Act for non-reporting.
  o Non-reporting of movable assets up to INR 20 lakh will be **de-penalised**.
- Late payment of TDS will be decriminalised if payment is made before the prescribed time for filing the TDS statement.
  o Time limits for reassessment will be reduced from 10 years to 5 years, with rationalisation of reassessment procedures.
- **Adjustments to TDS Rates**: The rate of TDS will be reduced from 5% to 2% for several transactions, including payment of insurance commission, life insurance policy payments, commission on sale of lottery tickets, brokerage payments, and rent payments by certain individuals or HUF. These changes will be effective from October 1.
  o The TDS rate on **e-commerce operators** will be reduced from 1% to 0.1%.
- **Increased Monetary Limits for Appeals**: Monetary limits for filing appeals related to direct taxes, excise, and service tax will be increased to INR 60 lakh for tax tribunals, INR 2 crore for High Courts, and INR 5 crore for the Supreme Court. Current limits are INR 50 lakh, INR 1 crore, and INR 2 crore respectively.

2. Angel Tax

News: The Union Minister for Finance has proposed to abolish the 'angel tax' for all classes of investors.

About Angel Tax
- Angel tax was levied on the capital raised via the **issue of shares by unlisted companies** (not listed on the Stock market) from an Indian investor if the share price of issued shares exceeded the **fair market value of the company**.
- The **excess funds** raised at prices above fair value were **treated as income**, on which tax was levied.
- The tax derives its genesis from **Section 56(2) (VIIb)** of the **Income Tax Act**, **1961**. It was first introduced in 2012 to **prevent laundering of black money** through **share sales**.
- It was levied at a rate of **30.9% on net investments** in **excess of the fair market value**.
- Fair market value is the price of an asset **when the buyer and seller have reasonable knowledge** of it and are **willing to trade without pressure**.

Exemptions for Startups (Announced in 2019)
- **Eligible Startups**: Startups should be recognized by the Department for Promotion of Industry and Internal Trade (DPIIT) as eligible startups.
- **Capital Limit**: The aggregate amount of paid-up share capital and share premium of the startup cannot be more than INR 25 crores. This amount does not include money raised from Non-Resident Indians (NRIs), Venture Capital Firms, and specified companies.
- **Angel Investors**: For angel investors, the amount of investment that exceeds the fair market value could be claimed for a 100% tax exemption. The investor must have a net worth of INR 2 crores or an income of more than INR 25 lakh in the past 3 fiscal years.

3. Liquidity Coverage Ratio (LCR)

News: The RBI has issued draft guidelines for banks on the Liquidity Coverage Ratio (LCR).

#### About Liquidity Coverage Ratio (LCR)

- It refers to the proportion of **highly liquid assets** held by financial institutions to ensure they can meet **short-term obligations**. The short term obligation means maintaining the **cash outflows for 30 days**.
- It ensures banks and financial institutions have sufficient capital to **handle short-term liquidity disruptions**.
- It has originated from the **Basel III Agreement**.
- It is calculated as follows:
  - **LCR** = (High-Quality Liquid Assets (HQLA))/(Total net cash outflows over the next 30 calendar days).
    - **HQLA**: These are assets that can be **easily and quickly converted into cash** with **minimal or no loss of value**.
    - These include **cash**, **reserves with central banks**, **central government bonds** and SLR securities.

4. Asset Management Companies (AMCs)

News: SEBI has announced that it will hold senior leadership of AMCs responsible and accountable for implementing mechanisms to deter potential market abuse.

About Asset Management Companies (AMCs)

- An AMC is a firm that **invests money collected from clients** into various investments such as stocks, bonds, real estate, and more.
- AMCs create **pooled investment structures** like mutual funds, index funds, or exchange-traded funds (ETFs) which they manage as a single portfolio.

- AMCs are often called **money managers** or **money management firms**.
  - If they offer mutual funds or ETFs to the public, they are also known as investment companies or mutual fund companies.
- The performance and size of AMCs are typically measured by their Assets Under Management (AUM), which is the total value of the assets they manage.
- SEBI is the market regulator that governs and controls every AMC in India.
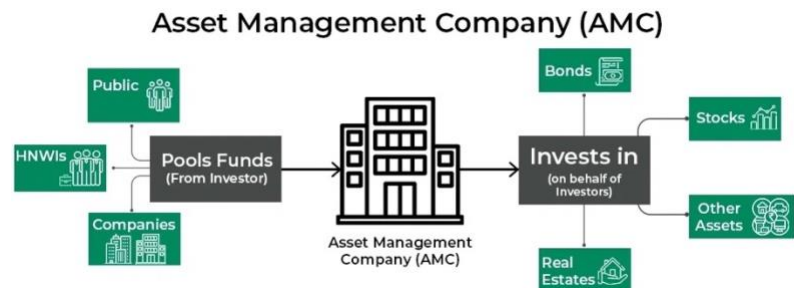
Role and Function of AMCs

- **Investment Management**: AMCs manage and optimize portfolios to meet specific investment goals.
  - They perform **thorough market analysis** and use their expertise to make **informed investment decisions** on behalf of their clients.
- **Diversification**: By pooling funds from multiple investors, AMCs can **diversify investments** across a wide range of assets. This **reduces risk** as the performance is not reliant on a single investment.
- **Access to a Wide Range of Investments**: AMCs provide individual investors access to variety of investment options, including those that may require large capital, expertise and would otherwise be inaccessible.
- **Administration and Record-Keeping**: AMCs handle all administrative tasks such as record-keeping, reporting, and regulatory compliance, which **simplifies the investment process** for their clients.

The Yen Carry Trade

5. Carry Trade in Yen and Fall in Global Stock Markets

News: Major global stock markets witnessed their steepest decline in decades, with the yen carry trade being a major contributing factor to this downturn.

About the Carry Trade in Yen

- It involves **borrowing money in Japan**, where interest rates are low; and **investing it in other countries** with higher interest rates to **earn better returns**.
- Investors borrow in Yen due to **Japan's low or negative interest rates**. They convert the Yen into other currencies and invest in countries with higher interest rates like Brazil, Mexico, India, or US.
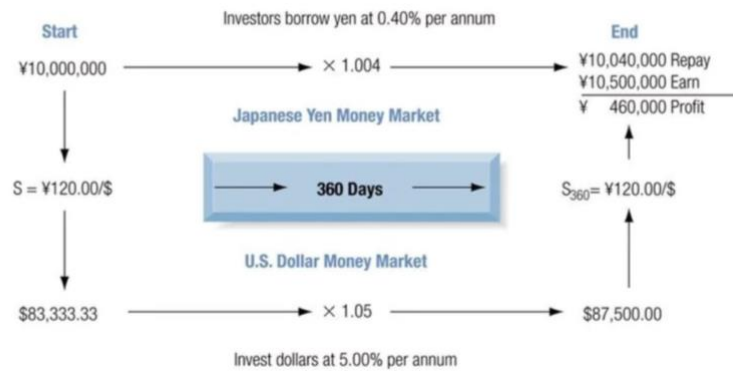
*Source: Investopedia. Investor borrows 10 million yen, converts them into US$ (US$ 83,333); and invests in the US, where the annual interest rate is 5% (0.4% in Japan). After a year, the investor converts the US$ (US$ 87,500) back into Yen (10.5 million Yen) and repays the debt (borrowed in Yen @ 0.4%) and earns a profit. This is a simplified example. In practice, **transaction costs** (brokerage) and **currency depreciation** (Yen depreciates against US$) lower the profit.*

Interest Rates Hike in Japan and Market Impact

- The **Bank of Japan** (BoJ) had kept interest rates at 0% between 2011 and 2016. Since 2016, rates were pushed below zero (-0.10%) to **stimulate economic activity**. Low interest rates in Japan made Yen a cheap borrowing currency for global investors.
- However, between mid-March and July-end 2024, the **BoJ raised interest rates by 35 basis points** (0.35%) to 0.25%. This marked a significant change in Japan's monetary policy, affecting global carry trades.
- The BoJ's **interest rate hike** has led to the **strengthening of the Yen against the Dollar** and other emerging market currencies. Higher Yen value made **foreign assets**, held by investors using borrowed Yen, **less valuable** when converted back to Yen.
- Investors began **selling off assets in international markets**, which were previously bought using cheap Yen. This **sell-off led to a decline in major stock markets** across the world on August 5, 2024. Concerns about further interest rate increases by the BoJ has exacerbated market jitters.

6. Boosting Exports from e-Commerce

News: The Union Minister for Finance has announced in her Budget Speech about the establishment of e-commerce export hubs across India in the PPP mode.

About Industry Potential

- India's e-commerce industry is **dominated by small businesses** exporting items valued between US$ 25 and US$ 1,000, including handicrafts, art, books, ready-made garments, gems, and jewellery.
- According to the **Global Trade Research Initiative** (GTRI), the segment has potential to grow faster than IT exports did in the early 2000s.
- The Ministry projects e-commerce export potential of US$ 200-300 billion by 2030.

Challenges Faced by Indian Exports
- Indian goods exports are **facing disruptions** due to **external shocks** such as the Russia-Ukraine war, the Red Sea crisis, and container shortages stemming from US-China trade tensions.
  - Indian goods exports declined by 5% last financial year.
- While MSMEs and artisans in China, South Korea, Japan, and Vietnam have seen significant export growth through e-commerce, India's e-commerce exports stand at US$ 5 billion, a small fraction of its total goods exports of $450 billion. In contrast, China's e-commerce exports have surpassed US$ 300 billion.
  - McKinsey & Company reported that Southeast Asia's e-commerce market has accelerated since the mid-2010s, further propelled by the COVID-19 pandemic.
- Current e-commerce export provisions in India are a **patchwork of rules** designed for regular B2B exporters, creating **compliance burdens for small firms**. *(Refer EPIC June 2024 for Challenges in India's Foreign Trade).*

About the Initiatives Taken
- The e-Commerce Export Hub aims to enable MSMEs and traditional artisans to **sell their products in international markets**.
  - The hubs will offer a **seamless regulatory** and **logistics framework** to **facilitate trade and export-related services** under one roof.
  - These hubs will be modelled after successful Southeast Asian countries benefiting from e-commerce export growth.
- The Government's **Foreign Trade Policy** (FTP) increased the consignment-wise cap on e-commerce exports through courier from INR 5 lakh to INR 10 lakh.
- The GTRI report recommends a **separate e-commerce export policy** to address the challenges faced by small firms comprehensively. The Government must formulate a policy in this regard at the earliest.

7. More Power Cuts Likely in India

News: According to a recent research report from the India Energy and Climate Centre, University of California (Berkley), power cuts in India will rise in coming 3 years.

Findings of the Report
- **More Power Cuts**: The Report predicts that rising electricity needs in India will likely result in **more evening power cuts** by 2027.
- **Insufficient Renewable Energy Backup**: India has an installed electric capacity of 446 GW, with 211 GW coming from coal, 195 GW from renewable energy sources, and the rest from gas and nuclear energy.
  - However, during heatwaves, prolonged high electricity demand can extend into the night. While solar energy can meet daytime spikes in demand, it cannot address night time demand.
- **Inability of Coal to Meet Demand**: India's most reliable power source coal cannot meet the demand alone.
- **Increase Renewable Energy Storage**: The Report recommends increasing utility-scale solar plants alongside **battery storage**. Battery storage can store solar energy produced during the day for use at night.

8. India's Mineral Production and Imports

News: India's major mineral imports have witnessed almost 80% rise in value terms over five years.
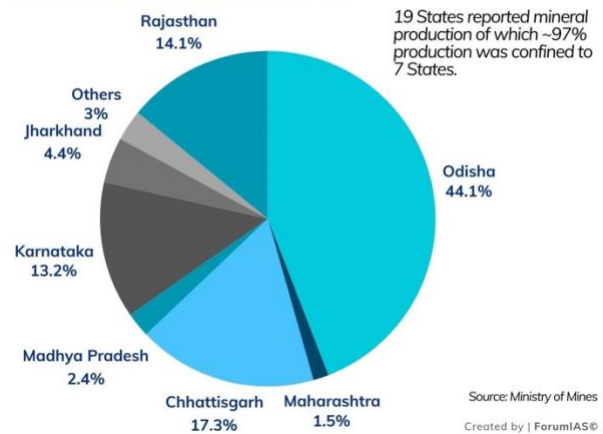
About Major Minerals Imported in India
- The imports in value terms has risen to INR 68,633 crore in 2023-24 from INR 38,604 crore in 2018-19.
- Major minerals imported by India are **copper ore concentrates**, **phosphorite**, **manganese**, **limestone**, **iron ore**, **bauxite**, **asbestos**, **sulphur**, **magnesite**, and **fluorspar**.

o These ten minerals account **for 97% of mineral imports**.

- **Copper**: Copper imports have been the highest in value terms. It constitutes ~40% of the total major mineral imports in 2023-24. Copper imports stood at INR 25,951 crore in 2023-24, doubling from INR 12,146 crore over the last 5 years.
- **Phosphorite**: Phosphorite imports constitute ~20% of the total import in value terms. The imports have increased to INR 12,649 crore in FY2023-24 doubling from INR 5,625 crore.
- **Limestone**: Limestone imports have been highest in volume at 338.09 lakh tonnes (55% of the total), followed by phosphorite at 55.98 lakh tonnes (14%).
- **Critical Minerals**: Critical imports (excluding lithium-ion and copper), totalled INR 1,396.6 crore in 2023-24, with a volume of 82,260 tonnes.

India's Mineral Production (2021-22)
State-wise Share in Mineral Production

19 States reported mineral production of which ~97% production was confined to 7 States.

- Rajasthan 14.1%
- Others 3%
- Jharkhand 4.4%
- Karnataka 13.2%
- Madhya Pradesh 2.4%
- Chhattisgarh 17.3%
- Maharashtra 1.5%
- Odisha 44.1%

Source: Ministry of Mines
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Domestic Production of Minerals

- India is the 2nd largest Aluminium producer, 3rd largest lime producer and 4th largest iron ore producer in the world.
- There was record production of minerals in 2023-24.
- **Iron ore** and **limestone** account for **~80% of the total mineral production by value**. Production of iron ore was 275 million metric ton (MMT) and limestone at 450 MMT in 2023-24.
- The robust growth trends in mineral production point towards continued strong economic activity in user sectors such as **energy**, **infrastructure**, **construction**, **automotive** and **machinery**.

Contribution and Rank of India in World Production of Principal Minerals & Metals, 2020

Sector	Unit of Commodity	Production quantity		Contribution (Percentage)	India's rank in World order $
		World	scope="col" India*		
Metallic Minerals					
Bauxite	'000tonnes	368600	20368	5.53	6th
Chromite	'000tonnes	31000	2863	9.24	4th
Ironore	milliontonnes	3016	204	6.76	4th
Manganeseore	'000tonnes	49600	2688	5.42	5th
Industrial Minerals**					
Magnesite	'000tonnes	28300	78	0.28	17th
Apatite&Rock phosphate	'000tonnes	221000	1455	0.66	15th
Metals					
Aluminium(primary)	'000tonnes	65400	3619	5.53	3rd
Copper(refined)	'000tonnes	24900[1/]	364[#]	1.46	7th
Steel(crude/liquid)	milliontonnes	1857	104	5.60	2nd
Lead(refined)	'000tonnes	12500[2/]	214[#@]	1.71	3rd
Zinc(slab)	'000tonnes	13800	715	5.18	3rd

9. World Development Report, 2024

News: The World Bank has released the World Development Report 2024: The Middle Income Trap.

Key Highlights of the Report

- The Report has identified **India as one of 100-odd countries** (including China) that face the **risk of falling into the Middle Income Trap**. India has favourable demographics and has adopted digital technologies, yet the tougher external (economic) challenges can hamper its growth.

- With the current trends, India will take ~75 years to achieve a per capita income of one-quarter (25%) of the US income. China will take another 10 years to reach 1/4th of US per capita income.

*Source: World Bank. **Brazil** and **South Korea** had same per-capita income level till 1980s. South Korea has transitioned to a high-income economy, but **Brazil has fallen into Middle Income Trap**.*

- Most growing economies usually **hit a "trap"** at **~10% of annual US GDP per person** (which comes out to be ~US$ 8,000 per person at present), a phenomenon that has been called **Middle Income Trap**.

- The Report has warned that **old policies** that helped countries like South Korea transition into high income economies **may not work in the prevailing economic circumstances**.
  - Increasing savings and investments alone won't transform into economic development if the productivity remains stagnant. *(Refer EPIC December 2023 for Middle Income Trap)*.

- Since 1990, only **34 middle-income economies have managed to shift to high-income status**, with over a third of them benefiting from integration into the European Union or previously undiscovered oil reserves.

- As of 2023, **108 countries were classified as middle-income**, each with annual GDP per capita in the range of US$ 1,136 to US$ 13,845.

- These middle economies are home to ~6 billion people or 75% of the global population. They generate more than 40% of global GDP. But 2 out of every 3 persons in these countries live in extreme poverty.

- Many middle-income economies face serious obstacles in their efforts to become high-income countries in the next few decades. These include **rapidly ageing populations**, **burgeoning debt**, **geopolitical and trade frictions**, and the difficulty of expediting economic progress without **degrading the environment**.

- The Report recommends that these economies should first focus on **enhancing investments**; then add an emphasis on **infusion of new technologies** from abroad; and, finally, adopt a **3-pronged strategy that balances investment**, **infusion** (of technology), and **innovation**.

10. Digital Public Infrastructure in Agriculture

News: The Union Finance for Minister has announced the rollout of Digital Public Infrastructure (DPI) for the agricultural sector.

About Digital Public Infrastructure (DPI) in Agriculture

- DPI in agriculture will help farmers and their land in 400 districts during the Kharif season.

- DPI aims to help farmers with **new digital services** by providing **important information about crops**, **farm inputs**, **credit**, **insurance**, **crop estimation**, **market trends**, and support for **new agricultural technologies**.

Main Parts of DPI

- **AgriStack:** This includes 3 key registries:

- o **Farmers' registry** (like an ID for farmers), **crops sown registry** (information about crops planted), and **geo-referenced maps of villages**.

- **Krishi-DSS:** Decision support system for agriculture.

- **Soil Profile Maps**: Maps that provide detailed soil information for better farming.

- These components will make it easier for farmers to access

Benefits of Digital Public Infrastructure (DPI)

- **Improve Efficiency:** DPI can **streamline and automate processes**, **reducing the time and effort** required to provide services e.g., online application for passports, filing of income tax etc.
- **Increase Access:** DPI can improve access to services for people living in remote areas e.g., the use of **digital learning platforms** can provide students in rural areas with access to quality education.
- **Better Service Quality:** DPI can help deliver services of higher quality by **enabling real-time monitoring** and **feedback mechanisms** e.g., digital health records can help healthcare providers deliver personalized and efficient care.
- **Increase Transparency:** DPI can improve transparency in service delivery by providing citizens with **access to information and data** e.g., citizen can know status of their applications online and file grievance redressal in case of delays.
- **Digital Financial Inclusion:** DPI can help **expand financial access** to **underbanked and unbanked populations** e.g., the **use of mobile wallets** and digital payment platforms can enable easy and secure transactions for people who do not have access to traditional banking services.

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government programs like crop insurance and loans, and receive personalized advice based on their crops, soil, and local weather conditions. *(Refer EPIC April 2023 for India's Digital Public Infrastructure, EPIC August 2023 for India Stack: Meaning and Benefits and EPIC September 2023 for World Bank's Observations on India's Digital Public Infrastructure (DPI)).*

11. Decline in India's Garment Sector

News: A report by the Global Trade Research Initiative (GTRI) has highlighted the challenges faced by India's garment sector.

Key Highlights of the Report

- A report by the Global Trade Research Initiative (GTRI) highlights that India's garment export sector is struggling due to **high duties**, **import barriers**, and **complex customs procedures**.
- In 2023-24, garment exports were US$ 14.5 billion, down from US$ 15 billion in 2013-14, while **Vietnam** and **Bangladesh** saw significant growth in their exports.
- **Comparative Decline**: Vietnam's garment exports grew by 82% to US$ 33.4 billion, and Bangladesh's by 70% to US$ 43.8 billion, whereas India's exports decreased.
- **Import Restrictions**: High duties and complicated import procedures for raw materials, especially synthetic fabrics, are major hurdles for Indian exporters.
- **Domestic Issues**: **Quality control orders** for fabric imports have **increased costs for exporters**, forcing reliance on more expensive domestic supplies.
- **Procedural Complexity**: Outdated customs and trade procedures require meticulous tracking of all imported materials, adding to exporters' burdens.
- **Limited Impact of PLI Scheme**: The production-linked incentive (PLI) scheme for textiles, launched in 2021, has not attracted significant investment and needs revision.
- **Rising Imports**: India's garment and textiles imports grew to nearly US$ 9.2 billion in 2023, with further increases expected if export declines are not addressed. *(Read more about Textile Sector).*

International Relations

1. India's Aid to Foreign Nations

News: The Ministry of External Affairs has outlined the development assistance plans for neighbouring countries and strategic partners.

India's Development Aid

- A large share of the allocation to Ministry of External Affairs has been earmarked for aid to countries.

- **Bhutan**: Bhutan will receive the highest aid of ~INR 2070 crore. It is slightly less than the last year's allocation of INR 2,400 crore.
- **Maldives**: It will get INR 400 crore in the new Budget, the same as budgeted last year. However, the actual amount (revised) spent on Maldives for 2023-24 stood at INR 771 crore.
- **Nepal**: Nepal has got INR 700 crore, up from INR 550 crore in 2023-24 (Revised INR 650 crore in 2023-24).
- **Sri Lanka**: Sri Lanka has been allocated INR 245 crore, up from INR 150 crore last year.
- **Afghanistan**: Afghanistan will get INR 200 crore.
- **Chabahar Port**: Chabahar Port will receive INR 100 crore, which hasn't changed for the last 3 years.
- The total Budget estimate for the MEA for 2024-25 is INR 22,155 crore, which exceeds the INR 18,050 crore allocated in 2023-24. However, it falls short of the revised estimate of INR 29,121 crore for the same fiscal.
- The high share of allocation to India's neighbouring countries indicate the emphasis of the Government on the **Neighbourhood First policy**.

Policy Framework for India's Overseas Development Cooperation

Vision for India's Development Cooperation
- **Non-Conditionality**: The development partnerships must be based on mutually agreed terms
- **Promoting a 'Partnership among Equals'**: All development partnerships must be on an equal footing, without domination or undue influence.
- **Mutual Accountability**: Both India and development partners must be accountable to each other.

Operating Principles
- Mutual Benefit.
- Transparency and Fiscal Integrity.
- Accountability.
- Sustainability.
- Inclusiveness.

Goals and Development Priorities
- Capacity Development and Technology Transfer.
- Gender Empowerment and SDGs.

Source: Towards a White Paper on Policy: Jindal Journal of Public Policy   Created by | ForumIAS©

Benefits of Development Aid

- Development Assistance helps in deepening of **diplomatic relations** and **political and economic ties**.
- Development aid **helps in economic growth** of countries which promotes **regional stability**.
- It leads to better **trade and investments** (e.g., hydroelectric or railway connectivity projects) in the region, which contribute to **improvement in the living standards**.
- Development Aid is also useful in **humanitarian assistance and disaster relief**.
- It contributes to **goodwill among the citizens** of beneficiary nations and **adds to soft power**. *(Refer EPIC October 2022 for India's Overseas Development Cooperation)*.

2. Visit of Vietnam's PM to India

News: The Prime Minister of Vietnam visited India.

Key Highlights of the Visit

- **Plan to Implement the Comprehensive Strategic Partnership**: The two countries have agreed on a new plan of action for their comprehensive strategic partnership. The plan will be adopted for the 5 year period, 2024-2028. The plan includes measures like **strengthening bilateral trade and economic cooperation**, enhancing collaboration in **technology and development**, and fostering partnerships in **defence and security**.
- **Digital Payment Connectivity**: The Central Banks of both countries have reached an agreement to establish digital payment connectivity. It will enhance financial transactions between the two countries. Like India, Vietnam too has adopted digital payments and has already committed to **developing cross-border payment connectivity** for retail transactions, including quick response (QR) codes and instant payments.
- **Defence and Security**: India will provide **US$ 300 million credit line** to Vietnam to strengthen Vietnam's military security.

o The PMs of the two countries jointly inaugurated the Army Software Park at the Tele-Communications University in Nha Trang, Vietnam.

- **MoUs**: Six Memorandums of Understanding (MoUs) have been signed, covering areas of Agricultural Research, Customs capacity building, Law and Justice, Radio & Television, and Traditional Medicines.
- **Trade**: The PM of Vietnam has proposed an annual bilateral trade target of US$ 20 billion, up from US$ 14.8 billion at present.
  o India and Vietnam also agreed that early completion of the on-going review of the ASEAN-India Trade in Goods Agreement will help both countries to reach their bilateral trade potential.
- **Strategic Aspect**: Both sides will continue cooperation for a free, open, rules-based and prosperous Indo-Pacific. The PM of India acknowledged that Vietnam was India's important partner in the Act East Policy and Indo-Pacific vision.
- **Cultural**: A letter of intent was also exchanged for restoration and conservation of Mysoon UNESCO World Heritage site.

3. St. Martin's Island (Bay of Bengal)

News: There have been unsubstantiated reports that the US wanted to establish an airbase at St. Martin's Island (belonging to Bangladesh) in the Bay of Bengal.

About St Martin's Island

- It is situated in the **northeastern region of the Bay of Bengal**, near the **border between Bangladesh and Myanmar**. It is Bangladesh's only **coral island**.
- It is located 9 kms from southern tip of Bangladesh's Cox's Bazar-Teknaf peninsula. It is 7.3 km long. It has an elevation of 3.6 meters above sea level.
- The island has a permanent population of ~10,000 people. It is a **popular tourist spot**.
- In the 18th Century, Arab merchants were among the first to settle on the island. They'd initially named it "*Jazira*" (meaning the island) and later changed it to "*Narikel Jinjira*" or "Coconut Island."

Source: Google Maps. Location of the Island in Bay of Bengal.

- The island was **annexed by British India** during a land survey in 1900. During this time, the island became known as St Martin's Island, reportedly named after the then Deputy Commissioner of Chittagong, Martin.
- It was originally part of the **Teknaf peninsula**. However, the island was **submerged into the sea ~5,000 years ago**. The southern part resurfaced about 450 years ago, with the northern parts rising above sea level in the following century.
- The island's position in the Bay of Bengal makes it **strategically important** in regional geopolitics.
- The island has a **mixed cultural heritage**, with influences from both **Bengali and Rakhine communities**, as well as the **early Arab settlers**.
- St Martin's Island holds **significant environmental importance** as it is both a coral island and a breeding ground for sea turtles.

4. Axis of Resistance

News: Hamas leader Ismail Haniyeh was assassinated in Tehran. Experts believe Iran could increase attacks against Israel through its allies in the "Axis of Resistance".

About Axis of Resistance

- The "axis of resistance" is an **informal**, **loose-knit alliance** that includes both Sunni and Shia Muslim groups and Governments in Yemen, Syria, Lebanon, Gaza and Iraq, with differences and varying levels of proximity to one another and to Tehran.
- The coalition's name is inspired by former US President George W. Bush's term "**Axis of Evil**", which referred to Iran, Iraq, and North Korea.
- The roots of the Axis of Resistance trace back to the **Iranian Revolution of 1979**, which allowed radical Shia Muslim clerics to come to power.
- To expand its influence in a predominantly Sunni region, Iran's regime began **supporting non-state actors**.
- Iran views Israel's creation in 1948 as a means for the US and the West to influence the region for strategic interests. Iran considers Israel as a threat.
- The members of Axis of Resistance include:
  - **Hezbollah**: A Shiite militant organization.
  - **Hamas**: A Palestinian Sunni militant group based in Gaza.
  - **Palestinian Islamic Jihad (PIJ)**: A Sunni Islamist militant group in Palestine.
  - **Houthis**: A Zaydi Shia militant group in Yemen.
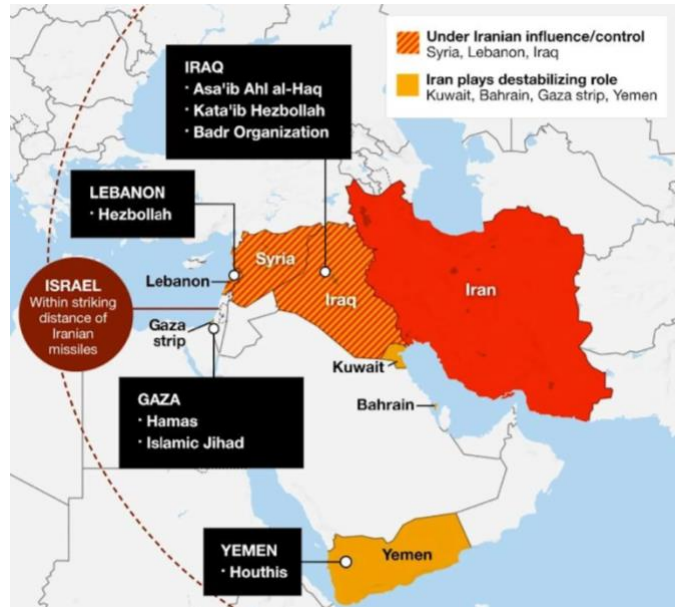
Science and Technology

1. Brown Dwarfs

News: Researchers have used the James Webb Space Telescope to conduct detailed examinations of the atmospheric conditions on pairs of brown dwarfs.

About Brown Dwarfs

- Brown dwarfs are **celestial bodies** that are **larger than a planet** but **smaller than a star**. They have a size range between that of a **giant planet** like Jupiter and a **small star**.
- Brown dwarfs **accumulate material in a manner similar to stars**, not like planets.
- Brown dwarfs can have clouds made of precipitates in their atmospheres. Unlike Earth's

Source: NASA. From left to right, Sun, Low Mass Star, Brown Dwarf, Jupiter and Earth (Relative Sizes).

water clouds, the clouds on brown dwarfs are much hotter and likely composed of **hot silicate particles**.
- Brown dwarfs retain lighter elements such as hydrogen and helium more effectively than planets, and they have a **relatively low metal content**.

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- Most astronomers classify any object with **mass between 15 to 75 times that of Jupiter to be a brown dwarf**. In this mass range, Brown dwarfs do not have enough mass for their cores to **burn nuclear fuel and radiate starlight**, which is why they are sometimes referred to as "**failed stars**".

About James Webb Space Telescope
- The James Webb Space Telescope was launched in 2021. It is a joint endeavor of the USA, European, and Canadian space agencies. *(Refer EPIC December 2021 for James Webb Telescope).*
- It is a **large infrared telescope** with ~6.5-meter primary mirror.
- Unlike the Hubble Space Telescope, it **does not orbit Earth**. Instead, it orbits the Sun, 5 million kilometers away from Earth, at the **second Lagrange point** (L2).
- The telescope is designed to see farther across the cosmos and further back in time than any previous astronomical tool. One of its objectives is to **find the very first stars that ignited in the nascent Universe**.

2. Distributed Denial of Service Attack (DDoS)

News: There were reports that the platform X faced DDoS attack before the streaming of interview between Elon Musk and the Republican candidate for the US Presidential election, Donald Trump.

About DDoS Attacks
- A Distributed Denial-of-Service (DDoS) attack overwhelms a website or online service by **flooding it with massive traffic**, making it **inaccessible to legitimate users**.
- Attackers typically use **networks of compromised devices**, known as **botnets** (zombie networks), to send excessive connection requests to the target. Large number of requests at the same time over-whelms the server, leading to **slow or no response** (users unable to connect or access the website).
- **Working of the Attack**
  - **Botnets**: Attackers use networks of compromised devices, known as **botnets**, to launch an attack by overwhelming a target site with excessive traffic.
  - **Smurf Attack**: In this method, attackers send malicious **Internet Control Message Protocol** (ICMP) packets to multiple hosts using a spoofed source IP address. The targeted servers respond, inadvertently flooding their own network and causing a DDoS attack.

DDoS Attacks Explained

DDoS attacks occur when a hacker uses a zombie network to flood a website/server with traffic or requests until it crashes.

Attacker	Zombie Network	Targeted Website/Server
A hacker infects devices to make botnets, forming a **zombie network**.	The zombie network **floods a targeted website or server** with traffic.	The targeted **website or server crashes**, disconnecting from the internet.

  - **SYN Flood**: Attackers initiate connection requests to a server but intentionally leave them incomplete. This results in multiple incomplete connections, **overloading** the server and **preventing legitimate connections from being processed smoothly**.
- **Signs**: Slower internet speeds and difficulty in accessing online services indicate a possible DDoS attack.
- **Impact**: DDoS attacks can **cause disruptions** which can last from a **few hours to days**, affecting major websites and services. In 2016, DDoS attacks had disrupted sites like Spotify, Twitter, and Amazon for hours.
- **Prevention**: Anti-virus software, firewalls, and security systems are essential for detecting and mitigating such attacks.
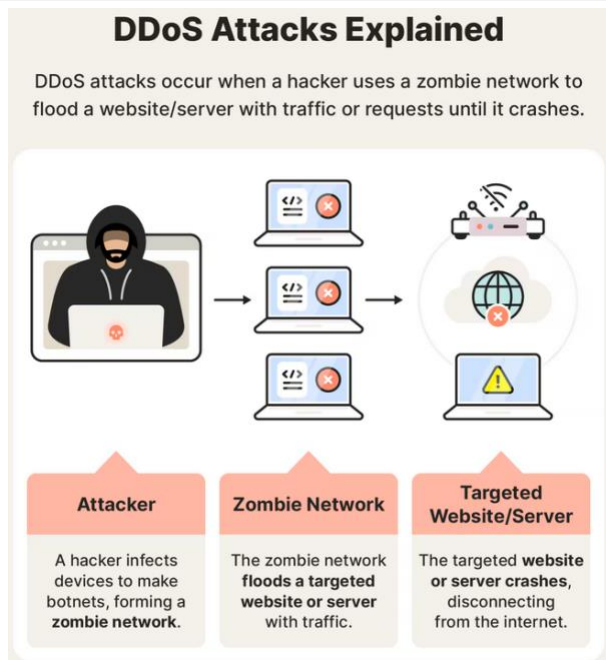
3. Caller ID Spoofing

News: Rise in number of spoof calls present a cyber-security challenge.

About Caller ID Spoofing

- In Caller ID Spoofing, a caller **deliberately falsifies information transmitted** to the **caller ID display of the call receiver** to **disguise their identity**.
- It is relatively easy to perform and has been used by enthusiasts, telemarketers, and fraudsters.

Risks

- **Shielding Identity**: Malicious individuals use spoofing to hide their identity during illicit activities.
- **Social Engineering**: Spoofed caller IDs exploit the trust associated with familiar numbers to carry out social engineering attacks.
- **Circumventing Call Blocking**: Spoofing helps bypass standard call blocking systems.
- **Exploiting IVR Systems**: It can be used to exploit vulnerabilities in insecure Interactive Voice Response systems.

Legal Status and Commercial Services

- Caller ID spoofing is legal in many jurisdictions.
- Various companies offer caller ID spoofing services, with the first commercial service launching in 2004.

Financial Impact

- Loss of revenue to telecom providers.
- Users face financial losses due to scam calls.
- Law Enforcement agency faces difficulty in **investigating crimes** involving spoofed IDs.

Technical and Regulatory Efforts

- I**nternational Telecommunications Union** (ITU) published a technical report in 2021 recommending **PKI-based authentication** (Public Key Infrastructure) to counter spoofing.
- Telecom Regulatory Authority of India (TRAI) recommended the integration of **Calling Name Presentation** (CNAP) to display caller names based on KYC documents.
- A 2022 consultation paper acknowledges the problem but lacks a detailed plan for tackling caller ID spoofing.
- In May 2024, Department of Telecommunications (DoT) devised a system to identify and block international calls with manipulated **Calling Line Identity** (CLI).
- The DoT has issued directions to telecom operators to prevent such calls, though the effectiveness and implementation details are unclear.

Benefits of Fixing Caller ID Spoofing

- **For Consumers**
  o Reduction in spam and fraud calls.
  o Elimination of fraud reliant on false caller identity representation.
- **For Telecommunications Providers**: Savings on revenue otherwise lost due to spoofing.
- **For Government and Public**

o Increased revenue contributing to the economy.
o Enhanced public safety through reduced fraudulent activities.

4. Collision Avoidance System

News: As traffic in various modes of transportation becomes denser, collision avoidance systems become essential for safety.

About Collison Avoidance System (CAS)
- It is a **safety technology** designed to **prevent or reduce the severity of collisions** in **vehicles**, **aircraft**, **ships**, and other **modes of transportation**.
- **Key Components**
  o **Sensors and Detection**: CAS relies on a variety of sensors such as **radar**, **lidar**, **ultrasonic sensors**, and **cameras** to **detect obstacles** or **other vehicles** around the vehicle or aircraft.
  o **Processing Unit**: The data from the sensors are processed by an onboard computer, which **assesses the risk of collision** by analyzing the speed, distance, and trajectory of the detected objects.
  o **Warning System**: If the system determines that a collision is imminent, it alerts the driver or pilot through audible alarms, visual warnings, or haptic feedback (like vibrating the steering wheel or seat).
  o **Automatic Action**: In advanced CAS, if the driver or pilot does not respond to the warnings, the system can take **automatic actions** such as applying the brakes, steering away, or adjusting speed to avoid a collision.

Types of CAS
- **Automotive**: It involves Forward Collision Warning (FCW), Automatic Emergency Braking (AEB), Lane Departure Warning (LDW) and Blind Spot Detection (BSD).
- **Aviation**: It includes Traffic Collision Avoidance System (TCAS) and Ground Proximity Warning System.
- **Marine**: It includes Automatic Radar Plotting Aid (ARPA) which helps in detecting and tracking other vessels to avoid collisions at sea.

Benefits of CAS
- **Enhanced Safety**: CAS significantly reduces the likelihood of accidents by providing early warnings and automatic interventions.
- **Driver/Pilot Assistance**: It aids in situations where human reaction time may be insufficient.
- **Insurance and Liability**: Vehicles and aircraft equipped with CAS may benefit from lower insurance premiums due to reduced risk.

Challenges of CAS
- **Sensor Limitations**: The effectiveness of CAS can be hindered by poor weather conditions, malfunction of sensors, or false positives.
- **Over-reliance**: There is a risk that drivers or pilots may become too dependent on the system and not remain vigilant.

5. Supreme Court's Judgment on GM Mustard

News: The Supreme Court has delivered a split verdict on the validity of Union Government's decision to grant conditional approval for the environmental release of GM Mustard (Dhara Mustard Hybrid)-11.

About the SC Judgment
- The Judgment was delivered by a 2-Judge bench with Justice BV Nagarathna and Justice Sanjay Karol. Both the Judges disagreed on certain aspects. (*Refer EPIC November 2022 for GM Crops in India: Issues and Challenges*).

- **Justices B V Nagarathna**
  - o She argued that the Genetic Engineering Appraisal Committee (GEAC) **did not conduct required field tests** and ignored **precautionary principle**, thus **violating** the public trust.
  - o She noted that **only foreign research studies** were considered while making the recommendations.
  - o She highlighted that **no long-term studies** on the effects of GM mustard were conducted, which she saw as a **failure to ensure environmental safety**.

Timeline

GEAC published a report and invited comments.

Ministry of Environment asked GEAC to **re-examine the proposal.**

Environmentalist and Advocacy group Gene Campaign **challenged the approval** before the **Supreme Court.**

2015 — 2016 — 2017 — 2018 — 2022 — 2022 — 2024

Delhi University's **Centre for Genetic Manipulation of Crop Plants** (CGMCP) sought **GEAC's approval** for GM mustard.

GEAC recommended the **environmental release** of GM mustard.

CGMCP urged the Government to accept GEAC's recommendation. **Approval granted** in October 2022.

Supreme Court delivers a **split verdict.**

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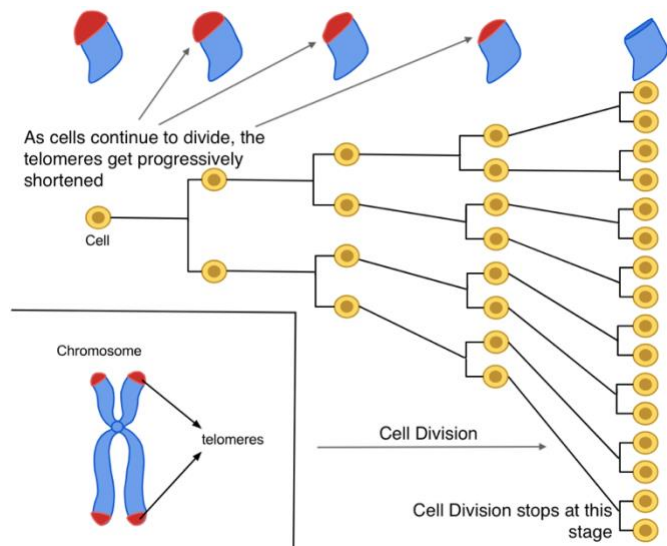
- **Justices Sanjay Karol**
  - o He believed the GEAC's **process was thorough** and **supported scientific development**.
  - o He argued that field tests are necessary to assess the crop's impact on health and biodiversity.
  - o He also noted that **other Government departments recommended the release of GM mustard** and that **honeybees did not avoid GM crops** like genetically engineered canola.
- Both Judges acknowledged that **judicial review** of decisions made by the GEAC was permissible.
- The Judges asked the Government to **formulate a national policy** in **consultation with all stakeholders**, such as experts in the field of agriculture and biotechnology, State governments, representatives of the farmers. The Bench also said the Government should hold the **consultations within 4 months**.

6. Hayflick Limit

News: Biomedical researcher Leonard Hayflick died recently. He has been credited with postulating the Hayflick limit that is related to understanding the ageing process in human beings.

About Hayflick Limit

- Leonard Hayflick discovered that **cell division in somatic** (non-reproductive) **cells** stopped after **roughly 40-60 times**.
- Hayflick proposed that **this limit in cell division causes ageing**. As **senescent cells** (those that have stopped dividing) **accumulate**, the **body begins to age and decline**.
- The discovery led to an understanding that there is an **inherent limit** (Hayflick Limit) which determines **how long the humans** (or other organisms) **can live**. Scientists have estimated the limit to be ~125 years for humans, beyond which no amount of diet, exercise, or even **genetic tweaking against diseases can extend the human lifespan**.

As cells continue to divide, the telomeres get progressively shortened

Cell

Chromosome

telomeres

Cell Division

Cell Division stops at this stage

  - o For Galapagos Turtle, this limit is ~200 years with ~110 cell divisions before senescing.

Role of Telomeres

- Telomeres were discovered by the researchers in the 1970s.
- As cells divide, they create copies of DNA strands. **Telomeres are repetitive DNA sequences at the end of the strands**. They are meant to **protect the chromosome**.
- With each cell division, the **telomeres get slightly shorter**. Eventually, the **telomere loss reaches a critical point** at which stage, **the cell division ends**.
- Scientists have not yet been able to establish the **exact relationship between length of Telomeres and lifespan** e.g., the telomere length in mice is 5 times longer than humans but their lives are 40 times shorter and they die after ~15 cell divisions.
- Some scientists argue that telomere loss and Hayflick limit are **not limits on ageing**, but **rather symptoms of ageing**.
  - They contend that it might be possible to **reduce telomere loss** or **replace telomeres**.
  - The discovery of **protein Telomerase** supports this possibility. This protein is capable of **producing new telomeres**.
  - Telomerase is present in all cells, but it is apparently "turned on" in only cancer cells. This is why Hayflick had said that the **cancer cells are not subject to Hayflick limit** (they continue to divide beyond the limit).
- Scientists have been able to **synthesise telomerase in laboratory**. Some in-vitro studies have indicated that it is **possible to slow down telomere loss in normal human cells**.
- Thus, some scientists argue that the process of ageing can be slowed down or halted. However, the research is still in a nascent stage and practical applications may not be available in the near future.
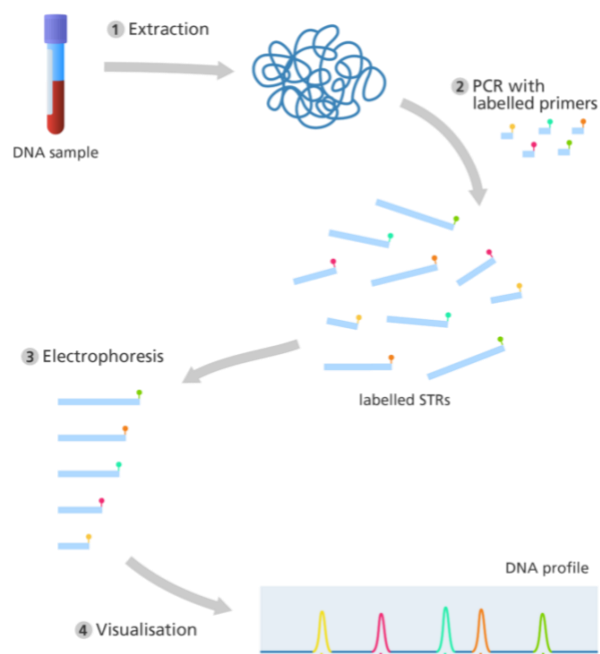
7. DNA Profiling

News: The Madras HC overturned the conviction of a man in a POCSO case, citing insufficient proof. The HC questioned sole reliance on DNA evidence for establishing guilt. This has brought focus on the process of DNA Profiling.

About DNA Profiling

- DNA profiling is a method used to **identify individuals** based on their **unique DNA sequences**.
- Although **99.9% of human DNA is identical**, the remaining 0.1% contains variations that can be used to create a DNA profile.
- Specific locations in 0.1% DNA are examined, with focus on **Short Tandem Repeats** (STRs) which are **repetitive sequences of DNA** that **vary from person to person**.

Process of DNA Profiling

- DNA can be collected from various **biological materials** like blood, saliva, semen, hair, or skin cells.
- The process of collecting, storing, and transporting DNA samples is crucial to avoid contamination and ensure the accuracy of the results.
- DNA profiling involves several steps: Isolating DNA from sample, amplifying specific **genetic markers**, and analyzing these markers to create a DNA profile.

- The key steps are **isolation**, **purification**, **amplification**, **visualization**, **genotyping**, and **statistical analysis**.

Reliability of DNA Profiling

- DNA Profiling is a powerful tool in forensic science, but it is **not foolproof**. The process is based on probability, and various factors like **sample contamination**, **degradation**, or **mishandling** can affect the results.
- The reliability of DNA evidence also depends on the **quality of the sample** and the **expertise of the laboratory** performing the analysis.
- A Law Commission of India report, 'A Review of the Indian Evidence Act, 2003', had observed that: "*If the samples match, that does not mean the identity is conclusively proved. Rather, an expert will be able to derive from a database of DNA samples an approximate number reflecting how often a similar DNA "profile" or "fingerprint" is found. (like in 1 person for every 1,00,000). This is described as the "random occurrence ratio". Thus, DNA may be more useful for purposes of investigation but not for raising any presumption of identity in a court of law*". Thus the DNA evidence alone shouldn't be considered conclusive.

DNA Profiling in Criminal Cases

- DNA evidence can be critical in criminal investigations, helping to identify or exclude suspects. However, **DNA evidence alone may not be conclusive**.
- Courts often **require additional evidence** to corroborate DNA findings before reaching a verdict.
- In legal cases, the probative value of DNA evidence can vary. Courts may treat DNA evidence as strong, but not absolute, and it must be weighed alongside other evidence.

8. Lab-grown Meat

News: Singapore is currently the only country in the world where lab-grown meat is available for purchase.
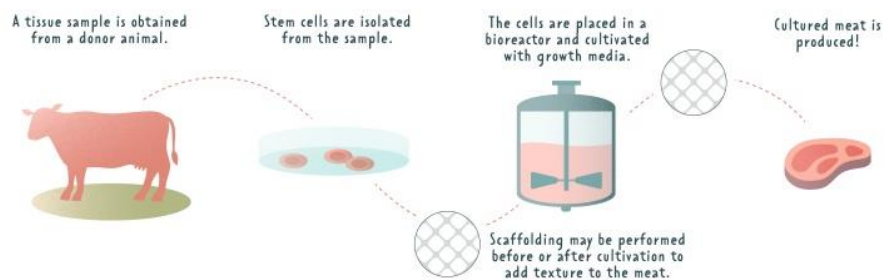
About Lab-grown Meat

- Lab-grown meat, also known as **cultivated meat**, is produced by **growing animal cells in a lab** rather than raising and slaughtering animals.
- **Process**

Source: Harvard.edu. Process of lab-grown meat.

  o **Cell Collection**: Animal cells, such as muscle cells, are collected from a live animal.
  o **Cell Culturing**: These cells are placed in a **nutrient-rich culture medium**. The medium contains essential nutrients like proteins, fats, carbohydrates, vitamins, and minerals.
  o **Bioreactors**: Cells are grown in bioreactors, which are large vessels that provide a **controlled environment for cell growth**. Bioreactors can range from small lab-scale sizes to large industrial-scale units.
  o **Tissue Formation**: Cells multiply and form muscle tissues. Techniques like scaffolding and tissue engineering help cells grow into structured meat products.
  o **Harvesting**: The cultivated meat is harvested from the bioreactors. It is then processed into various meat products like burgers, chicken nuggets, or minced meat.
- **International Trends**: Countries like the US, Israel, Australia, and China are also exploring lab-grown meat. Investments in the industry have fluctuated, with a significant drop in global funding recently.

- **Future Prospects**: The industry aims to reach cost parity with conventional meat by 2030. Potential market value of about US$ 25 billion by 2030.

Benefits of Lab-Grown Meat

- **Less Contamination**: Advocates of cultured meat say it's much less likely to be infected by *E. coli* bacteria (found in living animals) and other contaminants found in a meat processing plant.
- **Fewer Antibiotics**: Traditionally raised livestock are often given antibiotics to help keep them healthy. This can lead to **antibiotic resistance**.
- **Environment Friendly**: Cultured meat requires less land and water and causes less pollution. It can **reduce the need for traditional livestock farming**; lowering GHG emissions (methane).

Source: Harvard.edu. Reduced environmental impact of lab-grown meat compared to animal-based meat.

- **Reduce Killing**: Cultured meat requires a **small sample of tissue**, it does not require an animal to be killed.
- However, lab grown meat is **much expensive**. Hence the market for lab-grown meat may be limited till it achieves parity with conventional meat. Limited market may lower the investments in scaling up lab-grown meat. *(Refer EPIC November 2023 for Combating Anti-Microbial Resistance).*

9. Waiver for Clinical Trials in India (under certain conditions)

News: The Government has decided to waive-off the requirement for clinical trials in India for certain drugs if they have already been approved in specific countries like the US, UK, EU, Japan, Australia, and Canada.

About Waiver for Clinical Trials in India

- **Purpose of the Waiver**: This waiver aims to make drugs manufactured outside of India **more accessible and affordable** for Indian patients.
- **Rule 101**: The waiver is authorized under Rule 101 of the **New Drugs and Clinical Trial Rules**, **2019**. This rule allows the Government to exempt local clinical trials if the drug is already approved in the listed countries.
- **Categories of Drugs Considered for Waiver**: There are five drug categories:

Drug Category	Uses
Rare Disease[*] Drugs	• Drugs used to treat rare diseases.
Gene and Cellular Therapy[*] Products	• Advanced therapies involving genes and cells.
Pandemic Situation Drugs	• New drugs specifically used during pandemics.
Special Defence Purpose Drugs	• Drugs developed for defence or military purposes.
Significant Therapeutic Advances	• New drugs that offer major improvements over current treatments.

[*]*(Refer EPIC May 2023 for National Policy on Rare Diseases, 2021: Provisions and Concerns and Read more about Gene Therapy).*

About the Criteria for Waiver

According to the New Drugs and Clinical Trial Rules 2019, local trials may be waived if:
- The drug has been approved in specified markets.
- No **major adverse events have been reported**.
- A **global trial with Indian sites** is ongoing.
- There is no evidence that Indian enzymes or genes affect the drug's safety and efficacy.
- The applicant commits to conducting **Phase IV trials**.

Safeguards in Place

- **Post-Marketing Surveillance**: Even though local clinical trials are waived, drugs approved under this new mechanism must still undergo "**Phase IV post-marketing surveillance**". This monitoring **tracks serious side effects** and **ensures drug safety**, while allowing faster access to new treatments.
- **Authority for Local Trials**: If there is evidence that a drug could have different effects in the Indian population, the DGCI's Subject Expert Committee can **mandate local clinical trials** to address any specific responses.

Significance of New Regulations for Drug Approvals

- **Faster Access to Treatments**: The new rules will speed up access to treatments for rare diseases and specific cancers.
  - Popular drugs for diabetes, obesity, Alzheimer's, and cancer will be available sooner. This update is important for treatments of rare diseases, gene therapies, pandemic needs etc.
- **Benefits for Drug Manufacturers**: The new regulations will **lower costs for local trials**, benefiting both international and Indian drug manufacturers. Indian companies may **offer drugs at lower prices**, **improving patient access** and **reducing financial strain** on pharmaceutical firms.

10. Provisions for Science and Technology in the Union Budget 2024-25

News: The Union Budget 2024-25 has several provisions for the field of Science and Technology including for research, agriculture and clean energy.

About Budget Allocation to S&T

- **Research and Development**: The **Anusandhan National Research Foundation** (ANRF), with a INR 1 lakh crore corpus, will focus on basic research and prototype development, aiming to foster private sector-driven research and innovation.
- **Biotechnology and Agriculture**: Agricultural research is focused on **boosting productivity** and **climate resilience**. Speed breeding platforms at various institutes allow growing 4-6 generations of rice in 1 year.
  - Research is focused on **developing crop varieties** that are both **climate-resilient** and **high-yielding**, covering crops like rice, wheat, chickpea, and linseed.
- **Industrial and Economic Policies**: The plan includes setting up "**plug and play**" **industrial parks** in 100 cities and creating 12 new parks under the **National Industrial Corridor Development Programme**. There is a clear focus on commercializing technologies with the involvement of private sector-driven research.
- **Critical Minerals**: Customs duties on 25 critical minerals will be waived to boost research in these areas.
- **Start-up and Investment Incentives**: Abolition of **Angel tax** will encourage private capital for start-ups.
- **Energy and Environment**: Focus has been on clean energy initiatives including solar and nuclear energy. The Government will partner with the private sector for small nuclear reactors. Reduced tax on critical raw materials and minerals will also aid clean energy initiatives.
- **Space Technology**: INR 1,000 crore venture capital fund for space technology will be established.

- **Health and Pharmaceuticals**: The Production Linked Incentive (PLI) Scheme has increased its allocation for pharmaceuticals to INR 2,143 crore to boost domestic manufacturing.
- **Education and Skill Development**: The i3C BRIC-RCB PhD program and internship scheme are designed to foster multi-disciplinary learning, skill development, and encourage students to pursue careers in science.

Concerns Associated with the Budget

- **Budget Allocations and Reporting**: Actual spending on science and technology was lower than allocated, and the increase in Budget 2024-2025 might be negated by inflation. There are concerns whether funds will meet allocations.
- **Commercializing Academic R&D Innovations**: India's R&D efforts are mainly focused on academia, and innovations often don't reach the market. *(Refer EPIC July 2023 for Status of R&D in India and the National Research Foundation (NRF)).*
- **Disparities in Funding**: Most of India's 40,000 State-run higher education centers receive limited funding, with only 11% of Department of Science and Technology funds allocated to them; while 65% goes to IITs.
- **ANRF's Focus and Funding Adequacy**: The ANRF's focus on basic science and prototype development, supported by a INR 1,000 crore fund for space tech, is promising but may be inadequate; there are concerns that combining prototype development with basic research might overly shift the focus towards translational research.

11. Evolution of Clocks

News: The technology related to Clocks has evolved a lot since the ancient times.

About the Evolution of Clocks

- Clocks measure time by tracking something that repeats at a fixed frequency.
- Modern clocks have a power source, resonator (like a quartz crystal), and a counter.

Evolution of clocks

- **Ancient Times**
  - **Sundial**: It used the **position of the Sun** to cast shadows, indicating time by shadow's length and position.
  - **Water Clocks**: It utilized the **steady flow of water** to measure time; water levels indicated elapsed periods.
  - **Hourglasses**: It employed **sand** flowing through a narrow passage to measure specific intervals.
- **Medieval Times**
  - **Mechanical Clocks** (13th Century): It featured the **verge escapement mechanism**, allowing **gear movement** at fixed intervals, driven by weights and pulleys.
  - **Spring-Driven Clocks** (15th-18th Centuries): It used **coiled springs** for power, with **fusee mechanism** ensuring consistent force, leading to evolution of **pocket watches**.
  - **Pendulum Clocks** (1656): It was invented by Christiaan Huygens and used a **pendulum's regular swings** to improve accuracy.
  - **Marine Chronometers** (1761): It was developed by John Harrison. It was crucial for determining longitude at sea. It was resistant to ship motion and environmental changes.
- **Modern Times**
  - **Electric Clocks** (19th Century): It is powered by batteries or electric motors, enhancing accuracy and reliability over mechanical predecessors.
  - **Quartz Clocks** (20th Century): It utilizes **quartz crystals oscillating at fixed frequencies** due to the **piezoelectric effect**, leading to widespread use in watches and wall-clocks.
  - **Atomic Clocks** (1940s-Present): It employs **atoms** (e.g., caesium-133) **as resonators**, with lasers exciting atoms to **emit radiation at precise frequencies**, achieving unprecedented accuracy.

o **Optical Clocks** (Next-Generation): It uses atoms like strontium or ytterbium, with radiation in the optical range, offering stability and precision over billions of years. (*Read more about Optical Atomic Clocks*).

o **Nuclear Clocks** (Future Development): It is a potential next-generation device, using atomic nuclei as resonators for ultra-high precision, with thorium-229 nuclei being a primary candidate.

Environment

1. Abnormally High Winter Temperatures in Antarctica

News: Antarctica is currently experiencing a significant 'heatwave' during its deep winter, with temperatures unusually high for this time of year.

About the Abnormal High Temperatures

- In East Antarctica, where **deep-winter temperatures** typically range between **-60°C to -50°C**, the current temperatures are **between -30°C and -25°C**. The temperatures are ~**10-20°C higher than normal**, with some days seeing **increases of up to 28°C**.

Reason behind Occurrence of 'Heatwave'

- **Weakened Polar Vortex**: The polar vortex is a band of cold air that usually **traps cold temperatures over Antarctica during the winter**. However, this year, large-scale **atmospheric waves** have **disturbed the vortex**, and have **weakened it**.

- **Warm Air Infiltration**: As the polar vortex weakened, it allowed **warmer air to enter Antarctica**, causing an unexpected rise in the temperatures.

- **Reduced Sea Ice**: The reduction in the extent of Antarctica Sea ice is another contributing factor. Sea ice reflects sunlight and keeps the air cool. **With less ice**, the region absorbs more heat, leading to warmer temperatures.

Understanding the polar vortex

The Arctic polar vortex is a strong band of winds in the stratosphere, surrounding the North Pole 10–30 miles above the surface.

The polar vortex is far above and typically does not interact with the polar jet stream, the flow of winds in the troposphere 5–9 miles above the surface. But when the polar vortex is especially strong and stable, the jet stream stays farther north and has fewer "kinks." This keeps cold air contained over the Arctic and the mid-latitudes warmer than usual.

Every other year or so, the Arctic polar vortex dramatically weakens. The vortex can be pushed off the pole or split into two. Sometimes the polar jet stream mirrors this stratospheric upheaval, becoming weaker or wavy. At the surface, cold air is pushed southward to the mid-latitudes, and warm air is drawn up into the Arctic.
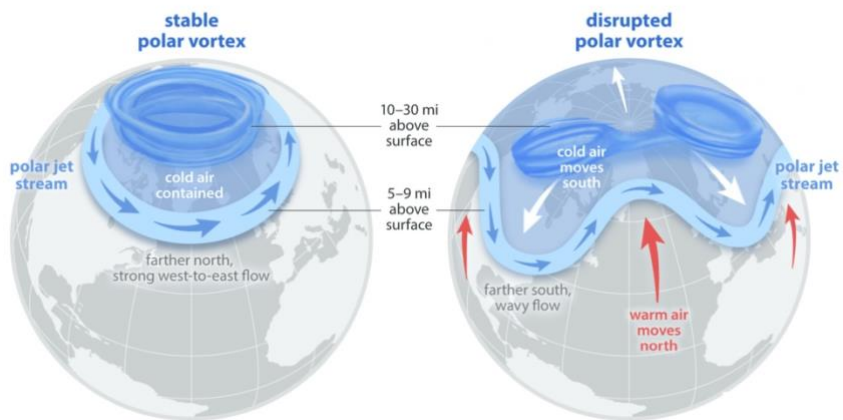
Source: NOAA. Arctic Polar Vortex. The Antarctic Polar Vortex functions in a similar fashion. Antarctic Polar Vortex is pronounced and persistent. In the Arctic, the distribution of land masses at high latitudes in the Northern Hemisphere gives rise to Rossby waves which contribute to the breakdown of the polar vortex, whereas in the Southern Hemisphere the vortex is less disturbed.

Potential Consequences of the Heatwave

- **Melting of Ice Sheet**
  o **Antarctic Ice Sheet**: The heatwave is likely to cause further melting of the Antarctic Ice Sheet, which contains more than 60% of the world's freshwater.

o **Sea Level Rise**: Melting ice sheets could raise global sea levels, potentially submerging coastal cities and displacing millions of people. Even a small rise in the sea levels can have severe consequences for populations living near the coast.

- **Impact on Global Climate**
  o **Disruption of Ocean Circulation**: The melting ice affects the **global ocean circulation system**, which helps regulate climate. Freshwater from the ice reduces the salinity and density of ocean water, **slowing down the circulation**.
  o **Intensified Global Warming**: A slower ocean circulation system means oceans will absorb less heat and CO_2, potentially leading to **more extreme weather events** like floods and droughts.

2. Climate Finance Taxonomy

News: The Union Budget 2024-25 included an announcement by the Finance Minister about developing a 'climate finance taxonomy' in India.

About Climate Finance Taxonomy

- It is a system that classifies the parts of the economy that can be marketed as **sustainable investments**.
- Its purpose is to **guide investors** and banks in **channelling funds towards impactful investments** to **combat climate change**.
- It will set **standards for climate-related financial instruments** (like green bonds) and serve in **climate risk management**, planning for **net-zero transition** planning, and climate disclosure.
- Countries like South Africa, Colombia, South Korea, Canada, Thailand, Singapore, Mexico, and the EU have developed their own taxonomies.

Source: EU. Objectives of EU Sustainable Finance Taxonomy.

Significance

- **Net-Zero Economy**: It helps countries transition to a net-zero economy, balancing the production and removal of greenhouse gases (GHGs).
- **Alignment with Science**: It ensures economic activities align with credible, science-based transition pathways. *(Refer EPIC November 2022 for Climate Finance: Meaning, Need and Challenges).*
- **Climate Capital Deployment**: It encourages the flow of funds toward climate adaptation and mitigation.
- **Prevent Greenwashing**: It reduces the risk of misleading claims about environmental benefits.
- **Availability of Capital**: It increases capital for climate initiatives, helping countries in meeting their commitments with respect to climate action and green transition goals.

3. Warming Waters in the Great Barrier Reef

News: Researchers have warned that, over the past decade, the ocean temperatures in the Great Barrier Reef have hit their highest level in 400 years.

Key Findings of the Research

- Aerial surveys of over 300 reefs in the Great Barrier Reef System along Australia's northeast coast revealed **bleaching in shallow waters** across two-thirds (~67%) of the reef.
- Researchers compared recent ocean temperatures to historical ones by **using coral skeleton samples from the Coral Sea**. They reconstructed sea surface temperature data from 1618 to 1995. The reconstructed temperature data were coupled with sea surface temperature data from 1900 to 2024.
- The researchers observed **largely stable temperatures till 1960**. Between 1960-2024, **steady warming** of the sea was observed between January-March of every year. However, the years marked by **massive coral bleaching events** (2016, 2017, 2020, 2022, 2024) witnessed **significant temperature rise**.
- The warming rate after 1900 has been attributed to **human-induced climate change**. The study said that even if global warming is kept under the Paris Agreement's goal, **70-90% of corals across the globe could be threatened**. Current trends indicate that Paris Agreement's goal will be breached.
- As a result, future coral reefs would likely have less diversity in coral species.
- The study further noted that the **coral reefs have been evolving** over the past quarter century **in response to bleaching events**. However, even the most robust coral systems may soon not be able to withstand the elevated temperatures expected under a warming climate, leading to **possible extinction**.

Impact of Warming Oceans on Circulation

- Another study has highlighted that the warming of ocean waters can disrupt the ocean circulation. Ocean circulation acts as a **global conveyor belt**, which moves water and nutrients across the ocean.
- This circulation plays a crucial role in **maintaining thermal balance in the oceans**.
- The study has found that disruption in ocean circulation can **reduce the amount of CO_2 absorbed by the oceans**, thus increasing its concentration in the atmosphere.
- It may give rise to a **positive feedback loop**, with rise in concentration of CO_2 in the atmosphere **further heating up the oceans**. *(Refer EPIC May 2024 for Global Warming and Mass Coral Bleaching Events)*.

4. Impact of Climate Change on Learning of Children

News: A report by UNESCO has highlighted the negative impact on learning of children due to extreme weather events and other impacts of climate change.

Key Highlights

- The **Global Education Monitoring Report** (GEM) has highlighted that the **climate related stressors** like **heat**, **wildfires**, **floods**, **droughts**, **diseases** and **rising sea levels** affect **education outcomes** and threaten to undo educational gains of recent decades.
- Climate change related impacts are **disrupting education systems and outcomes**.
  - **Direct effects**: Destruction of education infrastructure, injuries and loss of life among students, parents and school staff.
  - **Indirect effects**: Displacement of people and the effects on people's livelihoods and health.
- Over the past 20 years, **schools were closed** in at least 75% of the extreme weather events, impacting 5 million people or more.
- **Exposure to heat** has significant **detrimental effects** on **children's educational outcomes**.

o An analysis has shown that exposure to higher than average temperatures during the prenatal and early life period is associated with **fewer years of schooling**, especially in Southeast Asia.
- The impacts are further **exacerbated by development gaps** faced by marginalized populations. Of the 10 countries most affected by extreme weather events in 2019, 8 were **low or lower-middle-income countries**.
- Climate change negatively impacts the **physical and cognitive abilities**, **emotional well-being** and **access to educational opportunities**.

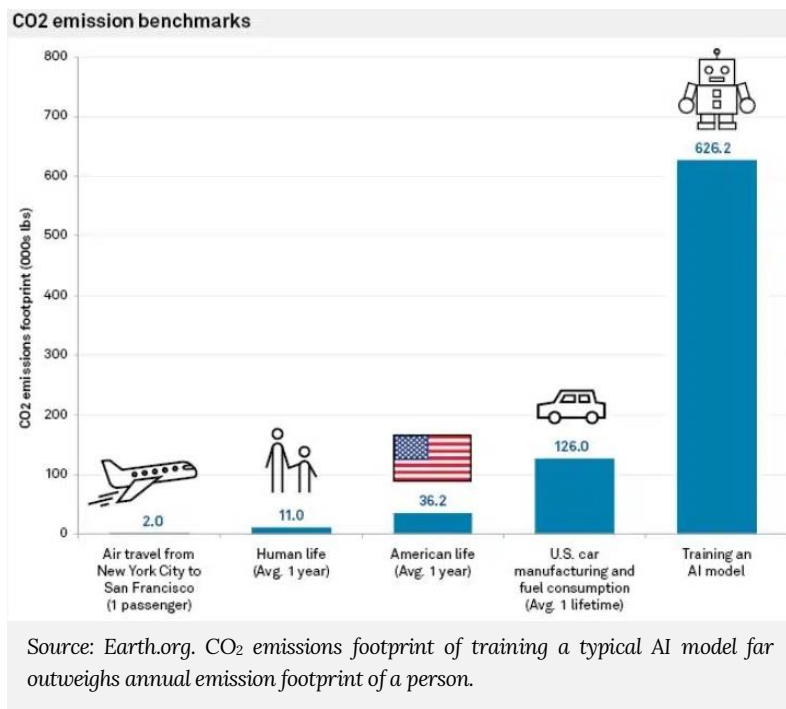### Recommendations of the Report

- The Report noted that dealing with direct and indirect effects of climate change-induced disruptions **requires a comprehensive focus on climate adaptation**, including **multi-sectoral planning**, **curriculum reform**, **teacher training** and **community awareness and engagement**.
- **Improving Infrastructure**: The ability of school infrastructure to absorb shocks and adapt to stresses and changes brought about by climate change must be improved.
- **Course Correction on Adaptation**: The Report notes that planning and funding for **climate impact risks** and adaptation remain inadequate. **Risk levels are rising much faster than the resilience** of the education sector in most countries, despite recognition that disaster risk resilience is key for preventing hazards from becoming disasters. The report says that **funding to education sector must be improved** to enhance resilience in the education sector to climate-related disruptions.

5. Impact of Artificial Intelligence on Environment

News: Google's annual environment report revealed a 13% increase in its emissions footprint in 2023. This is due to increased electricity consumption in data centers and supply chains, caused by growing deployment and usage of AI tools.

Reasons for Higher Energy Needs of AI Models

- **Complexity**: They perform more complex operations than simple search engines, even when handling the same query. They **process vast amounts of data** while formulating appropriate responses, resulting in more electrical signals for data processing, storage, and retrieval.
- AI queries, use 10 to 33 times more energy than a regular Google search. Image-based searches are even more energy-intensive.
- **Cooling Requirements**: The increased computational work generates more heat, **requiring stronger cooling systems** in data centers and increasing energy use.

CO2 emission benchmarks

Source: Earth.org. CO₂ emissions footprint of training a typical AI model far outweighs annual emission footprint of a person.

Environmental Impacts of Artificial Intelligence

- **Electricity Demand**: Data centers currently use **1% to 1.3% of global electricity**.

o This could increase to 1.5% to **3% by 2026** (International Energy Agency). In some countries, data centers use over 10% of national electricity. In Ireland, it's 18% while in the US, it ranges from 1.3% to 4.5%.
- **Water Resources**: There are increasing concerns about water use for cooling data centers. For instance, a data center for OpenAI's GPT-4 in Iowa (US) used **6% of the local water supply in July 2022**.
- Energy and water intensity has increased the ecological footprint of AI Technologies.

Way Forward
- **Sustainable Planning**: Experts stress the need for careful planning to reduce environmental impacts. This means data centers should use **efficient processes and minimize emissions**.
- **Use of AI in Emissions Reduction**: Studies suggest that widespread AI use in corporate and industrial practices could cut global emissions by 5-10% by 2030.
- **Monitoring and Predicting**: AI can cut emissions by monitoring, predicting, and optimizing processes to reduce waste and inefficiencies.

6. Role of Methanotrophs in Checking Concentration of Methane

News: Researchers have isolated and described India's first cultures of the indigenous methanotroph Methylocucumis oryzae from rice fields and wetlands.

About Methane Emissions
- It is the 2nd most important **greenhouse gas**, having ~26 **times more global warming potential compared to carbon dioxide** (CO_2) *(100 year)*.
- **Wetlands**, **ruminants**, **rice fields**, **landfills** are **sources of methane**.
  o The organisms that produce methane are called **methanogens**.

Global Warming Potential (GWP)
- The Global Warming Potential is dependent on the ability of the gas to absorb energy '**radiative efficiency**' and its time-period of stay in the atmosphere '**lifetime**'.
- GWP is measured relative to Carbon-dioxide (GWP = 1) over a horizon of 20 years and 100 years

Gas	Lifetime (Years)	GWP (20 Y)	GWP (100 Y)	Primary Sources
Carbon-dioxide	50-200	1	1	Fossil Fuels, Land Use
Methane	12	84	28	Fossil Fuels, Agriculture
Nitrous Oxide	121	264	265	Agriculture
Sulphur Hexafluoride	3,200	16,300	23,900	Power Transmission, Semi-conductor Industry

Source: Anthropogenic and Natural Radiative Forcing (IPCC)   Created by | ForumIAS©

o **Methanotrophs** are organisms which oxidise methane and reduce its concentration in the environment.

About Methanotrophs
- Methanotrophs are a specialized group of **bacteria that utilize methane** as their primary **carbon** and **energy source**.
- Methanotrophs are **natural methane mitigating agents**. These are **methane-oxidizing bacteria**, which **oxidize methane** (CH_4) to produce CO_2 and H_2O (water).

Methylocucumis oryzae
- Methylocucumis oryzae is a **bacterium found abundantly in nature**, particularly in wetlands and rice fields.
- It has an oval and elongated shape, resembling a cucumber, which led to its nickname 'methane-eating cucumbers'. It is a **Gram-negative bacterium**.
- It oxidizes methane using **methane monooxygenase** (MMO), converting methane to methanol, which is then processed to formaldehyde, formate, and carbon dioxide.
- These methanotrophs are found in environments where both methane and oxygen are available. Wetlands, rice fields, ponds and other water bodies are the common habitats.
  o It contributes to the **global carbon cycle** by **reducing methane levels in the atmosphere**.

- o In rice paddies, these bacteria help to balance the methane thereby **reducing the overall greenhouse gas emissions from these agricultural systems**.
- The current constraint with widespread use of Methylocucumis oryzae is its **slow growth**. It limits its cultivation on a larger scale needed for mitigation and biotechnological applications.

Applications

- **Agricultural Impact**: By promoting conditions that favour the growth of such methanotrophs, methane emissions from rice paddies can be minimized. (*Refer EPIC June 2023 for Methane Policies*).
- **Bioremediation**: M. oryzae and other methanotrophs are being studied for their potential in **bioremediation**. Their ability to oxidize methane and other hydrocarbons makes them useful for **cleaning up contaminated environments**, including soil and water polluted with organic compounds.
- **Biotechnology**: The metabolic pathways of M. oryzae could be engineered to **improve the efficiency of methane conversion processes**, leading to **sustainable energy solutions**.

7. PM JI-VAN Yojana

News: The Union Cabinet has approved modifications to the Pradhan Mantri JI-VAN Yojana to align with the latest advancements in biofuel technologies and to attract increased investment in this sector.

About Modified Pradhan Mantri JI-VAN Yojana

- The Pradhan Mantri JI-VAN Yojana is aimed at **promoting the production and use of advanced biofuels**, specifically ethanol, to **reduce environmental pollution**, **support farmers**, **create local jobs**, and **contribute to India's energy security**.

Recent Amendment and Extension

- The Union Cabinet has approved an amendment to this scheme, which include:
  - o Extending the timeline for the scheme by 5 more years, making it effective until the financial year 2028-29.
  - o Expanding the scope to include **advanced biofuels** made from **lignocellulosic feedstocks**, such as **agricultural and forestry residues**, **industrial waste**, **synthesis gas**, **algae**, etc.

Cabinet approves Pradhan Mantri JI-VAN Yojana

Jaiv Indhan- Vatavaran Anukool fasal awashesh Nivaran

- Financial support to Integrated **Bioethanol Projects using biomass and crop residues**
- **12 commercial scale & 10 demonstration scale 2G ethanol projects** to be provided Viability Gap Funding
- To **enhanced farmer income** from waste agriculture residues & to reduced greenhouse gases
- Total outlay of **Rs.1969.50 crore** for the period from 2018-19 to 2023-24

  - o The amendment introduces eligibility for "Bolt on" plants and "Brownfield projects". These are projects that can **leverage existing facilities** and technologies to **produce advanced biofuels**, making them more **viable and cost-effective**.
  - o The modified scheme emphasizes **innovation**, giving preference to projects that propose using new technologies and different types of feedstocks (raw materials used to produce biofuels).

Benefits of the Scheme

- **Farmers**: The scheme provides farmers with a **remunerative income** by using their agricultural residues (such as leftover stalks after harvesting) as feedstock for biofuel production.
- **Environment**: It helps **reduce environmental pollution** by using waste materials that would otherwise be burned or discarded.

- **Employment**: Local employment opportunities are created through the setting up and operation of biofuel plants.
- **Energy Security**: The scheme supports India's goal of becoming **more self-reliant in energy** by promoting the use of domestically produced biofuels.
- **Development of Technologies**: The Government's focus is on supporting the development of technologies that convert surplus biomass and industrial waste into ethanol, a cleaner and more sustainable fuel alternative.

8. State of the World's Mangroves, 2024

News: A report titled The State of the World's Mangroves 2024 has been released by the Global Mangrove Alliance (GMA).

Key Highlights Regarding India

- The Report highlighted that the mangroves in **Lakshadweep Islands** and on the coast of **Tamil Nadu** are **critically endangered**, due to **rising sea level** caused by **global warming**.
- Mangroves on the western seaboard (from Gujarat to Kerala) are also vulnerable to collapse.
- **Conversion to aquaculture**, **oil palm plantations** and **rice cultivation** together explain 43% of mangrove losses between 2000 and 2020.
- **Natural retraction**, influenced by climate change, sediment shifts and rise in sea level, also significantly impacted mangrove areas.
- Shrimp farming has emerged as a major commercial activity in States like Andhra Pradesh, West Bengal and Gujarat in recent years.
- Mangrove area of 4,083 km² has been lost since 1996. *(Refer EPIC June 2023 for Restoring Wetlands and Mangroves).*
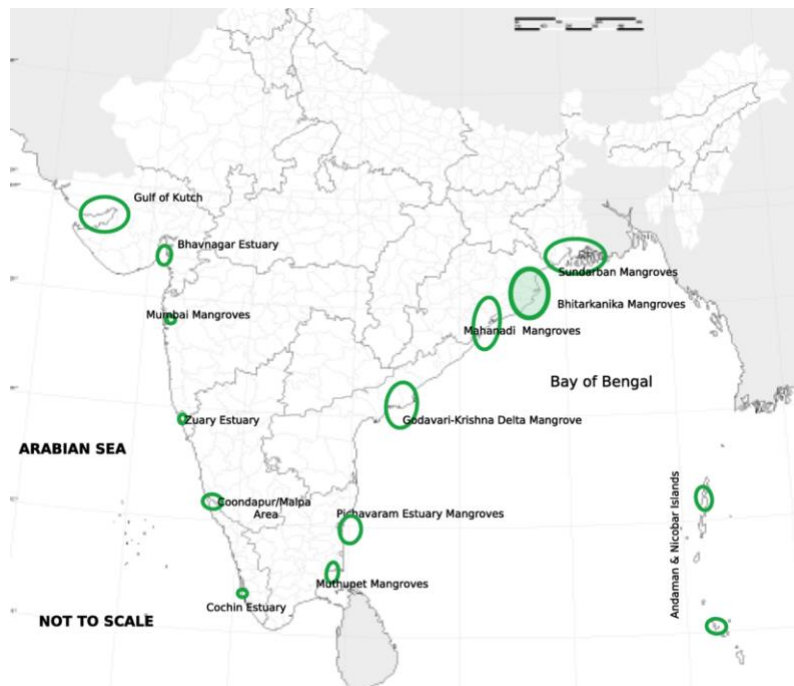
Mangrove Cover in India

- According to the India State of Forest Report, 2021, mangrove cover in India is estimated to be spread across 4,992 km².
- With estimated 2,114 km² of mangrove forests, **West Bengal has the largest mangrove cover in India**.
- **Gujarat comes 2ⁿᵈ** with an estimated area of 1,177 km², with mangrove forests largely located in **Gulf of Kutch** and **Gulf of Khambhat**. Kutch district has the largest mangrove area in Gujarat with 794 km².

Steps Required

- **Broadening Targets**: Conservation policies should focus on overall health of coastal ecosystem, and not just expanding mangrove cover.
  o Mangroves are interconnected with mudflats, lagoons, and other ecosystems, so preserving these areas and supporting coastal communities has a deeper impact.

- **Incorporating Climate Risks**: Managing mangroves and coastal ecosystems must **address climate risks** and include adaptation strategies. Climate models should be designed according to **the local hydrological and ecological conditions**.
- **Expanding Restoration Tools**: Mangrove restoration should expand to include **hydrological and sediment restoration**, along with combined **grey-green solutions**.
- **Integrating Sector Plans**: Sector plans for water, disaster management, fisheries, and tourism must consider the needs of mangroves and coastal ecosystems.
- **Assessing Ecosystem Values**: Coastal resilience should be based on understanding the value of ecosystems and involve everyone in society.

9. State of the World's Forests 2024

News: It has been released by the Food and Agriculture Organization (FAO). It provides a comprehensive analysis of conditions of forests and trends, revealing both positive developments and ongoing challenges.

Key Highlights of the Report

- The report highlights a **decline in deforestation rates** compared to previous decades. Several countries have shown significant improvements in forest conservation.
- **Forest Coverage**: As of 2020, global forest coverage was ~4.1 billion hectares (ha), or **31% of the land area**. (1 ha = 0.01 km^2). Major contributors to global forest area include:
  - Russia, Brazil, Canada, the US, and China are top five countries collectively accounting for **54% of the global forest area**.
  - Another 10 countries including Australia, the Democratic Republic of Congo, Indonesia, Peru, and India, among others, contribute to about two-thirds (66%) of the global forest area.
- **Deforestation Trends:** Between 1990 and 2020, ~420 million hectares of forest were converted to other land uses. Deforestation rates decreased from 15.8 million hectares per year (1990-2002) to **10.2 million hectares per year (2015-2020)**.
- **Regional Deforestation Rates:**
  - **Africa**: 4.41 million hectares.
  - **South America**: 2.95 million hectares.
  - **Asia**: 2.24 million hectares.
- **Forest Area Gains:** In 2020, 10 countries recorded annual gains in forest area, including China, Australia, India, Chile, Vietnam, Turkey, the US, France, Italy, and Romania.
  - India ranked 3rd globally in forest area gains, with an annual increase of 266,000 hectares from 2010-2020.
- **Mangrove Forests**
  - The global mangrove area was recorded at 14.8 million hectares, with South and Southeast Asia contributing almost 44% of the total.
  - The rate of gross global mangrove loss decreased by 23% between 2000-2010 and 2010-2020, though the rate of gain in mangrove area also decreased slightly.
  - Asia was a major contributor to both mangrove loss and gains.
- **Impact of Fires**
  - An estimated 340-370 million hectares of the earth's land area are impacted by annual fires.
  - Satellite data revealed that total fires in 2023 emitted 6,687 megatons of carbon dioxide globally, more than double the emissions from the European Union's fossil fuel consumption.
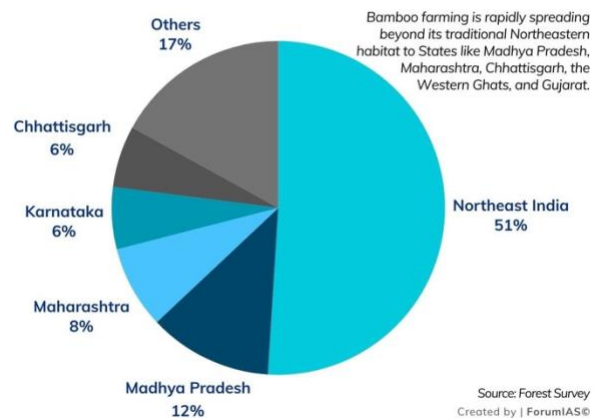
10. Bamboo Cultivation in India

News: Bamboo, often called "Poor Man's Timber" and "Green Gold", has transformed into a lucrative crop for cultivators.

Present Status of Bamboo Cultivation in India

- The land under bamboo cultivation is estimated at over 15.70 million hectares, with the Northeastern zone holding ~50% of the country's bamboo resources.
- India has **136 documented native species of bamboo** and produces ~3.23 million tonnes annually.
- NITI Aayog projects the global bamboo market to reach ~US$ 98.3 billion by 2025. As the world's 2nd-largest bamboo producer after China, India can capture a significant share of this market.

Bamboo Cultivation Areas (2019)
State-wise Share in Total Area under Bamboo Cultivation

Bamboo farming is rapidly spreading beyond its traditional Northeastern habitat to States like Madhya Pradesh, Maharashtra, Chhattisgarh, the Western Ghats, and Gujarat.

- Others 17%
- Chhattisgarh 6%
- Karnataka 6%
- Maharashtra 8%
- Madhya Pradesh 12%
- Northeast India 51%

Source: Forest Survey
Created by | ForumIAS©

Legal and Agricultural Reforms Boosting Bamboo Cultivation

- **Amendment to Indian Forest Act (2017)**: The reclassification of bamboo from "tree" to "grass" removed various restrictions on its harvesting, transportation, and sale, **making its cultivation easier** for farmers.
- **National Bamboo Mission**: Government initiatives like the National Bamboo Mission and the Mission for Integrated Development of Horticulture aim to promote bamboo farming.
  - They focus on encouraging the use of bamboo as a **sustainable alternative to wood**, and on **developing a value chain for bamboo production**, marketing, and export.
- **Incentives**: Maharashtra is expanding bamboo farming, with financial incentives of ~INR 7 lakh/hectare.

Environmental and Economic Benefits of Bamboo Cultivation

- **Environmental Impact**: Bamboo is a highly efficient carbon dioxide converter, **producing 35% more oxygen** than most plants making it an excellent biomass producer.
- **Economic Benefits**: High-yielding varieties like Beema Bamboo offer significant profit potential, with growers earning a net annual profit of INR 75,000-80,000 per hectare, making it one of the most profitable crops in India.
- **Health Benefits**: Bamboo based foods are deemed healthy because these are **rich in fibre and low in calories**. Some parts of bamboo plants, including their roots, are believed to have **therapeutic traits** and are used in the traditional health care systems in the Northeast
- **Energy**: Bamboo can be **converted into biofuels** like ethanol or pulped to produce paper. It is also widely used in construction as an alternative to wood and for making scaffoldings, thanks to its strength, resilience, and flexibility.

11. National Mission for Clean Ganga (NMCG)

News: The head of NMCG has expressed concern over slow pace of spending on river-cleaning projects.

About the National Mission for Clean Ganga (NMCG)

- It was **registered as a society** in August 2011 under the **Societies Registration Act**, **1860**. It acted as the implementation arm of the **National Ganga River Basin Authority** (NGRBA) which was constituted under the provisions of the **Environment** (Protection) **Act** (EPA), **1986**.

o The aim of the mission is **cleaning and conservation the Ganga River**.

- It is the key agency responsible for implementing the *Namami Gange* **Programme** (launched in 2014) to coordinate efforts for restoring the health of the Ganga.

Key Objectives of NMCG

- **Reducing Pollution**: NMCG focuses on reducing pollution in the Ganga by setting up sewage treatment plants, managing solid waste, and controlling industrial discharge into the river.
- **Developing Riverfronts**: The Mission works on improving riverfronts and building crematoria to prevent the direct flow of pollutants into the Ganga.
- **Conserving Biodiversity**: NMCG promotes tree planting along the riverbanks and works to protect the river's biodiversity, including species like the Ganga Dolphin.
- **Raising Awareness**: The Mission engages communities and raises public awareness about the importance of keeping the Ganga clean, involving people in conservation efforts.
- **Monitoring Progress**: NMCG uses modern technology to monitor water quality and track the progress of its projects, ensuring transparency and effectiveness.

Institutional Structure for Cleaning Ganga

- The Act envisages **5-tier structure** at National, State, and District levels to take measures for prevention, control, and abatement of environmental pollution in river Ganga and to ensure continuous adequate flow of water in river Ganga.
  - **National Ganga Council** under chairmanship of the Prime Minister of India.
  - **Empowered Task Force** (ETF) on river Ganga under chairpersonship of Union Minister of Water Resources, River Development and Ganga Rejuvenation.
  - National Mission for Clean Ganga (NMCG).
  - State Ganga Committees.
  - District Ganga Committees in every specified district abutting river Ganga and its tributaries in the States.

12. Pollution Under Control (PUC) Certificate

News: The Supreme Court has overturned its 2017 directive that required a valid Pollution Under Control (PUC) certificate to renew a third-party insurance policy.

About the Pollution Under Control (PUC) Certificate

- The Pollution Under Control (PUC) certificate (or simply pollution certificate), is a **mandatory document for vehicle owners** in India.
- It verifies that a **vehicle meets environmental standards** and its **emission levels are within permissible limits** set by the Government.
- All vehicles on Indian roads must have a valid PUC certificate according to the **Central Motor Vehicles Rules**, **1989**.
- **New vehicles are exempt from needing a PUC certificate in the first year**. After that, vehicles must undergo PUC tests at regular intervals.
- A PUC certificate is generally valid for six months or one year from the date of issuance.
- **Consequences of Non-Compliance**
  - Failing to produce a valid PUC certificate can result in a fine of up to INR 10,000, imprisonment for up to 6 months, or both, under the **Motor Vehicles Act**, **1988**.
  - The vehicle owner may also face **disqualification from holding a driving license for 3 months**.
- If a vehicle emits more fumes than allowed despite having a valid PUC certificate, the certificate will be cancelled. The owner must obtain a new certificate within 7 days.

- The PUC certificate requirement **applies to all types of vehicles**, including CNG-powered vehicles, as well as petrol and diesel vehicles.

History, Art and Culture

1. Vishnupad and Mahabodhi Temples

News: Corridor Projects have been announced for Vishnupad Temple (Gaya) and Mahabodhi Temple (Bodh Gaya) in the Union Budget 2024-25.

About the Vishnupad Temple

- It is situated on the banks of the **Falgu River** in **Gaya**, Bihar.
- It is dedicated to **Lord Vishnu**. The temple is believed to be built upon the site where Lord Vishnu had killed the demon **Gayasur**. It is also believed that the temple was built with the footprints of Lord Vishnu at the centre.
- The temple was built in 1787 on the orders of **Queen Ahilyabai Holkar** of Ahmadnagar.
- The temple is around 100 feet tall and has 44 pillars.
- Devotees visit the temple during *Pitra Paksh*, a period in the Hindu calendar when people take part in rituals to **remember their ancestors**.

About Mahabodhi Temple

- It is located in Bodh Gaya, central Bihar, on the banks of the **Niranjana River**.
- The temple stands to the east of the **Mahabodhi Tree**, where Gautam Buddha is believed to have **attained enlightenment**.
- The Mahabodhi Temple Complex was first built by **Emperor Asoka** in the **3rd century BC**. The present temple dates back to the **5th–6th centuries**.
- The temple has a unique shape and a height of 170 feet.
- It is one of the **earliest Buddhist temples** built **entirely in brick** from the **late Gupta period**.
- This temple is considered to have had significant influence on the development of brick architecture over the centuries.
- The Mahabodhi Temple was recognized as a **UNESCO World Heritage Site in 2002**.

2. Sangameswara Temple

News: The Sangameswara Temple was submerged in the backwaters of the Srisailam project in Nandyal district following heavy inflow from the Krishna River.

About Sangameswara Temple

- It is situated in **Nandyal district**, **Andhra Pradesh**. It is positioned on the banks of the **Krishna River**.
- It is dedicated to **Lord Shiva**. It was originally built in 740 AD by **Chalukya ruler Pulakesi II**.
- It was initially located at the **confluence of the Tungabhadra and Krishna Rivers**, 10 km from its current site.
- The temple was **dismantled and reassembled** rock-by-rock at its present location in 1979 due to sub-mergence caused by the **construction of Srisailam Dam**.

- **Features**
  - It is built in **Nagara style**. It has **elevated platform** with a fortified wall surrounding the temple.
  - It has a large hall supported by 12 pillars leading to the sanctum. It has also a circumambulatory path around the sanctum for performing *pradakshinas* (ritual circumambulation). The ceiling features a large relief of **Nagaraja**, characteristic of Chalukya temples.
  - Pillars in the hall are adorned with intricate engravings of **Lord Vishnu**, **Lord Brahma**, **Kumaraswamy**, and **celestial couples**. Each corner of the temple features carvings of crocodiles.

3. History of Buddhism in Amaravati

News: INR 15,000 crore have been sanctioned in the Union Budget 2024-25 for development of Amaravati as the capital of Andhra Pradesh.

Discovery of Ancient Amaravati

- The ruins of Amaravati were **discovered accidentally** when Raja Vessareddy Nayudu, a local zamindar, was searching for building materials for a new house in Andhra's Dhanyakatakam village (late 1700s). He renamed the village as **Amaravati**.
- In 1816, **Colonel Colin Mackenzie**, the **first Surveyor General of India**, undertook an intensive survey leading to the discovery of ancient city and its architecture.
- The site was announced to be the **new capital city of bifurcated Andhra Pradesh** in 2015.

Amaravati and Andhra Buddhism

- Buddhism arrived in the Andhra region **through traders**, fairly early after flourishing in **Magadha Empire** in 5th century BC.
- The real impetus to Andhra Buddhism though, came in the **3rd century BC** when the **Emperor Ashoka** set up an inscription in the region. Thereafter, Buddhism had thrived in the region for almost 6 centuries till about the **3rd century CE**. In isolated sites such as **Amaravati**, **Nagarjunakonda**, **Jaggayapeta**, **Salihundam** and **Sankaram**, the religion seems to have lingered on till as late as the **14th century CE**.
- The presence of Buddhism in Andhra coincided with Andhra's first **urbanisation process**. Trade, especially oceanic trade, was one of the major features of this urbanising culture.
- In Andhra Pradesh, Buddhism spread through **patronage extended by merchants**, traders and craftsmen in contrast to Northern India where Buddhism enjoyed **royal patronage**.
- Gradually the **local rulers provided support** by issuing several inscriptions and through donations and support to the Buddhist sangha. Thus, the **process of spread was reverse here**. (*Often conversion of King led to conversion of people, here conversion of people led to subsequent conversion of the rulers*).
- **Local practices of the region were integrated into the Buddhist doctrines**. Megalithic burials were adapted into the Buddhist **Stupas** and worshipping of Goddess and Naga (Snake) made their way into Buddhism.

- Amaravati became the **birthplace of Mahayana Buddhism**. **Acharya Nagarjuna** who propounded the *Madhyamika* **philosophy** lived in Amaravati. His teachings brought about a significant shift in the practice of Buddhism. The *Madhyamika* philosophy forms the basis of Mahayana Buddhism. From Amaravati, it spread across South Asia, China, Japan, Korea and Southeast Asia.
- The rise of **Shaivism**, and the political patronage granted to it by aristocrats and royals, led to the **decline of Buddhism in the region**, from the 4th century CE onward.

Amaravati School of Art

- The region also gave rise to the unique style of art and architecture. The **Amaravati Stupa** was central to Amaravati School of Art
- This School went on to influence Buddhist art and architecture in several other parts of India, such as the **Ajanta caves**, as well as other parts of South and Southeast Asia.
- The School is known for **particular kind of depiction of the Buddha** where he has the robe on the left shoulder and the other hand is in *abhaya*. It became an iconic formulation which can be found in Sri Lanka, Thailand, Java and in several other parts of South East Asia.

Source: Britannica. Remains of Amaravati

- Scholars note that there is yet **no evidence of any external influence on the art at Amaravati**, unlike in **Mathura** and **Gandhara Schools** where there was a lot of **Graeco-Roman influence**.
- The school has unique feature of **capturing intricate details of high quality**. The extensive use of special kind of limestone called **Palnad marble** allowed very fine and intricate carvings.

4. Kerala's Jewish Community

News: Kerala's Jewish communities have witnessed a significant decline in population.

About Kerala's Jewish Community

- Kerala's Jewish population was historically divided into two main groups: **Malabar Jews** and **Paradesi Jews**.
- **Malabar Jews**
  o Malabar Jews, also known as **Cochin Jews**, trace their origins to the days of **King Solomon**, ~3,000 years ago. They were initially settled in **Cranganore** (modern-day Kodungallur in Thrissur district).
  o Copper plates from around 1,000 CE detail the privileges granted to the Jewish leader by the Hindu ruler of Cranganore. From the 14th century onwards, especially after the Portuguese arrival, they moved south to Cochin, where they were welcomed by the local king.
- **Paradesi Jews**
  o Paradesi Jews, meaning "foreign" Jews, arrived in India in the 15th-16th centuries from the **Iberian Peninsula** due to persecution by Catholic rulers. They settled on the Malabar coast and in Madras (now Chennai), engaging in **spice and diamond trade**.
  o Paradesi Jews **adopted the Malayalam language and local customs**, but eventually distanced themselves from the older Jewish community in Kerala, leading to the formation of two distinct groups.
  o Paradesi Jews were often referred to as White Jews and Malabar Jews as Black Jews.
- Since the 1950s, there has been a **steady migration of Kerala Jews to Israel**, where over 4,000 Cochinim (mostly Malabar Jews) now reside. Today, **only 14 Malabar Jews** and **one Paradesi Jew** remain in Kerala.
- From an estimated 20,000-50,000 in the mid-1940s, India's Jewish population today stands at around 4,000-5,000, mostly from the Bene Israel community.

Legacy and Remaining Structures

- "Jew Streets" in Mattancherry and Kochi, along with formerly Jewish-owned shops and businesses, serve as remnants of Kerala's Jewish heritage.
- Kerala has **7 synagogues**, the most prominent being the Paradesi Synagogue in Mattancherry, built in 1568 CE. 3 other Paradesi synagogues at Paravur, Chendamangalam, and Mala are now **protected monuments**.
- The Kavumbhagam Ernakulam Synagogue is one of the remaining Malabari synagogues. It was taken over by the State Government in 2021 for conservation.

5. National Mission for Manuscripts

News: The National Mission for Manuscripts aims to document, conserve, digitize, and disseminate India's manuscript heritage.

About the National Mission for Manuscripts

- The National Mission for Manuscripts (NMM) was established by the **Ministry of Culture** in 2003. Its motto is 'Conserving the past for the Future'.
- NMM's mandate includes identifying, documenting, conserving, and making accessible India's manuscript heritage.
- To achieve this mandate, the mission has established more than **100 Manuscripts Resource Centres** and **Manuscripts Conservation Centres** all over India.

Manuscript

A manuscript was, traditionally, any document **written by hand** or **typewritten**, as opposed to mechanically printed or reproduced in some indirect or automated way. More recently, the term has come to be understood to further include *any* written, typed, or word-processed copy of an author's work, as distinguished from the rendition as a printed version of the same.

- The manuscripts encompass a variety of themes, textures, aesthetics, scripts, languages, calligraphies, illuminations, and illustrations.
- **Details of Works**
  - ~75% of existing manuscripts are in Sanskrit, while 25% are in regional languages.
  - The Mission has documented ~**5.2 million number of manuscripts** across India.
  - It has **conserved 90 million folios of Manuscripts**.
  - The mission has **digitized 3.5 lakh number of manuscripts** that contain **3.5 crore number of pages**.
  - The Mission has conducted more than **100 conservation workshops**.
  - It has **uploaded ~1.4 lakh manuscripts** on its web portal out of which **75,000 manuscripts are available online for free access** for research fraternity and public.
  - It has **published more than 100 books** since its inception.

6. Benefits of Inclusion into UNESCO World Heritage Site

News: India now has 43 UNESCO World Heritage Sites with the recent inclusion of Charaideo Moidams in Assam in the list. The status offers several benefits.

Benefits of UNESCO World Heritage Site Status

- **Global Recognition and Prestige**: It brings international attention and respect, showcasing the region's unique and significant cultural heritage.
- **Boost to Tourism**: World Heritage status typically leads to increased tourism, attracting visitors from around the world. Enhanced tourism can stimulate local economies, providing new opportunities for businesses, jobs, and infrastructure development.

- **Cultural Preservation**: Being listed as Heritage Site encourages efforts to preserve and protect the site, ensuring its cultural and historical integrity for future generations. It often leads to **increased funding** and resources **dedicated to the conservation and maintenance** of the site.
- **Educational and Research Opportunities**: The site becomes a focal point for educational programs and research, attracting scholars, historians, and archaeologists. It provides a rich resource for academic studies and can promote awareness and understanding of the region's cultural heritage.
- **Community Pride and Identity**: Local communities often experience a sense of pride and enhanced identity from having a World Heritage site. It fosters a connection to their heritage and can enhance cultural traditions and practices.
- **Sustainable Development**: World Heritage status encourages sustainable tourism and development practices, ensuring that the **economic benefits do not come at the expense of the site's preservation**. It promotes balanced and responsible management of natural and cultural resources.

Criteria for World Heritage Site Status

- Till 2004, the sites were selected on the basis of 6 cultural and 4 natural criteria.
- Cultural Heritage includes monuments, groups of buildings or sites which have Outstanding Universal Value from point of view of history, aesthetics, art or science.
- Natural Heritage includes natural features (physical or biological), geological and physiographical formations making habitat of threatened species, or natural sites; that are of Outstanding Universal Value from aesthetic, scientific or conservation point of view.
- Now only 1 out of 10 criteria must be met. These include:
  ○ Masterpiece of human creative genius.
  ○ Unique/exceptional testimony to a cultural tradition or civilization (living/disappeared).
  ○ Directly/tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance.
  ○ Contain superlative natural phenomena or areas of exceptional natural beauty.

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- **International Cooperation**: Being part of the World Heritage community facilitates international cooperation and exchange of best practices in conservation and management. It can lead to partnerships and collaborations with other World Heritage sites and global heritage organizations.
- **Funding and Grants**: UNESCO listing can open doors to various funding opportunities and grants for conservation, research, and tourism development. It ensures long-term financial support for the upkeep and promotion of the site.

7. Cultural Property Agreement between India and the US

News: India and the US have signed a Cultural Property Agreement.

About the Cultural Property Agreement

- The objective of the agreement is to prevent and **curb the illicit trafficking of antiquities** between India and the US.
- The Agreement aligns with the **1970 UNESCO Convention on the Means of Prohibiting and Preventing the Illicit Import**, **Export**, **and Transfer of Ownership of Cultural Property**.
- The Agreement restricts the importation into the US of certain **archaeological and ethnological materials**.
- The **Designated List** includes items ranging in date from 1.7 million years ago to 1947 CE. The US will return any forfeited objects on the Designated List to India.
- The Agreement is seen as a significant step towards **preserving India's rich cultural heritage** and **historical artifacts**. Preservation and protection of cultural heritage have become **integral to India's foreign policy**.
- **G20 Presidency and Global Cooperation**: Under India's G20 Presidency, the protection and promotion of cultural property emerged as a main priority. The **Kashi Culture Pathway**, endorsed by the G20 Culture Working Group emphasizes strengthened global efforts to fight the illicit trafficking of cultural property.

- **Benefits**: The Agreement **enhances cultural diplomacy** and sustainable development. Repatriation of artifacts promotes tourism, stimulates local economies, and fosters cultural stewardship.
  o Leveraging cultural assets for educational enrichment, social cohesion, and economic empowerment promotes inclusive development.

Miscellaneous

### 1. Heatwaves as Notified Disasters

News: Rising frequency and severity of heatwaves and the consequent number of deaths have led to debate on classifying heatwaves as notified disasters.

About Notified Disasters

- Notified disasters are specific disasters recognized under the **Disaster Management** (DM) **Act**, **2005**.
- It defines disasters as events causing **substantial loss** of life, property, or environmental damage **beyond the community's coping capacity**.
- Recognized disasters allow States to use the **National Disaster Response Fund** (NDRF) and **State Disaster Response Fund** (SDRF). In 2023-24, only two States drew money from the NDRF.
- At present **13 types of disasters have been notified under the Act**. These include cyclones, droughts, earthquakes, fires, floods, tsunamis, hailstorms, landslides, avalanches, cloudbursts, pest attacks, frost/cold waves and COVID-19. *(Refer EPIC April 2024 for Heatwaves in India)*.

Need for Including Heatwaves

- **Rising Frequency and Severity**: Over the last 15 years, heatwaves have become more severe and frequent, posing **greater risks to public health and safety**.
  o This had led to rising number of **heat-related illnesses** and deaths, especially among those who work outdoors.
- **Improved Disaster Response Funding**: Recognition would allow States to use funds from the SDRF and NDRF for heatwave management, including financing the **Heat Action Plans** (HAPs).
- These plans involve creating shaded spaces, ensuring water availability, and adjusting work and school schedules to mitigate heatwave impacts.
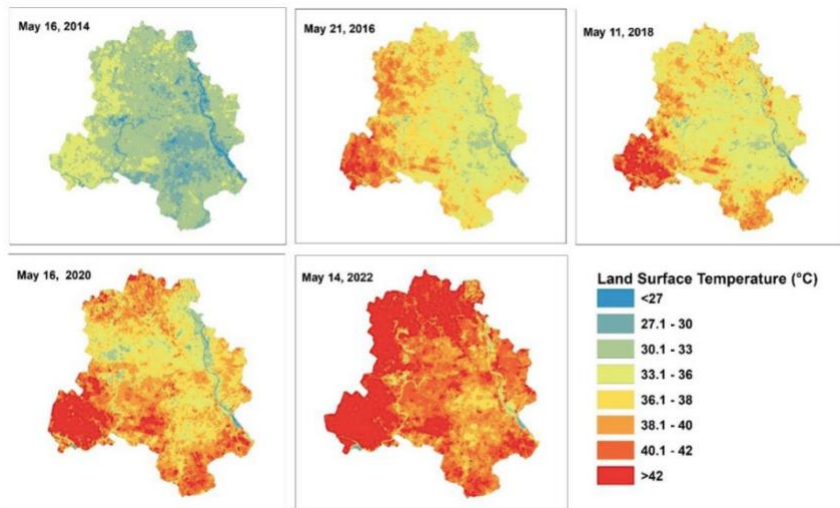
*Source: **Centre for Science and Environment**. The image shows rising heat stress in Delhi by plotting land surface temperature (LST) over a typical day in mid-May, over successive 2-year intervals (2014, 2016, 2018, 2020 and 2022). The average LST has risen by 9.8°C from 2014 to 2022.*

Challenges in Notifying Heat-waves as Disasters

- **Financial Constraints**: Recognition as a national disaster could significantly increase financial burden. The 15th Finance Commission expressed that the existing list of notified disasters covers the needs of the States to a large extent, suggesting that the financial implications of adding heatwaves could be substantial.

- **Compensation Costs**: Official recognition would require the Government to compensate for heatwave-related fatalities and injuries. In 2024 alone, more than 500 heat-related deaths have been reported, and official recognition could lead to higher compensation costs.
- **Attribution Challenges**: Determining if a death was **directly caused by a heatwave is complex**. Heat often exacerbates **pre-existing conditions rather than being the sole cause**, making direct attribution difficult.
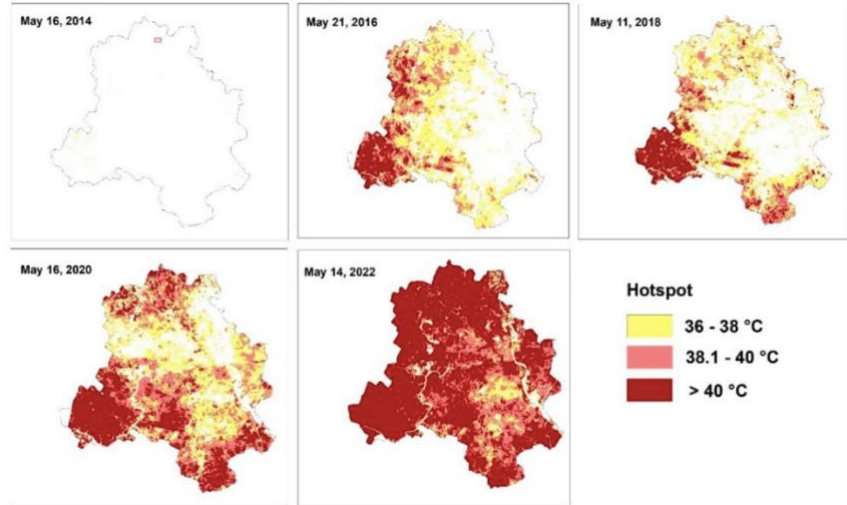
Source: Centre for Science and Environment. Trend of rising hotspots in Delhi (LST > 40ºC) between 2014-2022.
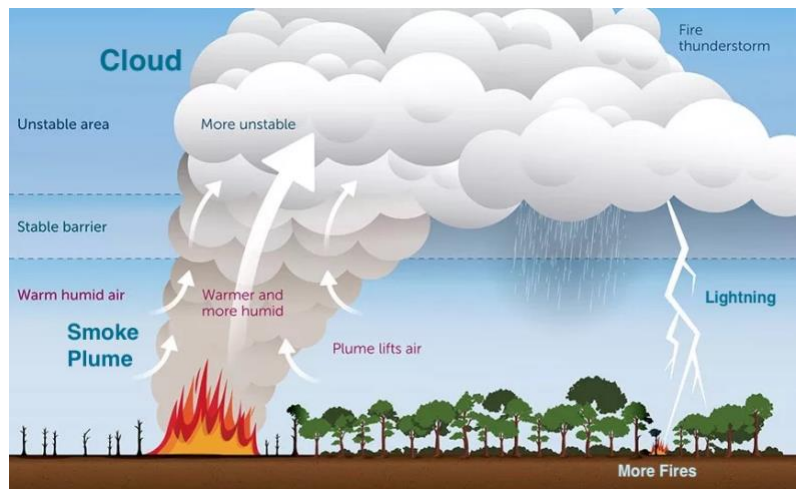
- **Existing Provisions for Local Disasters**: The enabling provision by the preceding Finance Commission allows States to use up to 10% of their SDRF for **local disasters like heatwaves**. States like Haryana, Uttar Pradesh, Odisha, and Kerala have already designated heatwaves as local disasters, utilizing this provision for management and relief, which may reduce the urgency for national recognition.

2. Pyrocumulonimbus Clouds

News: Intense wildfires in the US and Canada led to formation of pyrocumulonimbus clouds.

About Pyrocumulonimbus Clouds

- They are formed due to **intense heat caused by extremely hot wildfires** or by **volcanic eruptions**.
- They are formed under specific conditions and not every wildfire can lead to their formation.
- **Process of Formation**
  - The intense heat from the fire warms the surrounding air which **moves upward** into the atmosphere.
  - The rising hot air carrying water vapours, smoke and ash **expands and cools down**.
  - Once it is cool enough, water vapour condenses on ash, forming a grey or brown cloud. This cloud is known as a **pyrocumulus cloud** ('fire cloud').
  - If there is sufficient water vapour available and the upward movement of hot air intensifies, **pyrocumulus clouds can evolve into a pyrocumulonimbus cloud**. These clouds can reach heights of 50,000 feet and **generate their own systems of thunderstorms**.

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- **Impact**
  o Although pyrocumulonimbus clouds can produce lighting, **they do not generate much rain**. As a result, they can **spark new wildfires many kilometres away** from the main blaze.
  o These clouds can also **trigger strong winds** that can make the spread of the wildfire **unpredictable and faster**.
- Scientists attribute the rising frequency of formation of pyrocumulonimbus clouds to **climate change**, more **frequent wildfires** due **to heatwaves**, **altered wind patterns**, **deforestation** and **land-use changes** etc.

### 3. Impact of Climate Change on Earth's Rotation

News: Scientists have found that Earth's rotation is slowing down by ~1.3 millisecond per century due to melting of polar ice.

About the Impact of Melting Polar Ice on Earth's Rotation

- Scientists have found that the melting of polar ice caps due to climate change is causing **Earth's rotation to slowdown**. It leads to a slight increase in the length of a day.
- Over the past 2 decades, the Earth's rotation has slowed by **~1.3 milliseconds per century** due to climate change. If high emissions continue, this effect could **increase to 2.6 milliseconds per century**.

Reason of Slowing Down

- **Changes in Earth's Shape**: As ice melts and flows towards the equator, the **Earth bulges out slightly around the middle**.
- **Conservation of Angular Momentum**: As the Earth's shape changes slightly, its **moment of inertia increases** leading to **slowing of its spin**. This leads to longer days.

Source: FT. Melting of ice leads to flow of water towards the equator, redistributing mass and altering the rate of spin of earth.

- **Impact**: The slowdown of Earth's spin can **impact precise timekeeping** systems like atomic clocks, **GPS**, and technologies involved in **space travel**. Changes of even a few milliseconds can **cause discrepancies** in these systems which can **prove to be disastrous**.
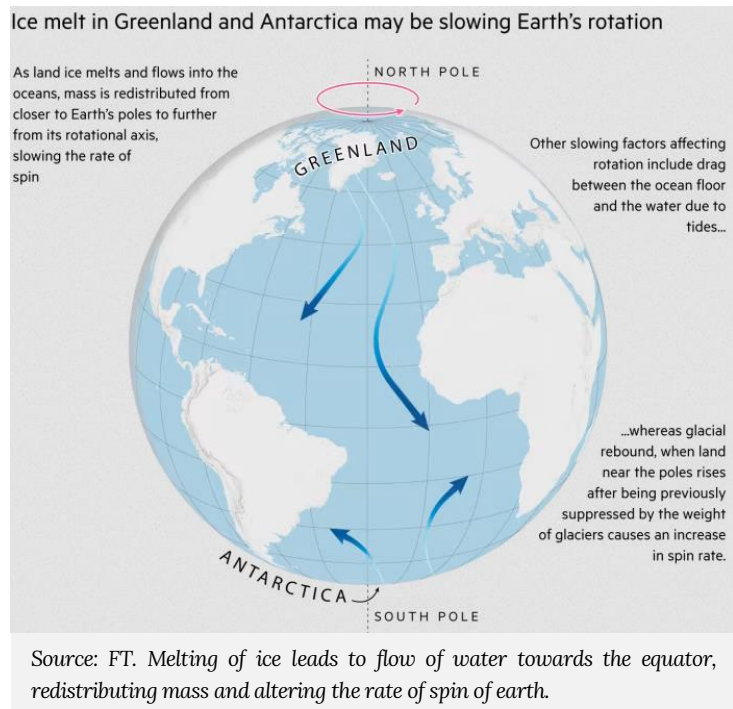
4. Migration in India

News: Data from the Multiple Indicator Survey (2021) of NSO offers key insights about migration in India.

Key Findings

- Migrants moving from Uttar Pradesh to Maharashtra constituted the largest group of all external migrants.
- **Maharashtra hosted the highest share of external migrants**, followed by Uttar Pradesh and West Bengal.
- **Uttar Pradesh was the leading contributor of migrants**, followed by Maharashtra, West Bengal, and Bihar.
- The **UP to Maharashtra migration route was the most significant** for external migrants, followed by migrations from **Gulf countries to Kerala** and from **UP to Delhi**.

- **~22% of migrants moved for economic reasons**, including better employment prospects, business, and service transfers. *(Refer EPIC December 2023 for Migrant Workers in India)*.
  - The largest economic migration flows were from UP to Maharashtra, UP to Delhi, and Bihar to West Bengal.
- Marriage accounted for **68.2% of all migration reasons**.
  - The top migration routes due to marriage were from UP to Maharashtra, Bihar to Jharkhand, and Madhya Pradesh to UP. *(Refer EPIC February 2024 for Migration, Impact on Women and the Need for better Data)*.
- Suburban Mumbai hosted the highest number of migrants, followed by Pune and Thane in Maharashtra.

Migrated to	% of external migrants	Migrated to	% of internal migrants
Maharashtra	11.21	U.P.	13.34
Uttar Pradesh	10.23	Maharashtra	10.12
West Bengal	7.83	West Bengal	7.58
Delhi	5.74	Tamil Nadu	6.53
Kerala	5.51	Rajasthan	5.68
Gujarat	5.09	Bihar	5.43
Rajasthan	4.70	M.P.	5.19
Punjab	4.69	A.P.	4.81

Source: The Hindu. Maharashtra received highest number of external migrants, while internal migration (within State) was highest in UP.

5. State of Food Security and Nutrition in the World, 2024

News: The FAO has released the report on State of Food Security and Nutrition in the World, 2024.

Key Highlights of the Report

- Global hunger had increased sharply from 2019 to 2021. This rise was followed by stagnation in the next 3 years.
- Between 713 and 757 million people faced hunger in 2023, with 1 out of 11 people (~9.1%) in the world and 1 out of every 5 (~20%) in Africa facing hunger. Asia has the highest number of undernourished people.
- By 2030, 582 million people are expected to remain **chronically undernourished**. Most of these under-nourished people will be in **Africa and South Asia**.
- There have been improvements in reducing stunting and wasting among children under 5. However, progress is insufficient to meet the SDG targets.
- Obesity levels are also rising globally.
- **Public spending on food security** and nutrition remains inadequate, especially in low-income countries.

Key Observations About India

Positive Outcomes

- **Reduction in Hunger**: Hunger decreased from 16.6% (2020-22) to 13.7% (2021-23).
- **Improvement in Child Nutrition**: Stunting in children under five declined by 10 percentage points to 31.7% between 2012 and 2022.
- **Decrease in Low Birth Weight**: The proportion of children born with low birth weight dropped by about 2 percentage points to 27.4%.
- **Increase in Breastfeeding**: Exclusive breastfeeding among infants increased by 17 percentage points in a decade.
- Public spending on food security and nutrition has seen improvement, but the resource allocation must be made more effective to address root causes of food insecurity.

Negative Outcomes

- **High Food Insecurity**: Despite improvements, food insecurity remains high. 55.6% of Indians, (~790 million people) cannot afford a healthy diet.
- **Undernourishment**: At 194.6 million, India is home to highest number of undernourished individuals in the world. 13% Indians suffer from chronic undernourishment.
- **Persistent Wasting and Anaemia**: India still has the highest prevalence of wasting and anaemia in South Asia. 53% of women in India are anaemic.

- **Rising Costs**: The cost of a healthy diet has increased, making it unaffordable for 55.6% of the population in 2022.
- **Increased Obesity**: The proportion of overweight children rose from 2.2% to 2.8% between 2012 and 2022, reflecting a **double burden of malnutrition**. The proportion is 7.3% in adults.
- **Impact of Pandemic**: COVID-19 worsened the food security in India due to loss of livelihoods and disruption of supply chains, negatively impacting access to food.
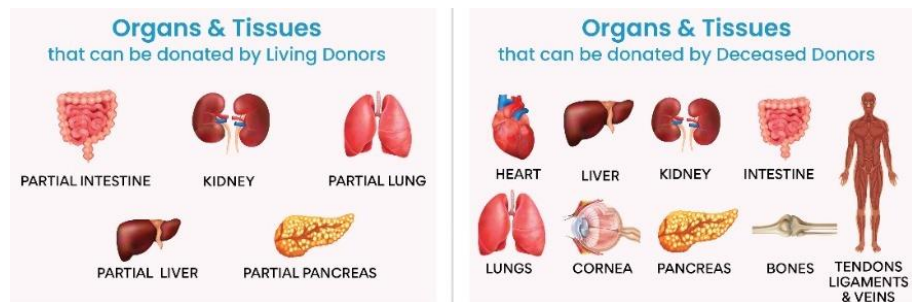
Suggestions for Improvement

- The Report suggest measures like enhancing **public investment**, promoting **climate-resilient agriculture**, improving **food systems**, focusing on **vulnerable populations**, and strengthening **data collection** and **monitoring** for improving food security and nutrition.

6. Status of Organ Donation in India

News: According to Ministry of Health and Family Welfare, there were 15,436 living donors in India in 2023 with 9,784 women (63.4%), 5,651 men (36.5%) and 1 transgender person.

About Donor Eligibility

- **Living Donor**: Persons over the age of 18 can donate one kidney or part of the pancreas, liver or lungs.
- **Brain Dead Donor**: Brain dead donors can donate multiple organs, including the heart, lungs, liver, kidneys, pancreas, small intestine, cornea, bone, skin, and heart valves.
- **Post-Mortem Donations**: After natural cardiac death, only tissues can be donated.

Organs & Tissues that can be donated by Living Donors — PARTIAL INTESTINE, KIDNEY, PARTIAL LUNG, PARTIAL LIVER, PARTIAL PANCREAS

Organs & Tissues that can be donated by Deceased Donors — HEART, LIVER, KIDNEY, INTESTINE, LUNGS, CORNEA, PANCREAS, BONES, TENDONS LIGAMENTS & VEINS

About Total Organ Transplants

- The total number of organ transplants, including both **living and deceased donors**, reached **18,378 in 2023**, the highest ever recorded.
- **Gender-wise Contribution**: Among deceased donors, men significantly outnumbered women, with 844 men and 255 women donating their organs.
- **Types of Transplants**: 13,426 kidney transplants, 4,491 liver transplants and 221 heart transplants were undertaken in 2023.
- **Facilitating Organ Donations**: The Union Government issued a circular to enable round-the-clock post-mortem facilities in hospitals with adequate infrastructure to facilitate organ donation in medico-legal cases, such as road accidents.
- **Awareness and Organ Donation Rate**: Intensive awareness campaigns have been conducted, resulting in a notable increase in organ donations, from 4,990 in 2013. Despite these efforts, the organ donation rate remains **less than one per million population**.
- **State-Wise Organ Donation Data**
  - **Telangana** led the nation in organ donation, recording 252 cadaver donors. **Tamil Nadu** and **Karnataka** followed closely, each with 178 donors.
  - In terms of **kidney transplants**, **Delhi** ranked first with 2,576 cases, while **Tamil Nadu** and **Maharashtra** reported 1,633 and 1,305 cases, respectively. *(Read more about Organ Donation in India).*

1. Bohai Sea

UNESCO has recently added China's Migratory Bird Sanctuaries along the Yellow Sea-Bohai Sea to its World Heritage List. The Bohai Sea is the innermost part of the Yellow Sea, situated on the northeastern coast of China. It is also known as the Bohai Gulf or Bo Hai. Historically, it was called the **Gulf of Chili** or the **Gulf of Pechili**.

It covers an area of ~78,000 kms^2. Due to its proximity to Beijing, it is one of the **busiest seaways in the world**.

It is bordered by the **Liaodong Peninsula** to the northeast and the **Shandong Peninsula** to the south. The Yellow River, China's 2nd-longest river, flows into the sea. The area has **significant petroleum deposits**, oil refineries, and various industries.

2. Yellow Sea

The Yellow Sea is a **marginal sea** of the western Pacific Ocean.

It is located between mainland China to the west and north, the Korean Peninsula to the east. It connects to the Bohai Sea to the northwest.

The Yellow Sea is **one of the largest shallow areas of continental shelf in the world**, with an average depth of 44 meters and a maximum depth of 152 meters.

Major rivers such as the **Yellow River** and the **Yangtze River** flow into the Yellow Sea. The sea has many islands, with notable ones including Jeju Island (South Korea), the Shandong Peninsula islands (China), and Ganghwa Island (South Korea).

3. Lake Turkana

It is also known as Lake Rudolf or the Jade Sea. It is a vast, shallow lake located in the **arid northern region of Kenya**, with its northernmost section **extending into Ethiopia**. It ranks as **Africa's 4th largest lake** by surface area and holds the title of the **world's largest permanent desert lake**. It is **Africa's**

largest saline lake by volume. The climate around the Lake is characterized by **low annual rainfall** (less than 250 mm), high temperatures, and strong winds. Due to intense heat, the lake **loses more water through evaporation than it gains through precipitation**. Intense heat and strong winds limit plant life around Lake Turkana, with **thorn bushes as the dominant vegetation**.

4. Gas Discovery in South China Sea

China has announced the discovery of a major gas field in the South China Sea. The **Lingshui 36-1 gas field** has been labelled as the **world's first large, ultra-shallow gas field in ultra-deep waters**. It is

located southeast of **Hainan**, China's southernmost island province. China is world's largest gas importer and the discovery will enhance its energy security. However, it could intensify the already existing geopolitical tensions in the region. The South China Sea is contested between **Philippines**, **Vietnam**, **Malaysia**, **Brunei**, **Taiwan** and **China**.

5. **Companion of the Order of Fiji**

The President of India, Droupadi Murmu, has been awarded the Companion of the Order of Fiji, the **highest civilian honour of Fiji** recognising the strong India-Fiji ties. This is the first visit by a President of India to Fiji. She also acknowledged that India's indentured labourers and their descendants, **Girmitiyas**, have been embraced by Fiji and have helped build Fiji through their hard work and diligence.

6. **Grand-Collar of the Order of Timor-Leste**

The President of India has been awarded the **Grand-Collar of the Order of Timor-Leste**, recognizing her contributions to public service, education, and women's empowerment. It is **Timor-Leste's highest civilian award**.


7. **East Timor or Timor-Leste**

It is a country in **Southeast Asia**. It comprises the **eastern half of the island of Timor**, the exclave of Oecusse on the island's north-western half, and the minor islands of Atauro and Jaco. The western half of the island of Timor is **administered by Indonesia**. Australia is its southern neighbour, separated by the **Timor Sea**. The country's size is 14,950 kilometres^2. **Dili** is its capital and largest city.

8. **New Names of Geographical Structures in the Indian Ocean**

3 underwater geographical structures located in the Indian Ocean have been awarded names proposed by India. These are **Ashoka Seamount**; **Chandragupt Ridge**; and **Kalpataru Ridge**. These names were proposed by India and approved by the **International Hydrographic Organization** (IHO) and UNESCO's **Intergovernmental Oceanographic Commission** (IOC). Other structures (earlier) named after Indians include **Raman Ridge** (1992, after Physicist and Nobel Laureate Sir CV Raman); **Panikkar Seamount** (1993, after oceanographer NK Panikkar); **Sagar Kanya Seamount** (1991, after research vessel Sagar Kanya); **Wadia Guyot** (1993, after geologist DN Wadia).

9. **Guyots, Seamounts**

Guyot is an isolated **submarine volcanic mountain** with a **flat summit** more than **200 metres below sea level**. The flat tops may have
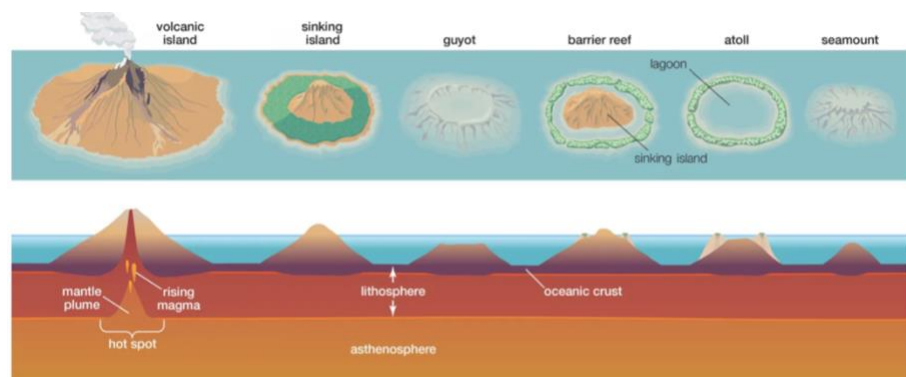
diameters greater than 10 km. The term derives from the Swiss American geologist Arnold Henry Guyot. Seamount is a large **submarine volcanic mountain** rising at least 1,000 m above the surrounding deep-sea floor. Smaller submarine volcanoes are called **sea knolls**, and **flat-topped seamounts are called guyots**.

10. Intergovernmental Oceanographic Commission

It is a specialized agency within **UNESCO**. It was established in 1960. It has over 150 members. The IOC Secretariat is based at **UNESCO headquarters in Paris**. Its functions include coordination of marine research; coordinating global ocean observation systems like GOOS, providing essential data for climate change studies, disaster risk reduction, and marine ecosystem management; capacity building and education; offering scientific advice and expertise to support marine policy creation, including **implementing international agreements like UNCLOS and SDG 14**; enhancing preparedness for ocean-related hazards by coordinating early warning systems and providing guidance on risk assessment and mitigation.

11. Asian Disaster Preparedness Centre (ADPC)

ADPC is an **autonomous international organization**. It was established in 1986. It focuses on **cooperation and implementation of disaster risk reduction** and **building climate resilience** in the Asia-Pacific region.

ADPC provides training, deploys **disaster risk management** (DRM) strategies, and works to mitigate the impacts of natural disasters and climate change

Founding members include India, Bangladesh, Cambodia, China, Nepal, Pakistan, Philippines, Sri Lanka, and Thailand.

12. Upper Karnali Hydro-Electric Power Project

The Indian Renewable Energy Development Agency Limited (IREDA) is investing ~INR 290 crore in the Upper Karnali Hydro-Electric Power Project. It is a **900 MW run-of-the-river hydropower project** being developed on the **Karnali River in Nepal**. It will supply power to **Nepal**, **India**, and **Bangladesh** for a contracted period of 25 years.

The project was awarded to GMR Group of India by the Government of Nepal in 2008. GMR is developing the project on a build-own-operate-transfer (BOOT) basis. The project is estimated to generate 3,**466 million units of electricity annually**, while **offsetting ~ 2 million tons of greenhouse gas emissions** each year.

13. Karnali River

The Karnali River is a **perennial trans-boundary river** originating in the Himalaya Mountains on the Nepal side of the Tibet border, **near the sacred Mt. Kailash**. It is the **longest and largest river in Nepal**, stretching 315 miles. Over 90% of the river's basin lies within Nepal.

The Karnali River cuts through the Himalayas in Nepal and **joins the Sharda River at Brahmaghat in India**. Together, they form the **Ghaghara River**, a major **left-bank tributary** of **Ganga**.

14. About Indian Renewable Energy Development Agency Limited (IREDA)

IREDA is a **Mini Ratna** (Category I) Government of India Enterprise under the administrative control of the **Ministry of New and Renewable Energy** (MNRE). It was established in 1987 as a **non-banking financial institution**. IREDA is engaged in promoting, developing, and providing financial assistance for

projects related to new and renewable sources of energy and energy efficiency /conservation. *(Refer EPIC May 2022 for Navratnas and Maharatnas)*.

15. Mekedatu Project

It is a **proposed multipurpose project** involving construction of a **balancing reservoir** near **Kanakapura in Ramanagara district**, Karnataka.

Mekedatu is a **deep gorge** at the confluence of rivers **Kaveri** and **Arkavathi**.

The primary objectives of the project are to **provide drinking water to Bengaluru** and the neighbouring areas (4.75 TMC, Thousand Million Cubic Feet), and **generate 400 MW of power**. The Government of **Tamil Nadu has opposed the project**.
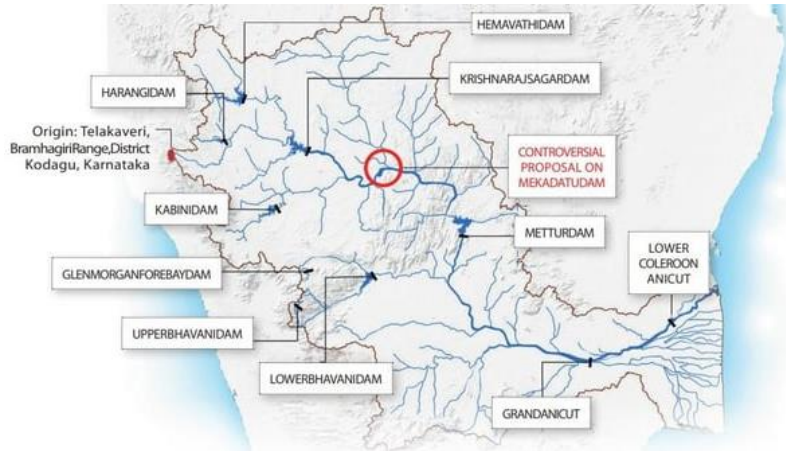
16. Kosi-Mechi River Interlinking Project

It is part of India's ambitious **National Perspective Plan (NPP) for interlinking rivers**. The project is aimed at **improving irrigation** in the region. However, locals argue that it **fails to address the critical issue of flood control,** which affects them annually. The project involves inter-linking **Kosi and Mechi Rivers**. Mechi is a tributary of the **Mahananda River**. It aims to provide annual irrigation to 4.74 lakh hectares (2.99 lakh hectares in Bihar) and 24 million cubic meters (MCM) of domestic and industrial water supply. The project is overseen by **National Water Development Agency** (NWDA), under the **Union Ministry of Jal Shakti**.

Source: MapsofIndia. Interlinking of Rivers, Project 12 is Kosi-Mechi Interlinking Project.

17. Rogue Waves

Rogue waves are **exceptionally large and unexpected ocean waves** that are **significantly taller (twice or more) than the average waves surrounding them**. These waves can **form suddenly** and **without warning**, making them **extremely dangerous for ships**, **coastal structures**, and **offshore platforms**.

They may occur when **swells** (long-wavelength waves generated by distant weather systems) **converge and combine to create a much larger wave**.

Rogue waves can also form when **ocean currents interact with waves**, compressing them into larger and more powerful waves.

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Rogue waves pose a **significant threat to maritime activities**. Between 2011 and 2018, rogue waves were responsible for deaths of ~ 386 people and sinking of 24 ships. Predicting rogue waves has been difficult due to their **sudden and unpredictable nature**. Now scientists are using AI to predict rogue waves up to five minutes in advance.

18. Pralay Missile

It is a **short-range**, **quasi-ballistic surface-to-surface missile** with a range of **350-500 km**. It has a payload capacity of 500-1,000 kg. The missile has been developed by the DRDO to meet defence requirements along the **Line of Actual Control** (LAC) and **Line of Control** (LoC).

The Pralay missile **never leaves the atmosphere** and **follows a flat trajectory**. It is powered by a **solid propellant rocket motor**. The missile navigates to its target using inertial guidance and **can be controlled throughout its flight**. The Pralay missile includes a **jet vane system for thrust vector control**, allowing it to perform **evasive manoeuvres** in the terminal phase of flight. The missile is designed with **two sets of small fins** to reduce its **radar signature**.

PRALAY: Surface-to-Surface Missile

Pralay is a canisterised tactical, surface-to-surface, and short-range ballistic missile for battlefield use developed by the Defence Research and Development Organisation of India

ENGINE: Two stage rocket motor with third stage MaRV

SPEED: Mach 1 to 1.6

RANGE: 150-500 km

TRAJECTORY: low

GUIDANCE SYSTEM: Inertial navigation system

LAUNCH PLATFORM: 8x8 BEML-Tatra transporter erector launcher

MASS: 5 tonnes (4.9 long tons; 5.5 short tons)

OPERATIONAL RANGE: 150–500 km (93–311 mi)

Warhead Bay

Rocket Motor

Controls
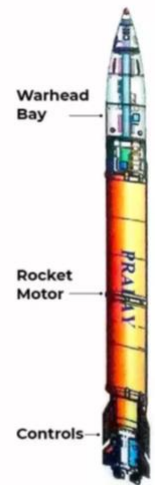
Can change its path after covering certain range mid-air and is difficult to be tracked

It is capable of being launched from a mobile launcher and has latest navigation system and integrated avionics

It has the **capability to defeat interceptor missiles**

19. INS Arighat

It is India's **2ⁿᵈ indigenously built nuclear-powered Ballistic Missile Submarine** (SSBN) after **INR Arihant**. They are a part of India's effort to establish a **credible nuclear triad** (*Refer EPIC May 2023 for India's Nuclear Doctrine*), which includes **land-based**, **air-based**, and **sea-based nuclear weapon delivery systems**. It provides India a credible **second-strike capability** that enhances the ability to retaliate in the event of a nuclear attack.

It has a submerged displacement of ~**6,000 tons**. The submarine is ~111 meters long and 11 meters wide. It is **powered by a nuclear reactor** which provides it with virtually **unlimited range and endurance**, allowing it to **remain submerged for extended periods**. INS Arighat is equipped with **ballistic missiles** capable of carrying **nuclear warheads**. The specific missiles include the **K-15 Sagarika** and potentially the **K-4 missile**, both designed to enhance the submarine's **strategic strike capabilities**. The submarine features advanced stealth technology to reduce its detectability by enemy sonar systems.

It was constructed at the Indian Navy's **Ship Building Centre** (SBC) in **Visakhapatnam**.

20. Exercise KHAAN QUEST

The **Indian Army** participated in the Exercise KHAAN QUEST. It is a **multinational military exercise**. It took place in **Ulaanbaatar**, **Mongolia**. It began as a **bilateral event** between the **US and Mongolian Armed Forces** in 2003 and expanded to become a **Multinational Peacekeeping Exercise** in 2006. Its purpose is to bring together military forces worldwide to collaborate and enhance their **peacekeeping capabilities**.

21. Exercise Tarang Shakti

It is the first and **largest international air exercise ever conducted in India**. This exercise aims to strengthen strategic relations with the international community. It will be conducted **in 2 phases**. In the first phase (August 2024) **France**, **Germany**, **Spain** and **the UK** will participate with their assets. In

the second phase (September 2024) **Australia**, **Bangladesh**, **Greece**, **Singapore**, **UAE** and **US** will be the participating countries.

22. **Maritime Partnership Exercise (MPX)**

The maritime partnership exercise (MPX) took place between **India and Russia** in St. Petersburg. This exercise highlights the commitment of both nations to **maintain peace**, **stability**, and **security in the region**. It included communication drills, search and rescue tactics, replenishment exercises etc.

23. **Exercise Udara Shakti**

It is a **joint air exercise** between the **Indian Air Force** (IAF) and the **Royal Malaysian Air Force** (RMAF). In 2024, it was conducted in Kuantan, Malaysia.

24. **Neutron Stars**

NASA has estimated that **Milky Way galaxy may contain up to a billion neutron stars**. Neutron stars are formed when a **massive star runs out of fuel** and collapses under its own gravity. The Core (central region of the star) collapses, crushing together **every proton and electron into a neutron**. If the core of the collapsing star is between about 1 and 3 solar masses, these newly-created neutrons can stop the collapse, leaving behind a neutron star. A typical neutron star can contain ~ 1.4 times the mass of the sun compressed into a sphere roughly 10 to 20 kilometers in diameter. Neutron stars possess extreme magnetic fields, intense gravity, and can spin rapidly, emitting beams of radiation detectable as pulsars.

25. **Pulsars**

Pulsars are a **type of neutron star** that **emit beams of electromagnetic radiation from their poles**. As the star rotates, these beams sweep across space creating a pulsing effect when observed from Earth. Pulsars are known for their **precise and regular pulsing**, making them cosmic timekeepers.

All pulsars are neutron stars, **but not all neutron stars are pulsars**.
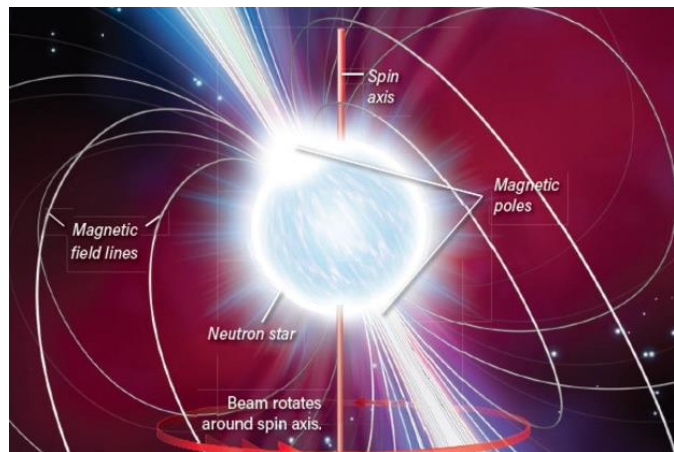
26. **Cepheids**

Cepheids are type of **variable stars** that **pulsate in brightness** due to the **expansion and contraction of their outer layers**. These stars shine with a luminosity 500 to 30,000 times greater than that of the Sun. These stars are hot and massive and range from **5-20 times the mass of Sun**. They exhibit radial pulsations that cause **variations in both their diameter and temperature**.

27. **EOS-08 Satellite**

ISRO has successfully launched the EOS-08 Earth Observation Satellite through the Small Satellite Launch Vehicle (SSLV-D3) from the Satish Dhawan Space Centre (SDSC) in Sriharikota. It is designed to operate in a circular Low Earth Orbit (LEO) at an altitude of 475 km and has a mission life of one year. The Satellite carries 3 key payloads which are useful in applications like **satellite-based surveillance**, **disaster and environmental monitoring**, **fire detection**, **tracking volcanic activity**, **monitoring**

industrial disasters, measuring ocean surface winds, detecting soil moisture, monitoring the Himalayan cryosphere, and identifying floods and inland water bodies, measuring UV radiation etc.

28. Dyson Sphere

It is a **hypothetical megastructure** that **encloses a star** and **captures all** (or a large percentage) of **its solar power output**. The Dyson sphere is named after theoretical physicist **Freeman Dyson** (1923-2020), who hypothesised its existence. Dyson sphere can have panels to capture the stellar energy.

Earth receives only ~0.00000005% (5×10^{-8} % or 5×10^{-10}) **of Sun's energy**, the rest is lost to space (in all other directions). Dyson Sphere will be able to capture all the emitted energy by the Sun (thus ~2 billion times (2×10^9) more energy than currently received by Earth).

A Dyson Sphere will absorb all the radiation from a Star, but will **emit infra-red radiations** due to its temperature. Astronomers are looking for infra-red signatures from distant stars to **establish possibility of existence of an advanced intelligent civilization** that may have created a Dyson Sphere around a Star.
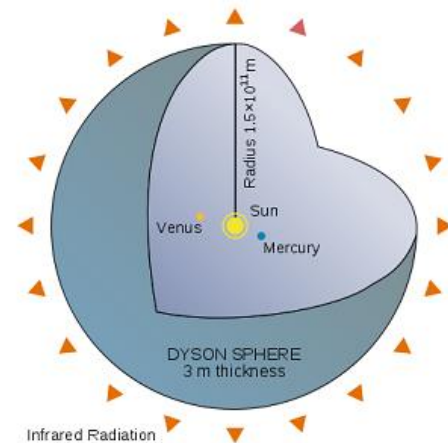
Source: Energy Education. A theoretical Dyson Sphere will enclose the Sun, Mercury, Venus and the Earth from all directions.

29. Kardashev Scale

It is a method of measuring a **civilization's level of technological advancement** based on the **amount of energy it is capable of harnessing and using**. It was proposed by Soviet astronomer **Nikolai Kardashev** in 1964. It classifies civilization into various types.

Type I Civilization: Able to access **all the energy available on its planet** and store it for consumption.

Hypothetically, it should also be able to control natural events such as earthquakes, volcanic eruptions, etc.

Type II: **Directly consume a star's energy**, like through the use of a Dyson sphere.

Type III: Able to **capture all the energy emitted by its galaxy**, and **every object within it**, such as every star, black hole, etc.

Source: Getty Images. An artists rendition of Dyson Sphere, though this is not an accurate representation because a lot of energy is escaping to the space through the gap between the 8 spindles of the Sphere.

Human Civilization is far from reaching the Type I stage. Scale has been modified to add more stages, e.g., Type IV Civilization that can use energy comparable to the power of the entire universe.

30. Axiom-4 Mission

Group Captain **Shubhanshu Shukla** has been selected as the prime mission pilot for the Axiom-4 mission. It is a private spaceflight to the **International Space Station** (ISS). The mission is in collaboration with NASA and is scheduled for launch in 2024. The mission will use a **SpaceX Dragon spacecraft**, launched atop a **Falcon 9 rocket**. The mission aims to continue Axiom Space's pioneering efforts to establish a sustainable human presence in the **Low Earth Orbit** (LEO).

31. Impact of Extended Stay in Space in Human Body

The **Boeing Starliner spacecraft** that took Astronauts Sunita Williams and Barry Wilmore to the ISS has **developed a leakage** in its **propulsion system**. Not willing to risk the lives of the astronauts, NASA has announced that the Starliner will come back to the Earth without crew, while the **two astronauts will possibly stay at ISS till February 2025**. Their mission was originally for 8 days, has now been **extended to ~8 months**. **Long stay in space** can have **negative impact on human body** including accelerated **reduction in bone density** and **muscle quality deterioration**, **alterations in brain structure** due to changes in brain fluids, increased risk of **heart disease**, **vision-related issues** and **higher risk of cancer** due to DNA damage from radiation exposure.

The **longest continuous stay in space** was by **Russian Astronaut Valeri Polyakov** who stayed at Russian Space Station Mir for **437 days** between 1994-95.

32. Dark Oxygen

A study has found high concentration of oxygen in ocean waters at the depth of ~4km from surface. The oxygen has been termed as 'dark oxygen' due to absence of sunlight or possibility of photosynthesis at this depth. This discovery suggests the presence of **new types of marine ecosystems**.

One explanation for dark oxygen is that **polymetallic nodules** (lumps of iron, manganese, and other materials found on the ocean floor) might be **creating electric charges that split water molecules**, releasing oxygen. Scientists are of the opinion that **deep-sea mining** for these polymetallic nodules can **disturb the marine ecosystems** and destroy marine life. *(Refer EPIC July 2023 for Deep Sea Mining)*.

33. Naegleria fowleri and Amoebic Meningoencephalitis

5 cases of amoebic meningoencephalitis, including 3 deaths, have been reported in Kerala in the past three months. The disease is caused by Naegleria fowleri.

Naegleria fowleri is commonly known as the "brain-eating amoeba". It is a **single-cell organism** found in **warm freshwater environments** such as **lakes**, **hot springs**, and **poorly maintained swimming pools**. Only one species of Naegleria, Naegleria fowleri, infects humans.

The amoeba **enters the human body through the nose** (when someone swims in the contaminated water) and **then travels to the brain**. There it **destroys brain tissue** and causes a dangerous infection known as primary Amoebic meningoencephalitis (PAM). The infection **does not spread from person to person** and does not manifest symptoms when contracted through other forms.

The **infection is highly fatal**, with a **recorded death rate of 97%**.

The disease can be avoided through **proper precautions and hygiene measures** and **using chloring to disinfect water**.

34. MPox

The WHO has declared Mpox as a **Public Health Emergency of International Concern** (PHEIC). It is a **viral infection** caused by the **monkeypox virus** (MPXV). It was first reported in humans in 1970, predominantly in African regions.

There are two known types (clades) of mpox virus: Clade I (originated in Central Africa) and Clade II (West Africa). Its symptoms include fever, headache, muscle aches, back pain, low energy, swollen lymph nodes, and pox-like rashes which last for about 2-3 weeks. It can **spread from animals to humans** (zoonotic transmission) or **between humans** (through direct contact with body fluids or sexual contact). Mpox has been declared as PHEIC because the new variant (Clade Ib) is **spreading more through sexual contact**, unlike previous strains that mainly spread through animal-to-human

transmission. Over 99,000 cases and 208 deaths have been reported globally since 2022. **The virus has been mutating and diversifying**, making it harder to control. Mpox has spread to new areas.

Two vaccines are recommended by WHO for Mpox. WHO is working to ensure vaccines are available in low-income countries through emergency listings and partnerships.

35. Biostimulants

Biostimulants **promote natural processes in plants** and **help improve nutrient absorption**, efficiency, stress tolerance, and overall crop quality and yield. They are conducive for organic farming as they also emphasise on **ecological balance**, **soil health**, and **reduced reliance on synthetic chemicals**.

The Government of India has **included seaweed-based biostimulants under Fertilizer Control Order** to ensure their supply to farmers.

36. Detecting Microplastics in Foods

The Food Safety and Standards Authority of India (FSSAI) has initiated a project to **evaluate microplastic contamination in food products** and to develop detection methods. The programme will develop detection methods, assess contamination levels, set analysis standards, undertake laboratory testing etc. The project will help determine the level of microplastic contamination in Indian food and guide the creation of safety regulations. *(Refer EPIC April 2024 for Hydrogel and EPIC July 2023 for Impact of Nanoplastics)*.

37. Climate Finance Action Fund (CFAF)

Azerbaijan, the host of the **29ᵗʰ Conference of Parties** (COP29) to the UNFCC, has announced the establishment of the **Climate Finance Action Fund** (CFAF). Azerbaijan will be a founding contributor to the fund, which will be **supported by contributions from fossil fuel-producing countries** and **companies in the oil**, **gas**, and **coal sectors**. The Fund's secretariat will be based in Baku, Azerbaijan. It aims to **mobilize the private sector** and **de-risk investments** through a **public-private partnership model**. The fund will include special facilities providing concessional and grant-based support to **address natural disasters in developing countries**. 50% of the capital will be directed towards **climate projects in developing countries**, focusing on **mitigation**, **adaptation**, and **research and development**. The remaining 50% will support countries in meeting their **Nationally Determined Contributions** (NDCs) to achieve the 1.5°C temperature target.

38. Banni Grasslands

Researchers have conducted a new study assessing the suitability of different areas within the **Banni grasslands in Kachchh district**, Gujarat, for **sustainable restoration**. Banni grasslands are among the largest grasslands in India and Asia. They cover an area of 2,618 km². Both **Wetlands and grass-lands** coexist in Banni. Vegetation features **sparse growth** dominated by low forbs and graminoids, including salt-tolerant varieties, along with scattered trees and scrub.

The area is **rich in flora and fauna with 192 species of plants**, **273 species of birds**, several species of mammals, reptiles, and amphibians.
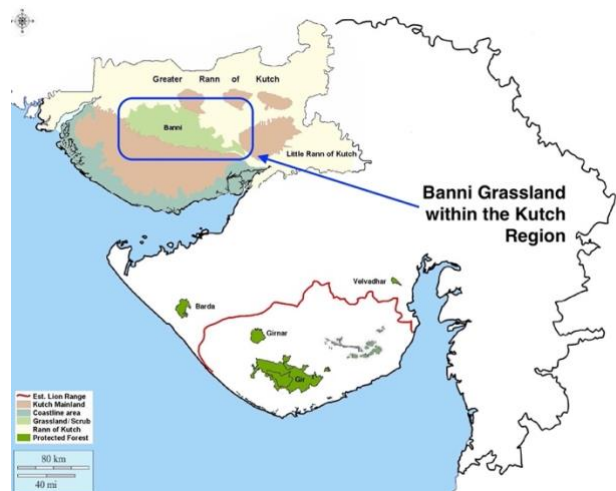
In 1955, the judiciary notified the grassland will be a **reserve forest**. In 2019, the NGT ordered to demarcate the boundaries of the Banni grassland and restricted non-forest activities.

39. Miombo Forest

It is a **biome** encompassing **tropical and subtropical grasslands**, **bushlands**, and **savannahs**. It is a **vast African dryland forest ecosystem** covering ~2.7 million kms^2 in **southern Africa**. They are found in Angola, Democratic Republic of Congo, Malawi, Mozambique, Tanzania, Zambia and Zimbabwe.

They are home to various mammal species, such as African elephants, lions, leopards, zebras, giraffes, and several species of antelope. The climate in the Miombo region is **typically tropical**, with a **distinct dry season**. The Miombo Forest faces significant threats from **deforestation and land degradation**. Climate change poses additional threat, with increasing temperatures and changing rainfall patterns potentially altering the ecosystem's dynamics.

40. New Ramsar Sites

The Government has declared 3 new Ramsar Sites, taking the total number of Ramsar Sites in India to 85. The area of Ramsar sites in India has reached **13,58,067.75 ha**. Tamil Nadu (18) has maximum Ramsar sites, followed by Uttar Pradesh (10).

The 3 new sites included are **Nanjarayan Bird Sanctuary** (Tamil Nadu), **Kazhuveli Bird Sanctuary** (Tamil Nadu) and **Tawa Reservoir** (Madhya Pradesh).

- **Nanjarayan Bird Sanctuary**: The Nanjarayan lake is a large **shallow wetland** situated along the north-eastern region of **Uthukuli Taluk** of **Tiruppur District in Tamil Nadu**. About 191 species of birds, 87 species of butterflies, 7 species of amphibians, 21 species of reptiles, 11 species of small mammals and 77 species of plants have been recorded in and around the lake. The lake plays vital role in ground water recharge.

- **Kazhuveli Bird Sanctuary**: It is a **brackish shallow lake** located on the **Coromandel Coast in Villupuram district**, **north of Pondicherry**. The lake is connected to the **Bay of Bengal** by the **brackish Uppukalli creek and the Edayanthittu Estuary**. The lake is **one of the largest wetlands in peninsular India**. The Kazhuveli Bird Sanctuary lies in the **Central Asian Flyway** and is an important stopover site for migratory species of birds.

- **The Tawa Reservoir** has been constructed at the confluence of the **Tawa and Denwa rivers**. Tawa River is the longest tributary of river Narmada (172 Km), originates from **Mahadeo hills** in Chhindwara district, and joins river Narmada in **Narmadapuram district**. Tawa Reservoir is situated near **Itarsi town**. The reservoir is located inside the **Satpura Tiger Reserve** and forms its western boundary with **Bori Wildlife Sanctuary**.

41. Oil Drilling in Hoollongapar Gibbon Wildlife Sanctuary

The Government has approved the exploration of oil and gas in Assam's eco-sensitive zone in the Hoollongapar Gibbon Wildlife Sanctuary. This has raised concerns about potential threat to the **Hoolock gibbons**. The gibbons are canopy dwellers and are highly sensitive to habitat fragmentation. Any disruption can **severely impact their movement and survival.** The are also concerns raised that oil drilling could exacerbate **human-wildlife conflicts**. *(Refer EPIC September 2023 for Hollongapar Gibbon Sanctuary and EPIC July 2023 for Hoolock Gibbon).*

42. Displacements Due to Project Tiger

A report released on Global Tiger Day (July 29) reveals that Project Tiger will displace at least 5.5 lakh persons from Scheduled Tribes and other forest dwellers.

Pre-2021: 254,794 people were displaced from **50 tiger reserves**, with average ~**5,000 people/reserve**. **Since 2021**: The average number of people displaced from 6 tiger reserves has increased to **48,333 per reserve**. A large number of people are expected to displaced from **Kumbhalgarh Wildlife Sanctuary** (Rajasthan, ~160,000 people), **Nauradehi Wildlife Sanctuary** (Madhya Pradesh, 72, 772 people) and **Ranipur Tiger Reserve** UP, ~45,000 people). The report has also highlighted significant human rights violations associated with these forced evictions.

43. Omkareshwar Floating Solar Project

SJVN has successfully commissioned the **Omkareshwar Floating Solar Project** (90 MW capacity). SJVN (Satluj Jal Vidyut Nigam) is a **Mini Ratna** Schedule 'A' Central Public Sector Unit (CPSU) under **Ministry of Power**.

The Project is located in District **Khandwa**, Madhya Pradesh. It is the largest floating solar park of India. It is expected to generate **196.5 million units of energy in first year**. It will reduce **2.3 lakh tons of carbon emissions**. The project will also help in **water conservation by reducing water evaporation**.

44. Green National Highways Corridor Project

The Government of India and the World Bank have signed an agreement for the construction of Green National Highway Corridors Project (GNHCP). The project will construct highways with aggregate length of 781 km in **Himachal Pradesh**, **Rajasthan**, **Uttar Pradesh** and **Andhra Pradesh**.

The project incorporates demonstrating **safe and green highway** keeping in view **climate resilience** and **use of green technologies** with following aspects: **Conservation of natural resources** using cement treated sub base/reclaimed asphalt pavement; **Promote use of local** or **marginal materials** such as lime, fly ash, waste plastic; and **use of bio-engineering measures for slope protection** like **Jute erosion control blanket** with grass plantation, **hydroseeding**, bamboo plantation etc. in **slope protection works**.

45. Adoption of Green Steel Technologies

The Government has implemented several measures to encourage the **adoption of green steel technologies within the steel manufacturing sector**. These initiatives focus on reducing greenhouse gas emissions and enhancing the sustainability of steel production processes. These initiatives include **National Green Hydrogen Mission** (promoting the use of Green Hydrogen in iron and steel making processes), **National Solar Mission** (increasing renewable energy adoption in steel production), **Perform, Achieve and Trade (PAT) Scheme** (encourages the steel industry to reduce energy consumption by offering incentives) and **Adoption of Best Available Technologies (BAT)** (Steel sector has incorporated several globally recognized Best Available Technologies (BAT) in modernization and expansion projects to enhance sustainability).

46. Agarwood

Agarwood is often referred to as the "**Wood of the Gods**". Agarwood is celebrated for its **religious and cultural significance** due to its **aromatic properties**. Agarwood is derived from a **fast-growing evergreen tree species** native to **Northeast India**. Beyond India, Agarwood trees are found from the foothills of the Himalayas to Papua New Guinea. Following Assam's lead, Tripura is actively promoting the commercial cultivation of agarwood among farmers.

CITES has set a new **export quota** for agarwood and its derivatives from India starting April 2024. The new regulations are expected to benefit lakhs of farmers, especially in Assam, Manipur, Nagaland, and Tripura, where agarwood is cultivated.

47. Nitrogen Utilization Efficiency (NUE)

Biotechnologists have found significant differences in the **nitrogen utilization efficiency** among popular rice varieties in India. Some varieties of rice are more efficient than others. The discovery can lead to the **development of new rice varieties** that **require less nitrogen** while **maintaining high yields**. Nitrogen-use efficiency refers to the **yield of a crop relative to the amount of nitrogen** (both natural and artificial) **available to it**. Poor NUE in crops leads to a massive **waste of nitrogen fertilizers**, costing India INR 1 trillion annually and over US$ 170 billion globally.

Nitrogen fertilizers are a **major source of pollution**. They contribute to harmful emissions like nitrous oxide and ammonia, as well as nitrate and ammonium contamination in water.

48. GI Tag for Purandar Fig

Purandar figs are grown in the fertile lands of **Purandar taluka in Pune**, **Maharashtra**. Dry weather, hilly terrain, and well-drained soil in the region make it perfect for fig farming. The unique qualities of Purandar figs come from the **area's specific climate**, **red-black soil**, and **salt-free well irrigation**.

Purandar figs are famous for their **unique taste**, **smooth texture**, and **high pulp content**. These figs have a sweet, lingering taste, low acidity, and high Total Soluble Sugar (TSS). **Fig juice** made from these GI-tagged figs has already gained international recognition, winning an award at the Macfrut 2024 event highlighting its **potential in global markets**.

49. National Culture Fund

It was established in 1996 by the Government of India as a **Trust under the Charitable Endowment Act**, **1890**. It was created to provide a **new funding mechanism for the arts and culture**. Its primary aim is to **mobilize additional resources** through **Public-Private Partnerships** (PPP) to promote, protect, and **preserve India's cultural heritage**, both tangible (physical artifacts) and intangible (cultural practices and traditions). **Donations** made to the NCF are **eligible for tax benefits under the IT Act, 1961**.

The NCF is managed by a Council and an Executive Committee to implement its policies. The **Council is chaired by the Union Minister of Culture** and includes up to 24 members.

50. Navroz

Navroz (Nowruz) is the Parsi New Year. It is derived from the Persian words 'Nav' and 'Roz', which mean a new day. It is generally celebrated during July or August, depending on the **Shahenshahi or Fasli calendar**, which **does not account leap year**.

The celebration of Navroz is deeply rooted in **Zoroastrianism**, one of the world's oldest monotheistic religions founded by the prophet Zoroaster in ancient Persia. **Prophet Zoroaster** is said to have initiated the Parsi New Year celebration, a tradition with roots in Zoroastrianism dating back **3000 years**. The Parsi New Year holds profound significance for the Parsi community, **symbolising renewal** and the eternal saying 'good over evil', highlighting the core values, such as **truth and the continuous battle between light and darkness**.

51. Bagata Tribe

The Bagata tribe resides in **Odisha** and **Andhra Pradesh**. The Bagatas trace their community name to devoted warriors (Bhaktas) of the former rulers. The Bagata tribes primarily engage in farming. **Dhimsa**

is a popular dance enjoyed by Bagata tribes of all ages. Their dances are collectively known as **Sankidi Kelbar**. Nuclear families are common within their society. Cross-cousin marriage is preferred, and marriage by negotiation is considered ideal. **Telugu** and **Adivasi Oriya** are their main languages. They worship Hindu gods and goddesses alongside their **family and tribal deities**.

52. Mashco Piro Tribe

Indigenous rights NGO Survival International has released rare pictures of the **Mashco Piro** tribespeople, one of the **world's 100-odd uncontacted tribes**. Almost all such tribes live in the **jungles of Amazon and Southeast Asia**. The Mashco Piro, possibly number more than 750 and are **believed to be the largest of uncontacted tribes**. These nomadic hunter-gatherers live in the **Amazon jungles of the Madre de Dios Region**, close to **Peru's border with Brazil and Bolivia**.

In India, Sentinelese tribe living in North Sentinel Island (Andaman) is considered to be an uncontacted tribe.

53. Eri Silk

Eri Silk, also known as '**Peace Silk**' or '**Vegan Silk**', is derived from the Eri silkworm (Samia ricini). Unlike other silk production processes, **Eri Silk is made without killing the moth inside the cocoon**. The moth naturally exits the cocoon, leaving it intact for silk production. The silk is known for its softness, warmth, and durability. It is predominantly produced in the North-Eastern States of India. It holds **deep cultural importance in Assam**, where it is **traditionally handwoven by skilled artisans**. It is a part of the region's rich textile heritage. It is a **GI-tagged product of Assam**.

It recently obtained the **Oeko-Tex certification**, which ensures that the **textile is free from harmful substances** and **produced under environmentally friendly conditions**.

54. Saffron

Saffron is a highly valuable spice known as 'Red Gold' or 'Golden Condiment'. Saffron plants grow from **underground bulbs called corms**. They regenerate through **vegetative multiplication**. It originally comes from Greece and Asia Minor. It is now grown in Europe (Italy, France, Spain), China, and India. **~90% of India's saffron is produced in Kashmir**. It grows best at elevations of 1,500-2,000 m. It requires temperatures between 35°C-40°C in summers and 15°-(-20)°C in winters. It is suitable for dry, moderate, and continental climates. It thrives in loamy, sandy, and calcareous soils and prefers acidic soil. Due to erratic weather, many farmers in Kashmir are shifting from growing saffron to cultivating apple orchards or mustard crops.

55. Olympic Order

Indian shooting icon Abhinav Bindra has been awarded the **Olympic Order**. Abhinav Bindra was India's **first-ever individual Olympic gold medallist** in the **2008 Beijing Games** in **10m air rifle event**.

The Olympic Order was **established in 1975**. It is the **highest award** of the Olympic Movement. It is awarded to individuals for their **distinguished contributions to the Olympic Movement**.

56. Negotiations for BIMSTEC FTA

The Union Minister of Commerce & Industry has called for faster negotiations for the proposed BIMSTEC Free Trade Agreement (FTA). The **Framework Agreement on the BIMSTEC Free Trade Area** was signed in February 2004. Article 2 of the Framework Agreement outlines multiple areas to be covered by the FTA including **progressive elimination of tariffs and non-tariff barriers**, progressive **liberalization of trade in services**, establishing an **open and competitive investment regime** to

facilitate and promote investment within the BIMSTEC FTA, establishing effective **trade and investment facilitating measures**, including **simplification of customs procedures** etc.

57. Clean Plant Programme

It aims to **enhance the quality and productivity of fruit crops** across India. It is an initiative of the Ministry of Agriculture and Farmers Welfare. The programme will be implemented by the **National Horticulture Board** in collaboration with the **Indian Council of Agricultural Research** (ICAR). Under the initiative, 9 world-class Clean Plant Centers will be set-up with advanced labs for diagnostics, therapy, and tissue culture. A **strong certification system** will be put in place to ensure that planting materials are produced and sold with full accountability. This system will be supported by **regulations under the Seeds Act of 1966**. **Large nurseries will receive support** to develop the necessary infrastructure.

58. National Pest Surveillance System (NPSS)

This digital initiative has been developed by the **Department of Agriculture and Farmers' Welfare**. It **leverages advanced technologies** like AI and Machine Learning (ML) to provide **timely and accurate pest management advisories**. It aims to help farmers **connect with agricultural scientists** and experts for effective pest management using their mobile phones. It will reduce farmers' dependence on pesticide retailers, **promote a scientific approach to pest management** and provide real-time pest analysis. It is expected to rationalize use of pesticides and increase farm yields.

59. Arogya Maitri Disaster Management Cube

It is a **mobile hospital** developed under Army's broader **BHISHM initiative** (Bharat Health Initiative for Sahyog, Hita, and Maitri). The cube is designed to be **deployed within 12 minutes**, ensuring **swift response during emergencies**. It is equipped to treat up to 200 casualties, providing comprehensive medical care in disaster-stricken areas. The unit comprises 72 lightweight, easy-to-transport components, which can be carried by hand, cycle, or drone. This flexibility allows for deployment in various challenging environments, making it ideal for mass casualty incidents. The cube is **waterproof and durable**, ensuring it can be used in any emergency situation. After use, it can be efficiently **repacked and redeployed**, maintaining its readiness for subsequent operations.

60. Multidimensional Vulnerability Index (MVI)

The UN General Assembly officially launched the Multidimensional Vulnerability Index (MVI) aimed at **providing small island states** and **developing nations with better access to low-interest financing**. The MVI is designed to **complement traditional development metrics** like GDP.

It aims to address the **specific needs of Small Island Developing States** (SIDS) and other developing nations that face unique vulnerabilities but do not qualify for **low-interest development financing** based on GDP per capita alone. Traditional metrics often fail to adequately capture the vulnerabilities faced by SIDS. These traditional measures make it difficult for SIDS to access necessary financing for development.

It incorporates a range of indicators reflecting a **State's structural vulnerabilities** and **lack of resilience**, including: Import dependence, Exposure to extreme weather events and pandemics, Impacts of regional violence and refugee crises, Demographic pressure, Availability of water and arable land resources, and Child mortality under the age of five etc.

61. CIBIL Score

It is a measure of the **creditworthiness of an individual**. It is based on an individual's past credit behaviour and how well the person has managed the credit products like personal loans, credit cards, overdrafts etc. It gives an indication regarding an individual's capacity to repay the borrowed amounts. It tells the lenders whether the borrower is reliable (low risk of default) or not (high risk of default).

CIBIL score is generated based on the **consumer's credit information provided by the lenders to credit bureaus on a monthly basis**.

CIBIL (Credit Information Bureau India Limited) score **ranges from 300-900**. Higher the credit score, higher the reliability of the borrower and higher the chance of lenders approving the credit (loan) to the borrower. A CIBIL score of 750 or above is considered a standard benchmark and preferred by lenders for loan or credit card approval. A score below 650 indicates history of delayed credit card payments or loan EMIs. Individuals in this range have high risk of default on payments.

NOTE: With effect from 1st February 2022, the monthly ForumIAS Epic Magazine, for the month will provide wholistic coverage for the said month up to 20th of the month. This ensures that issues / stories that occur after 21st of the month are allowed to fully develop and are covered wholistically in the next month.

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