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TRIBAL LIVES MATTERS

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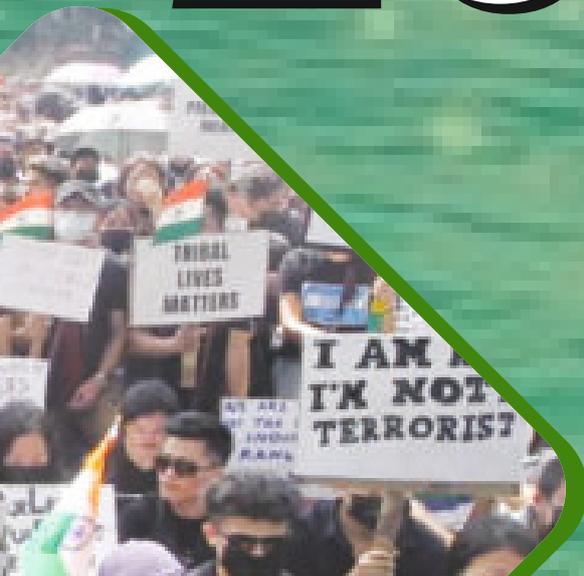
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Subject -Geography

Diamond Dust Geoengineering

Sub Topic- *Physical Geography, Important Geophysical Phenomena*

Context:

A **new study** published in the **journal** *Geophysical Research Letters* **suggests** that **spraying millions of tonnes** of **diamond dust** into the **Earth's upper atmosphere each year** could **help cool the planet** and **combat global warming**.

More on News:

- This idea, **while unconventional**, **builds on previous suggestions** of **using** materials like **sulphur, calcium, aluminium**, and **silicon** for the same purpose.
- The concept falls under **geoengineering**, specifically **solar radiation management (SRM)**, which aims to reflect solar radiation back into space to cool the planet.
- Other proposed methods include the installation of space-based mirrors.

The Challenge of Rising Temperatures:

- **Inadequate Measures: Current efforts to combat global warming** have been **insufficient**, with greenhouse gas emissions continuing to rise. As of 2022, global temperatures remain on an upward trend, highlighting the urgency of the situation.
- **Temperature Increase: Global temperatures** are approximately **1.2°C higher** than **pre-industrial levels (1850-1900). In 2023**, temperatures are around **1.45°C** warmer.
- **Paris Agreement Goals:** The **target to limit global warming** to **below 1.5°C** is increasingly difficult to achieve.
  - **Achieving** this **target requires** a minimum **43% reduction in emissions** from 2019 levels by 2030. However, current trajectories suggest only a **2% reduction by 2030**.
- **Need for Radical Solutions:** Given the slow pace of emission reductions, **scientists are exploring geoengineering** as a means to **achieve** significant **temperature decreases quickly**, even if temporarily.

Geoengineering Overview:

- Geoengineering **encompasses large-scale efforts** to **alter Earth's climate system** to combat the adverse effects of climate change.
- **It is mainly divided into two categories:**
  - **Solar Radiation Management (SRM)**: This approach involves deploying materials in the atmosphere or space to reflect incoming solar radiation. Potential materials include sulphur, calcium, and now, diamonds.
  - **Carbon Dioxide Removal (CDR)**: This includes technologies such as Carbon Capture and Sequestration (CCS) and Direct Air Capture (DAC), which aim to remove carbon dioxide from the atmosphere.
    - **While CCS** is currently the **only method being actively implemented**, both strategies face significant technical, economic, and ethical challenges.

Key CDR Technologies

- **Carbon Capture and Sequestration (CCS):** Captures CO_2 emissions at the source (e.g., power plants) and stores it underground in suitable geological formations to prevent it from entering the atmosphere.
- **Carbon Capture and Utilization (CCU):** Uses captured CO_2 as a raw material for other industrial processes, while some are stored underground.
- **Carbon Capture, Utilization, and Storage (CCUS):** A combination approach where some CO_2 is utilised, and the remainder is stored.
- **Direct Air Capture (DAC):** Extracts CO_2 directly from the ambient air using large-scale "artificial trees" and directs it to storage or utilisation sites.
  - It has the potential to remove historically accumulated CO_2, but it faces significant technical challenges.

Potential for Solar Radiation Management (SRM):

- SRM **represents one of the most ambitious forms of geoengineering**, focusing on **reflecting sunlight to cool the Earth**.

- **Natural Inspiration:** SRM strategies are **inspired by volcanic eruptions**, which **release** large **quantities** of **sulphur dioxide**.

  ➤ This **gas combines** with **water vapour to form sulphate particles** that **reflect sunlight**, **reducing** the amount of **solar radiation** that **reaches** the **Earth's surface**.

- **Historical Context:** The **1991 Mount Pinatubo eruption** in the **Philippines** significantly **exemplifies** this **effect**, leading to a **temporary global temperature reduction** of approximately **0.5°C**.

- **Scientists** are **investigating** various **materials** for their **potential effectiveness in SRM**, including **Sulphur Dioxide, Calcium Carbonate, Sodium Chloride (common salt)** and **Diamonds.**

New Study on Diamond Dust:

- The **study compared** the **effectiveness of seven materials** for solar radiation management and **identified diamond dust as the most efficient option**.

- Theoretically, **to achieve a temperature reduction of 1.6°C,** around **five million tonnes of diamonds** would **need to be deployed annually** into the upper atmosphere.

- This innovative approach **seeks to capitalise on diamonds' reflective properties** to enhance the scattering of solar radiation.

Challenges and Concerns of SRM and CCR:

- **Technical and Cost Challenges:** Relying heavily on CCS to meet climate goals could incur additional costs, with estimates suggesting it may add at least **$30 trillion compared to** a strategy focused on **renewable energy** and energy efficiency.

- **Unintended Consequences: Large-scale manipulation** of natural processes could **disrupt global** and **regional weather patterns**, affecting rainfall distribution and overall climate stability.

  ➤ **Altering sunlight exposure** may have **negative effects on agriculture, vegetation**, and various life forms, potentially **harming ecosystems**.

- **Ethical Considerations:** There are ethical dilemmas regarding the manipulation of the climate system, especially **concerning** the **rights** and **impacts on communities** and **ecosystems**.

- **CCS Limitations:** While CCS is currently the **most developed technology**, its **effectiveness is challenged** by the availability of safe underground storage sites for captured CO_2.

Implication:

Research indicates that simply relying on CCS might not be a viable long-term solution to climate change, emphasising the need for a diverse approach that includes renewable energy strategies.

Subject - Indian History, Heritage and Culture

Relaunch of National Manuscript Mission

Sub Topic- *Indian Culture - Literature*

Context:

The Union Ministry of Culture is set to **"revive and relaunch"** the **National Mission for Manuscripts (NMM)** and is mulling the formation of an autonomous body to help preserve ancient texts in India. The new body, **likely to be named the National Manuscripts Authority,** will be an autonomous entity **under the Ministry.**

About NMM:

- Presently, NMM is a **part of the Indira Gandhi National Centre for Arts.**

- **The key objectives** of the National Mission for Manuscripts are **documentation, conservation, digitisation and online dissemination** of manuscript heritage of India.

- The Mission through the **network of Manuscript Conservation Centres (MCCs) and Manuscript Resource Centres (MRCs)** has preserved, documented and disseminated India's rich manuscript heritage.

Achievements of NMM:

- The NMM has prepared metadata for **52 lakh manuscripts and digitised over 3 lakh titles,** with **one-third uploaded online.**

- **44.07 lakhs Manuscripts have been documented.**

- **To achieve this mandate,** the mission has **established more than 100 Manuscripts Resource Centres and Manuscripts Conservation Centres all over India.**
- **Conservation Efforts:** The NMM has undertaken preventive and **curative conservation of 9 crore folios over the past 21 years.**

Challenges faced by NMM:

- **Concerns Over Digitisation Discrepancies:** Experts expressed concerns about mismatches between digitised metadata and actual manuscripts, leading to hand-correction efforts.
- **Access Issues for Manuscripts:** Out of **1.3 lakh manuscripts uploaded, only 70,000 are accessible** due to a lack of access policies, discouraging private owners from sharing.
- **Concerns Over Manuscript Sales:** Discussions highlighted the need to **prevent the sale of manuscripts outside India** and support private owners in preservation efforts.
- **Immense Manuscript Wealth:** India is home to an estimated ten million manuscripts, potentially the largest collection in the world.
- **Language and Script Diversity:** Manuscripts are available in a vast number of languages and scripts, many of which are now unreadable.
- **Varied Repositories:** Manuscripts are located in diverse repositories, including museums, educational institutions, and private homes, as well as places of worship.
- **Physical Deterioration:** Many manuscripts have been neglected for decades and are in poor physical condition, suffering from issues like insect damage, fungal infections, and brittleness.
- **Disconnection from Modern Knowledge:** A significant gap exists between contemporary knowledge and the information preserved in manuscripts, hindering their relevance and utilisation.
- **Declining Scholarly Engagement:** The number of scholars capable of studying and utilising these manuscripts is diminishing, and a new generation of scholars is struggling to take up the mantle.

Need for Manuscript Preservation:

- **Growing usage in Today's Time :** Many people don't see the knowledge in manuscripts as useful today. However, there is growing interest around the world in traditional systems of medicine like **Ayurveda and Unani, as well as in ancient fields like Vaastu Shastra** and older literature and philosophy. This has led to a renewed effort to find and study manuscripts.
- **Cultural Heritage:** Manuscripts are a vital part of India's cultural heritage, reflecting the thoughts and practices of past generations.
- **Historical Records:** They provide insights into India's history, including events, social structures, and political systems.
- **Educational Value:** Manuscripts can offer knowledge that contributes to various fields of study, enriching education and research.
- **Reviving Traditional Knowledge:** As interest in traditional practices grows, manuscripts can help revive and maintain these ancient systems.
- **Connection to Identity:** Preserving manuscripts strengthens our connection to our roots and helps future generations understand their identity and heritage.

Future Roadmaps on Manuscript Preservations:

- **Future Roadmap and International Collaboration:** Plans include establishing academic chairs in universities abroad to enhance collaboration in ancient Indian studies.
- **Intellectual Property Rights Discussion:** Suggestions are being made to involve intellectual property rights experts in the initiative for better manuscript preservation.
- **Preservation of Lesser-Known Scripts:** Emphasis was placed on the importance of preserving non-Brahmi and other lesser-known scripts in the initiative.

Subject Geography

Landfall of a Cyclone

Sub Topic- *Cyclone, Important Geophysical Phenomena*

Context:

Parts of West Bengal and Odisha experienced heavy rainfall on October 24, as both states prepared for the arrival of Cyclone Dana, expected to make landfall later in the night.

More on News:

- Cyclone Dana intensified into a **severe storm**, with wind speeds ranging from 88 to 117 km/h.
- The Indian Meteorological Department (IMD) reported that the cyclone is **likely to move north-northwestward** and approach the coasts of northern Odisha and West Bengal between Puri and Sagar Island.
- The **landfall is expected near Bhitarkanika and Dhamara (Odisha)** between midnight on October 24 and the early hours of October 25.

What is a Cyclone "Landfall"?

- Landfall occurs **when a tropical cyclone moves from water to land**.
- According to the IMD, landfall is officially declared **when the cyclone's centre, or eye, crosses the coast.**
  - This should not be confused with a "direct hit," where the cyclone's high-wind core (eyewall) makes landfall, but the storm centre remains offshore.
- As noted by the U.S. **National Oceanic and Atmospheric Administration (NOAA)**, a **cyclone's strongest winds are not always at the centre,** so powerful winds may impact land even without a full landfall.

Damage from Cyclone Landfall:

- The extent of damage during landfall **depends on the cyclone's intensity,** marked by wind speed.
- Cyclone Dana is expected to cause significant damage, including **destruction of temporary structures, disruptions to power and communication lines**, minor disruptions to rail and road services, risks from flying debris, and potential flooding of evacuation routes.
- High winds, heavy rainfall, and storm surges often lead to severe coastal flooding and other impacts.

Duration of Cyclone Landfall:

- A cyclone's landfall can last **several hours**, depending on its wind speed and size.
- During Cyclone Dana's landfall, which is expected to last five to six hours, wind speeds may reach 125 km/h, affecting a wide region.
- Cyclones generally weaken over land due to decreased moisture and increased surface friction, making landfall both a peak of impact and the beginning of the storm's dissipation.

Subject - Indian History, Heritage and Culture

British Indian Association

Sub Topic- *Modern India History, Significant Events*

Context:

On 29th October 1851, the British Indian Association was established.

About:

- The **British Indian Association** (BIA) was established by **Raja Radhakanta Deb** as its first President and **Debendranath Tagore** as its Secretary.
- This association emerged from the merger of the **Bengal British India Society** and the **Landholders' Society**, and it was exclusively composed of Indians, primarily representing the **interests of the landlord class**.

- Prominent members included **Ramgopal Ghosh**, **Peary Chand Mitra**, and **Krishnadas Pal**.

Objectives and Activities:

- The BIA aimed to **advocate for improvements in local governance** and to **address grievances related to British colonial policies**.

- In 1852, the BIA submitted a **petition to Parliament** concerning the **renewal of the East India Company's charter**, asserting that Indians were not benefitting from their connection with Great Britain to the extent they had anticipated.

- The BIA also proposed that **two-thirds of the representatives** in future **Indian Legislative Councils** should be **Indians**.

Key Demands Included:

- Relaxation of revenue pressures.

- Improvement in judicial administration.

- Protection of life and property.

- Relief from monopolies held by the East India Company.

- Encouragement of indigenous manufacturing.

- Education for the populace.

- Inclusion of Indians in higher administrative services.

Historian ABM Mahmood notes that from its inception, the BIA maintained an **all-India outlook** and established connections with similar associations in **Pune**, **Madras**, and **Bombay**. For about a quarter of a century, it served as a spokesperson for Indian interests. When restrictions were imposed on higher education by the Government of India in 1879, the BIA vehemently protested these measures.

Contribution to National Consciousness

Pre-Congress organisations like the BIA played a pivotal role in fostering a **sense of national consciousness among Indians**. They provided a platform for educated Indians to articulate their demands and grievances against colonial rule, laying the groundwork for broader political mobilisation that eventually led to the formation of the Indian National Congress (INC) in 1885.

Contributions:

- **Petitioning Parliament:** The BIA's petitions highlighted systemic injustices and sought reforms that resonated with a burgeoning middle class discontented with British

policies. **Historian Gyanendra Pandey** emphasises that such early political organisations were crucial in **raising awareness about governance issues among a wider audience**.

- **Collaboration with Other Associations:** The BIA maintained ties with regional organisations like the **Madras Native Association**, facilitating a united front against colonial rule. This cooperation was vital during significant events such as the **Indian National Conference** held in 1883 and 1885, where leaders from various backgrounds convened to discuss common concerns.

- **Support for Social Issues:** Despite its elite composition, the BIA occasionally aligned itself with broader social issues. For instance, it supported *raiyat* (tenant) rights during disputes over indigo cultivation, demonstrating an awareness of agrarian concerns beyond its immediate class interests.

- **Cultural Awakening:** The activities of the BIA coincided with a cultural renaissance in Bengal, where intellectuals began promoting ideas of self-governance and national identity through literature and public discourse. **Historian Partha Chatterjee** argues that this cultural shift was crucial in building a collective national consciousness that transcended regional divides.

Bipin Chandra Pal

Sub Topic- *Important personalities*

Context:

92nd Death Anniversary of India's freedom fighter.

About:

- **Bipin Chandra Pal** was a significant figure in the Indian nationalist movement who is often referred to as the "*Father of Revolutionary Thoughts in India*" and was a key member of the influential trio known as **Lal-Bal-Pal**, alongside **Lala Lajpat Rai** and **Bal Gangadhar Tilak**.

- This group was instrumental in shaping the early nationalist discourse in India.

Role in Awakening Nationalist Pride:

- **Bipin Chandra Pal** played a pivotal role in awakening nationalist sentiment through his writings and speeches.

- He was an ardent advocate of **swadeshi** (the use of Indian-made goods) and **swaraj** (self-rule), which became central themes in the struggle for independence.

- His literary contributions, especially during the period surrounding the partition of Bengal in 1905, were crucial in **mobilising public opinion** against British colonial rule.

- Through essays like *Rajdharma* and *Raja Proja*, he criticised British policies and encouraged Indians to recognize their power and potential for self-governance.

- Pal's activism was characterised by his **passionate oratory and journalistic efforts**.

- He edited several newspapers, including *The Democrat* and *New India*, where he disseminated his ideas on nationalism and social reform.

- His involvement in the Swadeshi movement further solidified his reputation as a leader who encouraged boycotting British goods and **promoting indigenous industries**.

Contributions Beyond Nationalism:

- In addition to his nationalist activities, **Bipin Chandra Pal** made significant contributions to the labour movement in India.

- He advocated for **workers' rights**, **calling for better wages** and **working conditions**.

- His vision included a **48-hour workweek**, reflecting his commitment to social justice and economic reform.

- Pal's approach to labour issues was part of a broader critique of social evils, including the caste system, which he vehemently opposed.

- Pal's legacy also includes his **promotion of gender equality**; after **marrying a widow** later in life, he joined the **Brahmo Samaj**, which denounced caste discrimination and supported women's rights.

Madan Mohan Malviya

Sub Topic- *Important personalities*

About:

Madan Mohan Malviya was a prominent **Indian scholar**, **educational reformer**, and **politician** born on **December 25, 1861**, in **Allahabad**. He played a significant role in the Indian independence movement and is best known for founding the **Banaras Hindu University** (BHU) in **1916**, which remains one of the largest residential universities in Asia. Malviya served as the **university's vice-chancellor** from **1919** to **1938** and was deeply committed to promoting modern education among Indians.

Contributions to India's Freedom Struggle:

- **Leadership in the Indian National Congress:** **Malviya** was a key figure within the Indian National Congress, serving as its president four times. His political career began at the 1886 Congress session, where he became actively involved in advocating for **Indian rights** and **self-rule**.

- **Promotion of Hindu Nationalism:** In addition to his work with the Congress, Malviya founded the **Akhil Bharat Hindu Mahasabha** in 1906, which sought to unite various **Hindu nationalist movements**. His efforts were aimed at protecting Hindu interests during a time of **increasing communal tensions**.

- **Advocacy for Social Issues:** Malviya was also involved in social reform movements, including efforts to eradicate untouchability and promote the welfare of marginalised communities. He played a role in founding organisations like the **Harijan Sevak Sangh** to support these causes.

- **Media Influence:** He established several newspapers and periodicals, such as **Abhyudaya** and **The Leader**, to raise awareness about national issues and mobilise public opinion against British rule.

"Responsivists" Label:

- Madan Mohan Malviya is often associated with the term "*Responsivists*," which emerged from a faction within the **Swaraj Party** during the 1920s.

- This group advocated for **cooperation with the British government** rather than complete **non-cooperation**, which was championed by leaders like **Mahatma Gandhi**.

- The Responsivists believed that engaging with the government was essential for **protecting Hindu interests** and achieving gradual reforms.

- Key figures alongside Malviya included **Lala Lajpat Rai** and **N.C. Kelkar**, who collectively argued that participation in legislative processes could serve as a means to secure rights for Indians while maintaining a semblance of political engagement with colonial authorities.

'Orbital' Wins the 2024 Booker Prize

Sub Topic- *Literature*

Context:

British author **Samantha Harvey** has made literary history by winning the **2024 Booker Prize** for her novel **"Orbital".**

More on News:

- This marks the **first time a novel set in space** has **claimed** the prestigious **literary award**.

- The novel spans just **136 pages**, making it the second-shortest work to win the Booker Prize, just four pages longer than **Penelope Fitzgerald's** *Offshore* **(1979)**.

> *Harvey, who was longlisted for the Booker Prize in 2009 for her debut novel "The Wilderness," has now solidified her place in literary history with "Orbital." She has also authored several other novels, including "The Western Wind" and "The Shapeless Unease: A Year of Not Sleeping."*

About 'Orbital':

- "Orbital" takes place over a single day aboard the **International Space Station (ISS)**, following the lives of six astronauts and cosmonauts from different countries as they experience **16 sunrises and sunsets** in 24 hours.

- The novel explores themes of human connection, the beauty of Earth from space, and the fragility of our planet.

Historical Significance:

- Samantha Harvey is the first woman to win the Booker Prize since **2019**.

- Her novel has also become the **best-selling book** on this year's shortlist in the UK, outselling the combined sales of the past three Booker Prize winners prior to their success.

Conclusion:

"Orbital" is a testament to the power of literature to transport readers to new and extraordinary places. Samantha Harvey's achievement with this novel highlights the importance of diverse and innovative storytelling in the world of fiction.

The Booker Prize

- Officially known as the **Man Booker Prize** until 2019, is one of the most **prestigious literary awards in the world**.

- It is **awarded annually to the best single work of fiction written in English** and **published** in the **United Kingdom** or **Ireland**.

- The **prize was established in 1969** and has since become a mark of distinction for authors.

- **Prize Money**: The winner receives £50,000 (approximately INR 55,32,555).

Bali Jatra

Sub Topic- *Ancient Indian History -fair & festivals*

Context:

Asia's largest open-air trade fair, *Bali Jatra*, has started to celebrate **Odisha's ancient sea-trading history.**

More on News

- This year's fair opens on the full moon day of Kartika and will run until 22nd November.

- While the fair has changed, the excitement and spirit remain the same.

- The festival **stirs up warm memories of Odisha's rich heritage and amazes visitors.**

About Bali Jatra

- Bali Jatra, also known as **"Voyage to Bali,"** is a significant cultural festival celebrated in Odisha, particularly in the city of Cuttack.

- This festival **commemorates the rich maritime history of the region** and is observed during the **full moon day of Kartika** (October-November), lasting for seven days.

Historical Significance:

- The festival **marks the day when ancient Odia mariners,** known as **Sadhabas,** would **set sail to distant lands such as Bali, Java, Sumatra, and Borneo** for trade and cultural exchanges.

- The name "Bali Jatra" **reflects this historical connection,** celebrating the maritime legacy of Odisha and its trading links with Southeast Asia.

- The **Kalinga Empire** (ancient Odisha) **was renowned for its naval prowess,** with ports facilitating extensive trade routes across the Bay of Bengal.

Key Features of the Festival

- **Boita Bandana Ritual:** A central aspect of Bali Jatra is the Boita Bandana ceremony, **where participants create small boats** from materials like paper and banana leaves.
  - These boats are **illuminated with lamps and floated on the Mahanadi River** as a tribute to the seafaring traditions of their ancestors.
- **Cultural Celebrations:** The festival includes a grand fair featuring stalls selling traditional handicrafts, food items, and various attractions such as rides and games.

Open Trade Fair: In 2022, it set a Guinness World Record for creating over 22,000 paper boats in a short period.

Harekrushna Mahtab

Sub Topic- *Important personalities*

Harekrushna Mahtab, popularly known as **Utkal Keshari**, was a prominent Indian **freedom fighter** and **politician** born on **November 21, 1899**, in **Agarpada, Bhadrak** district of Odisha. He played a significant role in the Indian independence movement and later in shaping post-independent India, particularly in the state of Odisha.

Contributions to India's Freedom Struggle:

- **Early Activism and Leadership Roles:** Inspired by **Mahatma Gandhi's ideals**, **Mahtab** joined the **Indian National Congress** (INC) in 1920. He actively participated in the **Non-Cooperation Movement**, which aimed to resist British rule through non-violent means.
  - He served as the **Chairman** of the **Balasore District Congress Committee** from 1924 to 1928, where he coordinated efforts to **boycott foreign goods and promote indigenous products**.
- **Salt Satyagraha:** In 1930, **Mahtab** led a successful **Salt Satyagraha** in **Odisha**, inspired by Gandhi's Dandi March. This act of civil disobedience against British salt laws resulted in his imprisonment, highlighting his commitment to the cause of independence.

- **Social Reforms and Advocacy:** Mahtab was a strong advocate for social reform. In 1934, he led initiatives to **combat untouchability** by opening the **gates of his ancestral temple to all castes**, challenging societal norms and promoting inclusivity.
- **Praja Mandal Movement:** He played a crucial role in the **Praja Mandal Movement**, which sought to empower **local populations against feudal lords and British exploitation**. This grassroots movement aimed at securing rights for peasants and workers in princely states.
- **Quit India Movement:** During the **Quit India Movement** of 1942, Mahtab was again **imprisoned for his activism against British rule**. His unwavering commitment to independence made him a respected leader among his peers and the public.

Role in Post-Independence India:

- **Integration of Princely States:** One of Mahtab's most significant achievements was his role in **merging the 26 Oriya-speaking princely states with Odisha**. As Chief Minister from April 1946 to 1950, he worked closely with **Sardar Patel** to facilitate this integration. His diplomatic skills were instrumental during negotiations with local rulers, leading to a **relatively peaceful merger process** that began with **Nilgiri state** on November 14, 1947.
- **Development Initiatives:** Mahtab played a pivotal role in **relocating Odisha's capital** from **Cuttack to Bhubaneswar** in 1949. This move was part of broader plans for urban development and modernisation within the state.
- **Infrastructure Projects:** Under his leadership, significant infrastructure projects were initiated, including the construction of the **Hirakud Dam**, which became one of the largest earthen dams in the world and played a crucial role in flood control and irrigation.
- **Political Leadership and Governance:** After serving as Chief Minister again from 1956 to 1961, Mahtab continued to influence Odisha's political landscape. He was elected to the **Constituent Assembly**, where he contributed to discussions on governance and policy-making for independent India. He also held various positions at the national level, including **Union Minister for Commerce and Industry** from 1950 to 1952, where he promoted **industrialisation efforts** aligned with **Gandhi's vision of self-sufficiency**.

Climate-Driven Vector-Borne Diseases

Sub Topic- *Issues related to health*

Context:

Climate change is increasingly being **recognised** as a significant **factor contributing** to the **rising incidence of dengue fever in India**.

More on News:

The changing climate patterns, **characterised by higher temperatures, increased humidity,** and **altered precipitation**, create favourable conditions for the proliferation of Aedes mosquitoes, the primary vectors of dengue.

> *Vector-borne diseases are illnesses **caused by pathogens** such as **viruses, bacteria,** or **parasites** that are **transmitted to humans** and **animals** through the **bites of infected vectors**, primarily blood-feeding arthropods like mosquitoes, ticks, and fleas. Including **malaria** (transmitted by Anopheles mosquitoes), **dengue fever** (transmitted by Aedes mosquitoes), **Lyme disease** (transmitted by ticks), and **Zika virus**.*

Background:

- **In 2023**, a 12-year-old **boy from Nagaland succumbed to dengue**—a disease that had **only been reported** in the **state since 2015**.
- This tragic incident **highlights a disturbing trend: climate change is altering** the **global landscape of vector-borne diseases (VBDs)** like dengue, transmitted primarily by mosquitoes.

The Impact of Climate Change on Dengue Transmission:

- **Rising temperatures create ideal breeding conditions** for Aedes aegypti and Aedes albopictus mosquitoes, which thrive in warm, humid environments.
- **Research indicates** that the number of months suitable for **dengue transmission in India** has **increased** to approximately **5.6 months per year**, reflecting a **1.69% annual increase from 1951 to 2021**.
- A **study projected** that **climate change could extend the dengue transmission season by two additional months** in many regions of India, particularly **affecting Southern, Eastern,** and **Central states**.
- **High humidity, excess rainfall**, and even **droughts contribute** to favourable **breeding conditions**.

Geographic Expansion of Dengue:

- As **climate change expands mosquito habitats** into **previously unaffected regions**, areas such as **Shimla, Northern Himachal Pradesh,** and **Jammu** and **Kashmir** are experiencing **increased dengue cases**.
- **Studies suggest** that these **mosquitoes** are **migrating into colder areas** like the **Thar Desert** and the **upper Himalayas** as temperatures rise.
  - This **shift poses challenges for public health systems** that may **not** be **equipped to handle outbreaks** in **these novel locations**.

Recent Trends and Statistics:

- The World Health Organisation (**WHO**) **projects** that **climate change could expose** an additional **4.7 billion people to dengue** by the **century's end**.
- In India, **reported dengue cases skyrocketed** from 28,066 in 2010 to 289,235 in 2023. This **surge** not only strains healthcare systems but also **imposes** significant **socio-economic burdens**.
  - **Urban areas** are **particularly affected** due to **higher population densities** and **inadequate infrastructure** for managing mosquito breeding sites
- Thus, **tackling VBDs** is **crucial** for **achieving broader development goals**, including Universal Health Coverage and the Sustainable Development Goals (SDGs).

Challenges in Controlling Dengue:

- The **lack of effective vaccines**—due to the virus's four serotypes—complicates prevention efforts.
- **Current strategies focus** primarily on **mosquito population management rather** than **treating** the **disease itself**.
- Additionally, **extreme weather events** linked to climate change **create stagnant water pools ideal for mosquito breeding**, further complicating control measures.

Recommendations:

- **Utilising Insecticide-Treated Materials (ITMs):** ITMs are crucial for protecting homes from mosquito bites. **Studies in Mexico show** that insecticide-treated **screens** can significantly **reduce mosquito populations**.
  - ➢ While ITMs are part of India's vector control strategies, their usage remains inconsistent. **Increasing targeted outreach** and culturally relevant messaging can **enhance their effectiveness**.
- **Implementing Biocontrol Strategies:** Given the **adverse effects of chemical insecticides**, biocontrol methods, such as **introducing** fish species like *Gambusia affinis* into stagnant **water bodies, can be effective**.
  - ➢ This **approach** has been successfully **implemented in regions** like **Andhra Pradesh** and **should be expanded to other areas**.
- **Strengthening Public-Private Partnerships:** Collaborations between government authorities and private businesses can facilitate the distribution of low-cost ITMs and sponsor community clean-up campaigns to reduce breeding sites.
- **Initiatives for Remote Areas:** In remote areas, where public health infrastructure is often lacking, **expanding mobile health clinics** can provide rapid diagnostic testing and distribute preventive materials.
  - ➢ Proactive measures, such as **community inspections** and **educational campaigns** led **by ASHA workers**, can **help mitigate outbreaks**.
- **Adopting Integrated Vector Management (IVM):** IVM principles should be integrated into National Disease Programmes. IVM **encourages collaboration** among health, agriculture, urban planning, and environmental agencies to reduce mosquito breeding.
- **Fostering International Collaboration:** Collaborative efforts with neighbouring countries, such as Bangladesh and Sri Lanka, can enhance regional responses to climate change's cross-border impacts.

Revitalising India's Higher Education System

Sub Topic- *Issues related to Education, Human Resources*

Context:

The **growing demand for research in** Science, Technology, Engineering, and Mathematics (**STEM**) is **reshaping** the **landscape of education**.

More on News:

As advancements in these fields continue to drive innovation and economic growth, there is an increasing **need to revitalise STEM education to prepare** the **next generation** of **scientists, engineers, and technologists**.

STEM Research and Key Initiatives

- Education focuses on **integrating science, technology, engineering,** and **mathematics** to develop critical thinking, problem-solving skills, and innovation.
- **I-STEM Initiative:** Launched in January 2022, it serves as a national gateway for science and technology. It aims to foster a robust R&D ecosystem in India, aligning with the government's "Atma Nirbhar Bharat" (self-reliant India) vision.
- **Atal Tinkering Labs (ATL):** Part of the Atal Innovation Mission by NITI Aayog, ATLs are established in schools to encourage hands-on learning and innovation among students from kindergarten through high school.
- **Rashtriya Avishkar Abhiyan (RAA):** This program promotes inquiry-based learning in science and mathematics, particularly targeting students in rural areas. It aims to cultivate a culture of creativity and innovation among young learners.

- **IRIS (Initiative for Research and Innovation in STEM):** This initiative nurtures scientific research among young innovators by providing platforms for showcasing projects at national and international levels. It encourages investigative skills and creativity through outreach programs and science fairs.

Key Drivers of Rising STEM Research Demands:

- **Technological Advancements:** Rapid **developments in areas** such as **artificial intelligence, biotechnology,** and **renewable energy** are creating new opportunities for research and innovation.

- **Global Challenges:** Addressing global issues such as **climate change, healthcare,** and **sustainable development** requires a robust foundation in STEM disciplines.

- **Economic Growth:** STEM fields are critical to economic competitiveness, with countries investing heavily in research and development to maintain their technological edge.

Current Challenges in Higher Education:

- **Skill Gaps in Graduates:** Many students graduating from private engineering colleges, newer IITs, and universities lack the basic skills required by industries.

- **Faculty Shortages:** The **number of students pursuing higher education is decreasing**, which poses a significant challenge as educational institutions are already grappling with faculty shortages.

- **Quality of Teaching:** Many faculty members in teaching **institutions prioritise** research output (**papers and patents**) **to maintain rankings**, which **harms pedagogy** and the quality of education.

- **Underutilisation of Funding:** Government investments in advanced fields like **quantum computing, AI,** and **cybersecurity** may go underutilised **due to a lack of qualified talent**.
  - This **threatens India's socio-economic future** and growth in key technological fields.

Proposed Solutions:

- **Stop ranking teaching institutions based heavily on research output**: De-emphasise the focus on research output (papers, patents) for teaching institutions.

  - Ranking teaching institutions based on **teaching quality** rather than research output would alleviate pressure and promote better pedagogy.

- **Collaborative teaching initiatives** between research institutions and teaching institutions should be promoted, with faculty from research institutions working closely with their counterparts in teaching institutions.

  - Increased focus on **faculty development programs**, **mentorship**, **teacher evaluations**, and **newer courses** would improve the quality of education.

  - Establish a **teaching track** in academic hierarchies (e.g., Teaching Assistant, Associate Professor, Full Professor) to differentiate faculty interested in pedagogy from those focused on research.

- **Incentivising Collaborative Research and Teaching:** Funding agencies should incentivise and mandate **collaborative projects** between teaching and research institutions to enhance both research and pedagogy.

  - Faculty promotions should be based on **pedagogical skills** and teaching effectiveness, assessed through appropriate metrics.

- **Establish Joint Degree Agreements: Agreements** should be created between research institutions and teaching institutions, where students from teaching institutions can spend their final years in research institutions and receive a **"hyphenated degree"** bearing both institutions' insignia.

  - The curricula at teaching institutions should be **aligned** with those of research institutions in terms of content and pedagogy.

  - Research institutions should engage in **regular workshops** and **on-site visits** to train faculty in best pedagogical practices.

  - Such agreements would improve:
    - **Student quality** in research institutions,
    - **Teaching quality** in undergraduate-focused teaching institutions,
    - **Revitalisation** of teaching institutions themselves.

- **Leveraging Existing Resources for Improvement:** These changes do not require large new investments but instead, call for a **rebalancing of current efforts** and a more creative use of existing resources.

Implications for Education:

- **Curriculum Enhancement:** Updating curricula to include the latest advancements in STEM fields and integrating interdisciplinary approaches to problem-solving.

- **Hands-On Learning:** Emphasising experiential learning through laboratory work, research projects, and industry partnerships to provide students with practical skills and real-world experience.

- **Teacher Training:** Invest in professional development for educators to ensure they are equipped with the knowledge and tools to teach cutting-edge STEM concepts.

- **Inclusivity and Diversity:** These strategies could be applied not only in **science and engineering** but also in fields like **arts, humanities, and social sciences**, where similar quality and skill challenges exist.

- **Early Engagement:** Encouraging interest in STEM from a young age through engaging and interactive activities, such as science fairs, coding clubs, and robotics competitions.

Australia's Ban Social Media for Teenagers

Sub Topic- *Issues related to Children, Education, Human Resources*

Context:

The Australian government has announced plans to introduce legislation aimed at **preventing children and adolescents under 16 from accessing social media platforms** like Instagram, Facebook, and TikTok.

More on News:

- Prime Minister Anthony Albanese described the proposed measures as **"world-leading"** and stated that the legislation, expected to be presented to Parliament this year, would require platforms to take **"reasonable steps"** to restrict underage users.

- The law would **not penalise users for violations but focus on the platforms themselves.**

What the Proposed Law Entails:

The legislation aims to **limit social media access for those under 16.** The state's **draft Children (Social Media Safety) Bill 2024** proposes the following:

- **Access Restrictions:** Platforms must block access for children under 14 and allow access for 14- and 15-year-olds only with **parental consent.**

- **Regulated Platforms:** The law applies to services designed primarily for user interaction and content sharing.

- **Fines for Non-Compliance:** Social media companies could face fines for failing to enforce restrictions.

  - These fines would fund initiatives like implementing the law, compensating children harmed by social media, and other safety measures.

Regulations in India

Digital Personal Data Protection (DPDP) Act, 2023: The DPDP Act mandates **verifiable parental consent** for processing the data of children under 18 years old.

Information Technology Act, 2000: This Act includes provisions specifically **addressing online offences against children.** It **criminalises the publication and transmission of child pornography** and other obscene content involving minors.

Advertising Standards Council of India (ASCI) Guidelines: The ASCI has set standards to ensure that advertisements targeting children do not mislead or promote harmful behaviours.

Gaming Intermediaries Regulations, 2023: These regulations require **age classification for digital content** and mandate that platforms implement reliable age verification mechanisms.

Challenges of Age Verification:

- A major hurdle in enforcing such laws is verifying users' ages. Current systems rely on **self-reported dates of birth,** which are easily falsified. **Proposed methods** to verify age include:

  - Government-issued ID or credit card verification.

  - Facial age estimation technology.

  - Real-time photograph matching with government-issued ID.

  - Additional checks when users attempt to change their birthdate.

  - However, privacy concerns arise with these measures, particularly regarding the handling of minors' data by corporations.

The Impact of Social Media on Adolescents:

- **Concerns:** Problematic use, such as **neglecting other activities or experiencing withdrawal symptoms,** has increased globally — from **7% in 2018 to 11% in 2022,** according to a **World Health Organisation study.**
  - ➢ This issue is **more pronounced among girls (13%) than boys (9%).**
  - ➢ Negative outcomes include **lower mental well-being, substance abuse, sleep disruptions, and anxiety** related to online validation, **trolling, or fear of missing out.**

- **Benefits:** Social media provides platforms for **addressing stigmatised topics such as mental health, gender identity, and sexuality.**
  - ➢ During the **COVID-19 pandemic,** it played a crucial role in keeping people connected while physically isolated.

Proposed Solutions:

Experts advocate for **a balanced approach** that promotes responsible use of social media.

- **Parents and Guardians:** Encourage discussions with children about online behaviour, set tech-free zones, and model responsible usage. Providing a phone to a child should be accompanied by guidance on safe and respectful use.

- **Policymakers:** Develop **age-appropriate health and safety standards,** strengthen data privacy protections, and integrate digital literacy into school curriculums.

- **Social Media Companies:** Ensure **transparency,** implement risk assessments, prevent misuse, enforce age restrictions, and set default safety and privacy settings for children.
  - ➢ Last year, U.S. Surgeon General Vivek Murthy recommended creating **family media plans,** fostering in-person friendships, and reporting cyberbullying.

- Australia's proposed legislation reflects growing concerns about the impact of social media on youth. While some see these measures as necessary to protect minors, others question their feasibility and effectiveness. Balancing safety, privacy, and the benefits of connectivity will remain a critical challenge as this law is debated and implemented.

Rising Violence Against Healthcare Professionals in India

Sub Topic- *Issues related to Social Sector/ Services, Health*

Context:

On November 13, 2024, a doctor in Chennai was stabbed while on duty, following a similar attack on a young doctor in Kolkata three months ago.

More in News:

- Doctors in India are increasingly reporting violence in the workplace, with a 2017 study by the Indian Medical Association (IMA) r**evealing that over 75% of doctors faced workplace violence**, and nearly **63% were fearful of violence while treating patients**.

- Another **study showed that almost 70% of doctors experienced violence at work**, with many incidents going unreported.

Key Findings of the Recent Study:

Conducted by IMA Kerala State in August 2024, involving 3,885 doctors across India, this survey was the largest of its kind:

- **Safety Concerns**: **Over 60% of the respondents were women**, many of whom faced physical and verbal abuse.

- **Workplace Safety**:
  - ➢ **11% rated their workplace as very unsafe**, while 24% felt unsafe overall.
  - ➢ Many doctors, **especially women,** reported insufficient safety measures at work.
  - ➢ Security was described **as either absent or inadequate**.

- **Night Duty Concerns**:
  - ➢ **Less than half of doctors** on night duty had access to a duty room, and **only a third** had an attached restroom.
  - ➢ **53% of duty rooms were located far from wards or casualty areas**, making doctors walk through isolated and poorly lit areas.
  - ➢ Inadequate duty rooms forced some doctors to rest in patient wards, exposing them to safety risks.

- **Frustration Among Young Doctors**: Many young doctors expressed frustration over

administrators not addressing their safety concerns.

- **Violence in Emergency Rooms**: Doctors reported being surrounded by crowds while attending to patients, especially during night shifts in emergency areas. This often involved drunk or disruptive individuals.

Challenges:

- **Overcrowding and Understaffing**: These conditions increase the likelihood of confrontations with patients or bystanders.
- **Inadequate Security**: Poor security measures, especially during night shifts, expose doctors to violence.
- **Lack of Basic Amenities**: Duty rooms, when available, are often poorly located or lack basic security features, increasing the risks faced by healthcare professionals.
- **Underreporting of Violence**: Social pressure and heavy workloads discourage doctors from reporting violent incidents, allowing the cycle of violence to continue.

Government Initiatives:

- **Legislation**: Kerala passed a **hospital protection law in 2012**, updated in 2023, but the problem persists, highlighting the **limitations of relying solely on legislation**.
- **Ministry of Health and Family Welfare's Provisions**:
  - Recently the Ministry issued an order stating that in the event of any violence against a healthcare worker while on duty, **the head of the institution must file an institutional FIR within six hours of the incident.**
  - This was introduced to address the common occurrence of violence in government hospitals, especially from patients or their attendants.
- **National Medical Commission (NMC) Directive**:
  - The NMC instructed **medical colleges to develop a policy ensuring a safe work environment** for all staff members within the college and hospital premises.
  - It mandated that **any violence against medical students must be promptly investigated and an FIR lodged**, with an action report submitted to the NMC **within 48 hours of the incident**.
- **Training for Doctors**: IMA **provides communication and soft skills training to**

help doctors manage difficult situations and break bad news, although this cannot fully address the systemic issues.

Way Forward:

- **Crowd Control and Triage**: The study recommends basic measures such as **crowd control and enforcing strict visitor policies** to reduce violent incidents.
- **Need for Action**: The rising violence in healthcare settings demands urgent action from policymakers and hospital administrators to address the underlying causes, rather than waiting for further proof of the issue.

New Infectious Diseases Among Bees Threaten World's Economies

Sub Topic- *Issues related to Social Sector/ Services, Health*

Context:

The decline of insect pollinators, especially bees, is gaining attention due to their vital role in global agricultural productivity and nutritional security.

More in News:

*While Western honey bees have been extensively studied, **data on wild pollinators, particularly in biodiversity-rich regions like India, is limited***. *Studies show the following highlights:*

- **Wild vs. Managed Bees**: Research indicates that **wild bees are often more efficient pollinators than managed honey bees**, highlighting the need for their conservation.
- **Pathogen Load Study**: A study conducted in Switzerland found that **wild pollinators in shared habitats with honey bees had ten times higher pathogen loads**, underscoring the risks of habitat overlap.

About the New Infectious Diseases Among Bees:

- **Transmission**: The virus **spreads through the movement of bee colonies** for pollination and honey production.
- **Geographical Spread**: A **major outbreak in 1991-1992** devastated around 90% of Asiatic honeybee colonies in South India. It **resurfaced in Telangana in 2021** and has been reported in China and Vietnam.
- **Pathogen Spillover**: Diseases like deformed

wing virus and black queen virus can spill over from managed honeybees to wild pollinators, increasing their virulence.

How It Threatens the World's Economies:
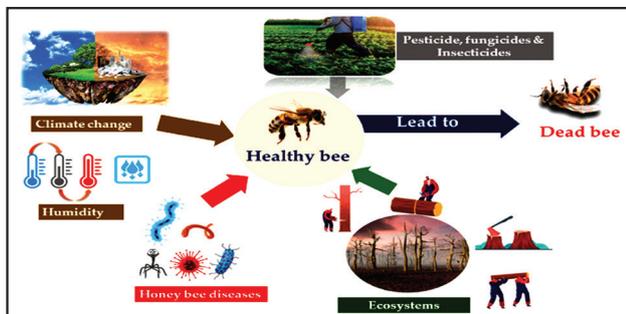
- **Impact on Agriculture**: **Over 75% of food crops depend on pollinators**, making their **decline a direct threat** to food production and security.
- **Economic Consequences**: The loss of pollinators could **lead to decreased agricultural yields**, affecting economies reliant on farming and food production.

Overview of Bee Diversity in India:

- **Species Count:** India is home to over 700 bee species, including four Indigenous honey bees:

- **Asiatic Honey Bee** (*Apis cerana indica*)
- **Giant Rock Bee** (*Apis dorsata*)
- **Dwarf Honey Bee** (*Apis floraea*)
- **Stingless Bee** (*sp. Trigona*)
- **Introduction of Western Honey Bees:** Western honey bees were introduced in India in 1983 to enhance honey production.

Threats from Infectious Diseases

- **Thai Sacbrood Virus Outbreak:**
  - The **virus reemerged in 2021 in**

Telangana and has been reported in other countries, including China and Vietnam.

- **Impact on Bee Populations: Thai Sacbrood Virus (TSBV)** primarily affects **honeybee larvae, causing death and stunted colony growth**. It poses a **severe threat to Asiatic honeybees** (*Apis cerana indica*) but is less harmful to western honeybees.

What Are the Challenges?

- **Complex Disease Dynamics**: Understanding how diseases spread between managed and wild bee populations is **complicated by habitat loss and migration patterns.**
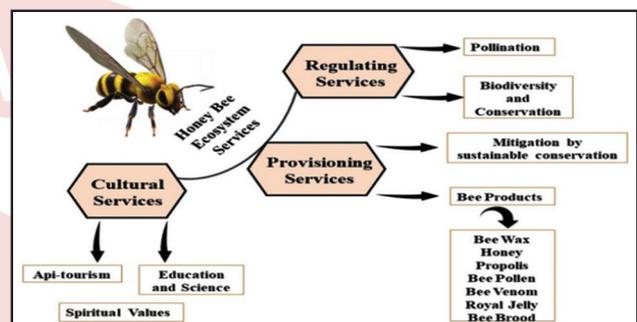
- **Potential for Spillover:**
  - Viruses may spill over from managed honey bees to wild pollinators, **potentially mutating and returning to honey bees in a more virulent form.**
  - This spillover can **severely affect both wild pollinators and managed honeybee health**.
- **Limited Data**: There is a lack of comprehensive data on wild bee populations, particularly in biodiversity-rich areas like India.
- **Habitat Loss**: As natural habitats shrink, **pollinators are forced into smaller areas**, increasing competition for resources and the likelihood of disease transmission.

What Needs to Be Done and Way Forward

- **Focused Research**: There is a pressing need for **dedicated research on viral threats** affecting both managed and wild bee populations.
- **Monitoring Managed Colonies**: Regular surveillance of managed honeybee colonies can help control diseases and reduce transmission risks to wild populations.
- **Ecological Understanding**: A deeper understanding of pollinator ecology is essential for developing effective

conservation strategies against climate change, habitat loss, and infectious diseases.

- **Policy Development:** Policymakers should prioritise research findings to create informed strategies that protect pollinator health and ensure agricultural sustainability.

High-Altitude Sickness

Sub Topic- *Issues related to Health*

Context:

Every year, high-altitude regions in the Himalayas draw numerous adventurers and trekkers. However, these pristine but extreme environments also pose significant risks, including high-altitude sickness.

More on News:

- Recently, a trekker from Idukki, Kerala, tragically succumbed to respiratory failure while attempting to scale Garur Peak in Uttarakhand.
- Such incidents highlight the hidden dangers of high-altitude trekking.

What is High-Altitude Sickness?

- High-altitude sickness, or **Acute Mountain Sickness (AMS)**, occurs **when the body fails to acclimatise to elevations typically above 8,000 feet (2,400 metres).**
- At higher altitudes, **lower air pressure and reduced oxygen levels can lead to hypoxia**—a lack of oxygen in the body's tissues.
- **Early symptoms of AMS** include **headaches, nausea, fatigue, and breathlessness.** If left untreated, it can progress to life-threatening conditions such as:
  - ➢ **High-Altitude Pulmonary Edema (HAPE):** Fluid accumulates in the lungs, making breathing difficult.
  - ➢ **High-Altitude Cerebral Edema (HACE):** Fluid builds up in the brain, causing confusion, hallucinations, and, in severe cases, coma.
  - ➢ Both HAPE and HACE require immediate medical attention, with descent to lower altitudes being the most effective treatment.
- **At high altitudes, the body adapts by:**
  - ➢ **Increasing the breathing rate,** which can lead to **hyperventilation.**

- ➢ **Producing more red blood cells** to carry oxygen, which **thickens the blood and strains the heart.**

Challenges in Infrastructure:

- Despite the popularity of the Himalayas as a tourist destination, **healthcare infrastructure in remote regions remains inadequate.**
- **Specialised facilities** for altitude-related illnesses, like those in Leh, Ladakh, are **exceptions.**
- In many areas, **even basic preventive measures**, such as health screenings at entry points, **are absent.**
- Introducing protocols similar to the **"Inner Line Permit"** system could help.
- Tourists entering high-altitude zones like Kinnaur or Lahaul-Spiti could undergo **health checks at base hospitals, potentially preventing fatalities.**

Importance of a Registration System: A mandatory registration system for tourists visiting remote mountain regions could greatly enhance safety. A **centralised database maintained by state governments** would allow for:

- Tracking tourist movements.
- Swift emergency response.
- Research on high-altitude illnesses by analysing demographic data and risk factors.

The Need for Gradual Ascent: Rapid ascents without adequate acclimatisation are a leading cause of high-altitude sickness. To minimise risks, gradual ascent is essential. The **Wilderness Medical Society recommends:**

- **Rest days every 3-4 days** when ascending above 3,000 metres.
- **Limiting daily sleeping** elevation increases to no more than 500 metres.
- **Preventive medications** such as **Acetazolamide** (to improve oxygenation) and **Dexamethasone** (to reduce inflammation) can help, but consulting a doctor familiar with altitude-related risks is crucial, especially for those with pre-existing health conditions.

Treatment Strategies: The most effective treatment for high-altitude sickness is **immediate descent by 300–1,000 metres.** Additional measures include:

- **Supplemental oxygen or portable hyperbaric chambers** to alleviate symptoms.
- **Medications** like acetazolamide or dexamethasone for short-term relief.

Policy Recommendations: To mitigate risks and improve safety in high-altitude regions, the following measures are recommended:

- Establish **advanced medical facilities** in remote Himalayan areas.
- Create **dedicated research centres** for high-altitude illnesses.
- Equip Himalayan states with **air-ambulance services** for rapid evacuation.
- Provide **comprehensive health and safety information** online and at entry points for tourists.

By addressing these challenges, authorities can enhance safety and ensure sustainable high-altitude tourism.

Subject - International Relations

Quad Mineral Security Partnership

Sub Topic- *Bilateral Groupings & Agreements, International Treaties & Agreements*

Context:

Critical minerals, often called the **"new oil,"** are pivotal to the ongoing high-tech industrial revolution. However, the **concentration** of the critical mineral supply chain in countries like China—presents security risks for other nations, especially members of the Quadrilateral Security Dialogue (Quad).
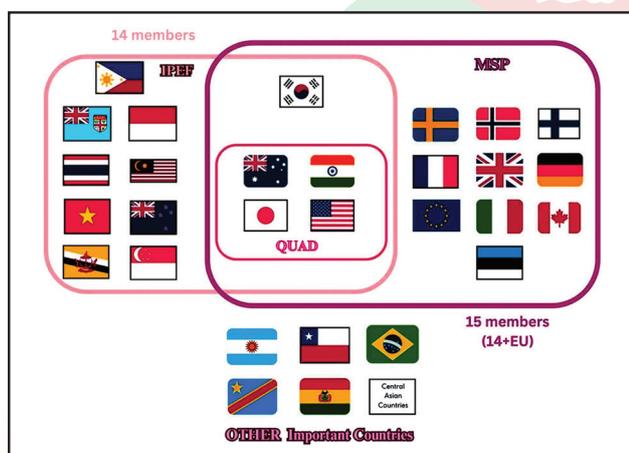
More on News:

- In response, **countries are developing policies and strategies** to enhance the resilience of their supply chains.

- The **European Union (EU)** and countries such as **Canada, India, Australia, and South Korea have all recognised the importance of these minerals**, releasing strategic frameworks or critical mineral lists to address this need.

China's Domination of the Critical Mineral Supply Chain:

- China is a dominant force in the critical mineral supply chain, **especially in rare-earth elements (REEs)** like neodymium and dysprosium, where it **accounts for approximately 60% of global production** and nearly **90% of processing and refining capacity.**

- This dominance has been **leveraged in foreign policy;** in 2010, **China restricted REE exports to Japan,** and in 2023, it began restricting exports of minerals like germanium and gallium, emphasising its control over critical mineral resources.

Quad and Critical Minerals:

Each Quad member brings **distinct strengths** to the critical mineral sector:

- **Australia** has **vast reserves**; the **U.S.** leads in **mining technology**; **Japan** brings **capital and expertise** in extraction and processing; and **India** possesses **untapped mineral reserves** and a growing market.

- Together, these capabilities **could strengthen the Indo-Pacific region's critical mineral supply** chain.

India: Emerging Manufacturing Hub:

- India views critical minerals as **vital to its national security and development**, especially since the COVID-19 pandemic highlighted vulnerabilities in global supply chains.

- The government has since **prioritised securing these resources** to align with its **Atmanirbhar Bharat** self-reliance vision.

- In 2023, India issued its **first list of 30 critical minerals**, underscoring their importance to sectors like defence, agriculture, and energy.

- India's approach includes **simplifying the mining process and enhancing international cooperation** with mineral-rich countries.

- The government has also passed the **Mines and Minerals (Development and Regulations) Amendment (MMDR) Bill,** enabling private sector participation in mining and setting royalty rates for various critical minerals.

- To support international efforts, India **established Khanjij Bidesh Private Ltd. (KABIL)** to acquire overseas mineral resources, securing **agreements with Australia, Argentina, and potentially Chile and Sri Lanka.**

Convergences and Divergences:

- The Quad countries have **distinct yet overlapping strategies** regarding critical minerals.
- Each member has a **unique definition of what constitutes a "critical mineral,"** influenced by their specific national priorities.
  - The **United States and Australia,** for instance, **emphasise structural factors** more heavily, while **India's focus includes poverty alleviation and development** in alignment with its economic goals.
- In terms of **strategic approaches**, the **US has primarily pursued a decoupling approach,** aiming to build a resilient supply chain independently of China.
- Meanwhile, **India, Japan, and Australia favour a de-risking approach**, which emphasises reducing dependencies by diversifying their upstream supply chains rather than focusing solely on full-scale decoupling.

Critical Mineral Agreements Between Quad Members				
	Australia	**India**	**Japan**	**United States**
Australia			Partnership on Critical Minerals	
India	Critical Mineral Investment Partnership			
Japan				Agreement on Strengthening Critical Mineral Supply Chain
United States	Partnership on Critical Minerals			

Quad Members' Mineral Security Approaches:

- **Australia:** Australia's critical mineral strategy **aims for a "concerted, targeted, and proportionate approach"** to strengthen its critical minerals sector as a means of

bolstering national security.

- **India:** India's strategy is largely aligned with its economic and security interests, reflected in its **"Aatmanirbhar Bharat" vision** to utilise critical minerals for growth, competitiveness, and sustainable development.
- **Japan:** Japan's approach is **three-pronged,** focusing on **offshore mining investments, strategic partnerships** with other countries, and **capacity-building** initiatives in human resources and mining skills, all of which aim to mitigate Japan's reliance on other countries and enhance its security.
- **United States:** The US has chosen a **decoupling strategy** to build an alternative, resilient, and liberal supply chain that ensures mineral security across its economy, protecting its strategic interests by focusing on every part of the supply chain.

Potential for Cooperation Among Quad Members:

- Since 2021, the Quad has taken steps to enhance collaboration on critical minerals.
- A notable example is the **Quad Investors Network (QUIN),** which launched in 2022 to **strengthen private-sector cooperation** in key areas like clean energy and critical minerals.
- Initiatives in the US, such as the proposed **Quad Critical Minerals Partnership Act** and the Critical Minerals Security Act of 2024, reflect efforts to secure an alternative mineral supply chain in coordination with Quad partners.
- However, **further steps are necessary to solidify these efforts** into a cohesive framework.
- **Bilateral and multilateral agreements,** such as the US-Japan agreement on critical minerals and a task force between the US and Australia, further underscore the need for collaboration.
- **India**, which currently **only has a critical minerals agreement with Australia,** could benefit from further partnerships with other Quad members.

Challenges:

- **Economic Realism:** Quad members' **efforts to compete with China have faced limitations.**
  - Despite Australia's efforts to diversify its market, **China remains its largest consumer** for minerals like rare earths, valued at around US$100 billion.

- **Supply Chain Expertise:** The **Quad lacks deep expertise in downstream segments** like advanced battery materials and research into alternative technologies.

  ➤ **China, meanwhile, has invested heavily** in next-generation battery technologies, such as solid-state and sodium-ion batteries, which have the potential to lower production costs.

- **Policy Uncertainty:** Unlike **China's centralised approach**, **Quad members operate in decentralised political systems**, limiting the ability to mandate investments aligned with geopolitical goals.

  ➤ **Environmental, Social, and Governance (ESG) compliance** also varies among members, with India's ESG standards not yet aligned with Western expectations.

- **Zero-Sum Game Risks:** Collaborative efforts to reduce reliance on China have led Beijing to impose mineral restrictions, heightening the risk of supply chain fragmentation.

Recommendations for Quad Cooperation:

- Establishing a **comprehensive agreement** between Quad members based on shared principles, **similar to the G7's consensus** on critical mineral security.

- Creating a **common definition of critical minerals** to streamline policies and link initiatives, facilitating a collaborative framework.

- Developing a **trading system** for critical minerals among Quad members that spans the entire supply chain, from upstream to downstream segments.

- Implementing **an early-warning system** to monitor potential supply chain disruptions, potentially focusing on essential minerals like lithium, nickel, and graphite for the electric vehicle (EV) industry.

- Initiating **regular ministerial meetings** among Quad members to coordinate initiatives and explore new areas of collaboration.

- Identifying co-investment opportunities in third countries, leveraging bilateral partnerships and multilateral efforts like the Indo-Pacific Economic Framework (IPEF).

NITI Aayog CEO Advocates India joining RCEP & CPTPP

Sub Topic- *Global Groupings & Agreements, International Treaties & Agreements*

Context:

According to Niti Aayog CEO BVR Subrahmanyam, India, currently not part of major global trade agreements, would benefit from joining the Regional Comprehensive Economic Partnership (RCEP) and Comprehensive and Progressive Agreement for Trans-Pacific Partnership (CPTPP).

About RCEP:

- The Regional Comprehensive Economic Partnership (RCEP) is a major economic agreement formed between ASEAN nations and their Free Trade Agreement (FTA) partners, creating the world's largest trading bloc.

- It aims to promote **economic integration, trade liberalisation, and cooperation among member countries** by reducing or **eliminating tariffs and non-tariff barriers**.

- **Negotiations started in November 2012**, and it was **signed in November 2020**. The agreement officially **entered into force on January 1, 2022**.

- **RCEP includes 15 countries—10 ASEAN members** (Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Singapore, Thailand, the Philippines, Laos, Vietnam) and **5 FTA partners** (China, Japan, South Korea, Australia, New Zealand).

- RCEP members collectively **represent over 30% of global GDP** and cover about **one-third of the world's population**.

- India initially participated in the RCEP negotiations but chose to **withdraw in 2019**.

Overview of CPTPP and Its Member Nations

The **CPTPP, spanning five continents, includes key Pacific Rim countries** such as Canada, Mexico, Peru, Chile, New Zealand, Australia, Japan, Brunei, Singapore, Malaysia, and Vietnam. Membership in this bloc would **provide India with expanded trade access across multiple regions.**

Reasons India Initially Withdrew from RCEP

- **Trade Deficit Concerns:** India feared joining RCEP could increase its trade deficit,

especially with China, due to an influx of cheaper imports that could harm domestic industries.

- **Domestic Industry Protection:** Key sectors like agriculture, dairy, and MSMEs were shielded to avoid overwhelming competition from foreign imports.

- **Geopolitical Relations with China:** Given strained ties, India hesitated to increase economic reliance on China.

- **Lack of Concessions on Trade Terms:** RCEP offered insufficient safeguards for Indian industries.

- **Domestic Opposition to FTAs:** Concerns from agriculture and dairy sectors about potential negative impacts on rural livelihoods fueled reluctance.

Benefits of India Joining RCEP and CPTPP

- **Expanded Market Access:** Membership in RCEP and CPTPP would allow India access to large markets, boosting exports, particularly for MSMEs, which contribute 40% of India's exports.

- **Integration into Global Supply Chains:** Joining would enhance India's role in global supply chains, particularly under the "China Plus One" strategy that encourages manufacturing diversification.

- **Increased Foreign Direct Investment (FDI):** Clearer trade policies and easier market access would attract more FDI, strengthening infrastructure, technology, and manufacturing sectors.

- **Boosting Trade Competitiveness:** Reduced tariffs and non-tariff barriers would make Indian products more competitive, improving market presence in regions like Japan, South Korea, and Australia.

- **Support for MSME Sector:** Access to larger markets and cheaper raw materials would enhance MSME competitiveness and production efficiency.

Challenges India Faces in Joining RCEP and CPTPP

- **High Tariff Structure:** India's higher tariffs make domestic products less competitive. Reducing tariffs to align with RCEP/CPTPP standards may face domestic opposition.

- **Structural Reforms Needed:** Simplified regulations, reduced trade barriers, and improved infrastructure are necessary to meet these trade blocs' standards.

- **Domestic Market Protection Concerns:** Increased foreign competition could challenge agriculture and MSMEs, requiring India to secure safeguards for these vulnerable sectors.

- **Geopolitical Balancing with China:** Relations with China, a major RCEP member, add complexity, requiring careful management to prevent overdependence on a strategic competitor.

Potential Strategic Benefits

- **Enhanced Negotiating Power:** Membership would boost India's influence in trade rule formation, enabling better negotiation outcomes for agriculture, technology, and services while safeguarding domestic interests.

- **Economic Growth Projections:** According to the World Bank, India could gain up to $60 billion by 2030 from joining RCEP, reinforcing economic growth and industrial expansion.

India's Current Tariff Structure and Trade Competitiveness

- **Average Applied Tariffs:** India's average tariff is around 13.8%, higher than China (9.8%) and the U.S. (3.4%), constraining India's trade competitiveness.

- **High Bound Tariffs on Agriculture:** India has high tariffs on agricultural goods, posing barriers for foreign exporters and limiting its role in global supply chains.

Suggested Steps Forward

- **Focus on Bilateral FTAs:** India should pursue FTAs with key partners, such as the UK and the EU, to expand market access.

- **Strengthen Regional Ties:** Enhancing integration within SAARC and BIMSTEC could yield regional economic benefits.

- **Trade Relations with Gulf and African Nations:** Pursue partnerships with GCC and African countries to foster cooperation in energy, infrastructure, and digital sectors.

- **Active Participation in Indo-Pacific Economic Framework (IPEF):** This would support India's "Act East Policy" through cooperation in supply chain resilience, clean energy, and fair economic practices.

- **Enhance Self-Reliance Initiatives:** Strengthen domestic manufacturing through "Make in India" and Production Linked Incentive (PLI) schemes to boost exports and reduce import dependence.

Two-Front Deterrence

Sub Topic- *Effect of Policies and Politics of developed and developing countries on India's interests*

Context:

India's defence spending, measured as a percentage of GDP and the national budget, **has declined in recent years.**

More on News:

- Increasing it to **2.5% of GDP from the current 1.9% over the next four years is imperative.**

- However, **a mere budgetary increase is not enough**; targeted investments in critical areas are necessary to bridge gaps in India's defence capabilities and deter adversaries effectively.

Learning from History:

- A stark reminder of **India's defence shortcomings** dates back to December 9, 1971, during the **Indo-Pak war.**

- On this night, **INS Khukri**, a 1,200-tonne warship, **was sunk by the Pakistani submarine PNS Hangor.**

- Despite being aware of Pakistan's formidable submarine capabilities, **India's anti-submarine warfare (ASW) fleet lacked adequate sonar technology.**

- **Experimental sonars**, including one developed in collaboration with the Tata Group, were **under testing on the Khukri but failed to perform,** leading to significant casualties.

- The **subsequent hunt for Hangor further exposed gaps.** A French-made Alizé ASW aircraft was shot down by a **Pakistani F-104,** highlighting the lack of coordination and readiness.

- These **avoidable setbacks underline the systemic neglect** of critical technological upgrades in India's defence apparatus.

Understanding Deterrence

Deterrence is **a strategic concept in international relations** aimed at **preventing adversaries from taking undesirable actions,** particularly military aggression. It **operates on the principle that the potential costs of such actions outweigh any perceived benefits.**

Types of Deterrence

- **Deterrence by Denial:** It involves **strengthening defences or implementing measures that reduce the likelihood of success for an aggressor**, such as military fortifications or economic sanctions.

- **Deterrence by Punishment:** This approach **seeks to convince potential aggressors that any hostile action will result in severe retaliation.**

Theoretical Foundations: Deterrence theory gained prominence during the **Cold War,** particularly concerning nuclear weapons. The concept is closely associated with the idea of **Mutual Assured Destruction (MAD)**, where both sides possess enough nuclear capability to ensure that a first strike would lead to devastating retaliation, thereby deterring initial aggression.

Credibility and Communication: For deterrence to be effective, it **must be perceived as credible by potential aggressors**. Clear communication of deterrent capabilities and intentions is crucial; ambiguity can lead to miscalculations and increased tensions.

Contemporary Challenges: In today's complex geopolitical landscape, traditional deterrence strategies **face challenges due to the rise of non-state actors, cyber warfare, and hybrid threats.** The effectiveness of nuclear deterrence is **questioned in scenarios involving terrorism or asymmetric warfare,** where conventional military responses may not suffice.

Persistent Missile Gap:

- Fast forward to 2019, during the **Pulwama-Balakot incident**, the **Indian Air Force (IAF) faced another glaring disadvantage**.

- **Pakistani Air Force (PAF) AMRAAM missiles outranged most of India's inventory,** barring a few French MICA-equipped Mirage fighters.

- This missile gap, **existing since 2010, persisted until the Rafale jets** became operational.

Strategic Priorities for India's Defence:

To ensure robust deterrence against adversaries like China and Pakistan, India must adopt a **targeted approach:**

- **For the Army: Invest in long-range artillery,** armed drones, loitering munitions, and

modern air defence systems for forward units.

- ➢ **Standardise infantry equipment**, including small arms, protective gear, night vision devices, secure communication systems, and anti-tank guided missiles.

- **For the Air Force: Accelerate acquisition of refuellers and Airborne Early Warning and Control (AEW&C) systems**, which are critical force multipliers.

  - ➢ **Address the falling squadron strength** and enhance missile capabilities.

- **For the Navy: Procure heavyweight torpedoes** for Scorpene submarines, minesweepers, and swarm boats.

- Introduce a **"navalised" version of the C-295 aircraft** to complement the P-8i fleet for medium-range surveillance and ASW duties.

Filling Critical Gaps:

- Rather than prioritising high-profile acquisitions, India must **focus on smaller, cost-effective purchases** that address critical operational gaps.

- These include **modernising artillery ammunition, enhancing air defence systems**, and equipping the armed forces with **cutting-edge technology** for modern warfare.

Mobilising Resources for Defence:

- **Increasing defence spending to 2.5% of GDP** can be phased over four years, starting with **incremental increases of 0.2% annually.**

- An **additional 0.1% increase alone would generate ~₹30,000 crore for acquisitions.**

- Alternatively, **aggressive privatisation of public sector enterprises** could generate significant funds, earmarked exclusively for defence modernisation.

India's defence preparedness **cannot afford a "chalta hai" attitude.** Learning from past mistakes, the focus must shift from **reactive measures to proactive investments** in technology and resources. **Clear deterrence** against adversaries requires both political will and strategic foresight.

India and Nigeria

Sub Topic- *Bilateral Groupings & Agreements, International Treaties & Agreements*

Context:

Prime Minister Narendra Modi underscored the **importance of India's strategic partnership with Nigeria** during his discussions with Nigerian President Bola Ahmed Tinubu in Abuja.

More on News

- This marks the **first visit by an Indian Prime Minister to Nigeria in 17 years**, signalling a **renewed commitment to deepening bilateral ties** in areas such as defence, energy, and trade.

- In his televised opening remarks, PM Modi identified **terrorism, separatism, piracy, and drug trafficking as key global challenges** and reaffirmed **India and Nigeria's shared commitment to combating these issues together.**

- He also emphasised the role of the **Indian expatriate community of nearly 60,000 in strengthening India-Nigeria relations** and expressed gratitude to President Tinubu for ensuring their welfare.

Key Highlights of India-Nigeria Relations

Historical Context:

- **Warm Bilateral Relations**: India and Nigeria have **shared over 60 years of diplomatic ties**, rooted in shared struggles against colonialism and **membership in the Non-Aligned Movement (NAM)**.

- **Early Engagements**: **India established its first diplomatic mission in Nigeria in 1958**, two years before Nigeria's independence.

- **Strategic Partnership**: Elevated during former **PM Manmohan Singh's visit in 2007**, the partnership emphasises mutual cooperation in multiple sectors.

Current Developments

- **PM Modi's Visit**: The **first Indian PM visit to Nigeria in 17 years**, signalling renewed focus on defence, energy, and trade collaboration.

- **Humanitarian Aid**: **India provided 20 tonnes of relief supplies to Nigeria** for flood recovery.

- **Global Cooperation**: PM Modi reaffirmed **shared commitments against terrorism, piracy**, and **drug trafficking**, emphasising **India's support for the Global South** and the **African Union's inclusion in the G-20**.

Areas of Cooperation

Economic Ties:

- **Trade Volume**: **Exceeds $14 billion annually**, with **Nigeria being India's largest African trading partner**.
  - ➤ **India's Imports**: **Primarily crude oil** (70% of total imports).
  - ➤ **India's Exports**: **Pharmaceuticals, textiles, automobiles**, and **engineering goods**.
- **Investments**: **Over 200 Indian companies in Nigeria with $27 billion in investments**, contributing significantly to local employment.
- **Energy Security: Nigeria supplies 12% of India's crude oil** needs, making it a critical partner in energy security.
- **Defence Collaboration:** India provides **defence training, equipment**, and **technical support**, with notable **contributions like the National Defence Academy in Kaduna**.

Development Initiatives

- **Technical and Economic Cooperation (ITEC)**: India has supported Nigeria with **training programs and concessional loans**, including $30 million for energy projects.
- **Capacity Building**: Initiatives in **agriculture, technology transfer**, and **education aim to support Nigeria's modernisation**.

Diaspora Contributions

- **Indian Community**: **Over 60,000 Indian expatriates** contribute to Nigeria's economy, healthcare, and cultural exchange.
- **Cultural Influence**: **Indian cuisine, festivals**, and **Bollywood** have fostered mutual cultural appreciation.

Challenges in Bilateral Relations

- **Declining Trade Volume**: Dropped from $14.95 billion (2021–22) to $11.8 billion (2022–23) due to reduced oil imports.
- **Limited Upstream Energy Investments**: Unlike China, India lacks significant strategic stakes in Nigeria's energy sector.
- **Sparse High-Level Engagements**: Infrequent summits and joint commission meetings hinder dialogue.
- **Rising Chinese Influence**: **China's Belt and Road Initiative** (BRI) projects pose competition to Indian investments.
- **Economic Reforms in Nigeria**: Subsidy cuts and currency devaluation create uncertainties for Indian investors.

Opportunities for Future Cooperation

- **Enhanced Defence Collaboration**: India can assist Nigeria with counterterrorism strategies, maritime security, and advanced defence supplies.
- **Economic Diversification**: Focus on renewable energy, IT, and infrastructure to reduce over-reliance on oil trade.
- **Bilateral Trade Boost**: Increase exports in pharmaceuticals, food, and textiles; explore rupee-based trade.
- **Capacity Building**: Leverage India's expertise in healthcare, IT, and education for Nigeria's development.
- **Infrastructure Investments**: Strengthen Nigeria's transport and energy networks, inspired by Indian contributions in Ethiopia.

Strategic Recommendations

- **Comprehensive Economic Partnership Agreement (CEPA)**: Establish frameworks to reduce trade barriers and foster industrial collaboration.
- **Currency Swap Arrangements**: Mitigate Nigeria's foreign exchange shortage for smoother bilateral trade.
- **Enhanced Diplomatic Engagements**: Increase high-level visits and joint commission meetings for regular dialogue.
- **Leverage Indian Diaspora:** Utilise the Indian community as cultural and economic ambassadors to deepen bilateral ties.

Indo-Pacific Marine Cooperation

Sub Topic- *Bilateral Groupings & Agreements, International Treaties & Agreements*

Context:

The **Indo-Pacific region,** abundant in marine resources, is among the areas **most vulnerable to climate change and biodiversity loss.**

More on News:

- Research warns that **mangrove forests in regions with low tidal ranges and minimal sediment supply could vanish by 2070.**

- These marine ecosystems are **vital for regional food security, livelihoods, and global climate mitigation,** as they serve as significant **carbon sinks.**

- However, these ecosystems **face growing threats from environmental changes and human activities.**

Strategies:

To address these dual crises, robust cooperation among Indo-Pacific nations is imperative.

- **Strengthening Scientific Research Networks and Data Sharing:** Establishing a **comprehensive scientific research network** and enhancing data-sharing mechanisms are foundational steps.

  ➢ **Collaborative efforts** among marine scientists, biologists, and climate experts are essential to monitor biodiversity loss and climate change impacts on coastal and marine ecosystems.

  ➢ **Regional bodies** such as the Association of Southeast Asian Nations **(ASEAN),** the United Nations Economic and Social Commission for Asia and the Pacific **(UNESCAP),** the Asia-Pacific Economic Cooperation **(APEC),** and the United Nations Environment Programme **(UNEP) can facilitate real-time information sharing** through a unified platform.

- **Expanding Marine Protected Areas (MPAs) and Conserving Carbon Sinks:** Marine Protected Areas (MPAs) play a crucial role in preserving biodiversity and **building resilience against climate change.**

  ➢ The **Indo-Pacific region,** home to coral reefs, mangroves, and seagrass meadows, **hosts some of the most biodiverse ecosystems** that act as vital carbon sinks.

  ➢ **Countries in the region must collaborate to expand MPAs,** creating transboundary networks to protect ecosystem connectivity and migratory species.

    ■ For example, the **Coral Triangle Initiative,** co-managed by Indonesia and the Philippines, **provides a model for transnational ecosystem management.**

- **Adopting Nature-Based Ocean Climate Solutions:** Nature-based solutions are essential for climate adaptation and mitigation.

  ➢ Initiatives like the **Pacific Mangroves Initiative (PMI)** and the **Ocean-Based Climate Action (OBCA) program** launched by UNESCAP in 2023 exemplify successful efforts in this domain.

  ➢ **Such projects could be scaled up across the region,** supported by regional climate financing mechanisms to ensure countries have the resources needed for implementation.

- **Engaging Local Communities and Leveraging Traditional Knowledge:** Local communities in the Indo-Pacific possess valuable traditional knowledge of sustainable marine resource management.

  ➢ Models like the **Philippines' community-based MPAs** and **Fiji's Locally Managed Marine Areas (LMMAs)** highlight the importance of community participation in marine conservation.

- **Boosting Financial Support and Technology Transfer:** Financial assistance and technology transfer are essential for empowering developing states in the Indo-Pacific to address climate and biodiversity challenges effectively.

  ➢ **Developed countries and global organisations must provide substantial support** under frameworks like the **Paris Agreement (Article 6), Sustainable Development Goal 14,** the **Kunming-Montreal Global Biodiversity Framework (GBF),** and the **High Seas Treaty of 2023.**

  ➢ Institutions like the **World Bank, the Asian Development Bank (ADB), and the Green Climate Fund (GCF)** can establish **dedicated funds for climate adaptation and marine conservation projects.**

Additionally, private sector contributions through Environmental, Social, and Governance (ESG) frameworks can play a pivotal role.

Declaration on Digital Public Infrastructure, AI and Data for Governance - Joint Communiqué by the G20 Troika

Sub Topic- *Global Groupings & Agreements, International Treaties & Agreements*

Context:

India, Brazil and South Africa agree to use digital public infra and AI to bridge the global inequality gap. This declaration, endorsed by several G20 countries, guest nations, and international organisations, underscores the potential of technology to bridge global inequalities and accelerate progress toward the Sustainable Development Goals (SDGs).

About the G20 Declaration on DPI:

- The G20 Troika, comprising India, Brazil, and South Africa, unveiled a joint declaration on **Digital Public Infrastructure (DPI), Artificial Intelligence (AI), and data governance.**

- Endorsed by multiple G20 nations, guest countries, and international organisations, the declaration **highlights technology's potential to bridge global inequalities and accelerate progress toward the Sustainable Development Goals (SDGs).**

- Recognising the transformative power of DPI and AI, the **leaders emphasised fostering inclusive digital transformation.**

Purpose of DPI Declaration Acceptance by G20:

The G20 declaration underscores the role of well-designed DPI and AI in leveraging data for development. The purpose is to:

- **Create new jobs.**
- Improve **health and education outcomes.**
- **Renew citizens' trust** in democratic governance.
- **Facilitate equitable economic development.**

The leaders envision DPI as a driver for transformative change, benefiting citizens globally through seamless and inclusive technological integration.

Why G20 Needs to Accept DPI Now:

Global economic growth has stagnated at just over 3%, the lowest rate since the turn of the century.

Meanwhile, rapid technological advancements provide a unique opportunity to:

- Boost global growth.
- Reduce economic and digital inequalities.
- Accelerate progress toward the SDGs.
- Timely adoption of DPI and AI **ensures nations harness these advancements for development-oriented and equitable solutions.**

How DPI and AI Help Bridge the Global Inequality Gap:

DPI and AI have the potential to

- **Enable inclusive economic participation** by connecting small and large businesses.
- Empower individuals through **better access to education, healthcare, and financial services.**
- **Address disparities in access to resources** by using AI for targeted interventions.
- **Enhance livelihoods at grassroots levels** by creating seamless connections within local ecosystems.

Global Cooperation on DPI and AI for Development:

The declaration welcomed global initiatives like the **Global Digital Compact (adopted at the UN Summit of the Future) and the 2024 Global DPI Summit in Cairo.** These efforts underline the importance of international collaboration to build inclusive, development-oriented, and secure technological systems. Such cooperation can enable equitable access to technology and stimulate worldwide innovation.

Principles for Digital Systems to Ensure Inclusivity:

- **Open, Modular, Interoperable, and Scalable Systems:** Systems must follow design principles that ensure adaptability to diverse and evolving national needs, enabling seamless integration across sectors.

- **Focus on Citizens:** Technological systems should prioritise citizens, empowering them through better services and enhancing their quality of life.

- **Technology-Neutral Approach:** A level-playing field for market participants is crucial for fostering competition, innovation, and reducing digital economic asymmetries.

- **Robust Data Governance:** Frameworks must safeguard privacy, intellectual property

rights, and security, ensuring fair market practices.

- **Transparent and Equitable Data Principles:** Transparency, fairness, and ethical management of data are central to fostering trust in technological systems.
- **Trust as a Cornerstone:** Trust is essential for flourishing democracies and technological adoption. Systems must be transparent, respect citizens' rights, and ensure fairness in governance.

How DPI Helps Promote SDGs:

- **Economic Growth:** DPI fosters innovation and job creation, stimulating equitable economic progress.
- **Health and Education:** AI-driven solutions improve service delivery and accessibility in underserved areas.
- **Reduced Inequalities:** Technology bridges gaps in access to essential resources, levelling opportunities.
- **Sustainable Communities:** DPI enables smart, sustainable solutions for urban and rural development.

Subject - Polity, Governance, Constitution

SC Stays High Court Order on Madarsa Education Act

Sub Topic- *Indian Judiciary*

Context:

The Supreme Court has reserved its verdict on a case that could impact religious education nationwide. The case involves a challenge to the Allahabad High Court's decision from March, which struck down the Uttar Pradesh Board of Madarsa Education Act, 2004.

The Madrasa Act, 2004: Overview

- **The Madrasa Act, 2004,** provides a legal framework for madrasa education in Uttar Pradesh. It incorporates the curriculum of the National Council of Educational Research and Training (NCERT) alongside religious education.
- **Establishment of the Uttar Pradesh Board of Madarsa Education:** The Act establishes the Uttar Pradesh Board of Madarsa Education, which is predominantly composed of

members from the Muslim community.

- ➢ **Functions of the Board:** Under **Section 9 of the Act,** the board is responsible for **Preparing and prescribing course materials** & **Conducting examinations for courses** ranging from 'Maulvi' (equivalent to Class 10) to 'Fazil' (equivalent to a Master's degree).
- **Demographics of Madrasas in India:** According to data presented to Parliament on February 3, 2020, there were a total of **24,010 madrasas in India** as of 2018-19.
  - ➢ Notably: Over **60% (14,528) of these madrasas are located in Uttar Pradesh** out of which 11,621 are recognised madrasa .
- **Student Enrollment and Examinations:** In 2023, approximately **1.69 lakh students appeared** for the Uttar Pradesh Madarsa Education Board examinations, which are equivalent to Class 10 and Class 12.

Allahabad High Court Ruling:

- On March 22, a Bench of Justices Subhash Vidyarthi and Vivek Chaudhary **struck down the Madarsa Act in its entirety. The Supreme Court stayed this order of HC.**
- **Grounds for Unconstitutionality:** The Act was deemed unconstitutional on **three main grounds**, which have significant implications for madrasas education in the state.
  - ➢ **Secularism and Equal Treatment**
    - The High Court emphasised that secularism entails equal treatment of all religions by the State, without favouritism.
    - It noted that **madrasa students are required to study Islam,** while **modern subjects are often optional or absent,** thus violating the principle of secular education.
  - ➢ **Right to Education Violations**
    - Citing **Article 21A of the Constitution,** the court held that the **government was infringing on the right to free and compulsory education by not providing quality education in modern subjects**.
    - The HC criticised the reliance on **traditional education as insufficient.**
  - ➢ **Conflict with Central Law**
    - The HC ruled that the Madarsa Act's provisions, which empower the madrasas board to grant degrees,

conflict with the **University Grants Commission Act, 1956.**

- It stated that **only universities or recognised institutions have the authority to confer degrees,** excluding madrasas and their boards.

Arguments Against the Allahabad High Court's Decision:

Preserving Cultural and Religious Education

- The Madrasa Act **aims to preserve Islamic culture and religious** education while incorporating modern subjects.
- Scrapping the Act could infringe on the rights of the Muslim minority to maintain their religious identity through education, as per **Articles 29 and 30** of the Indian Constitution.

State's Role in Educational Diversity

- The Act accommodates educational diversity, ensuring that religious minorities receive structured and regulated religious and secular education.
- It provides a framework for religious and modern education to coexist, addressing the unique needs of Muslim students.

Possible Disruption for Madrassa Students

- The High Court's decision **could disrupt the education of 17 lakh students** by moving them to regular schools without a clear transition plan.
- Advocates suggest amending the Act to better integrate secular education within madrassas rather than dismantling their religious role entirely.

Balancing Regulation and National Interest

- The **Supreme Court cautioned against ghettoisation,** advocating for the regulation of madrasas to facilitate the mainstreaming of students and their integration into national education frameworks.

Key Questions Raised Before the Supreme Court:

During the hearings in October 2024, **two primary questions** were debated regarding the Madarsa Act.

Distinction Between Religious Education and Religious Instruction

- **First Question:** The court examined whether madrasas impart **"religious education"** or **"religious instruction."**

- In *Ms. Aruna Roy vs Union of India (2002),* the Supreme Court distinguished between the two, ruling that:

- **Religious Instruction:** Compelling attendance for religious worship in state-recognised educational institutions is prohibited under **Article 28** of the Constitution.

- **Religious Education:** Teaching students about different religions to **promote communal harmony is permissible.**

- **Advocacy Argument:** High Court incorrectly conflated regulation with religious instruction, arguing that this conflation mischaracterised the nature of religious education and its compliance with constitutional secularism.

Striking Down of the Entire Act vs. Specific Provisions

- **Second Question:** The court deliberated whether the High Court was justified in striking down the entire Madarsa Act **or if it should have limited its ruling to specific provisions, allowing the government to regulate madrasas operations.**

The Manipur Crisis and Managing Diversity

Sub Topic- *Communalism, Pressure Groups, North East Insurgency*

Context:

A recent escalation of violence in Manipur has prompted the State's Chief Minister to demand greater control over security operations, revealing that he hasn't held full authority for some time.

More on News:

- Reports even suggest the **invocation of Article 355 of the Constitution**, which obligates the Union to protect States from external aggression and internal unrest.
- The breakdown of constitutional order in Manipur is evident, raising important

questions about the Constitution's ability to manage identity-based differences.

> **Article 355** of the Indian Constitution plays a crucial role in **maintaining the integrity and security of states**. It mandates that it is the **duty of the Union government to protect every state against external aggression and internal disturbances.** It also ensures that the **government of each state operates according to the provisions of the Constitution.**

Special Provisions and Diversity Management:

- **Managing Diversity:** The Indian Constitution is uniquely equipped to manage diversity.
- **Special Provisions: Various States**, including Maharashtra, Gujarat, Nagaland, Assam, Manipur, Andhra Pradesh, Sikkim, Mizoram, Arunachal Pradesh, and Karnataka, **have been granted "*special provisions.*"**
  - These provisions **aim to balance development needs and preserve cultural identities.**
- **Federalism:** Federalism, in a country as vast and diverse as India, is **a necessity**, not a choice.
  - The Constitution has evolved **mechanisms for sharing power, representation, and autonomy,** aiming to foster stability while respecting the socio-political contexts of various identities.

Sikkim's Integration and Constitutional Flexibility:

- When Sikkim joined India in 1975, **Article 371F** was introduced, **empowering Parliament to protect the interests of Sikkim's diverse population**.
- The Constitution allowed for **representation based on group identities** to ensure political stability, even if it meant deviating from strict proportionality.
- In *R.C. Poudyal (1993)*, the Supreme Court upheld this, recognising that **historical factors justified unequal representation** to protect the Bhutia-Lepcha community's identity.
  - The Court emphasised that acknowledging these identities fostered political stability and coexistence.

Tripura's Example of Peace through Constitutional Accommodation:

- Tripura, too, is an example of how the Constitution facilitated peace.
- The **Sixth Schedule**, which allows for local governance in tribal regions, **wasn't applied to Tripura until 1984**.
- Following the **1988 Tripura Accord**, which sought to end insurgency, **a third of the State Assembly seats were reserved for Scheduled Tribes**, even beyond their population proportion.
- In *Subrata Acharjee (2002)*, the Supreme Court supported this unique arrangement as a **temporary measure to secure peace and governance in tribal areas.**

> ## Sixth Schedule
>
> The Sixth Schedule of the Indian Constitution provides for the **administration and governance of tribal areas** in specific northeastern states, granting them a degree of autonomy.
>
> ### Overview of the Sixth Schedule
>
> - **States Covered:** The Sixth Schedule applies to the tribal areas in **Assam, Meghalaya, Tripura, and Mizoram.**
> - **Legal Framework:** It is enshrined in **Articles 244(2) and 275(1)** of the Constitution.
> - **Historical Context:** The provisions were influenced by the recommendations of the **Bordoloi Committee**, which emphasised the need for a system that would protect tribal areas from exploitation and preserve their unique customs.
>
> ### Key Features
>
> - **Autonomous District Councils (ADCs):** These councils can make laws on specified matters such as land use, inheritance, marriage, and social customs.
> - **Governor's Authority:** The Governor of the state has significant powers **to determine the boundaries of these autonomous districts** and can create or alter them as necessary.
> - **Legislative Powers:** ADCs can legislate on various matters but require the Governor's assent for their laws to take effect.

- **Local Governance:** The councils are empowered to manage local resources, including schools, health facilities, and infrastructure projects.

- **Protection of Rights:** The Sixth Schedule aims to safeguard the rights and interests of tribal populations by allowing them self-governance.

- **Current Structure:** The Sixth Schedule currently **encompasses 10 autonomous districts** across the four states mentioned above.

Manipur's Situation and the Need for Reconciliation:

- Unlike Tripura, the **Sixth Schedule doesn't apply to Manipur**.

- Instead, Manipur is governed by **Article 371C**, which provides for a **Hill Area Committee,** though its approval isn't required for decisions affecting those areas.

- The creation of **District Councils** under the Manipur Hill Areas Autonomous District Council Act, 2000, is **based on Scheduled Tribe classification** but lacks the strong provisions present in other States like Nagaland, Sikkim, and Tripura.

- In this context, **tensions over resource allocation, representation, and perceived dominance have deepened social divides.**

The Role of the Constitution in Fostering Peace:

- The Indian Constitution, as a **living and evolving document,** has demonstrated an ability to adapt to complex challenges.

- The Supreme Court's words in *R.C. Poudyal* offer guidance: "*Pluralist societies are the result of irreversible movements of history. They cannot be washed away. The political genius of a people should be able to evolve within the democratic system, adjustments, and solutions.*"

Money Power in Elections

Sub Topic- *Constitutional Bodies, Transparency & Accountability*

Context:

The projected total spending on the upcoming U.S. presidential and Congressional elections in November 2024 is approximately **$16 billion (₹1,36,000 crores)**. In India, the **Centre for Media Studies (CMS)** estimates that the total expenditure by political parties for the **Lok Sabha elections this year reached around ₹1,00,000 crores.**

Spending Limits in India:

- **Lok Sabha:** In India, **individual candidates in larger states** are limited to a campaign expenditure of **₹95 lakh per Lok Sabha constituency**, while in **smaller states**, the limit is ₹**75 lakh.**

- **Legislative Assembly:** For Legislative Assembly seats, candidates are restricted to ₹**40 lakh in larger states and ₹28 lakh in smaller states**.

- **Periodic Review:** These limits are **periodically reviewed by the Election Commission of India (EC)**.

- **No Cap:** There is **currently no cap** on the amount **political parties** can spend during elections.

International Practices:

- **America:** In the U.S., election financing **relies largely on contributions from individuals, corporations, and Political Action Committees (PACs).**

  - While there are **restrictions on individual and PAC contributions** to candidates, **U.S. Supreme Court rulings have allowed for the creation of Super PACs**, which **can spend unlimited amounts**.

  - Of the total estimated $16 billion for the 2024 election cycle, about $5.5 billion is expected to go towards the presidential race, with $10.5 billion allocated for Congressional elections.

  - This significant increase in spending is largely driven by large-scale donations from organisational donors and Super PACs.

- **United Kingdom:** In the U.K., **political parties are permitted to spend £54,010 per contested constituency**, **capping total spending for nationwide campaigns at around £35 million** for those competing in all constituencies.

  - Additionally, **limits are placed on candidate spending:** £46,000-£49,000 during the extended campaign period (starting five months before the end of the House of Commons term) and £17,000-£20,000 during the shorter period after elections are officially announced.

Challenges:

- **Conflicts of Interest:** Election costs have risen sharply in democracies around the world, creating a **dependency on substantial donations and fostering connections** between politicians and donors, often leading to conflicts of interest.

- **No Cap on Political Parties:** In India, candidates **frequently exceed** their prescribed spending limits, with political parties free to spend unlimited amounts.
  - During the 2019 elections, **BJP and Congress** officially declared expenditures of ₹**1,264 crores and** ₹**820 crores,** respectively, though CMS estimates placed total spending by all parties at around ₹50,000 crore.

- **Rising Costs and Corruption:** CMS also reported that **roughly 35% of this money went towards publicity**, while around **25% was allegedly used for voter inducements**, highlighting a **cycle of rising costs and corruption.**

Legal Framework Governing Campaign Finance in India:

- **Representation of People Act, 1951**:
  - **Limitations on Candidate Expenditure**: Requires candidates to account for their spending but has no equivalent rule for party spending.
  - **Disclosure Requirements**: Contributions over ₹20,000 must be reported to tax authorities; corporate donations are capped under the **Companies Act, 1956**.

- **Election and Other Related Laws (Amendment) Act, 2003**: Introduced **Section 29C** for mandatory financial disclosures by parties, with compliance required to retain tax exemptions.

- **Foreign Contribution Regulation Act (FCRA)**: Bars political organisations from receiving **foreign donations** to prevent external influence.

- **Income Tax Act, 1961**: Allows **tax deductions** on political donations and mandates audited financial accounts be submitted to tax authorities.

Potential Reforms:

- **State Funding:** It was advocated by the **Indrajit Gupta Committee (1998)** and the **Law Commission (1999)**, suggesting that the **government partly cover the costs for candidates from recognised political parties**.

- While the concept is **challenging to implement**, it **remains a potential solution.**

- **Simultaneous Elections:** These are another proposed reform aimed at **reducing campaign expenses.**
  - However, they **would require constitutional amendments and face issues related to federalism.**
  - This approach may curb campaign spending somewhat, but **without addressing illegal voter inducements, simultaneous elections alone may have limited impact**.

- **Practical Reforms:** To create a fairer system, some practical reforms could be adopted.
  - Following **recommendations from the EC's 2016 report** on *"Proposed Electoral Reforms,"* political parties' financial support to candidates could be included **within the candidates' spending limits.**
  - Additionally, a **ceiling on party expenditures** could be introduced, calculated as the candidate spending limit multiplied by the number of candidates fielded.
  - Lastly, **appointing more judges in High Courts to expedite election-related cases** could act as a deterrent against violations.
  - Implementing these reforms would require bipartisan support and swift legislative action.

Subdivision of Quotas

Sub Topic- *Judgements & Cases, Judicial Review, Issues Related to SCs & STs, Indian Constitution, Government Policies & Interventions. Welfare Schemes*

Context:

India's reservation system, established to uplift historically marginalised communities like the Scheduled Castes (SCs) and Scheduled Tribes (STs), has aimed to correct long-standing social and economic exclusion.

More on News:

- For over 75 years, it has **opened pathways in education, government employment, and public offices** for communities once relegated to society's margins.

- However, there are now questions about whether the system is meeting its intended goals, especially as some SC subgroups appear to benefit more than others.

- Triggered by a recent Supreme Court ruling, debates have emerged on whether a *"quota-within-quota"* **approach** could make affirmative action more equitable across SC subgroups.

- This idea proposed dividing the SC quota to better support the most disadvantaged groups within it.

  ➤ States like Punjab have experimented with such policies, but the effectiveness of these subdivisions remains disputed.

An Overview of Caste-Based Quotas:

- **Deep-Rooted Inequalities: Dr. B.R. Ambedkar**, who was instrumental in drafting the Indian Constitution, emphasised that *mere legal equality wouldn't dismantle the deep-rooted caste inequalities*.

- **Legal to Substantive Equality:** Therefore, **reservations were introduced to help move from** *legal equality to substantive equality* by creating opportunities for SCs and STs in higher education, government jobs, and public offices.

- **SC Observations:** Yet, the Supreme Court's recent observations suggest that India's reservation system is **producing uneven outcomes**, with some SC groups progressing faster than others.

- **Nuanced Approach:** This has led to calls for a **more nuanced affirmative action approach** that recognises differences within the SC category itself.

What Data from Different States Tells Us:

- **Andhra Pradesh:** Data shows **minimal differences between the two major SC groups, Malas and Madigas**, with both seeing improvements in education and employment.

- **Tamil Nadu:** It also presents a **similar story**, with its two largest SC groups — Adi Dravida and Pallan — achieving comparable socio-economic outcomes by 2019.

- **Punjab:** Where the SC quota has been subdivided since 1975, this policy appears to have **benefited more disadvantaged groups like the Mazhabi Sikhs and Balmikis**, who have begun catching up to more advanced

groups such as the Ad Dharmis and Ravidasis.

- **Bihar:** Conversely, Bihar's attempt to subdivide the SC quota in 2007 by creating a **"Mahadalit"** catego**ry met challenges, as political pressures** eventually led to the inclusion of all SC groups in the category, diluting its purpose.

- A broader observation is that while disparities exist within the SC category, the gap between SC groups and upper-caste groups is still far more significant.

Access to Reservations:

- **Reliable jati-wise data** on reservation usage **remains limited**.

- A question from the **India Human Development Survey (IHDS),** asking if individuals possess a **caste certificate** (a prerequisite for accessing reserved positions in education and employment), provides a rough estimate of access.

- In **Uttar Pradesh and Bihar, fewer than 50% of SC households reported holding these certificates,** suggesting that many SCs are unable to access the benefits intended for them.

- **Tamil Nadu and Andhra Pradesh** perform better, with **60-70%** of SC households holding certificates, but they remain exceptions.

- This highlights a **fundamental issue** with the current system — **access.**

- Without ensuring that all eligible SCs can benefit from reservations, subdividing the quota is secondary. The **priority should be improving access to reservations** universally to enable all entitled SCs to take advantage of these benefits.

Is Quota-Within-Quota the Solution?

- The idea of a "quota-within-quota" has **merit in places like Punjab,** where clear disparities between SC subgroups exist.

- However, **in states like Andhra Pradesh and Tamil Nadu, data indicates that benefits are already fairly evenly distributed,** making further subdivision less necessary.

- **Political influences often complicate the effectiveness** of quota subdivisions, as seen in Bihar, where decisions about inclusion in disadvantaged categories can be driven by political motivations rather than evidence.

  ➤ This **risks turning affirmative action into a political tool** rather than a genuine instrument for social justice.

- The **Supreme Court's proposal** to introduce

a **"creamy layer"** exclusion for SCs — similar to the policy for Other Backward Classes (OBCs) — **needs to be approached with caution.**

- While income could determine eligibility for monetary benefits like scholarships, **class improvement alone does not eliminate discrimination** for historically marginalised groups.

  - ➤ **Economic mobility has yet to erase the stigma of untouchability,** both in India and globally.

  - ➤ While reservations have helped create a Dalit middle class, which might gradually reduce stigma, the time may not yet be ripe for creamy layer exclusion within SCs.

The Need for Updated Data:

- The pressing need for **updated, accurate data** cannot be overstated.

- India's **delayed national Census is the only comprehensive source** that can reveal caste-based disparities.

- Without it, efforts to reform the system are likely to rely on incomplete or outdated evidence.

Right to Privacy (R2P)

Sub Topic- *Judgements & Cases, Fundamental Rights, Quasi-Judicial Bodies*

Context:

In a landmark decision on privacy rights within marriage, the **Madurai Bench of the Madras High Court** has ruled that **evidence obtained by violating a spouse's privacy is inadmissible in court**.

More on News:

- Justice G.R. Swaminathan affirmed that **privacy is a fundamental right** that **remains intact within marriage** and that marital status does not diminish this constitutional protection.

- The case stemmed from a petition, filed by R (the wife) against her husband B and the Secretary to the Ministry of Electronics and Information Technology.

- The wife contested the admissibility of call records submitted by her husband to support his divorce petition, arguing

that he accessed the records without her consent, thus infringing on her privacy.

Case Background:

- The conflict began in 2019 when **B filed for divorce in the Subordinate Court** of Paramakudi, **citing cruelty, adultery, and desertion**.

- During the proceedings, **he presented his wife's call records as evidence.**

- R **challenged the use of these records, claiming her husband had obtained them unlawfully,** and filed a petition to exclude them.

- When the trial court dismissed her plea as premature, R sought relief from the High Court.

- Justice Swaminathan's ruling tackled the admissibility of evidence obtained through privacy breaches, raising crucial questions about privacy rights in marriage.

- To assist with the legal complexities, the court appointed Senior Counsel Mr. Srinath Sridevan as amicus curiae.

The **Right to Privacy** in India is recognised as a fundamental right under **Article 21 of the Indian Constitution**, which guarantees the *right to life and personal liberty*. Although the Constitution does not explicitly mention privacy, the Supreme Court has interpreted Article 21 to include this right, particularly in light of landmark judgments.

Historical Context

- **Early Cases:** In the past, cases like *Kharak Singh vs State of Uttar Pradesh* (1963) initially denied the recognition of a fundamental right to privacy, although it **acknowledged aspects of personal liberty.** The court ruled that **police surveillance did not infringe on constitutional rights at that time.**

- **Significant Ruling:** The pivotal moment came with *Justice K.S. Puttaswamy (Retd) vs. Union of India* (2017) case, where a nine-judge bench unanimously declared that the **right to privacy is indeed a fundamental right protected under Article 21**. This ruling overruled previous judgments that had denied this recognition and established that privacy is an intrinsic part of personal liberty.

Legal Issues Discussed:

- **Privacy Rights Within Marriage:** The central question was whether the fundamental right to privacy, as recognised in the *Justice K.S. Puttaswamy (Retd.) vs Union of India case*, extends to marital relationships.

  ➢ Justice Swaminathan concluded that each spouse retains an individual right to privacy and cannot infringe on the other's privacy for evidence gathering purposes.

- **Admissibility of Evidence Obtained Through Privacy Breach:** The court scrutinised legal standards for electronic evidence under **Section 65B(4) of the Indian Evidence Act, 1872.**

  ➢ The husband had submitted call data without a certificate from the telecom provider, relying instead on self-certification. The court deemed this inadequate, making the evidence inadmissible.

- **Implications of the Bharatiya Sakshaya Adhiniyam (BSA), 2023:** While **not directly applicable to this case,** Justice Swaminathan referred to stricter electronic evidence standards established by the BSA, which requires certification by an expert under Section 79A of the Information Technology Act, 2000. He noted that Tamil Nadu currently lacks such designated experts, stressing the need for government intervention.

Court's Observations and Verdict:

- Justice Swaminathan emphasised the importance of privacy and mutual respect in marriage, noting that *"trust forms the bedrock of matrimonial relationships."* He stated that the violation of a spouse's privacy erodes this trust, concluding that *"privacy as a fundamental right includes spousal privacy,"* and declared that evidence obtained through such invasions is inadmissible.

- The court also addressed arguments regarding the Family Courts Act, 1984, which allows Family Courts to admit any material necessary for resolving matrimonial disputes. Justice Swaminathan clarified that this *authority does not supersede constitutional rights,* cautioning that allowing privacy violations could set a troubling precedent for unauthorised surveillance within families.

Need for Experts to Certify Electronic Evidence:

- The judge also addressed procedures for filing electronic evidence, analysing Section 63 and Section 39 of the BSA, 2023, alongside Section 79A of the IT Act, 2000.

- Justice Swaminathan concluded that **any individual relying on electronic records as evidence must submit a certificate at the time of filing**, consisting of Parts A and B. Part B must be completed by an expert designated under Section 79A of the IT Act.

- Expressing concern over the scarcity of designated experts, with none available in Tamil Nadu, the judge pointed out that this lack could effectively deny access to justice.

- He directed the Ministry of Electronics and Information Technology to appoint sufficient experts across Tamil Nadu, ideally one per district, within three months.

Borrowing Powers and Related Provisions

Sub Topic- *Fiscal Policy, Government Policies & Interventions*

Context:

In 2023, the central government imposed a **'Net Borrowing Ceiling' (NBC)** on **Kerala**, limiting the maximum borrowing the state can undertake to 3% of its projected Gross State Domestic Product (GSDP) for FY 2023-24.

More on News:

- This **NBC covers all borrowing methods**, including open market loans, financial institution loans, and liabilities from Kerala's public account.

- To prevent states from bypassing this borrowing limit through state-owned enterprises, the ceiling now also includes certain borrowings by these entities.

Impacts on Kerala's Finances:

- **Meeting Expenses:** This restriction has severely impacted Kerala's finances, making it difficult for the state **to meet expenses and invest in developmental and welfare projects.**

- **Tensions:** It has also sparked **political and legal tensions between the Centre and the state.**

➤ Kerala has **approached the Supreme Court**, arguing that this measure encroaches on its executive authority under **Article 293** of the Indian Constitution, which **grants states the power to borrow based on the security of the Consolidated Fund**.

● **Fiscal Autonomy:** Kerala claims that its fiscal autonomy, as enshrined in the Constitution, has been unlawfully curtailed by the Centre.

➤ This case marks the **first time Article 293 has been brought before the Court** for interpretation.

Borrowing Powers and Provisions:

● **Chapter II of Part XII of the Constitution:** It covers the **borrowing powers** of the Centre and states.

➤ **Article 292 allows the central government to borrow against the security of the Consolidated Fund of India**, while **Article 293 allows state governments** to borrow within India based on the state's Consolidated Fund.

● **Extent of Borrowing:** It **may be set by laws enacted by Parliament and state legislatures,** respectively.

➤ Article 293(2) permits the Centre to lend to states, with terms set by any applicable laws made by Parliament.

● **Restrictions:** Additionally, **Article 293(3) restricts states** from **borrowing without the Centre's consent** if there are **outstanding loans or guarantees** previously provided by the Centre.

➤ The Centre has **broad discretion** over "consent" and may impose any conditions it deems appropriate.

Sources of Article 293:

● **GoI Act, 1935: Article 293** is derived from **Section 163 of the Government of India Act, 1935.**

➤ Section 163(4) of the 1935 Act required that while exercising powers under Section 163(3), the Federation should not unreasonably delay or deny loans or guarantees or impose unreasonable conditions if provinces showed sufficient cause.

● **Constituent Assembly:** In debates on Article 293 (formerly draft Article 269), Constituent Assembly member **Ananthasayanam Ayyangar highlighted the need for scrutiny**

of borrowings, as they impose long-term obligations on future generations.

➤ He suggested creating a **commission similar to the Finance Commission.**

● **Disputes:** Disputes over such matters would be **referred to the Governor-General, whose decision was final**.

➤ However, this clause **was not included in the Indian Constitution**, as it was thought unnecessary after Independence, given the replacement of provinces by state governments and the establishment of a national government at the Centre.

Addressing Revenue Shortfall:

● **FRBM Act:** To implement Article 292, the Fiscal Responsibility and Budget Management (FRBM) Act, 2003 was **enacted to ensure financial discipline** through goals like **eliminating revenue shortfall and reducing fiscal deficit.**

➤ The **Centre's fiscal deficit target is set at 3% of GDP**, and **states have their own fiscal laws** in line with this target.

➤ The **FRBM Amendment Act, 2018**, requires the **Centre to keep the fiscal deficit below 3% of GDP** and **total public debt under 60% of GDP.**

➤ The Centre aims to reduce the fiscal deficit to below 4.5% of GDP by 2025–26.

● **Concerns Over Fiscal Autonomy:** By capping states' borrowing limits, the Centre intends to promote fiscal discipline, but this has raised **concerns over states' financial autonomy and their ability to balance their budgets.**

● **Supreme Court's Involvement:** The Supreme Court is now addressing the issue of states' borrowing powers under Article 293, as Kerala's case raises critical questions about fiscal decentralisation, state autonomy, and the Centre's financial regulations.

➤ The Court has **referred this matter to a Constitutional Bench** for examination, which will also consider the impact of these fiscal constraints on the Reserve Bank of India's role in fiscal management.

Revisiting Article 293:

● Given the **changing economic, political, and fiscal landscape** in India, it may be time to review Article 293 of the Constitution.

● Section 163(4) of the Government of India Act, 1935 cautioned against **unreasonable**

delays, refusals, or conditions in granting loans by the Centre.

- A similar provision could be considered to resolve disputes between the Centre and states.

Strengthening Article 293:

- Article 293 could be strengthened in the following ways:
- **Establishing a Commission:** As **Ananthasayanam Ayyangar** suggested, a commission similar to the Finance Commission **could help resolve disputes** related to loan approvals by considering both state finances and the Centre's fiscal goals.
- **Setting Clear Guidelines:** Guidelines could **ensure transparency** when the Centre exercises its powers under Article 293(4).
  - This balanced framework would **support cooperative federalism** and **prevent arbitrary decisions** that could compromise fiscal discipline or impose excessive constraints.
- **Transparency in Decision-Making:** Establish clear, public procedures for approving or rejecting state borrowing requests.
- **Consultation Process:** Engage with state governments before imposing any borrowing terms or limits, fostering a cooperative approach.
- **Uniform Terms:** Apply borrowing terms and restrictions equitably to all states, avoiding any bias.
- **Respect for Fiscal Autonomy:** Ensure that restrictions are reasonable and do not excessively hinder a state's financial management.

Adhering to these guidelines would help the Centre exercise its powers under Article 293(4) fairly and transparently, promoting balanced fiscal management and cooperative federalism.

AMU and Minority Status

Sub Topic- *Indian Constitution, Constitutional Amendments, Fundamental Rights, Directive Principles of State Policy, Judicial Review*

Context:

On November 8, 2024, the Supreme Court delivered a 4-3 majority verdict overturning its 1967 decision in *S. Azeez Basha vs Union of India*,

which had denied Aligarh Muslim University (AMU) minority institution status.

More on News

- The majority judgement, authored by Chief Justice D.Y. Chandrachud and supported by Justices Sanjiv Khanna, JB Pardiwala, and Manoj Misra, **ruled in favour of AMU.**
- Justices Surya Kant, Dipankar Datta, and S.C. Sharma dissented, each offering separate opinions.

Minority Institutions

- **Article 30(1):** This article of the Constitution **guarantees the right of religious and linguistic minorities to establish and manage educational institutions of their choice**.
- **Article 30(2):** It ensures **equal treatment in state aid to all institutions,** regardless of their minority status.
- **Autonomy:** Minority institutions enjoy significant autonomy, **including the ability to reserve up to 50% of seats** for their community members, and are **exempt from providing reservations for SC/STs under Article 15(5).**
  - The Supreme Court in the *T.M.A. Pai Foundation case (2002)* clarified that **minority status is based on the state's demographic composition.**

Background of the Case

- **1875: Establishment of MAO College:** Sir Syed Ahmed Khan, a Muslim reformer and educator, founded the Muhammadan Anglo-Oriental (MAO) College in Aligarh to provide modern British education based on Islamic values for Muslims.
- **1920 - AMU Act:** The Aligarh Muslim University Act (AMU Act) was passed, integrating MAO College and the Muslim University Association into Aligarh Muslim University (AMU).
- **Section 23 of AMU Act (1920): Only Muslims were allowed to be members** of the university's governing body, the Court.
- **1951 - Abolition of Muslim-Only Representation:** The requirement for Muslim-only representation on the Court was abolished.
- **1965 - Redistribution of Powers:** An amendment redistributed the Court's powers among other administrative bodies, including allowing the President of India to nominate members.

- **1967 - Azeez Basha Ruling:** The Supreme Court, in the Azeez Basha case, upheld the amendments, stating that **AMU was not established or administered by a Muslim minority** since it was created through central legislation.

- **1981 - Amendment for Minority Status:** In response to protests, the AMU Act was amended to officially recognise the university's minority status.

- **2005 - Postgraduate Medical Course Reservation:** AMU introduced a policy reserving 50% of seats in its postgraduate medical courses for Muslim students.

- **2005 - Allahabad High Court Ruling:** The Allahabad High Court struck down the reservation policy, ruling that **AMU did not qualify as a minority institution** as per the Azeez Basha ruling.

- **2006 - Supreme Court Stay:** A two-judge Bench of the Supreme Court stayed the reservation policy and referred the case to a larger Bench.

- **2019 - Reconsideration of Azeez Basha:** A three-judge Bench headed by former Chief Justice Ranjan Gogoi referred the Azeez Basha decision for reconsideration by a seven-judge Bench.

- **2023 - Seven-Judge Bench Formation:** In October 2023, Justice Chandrachud constituted a seven-judge bench to hear the case, which had been in limbo for several years.

Majority Opinion

- **Justice Chandrachud,** interpreting Article 30 expansively, ruled that **educational institutions established before the Constitution are entitled to protections under Article 30(1)** if their primary purpose was to benefit a minority community.

  - He clarified that **statutory recognition or change in administration does not strip an institution of its minority status**, especially if the founders or community appoint non-community members to manage secular education.

- The majority **overturned the Azeez Basha ruling,** emphasising that **legal formalities for recognition should not invalidate an institution's minority status.**

- The **onus is on the minority** to prove the institution was created primarily for their benefit.

- The court also ruled that recognising an institution as of national importance does not diminish its minority status, and religious aspects like buildings or instruction are not decisive in determining minority status.

Dissenting Opinions

- **Justice Kant** disagreed on **procedural grounds,** arguing the referral to a seven-judge Bench was improper, undermining the Chief Justice's authority.

- Justice Datta, while agreeing on procedural issues, **questioned the legitimacy of granting AMU minority status after nearly a century,** calling it *"historical revisionism,"* and criticised the lack of constructive discussions.

- **Justice Sharma** argued that initial support from a minority community doesn't automatically grant minority status, especially when the institution is controlled by the government.

What Next?

- A **regular bench**, appointed by Chief Justice Sanjiv Khanna, **will now reconsider AMU's minority status** using the criteria outlined by the majority, **without being bound by the Azeez Basha decision.**

- The **stay on the university's 2005 reservation policy will continue** until a final ruling is made.

- This reassessment could have significant consequences for AMU's autonomy, its ability to reserve seats for Muslim students, and the wider debate on minority rights in India.

Rethinking Cooperative Federalism in India

Sub Topic- *Federalism, Co-operative Federalism*

Context:

In discussions about the Indian Union, scholars often characterise it as an example of *"cooperative federalism."*

More on News:

- **Former Chief Justice of India D. Y. Chandrachud**, in a lecture delivered in October 2023 shortly before his retirement, **reaffirmed this view**, highlighting the **importance of cooperative federalism in democratic governance.**

- However, he emphasised that **cooperation doesn't imply state conformity** with Union policies.
- Rather, cooperative federalism in India **should be built on discussions and dialogues** that range from **cooperation to contestation and even competition.**

The Evolution of Cooperative Federalism in India:

- **Ideal Approach:** The term "cooperative federalism" is often discussed in Indian academic circles **as an ideal approach for balancing power** between the Union and state governments.
- **Collaboration:** This model implies that the **Union and states work collaboratively, ironing out differences through dialogue** to achieve shared developmental goals.
- **Consensus:** It suggests an approach where both levels of government **work toward consensus for the collective benefit**.
- **Not in Sync with Reality:** However, this idealised view has not always matched reality, as historically, **central planning and one-party dominance** often pressured states into conforming to Union mandates. This form of cooperation, in fact, often **bordered on coercion.**

GST and Challenges:

- **GST:** The introduction of the Goods and Services Tax (GST) aimed to **simplify taxation by unifying multiple consumption taxes into a single national tax.**
  - This reform **required states to sacrifice some fiscal autonomy for the potential economic gains** of a unified market.
  - To facilitate this cooperation, the **GST Council was established** as a joint body of the Union and states, serving as a platform for deliberation.
  - To ensure state compliance, the **Union promised compensation for any revenue loss due to GST implementation**, guaranteeing a 14 percent growth from the base year of 2015-16.
- **Pandemic:** The **pandemic disrupted this arrangement.**
  - The Union government's decision to

discontinue compensation, citing the pandemic as an **"Act of God,"** led to **widespread dissatisfaction among states.**

Competitive Federalism: A Reality in Indian Governance:

- While cooperative federalism is often promoted, what **India frequently experiences is a model of competitive federalism.**
- This competition exist**s both vertically,** between the Union and states, **and horizontally,** among states themselves.
- Competition occurs in **various forms—** political parties vie for control, states compete for resources, and both Union and state governments seek to attract investments.
- This competitive dynamic **can promote efficiency but requires certain conditions,** such as **"competitive equality"** and **fair distribution of costs and benefits.**
- Unfortunately, the **asymmetric power** between the Union and states, along with the **absence of institutions to regulate competition,** complicates the realisation of fair competitive federalism.

> **Article 252 allows Parliament to legislate on state matters** when two or more states consent to such legislation. This provision enables states to coordinate and empower the Union to legislate on subjects of mutual interest, promoting collective action. Meanwhile, **Article 256** requires that **executive power in every state be exercised in a manner that does not interfere with the Union's executive power,** ensuring alignment in policy implementation while respecting state autonomy.

The Need for Formal Intergovernmental Coordination:

- The **Indian Union lacks formal mechanisms** to coordinate, negotiate, and resolve **conflicts** between Union and state governments.
  - The **first Administrative Reforms Commission** in 1966 suggested an **inter-state council for coordination.**
  - This recommendation was **reiterated by the Sarkaria Commission** in 1983, which stressed the need for a neutral body to mediate Union-state issues.
- Although the **National Development Council** exists, it **rarely convenes,** and when it does, discussions often devolve into

grievance airing rather than constructive dialogue.

- During the era of the **Planning Commission**, there were **annual discussions** that allowed states some voice in national planning, but **after economic liberalisation in 1991, these became more about negotiating grant allocations than meaningful policy deliberations.**

- While the **63rd Constitutional Amendment** created the **Inter-State Council**, it was **placed within the Union Home Ministry,** limiting its independence and non-partisan role.

Towards an Inclusive and Balanced Federal Structure:

- **Diverse Political Landscape:** As India's political landscape becomes more diverse, with **regional parties gaining influence at the state level,** the need for an institution dedicated to intergovernmental coordination has never been greater.

- **Independent Body:** Establishing an independent, efficient body to regulate competition, manage conflicts, and facilitate negotiation is critical to achieving the vision of a *Viksit Bharat*, a developed India.

SC issues Guidelines to Curb Illegal Demolitions

Sub Topic- *Judiciary, Judgements & Cases, Government Policies & Interventions*

Context:

The Supreme Court has issued guidelines to curb illegal demolitions, specifically addressing cases where homes and private properties are demolished simply because occupants are accused of crimes.

More in News:

- These guidelines were **issued following cases from Rajasthan and Madhya Pradesh** where demolitions took place after Muslim tenants were accused of crimes that led to communal unrest.

- Similar cases from other states, including the **Jahangirpuri demolitions in Delhi,** were also cited.

Supreme Court Guidelines on Illegal Demolitions:

- **Mandatory Notice Period:** The SC has made it mandatory for authorities to issue a **15-day notice before any demolition.** This allows

tenants time to either challenge the order legally or manage their affairs before eviction.

- **Clear Justification and Hearing Date:** The notice must specify the reasons for demolition and provide a hearing date where the tenant can contest the action.

- **Penalties for Non-Compliance:** Violating these guidelines could result in contempt proceedings. Officials responsible for illegal demolitions may be held personally liable to pay restitution and compensation.

- **Protection of Fundamental Rights:** The SC emphasised that these demolitions violate rights under **Article 21 of the Constitution,** which guarantees the right to shelter. The court condemned punitive demolitions, especially as they infringe on the presumption of innocence and unfairly affect uninvolved tenants.

Recent controversial cases of Demolition and State Laws on demolition process:

Rajasthan:

- **Case:** Udaipur Municipal Corporation demolished a tenant's house allegedly encroaching on forest land after the tenant's son was accused of a crime.

- **Notice Requirements:** Notice was issued the night before the demolition.

- **Legal Provisions:**

  - **Rajasthan Municipalities Act, 2009 (Section 245):** Imposes penalties for public land encroachment but mandates written notice, a chance for representation, and a hearing.

  - **Rajasthan Forest Act, 1953 (Section 91):** Only a Tehsildar can issue an eviction order for illegal forest land occupancy.

Madhya Pradesh:

- **Case:** Ancestral home demolished after the owner's son was accused of a religiously sensitive crime.

- **Notice Requirements:** Demolition occurred on the same day as the FIR, allegedly without prior notice.

- **Legal Provisions: Madhya Pradesh Municipalities Act, 1961 (Section 187):** Allows demolition of unauthorised structures but requires prior notice and an opportunity for the owner to show cause.

Need for Supreme Court Guidelines:

- **Due Process Violations:** Demolitions in cases from Rajasthan, Madhya Pradesh, and Delhi were often carried out without adequate notice or a fair hearing, **depriving tenants of the chance to legally contest these actions.**

- **Protection of Fundamental Rights:** These actions **violated Article 21** of the Constitution, which guarantees the right to shelter. Demolitions conducted **without due process undermine this fundamental right.**

- **Presumption of Innocence and Fair Treatment:** Many demolitions were based on unproven criminal allegations, punishing tenants and uninvolved residents alike, which contravenes the presumption of innocence.

- **Concerns over Targeted Actions:** Demolitions frequently followed communal tensions, raising concerns about potential misuse of state power to target specific communities without clear legal justification.

Impacts and Significance of the Verdict:

- **Enhanced Legal Protections:** The mandatory **15-day notice** and hearing requirement allow tenants time to prepare or legally challenge eviction, ensuring procedural fairness.

- **Reduced Arbitrary and Punitive Demolitions:** The guidelines deter the use of demolitions as punitive measures in communal or criminal contexts, promoting impartial treatment and protecting vulnerable communities from discrimination.

- **Accountability for Officials:** By establishing penalties, including contempt proceedings and personal liability for restitution, the guidelines promote adherence to lawful processes.

- **Policy Influence and Consistency:** States may revise demolition procedures to align with these standards, creating more uniform, transparent, and fair practices across India.

- **Reinforcement of Constitutional Rights and Rule of Law:** This verdict strengthens the protections under Article 21 and restricts arbitrary state action, affirming that punitive demolitions targeting specific groups are unconstitutional.

- **Judicial Safeguards for Vulnerable Groups:** By upholding the right to shelter and presumption of innocence, the Supreme Court's guidelines foster public trust in the judiciary's role as a guardian of rights, particularly for marginalised communities.

PMAY-G Survey to use 'Face Recognition' tools to identify new Beneficiaries

Sub Topic- *Government Policies & Interventions*

Context:

A **new survey for the rural housing (PMAY-G)** scheme aims to identify 8 million additional beneficiaries, alongside the existing 12 million, **using advanced face-recognition tools to minimise gaps.**

About PMAY-G:

- **Launch of Flagship Scheme:** The Pradhan Mantri Awaas Yojana – Gramin (PMAY-G) is a flagship rural development program launched by Prime Minister Narendra Modi on November 20, 2016.

Pradhan Mantri Awas Yojana–Gramin performance matrix ■ FY05 to FY14 ■ FY15 to FY25*

Houses built (in mn): 20.6 | 34.4*

Central funding (₹cr): 69,744 ₹6,974 cr/yr** | 2,56,440 ₹25,644 cr/yr**

*As on November 18, 2024; **Average value; #includes pending houses from Indira Awas Yojana   Source: Rural Development ministry

Year-wise progression In house constructions
Houses completed (in mn)

3.40 FY21 | 4.20 FY22 | 5.80 FY23 | 2.64 FY24 | 0.22 FY25

- **Vision:** The scheme aims to fulfil the government's vision of **"Housing for All"** by providing affordable and quality housing to the rural poor.

- **Objectives:** PMAY-G ensures inclusivity by prioritising women beneficiaries, the economically weaker sections, and marginalised communities, with ownership primarily in the name of women or as joint ownership.

Achievements in the First Phase (2016-24):

- **Sanctioned and Completed Houses:** Out of the 29.5 million houses sanctioned, 27 million have already been constructed.
- **Saturation in 20 States:** Based on the Socio-Economic Caste Census (SECC) 2011 and the first Awasplus survey conducted in 2018, 20 out of 34 states have achieved saturation in beneficiary coverage.
- **Empowerment of Women:** Approximately 74% of the houses were allotted to women beneficiaries or as joint ownership during the initial phase. By 2024, 100% of houses are being sanctioned under the same criteria, ensuring gender inclusivity and financial empowerment.

Key achievments from FY16–FY25* (in mn)

26.7	30.2	32.1	33.0
Houses constructed	First installment	Sanctioned houses	House target

Post-2024 Targets Under PMAY-G:

The government has set ambitious goals for the next five years.

- **20 Million New Rural Houses:** The scheme plans to construct an additional 20 million houses by 2029.
- **Immediate Focus:** The identification of at least 8 million new beneficiaries in addition to the existing 12 million identified.
- **Annual Targets:** For 2024-25, the goal is to construct 3.8 million houses, reflecting a structured and systematic approach to scaling the program.

Methods of Identifying Beneficiaries:

The identification process for PMAY-G has evolved over the years to ensure accuracy and inclusivity.

- **SECC 2011:** Initially, beneficiary identification was based on data from the SECC 2011, providing a foundational list.
- **First Awasplus Survey (2018):** Conducted to address gaps in SECC 2011 data, identifying additional eligible households overlooked in the original survey.
- **Second Awasplus Survey (2024):** Aimed at identifying 20 million rural houses over five years, this survey focuses on including first-time beneficiaries and addressing regional gaps.

New Face Recognition Survey Post-2024:

To enhance accuracy and transparency, PMAY-G is incorporating advanced technology for beneficiary identification.

- **Face Recognition Tools:** These tools ensure accurate identification, reduce duplication, and eliminate errors in the beneficiary database.
- **Self-Survey via Awaassoft App:** Beneficiaries can conduct their own survey using the mobile application, which is allowed only once per device to maintain data integrity.

Benefits of the New Survey Approach:

- **Accuracy:** Face recognition ensures that beneficiaries are correctly identified, minimising errors and fraudulent claims.

Need for the New Survey Type:

Despite the success of traditional methods, gaps in coverage and inclusion persisted, necessitating a more robust mechanism.

- **Challenges in Manual Surveys:** Errors in data collection, duplication, and exclusion of eligible beneficiaries highlighted the limitations of older methods.
- **Role of Technology:** Face recognition and self-surveys ensure that every eligible individual is accounted for, aligning with the government's objective of equitable and transparent resource allocation.

- **Transparency:** The self-survey process empowers individuals while ensuring data integrity.
- **Efficiency:** Automation of the survey process speeds up data collection and analysis, reducing manual effort and delays.

Comparison with Existing Surveys::

- **Traditional Surveys (SECC and Awasplus):** Relied on manual enumeration and verification, prone to errors and delays.
- **Face Recognition-Based Surveys:** Incorporate advanced technology, enhancing accuracy and significantly reducing scope for duplication or exclusion.

Elections, Accountability, and Democracy in the Time of A.I.

Sub Topic- *Governance, Accountability & Transparency*

Context:

As of now, **over 80 countries,** including seven of the 10 most populous, are **holding or preparing for elections,** representing **three billion registered voters** across regions like South Asia, the US, EU, and UK.

More on News:

- These elections **occur amid global challenges** such as **geopolitical tensions, inflation, inequality, and societal polarisation.**

- The rise of **AI-driven misinformation,** highlighted as a **top global risk by the World Economic Forum's 2024 Global Risks Report,** poses significant threats to informed voter decisions.

- **Foreign and domestic actors,** including nations like **China, Russia, and Iran, are increasingly using AI tools to manipulate public opinion,** disrupt election integrity, and exploit vulnerabilities like voter fraud narratives.

- Agencies like the FBI and CISA warn that **these tactics aim to undermine trust during critical election phases** and gather data for future interference efforts.

Technology and Democracy: From Early Promise to Emerging Dangers:

In July 2024, a viral **"deepfake" video mimicking Vice President Kamala Harris** with a voice-cloning tool spread disinformation, portraying her as incompetent and labelling her a **"diversity hire."**

- **Narratives of Liberation and Control: Foreign interference** in democratic elections is not new.

  - For instance, under the **Monroe Doctrine,** the **US supported a military junta in Chile to overthrow its democratically elected government in 1973.**

  - **Russia's interference in the 2016 US presidential election** remains a striking example.

- **Early Optimism About Digital Tools:** Digital platforms like **WhatsApp, Facebook, and YouTube initially empowered citizens**, enabling better campaign access, fundraising,

and feedback.

- **User data allowed political actors to personalise outreach,** while AI tools like Machine Learning **enhanced predictive insights and engagement.**

- **Emerging Threats in the AI Era:** While AI holds potential for democratic improvements, its **misuse endangers representation, accountability, and trust.**

- A May 2024 study suggests that **while voters' decisions are often premeditated, persuasive AI-generated audio-visual content poses a significant risk of swaying opinions**, particularly among marginal groups.

AI in the Electoral Process: Insights from South Asia:

In South Asia, where **over a billion voters participated in elections in early 2024,** trends highlight the growing influence of AI and misinformation in shaping democratic processes.

- **Bangladesh:** In the January 2024 elections, **disinformation campaigns targeted the opposition Bangladesh National Party (BNP).**

  - Additionally, **misinformation campaigns targeted the US government** for pressuring the ruling Awami League to ensure a fair election, with disinformation networks generating revenue from malicious content.

- **Pakistan:** In February 2024, **former Prime Minister Imran Khan leveraged AI-generated audiovisual messages to claim election victory while in prison**, despite a crackdown on his party, Pakistan Tehreek-e-Insaf (PTI).

- **Sri Lanka:** During Sri Lanka's September 2024 presidential elections, a **"shallowfake" video of Donald Trump** endorsing National People's Power leader Anura Kumara Dissanayake caused political backlash.

- **India:** India's general elections (April–June 2024) involved **969 million voters**. AI **facilitated large-scale surveys, sentiment analysis, and voter personalisation** while improving vote counting and fraud prevention.

  - Efforts to counter misinformation included a **WhatsApp helpline** from the Misinformation Combat Alliance and Meta, as well as interventions by the **Election Commission of India (ECI) under Article 324** of the Constitution.

> While India saw limited deepfake content and **no direct evidence of foreign AI interference, OpenAI disrupted anti-BJP activity by an Israeli firm** generating **pro-Congress social media content.**

The Imperatives of Resilience, Governance, and Awareness:

Advancements in Artificial Intelligence (AI), particularly **Generative AI, are reshaping content creation**, necessitating a transformative approach to combating misinformation.

- **Detection (Debunking):** A range of **forensic tools and techniques can identify deepfakes and misinformation.**
  - These include **analysing unnatural blinking, distortions in features, inconsistencies in lighting within videos,** mismatches between speech and mouth movements, and the absence of biometric markers specific to known individuals.

- **Prevention (Content Provenance):** The content provenance approach focuses on **embedding watermarks or metadata into digital content.**
  - This metadata **records the creator, creation time, and method of production,** enabling platforms and users to verify authenticity.
  - Standards like the **Coalition for Content Provenance and Authenticity (C2PA) have gained traction.** C2PA's framework **binds provenance data to media from creation through editing,** ensuring a tamper-evident record that can be verified by users or downstream systems.

Regulation: Transparency, Accountability, and Enforcement

Global AI regulation **requires both international frameworks and national policies.**

- **The EU AI Act: A Comprehensive Framework:** On May 21, 2024, the European Parliament adopted the EU AI Act, the **world's first comprehensive AI regulation.**
  - Prohibitions under Article 5 **ban systems that exploit subliminal techniques, endanger informed decision-making, or enable harmful surveillance.** Violators face significant **fines, ranging from €7.5 million to 7% of global turnover.**

- **USA: Countries like the US have adopted voluntary compliance models** emphasising industrial autonomy.

- **China: China focuses on commercial development and state control.**

- **ASEAN:** The ASEAN region promotes **business-friendly ethical guidelines for AI governance.**

India's Policy Prerogatives:

- India is **in the early stages of developing a national AI regulatory framework,** drawing lessons from global approaches.

- Recent **efforts include leveraging existing laws like the Information Technology Act and issuing advisories** to social media platforms to combat deepfake content. However, **reactive measures risk stifling innovation and eroding trust.**

- **Indian policymakers are encouraged to adopt globally validated principles of democratic governance,** such as transparency, accountability, and citizen rights.

- Establishing an **AI Safety Institute (AISI)** and addressing strategic, tactical, and technical priorities will be crucial:
  - **Strategic Goals: Avoid the "developing nation" trap** by participating actively in global AI governance and enforcing chosen regulatory rules.
  - **Tactical Measures:** Maintain **regulatory flexibility,** conduct risk assessments, and balance innovation with accountability.
  - **Technical Development: Address complexities in AI,** including data ownership, algorithmic transparency, and intellectual property, while fostering harmonised compliance standards.

Public Awareness and Literacy:

- The rise of deepfakes has created a phenomenon known as the **"Liar's Dividend,"** where **increasing scepticism allows misinformation to flourish unchecked.**

- **Simple communication strategies,** such as **Microsoft's educational primer on deepfakes, and collaborations between media platforms and public figures** can help raise awareness.

- **Universities** in India have begun offering courses on digital disinformation, signalling a growing societal response to these challenges.

Packaged Food Labelling: Why It Matters

Sub Topic- *Governance*

Context:

A new report by the **Access to Nutrition Initiative (ATNi)** reveals that leading food and beverage (F&B) companies **sell less healthy products in low-and-**

middle-income countries (LMICs) compared to high-income countries (HICs).

Findings from the ATNi Report:

The Access to Nutrition Initiative (ATNi) **assessed 52,414 products from leading brands** like Nestlé, PepsiCo, Unilever, Coca-Cola, and Hershey.

Key Results:

- **Health Star Ratings:**
  - Average score in **Low- and Middle-Income Countries (LMICs)**: 1.8 stars.
  - Average score in **High-Income Countries (HICs)**: 2.3 stars. LMICs had fewer healthy product options compared to wealthier nations.
- **Affordability:** Only 30% of companies had plans to make healthier foods affordable for low-income groups.
- **Nutritional Data:** Products sold in LMICs often **lacked key information about micronutrients,** unlike those in HICs.
- **Health Disparities:** The report highlighted that **big companies often sell less healthy products in LMICs than in richer countries,** contributing to nutritional inequities.

Understanding Non-Communicable Diseases (NCDs) in India:

India is witnessing a surge in diseases like diabetes, heart conditions, and obesity. These are driven by:

- **Unhealthy Diets:** A rise in processed and calorie-rich packaged food consumption.
- **Lifestyle Shifts:** Urbanisation and sedentary habits.
- **Limited Awareness:** People lack knowledge about the long-term effects of poor dietary choices.

NCDs already impact millions:

- Over **10 crore Indians** have diabetes.
- **24% of women** and **23% of men are obese (NFHS-5).**
- Unhealthy diets account for **56.4% of India's disease burden (ICMR, 2024).**

India's Dual Food Challenges:

India faces two significant dietary issues:

- **Overnutrition:** Growing consumption of foods high in sugar, fat, and salt.
- **Undernutrition:** Persistent anaemia and deficiencies in essential nutrients.

Additionally, affordability is a concern. According to the UN, over 50% of Indians cannot afford a healthy diet, while spending on processed foods continues to rise, further straining health outcomes.

Can Front-of-Pack Labelling (FOPL) Help Solve India's NCD Problem?:

FOPL is a system where food packaging **displays key nutritional information** to help consumers make healthier choices. Systems like the **Health Star Rating (HSR)** rate foods on a scale from **0.5 to 5 stars,** with higher ratings indicating healthier options. FOPL can:

- **Guide Buyers:** Empower consumers to select better products quickly.
- **Encourage Companies:** Push manufacturers to reformulate and improve product quality.
- **Reduce NCDs:** Support public health efforts to tackle obesity, diabetes, and cardiovascular diseases.

Global Success with Food Labelling:

Countries like **Chile and Mexico** have shown that **mandatory labelling can drive change:**

- **Warning labels** in these countries led to reduced consumption of sugary drinks.
- Studies indicate that **warning labels are more effective than star ratings** for influencing consumer choices.

Food Labelling in India - Current Status:

- India has joined global efforts to protect children from harmful food marketing, but **progress on FOPL has been slow.**
- The **National Multisectoral Action Plan** (2017–22) aimed to address NCDs but did **little to implement FOPL.**
- The **2022 FSSAI Draft Regulations for mandatory** labelling have been **stalled for two years.**

The Need for Urgent Action:

Advocates are demanding:

- **Mandatory FOPL** to flag high sugar, fat, and sodium content.
- **Policies to hold companies accountable** for unhealthy products.

In India, voluntary efforts by companies have been insufficient. Analyses by organisations like **NAPi reveal that pre-packaged foods are often high in harmful nutrients**, emphasising the need for stricter regulations.

Subject - Social Justice

Pandemic Fund Project

Sub Topic- *Issues related to Health*

Context:

Recently, the Union Minister Shri Rajiv Ranjan Singh launched the *"Animal Health Security Strengthening in India for Pandemic Preparedness and Response"* project.

More on News:

- This $25 million initiative, **funded by the G20 Pandemic Fund**, aims to **enhance India's capacity for pandemic preparedness**, specifically in the area of animal health security.

- In his address, the Union Minister emphasised the **significant role of the livestock sector in promoting social and economic growth.**

- He highlighted the sector's rapid development over the last nine years due to various departmental schemes.

> The **G20 Pandemic Fund** is a significant multilateral financing initiative established to enhance pandemic preparedness and response, particularly for low- and middle-income countries. It was launched during the G20 meetings in Bali, Indonesia, in November 2022, following its creation in September 2022. It is **hosted by the World Bank** and represents a collaborative effort among G20 member states and other contributors.

Various Schemes:

- Through the **National Animal Disease Control Program (NADCP)**, the government **aims to control and eradicate Foot and Mouth Disease (FMD) and Brucellosis** nationwide.

  - To date, **90.87 crore FMD vaccines and 4.23 crore Brucellosis vaccines** have been administered.

  - Additionally, the Department of Animal Husbandry and Dairying is working to **establish FMD-Free Zones in nine states**.

- The **Pandemic Fund Project** will **support ongoing departmental initiatives**, enhancing disease surveillance, laboratory infrastructure, and cross-border collaboration to create a more integrated zoonotic disease management system.

Releasing Documents:

- During the event, the Union Minister **released two key documents** to strengthen animal health management in India:

  - **Standard Veterinary Treatment Guidelines (SVTG):** A comprehensive document outlining best practices for veterinary care to improve livestock health and productivity, aligning with the national action plan for Antimicrobial Resistance.

  - **Crisis Management Plan (CMP) for Animal Diseases:** A framework for managing and responding to animal disease outbreaks to ensure swift containment and mitigation.

- These resources will be **essential tools for veterinarians, policymakers, and field officers**, facilitating more efficient responses to animal health crises.

- With recent public health emergencies often stemming from animal sources, the project highlights the need to address zoonotic risks, protecting both human and animal populations from future pandemics.

PM-Vidya Laxmi Scheme

Sub Topic- *Issues related to Education, Human Resources*

Context:

The **Union Cabinet** recently approved the **PM-Vidyalaxmi scheme,** a financial support initiative for **meritorious students across India,** which provides **monetary support in the form of education loans in both public and private institutions.**

Key Features

- **Collateral-Free Loans:** Students admitted to top-ranking **higher educational institutions (HEIs)** can avail collateral-free and guarantor-free education loans. The scheme will cover tuition fees and other course-related expenses.

Loan Coverage:

- Up to Rs. **7.5 lakh loan** with a **75% credit guarantee** by the central government to support banks.

- Students from families with an annual income up to **Rs. 8 lakh** are eligible for a **3% interest subsidy** on loans up to **Rs. 10 lakh during the moratorium period**. This interest subsidy will support **1 lakh students each year.**

Unified Digital Portal: Applications for loans and interest subventions can be made through a government-run PM-Vidyalaxmi portal, making the process transparent, easy, and fully digital.

Eligible Institutions:

- The scheme applies to top-ranking HEIs based on the National Institutional Ranking Framework (NIRF), covering both government and private institutions:
    - **Top 100** in overall and category-specific NIRF rankings.
    - **State-run institutions ranked 101-200 in NIRF.**
    - **All central government-run institutions.**

- Initially, **860 institutions qualify,** with **annual updates** to the list based on **NIRF rankings.**

Financial Outlay and Impact

- **Budget Allocation:** Rs. **3,600 crore allocated for 2024-25 to 2030-31.**

- **Student Coverage:** Expected to support **22 lakh students annually,** with **7 lakh new students** benefiting from interest subvention each year.

Additional Benefits

- The scheme supplements existing programs like the **Central Sector Interest Subsidy (CSIS) and Credit Guarantee Fund Scheme for Education Loans (CGFSEL).** It builds on the goals of the **National Education Policy 2020,** which emphasises accessible, affordable higher education for deserving students.

The PM-Vidyalaxmi Scheme VS Higher Education Financing Agency (HEFA):

Both serve different purposes within India's higher education sector, although both aim to support the development and accessibility of quality education. Here's a comparison to outline their distinct roles:

- **Purpose and Focus**
    - **PM-Vidya Laxmi Scheme:** Aims to provide **collateral-free education loans and interest subvention** to meritorious students from economically weaker backgrounds, helping them pursue higher education without financial barriers.
    - **HEFA (Higher Education Financing Agency):** Primarily focuses on **financing infrastructure and research projects** in higher educational institutions, especially public universities and institutes. It provides low-cost loans to institutions for development projects rather than offering direct financial aid to students.

Beneficiaries

- **PM-Vidya Laxmi Scheme:** Directly benefits students, **covering tuition fees and related expenses.**

- **HEFA: Benefits institutions rather than individual students.** HEFA funds are used by educational institutions to improve facilities, infrastructure, and resources that enhance the overall quality of education and research capacities.

Funding and Loan Structure

- **PM-Vidya Laxmi Scheme: Provides collateral-free loans up to Rs. 7.5 lakh with a 75% credit guarantee** by the government. For students with family incomes up to **Rs. 8 lakh**, it offers a **3% interest subsidy on loans up to Rs. 10 lakh** during the moratorium period.

- **HEFA: Offers low-interest loans to institutions with no interest subsidy or credit guarantee** for individual students. The repayment responsibility lies with the institution, typically covered by revenue generated from their internal resources.

Scope of Coverage

- **PM-Vidya Laxmi Scheme:** Focuses on student financial aid for attending **both public and private institutions, including technical and professional courses.**
- **HEFA:** Primarily supports infrastructure projects in **government-funded and aided institutions.** This includes central universities, **IITs, IIMs, and other high-ranking public institutions,** expanding their research capabilities and physical infrastructure.

Implementation Mechanism

- **PM-Vidya Laxmi Scheme:** Operates through a **unified digital portal,** where students can apply for loans and interest subventions. The application process is student-centric and streamlined for ease of access.
- **HEFA:** Operates as a **non-banking financial company (NBFC),** in partnership with institutions, where they apply for funding for infrastructure projects. HEFA is **co-promoted by the Ministry of Education and Canara Bank,** with other PSBs providing loans.

Summary

- PM-Vidyalaxmi is a **student-centred scheme** providing loans for individual educational needs, making higher education more accessible for students from low-income families.
- HEFA, in contrast, is an **institution-centred agency** that finances infrastructure projects for public institutions, improving the quality and capabilities of these institutions over the long term.
- **Both contribute to the educational ecosystem by addressing different needs** — PM-Vidyalaxmi for student financing and HEFA for institutional development.

Mandatory Accessibility Standards

Sub Topic- *Issues Related to Disability, Government Policies & Interventions*

Context:

The **Supreme Court** of India recently **directed the Union government to establish mandatory rules ensuring accessibility in public spaces** and **services for persons with disabilities.**

More on News:

- The Court found that the **provisions of the Rights of Persons with Disabilities (RPwD) Act,** and the associated guidelines, **were not consistently treated as compulsory,** reaffirming accessibility as a fundamental right.
- According to the National Academy of Legal Studies and Research (NALSAR)'s Centre for Disability Studies, while **various ministries have issued 17 accessibility standards**, such as those for Indian Railways and the Ministry of Ports, Shipping, and Waterways, the **SC noted inconsistencies in these standards across sectors,** complicating enforcement and leading to differing accessibility benchmarks.
- While Delhi has 3,775 low-floor CNG buses for accessible travel, Tamil Nadu has only 1,917 accessible buses out of 21,669.

What is the Rights of Persons with Disabilities (RPwD) Act?

- As a **signatory** to the **United Nations Convention on the Rights of Persons with Disabilities (CRPD)**, India is obligated to promote accessibility as an essential right.
  - ➢ **Article 9 of the CRPD mandates measures** to ensure that persons with disabilities have **equal access to the physical environment,** transportation, and public information, in both urban and rural areas.
- India's **RPwD Act, enacted in 2016,** draws on the CRPD's principles to **secure a life of dignity and equal opportunities** for persons with disabilities.
- The RPwD Rules of 2017 were **intended to specify accessibility standards**.
- However, the Supreme Court noted that **these 2017 rules are currently self-regulatory,** creating **guidelines rather than enforceable standards.**

What Did the Supreme Court Rule?

- The judgement follows a **writ petition filed in 2005 by Rajive Raturi,** a visually challenged person, who **requested directions for ensuring safety and accessibility** in public spaces.
- The SC ruled that the **current RPwD rules lack "non-negotiable" mandatory standards,** only providing suggestive guidelines.

➤ Rule 15 (1) was deemed ultra vires (beyond the powers of) the RPwD Act, as it contradicted the Act's legislative intent.

● The Court **ordered the Union government to frame mandatory rules** under the RPwD Act **within three months** of the judgement.

➤ The government **must consult stakeholders,** including NALSAR's Centre for Disability Studies, in this process.

➤ Once established, the Court directed that non-compliance should result in penalties, such as withholding completion certificates or imposing fines.

Deadliest Indian Roads

Sub Topic- *Issues Related to Development and management of social sectors/ service relating to Health*

Context:

A road accident in Dehradun last week claimed six lives and critically injured one, underscoring **India's status as the world's deadliest for road fatalities.**

More on News:

● **In 2022,** nearly **170,000 people died,** and 423,158 were injured in 446,788 crashes—figures marking a **10% rise in deaths and 11% in crashes from 2021.**

● India, with **14% of global road accident deaths, far surpasses China's 61,000 fatalities.**

● The **economic cost is staggering,** with road accidents draining **an estimated 3% of the country's GDP annually.**

Key Causes of Accidents:

● **Over-speeding and reckless driving** are the primary culprits, responsible for **87% of accidents and fatalities,** while driving under the influence caused 1.7%.

● **Collisions,** including rear-end hits (19.5%), hit-and-runs (18.1%), and head-on crashes (15%), are significant contributors.

● **National highways,** despite comprising **only 2% of road length,** account for over **30% of accidents and 35% of deaths.**

● **Two-wheelers** are the **most accident-prone,** causing over **45,000 fatalities annually.**

Who Are the Most Vulnerable?

● **Two-wheeler riders** face the highest risk, accounting for **44.5% of fatalities,** followed by **pedestrians at 19.5%.**

● **Pedestrian deaths have surged,** more than doubling in six years, and now **exceed combined pedestrian fatalities in the EU and Japan.**

Efforts and Their Impact:

● The government has **invested ▢50,000 crore to address accident-prone spots**, upgrade highways with local passageways, and improve law enforcement through cameras.

● **Licensing systems are also being modernised**.

● These measures have **yielded some results,** with the **road accident rate per lakh population dropping from 41.1 in 2011 to 33.5 in 2022.**

Why Progress Is Limited:

● Efforts are hampered by **poor coordination between government agencies,** with **only four states installing highway electronic surveillance systems.**

● **Safety measures disproportionately focus on cars,** which account for **15% of fatalities,** neglecting vulnerable groups like two-wheeler riders and pedestrians.

● **Weak licensing norms and limited road safety awareness** further exacerbate the problem.

● Addressing these systemic challenges will require a holistic approach to improve education, enforcement, and infrastructure for safer roads in India.

Mental Health and Workplace

Sub Topic- *Issues related to Health and social sectors*

Context:

Organisations must take responsibility for fostering an environment that prioritises mental health and well-being through long-term strategies.

More on News:

● Moving from **reactive to proactive approaches**, companies should integrate mental health into their organisational culture rather than relying solely on policies.

- For example, **flexible work hours** as a policy may fail if leaders regularly work late, indirectly discouraging work-life balance.
- Beyond policies, **fostering a culture** that addresses psychosocial risks and promotes empathy and inclusion is crucial.

Respecting Diversity:

- **Unique Challenges:** A **one-size-fits-all approach does not work** in diverse workplaces.
  - Employees face **unique challenges** based on their backgrounds, such as entry-level staff from rural areas or senior women leaders with caregiving responsibilities.
- **Specific Forms of Discrimination:** Additionally, **marginalised groups,** including **disabled, LGBTQI+, Dalit, and religious minorities,** may encounter specific forms of discrimination.
- **Inclusive Culture:** Companies must cultivate an **inclusive, flexible, and empathetic culture,** supported by diversity-focused training and equality policies.
  - For instance, initiatives like the **Mariwala Health Initiative's** training program, **"The Fault in Our Chai,"** aim to create **sensitive workplaces by addressing inequality and marginalisation.**

Promoting Openness:

- **Role of Leaders:** Leaders play a critical role in **establishing a transparent and empathetic work culture.**
  - They **must lead by example,** creating an environment where listening, trust, and direct communication thrive.
- **Autocratic Leadership:** An inability to handle dissent can lead to **toxic workplaces marked by mistrust** and poor mental health outcomes.
- **Open Dialogue:** Open dialogue, a sense of belonging, and meaningful work contribute to employee motivation and productivity.
- **Practices:** Practices like **job rotation reduce monotony and stress,** while policies enabling flexibility—such as **hybrid models**—can help address burnout and commute-related fatigue.

Providing Mental Health Support:

Organisations should have tailored policies for employees experiencing mental health challenges.

Key measures include:

- **Flexible work arrangements** and remote work options.
- **Comprehensive mental health insurance and allowances.**
- **Disability policies** with reasonable accommodations, such as adjusting work environments or processes.
- **Peer support programs,** like buddy systems, to foster open conversations and normalise mental health discussions.
- The **Mariwala Health Initiative** highlights the value of buddy systems, where new **employees are paired with colleagues for regular check-ins,** guidance on organisational practices, and addressing challenges.

Workplace mental health begins with leadership:

By cultivating an inclusive, discrimination-free environment and implementing supportive policies, leaders set the stage for employees to thrive. Investments in training and sensitisation programs focused on inclusion, empathy, and proactive leadership are vital.

Subject - **International Relations**

Strategic Stability in Southern Asia and Non-Strategic Nuclear Weapons (NSNWs)

Sub Topic- *Effect of Policies and Politics of developed and developing countries on India's interests*

Context:

The shifting global geopolitical landscape, characterised by great power competition, has led to an increasing focus on nuclear doctrines and capabilities, particularly regarding Non-Strategic Nuclear Weapons (NSNWs).

- In Southern Asia, the dynamics between India, China, and Pakistan raise critical concerns about strategic stability and the potential for nuclear conflict.

Key Dynamics of Strategic Stability:

- **Geopolitical Transition**: The world is currently experiencing significant power shifts, creating tension and competition among major nations.

- **Increased Nuclear Threat**: The ongoing conflicts, particularly in Ukraine and Indo-Pacific, heighten the risk of nuclear weapon usage due to escalating confrontations.

- **Proxy Conflicts**: Proxy wars in various regions contribute to strategic instability, leading to a higher likelihood of nuclear escalation.

Role of Non-Strategic Nuclear Weapons (NSNWs):

- **Definition**: NSNWs are low-yield nuclear weapons intended for operational-level deployment, aimed at military mission success if conventional deterrence fails.

- **Comparison with Strategic Weapons**: Unlike strategic weapons, which are designed for massive destruction, NSNWs can be used for tactical advantages in a military context.

NSNWs in the South Asian Context:

- **India-China-Pakistan Triad**:
  - **India and China**: Both countries maintain a No-First-Use (NFU) policy, emphasising minimal deterrence.
  - **Pakistan**: Advocates nuclear warfighting as part of its "full spectrum" deterrence, viewing strategic stability through the lens of power asymmetry with India.

- **China's Influence**: China's support and modernisation of Pakistan's nuclear capabilities create a complex nuclear posture in the region.

Conventional Military Dynamics:

- **Disadvantage of India**: India's NFU policy may place it at a disadvantage against China's conventional military superiority and advanced capabilities.

- **Chinese Offensive Capabilities**: China's Theatre-Range Ballistic Missiles (TBMs) and cyber capabilities allow it to degrade Indian forces without crossing the nuclear threshold.

- **Targeting Vulnerabilities**: The geographical range of Chinese missiles puts significant portions of India at risk, challenging India's deterrent strategy.

Escalation Scenarios and Indian Responses:

- **Potential Chinese Offensives**:
  - **Dalai Lama Crisis**: The potential fallout from a succession crisis could provoke military action from China.
  - **"Galwan Plus" Scenario**: A renewed conflict in Ladakh could escalate into a larger confrontation.

- **Response Options for India**: India must carefully define its redlines and potential responses, including the use of NSNWs if necessary.

Escalation Dynamics and Decision Making:

- **Crossfade Scenario**: A high-intensity conflict could blur the lines between conventional and nuclear responses, creating a dilemma for Indian leadership.

- **Redlines Definition**: Clearly defined thresholds are crucial to prevent miscalculations and unintended escalation.

- **China's Response**:
  - **Major Counterstrike**: A direct retaliation could lead to a spiralling escalation.
  - **Graduated Response**: A controlled response might allow for de-escalation and conflict termination.

Impact on India's Nuclear Policy:

- **NFU Policy Viability**: While India's NFU policy has proven effective in past crises, the threat from China may necessitate a reconsideration of this approach.

- **Flexibility in Response**: India's policy allows for proportionate responses under extreme provocation, ensuring preparedness for various conflict scenarios.

- **Building Comprehensive Power:** India must enhance its military capabilities to deter aggression, potentially including NSNWs as a deterrent.

Sakharov Prize

Sub Topic- *Important International Institutions, agencies and fora - their structure, mandate*

Context:

The **European Parliament awarded** its **annual Sakharov Prize** to Venezuelans.

- This **recognition celebrates** their **efforts to represent** the Venezuelan people in their **struggle for freedom and democracy**.

About Prize:

- **Name:** *Sakharov Prize for Freedom of Thought*

- **Established: December 1988** by the European Parliament.
- **Purpose:** The prize honours individuals, groups, and organisations that contribute significantly to protecting freedom of thought.
- **Named After:** *Andrei Sakharov*, a **Soviet physicist** and **political dissident** known for his **advocacy of civil liberties and human rights**.
- **Significance:** It is the highest tribute paid by the **European Union** to recognise human rights work.
- **Eligibility:** Any individual could be a candidate, regardless of **nationality** or **place of residence**.
- **Award Criteria:**
  - ➤ Recognises achievements in defending human rights, particularly freedom of expression.
  - ➤ Focuses on safeguarding minority rights, upholding international law, and promoting democracy.
- **Prize Amount: €50,000** awarded to the laureate(s).
- **Notable Recipients:** Nelson Mandela (1988), Aung San Suu Kyi (1990), Malala Yousafzai (2013), Ukrainian People (2022), Jina Mahsa Amini and the Woman, Life, Freedom Movement (2023).
- **Support for Laureates:** Through the prize and its network, the EU assists and **empowers laureates** in their **efforts to defend their causes**.

Mobility Arrangement for Talented Early-professionals Scheme (MATES)

Sub Topic- *Effect of Policies and Politics of developed and developing countries on India's interests*

Context:

Australia has come up with a **new scheme (MATES)** that allows talented young people from India to work in the country for some time. According to the department of home affairs of Australia, **MATES gives Indian university graduates and early career professionals a chance to work in Australia for two years.**

What is MATES?

The Mobility Arrangement for Talented Early-professionals Scheme (MATES) is a new initiative by the Australian government, **introduced under the Migration and Mobility Partnership Arrangement (MMPA),** which was signed between Australia and India on May 23, 2023. The program **allows Indian university graduates and early-career professionals to work in Australia for up to two years.**

Key Feature of MATES:

- **Eligibility Criteria:**
  - ➤ **Nationality and Age:** Open to Indian nationals aged **30 or younger at the time of application.**
  - ➤ **First-Time Participation:** Applicants **should not have previously participated in MATES.**
  - ➤ **Language Proficiency:** Must have **proficient English skills (IELTS score of at least 6** overall, with no less than 5 in each module).
  - ➤ **Recent Graduation:** Applicants must have graduated within two years from an eligible institution at the time of application.
  - ➤ **Eligible Degree Fields:** Bachelor's degree or higher in one of the following areas:
    - ■ Renewable Energy, Mining, Engineering, Information Communications Technology (ICT), Artificial Intelligence (AI), Financial Technology (FinTech) & Agricultural Technology (AgriTech).
- **Eligible Institutions:** Graduates from India's top 100 universities (as per NIRF 2024 rankings) qualify.
- **No Employer Sponsorship Requirement:** Unlike some work visa categories, **MATES does not require sponsorship from an Australian employer.**
- **Pilot Program Capacity:** MATES will operate initially as a pilot program with an annual cap of 3,000 places for primary applicants.

Advantages of the Scheme:

- **Work Experience:** MATES allows young Indian professionals to gain international work experience, potentially expanding their skills and networks in key industries.

- **Flexible Employment:** While participants are encouraged to work in their field of study, they are not strictly required to do so.

- **Dependents: Participants can bring their spouse and dependent children, who will also have work rights in Australia.** Dependents do not count towards the annual cap.

Duration of Stay:

- **Initial Entry:** Visa holders have **12 months** to enter Australia from the date of visa approval.

- **Stay Duration:** They can stay for **24 months** from the date of first entry, with multiple entries allowed.

- **Extension Options:** Participants can apply for other visas (temporary or permanent) to extend their stay, provided they meet the eligibility criteria.

Application Process and Ballot System:

- **Visa Granting Process:** Visa applications will be processed through a **ballot system, randomly selecting individuals to apply.**

- **Post-Ballot Process:** Selected candidates will proceed with further visa formalities.

Most important international mobility initiatives by India

- **Young Professionals Scheme (YPS) - UK:** Allows Indian professionals **(18–30 years)** with a degree to live and work in the **UK for up to 2 years.** Annual cap: 3,000 slots, lottery-based selection.

- **Migration and Mobility Partnership Agreement (MMPA) - France:** Facilitates Indian students, researchers, and professionals for education, work, and long-term residency in France.

- **Indo-German Skilled Workforce Partnership:** Offers German-style vocational training in manufacturing and engineering, with work opportunities in German firms and internationally recognised certification.

- **Global Talent Pool Program - Canada:** Provides fast-track visas for Indian IT and tech professionals and offers a pathway to permanent residency in Canada.

Air-to-Air Refuelling Agreement

Sub Topic- *Bilateral Groupings & Agreements, International Treaties & Agreements*

Context:

India and Australia have **taken** a significant **step forward in their defence cooperation** by signing an agreement to **facilitate air-to-air refuelling between** the Royal Australian Air Force (**RAAF**) and the **Indian Armed Forces**.

More on News:

- This **agreement** was announced during bilateral discussions **between Australia's Minister for Defence Industry** and **India's Defence Minister on** the sidelines of the **11th ASEAN Defence Ministers' Meeting in Vientiane, Laos**.

- The **new arrangement** further **strengthens** the **already established defence ties**, enhancing military cooperation and operational capabilities in the Indo-Pacific region.

Background of Collaboration:

- **History of Defence Relations:** The **Indian** and **Australian Navies** have developed operational practices over several years through joint training exercises like **Exercise Malabar** and in actual **counter-submarine patrols**.

  ➢ Both nations are also part of the **Quad Alliance**, which has been focused on **promoting stability in the Indo-Pacific region** through joint exercises and strategic dialogues.

- **Need for Air-to-Air Refuelling Capabilities:** These are essential for **extending the range and endurance of fighter jets** and other aircraft, allowing them to stay airborne for longer periods and operate over greater distances.

- Their cooperation is aimed at deterring **China's People's Liberation Army Navy (PLAN)** submarines from entering the **Indian Ocean**, which India considers its sphere of influence.

Details of the Arrangement:

- **Enhancing Operational Capabilities:** Under the agreement, the **RAAF's KC-30A Multi-Role Tanker Transport** will be able to refuel

Indian aircraft operating in airspace near Australia.

> The agreement does not specify whether **Australian aircraft** will also receive refuelling services when they enter the **eastern Indian Ocean**.

- **Expanding India's Reach:** The first step towards using the **KC-30A** to refuel the **Indian Navy's P-8I Poseidon surveillance aircraft**, expanding India's **operational reach** and **endurance** in the **Indo-Pacific region**.

Significance:

- **Strengthening Defence Cooperation:** This agreement marks a milestone in their growing **defence relationship** and aims to enhance **operational capabilities** and **interoperability** between the two nations.

  > The **Indian Air Force** currently uses **Ilyushin-78 airborne tankers**, which may not be fully compatible with **RAAF's modern aircraft**, highlighting the importance of this new partnership.

- **Strategic Importance:** This agreement signifies deeper **military cooperation** and is part of ongoing efforts to foster **trust**, **mutual understanding**, and **operational synergy** between the nations, enhancing their collective capabilities in the Indo-Pacific region.

Implications for Strengthening Bilateral Defence Ties:

- **Impact on Indo-Pacific Alliances:** This **agreement strengthens the Quad** (India, Australia, Japan, and the United States) and other regional security frameworks.

  > Cooperation beyond AAR, including **joint training, exercises,** and **intelligence sharing**, will **enhance regional security**.

- **Niche Areas of Cooperation:** Future cooperation could focus on high-tech defence sectors such as unmanned systems, electronic warfare, and cyber defence, further strengthening the partnership.

Challenges and Future Prospects:

- **Implementing** AAR capabilities **involves logistical, cost,** and **training challenges**. Addressing differences in operational protocols and aircraft compatibility is essential for success.

The agreement opens opportunities for expanding defence capabilities. Both nations will continue promoting a rules-based international order in the Indo-Pacific, enhancing regional stability and security.

Global Alliance Against Hunger and Poverty

Sub Topic- *Global Groupings & Agreements, International Treaties & Agreements*

Context:

The **2024 G20 Leaders' Summit in Rio de Janeiro**, Brazil, marked the **official launch of the Global Alliance Against Hunger and Poverty (*"the Alliance"*)**.

More on News:

- This initiative, **championed by Brazil during its G20 presidency**, **aims to connect countries requiring support with partners offering expertise or financial resources to eradicate hunger and poverty.**

Addressing a Pressing Crisis:

- **In 2015,** all 193 UN Member States committed to the **2030 Agenda for Sustainable Development,** which includes ending poverty and hunger, achieving food security, and improving nutrition by 2030.

- However, the **COVID-19 pandemic reversed much of the progress made,** leading to a **rise in extreme poverty and deteriorating nutrition, particularly in the Global South.**

- Subsequent challenges, including **uneven economic recovery, escalating global conflicts, and the intensifying effects of climate change**, have further hindered these goals. **Current projections suggest that by 2030:**

  > **622 million people will live below the extreme poverty line of $2.15 per day** — double the target set.

  > **582 million people will experience hunger,** a number almost unchanged since 2015.

- In this context, **Brazil's decision to launch the Alliance is both timely and necessary.**

How the Alliance Will Work:

- The Alliance has already **garnered significant support,** with 81 countries (including India), 26 international organisations, 9 financial institutions, and 31 philanthropic foundations and NGOs joining as members.

- The initiative **will serve as a collaborative platform,** enabling countries to **share proven best practices and connect with partners** who

can provide technical or financial assistance to develop tailored national models.

Key features of the Alliance include:

- **Policy Sharing:** A **repository of over 50 evidence-based policy instruments** that member countries can access and adapt.

- **"Sprints 2030": Targeted high-impact initiatives** focusing on vulnerable populations, including:
  - School meal programs
  - Cash transfer systems
  - Support for smallholder and family farming
  - Socio-economic inclusion initiatives
  - Maternal and early childhood interventions
  - Water access solutions

- **Unlike traditional initiatives,** the **Alliance does not rely on a centralised fund.**
  - Instead, it f**unctions as a matchmaking platform,** linking countries in need with donors and technical support.
  - **Operational funding of $2-3 million annually** will come **from member countries and institutions like the FAO, UNICEF, and the World Bank.**

Headquarters and Future Plans:

- The Alliance is **expected to establish its headquarters in Brasilia or another Global South country,** with **an additional office likely at the FAO headquarters in Rome.**

By fostering collaboration and leveraging shared resources, the Alliance aims to accelerate global efforts to eliminate hunger and poverty, addressing one of humanity's most pressing challenges.

Subject - Polity, Governance, Constitution

SC Upholds States' Power to Regulate Industrial Alcohol

Sub Topic- *Federalism, Co-operative Federalism, Centre-State Relations, Judgements & Cases, Judiciary, Public Policy*

Context:

In a landmark decision, the Supreme Court, by an 8:1 majority, ruled in favour of states' authority to regulate and tax industrial alcohol.

About the Verdict:

- This ruling overrules a 1990 judgement that limited state regulation to potable alcohol only.

- The court stated that 'intoxicating liquor' under Entry 8 of the State List includes not just alcoholic beverages but all types of alcohol that could adversely impact public health, extending the scope of state regulation.

- **Impact on Industrial Alcohol and Denatured Spirits**
  - The judgement clarifies that states have the authority to regulate industrial alcohol and denatured spirits, previously considered outside their purview.

Key Constitutional and Statutory Provision:

- **Entry 8 of List II (State List) – Intoxicating Liquor:** States have the power to regulate intoxicating liquor, including industrial alcohol. The Supreme Court extended states' regulatory and taxation powers over industrial alcohol.

- **Entry 52 of List I (Union List) – Industries of National Importance:** The central government argued for jurisdiction over industrial alcohol under national industries. However, the Court maintained states' rights to regulate alcohol affecting public health.

- **Entry 33 of List III (Concurrent List) – Trade and Commerce in Industrial Products:** Both central and state governments share powers over trade, production, and distribution of industrial products, including alcohol. The court balanced these concurrent powers while upholding state regulation of alcohol.

- **Article 246 – Distribution of Legislative Powers:** The Court interpreted Article 246 to clarify the division of powers between the Union and states. It ruled that **industrial alcohol regulation falls primarily under state jurisdiction but within the broader framework of legislative powers.**

- **Article 47 – Directive Principles of State Policy:** Article 47 advocates for the prohibition of intoxicants injurious to health. The dissent highlighted this directive to emphasise states' responsibility to prevent misuse of industrial alcohol.

- **Section 18G of the Industries (Development and Regulation) Act, 1951:** This provision empowers the central government to regulate certain industrial products. **The court balanced it with states' powers under Entry 33(a) of the** Concurrent List, affirming state regulatory authority over industrial alcohol.

Impact of the judgement:

- **Broad Interpretation of 'Intoxicating Liquor':** The court ruled that "intoxicating liquor" under Entry 8 of List II includes industrial alcohol, extending state regulation beyond just potable alcohol.

- **Impact on Public Health:** The regulation of industrial alcohol was justified due to its potential misuse, with the court emphasising states' duty to protect public health.

- **Public Interest and Economic Balance:** The ruling balanced public health concerns with economic considerations, ensuring alcohol regulation aligns with both.

Concerns Regarding the Verdict:

- **Fragmented Regulations:** States' independent regulation may create inconsistent rules, complicating operations for businesses across states.

- **Increased Compliance Costs:** Varying state regulations will raise compliance costs, particularly for companies operating across multiple regions.

- **Legal Uncertainty:** Potential conflicts between state and central laws could lead to increased litigation and regulatory confusion.

- **Impact on Investment:** Complex regulations may deter investors, slowing economic growth in industries reliant on industrial alcohol.

Member of Parliament Local Area Development Scheme

Sub Topic- *Federalism, Separation of Powers, Central Sector Schemes, Government Policies & Interventions*

Context:

Thirty-one years after its introduction, the relevance of the **Member of Parliament Local Area Development Scheme** (MPLADS) remains hotly debated.

About MPLADS:

- It is a **Central Sector Scheme launched** in **December 1993**.

- The primary **objective** of MPLADS is to **empower** Members of Parliament (**MPs**) to **recommend developmental works** in their constituencies **based on locally felt needs**.

- **Special Provisions:** MPs can recommend projects worth up to ₹ **25 lakhs** outside their constituency to **promote national unity** and **harmony**. In **cases of severe natural calamities**, MPs can recommend projects up to ₹**1 crore**.

- Despite its objectives, MPLADS has **faced criticisms** regarding **transparency** and **accountability**. In response, various guidelines have been introduced to enhance oversight and ensure proper utilisation of funds.

Key Features:

- **Funding:** Each MP can recommend works up to **Rs. 5 crore** per annum for their constituency.

  ➢ Rajya Sabha MPs can suggest projects in one or more districts within the state from which they are elected, while Nominated Members of both Houses can select districts from any state.

- **Focus Areas:** The funds can be used for creating durable community assets in sectors such as **health, education, drinking water, sanitation, roads**, and **public health**.

- **Benefit to SC/ST Populations:** MPs are required to allocate at least **15%** of their **MPLADS funds** for areas **inhabited** by Scheduled Castes (**SC**) and **7.5%** for Scheduled Tribes (**ST**) populations.

- **Implementation:** The **district authority** is responsible for the overall supervision, sanctioning, execution, and completion of the recommended projects.

  ➢ The **Ministry of Statistics and Programme Implementation oversees** the policy formulation, fund release, and monitoring of the scheme.

- **Non-Lapsable Funds:** MPLADS funds are non-lapsable, meaning any unused funds can be carried forward to the next financial year.

Monitoring and Evaluation:

- **CAG Reports** highlight **irregularities** like poor monitoring of funds, the sanctioning of ineligible works, and non-completion of projects.

- **Third-party evaluations** have been conducted by entities like **NABCONS**, **AFC**, and **Deloitte India**, which noted positive outcomes but also pointed out several flaws in implementation (e.g., delayed financial sanctions, and non-existence of assets).
- A **2021 report** by **Deloitte** found that **95.9%** of assets funded by MPLADS were **functional** and **95.6%** were **durable**.

Concerns:

- **Accountability and Transparency Issues:** While MPLAD funds are subjected to utilisation certificates and audit requirements, allegations of favouritism and fund mismanagement persist.
- The **Second Administrative Reforms Commission**, in its **2007 report**, recommended the **abolition of MPLADS and similar schemes**, arguing that they "seriously erode the notion of separation of powers" and "infringe on the rights of local governments."

Recommendations:

- **Judicial Stance:** The **Supreme Court** ruled in 2010 that MPLADS was constitutional, and the debate continues to be a polarising one. The court acknowledged the potential for misuse but did not deem the scheme unconstitutional, allowing it to continue.
- **Transparency and Reforms:** Funds are released in **instalments** and subject to **strict project guidelines** and oversight from district authorities.
- Each MP's fund usage is reported to the Ministry of Statistics and Programme Implementation (MoSPI), which monitors the projects' progress and utilisation.
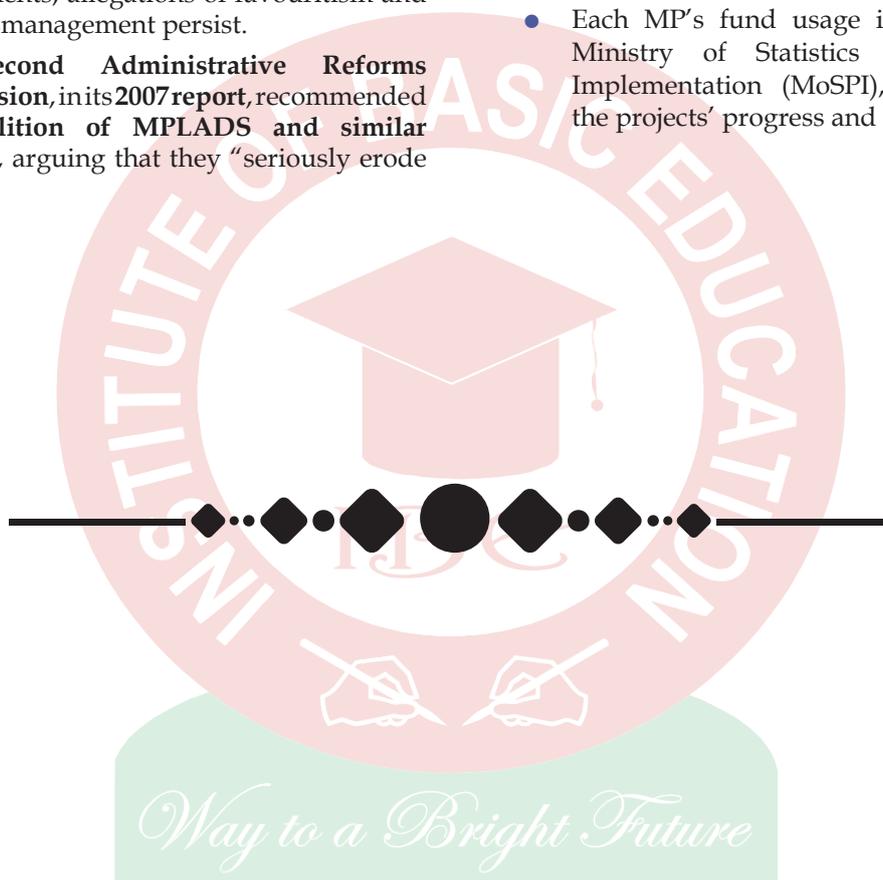
Subject - Science & Technology

New Space Missions

Sub Topic- *Achievement in the field of Space Technology*

Context:

India's space program is on the cusp of significant advancements, with recent approvals for numerous missions and projects, including the development of **a new rocket and ambitious moon and Venus missions.**

More on News:

- India is **also preparing to launch the NISAR and Proba-3 satellites**, alongside promising news from its Astrosat observatory.
- Private companies are also stepping up with satellite initiatives of their own.

A Flurry of Approvals:

- On September 18, the Union Cabinet approved **a series of missions under India's Gaganyaan human spaceflight program,** including four human spaceflight missions and four additional missions to test technology for India's first space station, **Bharatiya Antariksh Station 1**, planned for 2028.
- An **additional uncrewed Gaganyaan flight** has been added, bringing the total to three.
- Funding of ₹11,170 crore has been approved for the station-related missions and the extra Gaganyaan flight.
- The Cabinet has also greenlit the development of ISRO's **Next Generation Launch Vehicle (NGLV)** with a budget of ₹8,240 crore, covering the cost of its first three development flights.
  - ISRO aims to **work closely with industry partners** so private sector players can take over operational flights once the rocket has been fully developed and tested.
- **A PSLV rocket** built by Hindustan Aeronautics Ltd. and Larsen & Toubro **is expected to launch in late 2024 or early 2025.**

- Additionally, **New Space India Ltd.** is expected to **select a private partner to commercialise the LVM-3 rocket.**
- Approvals were also given for a **scientific mission to Venus and a new lunar mission, Chandrayaan-4.**
  - The **Venus Orbiter Mission,** aimed at studying the planet's harsh surface and atmosphere, is planned for launch in March 2028 with a budget of ₹1,236 crore.

Chandrayaan-4 and LUPEX:

- **Chandrayaan-4**, slated for 2027 with a budget of ₹2,104 crore, **will focus on bringing lunar samples back to Earth.**
  - This mission **will involve two LVM-3 rockets,** with components docking in Earth's orbit before travelling to the Moon to collect samples near Chandrayaan-3's landing site.
- India and Japan will also collaborate on the **Lunar Polar Exploration Mission (LUPEX)**, with ISRO developing a new lander.
  - This lander could **potentially support future crewed lunar missions.**
- To support the NGLV and future missions, the **Space Commission has approved a third launch pad at Sriharikota.**

SBS and Axiom-4 Missions:

- On October 11, the Cabinet Committee on Security approved the **third phase of the Space Based Surveillance (SBS) missions.**
  - This project will see ISRO and private companies building **52 satellites** for a combined budget of ₹26,968 crore, a marked increase from previous SBS missions.
- Meanwhile, Indian astronaut-designate Sudhanshu Shukla recently underwent spacesuit and pressurisation tests at SpaceX headquarters in preparation for his training for the Axiom-4 mission to the International Space Station, where he will spend 10 days.

Incoming Satellites:

- The **NISAR satellite**, developed in collaboration with NASA, **recently returned to India** after receiving a protective

coating to withstand higher-than-expected temperatures during launch.

> ➤ Its launch on a GSLV is expected in early 2025.

- Additionally, the European Space Agency's Proba-3 mission, set for launch on a **PSLV-XL rocket** on November 29, will study the Sun's corona by simulating an eclipse with two satellites flying in formation.

Private Sector Initiatives:

- **Manastu Space** has teamed up with **Dhruva Space** to test a green propulsion technology for the **LEAP-3 mission** in 2025.

> ➤ The propulsion system uses a hydrogen peroxide-based fuel, first tested on the PSLV-C58 mission in January.

- **Bellatrix Aerospace** has also introduced **'Project 200,'** a satellite capable of flying at an ultra-low altitude of 200 km.

- **Ananth Technologies** recently became the **first Indian private company to assemble, integrate, and test two Space Docking Experiment (SpaDEx) satellites**, which have since been transferred to ISRO's U.R. Rao Satellite Center.

Space Science:

- Research from Chandrayaan-2 and Chandrayaan-3 has revealed that the crater where Chandrayaan-3 landed predates the South Pole Aitken Basin, one of the oldest known impact basins.

- Meanwhile, India's Astrosat observatory, originally designed for a five-year mission, has exceeded its lifespan and is expected to operate for two more years, contributing data to over 400 scientific papers.

Stem Cell Therapy

Sub Topic- *Achievements in the field of Science & Technology*

Context:

A **recent study** published in *Science Translational Medicine* investigates the long-term changes and mutations in hematopoietic stem cells from donors post-transplant.

Key Highlights:

- **Study Group**: **Analysed 16 pairs of stem cell donors** and recipients, with data collected at a median of **33.6 years post-transplant**.

- **Mutation Rates**: Found that the rate of

mutations and clonal expansion remained relatively low and similar between donors and recipients over up to 46 years (2% in donors vs. 2.6% in recipients per year).

- **Clonal Hematopoiesis**: All donors exhibited some clonal hematopoiesis variants, even in early blood samples, but no widespread clonal expansion was observed in stem cells post-transplant.

Stem Cell

- They are **crucial** for **tissue renewal** and **repair in humans**, contributing to the
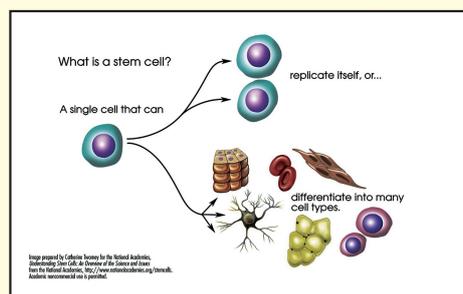
maintenance of **blood cells, skin,** and **hair**.

- The **loss of stem cell function** is **associated** with **ageing** and **various diseases**.

- **Types:** The **"pluripotent" stem cells** (embryonic stem cells and induced pluripotent stem cells) and **non-embryonic** or **somatic stem cells** (commonly called "adult" stem cells).

- **Applications:** Regenerative medicine, treating diseases like Parkinson's, diabetes, and spinal cord injuries.

Overview of Stem Cell Therapy:

- **Aims** to **replace damaged** or **diseased cells**.

- The process involves **isolating stem cells**, **growing** them in a **lab**, and then **introducing** them **into** the **patient's body**.

- **Mechanisms of Action:**

> ➤ **Tissue Regeneration:** Stem cells can differentiate into various cell types, aiding in the repair of damaged tissues.

> ➤ **Immune Modulation:** They possess immunomodulatory properties that can help manage autoimmune disorders by reducing abnormal immune responses.

> ➤ **Inflammation Reduction:** Stem cells secrete anti-inflammatory factors, alleviating symptoms associated with chronic inflammatory conditions.

> ➤ **Quality of Life Improvement:** By addressing the underlying causes of

degenerative diseases, stem cell therapy aims to enhance patients' overall quality of life and potentially slow disease progression.

Types of Stem Cell Therapy:

- **Hematopoietic Stem Cell Transplantation (HSCT):** This is the most established form of stem cell therapy, primarily used for treating blood cancers like leukemia and lymphoma.
  - ➤ It involves transplanting healthy stem cells to replace those destroyed by chemotherapy or radiation.
- **Mesenchymal Stem Cell Therapy:** These stem cells can be derived from various sources, including bone marrow and adipose tissue.
  - ➤ They are used in treating conditions such as osteoarthritis and spinal cord injuries due to their ability to differentiate into bone and cartilage.
- **Induced Pluripotent Stem Cells (iPSCs):** These are adult cells reprogrammed to an embryonic stem cell-like state, allowing them to develop into any cell type. iPSCs hold promise for personalised medicine and regenerative therapies.

Applications in Medicine:

- **Autoimmune Diseases:** Such as multiple sclerosis and lupus.
- **Neurological Disorders:** Including Parkinson's disease and spinal cord injuries.
- **Cardiovascular Diseases:** To repair heart tissue post-infarction.
- **Orthopaedic Injuries:** For joint repair and regeneration

Challenges:

- Include **ethical concerns**, the potential for **tumour formation**, and a **limited number** of **clinical trials.**
- **Invasiveness:** The procedure is invasive and carries inherent risks.
- **Immune Rejection:** Newly transplanted cells may be rejected by the body, necessitating long-term immune suppression, which can increase the risk of infections and cancer.
- **Encapsulation Technology:** While methods exist to protect transplanted cells from immune rejection, these may also pose long-term risks.

Implications:

- **Informed Consent:** Ensuring informed consent from donors of gametes and embryos is critical. Ethical concerns arise regarding whether donors fully understand the implications of their contributions to stem cell research and therapy.
- **Clinical Trials and Safety Assessments:** Rigorous clinical trials are essential to assess the safety and efficacy of stem cell therapies.

Further Research Needed: More studies are necessary to establish the long-term efficacy and scalability of stem cell therapy for the broader population.

South Africa Allows Genetic Editing in Children

Sub Topic- *Biotechnology*

Context:

South Africa has recently updated its health guidelines to permit research that could lead to genetically modified children, making it the first country to explicitly allow heritable human genome editing. This change is groundbreaking as most countries have strict restrictions or bans on this type of research due to ethical concerns.

New Guidelines on Genome Editing:

- In May 2024, South Africa added new rules in its health guidelines, allowing research that may result in children with modified genes.
- This decision marks a significant shift, as other nations hesitate to explore this path due to ethical questions and potential societal impacts.

Issues with Gender and "Designed" Traits:

- Allowing genetic modifications brings up challenging issues, such as the **possibility of reinforcing gender biases or choosing certain physical traits.**
- These practices could **affect future generations' perceptions of gender roles** and potentially limit natural human diversity by **"designing" specific characteristics.**

Gender and Societal Impact of the Decision

The decision to allow heritable genome editing in South Africa brings up several profound ethical concerns around gender and societal impact, particularly regarding **gender divide, foetus manifestation, and gendered manufacturing.** Here's what these terms mean and why they matter in the context of genome editing:

Gender Divide:

- The gender divide refers to the risk that genome editing could deepen existing gender biases by encouraging parents to select traits based on traditional gender stereotypes.

- This might lead to pressures to "design" children to fit narrow ideas of masculinity or femininity, limiting the diversity in how people can express gender. Such choices could reinforce outdated social roles and expectations around gender.

Foetus Manifestation:

- Foetus manifestation is the potential to control specific traits in a child before they are born. This raises ethical questions about autonomy, as children would have traits decided for them without their say.

- It may also lead society to view children according to specific "designed" characteristics, which could impact their personal identity and individuality.

Gendered Manufacturing:

- Gendered manufacturing refers to the risk of using genome editing to deliberately "manufacture" gender traits, such as strength or sensitivity, based on societal expectations.

- This could create pressures to design children to fit certain gender roles, potentially reinforcing stereotypes. Over time, this may lead to social imbalances if certain traits become more valued or desired, limiting gender diversity.

Controversial History of Gene Editing:

- In 2018, a Chinese scientist claimed to have created the world's first gene-edited babies, reportedly to make them resistant to HIV.

- This announcement caused an international backlash, as the research was conducted in secret and lacked public discussion.

- Many experts argued that editing human embryos should only occur with clear societal agreement, especially when alternative ways to prevent genetic diseases already exist.

Ethical Concerns Around Genome Editing: South Africa's new guidelines allow heritable genome editing but require it to meet specific criteria:

- **Medical Need:** The modification should have a clear medical purpose.

- **Transparency and Informed Consent:** Participants must fully understand and agree to the research.

- **Ethical Oversight:** Independent ethical bodies should monitor the research.

- **Ongoing Ethical Evaluation:** The research must be reviewed continuously for ethical implications.

- **Safety and Efficacy:** There should be strong evidence that it is safe and effective.

- **Long-term Monitoring:** The effects must be tracked over time.

- **Legal Compliance:** The research must follow national laws.

Legal Conflicts and the Collingridge Dilemma:

- Though the guidelines permit genome editing, **South Africa's National Health Act** of 2004 prohibits genetic manipulation of embryos.

- This conflict between new guidelines and existing law highlights the **Collingridge Dilemma — the challenge of controlling emerging technologies when their impacts are still uncertain and may be irreversible.**

Future Implications and "Scientific Tourism":

- The new guidelines could pave the way for disease treatments, like those **targeting sickle cell disease.**

- However, these rules also open the door to edits that affect future generations, raising concerns about "scientific tourism" — where researchers from other countries might come to South Africa to conduct studies they can't do at home.

Breakthrough in RNA Editing

Sub Topic- *Biotechnology*

Context:

Wave Life Sciences, a biotechnology company based in Massachusetts, made history by becoming the first to treat a genetic condition through clinical RNA editing.

- The company's therapy, **WVE-006**, targets **α-1 antitrypsin deficiency (AATD)**, an inherited disorder that affects the liver and lungs.

What is RNA Editing?

- **RNA editing** is a process that allows scientists to make targeted corrections in messenger RNA (**mRNA**), the molecule that transmits genetic instructions from DNA to the cellular machinery that makes proteins.
- The mRNA is synthesised based on DNA instructions, but sometimes errors can occur during this process, leading to faulty proteins that can cause diseases.
- RNA editing aims to **fix these errors** before the mRNA is used to produce proteins, offering a potential treatment option for many genetic disorders.

Wave Life Sciences' RNA Editing for AATD:

- **α-1 antitrypsin deficiency (AATD)** is a genetic disorder in which abnormal levels of the protein **α-1 antitrypsin** damage the liver and lungs.
  - Wave Life Sciences used RNA editing to correct a **single-point mutation** in the **SERPINA1 gene**, which is responsible for producing this protein.
- The therapy, **WVE-006**, helps patients produce normal levels of α-1 antitrypsin, offering a potential alternative to weekly intravenous treatments or, for those with liver damage, a liver transplant.

RNA Editing Working:

- **ADAR enzymes** (adenosine deaminase acting on RNA) play a central role. They convert **adenosine** (one of the building blocks of RNA) into **inosine**, which mimics another building block, **guanosine**.

- This trick allows the cell to detect a "mistake" in the RNA sequence, leading it to correct the error and produce the correct protein.
- In clinical applications, **guide RNA (gRNA)** directs ADAR enzymes to specific mutations in the mRNA, allowing for targeted editing.

Applications of RNA Editing:

- **Huntington's disease**, **Duchenne muscular dystrophy**, and certain types of **obesity** — all associated with single-point mutations — are among the next targets for RNA editing treatments.
- **Other Companies Exploring RNA Editing:**
  - **Korro Bio** is developing RNA editing treatments for **AATD** and **Parkinson's disease**.
  - **ProQr Therapeutics** is targeting heart disease and bile acid buildup in the liver.
  - **Shape Therapeutics** is working on neurological conditions.
- **Extending RNA Editing:** To include changes in **exons** (coding regions of mRNA), as opposed to just correcting single-point mutations.
  - **Ascidian Therapeutics** is testing RNA editing as a treatment for **ABCA4 retinopathy**, a type of eye disease caused by mutations in the ABCA4 gene.
  - **Rznomics**, a South Korean company, has also been granted permission to conduct RNA editing trials in the U.S. for liver cancer, focusing on regulating **telomerase reverse transcriptase** to prevent tumour formation.

Challenges:

- **Specificity and Precision**: ADAR enzymes may **affect** both the **intended and unintended parts** of the mRNA, leading to **potential off-target effects** or skipping the intended mutation altogether.
  - To address this, **researchers** are r**efining gRNA to improve accuracy** and reduce unwanted modifications.
- **Transient Nature**: While the temporary nature of RNA editing is an advantage, it also means that **repeated treatments** may be necessary to maintain therapeutic benefits.
- **Delivery Methods**: **Lipid nanoparticles** and **adeno-associated virus (AAV) vectors** are

the current methods used to deliver gRNA and ADAR enzymes to cells.

➢ However, both methods have **limited capacity** for carrying large molecules, which could hinder the delivery of complex RNA editing systems to the target cells effectively.

Future Outlook:

● RNA editing is in its early stages, but at least **11 biotech companies** are working on RNA editing techniques for various diseases.

➢ Interest from major pharmaceutical companies like **Eli Lilly**, **Roche**, and **Novo Nordisk** indicates growing investment in this technology.

● As clinical trials progress, RNA editing could become an integral part of **precision medicine**, offering treatments for a range of genetic disorders that were previously considered incurable.

Conclusion:

Wave Life Sciences' use of RNA editing to treat **α-1 antitrypsin deficiency** represents a significant breakthrough in biotechnology and gene therapy. By addressing genetic disorders at the level of mRNA, RNA editing offers a **safe, temporary**, and **targeted** solution that could change the lives of millions of patients worldwide.

RNA Editing vs. DNA Editing

● **RNA editing** has several advantages over traditional **DNA editing** technologies, such as **CRISPR-Cas9**.

● While DNA editing permanently alters the genome, RNA editing only makes **temporary changes** to mRNA. This means the effects of RNA editing can **fade over time**, offering a safety advantage.

➢ If any issues arise during RNA editing therapy, doctors can stop treatment, and the body can return to its normal state without irreversible genomic changes.

● Furthermore, **CRISPR-Cas9** often rely on proteins derived from bacteria, which can trigger **immune reactions**. RNA editing, on the other hand, uses **ADAR enzymes**, which naturally occur in the human body and are less likely to cause allergic responses.

India's First Autonomous Surface Vessel

Sub Topic- *Achievement in the field of Defence Technology*

Context:

The successful 1,500-km autonomous journey of **India's first autonomous surface vessel, built by Sagar Defence Engineering,** highlights the advancements in India's maritime technology, especially in support of national security, environmental monitoring, and resource management.

Background:

● The 1,500-km **Sagarmala Parikrama** journey was flagged off by **Union Defence Minister Rajnath Singh** on **October 29, 2024**, during the **Swavlamban** event.

● Indian Navy provided **testing facilities** and **operational feedback**, crucial for the project's success.

Key Technological Components of Unmanned Autonomous Maritime Technology & Benefits:

● **Autonomous Navigation:** Equipped with GPS and path-planning algorithms, the vessel autonomously charts routes, avoiding obstacles and adjusting course as needed. This ensures safe, efficient navigation over long distances without human intervention.

● **Artificial Intelligence (AI) and Machine Learning:** AI allows the vessel to respond to changing environmental conditions in real time, while machine learning helps it improve performance with each journey, enhancing safety and efficiency.

● **Sensor and Radar Systems:** Integrated lidar, **radar, sonar, and optical sensors** provide a comprehensive view of surroundings, enabling obstacle detection and safe manoeuvring even in complex waters.

● **Communication Systems: Satellite and radio communication enable real-time data** exchange with remote operators or the **Indian Navy,** ensuring operational security and transparency, particularly in remote areas.

A SILENT ARMADA

Unmanned Surface Vessels (USVs) and Unmanned Underwater Vehicles (UUVs) can transform naval operations. India is developing some of its own, while other countries are at a more advanced stage

⇘ BRAINBOX SMART SHIP OPERATION

Developed by Tardid Technology, the USV is 8 m long, with endurance of 12 hrs and speed of 12 nmph. To be used for surveillance missions, but can be weaponised too. Also has stealth capability, vast array of sensors, high bandwidth satellite data link networks

⇘ ARMED AUTONOMOUS UNCREWED BOAT

Developed by Sagar Defence Engineering Ltd, this lethal USV has swarming capability, AI- based collision avoidance,and smart vision capability suites

⇘ REMOTELY OPERATED UNDERWATER VEHICLE, AUTONOMOUS UNDERWATER VEHICLE

These UUVs are being developed by L&T Defence, MDL and DRDO. They have swarm technology, endurance of 10-20 hours. Per global standards, lightweight AUVs are compatible with torpedo tubes on ships/submarines, endurance of two days; heavy, high-endurance AUVs canremain submerged for as many as 15 days

⇘ UKRAINE USV : The maritime drones used to attack the Russian fleet in Sevastopol in October 2022 were each 5.5 m long, with a range of 40 km, 60-hr endurance and war- head load of up to 200 kilos

⇘ US NAVY'S T–38 DEVIL RAY USV Developed by MARTAC, the T–38 Devil Ray hasa speed of 25 knots and can carry a payload of 2,050 kg

⇘ CHINA'S SEA WING UNDER– WATER GLIDERS These are a type of UUVs that are unpowered and employ the variable-buoyancy propulsion system. They also have large wings that enable them to glide forward over vast distances

- **Energy Efficiency and Propulsion:** Advanced propulsion systems, possibly integrating hybrid or solar technology, support energy efficiency, extending the vessel's operational range while minimising environmental impact.

- **Emergency and Safety Protocols:** Equipped with automatic stop mechanisms, distress signalling, and emergency response systems, the vessel can address malfunctions autonomously, enhancing reliability in dangerous maritime environments.

- **Indigenous Development:** Supported by the **Naval Innovation and Indigenisation Organisation (NIIO), Technology Development Acceleration Cell (TDAC), and iDEX,** this project represents a significant milestone in India's journey toward Atma Nirbharta, reducing dependency on foreign technology.

Applications and Impact:

- **National Security and Defence:** The vessel is ideal for coastal surveillance, anti-piracy, and sea lane protection, supporting continuous border monitoring and enhanced maritime security.

- **Environmental Monitoring:** It can collect data on pollution, track marine biodiversity, and provide insights into climate change impacts.

- **Resource Management and Economic Advantages:** From fisheries monitoring to secure trade route protection, autonomous vessels enhance resource management and streamline trade, which aligns with India's cautious trade strategy.

Global Unmanned Autonomous Maritime Technology:

- **Global advancements in autonomous maritime technology** are led by the U.S., Norway, the U.K., China, Japan, and South Korea, focusing on national security, environmental monitoring, commercial shipping, and exploration.

- **United States:** DARPA's **Sea Hunter** is a USV for anti-submarine warfare with advanced AI, while **Boeing's Orca XLUUV** supports intelligence and mine countermeasures.

- **Norway: Yara Birkeland** is a zero-emission cargo ship, and AutoNaut, wave-powered, conducts ocean research with minimal environmental impact.

- **United Kingdom: Maxlimer by SEA-KIT** performs deep-sea surveys autonomously, and Mast-13 focuses on defence and mine countermeasures.

- **China: JARI USV** is a multi-role combat vessel, and the **Haidou AUV excels** in deep-sea exploration.

- **Japan: Sea-Kun and the Nippon Foundation's Blue Sea Project** enhance cargo automation and marine biodiversity monitoring.

- **South Korea: Haeseong** is a mine-clearing vessel, while **Samsung's marine drones** reduce operational costs.

Key Benefits and Future Prospects:

- **Expanded Operational Reach**: Enhances the Navy's ability to monitor **maritime activities** and secure **sea lanes**.

- **Future Deployments**: Paves the way for autonomous vehicles in **coastal surveillance, ocean research**, and **anti-piracy** missions.

- **Commitment to Aatmanirbharta**: Reflects India's dedication to **self-reliance** in **defence technology**, demonstrating indigenous innovation in **unmanned systems**.

Ozempic and Semaglutide: Breakthroughs in Diabetes and Weight Management

Sub Topic- *Achievement in the field of Medical Science*

Context:

Ozempic (semaglutide) has become widely known as a drug for diabetes and weight loss, gaining popularity due to endorsements from public figures like Elon Musk and trending on social media.

More in News:

- **FDA Approvals**: The U.S. FDA approved Ozempic in 2017 for type 2 diabetes, followed by **Wegovy, another semaglutide injection**, in 2021 for chronic weight management in adults with obesity.

- **Manufacturer**: Both Ozempic and Wegovy are produced by Danish pharmaceutical company Novo Nordisk.

- **Functionality**: Semaglutide is a **GLP-1 receptor agonist that simulates a gut hormone (GLP-1),** helping reduce appetite, slow digestion, and stimulate insulin release, thereby assisting in weight and glucose control.

- **Availability in India**: The **oral form (Rybelsus) was introduced in India a few years ago,** making it the primary option locally, as injectable forms are yet to be widely available.

Key Features:

- **Weight Loss Benefits**: Injectable forms (Ozempic/Wegovy) are shown to help **reduce body weight by 10-15%,** while oral Rybelsus provides moderate results.

- **Cardio-Renal Benefits**: Besides weight loss, semaglutide is noted for its potential heart and kidney health benefits, especially beneficial for diabetes patients at high cardiovascular risk.

- **Usage Guidelines**: Doctors primarily recommend semaglutide for diabetes patients, **especially those with additional risk factors**, and discourage its use as a general weight-loss solution for non-obese individuals.

Adoption & Demand in India:

- **Popularity** among patients due to positive word-of-mouth and overseas success stories.

- Seen as an **effective add-on therapy** to existing diabetes treatments, especially for those on metformin.

- Rising interest among patients, but doctors emphasise its primary role in diabetes management, not as a general weight-loss solution.

Challenges & Limitations:

- **Eligibility Criteria**: Not everyone qualifies; prescribed primarily for **high-risk diabetes patients** (e.g., those with cardiovascular risks).

- Limited to patients for whom weight loss aids in managing diabetes-related complications.

- **Side Effects**: Common issues include **nausea, bloating, and vomiting**; rare cases of **stomach paralysis and pancreatitis**.

  - Gradual dose increases can help mitigate side effects.

- **Cost Barrier**: High costs make it inaccessible for many, with a **monthly cost of approximately ₹10,000**.

  - The oral form remains prescription-only, with modest sales due to price sensitivity in India.

- **Sustainability & Lifelong Use**: Users need to continue the drug lifelong for sustained effects; stopping it can lead to weight regain.

  - **Lifestyle modifications** are recommended alongside medication to maintain long-term weight loss.

Way forward:

- **Potential for Broader Use**: Studies suggest that semaglutide may benefit a variety of conditions beyond diabetes and obesity, including heart failure, arthritis, Alzheimer's, and possibly cancer.

- **Indian Market Developments**: Indian drugmakers are now preparing to enter the weight-loss drug market, with new options expected soon. The FDA approval of similar drugs by competitor Eli Lilly indicates further developments in this space.

- **Lifelong Commitment:** For diabetes patients, semaglutide may require lifelong usage with ongoing dose adjustments, though lifestyle changes could help maintain benefits if treatment is discontinued.

X-rays Discovery

Sub Topic- *Achievement in the field of Medical Science*

Context:

In scientific discovery, few accidental findings have had as profound an impact as **Wilhelm Conrad Röntgen's unexpected encounter with X-rays**.

- This groundbreaking **discovery**, made in **1895**, revolutionised both science and medicine, forever changing the way we see the world.

Background:

- Roentgen, a **professor at Wuerzburg University in Germany**, was conducting

experiments with a **Crookes tube**, which is a type of cathode-ray tube.

- **Unexpected Phenomenon:** On November 8, 1895, he noticed that a nearby **screen coated with barium platinocyanide began to glow** even though the tube was shielded with heavy black paper.

- **Penetrative Rays**: Röntgen discovered that these rays had **extraordinary penetrative power**, passing through materials like paper, cardboard, wood, copper, and aluminium, and could be recorded on photographic plates.

  ➢ This unexpected fluorescence led him to hypothesise the existence of a new type of ray, which he termed "X-rays," with "X" denoting the unknown nature of these rays.

Key Experiments and Findings:

- **Penetration Ability:** In his initial experiments, **Roentgen discovered** that these rays could **penetrate** various materials, including **human tissue**, but were **absorbed by denser substances** like **bones** and **metals**.

  ➢ This property allowed X-rays **to cast shadows of solid objects on photographic plates**, effectively creating images of internal structures without the need for invasive procedures.

    ■ One of his first notable images was that of his wife Bertha's hand, showcasing the bones clearly.

- **Immediate Impact on Medicine:** The announcement of Roentgen's discovery generated immense interest worldwide.

  ➢ Within months, **X-rays were being used** in medical settings **across Europe** and the **United States** for various diagnostic purposes.

  ➢ **By January 1896**, physicians were already employing X-rays to examine patients' skeletons and organs, marking the **birth of radiology as a medical discipline**.

Medical Evolution:

- **Early Adoption**: For example, **Major John Hall-Edwards** of Britain used X-rays to guide surgery on **February 14, 1896**.

- **Military Use**: The British Army took X-ray machines to **Egypt** during the 1896 Nile expedition to locate **bullet wounds** during wartime and diagnose **bone fractures** and other internal conditions.

Concerns:

- **Public Fear**: As the discovery became more widely known, some people expressed fear and fascination, with rumours spreading about the potential for X-rays to see through clothing.

- **Commercial Exploitation**: Some companies advertised products like **"X-ray proof underclothing"** for women, and there were even concerns about X-ray use in opera glasses.

Scientific Significance:

- **Beyond medicine**, the discovery of X-rays had profound **implications for physics and chemistry**:

  ➢ **Atomic Structure:** X-rays played a crucial role in the study of atomic and molecular structures, leading to a deeper understanding of the composition of matter.

  ➢ **Nobel Prize:** In recognition of his groundbreaking work, Wilhelm Conrad Röntgen was awarded the first Nobel Prize in Physics in 1901.

Röntgen's Legacy:

- **Ubiquity of X-rays**: X-rays became a vital tool in medicine, with their use becoming widespread by the 1930s and 1940s. In some European shoe stores, customers could use X-ray machines to view their feet' bones.

- **Lack of Awareness of Risks**: Initially, there was little understanding of the potential **harmful effects** of radiation exposure from X-rays, and their risks weren't fully recognised until later.

- His **accidental discovery** not only **transformed** the **medical field** but also **paved** the **way for future innovations** in science and technology.

  ➢ Moreover, **modern safety protocols** have been established to **minimise radiation exposure risks** associated with X-ray imaging.

Impact on Science and Technology:

- **1912-13 Discovery**: In 1912-13, **Max von Laue** showed that X-rays could be diffracted by crystals, leading to a deeper understanding of their nature. He later won the Nobel Prize for this work.

- **X-rays and Electromagnetic Radiation**: X-rays were eventually understood to be a form of **electromagnetic radiation** with a higher frequency than visible light.

- **Evolution of Radiology:** The discovery of X-rays and the establishment of radiology paved the way for the development of modern medical imaging techniques, such as MRI, CT scans, ultrasound, and echocardiography.

Operation Dronagiri and the Integrated Geospatial Data Sharing Interface (GDI): Pioneering Geospatial Innovation in India

Sub Topic- *Achievements in the field of Science & Technology*

Context:

Operation Dronagiri is an initiative by the Indian Government to **improve the use of geospatial technology,** which involves gathering and analysing data about the Earth's surface.

- It aims to **use advanced tools like drones, satellites, and mapping systems** for better planning and decision-making in various sectors.

Objective of operation Dronagiri : Demonstrate the transformative potential of geospatial technologies to **improve the quality of life and ease of doing business.**

Advantage of Operations Dronagiri:

- **Better Geospatial Tools**
  - **Improved Data Collection:** India is using drones and satellites to gather more detailed and accurate data about the land and resources.
  - **Centralised System:** A system is being set up to store and analyse this data, making it easier for different sectors to access and use it.
- **Policy Changes**
  - In 2021, India relaxed its rules on geospatial data, allowing private companies to participate in gathering and using this information. This is helping make the system more efficient.

Benefits in Key Areas:

- **Disaster Management:** Geospatial data helps predict and manage disasters like floods and landslides, allowing faster responses.

- **Agriculture:** Farmers can use the data to improve crop yields and manage resources like water better.

- **Urban Development:** Cities can use geospatial data to plan infrastructure, such as roads and public services, more effectively.

- **Security:** The defence sector can use geospatial information to monitor borders and plan strategies.

Integrated Geospatial Data Sharing Interface (GDI): Backbone of Operation Dronagiri

- **Functionality of GDI**
  - **Seamless Data Access and Sharing:**
    - Facilitates the integration and sharing of geospatial datasets among stakeholders, including government agencies, private sector organisations, and startups.
    - Breaks down traditional data silos, encouraging collaboration and innovation.
- **Advanced Data Exchange Protocols:**
  - Built with sophisticated protocols ensuring efficient data processing, privacy preservation, and secure handling of sensitive information.
  - Empowers organisations to make informed, data-driven decisions.
- **Support for Diverse Applications:**
  - Applications in urban planning, environmental monitoring, disaster management, agriculture, logistics, and livelihoods.
  - Real-time data analytics enable swift and accurate responses to emerging challenges.
- **Actionable Insights:**
  - Provides tools and features for deriving actionable insights, aiding better decision-making and impacting sectors where timely information is critical.

Collaboration and Capacity Building under Operation Dronagiri :

- **Private Sector Partnerships:** Collaborations with Indian geospatial firms and startups like MapmyIndia are encouraged.

- **Skill Development:** Training programs for geospatial technologies are being implemented to build a skilled workforce.

Nationwide Rollout Vision

- **Inspired by UPI Model:** Envisions a similar revolution in geospatial data usage, enabling socioeconomic development akin to UPI's impact on financial inclusion.

- **Public-Private Partnership (PPP):** Deployment through PPP ensures scalable, innovative solutions involving diverse stakeholders.

International Cooperation

Operation Dronagiri seeks partnerships with global geospatial leaders to share best practices and technologies while strengthening India's leadership in the Global South.

Economic Impact

By democratising access to geospatial data and applications, Operation Dronagiri is expected to contribute significantly to India's GDP, driving innovation across multiple industries.

Strategic Importance of Operation Dronagiri :

- **Alignment with National Geospatial Policy 2022:** Strengthens India's global leadership in geospatial technologies.

- **Private Sector Collaboration:** Drives accessibility, application, and innovation in geospatial data.

- **Real-World Impact:** Converts geospatial insights into actionable solutions for socioeconomic benefits.

SMRs as an Area of Strategic Interest for India and Scope for India-US Collaboration

Sub Topic- *Nuclear Technology*

Context:

India views Small Modular Reactors (SMRs) as strategically important, with President-elect Trump also interested. SMRs offer India a flexible, safer nuclear energy option. This aligns with Trump's "America First" approach, potentially boosting U.S. exports and strengthening India-U.S. energy and trade ties.

India's view on SMRs as area of Strategic Interest:

- **Importance in clean energy transition:** India is increasingly positioning Small Modular

Reactors (SMRs) as a crucial area of strategic interest in its clean energy transition and foreign policy.

- **SMR promoting closer India- USA ties:** SMRs presents an opportunity for India to advance its energy security while fostering closer ties with global powers like the United States.

  ➤ **Benefits of SMR for India:** For the US, collaboration with India on SMRs offers an opportunity to expand its nuclear technology exports while balancing out its own technological and economic constraints, including labour costs and protectionist sentiments.

- **SMR's as a cleaner fuel:** The need to diversify its energy mix and reduce dependence on fossil fuels makes SMRs a viable option for India, as they can provide cleaner, more flexible power generation solutions.

Trump's Support for SMRs as a Nuclear Power Solution:

In a pre-election podcast with Joe Rogan, he highlighted the **advantages of SMRs, emphasising their modular nature,** which allows them to be **factory-built, reducing construction time and cost overruns.**

- **SMRs as a Scalable and Manageable Energy Source:** Trump believes that SMRs **offer a scalable, more manageable approach to nuclear power generation.** Unlike traditional nuclear reactors, which often face prolonged construction periods and budget issues, **SMRs present a more efficient and cost-effective option** for clean energy production.

- **Strategic Opportunity for India:** Adopting **SMRs could streamline India's nuclear infrastructure development** while aligning with its economic and environmental goals, providing a cleaner energy source with fewer financial and logistical challenges.

About SMRs, Their Types, and Advantages Over Traditional Large Nuclear Reactors:

Small Modular Reactors (SMRs) are nuclear reactors with a capacity of **30 MWe to 300 MWe** per unit, designed to be **more compact, scalable, and cost-effective** than traditional large nuclear reactors. There are several types of SMRs based on the coolant used to manage the extreme heat produced in nuclear fission reactions:

- **Light Water Reactors (LWRs):** The most common type, similar to conventional nuclear power plants, but smaller and more compact. These reactors use water as both the coolant and the moderator.
- **High-Temperature Gas Reactors (HTGRs):** Uses helium gas as a coolant, offering higher temperature operation.
- **Liquid Metal Reactors (LMRs):** Utilises liquid metals, such as sodium or lead, for efficient heat transfer.
- **Molten Salt Reactors (MSRs):** Use molten salt as a coolant and fuel, potentially offering better thermal efficiency.

LWR as most practical and easiest to design : Among these, Light Water Reactors (LWRs) are considered the most practical and easiest to design.

- Since **most of today's nuclear regulations are based on water-cooled reactors, LWRs have an advantage in terms of approval and operational familiarity.**
- The modular construction of LWR-based SMRs reduces construction time and costs, while ensuring high-quality control through factory fabrication.

Need for SMRs in India:

- **Meeting India's rising power demand:** India is experiencing a significant rise in power demand, driven by rapid industrial growth and technological advances, especially in sectors such as AI and data centres.
- **Scalable and portability:** They are scalable, can be deployed in remote areas, and provide a reliable source of baseload power, all while being more cost-effective and quicker to deploy than traditional large nuclear plants.
- **Reducing reliance on fossil fuels:** Furthermore, as India seeks to reduce its reliance on coal and oil, SMRs offer a clean alternative, aligning with India's broader climate and energy goals.

How SMRs Can Solve the Nuclear Energy Challenge and Help Meet Net-Zero Goals:

SMRs can address several critical challenges facing nuclear energy:

- **Nuclear Energy Challenge:** Traditional nuclear reactors are **large, costly, and time-consuming** to build, which often

leads to delays and budget overruns. SMRs, on the other hand, are **smaller, factory-built, and designed for quicker deployment,** making nuclear energy more accessible and reliable.
- **Net-Zero Goals:** The International Atomic Energy Agency **(IAEA)** estimates that **nuclear energy must more than double by 2050** to help achieve global net-zero emissions targets. SMRs, with their low carbon footprint, provide a feasible path to meeting these goals, offering a clean, reliable, and scalable energy solution.

Challenges in Promoting SMRs in India:

- **Technological Disparities:** India's nuclear program **relies heavily on Pressurised Heavy Water Reactors (PHWRs),** which use heavy water and natural uranium. These are outdated compared to the globally dominant light-water reactors, creating a technological gap that must be bridged.
- **Legal Challenges:**
  - **Civil Liability for Nuclear Damage Act (2010):** This law assigns liability to operators and equipment suppliers in case of nuclear accidents, deterring foreign companies like GE-Hitachi and Westinghouse from investing in India.
  - **US Export Restrictions (10CFR810):** This regulation restricts US companies from manufacturing or designing nuclear equipment in India, which hinders India's desire to co-produce SMRs domestically.

Incentive for the US and India to Collaborate on SMRs:

- **Strategic Collaboration:** Both India and the US are **facing challenges in competing with China in the SMR space.** India has outdated reactor technology, while the US faces high labour costs and protectionist policies.
  - A partnership between the two nations **would allow them to pool resources and advance SMR technology,** strengthening their positions in the global market.
- **Economic Growth:** A collaboration would encourage technological exchange, foster

innovation, and attract foreign investment, boosting both countries' nuclear sectors.

Recent SMR Promotion Cases:

- **Holtec International's Deal with India:** Holtec International's proposal to deploy its SMR-300 reactor in India offers a significant opportunity for collaboration. By using existing coal plant sites in India, Holtec's proposal could **revive the commercial potential of the US-India civil nuclear deal signed in 2008.**

- **Google's Demand for Nuclear Energy:** Google has expressed interest in incorporating nuclear energy into its data centres, highlighting the growing demand for clean energy solutions. This demand provides further impetus for the promotion of SMRs in India.

- **Environmental Benefits:** SMRs offer a **low-carbon alternative to coal,** which aligns with India's climate goals and **helps improve air quality** by reducing dependence on fossil fuels.

Challenges to the Holtec-India Deal and India-US Collaboration:

While the collaboration holds significant potential, challenges remain:

- **Legal Hurdles:** The Civil Liability for Nuclear Damage Act and the US's export restrictions under 10CFR810 pose substantial barriers to the deal's progress.

- **Technological and Regulatory Disparities:** India's technological limitations and outdated nuclear regulations need to be addressed before widespread SMR deployment can occur.

Way Forward and Conclusion: To move forward with SMRs, India needs to address regulatory challenges and work closely with the US to find legal and technological solutions. Collaborating with companies like Holtec International offers a path to advance India's nuclear capabilities while meeting growing energy demands. India's continued dialogue with the US, along with potential partnerships with other global players, will be key in positioning the country as a leader in the SMR sector, counterbalancing China's growing influence in nuclear technology.

Subject - Environment, Bio-diversity and Disaster management

Nature Restoration Law in India

Sub Topic- *Conservation, Environmental Pollution & Degradation*

Context:

The degradation of natural ecosystems is a critical global issue, and India, with its vast ecological diversity, is no exception.

More on News:

- **Nearly 30% of India's land has been affected by degradation**, highlighting the urgent need for a comprehensive nature restoration law.

- The **European Union's (EU) Nature Restoration Law (NRL) offers an inspiring model** that India could adapt to address its growing environmental crises.

About Nature Restoration Law (NRL):

- The EU adopted the NRL on June 17, 2024, a groundbreaking regulation **aimed at restoring the health of Europe's ecosystems.**

- Supported by a majority of EU member-states, **representing 66.07% of the EU population,** this law marks a **significant step in global environmental governance**.

- It **mandates that 20% of the EU's land and sea areas be restored by 2030**, with a vision to fully restore all ecosystems in need by 2050.

- Part of the **EU's Biodiversity Strategy for 2030** and the **European Green Deal**, the **NRL seeks to reverse biodiversity loss as over 80%** of Europe's habitats are in poor condition.

- It focuses on **restoring diverse ecosystems**, including forests, rivers, agricultural lands, and urban areas, with **specific measures like converting 25,000 kilometres of rivers into free-flowing rivers and planting three billion additional trees by 2030.**

Environmental and Economic Case for India:

- India faces similarly severe environmental challenges.

- According to the **Indian Space Research Organisation (ISRO)'s Desertification and Land Degradation Atlas, 97.85 million hectares, or 29.7%,** of India's total land

area experienced degradation in 2018-19, a marked increase from 94.53 million hectares in 2003-05.

- **Desertification**, in particular, is a growing issue, with **83.69 million hectares affected** in 2018-19.
  - Key states like **Gujarat, Karnataka, Maharashtra, and Rajasthan** have been significantly impacted.

Desertification is a significant environmental issue characterised by the **degradation of land in arid, semi-arid, and dry sub-humid areas.** This process leads to the **transformation of fertile land into desert-like conditions,** primarily due to a combination of natural factors and human activities.

- While India has made progress with programs like the **Green India Mission**, **Pradhan Mantri Krishi Sinchayee Yojana**, **Integrated Watershed Management Programme**, and the **National Afforestation Programme**, the scale of the problem demands a more comprehensive solution.

- A **legally binding nature restoration law,** similar to the EU's NRL, **could ensure long-term sustainability** by restoring degraded landscapes.

What a Law in India Could Look Like

A Nature Restoration Law in India, modelled after the EU's NRL, could include the following elements:

- **Restoration Targets:** India could aim to **restore 20% of its degraded land by 2030,** with a goal of **fully restoring ecosystems by 2050.**
  - This would encompass **forests, wetlands, rivers, agricultural land**, and urban green spaces.

- **Wetland Restoration:** While peatlands are less common, critical wetlands like the **Sundarbans and Chilika Lake** are vital for biodiversity and carbon sequestration.
  - India could aim to **restore 30% of its degraded wetlands by 2030.**

- **Biodiversity in Agriculture:** Since agriculture dominates India's landscape, promoting agroforestry and sustainable practices could rejuvenate farmlands.
  - Progress could be tracked using **biodiversity indicators,** similar to the **butterfly and bird indexes in the EU.**

- **River Restoration:** India could focus on restoring free-flowing rivers, starting with major water bodies like the **Ganga and Yamuna,** while addressing pollution and obstructions.

- **Urban Green Spaces:** To combat urban degradation, India should ensure **no net loss of green spaces,** promoting urban forests in cities like Bengaluru and Delhi, which face rising temperatures and declining air quality.

The **30x30 target**, also known as **30 by 30**, is a global initiative aimed at **conserving at least 30% of the Earth's land and ocean areas by the year 2030**. This initiative was formalised during the **Kunming-Montreal Global Biodiversity Framework,** adopted at the **COP15** meeting of the **Convention on Biological Diversity** in December 2022.

Economic and Social Benefits of Restoration:

- The benefits of such a law would extend beyond the environment.

- According to the **World Economic Forum**, global nature restoration **could generate up to $10 trillion annually by 2030**.

- In India, restoring degraded land **would boost agricultural productivity**, **improve water security, and create millions of jobs**, particularly in rural areas.

- This law would also **help India achieve its Sustainable Development Goal 15**, which promotes *sustainable forest management and combating desertification*.

- Restoring ecosystems could also **mitigate climate change**, which exacerbates land degradation.

- By restoring ecosystems, India can **enhance its carbon sinks and meet its commitments under the Paris Agreement.**

The EU's Nature Restoration Law sets a crucial precedent for countries worldwide. For India, where land degradation and biodiversity loss are critical concerns, a similar law could restore ecosystems, contribute to socio-economic development, and enhance climate resilience. The time to act is now.

UNEP EMISSION GAP REPORT 2024

Sub Topic- *Conservation, Environmental Pollution & Degradation*

Context:

The UNEP Emissions Gap Report 2024 warns that **no progress was made in limiting global temperature rise to 1.5°C,** with greenhouse gas emissions increasing by 1.3% in 2023 compared to 2022. The gap in implementing policies to meet 2030 NDCs remains unchanged from last year.

Key Findings:

- **No Significant Progress Toward 1.5°C Goal**
  - The 1.5°C target is "at risk of being missed within a few years" without accelerated action.
  - Current policies leave the world on track for **2.6°C warming** by 2100.
- **Greenhouse Gas Emissions Increase in 2023**
  - Global emissions reached **57.1 $GtCO_2e$**, primarily from the **power sector**, followed by **transport, agriculture,** and **industry**.

Figure ES.2 The landscape of current NDC targets and implementation gaps for the G20 members collectively and individually by 2030, relative to 2019 emissions

Stalled NDC Implementation Gap

- The difference between current Nationally Determined Contributions (NDCs) and required emission reductions for 2030 remains the same as last year:
  - **16 $GtCO_2e$ for 2°C** by 2030; **24 $GtCO_2e$ for 1.5°C** by 2030.
  - Conditional NDCs (needing external funding) and unconditional NDCs are **insufficient for both 1.5°C and 2°C pathways**.
- **Required Emission Reductions Not Met**
  - To align with the 1.5°C pathway, **42% emissions cut by 2030** and **57% by 2035** are needed.
  - Current NDCs fall short, projecting only **4-10% reductions by 2030** against the **28-42%** needed for 2°C and 1.5°C targets.
- **Economic Cost and Financial Support Needs**

- Closing the emissions gap by **2030** and **2035** could cost **$200 per ton of CO_2e**.
- Increased investment, particularly in **emerging markets** and **developing economies**, is vital, estimated at **$0.9 - $2.1 trillion annually** from 2021 to 2050.
- The **G20**, responsible for **77% of global emissions**, is significantly off-track in meeting 2030 targets, underscoring the urgent need for more ambitious NDCs.

Sector-Wise Emission Reduction Potential:

- **Renewable Energy**: Solar PV and wind could reduce **27% of emissions by 2030** and **38% by 2035**.
- **Forestry**: **Deforestation reduction, reforestation,** and **improved forest management** could achieve **20% of emissions reduction potential** by 2030 and 2035.
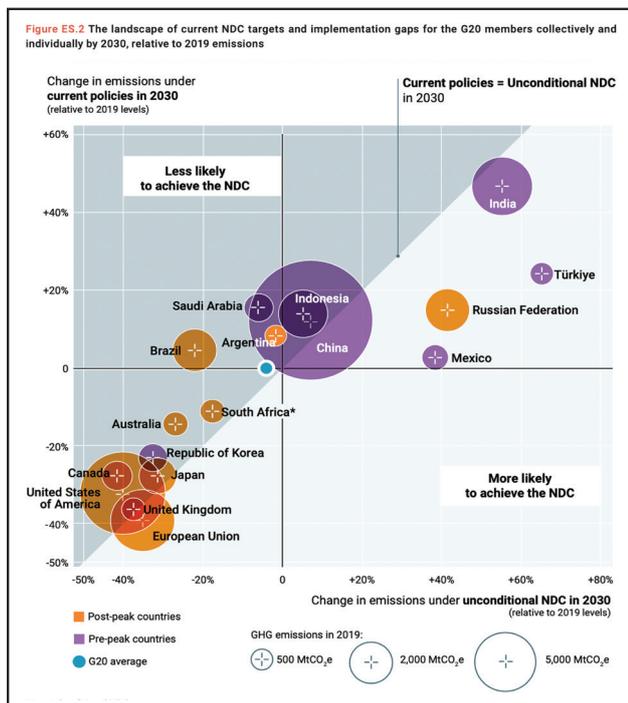
Key strategies identified for emissions reduction in the report:

- **The expansion of solar and wind energy, reducing deforestation, and improving forest management.**
- Additionally, the report urges countries **to adopt more ambitious NDCs, incorporating non-CO2 gases like methane and nitrous oxide,** which many major economies have yet to fully address.
- **Reforming Global Financial Systems** : The international financial architecture must be reformed to mobilise private sector investments and ensure sufficient funding for climate action in developing countries.

Global Cooperation and Ambition at COP29

- The report stresses the need for updated **NDCs by 2025**, including **all greenhouse gases (CO_2, methane, nitrous oxide)** under the **Kyoto Protocol**.
- Upcoming COP29 in Baku calls for a substantial scale-up in climate finance, urging wealthier nations to fulfil their responsibility for past emissions.

India's SO₂ Control from TPPs: NITI Aayog's FGD Memo

Sub Topic- *Conservation, Environmental Pollution & Degradation*

Context:

India's efforts to control sulphur dioxide (**SO₂**) **emissions** from thermal power plants (TPPs) have

recently come under scrutiny due to a memo from NITI Aayog.

More on News:

The Council of Scientific & Industrial Research-National Environmental Engineering Research Institute (CSIR-NEERI) presented findings, suggested that existing SO_2 emission controls may be adequate without further flue gas desulfurisation (FGD) installations.

Key Findings of the CSIR-NEERI Report:

- The draft report titled *Analysis of Historical Ambient Air Quality Data Across India* assessed data from from TPPs, coal mining regions, and the Central Pollution Control Board's (CPCB) monitoring stations.
  - ➤ It found that only 13 out of 953 monitoring sites exceeded the SO_2 limit of 80 micrograms per cubic metre, and these exceedances were infrequent.
- Focus Shift: The report suggested that regulatory efforts should instead target particulate matter (PM), which has shown higher exceedances in monitored data.
- Call for Transparency: The NEERI draft report has not been made public, and regulatory agencies do not have access to it.

Historical Context and Compliance Timeline:

- The inclusion of FGD systems in environmental assessments became mandatory only in 2015, after being under pressure for over a decade.
- The trajectory of compliance deadlines for SO_2 emissions has been marked by extensions.
- 2015: Strict emission norms were introduced, with initial compliance set for 2017.
- 2017: Extensions were granted, pushing deadlines to 2022.
- 2020: CEA recommended FGDs only for areas exceeding 40 micrograms per normal cubic metre.
- 2021-2022: Further categorisations were introduced based on geographic and pollution criteria, leading to staggered compliance deadlines across three categories of plants.

Current SO_2 Emission:

- Coal Consumption: In 2023, India consumed approximately 1,155.3 million tonnes of coal, with TPPs accounting for 826.64 million tonnes.
- SO_2 Generation: The low sulphur content of Indian coal (0.35-0.4%) does not mitigate SO_2 emissions during combustion, contributing to high particulate matter levels.
  - ➤ India became the largest global emitter of SO_2 in 2019, emitting significantly more than other countries, including China.
- Health Implications: The transformation of SO_2 into sulphate particles contributes to increased particulate matter (PM2.5), which is harmful to health including respiratory diseases, heart conditions, and premature death.

Technological Perspectives on SO_2 Control:

- Overview of FGD Technology: FGD technology is designed to remove sulphur compounds from exhaust emissions in fossil-fueled power stations.
  - ➤ While it offers significant environmental benefits, the implementation cost ranges from ₹1 to ₹2 crore per megawatt.
    - ■ This leads to higher electricity generation costs, potentially increasing consumer prices by 0.50 to 0.55 paise per unit, which raises significant concerns among stakeholders.
- Alternative Technologies: Circulating Fluidised Bed Combustion (CFBC) are being explored. These technologies also aim to enhance emission control while potentially offering cost-effective solutions for power generation.

Future Directions and Policy Recommendations:

- Accelerate FGD Implementation: Prioritise the installation of FGDs across all coal-based power plants.
- Strengthen Regulatory Mechanisms: Implement stricter monitoring and enforcement of emission standards.
- Promote Transparency: Ensure public access to data regarding emissions and compliance status.
- Encourage Research and Development: Invest in innovative technologies that can further reduce SO_2 emissions while maintaining economic viability.

COP16: Urgent Call for Action on Biodiversity Finance

Sub Topic- *Conservation, Environmental Pollution & Degradation, Biodiversity*

Context:

The 16th Conference of Parties (COP16) to the United Nations Convention on Biological Diversity emphasised the critical need for increased financial support from wealthy nations to safeguard global biodiversity, focusing on **Target 19a** of the **Kunming-Montreal Global Biodiversity Framework** (GBF).

Key Highlights

Urgent Financial Support Needed

- **Target 19a**: Developed countries must provide at least **$20 billion annually** to developing nations for biodiversity efforts by **2025**.
- **Funding Gap**: The global biodiversity finance gap is estimated at **$700 billion** each year.
- **2022 Funding**: Only **$15.4 billion** raised, indicating insufficient progress ahead of the 2025 deadline.

Challenges in Biodiversity Funding

- **Public vs. Private Funding**:
  - Public funding, which constitutes **84%** of biodiversity financing, has declined since **2015**.
  - Experts warn against over-reliance on private funding, which has proven ineffective.
- **Recent Trends**: Public financing for biodiversity has not significantly increased in **2024**, with many European nations cutting environmental budgets.

Call to Action

- **Increase Financial Contributions**: Governments are urged to boost grants to avoid worsening debt crises in developing countries.
- **Political Leadership**: Establish a group of ministers for accountability in mobilising resources to achieve the **$20 billion** target.
- **Support for Indigenous Peoples**: Urgent financial backing for Indigenous Peoples and local communities, with transparent tracking of expenditures.

Biodiversity Loss as a Global Risk: Biodiversity loss is deemed one of the **top global risks**, threatening ecological stability and human well-being.

GBFF Contributions and Initiatives

- **Global Biodiversity Framework Fund (GBFF)**
  - **Recent Contributions**: The GBFF has received **$163 million** from several countries, including **Austria, Denmark, France, Germany**, and **the UK**.
  - **Future Funding Needs**: Developed countries committed to **$20 billion** by **2025** and **$200 billion** annually by **2030**.
- **Indigenous Participation:** The fund aims to ensure that **20%** of its resources are led by Indigenous Peoples and local communities.

Protected Areas Progress

- **Protected Planet Report 2024:** The report indicates **17.6%** of terrestrial and inland waters and **8.4%** of marine areas are protected, necessitating a **doubling of land** protection and **tripling** of marine protection to meet the **30x30 target** by **2030**.
- **Slow Progress:** Since **2021**, progress has been slow, with **51 countries** exceeding the **30% target** on land and **31** at sea.
  - Less than **20%** of critical ecosystem function areas are currently protected.
- **Governance and Community Involvement:** Only **3.95%** of protected areas are governed by Indigenous Peoples and local communities.
  - Greater recognition and support for Indigenous governance are crucial for achieving biodiversity targets.

Conclusion:

COP16 emphasises the urgent need for developed nations to increase financial commitments to tackle the biodiversity crisis. With the 2025 deadline approaching, efforts must prioritise boosting public funding, supporting Indigenous communities, and enhancing governance to meet the Kunming-Montreal Global Biodiversity Framework's ambitious targets. Immediate action and accountability from all stakeholders are crucial for effective global biodiversity conservation.

Crawling Carbon Trading Scheme

Sub Topic- *Conservation, Environmental Pollution & Degradation, Climate Change*

Context:

India is expected to unveil a new carbon trading regime that will cover less than one-third of its rapidly increasing emissions, possibly by late 2025 or mid-2026.

More on News:

- This timeline is **nearly three years after its initial approval**.
- The government approved the establishment of an **Indian Carbon Market (ICM)** in June 2023.
- However, there has been little progress since then, with BEE officials stating they are still finalising the details.

Challenges Ahead:

- **Time Issues:** The benefits of a carbon market typically **take time to materialise.**
- **Exclusions:** Notably, India is currently **excluding heavily polluting sectors,** such as electricity and agriculture, from CCTS, which **undermines its overall effectiveness**.
  - It is anticipated that any noticeable impact on air quality may not be seen until 2031, as entities participating in CCTS will only represent 30% of the country's emissions, leaving the remainder unregulated and the atmosphere vulnerable.
- **Lag Effect:** A carbon market usually experiences a **"lag effect" of three to five years** before it begins to influence emissions.
- **Delays:** The delays in establishing the ICM and addressing emissions are jeopardising India's commitments to achieving **"Net Zero" by 2070**.
  - The ICM is intended to facilitate the operation of a domestic CCTS that aligns with United Nations (UN) regulations and establishes an emissions cap for industries.

Global Emissions at Risk:

- On October 28, the UN Climate Change released its 2024 **Nationally Determined Contributions (NDC) Synthesis Report**, which evaluates the collective impact of countries' current climate plans on anticipated global emissions for 2030.
- The report painted a **grim picture:** the **NDCs from major polluters like China, the US, and India reflect global emissions of 51.5 gigatonnes of CO2** equivalent by 2030 — **a mere 2.6% decrease from 2019 levels,** and far from the 43% reduction required by that year.
- Greenhouse gas emissions at these levels **would result in significant human and economic crises** for all nations.
- By 2035, it is **critical to reduce net global greenhouse gas emissions by 60%** compared to 2019 to limit global warming to 1.5°C this century.
- **Current national climate plans are inadequate** to prevent global heating from severely impacting economies and threatening billions of lives and livelihoods.

Sector-Specific Exemptions and Future Implications

- **Electricity is typically the most responsive sector** regarding emissions, **yet India has excluded fossil fuel power plants from CCTS oversight**, and agriculture remains outside its scope.

Framework of the Carbon Trading Programme:

- Unlike most programs that monitor total emissions, **India's CCTS will operate on an intensity-based model** mandated for energy-intensive industries, **where the government will determine emission intensity targets** (greenhouse gas emissions per unit of output) for compliance.
- **Only slight emissions deviations above and below the benchmark will generate credits** or deficits.
  - As India's GDP has increased, its emissions intensity has decreased over the past two decades.
- **CCTS should aim for an initial price floor of approximately ₹2,400 per tonne of CO2e** (around $30), with prices expected to rise over time, resulting in an annual reduction of about 2.2% in emission intensity from a baseline starting in 2026.
- A **World Bank** official mentioned that **buyers prefer low-cost credits,** as do nations seeking to fulfil their NDC commitments.

Influence of EU's Carbon Border Adjustment Mechanism:

- The EU's controversial **Carbon Border Adjustment Mechanism (CBAM)**, which Finance Minister Nirmala Sitharaman described as **"unilateral and arbitrary"** during a recent event, **may motivate Indian officials and industries to expedite the establishment of a carbon market mechanism**.

- **CBAM**, which is **set to implement a tariff on polluting products entering the EU** starting in 2026, **has already driven some nations,** like Taiwan, to introduce carbon fees in response to industry concerns.

- Industry experts have pointed out that **CCTS credits can help avoid the impacts of CBAM**, ensuring that the associated revenues remain in India.
  - ➤ In fact, fears over CBAM have prompted the steel ministry to grant a trial to Gensol Engineering for a facility powered by green hydrogen for steel production.

Current Carbon Credit Schemes:

- India currently operates a **domestic carbon credit mechanism** known as the **Renewable Energy Certificate (REC) Scheme**, which awards each renewable generator one certificate for every megawatt-hour of electricity supplied to the grid.
  - ➤ These RECs **can be sold to other polluting entities as a form of carbon credit**, allowing them to offset their emissions obligations.
  - ➤ The certificates are traded on the Indian Energy Exchange, with utilities utilising them to fulfil their **renewable purchase obligations (RPOs).**

- However, industry officials have reported that the **REC scheme has faltered, with certificate prices plunging from approximately ₹1,000 in January 2023 to around ₹112 now.**
  - ➤ This price drop allows utilities to meet their RPOs at a minimal cost.

- Additionally, the **scheme excludes traders, aggregators, and investors,** permitting only actual users to participate.

- A World Bank study indicates that the minimum carbon price should be set at $40-$60 per tonne by 2025 and around $100 per tonne by 2030 to achieve current global NDC targets. In stark contrast, India's RECs currently trade at just above a dollar, while voluntary credits are fetching approximately $1.50 per tonne.

Green Hydrogen-Powered Trains

Sub Topic- *Conservation, Environmental Pollution & Degradation, Renewable energy*

Context:

The Himachal Pradesh Chief Minister urged the **Central Government** to explore the possibility of running trains on the **Kalka-Shimla narrow-gauge railway** on **green hydrogen**.

More on News:

- This proposal is part of the state's larger goal to transition into a **'green energy state'** by **2026**, contributing to India's climate commitments and Nationally Determined Contributions (NDCs).

- The **Kalka-Shimla railway** has been a **UNESCO World Heritage Site** since 2008, recognised for its historic and scenic route through the Himalayan foothills.

Background

- **Green hydrogen-powered trains** represent a significant advancement in sustainable transportation, **utilising hydrogen fuel cells** to **produce electricity and emit only water vapour**. **Examples include:**
  - ➤ **North America** has **launched** its **first hydrogen-powered passenger train**, the **Coradia iLint**.
  - ➤ **Indian Railways** is set to **begin trials** of its **first hydrogen train in December 2024**, collaborating with Germany's TUV-SUD for safety audits.

- The introduction of **hydrogen trains** is **not limited** to **North America** and **India**. This **technology** is being **implemented in various regions worldwide**, marking a shift towards cleaner rail systems.
  - ➤ Countries like **Germany** and **France** have already integrated hydrogen trains into their rail networks, with **Germany launching** the **world's first hydrogen-powered train in 2018**.
  - ➤ The **UK** is also **testing hydrogen trains** as part of its plan to **phase out diesel by 2040**.

Himachal's Vision for Green Energy:

- **Green Energy Transformation Strategy:** A **six-pronged strategy** for transforming

Himachal Pradesh into a certified **green energy state** by **March 31, 2026**.

- ➢ The goal is to replace **1,500 Million Units (MUs)** of thermal power consumption with renewable energy sources like **hydropower, solar, and wind**.

- **Renewable Energy Consumption and Certification:** Currently, Himachal Pradesh consumes **13,500 MUs of electricity**, a large portion of which already comes from renewable sources.

  - ➢ The state plans to achieve **90% renewable energy consumption** in its power distribution network, making it eligible for certification as a fully **Green Energy State** in India.

- **Focus on Green Hydrogen and Solar Power:** The state is also focusing heavily on **solar power generation**, with plans to establish a **2,000 MW solar capacity** over the next **4-5 years**.

Significance:

- **Economic impact:** The transformation to green energy will help **boost the state's economy** while ensuring a **fair and just transition** to sustainable energy. The shift is expected to create more opportunities for **green industries** in the state.

- **Energy Efficiency:** Hydrogen fuel cells provide a **high energy density**, allowing for **longer travel distances** without the need for extensive charging infrastructure compared to electric trains.

- **Infrastructure Flexibility:** Implementing hydrogen technology **requires less upfront investment** in infrastructure than electrifying rail lines, making it an attractive option for regions with limited resources.

- **Environmental Impact:** The transition will also enable industries to apply for the **'Eco Mark'**, enhancing the value of their products in the market.

Challenges:

- **Hydrogen Production:** The sustainability of hydrogen trains depends on the availability of green hydrogen produced from renewable sources. Scaling up production while ensuring environmental integrity is crucial.

- **Infrastructure Development:** Adequate refuelling stations and maintenance facilities need to be established to support the operational demands of hydrogen trains.

Future Outlook:

- Himachal Pradesh is making significant strides in **green hydrogen production**, with its **first green hydrogen facility** under development in collaboration with **Oil India Limited (OIL)**.

- The successful deployment of green hydrogen trains could **transform rail transport**, contributing to **global decarbonisation efforts**.

- As technology advances and production scales up, more regions are likely to adopt this innovative solution, paving the way for a sustainable future in public transportation.

Unlocking Ocean Innovation: A Pathway to Sustainable Development Goals

Sub Topic- *Conservation, Environmental Pollution & Degradation*

Context:

Ocean conservation and sustainability are imperative in the current landscape, but the ocean technology ecosystem must be made more innovation-friendly and accessible.

The Critical Role of Oceans in Sustaining Life:

- The ocean, covering over **two-thirds of Earth's surface,** is fundamental to life.

- It provides **half of the oxygen** we breathe, **regulates global climate and water cycles, and supports livelihoods and food security** for billions of people.

- Recognising this, the **United Nations Sustainable Development Goal 14 (SDG 14)** emphasises conserving and sustainably using oceanic resources.

The Impact of Human Activities on Ocean Health:

- **Marine Plastic Pollution:** Increasing waste accumulation in oceans and waterways.

- **Ocean Acidification and Warming:** Resulting from rising global temperatures and greenhouse gas emissions.

- **Overfishing:** Disrupting ecological balances and depleting marine resources.

These challenges **threaten biodiversity, food security, human health, and coastal communities.**

Innovative Solutions to Ocean Challenges:

Technological advancements offer promising ways to combat these problems, such as:

- **Trash Interceptors:** Removing debris from rivers before it reaches the ocean.
- **Artificial Coastlines:** Capturing plastic waste along shorelines.
- **3D-Printed Coral:** Supporting coral reef restoration and biodiversity.
- **Mercury Capture Systems:** Reducing emissions from artisanal gold mining.
- **Renewable Energy Projects:** Lowering fossil fuel dependence to mitigate ocean warming.

Barriers to Ocean-Friendly Innovation:

Despite their potential, scaling up ocean technologies faces multiple challenges:

- **High Costs and Investments:** Developing and deploying these technologies requires significant funding.
- **Intellectual Property Restrictions:** Limiting open access to technological advancements.
- **Complex Operational Procedures:** High technical barriers to adoption.
- **Limited Research and Development (R&D):** Insufficient funding and support for innovation in the ocean technology sector.
- **Regulatory and Site Challenges:** Environmental assessments and site leasing issues hinder project implementation.

Regulation of Marine Ecosystems, Industries, and Economies

Existing Regulatory Frameworks Supporting Ocean Innovation

The **United Nations Convention on the Law of the Sea (UNCLOS), adopted in 1982,** provides a robust legal framework for marine technology development and conservation. Key provisions include:

- **Article 266:** Promotes the development and transfer of marine science and technology for conservation and research.
- **Article 268:** Outlines objectives like knowledge sharing, infrastructure development, capacity building, and fostering international cooperation in marine research.

Challenges in Implementation and Accessibility

Despite the intentions of UNCLOS, gaps exist in its enforcement:

- **Inequalities in Access:** Developed nations benefit disproportionately from ocean technology, leaving developing countries behind.
- **Limited Implementation:** Regulatory frameworks often fail to translate into actionable, on-ground progress.

Fresh Approaches to Overcoming Challenges in Ocean Sustainability:

- **International Funds for Ocean R&D**
  - **Dedicated R&D Funds:** Focus on developing sustainable ocean technologies.
  - **Equitable Access:** Ensure innovations benefit the public without undermining private incentives.
  - **Capacity-Building:** Empower emerging markets with training and infrastructure support.
- **Market-Based Incentives**
  - **Pollution Taxes/Fines:** Penalise companies causing ocean pollution.
  - **Redirection of Funds:** Support conservation projects and technology development.
  - **Encouraging Investment:** Financial incentives for industries to adopt sustainable practices.
- **Facilitating Technology Transfer**
  - **Joint Ventures & Shared Research:** Foster collaboration between developed and developing nations.
  - **Resource Sharing:** Make technologies affordable and accessible in lower-income countries.
- **Promoting Industry Engagement**
  - **Investment in Innovation:** Support eco-friendly technologies.
  - **Sustainability Goals:** Align industry operations with environmental objectives.

Subject - Internal Security

Strengthening CBRN Security in India

Sub Topic- *Challenges to internal Security through communications networks*

Context:

India is facing significant challenges in strengthening its **Chemical, Biological, Radiological, and Nuclear (CBRN) security framework**.

More on News

- While the nation has **yet to develop a comprehensive national security strategy**, recent initiatives highlight the urgent need to address these critical threats.

- **India's approach to national security has traditionally relied on military strategies** rather than a formalised doctrine.

- The **National Security Council Secretariat (NSCS)** initiated the formulation of a **National Security Strategy (NSS)** in November 2023.

  ➤ This strategy aims to encompass various aspects of security, including strategic deterrence, counterterrorism, economic security, cybersecurity, climate change, and food security, with a specific focus on CBRN threats.

- A robust CBRN strategy is essential for overseeing threat detection, non-proliferation, and deterrence.

Past CBRN Incidents and Potential Threats in India

- **Neighbouring Countries:** India's perception of CBRN threats is influenced by its geopolitical context and relationships with neighbouring countries.

  ➤ **Pakistan:** Pakistan's **nuclear capabilities** pose an ongoing concern for India due to historical tensions and the risk of escalation into nuclear conflict.

  ➤ **China:** Additionally, China's **advancements in biotechnology and artificial intelligence** raise fears about potential biological weapons development.

- **Islamic State:** From 2014 to 2017, the **Islamic State** orchestrated numerous chemical **attacks in Iraq and Syria**, showcasing the evolving capabilities of non-state actors.

- **Terrorist Organisations:** The potential for terrorist organisations like **Lashkar-e-Taiba (LeT) and Jaish-e-Mohammed (JeM)** to acquire or use CBRN materials presents a significant threat.

- **Insurgent Groups:** The threat landscape is further complicated by insurgent groups in regions like **Jammu and Kashmir and the Northeast**, which may seek unconventional means to challenge state authority.

The Role of CBRN Strategy in India's National Security

- **National Security:** A comprehensive CBRN strategy is crucial for India's national security framework.

- **Strengthening Non-Proliferation:** This strategy should include diplomatic efforts to strengthen non-proliferation treaties and enhance collective security against CBRN threats.

- **International Initiatives:** India has been active in international initiatives aimed at preventing nuclear terrorism and enhancing global nuclear security through cooperation with organisations like the **International Atomic Energy Agency (IAEA).**

Challenges in CBRN Security

- **Geopolitical Tensions:** Ongoing conflicts with neighbouring countries increase vulnerability to CBRN threats.

- **Domestic Vulnerabilities:** The presence of hazardous materials in industries poses risks of accidental releases or exploitation by malicious actors.

- **Insufficient Infrastructure:** Inadequate safety protocols and ageing infrastructure contribute to the potential for industrial accidents.

- **Natural Disasters:** India's susceptibility to natural disasters can exacerbate CBRN risks by triggering emergencies that could be exploited.

Leveraging Multilateral Collaborations

- Strengthening **international collaborations** is essential for addressing CBRN threats effectively.

  ➤ India's participation in the **Quadrilateral Security Dialogue (Quad)** presents

a strategic opportunity to enhance collective CBRN deterrence.

- Engaging with global **non-proliferation treaties** and **forming alliances** can enhance collective security measures.

  ➢ India's participation in the US-led **Indo-Pacific Security Strategy** signals a potential shift towards an **"Indo-Pacific NATO,"** aligning with regional partners to counter China's influence.

- India must actively participate in **international forums** focused on CBRN issues to share best practices and develop coordinated responses.

Policy Recommendations for Strengthening CBRN Deterrence

- **Develop a Comprehensive National Security Strategy:** Integrate CBRN considerations into India's broader national security framework.

- **Enhance Domestic Preparedness:** Invest in emergency response systems and ensure stringent safety protocols are implemented across industries handling hazardous materials.

- **Promote Research and Development:** Foster innovation in detection technologies and response mechanisms to improve resilience against potential CBRN incidents.

- **Increase Public Awareness:** Educate citizens about CBRN risks to empower communities during emergencies.

Adaptive Defence: India's Strategy for Navigating Emerging Security Challenges

Sub Topic- *Challenges to internal Security through communications networks*

Context:

India is strengthening its military strategies with a focus on **'Adaptive Defence'** to address evolving **security challenges.** Raksha Mantri Shri Rajnath Singh, speaking at the inaugural **Delhi Defence Dialogue (DDD)** on November 12, 2024, emphasised the need for India to **not just respond to current threats but to proactively anticipate and prepare for future ones**.

About Adaptive Defence: Adaptive Defence refers to a dynamic and flexible approach to national security where military strategies, technologies, and operational capabilities are continually updated to address emerging threats. Adaptive defence focuses on **continuous evolution** to stay ahead of emerging security risks. This approach includes:

- **Proactive Threat Anticipation:** It focuses not just on responding to current threats but also on predicting future security risks and preparing for them in advance.

- **Continuous Evolution:** The defence strategy is continuously evolving, incorporating new technologies, ideas, and doctrines as the threat landscape shifts.

- **Flexibility and Agility:** The armed forces must maintain flexibility at both strategic and tactical levels, enabling them to swiftly adjust their approach based on new intelligence and evolving circumstances.

- **Technological Integration:** Incorporating futuristic technologies like Artificial Intelligence (AI), cyber capabilities, drones, and swarm technologies is central to adaptive defence.

Need for Adaptive Defence: The changing global security environment calls for a shift in how nations approach defence. Key factors driving the need for adaptive defence include:

Policy Reforms and Initiatives

- Defence Acquisition Procedure 2020
- Innovations for Defence Excellence (iDEX)
- Increased Foreign Direct Investment (FDI)
- Indigenous Projects: The Light Combat Aircraft (Tejas), INS Vikrant
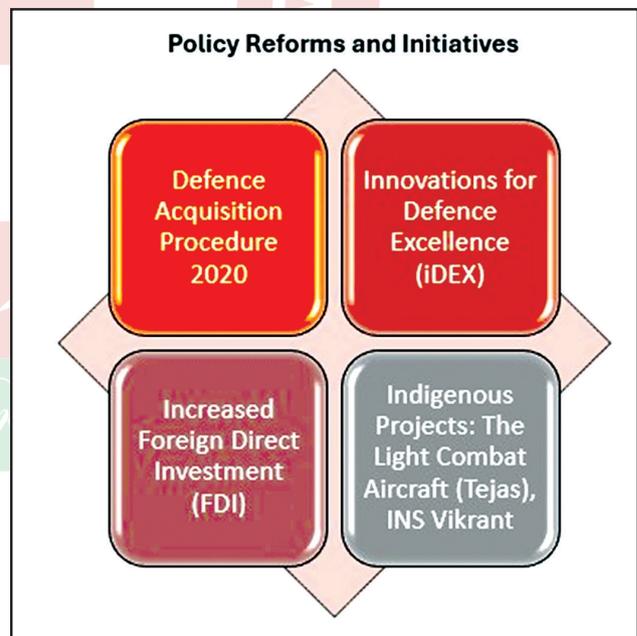
- **Emerging Non-Traditional Threats:** Traditional threats, like border conflicts, are now compounded by challenges such as cyber-attacks, hybrid warfare, terrorism, and information warfare.

- **Changing Nature of Warfare:** The rise of **Grey Zone** and **Hybrid Warfare** has blurred the lines between conventional and unconventional threats, involving tactics

like cyber-attacks, economic disruption, and psychological operations.

- **Technological Advancements**: The rapid development of technologies like AI, drones, and cyber capabilities is reshaping warfare, making traditional strategies inadequate.

- **Global Interconnectedness**: With the rise of cyber threats and AI, nations must adapt and collaborate globally to address complex security challenges.

Steps Taken and Planned by the Indian Government for Adaptive Defence: India has already taken significant steps to build adaptive defence capabilities, with further plans underway:

- **Strategic Organisational Changes**: The creation of the **Chief of Defence Staff (CDS)** promotes jointness among the Armed Forces, ensuring coordinated responses to emerging threats.

- **Technological and Infrastructure Development**: The government has established **Defence Industrial Corridors** to foster innovation and reduce reliance on foreign suppliers. The focus is on **Aatmanirbhar Bharat**, boosting indigenous defence production.

- **Research and Development**: Investments in **AI**, **cyberspace**, and **drone technologies** aim to position India as a global leader in advanced military technologies.

- **Drone and Swarm Technologies**: India is advancing its capabilities in drones and swarm technologies, fostering innovation and intellectual property in this sector.

Challenges in Implementing Adaptive Defence:

- **Technological and Operational Integration**: Rapid technological advancements make it challenging to integrate cutting-edge technologies, like AI and drones, into operational strategies. Substantial investment in R&D and training is required.

- **Cyber and Information Warfare**: Defending against cyber-attacks and information warfare requires continuous innovation and robust cybersecurity frameworks.

- **Geopolitical and Cross-Border Issues**: Security threats, such as terrorism and cyber-attacks, often transcend borders, necessitating international cooperation and coordinated responses.

- **Global Interdependence**: While focusing on self-reliance, India must balance global

collaboration in technology transfer, co-production, and R&D to ensure security without compromising national interests.

Subject - Indian Economy & Agriculture and Banking

Essential Business Priorities in a Changing World

Sub Topic- *Growth & Development*

Context:

In **2024, the global economy is starting to stabilise,** but there are still challenges due to political risks between countries. **Some G-20 economies are growing quickly, while others are facing difficulties.**

- This mixed situation creates opportunities for businesses to explore new ways to grow and help spread the benefits of development more inclusively across regions.

The **B-20 Process refers to the Business 20 (B-20), which is the official business dialogue platform of the G-20,** a group of major economies. The B-20 aims to bring together business leaders from G-20 countries to discuss and advocate for policies that promote global economic growth and development.

More in News:

- The **B-20 process,** led by developing countries over the last three years, has created an important agenda for the **Global South.**

- As leadership moves to South Africa later this year, businesses from both rich and developing countries **have pinpointed important goals and actions** to promote growth and development that includes everyone.

Essential Business Priorities in a Changing World:

- **Inclusive Development:** Focus on equitable growth by **promoting skill development,** especially for **women, enhancing financial access**, and fostering diversity, particularly in rapidly growing **regions like Africa.Eg**

  ➤ **TCS** provides digital skills training to underprivileged youth, especially

women, through its **Bridge IT program.**

- **Food Security:** Address global food security by **adopting sustainable agricultural practices, reducing waste,** and ensuring access to **nutritious food** through investments in technologies like **precision farming and collaboration with governments.**
  - ➢ Nestlé launched the *Nestlé Cocoa Plan* to promote sustainable farming and improve farmer livelihoods.

- **Resilient Global Trade:** Tackle rising tariffs and trade barriers by **collaborating with institutions like the WTO** to counter unfair practices and align environmental standards with trade policies.
  - ➢ **Unilever** advocates for fair global trade policies and supports small suppliers in entering global markets.

- **Digital Transformation and Innovation:** Leverage **AI for health care,** climate management, and resource allocation. Engage youth in innovation, support tech startups, and develop **STEM talent.**
  - ➢ **Google's AI for Social Good** applies AI for environmental conservation and disaster prediction.

- **Sustainability and Net-Zero Goals:** Invest in **renewable energy, biofuels, and green hydrogen** to support the transition to net-zero. Adopt circular economy models and sustainable practices. **Eg Adani Green Energy** scales renewable projects and commits to integrating green hydrogen technology in India.

- **Corporate Governance:** Prioritise high standards in **corporate governance, focusing on ethical operations** to build trust with governments, communities, and stakeholders, driving growth and improving business conditions globally.
  - ➢ eg **Infosys** implements **ESG initiatives,** (**Environmental, Social, and Governance**.) aiming for **carbon neutrality by 2040** while adhering to ethical business practices.

Need Why Global Business should prioritise inclusivity:

- **Tapping into Diverse Talent and Perspectives:** Inclusivity allows businesses to access a wider talent pool, fostering innovation and a better understanding of a global customer base. **Example: Accenture**

reports that inclusive teams make better decisions 87% of the time, enhancing performance.

- **Expanding Market Opportunities:** Inclusive practices enable businesses to penetrate emerging markets by providing access to jobs and financial services. For **example: Mastercard's financial inclusion initiatives in Africa** have empowered millions of small businesses and fueled regional growth.

- **Strengthening Corporate Reputation and Trust:** Companies that prioritise inclusivity build consumer trust and loyalty.

- **Meeting Regulatory and Stakeholder Expectations:** Stricter regulations on diversity and social responsibility necessitate businesses to adopt inclusive practices.

- **Addressing Global Inequality:** Inclusive practices play a crucial role in mitigating socioeconomic disparities by providing jobs and training to underserved populations.

Challenges global businesses face in promoting inclusivity, along with their examples:

- **Economic Disparities:** Significant inequalities exist between developed and developing regions, complicating workforce development and access to resources (**e.g., companies in Sub-Saharan Africa face infrastructure issues, limiting job and service access**).

- **Lack of Digital Access and Skills:** Insufficient internet access and digital skills hinder participation in the digital economy (**e.g., Mastercard's initiatives in Africa struggle against low digital literacy rates**).

- **Cultural and Social Barriers:** Social biases and historical exclusion can impede inclusivity efforts, especially for women and minorities (**e.g., companies in patriarchal societies face difficulties in promoting female leadership**).

- **Resistance to Change:** Internal pushback against diversity initiatives can stifle progress (e.g., Unilever navigates resistance in regions where gender equality efforts clash with traditional views).

- **Global Supply Chain Complexity:** Ensuring inclusivity across a multinational supply chain is difficult (e.g., Nike faces scrutiny over labour practices in its supply chain despite inclusivity commitments).

Venture Capital Fund for Space Tech Firms

Sub Topic- *Growth & Development, Mobilisation of Resources*

Context:

The Union Cabinet has approved a ₹1,000-crore venture capital fund to support companies in the space technology sector.

> Venture capital funds are **specialised investment vehicles** that focus on providing **capital to early-stage startups** and small to medium-sized enterprises (SMEs) with high growth potential. These funds **pool money from various investors,** primarily high-net-worth individuals and institutional investors, to invest in companies that are often considered high-risk but offer the possibility of substantial returns.

About the Fund:

- India aims to increase the value of its domestic **"space economy"** from the **current $8.4 billion to $44 billion by 2033.**
- This fund, set up **under the Indian National Space Promotion and Authorisation Centre (IN-SPACe),** an autonomous body under the Department of Space, will be **professionally managed** and is expected to **support around 40 companies** based on their commercialisation potential.
- Planned to be **deployed over five years**, the fund will **disburse ₹150 crore** in the 2025-26 financial year, followed by ₹250 crore annually over the next three years, and ₹100 crore in 2029–30.
- According to the government, **investments will range from ₹10 crore to ₹60 crore per company,** depending on the company's growth stage, trajectory, and potential impact on national space capabilities.
- The fund **aims to address the "trend of Indian companies domiciling abroad"** by providing the crucial risk capital that traditional lenders avoid in the high-tech space sector.
- It will focus on **early-stage investments,** while later-stage companies will receive between ₹30 crore and ₹60 crore, and early-stage firms will receive about half of that amount.
- The initiative is also expected to enable companies to attract further private equity investment.

Significance of Private Sector Investments in the Space Sector:

- **Innovation and Technology Development:** Private investments can drive innovation, leading to the development of new technologies and solutions that may not emerge from traditional public sector approaches.
- **Economic Growth:** The infusion of private capital can stimulate economic growth by creating jobs and establishing new markets within the space sector.
- **Global Competitiveness:** Enhanced private sector involvement can help India compete more effectively on the global stage, attracting international partnerships and investments.
- **Diversification of Funding:** Relying on private investments reduces the burden on government finances and diversifies funding sources for space initiatives.

Challenges:

- **Regulatory Framework:** The complexity of regulations can hinder private sector participation, making it essential to streamline processes.
- **Risk Appetite:** The space sector involves high risks, which may deter private investors who are typically more risk-averse.
- **Infrastructure Limitations:** Insufficient infrastructure can pose challenges for startups looking to scale their operations effectively.
- **Market Access:** Startups may struggle to access markets and customers due to established players dominating the space industry.

Key Initiatives to Encourage Private Sector Participation: IN-SPACe, Liberalised Foreign Direct Investment (FDI) Policy, New Space India Limited (NSIL), Indian Space Policy 2023, Seed Fund Scheme and Support Programs, Collaboration with Industry Associations, Encouragement of Startups, Capacity Building Initiatives

Way Forward:

- **Strengthening Regulations:** Simplifying regulatory frameworks will be crucial for attracting more private investments.
- **Enhancing Infrastructure:** Investments in infrastructure are necessary to support the growing number of startups in the space sector.

- **Promoting Research and Development:** Encouraging R&D through grants or incentives will help foster innovation within the industry.

- **Building Ecosystem Support:** Creating an ecosystem that includes investors, incubators, and educational institutions will be vital for nurturing startups.

India's Fertiliser Import Challenges

Sub Topic- *Direct & Indirect Farm Subsidies*

Context:

India is facing challenges in meeting fertiliser demand due to high import dependency, exacerbated by global conflicts in Ukraine and Gaza. These crises could impact fertiliser availability and drive up prices, creating additional stress on India's agricultural sector.

About Fertilisers:

- **Definition:** Fertilisers are chemical or mined products containing essential plant nutrients, vital for agricultural productivity.

- **Significance:** They provide nutrients to crops, supporting agricultural output, especially in **India**, which relies heavily on agriculture and faces issues of low productivity.

India's Agricultural Context:

- Small and **marginal farmers** dominate, often struggling with low crop quality and productivity.

- Predominantly **rain-fed** farming with continuous cultivation on the same land reduces soil fertility.

- **Nitrogen fertilisers** are increasingly needed to support soil fertility and crop growth.

Nutrients in Fertilisers:

- **Macro Nutrients:** Nitrogen (N), Phosphorus (P), Potassium (K), Calcium, Sulphur, Magnesium (required in larger quantities).

- **Micro Nutrients:** Iron (Fe), Zinc (Zn), Copper, Boron, Manganese, Molybdenum, Chloride (required in smaller quantities).

- **Popular Fertilisers:** NPK (Nitrogen, Phosphorus, Potassium) and **Urea** are the most commonly used in India.

- **Consumption:** India is the **second-largest consumer** of fertilisers globally, with over 55 million metric tons annually.

Current Fertiliser Import Scenario:

- **High Import Dependency:** India relies on imports to fill the gap between domestic production and demand.

  - **Urea:** 20% of demand is met through imports.

  - **Diammonium Phosphate (DAP):** 50-60% of demand is imported.

  - **Muriate of Potash (MOP):** 100% of demand is met through imports, as it is not produced locally.

- **Supply Vulnerability:** The ongoing crises in **Ukraine** and **Gaza** exacerbate this dependency, posing risks of increased prices and restricted availability.

Production vs. Consumption Gap:

- **Shortfall in Production:** In 2021-22, India produced **435.95 LMT** of fertilisers against a consumption of **579.67 LMT**.

  - **Notable Gaps:** This led to a shortfall of approximately **143.72 LMT**.

  - **High Consumption Fertilisers:** Urea remains the most consumed fertiliser, yet **only 250.72 LMT** of the **341.72 LMT** demand was met through local production in 2021-22.

- **Inadequate Domestic Production:** Rising demand during the **rabi (winter) crop season** intensifies pressure on fertiliser stocks.

Impact of Global Conflicts on Fertiliser Imports:

- **Geopolitical Instability:** Conflicts in **Ukraine** and **Gaza** threaten supply from key import partners, notably **Russia** and the **Middle East**.

- **Price Volatility:** Higher oil prices due to geopolitical instability increase the cost of petroleum-based fertilisers.

  - **Supply Chain Disruptions:** Uncertain global logistics may hinder smooth fertiliser imports.

Financial Burden of Fertiliser Subsidies:

- **Significant Government Allocation:** To offset high costs for farmers, the government has set aside ₹**1.79 lakh crore** for fertiliser subsidies in 2023-24.

➤ **Urea Subsidy**: Indigenous urea received ₹**1.04 lakh crore**; imported urea received ₹**31,000 crore**.

➤ **P&K Fertiliser Subsidy**: Indigenous and imported subsidies stood at ₹**25,500 crore** and ₹**18,500 crore** respectively.

● **Strain on Fiscal Budget**: Despite the subsidies, rising import costs and high dependency on imports continue to burden government finances.

Steps Taken by the Government to Enhance Self-Reliance:

● **New Urea Plants**: Under the **New Investment Policy (2012)**, six new urea plants were set up, adding **76.2 LMT** to production capacity.

  ➤ **Revived Units**: Major units like **Ramgundam, Gorakhpur, Sindri, and Barauni** were re-established as gas-based greenfield facilities.

● **Policy Reforms**: Encouragement for investments from **public, cooperative, and private sectors** to improve fertiliser production and distribution.

● **Nutrient-Based Subsidy (NBS)**: Efforts like including **Potash from Molasses** aim to reduce dependency on imports.

Proposed Solutions to Reduce Import Dependency:

● **Increase Domestic Production**: Expand infrastructure to enhance production, particularly of DAP and NPK fertilisers.

● **Encourage Alternative Fertilisers**: Promote the use of **nano urea** and **natural farming practices** to reduce reliance on chemical fertilisers.

● **Enhance Fertiliser Efficiency:** Invest in infrastructure to ensure efficient utilisation of fertilisers, reducing the required volume of imports.

Multilateral Development Bank (MDB) Reforms

Sub Topic- *Mobilisation of Resources*

Context:

The **G20 independent expert group** has expressed disappointment over the **slow and limited progress on multilateral development bank (MDB) reforms** recommended during India's G20 presidency, stating that implementation has been inadequate and lacks the urgency required.

The G20 **Independent Expert Group (IEG)** was established **under India's G20 Presidency to provide recommendations aimed at strengthening Multilateral Development Banks (MDBs)**.

More on News:

● In a report card titled *"An Incomplete Grade"*, the group highlighted that **while MDBs have initiated some reforms**, including expanded use of guarantees, **major shareholders have not provided sufficient support or resources** to fully meet the reform goals.

● The report noted that the **mobilisation of private capital remains incremental**, with **only $70 billion secured last year** — far below the transformation needed.

● Despite an increased mandate, MDBs have **achieved only a 30% expansion** in lending capacity, falling short of the necessary tripling.

● The expert group's previous **recommendations called for $3 trillion in annual spending by 2030 to meet global goals**, alongside a **$100 billion increase in MDB equity and tripling concessional finance** for the poorest nations.

Need for Multilateral Development Bank (MDB) Reforms:

● **Changing Global Context:** MDBs were **established in the aftermath of World War II** primarily to support reconstruction and development. However, the **current global landscape presents new challenges,** including climate change, rising debt levels, and the need for sustainable development that these institutions were not originally designed to address.

● **Inadequate Financial Resources:** Current funding levels are insufficient to meet the needs of developing countries. Estimates suggest that MDBs need to significantly increase their lending capabilities — up to $300 billion annually in regular lending and $90 billion in concessional loans by 2030 — to effectively support development and climate goals.

● **Inefficiency in Mobilising Private Capital:** MDBs currently mobilise only about **$0.6 in private capital for every dollar they lend.** There is a pressing need to enhance this ratio to at least $1.5 per dollar of MDB lending, which requires innovative financing mechanisms and better engagement with the private sector.

● **Need for Enhanced Mandates:** The scope of MDB operations should expand to

address **global public goods (GPGs)** such as climate stability and biodiversity. This includes adopting a triple mandate that focuses on eliminating extreme poverty, enhancing sustainable lending, and creating mechanisms for flexible engagement with investors.

- **Fragmented Global Financial System:** The existing financial architecture is complex and fragmented, making it difficult for developing countries to access necessary resources efficiently. Reforming MDBs can help streamline processes and improve coordination among financial institutions.

New International Economic Order (NIEO)

It emerged in the 1970s as a set of proposals advocated primarily by developing countries to address the inequities of the existing global economic system, which they argued perpetuated colonialism and dependency. The NIEO sought to transform international economic relations and promote development through a more equitable and cooperative framework.

Key Principles of the NIEO:

- **Sovereign Equality of States:** The NIEO emphasised the sovereign equality of all nations, advocating for non-interference in internal affairs and the right of countries to determine their own economic and social systems.

- **Control Over Natural Resources:** It called for full sovereignty over natural resources, allowing states to manage their resources without external interference, which was seen as crucial for development.

- **Equitable Trade Relationships:** The NIEO sought to establish just and equitable relationships between the prices of raw materials exported by developing countries and those exported by developed countries. This included proposals for international commodity agreements to stabilise prices.

- **Increased Development Assistance:** There was a strong emphasis on enhancing bilateral and multilateral assistance to promote industrialisation in developing countries, including financial resources and technology transfer.

- **Economic Cooperation Among Developing Countries:** The NIEO encouraged greater cooperation among developing nations to foster self-reliance and collective bargaining power in international trade.

The **Addis Ababa Action Agenda (AAAA)**, adopted during the **Third International Conference on Financing for Development** in July 2015, outlines a comprehensive framework aimed at addressing the financing needs for sustainable development. **Key Components** of the Addis Ababa Action Agenda include: Mobilisation of Domestic Resources, Private Sector Engagement, Official Development Assistance (ODA), Global Infrastructure Investment, Social Protection Systems, Combating Illicit Financial Flows, Sustainable Debt Management and International Cooperation,

Historical Context:

The NIEO was formally recognised with the adoption of the *"Declaration for the Establishment of a New International Economic Order"* by the **United Nations General Assembly in 1974.** This declaration highlighted the **need for urgent measures to address economic imbalances** between developed and developing nations, particularly in light of the decolonisation process that had gained momentum post-World War II.

Proposed Reforms:

- **Reform of International Trade Rules:** Overhauling existing trade rules, especially concerning raw materials and food, to better reflect the needs of developing nations.

- **Monetary System Reform:** Modifying the international monetary system to align with developmental needs, ensuring that financing mechanisms support growth in developing countries.

- **Technology Transfer:** Establishing incentives for technology transfer from developed to developing nations as a means to support industrialisation efforts.

- **Debt Forgiveness:** Advocating for debt relief for developing nations burdened by unsustainable debt levels.

Legacy and Continued Relevance:

Although many aspects of the NIEO have not been fully realised, its principles continue to resonate in discussions about global economic governance. The **2018 United Nations resolution *"Towards a New International Economic Order"*** reaffirmed the need for an economic framework based on equity, cooperation, and solidarity among states. The ideas encapsulated within the NIEO remain relevant as developing countries continue to seek fairer terms in international trade and finance amidst ongoing global inequalities.

Dedicated Freight Corridors (DFCs)

Sub Topic- *Mobilisation of Resources, Infrastructure Development*

Context:

Dedicated Freight Corridors (DFCs) are boosting India's GDP and contributing significantly to Indian Railways' revenue, according to a study by the University of New South Wales, Australia.

More on News

- The study found that **reduced freight costs and travel times on DFCs have lowered commodity prices by up to 0.5%** and **contributed 2.94% to Railways' revenue growth** from FY 2018–19 to FY 2022–23.

- Published in the journal Elsevier, the study analysed data from the Western Dedicated Freight Corridor (WDFC) using a Computable General Equilibrium model.

What are DFCs?

- DFCs are **designated routes for freight transport**, facilitating **faster and higher-capacity trains,** including double-stack and heavy-haul trains.

- This **enhances supply chains** for industries located along these economic corridors and **supports export-import growth.**

- Initiated by the **Ministry of Railways in 2006,** two major DFCs were constructed: the **Eastern Dedicated Freight Corridor (EDFC)** from Sonnagar (Bihar) to Sahnewal (Punjab), spanning 1,337 km, and the **WDFC** from Jawaharlal Nehru Port in Mumbai to Dadri (Uttar Pradesh), covering 1,506 km.

  - The **EDFC is fully operational** with links to coal mines and thermal power plants, while the **WDFC, at 93% completion**, serves various cement plants and ports in Gujarat.

  - It is expected to be completed by December 2025. As of March 31, 2024, Rs 94,091 crore has been spent on the DFC project, excluding land acquisition costs.

Why DFCs?

- The DFCs **address two key needs: easing congestion on the overutilised "golden quadrilateral"** linking Delhi, Mumbai, Chennai, and Howrah, which covers only 16% of rail routes but handles over half of the Railways' freight traffic, and **reversing the decline in Railways' share of total freight traffic**, which the National Rail Plan aims to raise to 45% by 2030.

- In 2006, Prime Minister Dr. Manmohan Singh inaugurated the DFC project; DFCCIL was established as a Special Purpose Vehicle to construct and maintain these corridors.

Current Status

- Currently, **325 DFC trains run daily,** a **60% increase over the previous year,** with freight trains moving faster, carrying heavier loads, and operating more safely.

- DFCs have **transported over 232 billion Gross Tonne Kilometres (GTKMs)** and **122 billion Net Ton Kilometres (NTKMs)**.

- Over 10% of Indian Railways' freight now runs on DFC lines, and DFCCIL is conducting a broader study on the DFCs' impact on the Indian economy.

- **Four additional corridors** are also **proposed**: the **East Coast Corridor** (Kharagpur-Vijayawada), **two East-West Sub-corridors** (Palghar-Dankuni and Rajkharsawan-Andal), and the **North-South Corridor** (Vijayawada-Itarsi).

National Rail Plan (NRP)

Envisioned for 2030, it aims to create a comprehensive and future-ready railway system. The plan is a strategic initiative by Indian Railways to enhance operational capacity, improve infrastructure, and increase the modal share of railways in freight transport to 45% by 2050.

Key Objectives:

- **Capacity Creation:** The primary goal is to **develop railway capacity** ahead of projected demand, ensuring that the system can accommodate growth up to 2050.

- **Modal Share Increase:** The NRP aims to **boost the railways' share in freight transport** significantly, targeting a **45% share by 2050**.

- **Infrastructure Development:** Identification of critical and supercritical projects for completion by 2024, including:

  - 58 Supercritical Projects totaling 3,750 km at an estimated cost of ₹39,663 crore.

> ➢ 68 Critical Projects spanning 6,913 km with a projected cost of ₹75,736 crore.

- **High-Speed and Dedicated Freight Corridors:** The plan includes the establishment of new dedicated freight corridors and high-speed rail lines to enhance efficiency and reduce travel times.

- **Improvement in Freight Train Speed:** Aiming to increase the average speed of freight trains from approximately **24 km/h to 50 km/h.**

- **Enhanced Passenger Experience:** Plans include operationalising new train services like **Vande Bharat trains** and improving amenities at railway stations.

Comprehensive Framework:

- **Investment in Technology:** Upgrading signalling systems and electrifying the entire network.

- **Doubling and Multi-tracking Lines:** Targeting high-density routes for enhanced capacity and reduced congestion.

Importance of Railways in Logistics:

- **Freight Capacity:** Indian Railways has a significant capacity for freight transport, handling approximately 1,418 million tonnes of goods annually. This is essential for industries such as agriculture, mining, and manufacturing, which rely heavily on efficient transportation of their products.

- **Cost-Effectiveness:** Rail transport is generally more economical for bulk goods compared to road transport. It significantly reduces logistics costs, which currently account for about 8.9% of India's GDP.

- **Environmental Benefits:** Railways are considered a greener mode of transportation due to their lower carbon emissions per tonne-kilometre compared to road transport.

Current Challenges:

Despite its advantages, the share of **railways in freight transport has declined from 86.2% in 1950-51 to about 33% in 2015**, primarily due to several challenges:

- **Capacity Constraints:** Many railway lines are **over-utilised**, with two-thirds operating at over 100% capacity. This leads to **delays and reduced reliability** for freight services.

- **Track Sharing:** The same tracks are often used for both passenger and freight trains, with **passenger services prioritised**, which

can slow down freight operations.

- **Inadequate Infrastructure:** There is a need for dedicated freight corridors and improved terminal capacities to enhance the efficiency of rail logistics.

Initiatives for Improvement:

- **Dedicated Freight Corridors (DFCs):** These corridors are being developed specifically for freight trains, allowing for faster and more reliable transport by separating freight from passenger services.

- **National Rail Plan (NRP):** Launched with a vision for 2030, the NRP aims to increase the modal share of railways in freight transport to 45% by 2050 through strategic investments and capacity enhancements.

- **Public-Private Partnerships (PPP):** Encouraging private investments in railway infrastructure and services is expected to boost operational efficiency and service quality.

Health and SDGs

Sub Topic- *SDG's, Mobilisation of Resources, Inclusive growth*

Context:

A **World Bank report** analysed health spending in 63 low-income countries (LICs) and lower-middle-income countries (LMICs) from 2019 to 2023, comparing it with trends from 2015 to 2019.

Chart-1 The average real government health spending per capita by income group (constant US$ 2023). Includes data for 63 countries.

LMICs: 54.5 (2019), 61 (2020), 64.1 (2021), 60 (2022), 57.6 (2023)
LICs: 10.1 (2019), 13.1 (2020), 11.7 (2021), 11 (2022), 10.2 (2023)
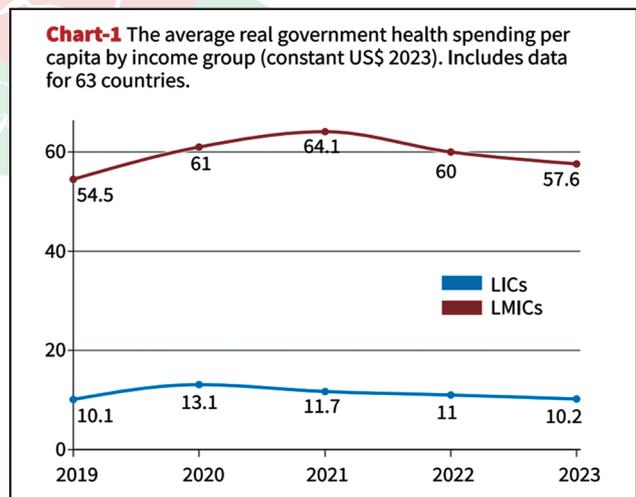
About the Study

- **Pandemic-Driven Spike and Decline:** Health spending spiked at the start of the

COVID-19 pandemic but declined steadily afterward.

➢ The initial reductions seemed temporary but now appear more permanent, **affecting progress toward health-related Sustainable Development Goals (SDGs).**

● **Decline in Per Capita Health Spending:** Government health spending per capita in LICs and LMICs has **grown only modestly** between 2019 and 2023.

➢ This growth is **limited by a decrease in health's share within overall government budgets**, as general spending has increased faster than health spending.

● **Reversal of Pre-Pandemic Prioritisation:** Pre-pandemic, health spending was gaining priority in national budgets.

➢ Recently, however, health spending has not kept pace with overall government expenditure growth.

● **LICs Particularly Affected:** The impact is strongest in LICs, where health budgets are minimal and rely heavily on external aid.

● **Projected Budget Contractions:** The report highlights risks **in 35 countries, including India**, where health spending per capita and its share of the budget have dropped.

➢ For 23 of these nations, IMF projections suggest that **government budgets may contract further** between 2023 and 2029, requiring difficult decisions to maintain health spending levels.

● **2023 Per Capita Spending Trends:** Average real government health spending per capita **continued to decline from pandemic peaks in 2023.**

➢ In LICs, spending surged in 2020 but returned to nearly pre-pandemic levels, at around **$10 per capita in 2023.**

➢ In LMICs, spending dropped from its 2021 peak.

● **Low Growth Rates in Health Spending:** From 2019 to 2023, the annual growth rate in per capita government health spending was only 0.4% in LICs and 0.9% in LMICs.

➢ This contrasts sharply with the pre-pandemic period (2015–2019), when LICs saw a 4.2% annual growth rate and LMICs 2.4%.

● **Decline in Health's Budget Share:** In 2023, the proportion of government spending allocated to health continued to fall.

Chart-2 The average annual growth rate of real GHS per capita by income group (in %)
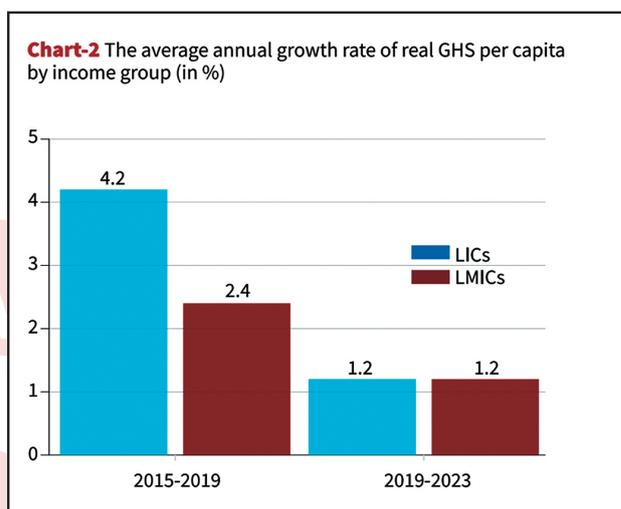
➢ In LICs, the decline began in 2021, reducing health's share to 5.6%.

➢ In LMICs, the decline started in 2022, with health's share falling to 6.5%.

● **India's Health Budget Trends:** India's health spending, which **surpassed 2% of the total budget in FY18,** saw an increase during the pandemic years but has since **declined to approximately 1.75–1.85%.**

Importance of Health for Sustainable Development Goals (SDGs)

● Health is a fundamental component of the Sustainable Development Goals (SDGs), particularly **Goal 3: Good Health and Well-being**.

● **Interconnectedness with Other Goals:** Health is intrinsically linked to various other SDGs, including **poverty reduction (Goal 1)**, **gender equality (Goal 5)**, **quality education (Goal 4),** and **clean water and sanitation (Goal 6)**.

● **Economic Growth:** A healthy population contributes to economic productivity, as good health enhances individuals' ability to work, learn, and contribute to society.

● **Equity and Inclusion: Universal Health Coverage (UHC)** is a key target under SDG 3, ensuring that everyone has access to essential health services without financial hardship.

Steps Taken by India

- **Ayushman Bharat Scheme:** Launched in 2018, this comprehensive health insurance scheme aims to provide coverage for over 500 million individuals, ensuring access to quality healthcare services and financial protection against medical expenses.

- **National Health Mission (NHM):** This program focuses on strengthening healthcare infrastructure, especially in rural areas, enhancing maternal and child health services, and addressing communicable diseases.

- **Focus on Maternal and Child Health:** India has set ambitious targets to reduce maternal mortality ratios and end preventable deaths among newborns and children under five.

- **Combating Communicable Diseases:** The government has implemented programs aimed at eradicating diseases such as **tuberculosis, malaria, and HIV/AIDS.**

- **Data-Driven Approaches:** The **SDG India Index** measures progress at national and subnational levels across various indicators related to health.

- **Collaboration with International Organisations:** India collaborates with WHO and other international bodies to align its health strategies with global standards and share best practices.

- **Investment in Health Infrastructure:** The Indian government aims to increase public health expenditure significantly by 2025, focusing on building robust healthcare systems that prioritise preventive care.

Through these initiatives, India is working towards achieving Goal 3 of the SDGs while addressing broader social determinants of health that impact overall well-being.

The Washington Consensus: A Vision in Decline?

Sub Topic- *Mobilisation of Resources*

Context:

The end of the Cold War in 1991 marked a historic victory for the United States and the Western world.

Background

- As the Soviet Union fell, American political theorists, including **Francis Fukuyama,** declared that ideological conflict had ended.

- **Electoral democracy**, they argued, had **triumphed over authoritarianism**, and free-market capitalism had emerged as the superior economic system, outpacing socialism.

- Yet, decades later, these systems are **faltering on the global stage.**

Electoral Democracy: The Persistence of Discontent

- **Competition:** Though electoral democracy is considered a hallmark of governance, the **competition between multiparty democracies and one-party states continues.**

- **U.S. Influence:** The U.S. often leverages its **global influence to pressure countries** like Russia, China, Iran, and Venezuela into adopting what it deems democratic standards.

- **Rising Dissatisfaction:** Yet the irony is that **dissatisfaction with American democracy is rising at home.**

  - In an October 2024 poll by The New York Times and Siena College, **45% of Americans felt that democracy in the U.S. fails to represent them**, and 76% perceived it as compromised by internal corruption.

Free-Market Capitalism: A Stumbling System

- **Role of IMF:** In line with the **Washington Consensus**, institutions like the International Monetary Fund (IMF) have **imposed stringent market reforms** on struggling economies as a condition for loans.

  - In 1991, **India had to adopt these reforms to receive emergency IMF support.**

- **2008 GFC:** The 2008 global financial crisis highlighted the **instability within the U.S.-style capitalism**, showing how little it prioritised ordinary people's welfare.

  - *"The Trillion Dollar Meltdown,"* is a bestselling book by Charles R. Morris that delves into the financial crisis of 2007-2008. The book provides a concise explanation of the factors leading to the economic turmoil known as the **Credit Crunch.**

  - The aftermath of the **2020 COVID-19 pandemic deepened these divides**, as the stock market surged while billions faced financial devastation.

  - Protests like **Occupy Wall Street** made clear that many felt alienated by a

system that primarily rewarded the top economic tier.

Structural Reform Failures

- **Exclusion of Stakeholders:** The IMF's October 2024 **World Economic Outlook Report** delved into why structural reforms often fail, highlighting a **lack of adequate stakeholder consultation**.

  - Too often, reforms are **designed by experts who dismiss the insights of those directly affected.**

- **Resentment:** This disconnect **fosters resentment,** as **seen in Greece after the 2008 crisis,** where austerity measures imposed by the IMF and European Central Bank led to intense resistance and the fall of a socialist government.

  - **"Turning Point"** is a documentary that explores **critical moments in history, focusing on how specific events have shaped the world we live in today.**

- **India:** The **government's attempts to reform labour, energy, and agricultural sectors were met with resistance**, particularly from farmers and labour unions who felt excluded from the process.

Populism and Middle Ground

- **Populist Movements:** These frustrations have fueled populist movements across the globe.

- **Anti-elite sentiments,** spanning both left and right political ideologies, are a reaction to a sense that ordinary citizens have been left behind by capitalist policies.

- In many cases, the **traditional political middle ground struggles to address** these grievances, allowing more extreme perspectives to gain ground.

- As the Washington Consensus falters, the **U.S. is under pressure to reform its own democratic processes.**

  - The **Kindleberger Trap** is a concept derived from the work of economic historian **Charles Kindleberger** and popularised by political scientist **Joseph Nye.** It refers to the **failure of a leading global power to provide essential global public goods,** which can lead to **international instability and chaos.**

- Wealth's influence on politics has become so pervasive that **policy decisions are often more reflective of elite priorities** than public needs.

- For many citizens, **the government no longer feels truly "by the people,"** but rather **by the wealthy.**

- The Washington Consensus promoted democracy and capitalism as a united force for global prosperity, yet these two systems are based on different principles.

  - Capitalism empowers individuals based on wealth, while democracy is supposed to give each citizen an equal voice.

The Rise of Alternative Frameworks

- **The Cornwall Consensus:** In response to the limitations of the Washington Consensus, this approach emphasises **inclusive governance and equitable economic policies** that prioritise social welfare alongside market efficiency.

  - It advocates for a **balanced role between state intervention and market mechanisms,** recognising that one-size-fits-all solutions are often ineffective.

- **Addressing Inequality:** The **Lorenz Curve**, which illustrates income distribution within a population, serves as a vital tool for understanding economic inequalities exacerbated by neoliberal policies.

  - As wealth becomes increasingly concentrated among elites, traditional measures of economic success fail to capture the growing disparities experienced by lower-income groups.

- **Climate Justice and Colonialism:** Concepts such as **climate colonialism highlight how global capitalist practices disproportionately affect marginalised communities** in developing nations.

  - Advocates for **climate justice argue that addressing environmental degradation must also involve rectifying historical injustices** tied to colonial exploitation.

The need for reform is clear: **governments and multilateral institutions must ensure that all citizens have a voice in policies that impact their lives.** This shift toward a more balanced approach will require a **significant departure from past policies,** fostering a system that values the voices of ordinary people over money-driven decision-making.

Reorient Industrial Policy

Sub Topic- *Changes in Industrial Policy and their effects on Industrial growth.*

Context:

The **global economy is experiencing a surge in activist industrial policies**, with **governments offering extensive subsidies** in sectors like chip manufacturing.

More on News

- However, these policies **often result in global overcapacity, lower international prices, and reactive protectionism,** ultimately **raising costs for manufacturing industries.**
- In recent years, the **number of such policies worldwide has risen dramatically**, from a few hundred in 2017 to over 2,000 in 2023, including around 100 in India.

India's Policies:

- **Long Tradition:** India has a **long tradition of activist industrial policy,** epitomised by the **Make in India initiative** launched in 2014.
    - This policy **introduced various sector-specific incentives,** including the **Production-Linked Incentive (PLI)** scheme and **subsidies for industries** such as chip manufacturing.
- **Outcomes:** Yet, the **outcomes have been underwhelming.**
    - Between 2014-15 and 2023-24, the **manufacturing sector's share of total gross value added (GVA) dropped from 16-17% to 14-15%**, signalling a lack of acceleration in industrial growth.

Market-Friendly vs. Business-Friendly Policies:

- **Shift:** India's industrial policy **must shift from being business-friendly,** which often **breeds crony capitalism, to being market-friendly**, fostering **healthy competition and innovation.**
- **LPG Reforms:** The **economic reforms of 1991** offer a valuable lesson.
    - These reforms—**removing industrial licensing,** reducing trade barriers, and transforming financial markets—**spurred private investment and integrated India into the global economy.**
- **Financial Market Reforms:** Key **financial market changes**, such as **opening the**

banking and mutual fund sectors to private entities, **dematerialising share trading,** and **empowering the Securities and Exchange Board of India (SEBI)**, boosted private investment and savings.

- These reforms significantly **increased private corporate investment,** with the ratio of private to public investment rising from 0.37 in 1990-91 to 1.63 in 2022-23.
- The private sector now accounts for **71% of manufacturing investment,** while small enterprises contribute 22%, and the public sector just 7%.

Rethinking Industrial Policy:

- **Minimised Sectoral Intervention:** Sectoral interventions should be minimised, allowing corporations—large and small—to independently decide on sectors and technologies.
- **Enabling Environment:** Governments must **create an environment** that **rewards risk-taking and innovation** by reducing tariffs and opening up the manufacturing sector to global competition.
- **Lowering Tariffs:** India's tariffs remain **higher** than those of other emerging economies, and lowering them to global averages can enhance competitiveness.

Key Areas for Government Focus:

While promoting competitive markets is crucial, the government also needs to address systemic issues:

- **Land Acquisition:** Complex ownership laws make land acquisition a major hurdle for industrial development. Governments can simplify this by acquiring land and packaging it for investors.
- **Technology and Education:** Long-term success depends on investments in research, development, and skill-building to prepare the workforce for emerging industries.
- **State-Level Cooperation:** States play a critical role in facilitating land acquisition, ensuring skilled labour availability, and maintaining regulatory standards. Tamil Nadu offers an example of success, attracting investments through its investor-friendly approach.

Towards a New Industrial Policy:

- **Union-State Collaboration:** India's New Industrial Policy **should emerge from collaboration between the Union and state**

governments.

> The **Union should focus on infrastructure development, trade liberalisation,** and long-term technology growth, while **states should streamline land acquisition,** provide **skilled labour, and enforce environmental standards.**

- **State-State Collaboration: Coordination among states** can further facilitate national manufacturing value chains, driving growth in output and employment.

A well-designed industrial policy that balances market-friendly reforms with targeted government support can position India as a manufacturing powerhouse while ensuring sustainable, inclusive growth.

State-of-the-Art Animal Feed Plant

Sub Topic- *Industrial growth & Development, Inclusive Growth, e-technology in the aid of farmers*

Context:

Union Home Minister and Minister of Cooperation, Shri Amit Shah, inaugurated a state-of-the-art cattle feed plant with a production capacity of 800 metric tons at Himmatnagar in Sabarkantha district, Gujarat.

Importance of Plant:

- **Empowering Rural Communities:** The Cooperation Minister praised **Sabar Dairy for uplifting over 3.5 lakh families and empowering women** through the cooperative dairy movement, attributing its success to the **White Revolution led by Amul.**

> Two cooperatives were recognised for earning over ₹1 crore in milk trade.

- **Advancing Animal Husbandry:** The ₹210 crore Sabarkantha Dairy feed plant boosts livestock nutrition with a 2,050 metric ton capacity.

> **India's per capita milk production has surged from 40 kg in 1970 to 167 kg in 2023, making it a global leader.**

- **Promoting Natural Farming:** He **urged farmers to adopt natural farming for better soil health and disease prevention.**

- **Cooperative Growth:** Highlighting the **Gobardhan Yojana and Amul's growth to ₹60,000 crore,** he envisioned natural farming unlocking a ₹10 lakh crore global market for Indian farmers.

Other Inaugurations:

- In addition to the cattle feed plant, he inaugurated the **Fila Vista-2024 Stamp Exhibition** in Gandhinagar and paid homage to the leaders of the **Dandi March** at the Dandi Kutir Museum, a significant cultural site.

- He also inaugurated the **Shela Lake and Park in Sanand,** adding to Gujarat's cultural and environmental infrastructure.

Animal husbandry in India:

- **Economic Importance:** Animal husbandry plays a crucial role in the agricultural landscape of India, **providing employment and income to a large segment** of the population.

> The gross value of output from this sector was approximately **₹8,123 billion in the fiscal year 2015-16.**

- **Livestock Population:** As of FY 2019, India had around **192.5 million cattle**, 148.9 million goats, 109.9 million buffaloes, 74.3 million sheep, and 9.1 million pigs.

> The country is the **largest producer of milk globally**, with an estimated production of 230.58 million tons in FY 2022-23.

Key Types of Animal Husbandry:

- **Dairy Farming:** This involves the long-term production of milk from dairy animals such as cows and buffaloes.

> India has the **world's largest dairy herd and is a leading producer of various dairy products** like cheese, butter, and yogurt.

- **Poultry Farming:** Raising birds such as chickens and ducks for meat and eggs is another significant aspect.

> India **ranks third in egg production globally,** producing over 138 billion eggs annually.

- **Meat Production:** India is also a **major player in meat production,** particularly buffalo meat, where it stands as the **top global exporter.**

- **Aquaculture and Apiculture:** These practices involve **raising fish and bees, respectively,** for food products like fish and honey, contributing to dietary diversity and nutrition.

Government Initiatives:

- **National Livestock Mission:** Focuses on improving livestock productivity through better breeding practices.

- **Intensive Dairy Development Programme:** Aims to increase milk production by promoting better management practices among dairy farmers.

- **Foot & Mouth Disease Control Programme:** Works towards disease management to ensure healthier livestock populations.

Challenges and Future Prospects:

- Despite its importance, the animal husbandry sector faces challenges such as **inadequate infrastructure, limited access to veterinary services, and fluctuating market prices**.

- However, with **increasing investments** from both domestic and international entities, along with government support for modernisation and disease control programs, **the future prospects for animal husbandry in India remain promising**.
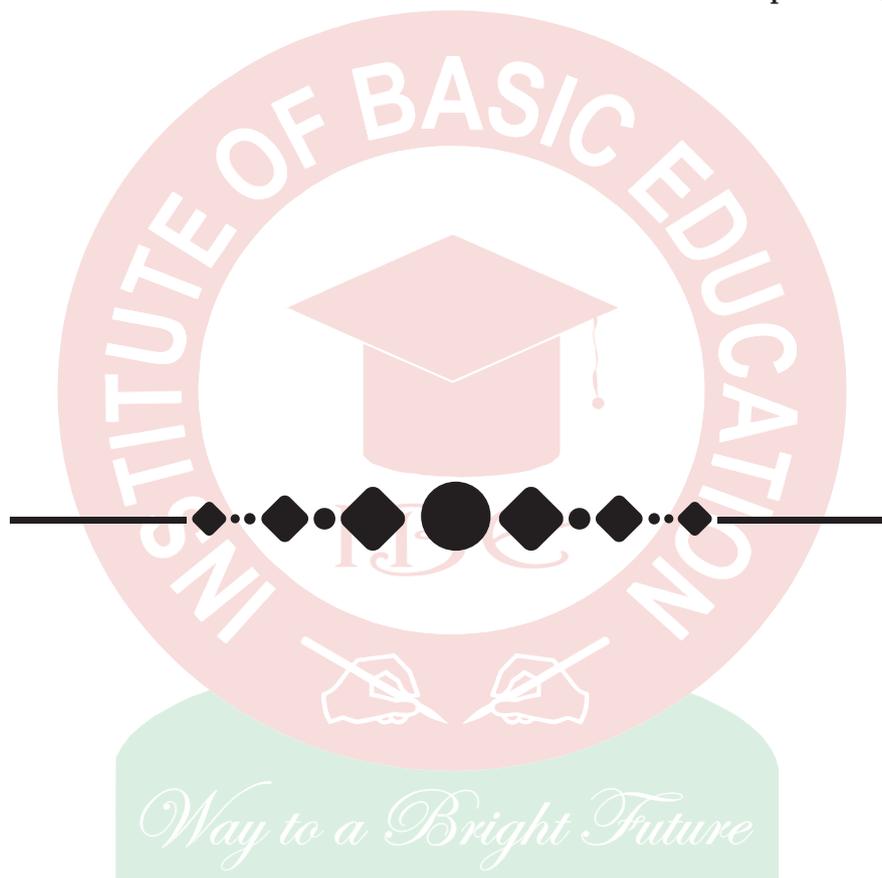
Discovery in Diatoms' Carbon Capture Mechanism

Sub Topic- *Biotechnology, Achievement in the field of Scientific Innovations & Discoveries*

Context:

Researchers at the **University of Basel, Switzerland**, **discovered** a protein shell called **PyShell** that is **essential for diatoms' efficient CO_2 fixation.**

Finding opens up **potential avenues for bioengineering approaches** to **combat climate change**.

> Tiny diatoms (microscopic algae), crucial players in the ocean's carbon cycle, have been found to possess a unique protein shell that enhances their ability to capture carbon dioxide (CO_2).

The Role of Diatoms:

- **Diatoms** are among the most p**roductive algae species**, essential for the global carbon cycle.
- They **utilise photosynthesis to absorb** significant amounts of **CO2, converting** it into **nutrients** that support much of ocean life.
- Despite their ecological importance, the mechanisms behind their efficient CO2 capture have remained largely unexplored until now.

Key Findings on PyShell:

- The **research team utilised advanced imaging technologies**, including **cryo-electron tomography (cryo-ET)**, to reveal the structure and function of the newly identified **PyShell** protein sheath **surrounding diatom pyrenoids**.
  - Pyrenoids are **specialised compartments** where the **enzyme Rubisco**, crucial for CO_2 fixation, **operates**.

- **The function of PyShell:**
  - **Structural Support**: The PyShell provides shape to the pyrenoid.
  - **Enhanced CO_2 Concentration**: It helps create a high concentration of CO_2 within the pyrenoid, facilitating efficient Rubisco activity.
- **Removing** the **PyShell diminished** the **algae's CO_2 fixation capability**, leading to **reduced photosynthesis** and **stunted growth**.
  - This highlights the **PyShell's critical role in carbon capture**, essential for both marine life and the global climate.

Implications for Climate Change Mitigation:

- The **discovery** of the PyShell **not only advances** our **understanding of diatom biology** but **also holds promise** for **biotechnological applications** aimed at reducing atmospheric CO_2 levels.
- Researchers emphasise the **need for immediate action to reduce human CO_2 emissions**, noting that the gases we emit will persist in the atmosphere for millennia.

Potential Applications:

- **Biotechnological Innovations**: Understanding the PyShell could inspire new methods to enhance photosynthesis in plants and algae, potentially improving CO_2 capture.
- **Long-Term Climate Strategies:** Basic research on mechanisms like the PyShell is crucial for developing future carbon-capture technologies.

How Climate Change is Reviving Interest in Airships

Sub Topic- *Achievement in the field of Scientific Innovations & Discoveries*

Context:

With the growing urgency of addressing climate change, **airships** are making a comeback as a potential solution for cargo transportation, thanks to their **low carbon footprint** and the rise of innovative technologies aimed at overcoming previous limitations.

lift, making them a more **sustainable option** for cargo transport.

- **Reachability**: Airships can access areas where **ships** or **trucks** may not be able to, making them a valuable tool for remote or underserved regions.

Drones in Fisheries

Sub Topic- *Achievement in the field of Scientific Innovations & Discoveries*

Context:

Union Minister of State for Fisheries recently highlighted the transformative potential of drone technology during an awareness workshop at the Central Marine Fisheries Research Institute (CMFRI) in Kochi.

- Drones are rapidly emerging as a game-changer in the fisheries sector, providing innovative solutions to address critical challenges with precision and efficiency.

Applications in Fisheries:

- **Aquaculture Management**: Drones will play a critical role in managing **aquaculture farms**, offering precision and efficiency.

- **Monitoring Fish Markets & Infrastructure**: They will assist in **monitoring fish markets** and **assessing damage** to fisheries infrastructure, especially during natural disasters, aiding **rescue operations**.

- **Underwater Drones**: Specialised **underwater drones** can monitor fish behaviour in natural habitats, detecting signs of distress (e.g., erratic swimming patterns) and providing **real-time data** to support **sustainable fisheries management**.

Government Initiatives:

- **Climate-Resilient Coastal Villages**: The Minister announced plans to develop **100 climate-resilient coastal fishermen villages** across India to support **fishing communities** facing climate change challenges.

  - **Funding**: ₹2 crore per village allocated under the **Pradhan Mantri Matsya Sampada Yojana**.

  - **Key Infrastructure**: The villages will have **fish-drying yards**, **processing centres**, **fish markets**, and **emergency rescue facilities**.

  - **Sustainable Practices**: The initiative will promote **seaweed cultivation**, **artificial reefs**, and **green fuel** initiatives.

How Airships Work:

- **Lighter-than-air Aircraft**: Airships are powered by gases like **helium** or hydrogen, which are lighter than the surrounding atmosphere.

- **Lifting Gas**: Originally, **hydrogen** was used due to its lightness and affordability, but its flammability (e.g., the Hindenburg disaster) led to the switch to **helium**, a non-combustible gas, though it is expensive and scarce.

- **Helium Cost**: **$35 per cubic metre** of helium is required to lift **1 kilogram** of weight, making it a costly resource.

The Varying Buoyancy Challenge:

- **Cargo Transport Limitations**: While airships are energy-efficient and have an excellent **lift-to-drag ratio**, they struggle with **varying buoyancy**—the need to adjust for weight changes during loading and unloading.

- **Helium Refill Problem**: A potential solution is releasing and refilling lifting gas, but the **scarcity and cost of helium** prevent this approach from being viable.

Promising Solutions:

- **Ballast Systems**: Using **ballast** or added weights is a proposed solution to adjust buoyancy, similar to how **hot air balloons** and **submarines** work.

- **Flying Whales**: The French company has developed the **LCA60T**, a 200-meter-long **helium airship** designed to carry heavy loads like **rocket sections** or **turbine blades**. The airship can pick up **water ballast** mid-flight to adjust its buoyancy.

- **Aeros**: This Los Angeles-based company has developed airships for **advertising** and **surveillance** and is exploring the idea of **floating warehouses** to support **e-commerce drone deliveries**.

Environmental Benefits and Potential:

- **Lower Carbon Footprint**: Unlike airplanes, airships do not burn **fossil fuels** to achieve

- **Marine Fishing Vessel Transponders**:
  - The **Union Department of Fisheries** will install **transponders** in **one lakh marine fishing vessels** this year, with an estimated cost of ₹364 crore.
  - **Two-way Communication**: The system will enable real-time tracking of vessels, and allow fishermen to send **short messages** (e.g., distress signals) using their **Android mobile phones**, even **200 nautical miles** offshore.
  - **Weather Alerts**: The system will provide **weather updates** and **cyclone warnings**.
  - **Fisheries Information**: The system will also offer **information on potential fishing zones** in **regional languages**.

Technological Advancements:

- The **Department of Fisheries**, in **collaboration** with the National Fisheries Development Board (**NFDB**), is **organising workshops** to showcase the use of drone technology in fisheries and aquaculture.
- These workshops feature live demonstrations of drone applications, such as fish transportation, feed dispensing, and deploying life jackets for emergency rescue operations.

The Significance of LignoSat: The First Wooden Satellite in Space

**Sub Topic-** *Achievement in the field of Space Science*

Context:

LignoSat, launched on November 5, is the world's first wood-panelled satellite, designed to explore the potential of **wood** as a sustainable alternative to metals in **spacecraft** construction.

- The Japanese-built satellite aims to test the **durability of wood** in the **extreme conditions** of space, marking a pioneering step in **sustainable space exploration**.

What is LignoSat?

- **Compact Design**: Measures 4 inches (10 cm) per side, weighing 900 grams.
- **Materials**: Constructed using **magnolia wood panels** without screws or glue, based on traditional **Japanese craftsmanship**.
- **Name Origin**: Derived from "**ligno**," Latin for wood, symbolising a shift towards renewable materials.
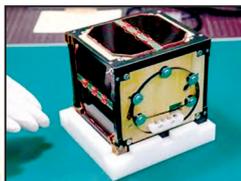
Mission Goals and Durability Testing

- **Extreme Temperature Fluctuations**: LignoSat will experience **temperature swings** between -100°C and 100°C every 45 minutes.
- **Space Radiation Impact**: The satellite will assess wood's potential to **shield semiconductors** from space radiation, a crucial aspect for future wooden spacecraft.

Historical Context and Precedents

- **Wood in Early Aviation**: Similar to **early 20th-century aircraft** made from wood, LignoSat revives this durable and lightweight material for space use.
- **Existing Applications in Space**: Materials like **cork**, already used in spacecraft re-entry shields, have proven wood's resilience under certain conditions.

The Vision for Wood in Space

- **Sustainable Space Habitats**: Led by astronaut Takao Doi, the Kyoto University team envisions using **wooden structures for habitats** on the Moon and Mars within the next 50 years.
- **Testing Feasibility**: LignoSat serves as a **proof of concept** to demonstrate that wood can withstand space conditions and potentially replace metals in future space missions.

Environmental Benefits of Wooden Satellites

- **Reduced Atmospheric Pollution**: Unlike traditional **aluminium-based satellites**, which emit harmful **aluminium oxides** upon re-entry, wood offers a more eco-friendly alternative.
- **Addressing Orbital Pollution**: With the rise of mega-constellations, such as SpaceX's Starlink, wooden satellites like LignoSat present a **sustainable solution** to mitigate space debris and pollution.

New Findings on Uranus' Magnetosphere

Sub Topic- *Achievement in the field of Space Science*

Context:

Recent research has **revealed** a significant **misunderstanding about Uranus's magnetic field**, stemming from data collected during **NASA's Voyager 2 flyby** in **1986**.

More on News:

- Much of what we know about Uranus comes from **NASA's Voyager 2 spacecraft**, which conducted a **five-day flyby** of the planet in 1986.
- However, recent research suggests that **Voyager 2's observations** were taken during an **unusual solar wind event** that led to **misleading conclusions** about the planet, particularly its **magnetic field**.

Voyager 2

- **Launched** by **NASA on August 20, 1977**, Voyager 2 is one of the most ambitious and **far-reaching space missions in history**.
- It was **designed to take advantage of a rare planetary alignment** that occurs once **every 176 years**, allowing the spacecraft to visit multiple planets with minimal fuel consumption.
- **Mission Milestones:** Jupiter Flyby (1979), Saturn Flyby (1981), Uranus Flyby (1986), and Neptune Flyby (1989).
- Voyager 2 **entered interstellar space on November 5, 2018**, becoming the **second human-made object** to do so, **after its twin, Voyager 1.**

Key Highlights:

- **Solar Wind Event**: The intense solar wind event compressed Uranus's magnetosphere to about **20%** of its usual volume.
  - This rare occurrence led to observations that suggested **Uranus's magnetosphere was lacking in plasma** and had unusually intense belts of highly energetic electrons.
- **Revised Understanding**: Researchers reanalysed the data and found that if Voyager 2 had arrived just **a week earlier**, it likely would have observed a **larger and more typical magnetosphere**, similar to those found around **Jupiter**, **Saturn**, and **Neptune**.
- **Implications**: This new understanding challenges previous assumptions about Uranus's magnetic field and highlights the need for future missions to explore the planet in more detail.

About Uranus:

- **William Herschel** discovered **Uranus** in 1781, making it the first planet to be discovered with a telescope.

- Uranus is the **third largest planet** in the solar system, after **Jupiter** and **Saturn.**
- It has a **diameter of 31,500 miles (50,700 km)**, large enough to fit **63 Earths** inside it.
- The planet has a distinctive tilt, causing it to appear to **roll around the Sun**. Its orbit is **about 20 times farther from the Sun than Earth's**.
- Uranus has **28 known moons** and two sets of rings, with its colour being blue-green due to **methane** in its atmosphere, which is mostly hydrogen and helium.
  - **Voyager 2** observations suggested that **Uranus's two largest moons**, **Titania** and **Oberon**, often orbit **outside the magnetosphere**.
  - New research shows these moons actually tend to stay **inside the magnetosphere's protective bubble**, which may help scientists detect potential **subsurface oceans** on these moons.

Significance for Future Research:

- The new research opens up possibilities for a better understanding of **Uranus' magnetosphere**, its **atmosphere**, **rings**, and **moons**.
- Scientists are particularly interested in the potential for **subsurface oceans** on Uranus' moons, as these may have conditions suitable for life, similar to the ongoing research on **Jupiter's moon Europa**.
- A future mission to Uranus is seen as crucial for gaining deeper insights into the planet's complex environment, magnetosphere, and the potential for life on its moons.

NISAR Satellite

Sub Topic- *Achievement in the field of Space Science*

Context:

The National Aeronautics and Space Administration (NASA) and the Indian Space Research Organisation (ISRO) are set to launch the **NASA-ISRO Synthetic Aperture Radar (NISAR) satellite** in **early 2025**.

Mission Overview:

- NISAR is a **historic US-Indian collaboration**, with Jet Propulsion Laboratory (**JPL**) leading the US side and ISRO handling the spacecraft bus and launch services.

- The satellite will be launched in early 2025 from **Satish Dhawan Space Centre, India**, using ISRO's **Geosynchronous Satellite Launch Vehicle Mark II**.
- This groundbreaking **Earth-observation mission aims to monitor Earth's surface changes with unprecedented precision**, enhancing our ability to **prepare for natural disasters** and **manage environmental changes**.

Key Features:

- **Advanced Radar Technology**: NISAR will be equipped with sophisticated L-band and S-band radar systems. The **L-band radar, provided by NASA**, can penetrate dense vegetation to detect small surface movements, while **ISRO's S-band radar** enhances image resolution1.
- **High-Frequency Monitoring**: The satellite will scan most of Earth's land and ice-covered areas **twice every 12 days**, providing consistent, high-resolution data.
- **Operational Independence**: NISAR will operate continuously, providing data regardless of time of day or weather conditions.

Applications and Benefits:

- **Disaster Preparedness**: By precisely tracking surface changes, NISAR will help monitor regions prone to **earthquakes, landslides,** and **volcanic activity**. This data will be crucial for early warning systems and disaster response planning.
  - It will help **identify areas prone to seismic activity**, particularly in high-risk regions such as **California** and the **Himalayas**.
- **Environmental Monitoring**: The satellite will track changes in vegetation, ice sheets, glaciers, and sea ice, providing valuable insights into climate change and ecosystem dynamics.
- **Infrastructure Monitoring**: NISAR's ability to detect subtle ground movements will aid in assessing the integrity of critical infrastructure such as dams, levees, and aqueducts.
- Post-disaster, the satellite's data can assist in identifying compromised structures quickly, particularly in regions like California's Sacramento-San Joaquin River Delta.

"Intelligent" Bacteria for Complex Computations

Sub Topic- *Achievement in the field of Biotechnology*

Context:

Scientists at the Saha Institute of Nuclear Physics (**SINP**) in **Kolkata** have **engineered bacteria to solve mathematical problems.**

More on News:

- The **team** has **developed bacterial "computers"** that can perform complex computations, such as **identifying prime numbers** and **recognising vowels**.
- Their goal is to explore **genetic engineering** to create bacteria capable of complex computations traditionally done by humans or computers.
  - A concept **traditionally associated with multicellular organisms** (like humans, dolphins, and octopuses) that have brains.

> **Complex Computations**
> - **The team tested more complex queries such as:**
> - Whether adding a specific number to an integer results in a prime number.
> - Whether the square of a number could be expressed as the sum of three factorials.
> - They even tackled optimisation problems, like calculating the maximum number of pieces a pie can be divided into with a given number of straight cuts, using **fluorescent proteins** to represent binary digits (0s and 1s), which were then converted to decimals.

Key Developments:

- **Creating Bacterial Computers:** The researchers engineered Escherichia coli (**E. coli**) bacteria with **genetic circuits** that allow the bacteria to perform logical tasks like determining if a number is prime or if a letter is a vowel.
  - The bacteria, referred to as "**bactoneurons**," interact in a manner similar to an **artificial neural network (ANN)**, where each "bactoneuron" performs a computation and contributes to the overall task.
- **Mathematical Computations:** The bacteria were able to answer basic mathematical

questions by converting inputs (numbers) into **binary code** using chemical inducers and then converting outputs into **fluorescent proteins** as indicators.

> For example, the bacteria were asked if a number (between 0 and 9) was prime, and they responded with **green fluorescent protein (yes)** or **red (no)**.

Methodology:

- The bacteria's genetic circuits are activated by **chemical inducers**, which function similarly to electrical signals in traditional computers (high voltage = "on", low voltage = "off").

- The team designed **synthetic promoters** and **transcription factors** to form genetic circuits that respond to specific chemical inputs, triggering a computation.

Applications:

- **Biocomputing in Medicine**: This work has significant implications for **medical sciences**, such as potentially using bacterial computers to **detect early signs of cancer** and administer **localised treatments** before tumours form.

- **Synthetic Biology in Pharmaceuticals and Biomanufacturing**: The creation of bacterial computers could revolutionise fields like **pharmaceuticals** and **biomanufacturing**, making processes more efficient and scalable.

Future of Biocomputing:

- The development of bacterial computers may significantly impact **traditional computing** by reducing reliance on **silicon-based systems** and offering a more **sustainable** and **bio-friendly** alternative.

- Biologists emphasised that in the future, computational tasks could be **outsourced to microbes**, providing new avenues for solving complex problems using biological systems.

Implications:

- This work opens new possibilities for understanding the **biochemical nature of intelligence**, especially in the context of **single-celled organisms**.

- It challenges traditional notions of intelligence by showing that even microorganisms, such as bacteria, can exhibit behaviours akin to problem-solving.

Knee Rehabilitation Device

Sub Topic- *Achievement in the field of Scientific Innovations & Discoveries*

Context:

Researchers at the Indian Institute of Technology (**IIT**) **Ropar** have **developed** an innovative solution to make **post-surgery therapy for knee disorders** more **accessible and affordable**.

- Termed as a **Completely Mechanical Passive Motion Machine for Knee Rehabilitation**, it has been awarded a **patent (No. 553407)**.

Key Features:

- **Mechanical Design**: Unlike **traditional motorised** Continuous Passive Motion (**CPM**) machines, which are **expensive** and **depend on electricity**, the **newly developed device** is **entirely mechanical**.

  > It **utilises a piston and pulley system** that stores air when the user pulls a handle, enabling smooth and controlled motion to aid in knee rehabilitation.

- **Portability**: The device is lightweight and portable, making it suitable for **use in** various settings, including homes and **off-grid locations**.

- **Ease of Use**: Patients can use the device in the comfort of their homes, **reducing** the **need for prolonged hospital stays** and frequent rehabilitation visits.

- **Cost-Effective**: By **eliminating** the **need for electricity, batteries, or motors**, the mechanical CPM machine **offers a cost-effective alternative** to traditional electric machines.

Benefits:

- **Improved Accessibility**: The device is designed to be a low-cost, sustainable solution that aids in recovery and **reduces the environmental impact** associated with motorised devices.

- **Enhanced Recovery**: Continuous passive motion therapy is crucial for patients recovering from knee surgeries, helping to **improve joint mobility, reduce stiffness,** and **speed up the recovery process.**

- **Off-Grid Solution:** Its simple design makes continuous passive motion therapy feasible even in off-grid locations, where access to advanced medical technology can be limited.

India's First Long-Range Hypersonic Missile

Sub Topic- *Achievement in the field of Space Technology*

Context:

Recently, India's Defence Research and Development Organisation **(DRDO) successfully conducted a flight test of a long-range hypersonic missile** off the Odisha coast.

More on News

- The Defence Minister highlighted the achievement on X, stating, *"India has reached a significant milestone by successfully flight-testing a long-range hypersonic missile from Dr. APJ Abdul Kalam Island, off the Odisha coast. This is a historic moment, placing India among the select nations with such critical and advanced military technology."*

- According to an official press release, the **missile is capable of carrying multiple payloads over ranges exceeding 1,500 kilometres** and has been **indigenously developed by DRDO's APJ Abdul Kalam Missile Complex** in Hyderabad, in collaboration with other DRDO laboratories and industry partners.

What Are Hypersonic Missiles?

- Hypersonic missiles **travel at speeds of Mach-5 or more,** which is **at least five times the speed of sound,** or roughly **one mile per second.**

- A key distinction of these missiles is their **ability to manoeuvre mid-flight**, **unlike ballistic missiles that follow a predetermined trajectory.**

- There are **two main types** of hypersonic weapon systems:

  - **Hypersonic Glide Vehicles (HGVs): Launched via rockets,** these glide to their targets.

  - **Hypersonic Cruise Missiles (HCMs): Powered by air-breathing engines,** such as scramjets, these maintain high speeds while targeting.

- Hypersonic weapons are considered a **"game-changer" for national security** due to their speed, agility, and precision.

Advantages of Hypersonic Missiles

- The hypersonic weapons **provide flexible, long-range strike capabilities** against time-sensitive, heavily defended, or remote targets, even when other options are unavailable or impractical.

- **Conventional hypersonic missiles** rely on **kinetic energy** (motion-derived energy) to neutralise unhardened targets or underground bunkers.

- A 2023 **UK Parliament report** emphasised that their lower-altitude flight paths make hypersonic missiles **harder to detect with surface-based sensors like radar.**

Challenges and Limitations

- **Heat Management:** Friction and air resistance at such high speeds generate extreme heat.

- **Precision and Manoeuvrability:** Maintaining control at hypersonic speeds requires advanced engineering.

- **Communication Issues:** Reliable connectivity with operators and sensors is difficult to maintain during flight.

- **High Costs:** Hypersonic missiles are more expensive to develop compared to ballistic missiles.

Characteristic	Supersonic	Hypersonic
Speed Range	Mach 1 to Mach 5	Mach 5 and above
Applications	Military jets, some commercial aircraft	Advanced missiles, space vehicles
Aerodynamic Effects	Shock waves form at lower altitudes; drag increases significantly	Extreme heating due to air friction; complex flow dynamics
Technological Challenges	Less severe than hypersonic; established technologies exist	Requires advanced materials and designs to withstand high temperatures

Global Hypersonic Missile Development

- **Russia and China** are considered **leaders in hypersonic missile technology**, with the **United States also making significant strides** through ambitious development programs.

- In May 2023, the **US Army awarded a $756 million contract to Lockheed Martin** for the **Long Range Hypersonic Weapon (LRHW).**
- **Russia** has **deployed** hypersonic missiles during the ongoing conflict **in Ukraine.**
  - In 2022, it announced the **use of its Kinzhal hypersonic missile** to destroy an underground ammunition facility in Ukraine's Ivano-Frankivsk region.

- Other nations, including **France, Germany, Japan, Australia, Iran, and Israel,** are also actively pursuing hypersonic missile projects.

- India's recent success further cements its position in the race for advanced military technologies and enhances its strategic defence capabilities.

Nafithromycin

Sub Topic- *Achievement in the field of Biotechnology*

Context:

In a significant milestone for India's biotechnology sector, Union Minister Singh announced the soft launch of **Nafithromycin.**

- India's first indigenous antibiotic, aimed at combating drug-resistant infections. The announcement was made on **November 20, 2024**, at Prithvi Bhawan in New Delhi.

> **Nafithromycin**, also known as **WCK 4873**, is a **novel macrolide antibiotic** currently under clinical development for the treatment of community-acquired bacterial pneumonia (CABP).

Historic Breakthrough:

- Nafithromycin marks a historic breakthrough as the **first new antibiotic in its class** to be **developed globally in over 30 years**.

- The success of Nafithromycin reflects **India's growing capability** to develop **homegrown solutions** to address pressing healthcare challenges, particularly in the context of AMR.
  - This achievement is seen as a testament to India's **scientific and technological prowess**.

Key Highlights:

- **Development and Support**: Nafithromycin has been developed with the support of the **Biotechnology Industry Research Assistance Council (BIRAC)**, a unit of the Department of Biotechnology. The antibiotic has been brought to market under the trade name **Miqnaf** by the pharmaceutical company **Wockhardt**.

- **Targeted Treatment**: The antibiotic is designed to treat **Community-Acquired Bacterial Pneumonia (CABP)**, a severe illness caused by drug-resistant bacteria.
  - It is particularly beneficial for vulnerable populations, including children, the elderly, and immunocompromised individuals.

- **Effectiveness:** Clinical trials have shown that Nafithromycin is **ten times more effective** than current options like azithromycin and achieves comparable outcomes with just a three-day treatment regimen.
  - It targets both **typical and atypical pathogens**, making it a versatile treatment option.

- **Safety and Tolerability**: Clinical trials have validated its safety, demonstrating **minimal gastrointestinal side effects** and no significant drug interactions, making it an ideal option for patients.

Significance:

- **Global Impact**: Nafithromycin is a game-changer in the battle against **drug-resistant pneumonia**, a condition that causes over **two million deaths globally** each year.
  - With India bearing **23**% of the world's pneumonia burden, this antibiotic is a vital tool in addressing **multi-drug-resistant bacteria** that have rendered many existing treatments ineffective.
  - **Innovation:** The country's innovation in biotechnology and pharmaceuticals demonstrates its commitment to improving healthcare outcomes worldwide and tackling one of the most pressing health crises of our time.

HIV Detection Technology

Sub Topic- *Achievement in the field of Medical Science*

Context:

Researchers have developed a novel diagnostic technology for detecting HIV using **G-Quadruplex (GQ)** structures, a four-stranded DNA conformation-specific to the HIV genome.

- This **fluorometric test** offers **increased reliability** in HIV detection by reducing **false positives**, a common problem in existing diagnostic methods.

Challenges in Current HIV Diagnostics::

- Existing HIV diagnostics may **miss early infections** and are prone to **false positives** due to **cross-reactivity** or nonspecific binding with general DNA sensing probes.

- **Nucleic acid-based diagnostics** often have **false positives** due to nonspecific amplification and poor differentiation between target and non-target sequences.

The GQ-RCP Platform:

- The **GQ-RCP** (GQ Topology-Targeted Reliable Conformational Polymorphism) platform was developed by researchers at **Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR)**, India.

- This technology was initially designed for detecting **SARS-CoV-2** but has been successfully adapted for **HIV detection**.

- It focuses on detecting **HIV-derived GQ DNA**, targeting a specific **176-nucleotide genomic segment** of the HIV genome.

Key Features and Advantages:

- The platform uses a **pH-mediated, single-step transition** that converts **double-stranded DNA (dsDNA)** into the **GQ conformation**, making it easier to detect HIV-specific sequences.

- The method uses a **benzobisthiazole-based fluorescent probe (TGS64)** to selectively recognise and quantify GQ structures, ensuring high **selectivity**.

- Unlike other diagnostics, this platform introduces a **novel approach** based on **nucleic acid-small molecule interactions**, offering more specific recognition of target sequences.

Impact on False Positives:

- The **GQ-RCP platform** addresses the challenge of **false positives** in existing amplification-based techniques by targeting the **noncanonical GQ conformation**, which is unique to HIV.

- This specificity helps achieve **unambiguous detection** and avoids the misidentification of nonspecific amplification.

Future Implications:

- This diagnostic platform is versatile and can be adapted for detecting a wide range of **DNA/RNA-based pathogens**, including other **bacteria and viruses**.

- It offers a more **reliable and accurate** detection method that can be integrated into existing nucleic acid-based diagnostic systems.

Subject - Environment, Bio-diversity and Disaster management

Globally Burned Areas are likely to Increase by more than 15% due to Climate Change

Sub Topic- *Conservation, Environmental Pollution & Degradation*

Context:

A recent attribution study published in *Nature Climate Change* indicates that climate change has likely **increased global burnt area** from wildfires by over **15%** between **2003 and 2019**.

Key Findings

- **Overall Increase in Burnt Area**: Climate change has contributed an estimated **15.8%** more global burnt area during the study period.

- **Annual Contribution**: The influence of climate change on burnt area is rising by **0.22% per year**.

- **Major Fire-Prone Regions**:
  - **Central Australia**: Largest increase in burnt area.
  - **Southeastern South America**: Increased by **30%**.
  - **West Siberia**: Increased by **18%**.
  - **Western North America**: Increased by **15%**.

Methodology

- The researchers utilised **global fire-vegetation models** to assess how climate change and socio-economic factors affect wildfire activity in forests and savannahs.

- This study is notable for **quantifying the specific contribution** of climate change to global fire regimes, a gap in previous research.

Regional Impacts

- **Africa**:
  - **Central Africa**: Burnt area increased by **20.3%**.
  - **Western Africa**: Increased by **2.7%**.
  - **Northeastern Africa**: Increased by **12.4%**.
- **Human Activities**: While climate change is increasing burnt areas, human activities have likely reduced them by **19%** overall.

Conclusion

The study highlights a **slight net reduction** of **5%** in global burnt area when balancing climate change and human activities. However, the **regional effects** of climate change are significant, and the influence of climate change is expected to **increase** in the coming decades. The researchers advocate for **ambitious climate mitigation** and **adaptation strategies** to address these escalating wildfire risks.

Mission Mausam and the Convective Cloud Chamber

Sub Topic- *Conservation, Environmental Pollution & Degradation*

Context:

The **Indian government launched Mission Mausam**, an ambitious initiative **aimed** at **enhancing weather forecasting** and **managing** various **weather events**.

More on News:

- This program intends to develop capabilities to **modify weather on demand**, including the **ability to enhance or suppress rainfall, hail, fog,** and eventually, **lightning strikes**.
- **Central to effective weather modification** is the **field of cloud physics**, an area where India seeks to bolster research significantly.
- The Indian Institute of Tropical Meteorology **(IITM)** in **Pune** is **establishing** a pioneering **convective cloud chamber**, a facility designed to deepen our understanding of cloud behaviour under varying atmospheric conditions.

*Mission Mausam seeks to **address** the **increasing unpredictability of weather patterns** due to climate change **by improving observational networks, modelling techniques,** and **utilising advanced technologies** such as **artificial intelligence**.*

Objectives of Mission Mausam:

- **Improved Forecast Accuracy:** To enhance short to medium-range weather forecast accuracy by 5-10% and improve air quality predictions in major metropolitan areas.
- **Expanded Observational Capabilities:** Over five years, it plans to increase the number of radars significantly (by over 150%) and add new satellites and supercomputers.
- **Localised Weather Predictions:** The initiative will enable weather predictions at the panchayat level with a lead time of 10-15 days and improve nowcasting frequency from three hours to one hour.

What is a Cloud Chamber?

- It is a **closed, cylindrical drum** where water vapour and aerosols are injected. Under controlled humidity and temperature, **clouds can form** within this chamber.
- While **many countries have basic cloud chambers with limited functionalities**, **India's new facility** will **focus on convection properties** essential for **studying monsoon clouds**.
  - An area where only a handful of such chambers exist globally.

Goals of the Cloud Chamber:

- **Understanding Cloud Behaviour:** Researchers aim to explore how clouds behave under various environmental conditions, particularly those affecting Indian monsoon systems.
- **Weather Modification Research:** Insights gained will contribute to developing techniques for weather modification, such as cloud seeding, which could enhance or suppress rainfall as needed.
- **Advanced Instrumentation Development:** The project will focus on creating sophisticated instruments capable of monitoring minute properties within clouds, facilitating deeper scientific investigations.

Planned Use of the Cloud Chamber:

- **Flexibility:** Tailor atmospheric parameters to study clouds under varied environmental conditions.

- **Instrumentation Development:** Over the next 18-24 months, the team will focus on creating advanced tools to monitor conditions and perform seed particle injections.

Previous Cloud Seeding Experience:

- **CAIPEEX Program:** Cloud Aerosol Interaction and Precipitation Enhancement Experiment conducted over a decade in four phases, focusing on cloud aerosol interaction and precipitation enhancement.
- **Findings:**
  - Successful enhancement of rainfall by up to **46%** in suitable conditions.
  - Average increase of about **18%** over a **100 square kilometre area** in rain-shadow regions of Maharashtra.
  - **Limitations of Cloud Seeding:** Recognised as not a comprehensive solution for rainfall issues, indicating the need for continued research and strategic planning.

IUCN's first Global Tree Assessment

Sub Topic- *Conservation*

Context:

A recent assessment by the **IUCN** reveals alarming statistics regarding global tree species, underscoring the urgent need for conservation efforts.

Key Findings:

- **Extent of Threat**: Nearly **38%** of the world's tree species are threatened with extinction, amounting to over **16,425** of **47,282** assessed species.
- **Comparative Threat**: The number of threatened tree species surpasses the combined total of all threatened **birds**, **mammals**, **reptiles**, and **amphibians**.
- **Global Reach**: Threatened tree species are found in **192 countries** worldwide.

Factors Contributing to Threat:

- **Habitat Loss**: Urban development and agriculture are leading causes of deforestation, particularly in **island ecosystems**.
- **Invasive Species**: The presence of invasive species, pests, and diseases exacerbates threats to native trees.
- **Climate Change**: Rising sea levels and increasingly severe storms threaten tree survival, especially in **tropical regions**.

Regional Impact:

- **South America**: Hosts the highest tree diversity, with **3,356** of **13,668** assessed species at risk, primarily due to **deforestation** for agriculture and livestock.
- **Island Ecosystems**: Experience the highest proportion of threatened trees due to habitat destruction.

Importance of Trees:

- **Ecosystem Role**: Trees are crucial for carbon, water, and nutrient cycles, soil formation, and climate regulation.
- **Human Dependence**: Over **5,000 tree species** are vital for timber, while more than **2,000 species** provide food, medicine, and fuel.

Conservation Recommendations:

- **Urgent Action Needed**: Protect habitats, restore ecosystems, and conserve seeds in **seed banks** and **botanical gardens**.
- **Community Efforts**: Successful conservation actions have been documented in regions such as the **Juan Fernández islands**, **Cuba**, **Madagascar**, and **Fiji**.
- **National Strategies**: Countries like **Ghana**, **Colombia**, **Chile**, and **Kenya** have initiated national strategies for tree conservation.

Plastic-Eating Insect Discovery in Kenya

Sub Topic- *Conservation*

Context:

A team from the International Centre of Insect Physiology and Ecology in Kenya has discovered **plastic-degrading abilities** in the Kenyan **lesser mealworm larvae**, which could contribute to tackling **plastic pollution** on a large scale.

Discovery of Plastic-Eating Insect in Kenya:

- **Species**: The **Kenyan lesser mealworm** larvae, the larval form of the **Alphitobius darkling beetle**, can break down **polystyrene** (commonly known as **styrofoam**).
- **Significance**: This is the **first African insect** discovered with plastic-eating abilities, joining other known plastic-degrading insects, like the **yellow mealworm**.

Plastic Pollution and Challenges

- **Problem**: Plastic waste is a **global environmental issue**, with particularly high levels in **African countries** due to **plastic imports** and limited recycling options.

- **Polystyrene**: Widely used in packaging, polystyrene is **difficult to recycle** with traditional methods due to its **durability** and high cost of breakdown processes.

Key Findings and Experiments:

- **Experiment Setup**: Over a month, larvae were fed on **polystyrene alone**, **bran alone**, and a **polystyrene-bran combination**.

- **Results**:
  - ➤ Larvae on the **polystyrene-bran diet** showed **higher survival rates** and consumed polystyrene more effectively than those on a polystyrene-only diet.
  - ➤ **Polystyrene degradation rate**: Larvae on the combined diet degraded **11.7%** of the total polystyrene.
  - ➤ **Balanced Diet Importance**: Adequate nutrition from bran enhanced plastic breakdown efficiency, showing the insects need more than polystyrene for optimal degradation.

Gut Bacteria and Enzyme Analysis:

- **Bacterial Shifts**: Analysis showed that larvae consuming polystyrene had increased levels of **Proteobacteria** and **Firmicutes**, along with specific bacteria like **Kluyvera, Lactococcus, Citrobacter,** and **Klebsiella**.

- **Plastic-Degrading Enzymes**: These bacteria produce enzymes capable of breaking down **plastic polymers**, essential for **plastic degradation**.

- **Adaptability**: This indicates a possible **adaptive bacterial response** that supports plastic digestion, with gut bacteria shifting to aid in degradation.

Practical Applications and Future Research

- **Microbial Solutions**: Instead of using mealworms directly, isolating **bacteria** and **enzymes** from their guts could allow **factory-based plastic degradation** solutions.

- **Further Research**:
  - ➤ Focus on identifying specific **bacterial strains and enzymes**.
  - ➤ Exploring potential enzyme production **at scale** for **recycling waste**.

- ➤ Investigating **other plastics** to see if the lesser mealworm's degradation abilities apply beyond polystyrene.

- ➤ **Long-Term Goals:** To devise a scalable microbial solution to address plastic waste in Africa and globally by using bacteria instead of insects, thereby managing waste more efficiently.

Sea Ranching Project

Sub Topic- *Conservation*

Context:

The **State Fisheries Department** in Thiruvananthapuram has launched a **sea ranching project** as a follow-up to the artificial reef initiative.

- This project, part of the **Pradhan Mantri Matsya Sampada Yojana (PMMSY)**, aims to replenish natural fish stocks and promote sustainable fishing practices.

> *Artificial reefs are **man-made structures** designed to **provide habitat for marine life**, particularly in areas where natural reefs are **lacking** or **degraded**. While they cannot fully replicate the **complex functions** of natural coral reefs, they offer significant ecological benefits. These **structures provide essential shelter**, **promote reproductive spaces**, and **support biodiversity** by **fostering the growth** of **marine plants** and **organisms**.*

Key Highlights:

- **Release of Pompano Fingerlings:** 20,000 pompano (Trachinotus blochii) fingerlings were released into the sea off **Vizhinjam** on Wednesday as part of an artificial reef project to promote sustainable fishing.

- **Fingerling Details:** The **fingerlings** released were between **8 to 10 grams** in size and were released from **two small fishing vessels** at the coordinates of the artificial reef.

- **Stocking and Rearing:** The **10 lakh pompano and cobia fry** were stocked and reared at the **Ayiramthengu fish farm** of the Agency for Development of Aquaculture Kerala (ADAK).

About Project:

- The project was inaugurated by the **Minister of State for Fisheries** aboard a Coast Guard vessel at sea, with Kerala Fisheries Minister and senior officials present.

- The project aimed at releasing **10 lakh pompano and cobia (Motha) fingerlings** at **10 locations** along the Thiruvananthapuram coast, with **1 lakh fingerlings** at each location.

- **Artificial Reefs**: A total of **42 artificial reef locations** have been created off **33 fishing villages** in Thiruvananthapuram district, consisting of **150 reef modules** in various shapes (triangular, flower, and pipe-shaped modules).

  - These reefs have already attracted a variety of fish, including **tuna**, **trevally**, and **mackerel**.

- **Funding:** The ₹**3-crore PMMSY scheme for sea ranching** was approved by the National Fisheries Development Board (NFDB) in March 2024.

- **Community Involvement**: The project involves **local fishing communities**, the coast guard, and the Kerala State Coastal Area Development Corporation Ltd. (KSCADC).

- The initiative is **expected to improve fish availability** and enhance the livelihoods of traditional fishermen.

Future Expansion Plans:

- The Fisheries department is awaiting **Central government approval** to extend the artificial reef project beyond Thiruvananthapuram district.

- **Phase II** plans to extend the project to **96 villages** in **Kollam, Alappuzha, Ernakulam, and Thrissur districts** at a cost of ₹29.76 crore.

- **Phase III** aims to cover **96 villages** in **northern districts** (Malappuram, Kozhikode, Kannur, and Kasaragod) at an estimated cost of ₹25.82 crore.

'Bhu-Neer' Portal

Sub Topic- *Conservation, Environmental Pollution & Degradation*

Context:

The Hon'ble Minister of Jal Shakti, Shri C.R. Paatil, launched the "Bhu-Neer" portal on 19th September 2024 during the concluding ceremony of **India Water Week 2024.**

About the Bhu- Neer Portal:

- Developed by the **Central Ground Water Authority (CGWA) under the Ministry of Jal Shakti, in collaboration with the National Informatics Centre (NIC),** the portal aims to improve groundwater regulation across the country.

- **Availability and Accessibility:**

  - **The "Bhu-Neer" portal is now live for public use. Project proponents can use the portal for:**

    - Queries and clarifications related to groundwater withdrawal.

    - Tracking the status of applications.

    - Payment of statutory charges.

Purpose and Objectives of "Bhu-Neer":

- **Centralised Regulation:** Designed to serve as a one-stop platform for managing and regulating groundwater resources.

- **Transparency and Efficiency:** Focused on ensuring sustainable and responsible groundwater usage through streamlined processes.

Key Features of "Bhu-Neer"

- **Legal Framework and Regulatory Clarity**

  - Comprehensive details on groundwater extraction laws.

  - Covers regulations at both state and national levels.

- **Centralised Database:** Provides access to vital information on groundwater compliance, policies, and sustainable practices.

- **User-Friendly Design:** Simplified interface for project proponents applying for groundwater withdrawal permits.

  - Features like:

    - **PAN-Based Single ID System** for seamless user identification and management.

    - **NOC with QR Code** to ensure authenticity and facilitate easy verification.

- **Improved Over Previous Systems:** Significant upgrade over the earlier NOCAP portal with enhanced process flow and user accessibility.

Broader Implications:

- Facilitates efficient and transparent groundwater regulation.

- Encourages sustainable practices among stakeholders.

- Strengthens India's commitment to managing water resources effectively.

# Subject - Indian Economy & Agriculture and Banking

Declining Income Disparity

Sub Topic- *Inclusive Growth*

Context:

Income disparity among individuals earning up to ₹5 lakh annually has seen a cumulative decline of 74.2% between the financial years 2013-14 and 2022-23, according to a report by the State Bank of India (SBI).

More on News:

- The report, analysed income disparity trends for assessment years (AY) 2014-15 (FY14) and AY 2024-25 (FY23).

- For individuals **earning up to ₹3.5 lakh,** the share in **income disparity decreased from 31.8% in FY14 to 12.8%** in FY21, showing a notable 19% income rise for this group relative to their population share.

- The lower income group (less than ₹5.5 lakh) exhibited positive growth rates in all years over the past decade, except AY20 due to the COVID-19 pandemic.

- The report noted that income tax base leaders such as Maharashtra, Delhi, Gujarat, and Karnataka **are approaching saturation in Income Tax Return (ITR) filings**, with their share in the overall tax file base declining.

Income Distribution Curve Shift from AY15 to AY24
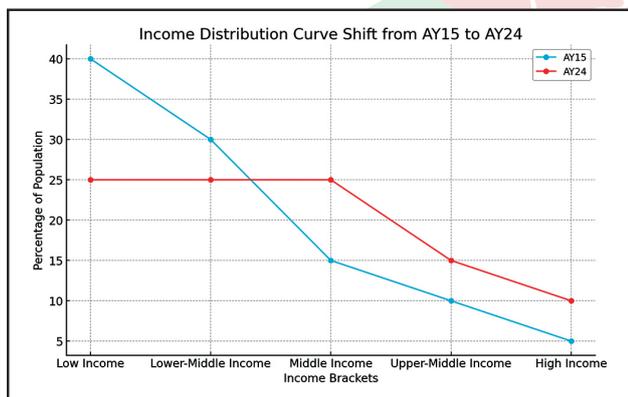
- In contrast, states like Uttar Pradesh, Bihar, Andhra Pradesh, Punjab, and Rajasthan are seeing significant growth in ITR filings.

- The SBI study also highlighted the **increasing contribution of direct taxes** in the progressive tax regime, with direct taxes contributing 56.7% to total tax revenue in AY24 (up from

54.6% in AY23), the highest in 14 years.

- The direct tax-to-GDP ratio rose to 6.64% in AY24, the highest since 2000-01, indicating improved tax compliance.

Gini Coefficient

Also known as the Gini index or Gini ratio, is a statistical measure of economic inequality within a population. It quantifies the distribution of income or wealth among individuals or households, providing insight into the level of inequality present in a society. It ranges from 0 to 1. A value of 0 indicates perfect equality, where everyone has the same income. A value of 1 (or 100%) signifies perfect inequality, where one individual possesses all the income while others have none. The Gini coefficient can be calculated using two primary methods: Lorenz Curve Method and Mean Income Gap Method.

Importance of Declining Income Disparity

- **Economic Growth and Stability**

  - ➢ **Enhanced Economic Growth:** When wealth is more evenly distributed, lower-income households have greater purchasing power, which stimulates demand for goods and services.

  - ➢ **Sustainable Development:** Income inequality poses a significant obstacle to achieving sustainable development goals (SDGs).

  - ➢ **Reduced Economic Volatility:** High levels of inequality are associated with increased economic instability.

- **Social Cohesion and Political Stability**

  - ➢ **Social Cohesion:** Declining income disparity enhances social cohesion by fostering a sense of community and mutual support among citizens.

  - ➢ **Political Stability:** Reducing income inequality can contribute to political stability by mitigating the risk of populism and extremism that often arise from perceived injustices in wealth distribution.

- **Health and Well-being**

  - ➢ **Improved Health Outcomes:** Inequality negatively impacts health outcomes across populations.

  - ➢ **Empowerment of Marginalised Groups:** Addressing income inequality helps empower marginalised communities, including women, racial minorities, and people with disabilities.

Alert on Illegal Payment Gateways

Sub Topic- *Inclusive Growth and issues arising from it*

Context:

The Indian Cybercrime Coordination Center (**I4C**) **under** the Ministry of Home Affairs (**MHA**) has **issued** a crucial **alert** regarding the **proliferation of illegal payment gateways linked to transnational organised cyber criminals**.

> Illegal payment gateways are digital platforms established by cybercriminals to facilitate illicit financial transactions. These gateways, established using mule bank accounts, facilitate money laundering as a service, posing significant threats to national security and financial integrity.

Nationwide Raids Uncover Illegal Operations:

- **Recent nationwide raids** by the **Gujarat Police** (FIR 0113/2024) and **Andhra Pradesh Police** (FIR 310/2024) have **revealed** that these **cybercriminals** have **set up illegal digital payment gateways using rented accounts**.
  - These **infrastructures** are **used to launder** the proceeds of **various cybercrime**.

Modus Operandi:

- **Scouting for Accounts**: **Current** and **savings accounts** are being **scouted** primarily **through social media platforms**, notably **Telegram** and **Facebook**.
  - These **accounts** typically **belong** to **shell companies, enterprises, or unwitting individuals**.
- **Remote Control of Mule Accounts**: The **mule accounts** are often **controlled remotely from overseas locations**, allowing criminals to operate without direct oversight.
- **Creation of Illegal Payment Gateways**: Once identified, these mule accounts are used to create illegal payment gateways.
  - These gateways serve criminal syndicates that accept **deposits on fraudulent platforms**, including **fake investment scams, offshore betting** and **gambling sites**, and **bogus stock trading platforms**.
- **Rapid Fund Movement**: Funds received through these illicit channels are quickly **layered into different accounts** to obscure their origin. The **misuse of banks' bulk payout facilities exacerbates** this **issue**.

Identified Payment Gateways:

- Several payment gateways have been highlighted during these operations, including **PeacePay, RTX Pay, PoccoPay, and RPPay**.
- These gateways are reportedly **operated by foreign nationals** and **provide money laundering services**.

Advisory and Legal Consequences:

- The **I4C** has **advised citizens not to sell or rent their bank accounts**, **company registration certificates**, or **Udhyam Aadhaar Registration certificates** to anyone.
  - **Illicit funds deposited** in such accounts can **lead** to **legal consequences**, including arrest.
  - Banks are also encouraged to deploy checks to identify misuse of accounts used for setting up illegal payment gateways.

Mediation for Operational Creditors

Sub Topic- *Banking Sector & NBFCs, Growth & Development*

Context:

The **Insolvency and Bankruptcy Board of India (IBBI)** has proposed new regulations **allowing operational creditors to opt for voluntary mediation before initiating insolvency proceedings** against a company. The goal is to reduce judicial workload and expedite insolvency processes.

> Operational creditors are defined under the Insolvency and Bankruptcy Code, 2016 (IBC), specifically in Section 5(20). They are individuals or entities to whom an operational debt is owed. This type of debt arises from transactions related to the provision of goods and services, including employment, as well as statutory dues payable to government authorities.

About the Regulations:

- **Non-Settlement Report:** If mediation fails, the mediator will issue a **non-settlement report**, which will accompany the application for initiating the **Corporate Insolvency Resolution Process (CIRP) before the adjudicating authority (AA),** according to the IBBI.

➤ This approach is expected to **alleviate the authority's caseload and speed up admissions.**

● **Expert Committee:** This proposal **aligns with recommendations from an expert committee**, which, in a January report, suggested **pre-institutional mediation as a preliminary step** before filing insolvency applications.

● **Causes:** The IBBI highlighted **common causes of disputes**, including **disagreements over quality or performance** of goods and services, **contractual disputes**, **discrepancies** in amounts owed, and **allegations of underpayment**.

➤ It noted that operational creditors are often more interested in securing repayment than in initiating full insolvency proceedings.

● **Data:** Data from the AA shows that of **21,466 cases filed under Section 9 —** initiation of insolvency by an operational creditor — **only 3,818 were admitted as of April 31**, with many cases settled before admission.

➤ The IBBI pointed out that **pre-admission settlements for operational creditors have been more common** than settlements at later stages, but the AA is required to hold hearings before accepting or rejecting an application, often resulting in delays.

Mediation, involving a neutral third party to help negotiate settlements, is seen as a potential tool to resolve disputes between operational creditors and companies early, potentially streamlining the admission process before the National Company Law Tribunal (NCLT).

Insolvency proceedings in India

These are governed primarily by the Insolvency and Bankruptcy Code, 2016 (IBC), which provides a comprehensive framework for the resolution of insolvency for individuals and corporate entities. The IBC aims to streamline the process of insolvency resolution and ensure timely recovery for creditors while balancing the interests of all stakeholders involved.

Key Features of Insolvency Proceedings:

● Types of Insolvency:

➤ Corporate Insolvency: Applies to companies and limited liability partnerships (LLPs).

➤ Individual Insolvency: Pertains to individuals and partnership firms.

● Regulatory Authority: The Insolvency and Bankruptcy Board of India (IBBI) is the regulatory body overseeing insolvency proceedings. It regulates insolvency professionals, agencies, and entities, ensuring compliance with the provisions of the IBC.

● Stages of Corporate Insolvency Resolution Process (CIRP): The CIRP consists of several distinct stages:

➤ Filing a Petition: Creditors can file a petition with the National Company Law Tribunal (NCLT) when a company defaults on payments. The minimum default amount required to initiate proceedings is currently set at INR 1 crore.

➤ Admission of Petition: The NCLT reviews the petition. If it finds merit, it admits the petition and initiates the CIRP, typically within 14 days.

➤ Appointment of Interim Resolution Professional (IRP): Upon admission, an IRP is appointed to manage the affairs of the company during the resolution process.

➤ Moratorium Period: A moratorium is declared, prohibiting any legal action against the corporate debtor for recovery of debts during this period.

➤ Resolution Plan: The IRP collects claims from creditors and invites resolution plans from interested parties. A resolution plan must be approved by at least 75% of the Committee of Creditors (CoC).

➤ Approval or Liquidation: If a resolution plan is approved by the NCLT, it becomes binding on all stakeholders. If no plan is approved within the stipulated time frame, liquidation proceedings may commence.

● Individual Insolvency Process: For individuals, a similar process exists but is typically less complex than corporate proceedings. Individuals can file for insolvency voluntarily or be declared insolvent by creditors through a petition to the Debt Recovery Tribunal.

Tractor Tax on Inheritance

Sub Topic- *Taxation, transport and marketing of agriculture produce and issues*

Context:

Thousands of **British farmers are set to march to Parliament Square** to **protest against the impending end of an inheritance tax exemption** that has traditionally allowed family farms to be passed down through generations.

More on News:

- This change, dubbed the **"tractor tax,"** was announced by Finance Minister Rachel Reeves as part of a budget aimed at raising funds for public services. 4

- Starting in 2026, farmers with land valued over £1 million ($1.26 million) will no longer be able to transfer their farms to their children without incurring tax liabilities.

Arguments by Farmers:

- Farmers argue that this tax reform **threatens the viability of family-run farms,** which often operate on tight profit margins.

- Many fear that **their heirs will be forced to sell portions of their land to cover the tax bill,** thereby jeopardising food production in the UK.

- Many farmers feel they face **unfair competition from cheaper imported goods** that do not adhere to the same environmental and welfare standards.

- Additionally, their **incomes have been squeezed by supermarket pressures and climate change impacts.**

Government's Arguments:

- The government claims that **only about 500 farms per year will be affected by this tax change**, which will impose a rate of 20% — half of the usual 40% — payable in instalments over ten years.

- Prime Minister Keir Starmer expressed confidence that **most farms would not be significantly impacted by this aspect of the budget** and highlighted a forthcoming £5 billion support package for the farming sector over the next two years.

Inheritance Tax in India

- The country **abolished its inheritance tax in 1985,** citing **concerns over its impact on family businesses and agricultural holdings.**

- Currently, there is **no specific inheritance tax** levied on wealth passed down through generations; however, **estate duty may apply** under certain circumstances if properties exceed specified values.

- The absence of an inheritance tax has **allowed many family-owned businesses and farms to continue operating without the burden of significant tax liabilities** upon succession.

- Nevertheless, **discussions about reintroducing some form of inheritance taxation have surfaced periodically,** especially in light of growing wealth inequality and calls for more equitable taxation systems.

Current Status

As of now, individuals inheriting property or assets in India do not have to pay any inheritance tax. However, they **may be subject to other taxes related to the inherited assets:**

- **Capital Gains Tax:** If an inherited asset is sold, capital gains tax may apply based on the profit made from the sale.
  - The classification as long-term or short-term capital gains depends on the holding period of the asset.

- **Income Tax:** Any income generated from inherited assets (e.g., rental income) must be declared and is subject to income tax.

Debate on Reintroducing Inheritance Tax

- Arguments for Inheritance Tax
  - **Wealth Redistribution:** Advocates argue it could help reduce wealth concentration among a small percentage of the population.
  - **Revenue Generation:** It could provide additional revenue for government programs aimed at social welfare.

- Arguments Against Inheritance Tax
  - **Double Taxation Concerns:** Critics highlight that assets have already been taxed during the lifetime of the deceased.
  - **Economic Impact:** There are fears that reintroducing such a tax could drive wealthy individuals to relocate abroad or hinder business growth.

VISION Portal

Sub Topic- *Growth & Development, Employment and Skill Development*

Context:

The Union Minister inaugurated the **"Viksit Bharat Initiative for Student Innovation and Outreach Network"** (VISION).

VISION Initiative:

- The initiative aimed at fostering **education, skill development**, and **innovation** among **underprivileged children**, making it accessible to all students, regardless of their background.

- The initiative seeks to **democratise startup skills** and provide **mentorship** and **training** to students, particularly from remote areas, bridging gaps in education and opportunities.

  - ➢ It acts as a **gateway** for underprivileged students to learn about innovation and entrepreneurship.

- The significance of initiatives like **VISION** in achieving India's goals under **Vision India 2047**, which aims to position India as a **global leader** in **technology**, **education**, and **economic growth**.

India's Startup Ecosystem:

- **India's startup ecosystem** has **grown** from around **350-400 startups in 2014** to over **1.67 lakh today**, making India the **third-largest startup hub globally**.

- The Minister also highlighted **success stories** like **lavender farming startups in Jammu and Kashmir**, showing that startups can thrive in diverse fields like **agriculture, space,** and **biotechnology**.

- **Biotechnology and Regional Innovation:** The **Bio-E3 policy** focuses on applying biotechnology for **economic growth**, **employment**, and **environmental sustainability**. India's biotech startups have grown from **50 in 2014** to nearly **9,000 today**.

Success Stories:

- **Technology as a Bridge Between Urban and Rural India: Students from remote areas**, who often lack access to libraries or coaching centres, have successfully **cracked exams** like the **IITs** and **Civil Services using only smartphones**.

  - ➢ This is a **testament to how initiatives like VISION** can **fuel a revolution** in **education, innovation,** and **skill development**, particularly for those with limited resources.

- **Public-Private Partnerships and Industry Linkages for the Sustainability of Startups:** India's first private rocket manufacturing startup, which has now set up a unit in Hyderabad, is a success story of collaboration between the government and private sector.

- **National Education Policy (NEP) 2020:** The **flexibility** of the NEP allows students to combine subjects and pursue **unconventional career paths**.

- The freedom offered by NEP ensures students are no longer limited by traditional subject choices and fosters innovation and new career opportunities.

India's Workplace Culture

Context:

In September, following the tragic death of Anna Sebastian, a young chartered accountant who allegedly succumbed to work-related stress, her mother expressed profound anguish, stating, *"They say we have received freedom in 1947, but our children are still working like slaves."*

More on News:

- The poignant remark highlights the critical issue of workplace culture in India's corporate sector.
- Despite promises from the **Ministry of Labour** to deliver an inquiry report within ten days, the corporate world has largely remained silent on this tragedy.
- Many corporate leaders hesitate to criticise others when similar conditions prevail in their own firms.

Toxic Work Culture:

- **Beyond Long Hours:** Toxic work culture is rampant in the private sector, characterised by **excessive working hours** driven by a **relentless focus on profit margins** at the expense of employee well-being.
- **Inadequate Staffing:** Management frequently operates with inadequate staffing—**employing two people where four are needed**—and **attempts to motivate them by offering salaries that reflect the workload of three employees**.
    - This exploitation is often **masked by corporate jargon**; for instance, meeting demanding targets is referred to as **"organisational stretch,"** while **"variable pay"** is touted as a means to foster a **"performance culture"** that primarily benefits top management through stock options.
- **Blame Culture:** Moreover, performance evaluations often employ a **bell curve system** that **labels employees as super-performers or under-performers**, leading to a **blame culture** where individuals are scapegoated for systemic issues.
    - Stress management workshops are organised to address burnout without addressing the root causes of stress in the first place.

Comparison with Global Work Cultures:

- **Limited Working Hours:** Long working hours and employee burnout are **common in the U.S.**, but this is **not as prevalent in Europe**, where countries like **France enforce a 35-hour work week** and **most European nations average about 40 hours**.
    - Despite claims of lower competitiveness, **European living standards remain high**.
- **Per Capita Income:** The **stark contrast in per capita income—$85,000 in the U.S. compared to $2,700 in India**—illustrates that **Indian employees face additional stressors such as challenging commutes and household responsibilities** that exacerbate their work-related stress.

Management Behaviour:

- **Toxic Language:** Management behaviour significantly **contributes to workplace toxicity**. Many bosses **use language that can range from unprofessional to outright abusive**.
    - For example, during **Prime Minister Rishi Sunak's tenure, his deputy Dominic Raab faced allegations of bullying and aggressive behaviour,** which **ultimately led to his resignation**—a standard of accountability that seems **absent in India's corporate landscape.**
- **No Legal Recourse:** In contrast to countries like the **U.S. and Europe**, where **employees can sue for mental distress** and often receive substantial settlements, **Indian employees lack such legal recourse.**
- **Unfair Treatment:** Employees frequently feel **unfairly treated** due to **biased performance evaluation systems** and **ruthless handling of perceived under-performance.**
- **Lower Dignity:** Terms like **"weeding out dead wood"** reflect a **disregard for employee dignity** and contribute to a toxic atmosphere where resentment brews among those who feel undervalued.

Public vs. Private Sector Work Culture:

- **Public>Private:** Interestingly, **many public sector firms exhibit a better work culture** compared to their private counterparts.
- **Job Security:** While public sector employees **may not receive exorbitant rewards,**

they **benefit from job security and union protections** that help mitigate arbitrary management practices.

- **Less Disparities: Pay disparities are less pronounced**, and although grievances exist among public sector employees, reports of toxic culture are notably rarer.

Potential Remedies:

- **Core Values:** To remedy these issues, corporate responses will likely include **reaffirmations of "core values," new "codes of conduct,"** and **initiatives aimed at improving "work-life balance."**
  - ➤ However, if such measures were effective, the current problems would not exist in the first place.
- **Responsibility: Boards of directors need to take responsibility** for workplace culture by engaging with employees at all levels and understanding their experiences.
- **Regulatory Measures:** It may be necessary to **hold boards accountable** for workplace conditions and ensure they actively engage with employee concerns.
- **Precedent:** Just as the **Nirbhaya case** prompted significant changes regarding women's safety in India, **Anna Sebastian's untimely death** should serve as a catalyst for reforming workplace culture across the country.

Corporate Donkeys and Micromanagement:

- The phenomenon of corporate donkeys—employees **who bear excessive workloads without adequate recognition or compensation**—exemplifies how organisations exploit their workforce while promoting an image of productivity.
- Furthermore, **micromanagement exacerbates stress levels;** rather than empowering employees with autonomy over their work, managers often hover excessively over tasks, stifling creativity and increasing anxiety.

Engagement with Purpose: TCS and Nike's Breakthrough Bias:

- Companies like Tata Consultancy Services (TCS) have begun emphasising engagement with purpose as **a strategy to improve workplace morale and productivity.**
  - ➤ By **aligning organisational goals with employee values** and fostering a sense of belonging, TCS aims to create a more supportive work environment.

- Similarly, **Nike's commitment** to breakthrough innovations reflects an understanding that **fostering creativity requires an environment free from excessive pressure and toxicity**.
- By prioritising employee well-being alongside performance metrics, these companies exemplify how positive workplace cultures can lead to sustainable success.

COVID-19 Scam

Context:

A recent report by the Deputy Commissioner of Bengaluru, V. Shankar DCunha, has recommended the prosecution of former Karnataka Chief Minister B.S. Yediyurappa and former Health Minister K.S. Eshwarappa in connection with a COVID-19 scam that allegedly involved irregularities in the procurement of medical supplies during the pandemic.

Details of the Report

- The report highlights **serious lapses in governance and accountability,** raising significant concerns about corruption within the state's administration.
- The investigation, triggered by allegations of **financial misconduct,** revealed that **substantial sums were misappropriated** during the procurement process for essential medical equipment and supplies.
- The report outlines **how the former chief minister and health minister were implicated in facilitating these irregularities,** which not only undermined public trust but also compromised the state's response to the health crisis.
- The findings have **sparked outrage** among citizens and political opponents, calling into question the integrity of those in power during a critical time when effective governance was paramount.
- The recommendations for prosecution signal a **potential shift towards greater accountability** in Karnataka's political landscape.

According to **Transparency International's Corruption Perception Index (CPI) 2023**, **India ranks 93rd out of 180 countries**, indicating a persistent perception of corruption within its public institutions. India's **score of 39 reflects widespread concerns about bribery**, lack of transparency, and ineffective enforcement of anti-corruption laws.

The **World Justice Project (WJP) Rule of Law Index 2024** reveals that India ranks **79th out of 142 countries**, reflecting a continuing decline in the rule of law globally.

Causes of Corruption

- **Lack of Transparency:** Government processes often lack transparency, making it easier for corrupt practices to flourish.

- **Weak Institutions:** Many institutions responsible for enforcing laws are compromised or ineffective.

- **Low Salaries and Incentives:** Public officials, particularly in lower-ranking positions, often receive low salaries.

- **Bureaucratic Red Tape:** Lengthy and convoluted bureaucratic procedures can drive individuals to engage in corrupt practices to expedite processes or bypass obstacles.

- **Political Interference:** Political pressures can compromise the autonomy of government institutions, leading officials to engage in corrupt activities for personal or party gain.

- **Cultural Acceptance:** In some contexts, there is a cultural acceptance of corruption, where individuals may engage in corrupt practices without feeling morally compromised due to the belief that *"everyone does it."*

STEPS TAKEN BY THE GOVERNMENT
01 Legislative Measures (Prevention of Corruption Act and the Right to Information Act (RTI)).
02 Anti-Corruption Agencies (Central Vigilance Commission (CVC)).
03 Digital Initiatives (e-governance, DBT).
04 Public Awareness Campaigns (Citizens' Charter).
05 Whistleblower Protection Laws.

- **Lack of Whistleblower Protection:** Insufficient protection for whistleblowers deters individuals from reporting corruption due to fear of retaliation.

- **Social Inequality:** Economic disparities can contribute to corruption, allowing individuals with wealth and power to secure preferential treatment without repercussions.

Impacts of Corruption

- **Economic Consequences:** Corruption leads to inefficient allocation of resources, reduced investment, and stunted economic growth.

- **Erosion of Trust:** Public trust in government institutions diminishes when corruption is prevalent, leading to cynicism and disengagement from civic duties.

- **Social Inequality:** Corruption exacerbates social inequalities by allowing the wealthy and powerful to manipulate systems for their benefit while marginalising the poor.

- **Poor Governance:** Corruption undermines good governance by fostering a culture of impunity and reducing accountability among public officials.

Solutions to Combat Corruption

- **Enhancing Transparency:** This includes making decision-making processes accessible to public scrutiny.

- **Strengthening Institutions:** Building stronger institutions with adequate resources and independence is crucial for effective enforcement of anti-corruption laws and holding corrupt officials accountable.

- **Improving Public Sector Compensation:** Increasing salaries for public officials can reduce their susceptibility to bribery by ensuring they are fairly compensated for their work.

- **Streamlining Bureaucratic Processes:** Simplifying administrative procedures can minimise red tape and reduce the incentives for individuals to engage in corrupt practices.

- **Promoting a Culture of Integrity:** Encouraging ethical behaviour through education and awareness campaigns can help shift societal norms regarding corruption, fostering an environment where integrity is valued.

- **Leveraging Technology:** Utilising technology such as blockchain for public procurement processes can enhance transparency and accountability by creating immutable records that are accessible for auditing purposes.

- **Encouraging Citizen Participation:** Engaging citizens in governance processes through participatory mechanisms can enhance accountability and empower communities to demand transparency from their leaders.

- By addressing these causes through comprehensive strategies, India can work towards reducing corruption significantly, thus enhancing governance quality and fostering sustainable socio-economic development.

Places in News

Places in News: Mozambique

Context:

Human Rights Watch (HRW) reported at least **30 people** were killed in **Mozambique** amid protests over the disputed **Presidential election** results.

About Mozambique:

Official Name: Republic of Mozambique

- **Form of Government:** Semi-presidential republic
- **Capital:** Maputo
- **Official Languages:** Portuguese
- **Money:** Mozambican Metical
- **Location:** It is **located** in **Southeastern Africa**, bordering the **Mozambique Channel,** between **South Africa** and **Tanzania.**
  - ➢ It is bordered by **Tanzania, Malawi, Zambia, Zimbabwe, Eswatini and South Africa.**

- **History:** The country gained **independence from Portugal in 1975** after a protracted civil war.
- **Major Mountain Ranges:** Angonia Highlands, Lichinga Highlands.
- **Highest and Lowest Point**: Monte Binga (2,435 metres), and Indian Ocean (0 metres).
- **Major Rivers:** Zambezi (the fourth-longest river in Africa), Limpopo, Licungo, Lurio, Rovuma.
  - ➢ The **Zambezi River** provides **water for irrigation** and is central to a regionally significant hydroelectric power industry.
- **Major Lakes**: Lake Malawi (Nyasa), Cahora Bassa (fourth-largest artificial lake in Africa), and a small part of Lake Chiuta.
- **Natural Resources**: Coal, titanium, graphite, iron ore, natural gas, hydropower, bauxite, kaolin, copper, gold, rubies, and tantalum.
- **Climate:** It has a **tropical to sub-tropical** climate.
- **Wildlife:**
  - ➢ **Mammals:** Elephants, lions, leopards, cheetahs, hippopotamuses, antelopes, tortoises, and monkeys.
  - ➢ **Birds:** A diverse range of bird species can be found across various habitats.
  - ➢ **Marine Life:** Includes dolphins, marine turtles, dugongs, and vibrant coral reefs in the Bazaruto Archipelago.
  - ➢ **National Parks**: Bazaruto National Park, Gorongosa National Park, Niassa Game Reserve.
- **Historical Sites**:
  - ➢ **Ilha do Moçambique**: UNESCO World Heritage Site with a 16th-century fortress and colonial architecture.
  - ➢ **Ibo Island**: Known for its atmospheric ruins and history as a slave-trading centre.

Species in News

A New Fire-Resilient, Dual-Blooming Species of Dicliptera

Context:

A new species of **fire-resilient, dual-blooming plant** has been discovered in the **Western Ghats,** a region known for its rich biodiversity.

About the Species:

- The species, named *Dicliptera polymorpha*, was found by a team led by Dr. Mandar Datar from the **Agharkar Research Institute (ARI)**, Pune, and botanists Adittya Dharap and Bhushan Shigwan.

- It is notable for its **unique ability to flower twice a year**, with the **second burst of flowering triggered by grassland fires**, a common occurrence in the region.

- Dicliptera polymorpha stands out for its **rare spicate inflorescence structure**, a feature not found in other Indian species, with its **closest relatives found in Africa.**

- The plant was **first collected during the 2020 monsoon**, and its distinct characteristics were confirmed over several years of study and by global expert Dr. I. Darbyshire from Kew Botanic Gardens.

- This species thrives on the **slopes of open grasslands in the northern Western Ghats**, where it endures extreme conditions, including drought and frequent fires.

- Its unique blooming pattern consists of a **post-monsoon flowering phase** (November to March) and a **fire-triggered flowering phase** (May to June), where the species produces dwarf flowering shoots.

Significance of Discovery:

- The discovery highlights the **need for careful management of grassland ecosystems** in the Western Ghats.

- While fire is a natural part of the species' life cycle, **overuse and unsustainable fire practices could threaten its survival.**

- Protecting these ecosystems and ensuring balanced fire management is essential to preserving Dicliptera polymorpha and other yet-to-be-discovered species in this biodiverse hotspot.

Species in News: Halari Donkey

Context:

The **Halari donkey** is an **intelligent** and **resilient breed** that is **endangered,** emphasising the **need for urgent conservation efforts**.

About Halari Donkey:

- Donkeys are **intelligent, social animals** that **form close bonds** with humans and **assist** in **transport**.

- **Origin:** Halar region, Gujarat.

- **Status:** Endangered, with fewer than 500 individuals remaining.

- **Characteristics:** Larger, more resilient, typically white.

- Their **resilience** and **larger size** compared to other donkey breeds **make them** particularly **suited** for the **semi-arid landscapes** of **Jamnagar** and **Dwarka districts** in **Gujarat's Saurashtra region**.

- **Historical Significance:** In constructing **dams, forts, temples,** and more, showcasing their strength and reliability in **carrying heavy loads**.

- **Economic Value:** The **price** of a Halari donkey **has surged** to over ₹**1 lakh**, with **growing demand** for **their milk**, known for its sweetness.

  ➤ **Halari donkey milk powder can sell** for **more than ₹7,000 per kg in international markets**, primarily **for cosmetic uses**.

- **Conservation Efforts:** The **Sahjeevan Trust**, in **collaboration** with the **Gujarat government's Animal Husbandry Department** and the **National Bureau of Animal Genetic Resources**, is actively working to **conserve this breed** by identifying **pure-bred donkeys for breeding**.

Way Forward:

- **Experts believe** that more **substantial resources from** the **State government** are **needed to establish breeding farms** in the Halar region to ensure the survival of this unique breed.

- The **Halari donkeys** of Gujarat **are not only a vital part of the region's heritage** but **also a testament** to the enduring **bond between humans** and **animals**.

- Their conservation is crucial for maintaining this unique relationship and preserving the cultural and economic fabric of the Halar region.

Species in News: Clouded Leopard

Context:

A **recent study suggests** that **Taiwan is highly suitable** for the **reintroduction** of the **clouded leopard**, a **species** that has been **extirpated from the island**.

- Approximately **38% of Taiwan's territory** offers **suitable habitat** for the clouded leopard, **with 46%** of that area **currently under protection**.

Historical Extirpation

- Historically, the **clouded leopard thrived in Taiwan**, also **known as Formosa**.

- However, a combination of **factors led** to its **extinction on the island**, including **poaching, trade in pelts**—especially rampant during Japanese rule (1895-1945)—**habitat destruction**, and the **loss of its natural prey**.

- A comprehensive **camera-trap survey conducted** from **1997 to 2012 found no evidence of the species**, confirming its probable **extinction decades earlier**.

About Clouded Leopard:

- Clouded leopards have relatively **short legs, a long head,** and **large upper canines** that are the longest in proportion to body size among cats.

- **Size**: Medium-sized cat, measuring between **60 to 110 cm in length** and **weighing** between **11 to 20 kg**.

- **Genetic Distinction:**

  - **Neofelis nebulosa**: Found on the **mainland of Southeast Asia**, particularly in **forests** and **wooded regions**.

  - **Neofelis diardi** (Bornean clouded leopard): Found on the **islands of Sumatra** and **Borneo**, diverged from N. nebulosa about 1.4 million years ago.

- The clouded leopard's **coat features unique "clouds,"** which are ellipses partially edged in black, with darker interiors contrasting the base color.

- **Habitat:** Inhabits dense forests, ranging from the **Himalayas** through mainland **Southeast Asia to South China**.

- **Geographic Range**: Found in the Himalayas, southern China, Taiwan, and the Malaysian Peninsula.

- It is the **state animal of Meghalaya**.

- **IUCN Status:** Vulnerable

- **Current Extinction Status**: The species is locally extinct in several areas, including **Singapore, Taiwan**, and possibly **Hainan Island** and **Vietnam**.

- **Diet: Carnivorous** and primarily prey on birds, monkeys, porcupines, deer, pigs, wild boar, young buffalo, and domestic animals.

- **Threats:** Including habitat loss, prey exploitation, and poaching across its range in South and Southeast Asia.

- **Hunting**: Targeted for its beautiful pelt, as well as teeth and bones used in traditional Asian medicine.

- **Conservation Efforts:** Plans to reintroduce the clouded leopard are being spearheaded by the Clouded Leopard Association of Taiwan, in collaboration with international experts from organisations like Panthera and the IUCN Species Survival Commission Cat Specialist Group.

Long Articles & Book Review

Long Article

Building a Resilient Counter-Terrorism Framework: India's Unified Response to Modern Threats

Introduction: A New Era in Counter-Terrorism

The **Anti-Terror Conference 2024**, organised by India's National Investigation Agency (NIA), represents a pivotal moment in the country's approach to combating terrorism. Held over two days and led by Union Home Minister Amit Shah, this conference underscored India's commitment to a unified, multi-level strategy against terrorism. Bringing together senior police officials, intelligence officers, and experts across disciplines, the event emphasised India's "whole of government" approach—a collaboration between central and state agencies, law enforcement, and intelligence bodies working together to combat the evolving and increasingly borderless threat of terrorism.

The conference's agenda highlighted not only the immediate need to address domestic terrorism but also the importance of partnerships and advanced technologies in securing India's future. Key discussions covered strengthening legal frameworks, the integration of new surveillance technologies, and strategies to dismantle terror networks. As India faces a range of security challenges across regions, a cohesive approach like the one outlined at the conference is crucial for effective action. This essay explores India's current terrorism threats, key components of a coordinated approach, the challenges ahead, and recommendations for a sustainable, resilient strategy.

Understanding India's Regional Terrorism Threats

India's security challenges vary widely across its regions, from cross-border terrorism in Jammu and Kashmir to insurgencies in the northeast and left-wing extremism in central India. Each of these threats requires a specialised response, as outlined in the conference discussions.

- **Cross-Border Terrorism in Northwest India**: The state of Jammu and Kashmir is particularly vulnerable to cross-border terrorism, primarily from groups like Lashkar-e-Taiba and Jaish-e-Mohammed. These groups, often with external support, attempt to infiltrate India's borders, threatening security and sovereignty. India's counter-terrorism measures in this region include advanced border surveillance technologies, such as drones and thermal imaging, that detect and prevent infiltration. The Anti-Terror Conference 2024 reiterated the need for persistent vigilance, community cooperation, and international partnerships to counter these complex threats in border areas.

- **Insurgencies in Northeast India**: States like Assam, Manipur, Nagaland, and Mizoram face insurgencies rooted in long-standing grievances and ethnic conflicts. Insurgent groups in these regions often call for autonomy, driven by a history of political and economic marginalisation. The Indian government's response has combined security measures with economic initiatives, such as improved infrastructure and job creation, to reduce support for these movements. Community involvement, along with strategic negotiations, has proven effective in easing tensions, though the situation requires ongoing attention.

- **Left-Wing Extremism in Central India's Red Corridor**: Left-wing extremism in central India, particularly in the "Red Corridor" of Chhattisgarh, Jharkhand, and Odisha, is primarily led by the Naxalite movement. This group draws support from disenfranchised communities, using issues like land rights and economic inequality to gain influence. The government's counter-extremism efforts include security operations and socioeconomic initiatives like land reforms, healthcare improvements, and job creation, aimed at addressing the root causes of discontent. The Anti-Terror Conference 2024 emphasised a balanced approach of both security and development to counteract left-wing extremism effectively.

Key Components of India's Unified Counter-Terrorism Strategy

The Anti-Terror Conference 2024 highlighted five essential elements for India's counter-terrorism strategy, stressing the importance of a collaborative, multi-faceted approach.

- **Enhanced Border Security and Surveillance**: To address cross-border terrorism, India has

invested in state-of-the-art border security measures, especially in regions like Jammu and Kashmir. Drones, thermal cameras, and AI-enabled surveillance help monitor and detect illegal border crossings, enhancing India's capacity to respond swiftly to threats. This advanced surveillance was identified as a core element in the conference, aimed at strengthening security and reducing the impact of cross-border infiltration.

- **Intelligence Sharing and International Partnerships**: The conference underscored the importance of intelligence sharing with international allies, such as Israel and the United States, in enhancing India's counter-terrorism capabilities. These partnerships facilitate the exchange of surveillance techniques and technological expertise, improving India's ability to detect and counter potential threats. Expanding such alliances will further bolster India's counter-terrorism resilience.

- **Community Engagement and Local Law Enforcement**: In insurgency-affected regions, local law enforcement and community leaders play a vital role in gathering intelligence and building trust. The conference promoted training for local law enforcement in specialised tactics, along with increased involvement in community activities to reduce the risk of recruitment by militant groups. This grassroots approach contributes to long-term peace and stability, helping communities become part of the solution.

- **Balancing Security Measures with Civil Liberties**: While laws such as the Armed Forces Special Powers Act (AFSPA) grant extensive powers to security forces in sensitive regions, they also raise civil rights concerns. The conference highlighted the need for oversight mechanisms and fair compensation for civilians impacted by security actions, promoting a balance between effective counter-terrorism and the protection of democratic values.

- **Socioeconomic Development Initiatives**: Addressing the underlying causes of extremism, such as poverty and lack of opportunity, is essential for long-term stability. Programmes focused on improving healthcare, education, and job prospects in regions affected by left-wing extremism are part of India's strategy to reduce support for militant groups. This developmental approach was stressed at the conference as

a way to address grievances and prevent the spread of extremism.

Challenges in Implementing a Cohesive Strategy

Despite the comprehensive approach outlined at the conference, India faces several challenges in executing a unified counter-terrorism strategy. These challenges stem from the country's federal structure, coordination issues among agencies, and balancing security needs with civil liberties.

- **Federal Structure and Jurisdictional Boundaries**: India's federal system, where states primarily manage law and order, complicates the establishment of a consistent national counter-terrorism policy. Initiatives like the National Counter-Terrorism Centre (NCTC) have encountered resistance from states worried about federal overreach. The conference emphasised the need for collaborative strategies that respect both state autonomy and national security needs.

- **Coordination and Bureaucratic Hurdles**: Fragmented intelligence sharing among agencies, such as the Intelligence Bureau (IB) and the Research and Analysis Wing (RAW), limits counter-terrorism effectiveness. Clear communication protocols and an improved collaborative culture are necessary for more effective coordination. The conference underscored that addressing these bureaucratic barriers is essential for a streamlined counter-terrorism effort.

- **Balancing Security and Civil Rights**: Laws like the Unlawful Activities (Prevention) Act (UAPA) grant security forces broad powers but have drawn criticism for potential misuse. Oversight and accountability mechanisms are critical to maintaining public trust while ensuring security measures are effective. The conference emphasised the importance of integrating civil rights protections into India's counter-terrorism laws.

Recommendations for Strengthening India's Counter-Terrorism Strategy

To build on the Anti-Terror Conference 2024's progress and address the challenges discussed, several recommendations can enhance India's counter-terrorism approach:

- **Establish the National Counter-Terrorism Centre (NCTC)**: A centralised NCTC with clear guidelines for collaboration

between states and the central government would streamline intelligence sharing and strengthen India's response to terrorist threats. This agency would serve as a central intelligence hub, coordinating efforts among multiple security forces.

- **Develop Targeted Socioeconomic Programmes**: Addressing the socioeconomic roots of extremism is vital. Development initiatives tailored to local needs—such as land reforms, healthcare improvements, and job creation—can reduce support for militant groups and foster stability. This recommendation aligns with the conference's emphasis on sustainable, peace-promoting strategies.

- **Revise Counter-Terrorism Legislation**: Updating counter-terrorism laws to reflect international human rights standards and establishing independent oversight mechanisms can prevent abuse. These changes are essential for balancing security needs with civil rights, ensuring public trust and support for government initiatives.

- **Enhance Technology for Border and Remote Surveillance**: Investing in advanced technologies, such as artificial intelligence and remote surveillance tools, can bolster India's border security and improve monitoring of internal threats. The conference highlighted technology as a cornerstone of effective modern counter-terrorism efforts.

- **Strengthen Community Policing and Engagement Programmes**: Community-based programmes that address local grievances and engage residents in counter-terrorism efforts can build trust and discourage support for militant groups. The conference endorsed this approach as a way to create regionally relevant, long-lasting solutions.

Conclusion

The Anti-Terror Conference 2024 has set a new course for India's counter-terrorism strategy by promoting a comprehensive, collaborative approach that involves all levels of government, law enforcement, and intelligence. This "whole of government" approach, backed by technology and community engagement, aims to address India's terrorism challenges from every angle.

Moving forward, India's commitment to establishing a centralised coordination centre, implementing socioeconomic development initiatives, and balancing civil liberties with security measures can ensure that its counter-terrorism strategy is both robust and adaptable. With consistent effort and cooperation, India can build a secure, cohesive society that upholds both national security and democratic principles, remaining resilient against evolving threats.

Empowering India's Women: Gains in Education, Gaps in Employment

Introduction

India has seen significant progress in empowering women over the last decade, marked by positive changes in education, marriage, social engagement, and attitudes toward gender equality. However, while these shifts suggest growing empowerment, economic participation for women remains stagnant, creating a gap between social progress and economic opportunity. This essay, drawing on findings from the India Human Development Survey (IHDS), explores these transformations and highlights how progress in social freedoms and educational achievements contrasts sharply with limited economic opportunities. Addressing this discrepancy is essential for fully harnessing the economic and social potential of Indian women, creating what economists call a "gender dividend."

Educational Advancements: A Catalyst for Change

Education has been a powerful driver in empowering Indian women, providing them with the knowledge, confidence, and independence to aspire for greater roles in society. According to IHDS data, the number of young women completing higher secondary education rose from 27% in 2011-12 to over 50% in 2022-24, with college degree attainment also increasing from 12% to 26%. Notably, the gender gap in education has nearly disappeared, indicating that Indian families are valuing their daughters' education just as much as their sons'.

As Kiran Saxena emphasises in "Empowerment of Women: The Indian Context" (*The Indian Journal of Political Science*, 1994), pp. 391-400), education is "fundamental to women's rights and necessary for their participation in societal progress" . This cultural shift toward valuing education for both genders has allowed more women to enter fields traditionally dominated by men, which can boost

their economic and social contributions. However, as noted by Stephan Klasen and Janneke Pieters in *The World Bank Economic Review* (2015, pp. 449-478), while educational access has surged, "the lack of growth in 'appropriate' employment sectors for educated women has contributed to low labour force participation despite increasing levels of education," leaving many educated women without employment opportunities that match their skills.

Marriage Trends: A Move Toward Autonomy

Marriage, once an area where women had limited control, is also evolving. Delayed marriage has become more common, with the proportion of women married by their twenties dropping from 76% in 2011-12 to 66% in 2022-24 . Delaying marriage gives young women more time to focus on education and personal development, which in turn strengthens their independence and sense of identity. Furthermore, the percentage of women having a say in selecting their spouses has increased from 42% to 52% in the same period.

This shift toward autonomy in marriage decisions reflects a growing acceptance of female agency within families. As Jugal Kishore Misra explains in "Empowerment of Women in India" in *The Indian, Journal of Political Science* (2006, pp. 867-878), "The ability to make personal decisions—especially regarding marriage—is a critical part of empowerment, as it enables women to negotiate more balanced and respectful partnerships." While some traditional norms still linger, these changes show the beginnings of greater freedom for young women in both their private and public lives.

Evolving Gender Attitudes: The Shift Toward Equality

Indian society's views on gender roles have also improved over the past decade. For example, the preference for sons has decreased from 23% to 12%, which shows a growing acceptance of daughters as valuable family members. This change is essential for women's rights advocates, as it reflects a shift in the belief that daughters have just as much to contribute as sons. Saxena describes this shift as "essential for dismantling the deep-rooted patriarchy that has historically marginalised women".

Moreover, women's independence in public spaces is on the rise. In 2011-12, only 42% of young women felt comfortable traveling alone by public transport; by 2022-24, this number rose to 54% . Mahbub Alam Prodip's research on institutional constraints published in the journal *World Affairs* (2021, pp. 213-244) highlights that this increase in mobility

is "foundational to women's empowerment," as it challenges traditional norms that restricted women's freedom and kept them dependent on male family members.

Social Engagement and Community Involvement

Participation in community activities, particularly through Self-Help Groups (SHGs), has provided many women with a path toward economic and social empowerment. SHG participation among young women increased from 10% in 2011-12 to 18% in 2022-24, offering them collective support and opportunities to develop skills in finance and decision-making. SHGs not only support mutual aid but also help women gain confidence, which is crucial for managing finances and making independent decisions. Prodip notes that such groups "serve as a springboard for greater involvement in community and even political spheres".

Moreover, political engagement, though still limited, has shown slight growth. As women increasingly attend local council meetings or gram sabha gatherings, they gain visibility in local governance. Saxena points out that the introduction of reserved seats for women in local councils has been a key step in encouraging political participation. However, traditional barriers, including the masculine model of politics, continue to limit women's influence in these spaces.

Employment: The Unresolved Challenge

Despite remarkable advances in education and social freedoms, stagnation in employment opportunities for women is a major barrier to their full empowerment. The IHDS data indicate a decline in wage labour participation among women aged 20-29, from 18% in 2012 to 14% in 2022 . Although increased college enrolment partly explains this decline, it does not account for the persistently low employment rates among women in their 30s. Many women have expressed interest in working, with 80% of married, unemployed women stating they would work if they found suitable jobs, and 72% reporting that their families would support such decisions.

The gap between women's educational attainments and their employment options highlights a serious problem in the job market. Klasen and Pieters argue that "the lack of growth in 'appropriate' employment sectors for educated women" has contributed to low labour force participation despite rising levels of education. Without structural changes to create job opportunities that match women's skills and aspirations, India risks wasting the potential of a highly educated female workforce.

The Four Pillars of Empowerment

Four key pillars of women's empowerment are identified: personal efficacy, household decision-making power, social engagement, and economic independence. While progress has been made in the first three areas in India, economic independence—achieved through employment—remains a significant gap. As Misra emphasises, "without economic empowerment, gains in education and social freedoms remain insufficient for achieving full gender equality".

Employment brings financial independence, greater authority in household decisions, and higher social status. These outcomes are crucial for negotiating equality within families and society. The current lack of employment opportunities prevents Indian women from experiencing the benefits of their education, which limits their empowerment and hinders India's broader economic growth.

Challenges and Solutions

To close the gap in employment, India must address several challenges:

- **Sectoral Job Creation**: Promoting job growth in sectors that typically employ more women, such as healthcare, education, and certain types of manufacturing, could help match women's qualifications to job opportunities.

- **Safety and Transportation**: Ensuring safe, reliable public transportation is essential for allowing women to travel for work without fear, broadening their employment options.

- **Flexible Work Arrangements**: Jobs with flexible hours, remote options, and part-time roles would help women balance work with family responsibilities.

- **Skills Training Programs**: Offering targeted skills training could help women develop expertise that matches current job market needs.

- **Anti-Discrimination Laws**: Enforcing laws that prevent gender discrimination is necessary to ensure fair hiring practices and to encourage a more inclusive workforce.

- **Support for Women Entrepreneurs**: Programs that empower women to start their own businesses could lead to greater economic opportunities, especially in rural areas.

Conclusion

India has made notable progress in empowering women through advancements in education, marriage autonomy, and social freedoms. However, limited access to employment prevents women from fully realising the potential of their empowerment. Economic empowerment is considered vital for India's progress, as it enables women to actively contribute to both household well-being and national development. By creating jobs that match women's educational qualifications and expanding opportunities for female employment, India can harness the full benefits of its highly educated workforce, achieving a true gender dividend. It is increasingly acknowledged that the moment has arrived to fully integrate women into India's economic progress, enabling them to share in and contribute to the nation's growing prosperity. With these efforts, India can unlock the full potential of its female population, foster gender equality, and strengthen its economic future.

Expanding Notions of Marriage as a Fundamental Right & Women

In a country like India, judicial precedents have been pivotal in ensuring that the **Indian Constitution** continues to be a **living document**, especially when it comes to expanding the ambit of Article 21 and the kind of rights it encompasses. In the last few decades, the rights under **Article 21** have also brought marriage-related provisions under its gamut. Be it *Lata Singh vs State of Uttar Pradesh* (**2006**), *Shakti Vahini vs Union of India* (**2010**), and the famous **Hadiya case** (**2018**), all have ensured that some notions of marriage, especially the one related to the right to marry of one's choice, is a matter of desire and privacy of whom we are choosing as our life partner. This right is recognised not just under **Article 21** but also under **Articles 14** (**Right to Equality**) and **15** (**Prohibition of Discrimination**), as explained by **legal expert Saurabh Kirpal** in his book "*Who is Equal?*". This means that it also supports the idea of gender equality.

However, considering that **marriage-related provisions** are part of the **state list,** it has become quite challenging to recognise other genders as well. This can be witnessed in the *Supriyo Chakraborty vs Union of India* (**2023**), where consent was not given to the provisions for same-sex marriage. This means that the right to marriage was not considered a fundamental right. It is no less than an irony that where other genders have been given recognition[1], **Section 377**[2] of the **Indian Penal Code** has been **decriminalised**[3],

1. *National Legal Services Authority vs Union of India* (**2014**)

2. **Section 377** of the **Indian Penal Code** (**IPC**) is a law that was introduced during British colonial rule in India in 1861. It criminalised "*unnatural offences*", which included **consensual sexual acts** between **adults of the same sex**, as well as **certain heterosexual acts** deemed "*against the order of nature*".

3. A pivotal moment came on September 6, 2018, when the

entities like **Noida Metro Rail Corporation** have **hired transgenders**, **High Courts** directing concerned state governments to ensure **reservation of other genders in government jobs**, etc., the other genders are not getting the right to marry and recognition of marriage, currently done through civil unions.

In recent times, another aspect of marriage that has become controversial is **spousal privacy**, a sub-component of **the right to privacy**. This ruling emerged from a **civil revision petition** filed by a **woman** challenging the admissibility of her call records, which her husband had obtained without her consent during divorce proceedings. The husband alleged **cruelty**, **adultery**, and **desertion** and sought to use the call data as evidence against her. However, the court ruled that such **evidence**, obtained through **stealthy means**, was inadmissible. **Justice GR Swaminathan** emphasised that the law should not encourage or permit one spouse to snoop on the other, as this undermines the trust essential to marital relationships. He stated that **obtaining private information without consent** cannot be viewed benignly and highlighted the need for clear legal standards to prevent surveillance between spouses.

To reach this conclusion, **Justice GR Swaminathan** noted the recommendations in the **94th Law Commission Report** that suggested the exclusion of evidence that was unlawfully obtained in criminal cases. **Justice Swaminathan** also held that **Section 14** of the **Family Courts Act**, **1984**, which states that receiving inadmissible evidence is not fair. Thus, the judiciary tried to ensure that the sanctity of marriage remained intact, which lies upon the pillar of trust. In this matter, the judge further said, "*Trust forms the bedrock of matrimonial relationships. Spouses must have implicit and total faith and confidence in each other*".

This brings us to the next aspect of how it is important to avoid instances of **snooping**, considering that they can trigger scenarios of divorce rates to a great extent. In an article published in the **Times of India** (TOI), states like Maharashtra and Karnataka have more than two-digit divorce rates in the country. Divorces have been cruel to women, along with more women being divorced or separated, considering the patriarchal norms of society, as observed by **Soutik Biswas** in his article titled "*What divorce and separation tell us about modern India*".

This indicates that **women, unlike men, are either opting to remain divorced or struggling to find partners for remarriage**. Prominent anthropologist **Sreeparna Chattopadhyay** points out, "*While women have the right to divorce, they face significant challenges*

Supreme Court delivered a unanimous verdict in *Navtej Singh Johar vs Union of India*, declaring that **Section 377's application to consensual same-sex relations between adults was unconstitutional**.

when it comes to remarriage due to societal prejudices against divorcees." Thus, in these scenarios, women want legal and constitutional protection somewhere to ensure that their interests are kept intact.

In India, the need for **essential protection for women within marriages** is underscored by persistent societal norms and legal challenges that often leave them vulnerable to various forms of abuse and discrimination. Despite significant progress in women's rights, many married women face issues such as **domestic violence**, **financial dependency**, and **social stigma**, necessitating robust legal measures to safeguard their interests. According to experts like **Dr. Suman Gupta**, a noted **sociologist**, "*The institution of marriage in India is often seen as one where women must sacrifice their autonomy for familial harmony, which can lead to exploitation and abuse.*" This highlights the critical need for legal frameworks that empower women and provide them with the necessary protection.

To address these concerns, several legal measures have been instituted in India. The **Protection of Women from Domestic Violence Act**, **2005** is a landmark law that offers protection against **physical**, **emotional**, and **economic abuse** within the household. This act enables women to seek **legal recourse against their husbands or in-laws** if they experience any form of violence. Additionally, the **Hindu Marriage Act**, **1955** provides women the **right to seek divorce** on grounds such as **cruelty** and **adultery**, ensuring they are not trapped in abusive relationships.

The Supreme Court's ruling in *Shah Bano vs Mohammad Ahmed Khan* (**1985**) further reinforced women's rights to maintenance after divorce, recognising their financial vulnerabilities. Moreover, the **Dowry Prohibition Act**, **1961,** aims to protect **women from dowry-related harassment and violence**, while the **Hindu Succession Act**, **1956,** guarantees women's rights to inherit parental property. These laws collectively work towards creating a more equitable environment for married women by ensuring they have access to financial support and legal protection against marital injustices.

Despite these provisions, challenges remain in their implementation. **Sociologist Dr. Ranjana Kumari** observes that "*While laws exist on paper, societal attitudes often hinder their effective enforcement.*" The rising divorce rates in India reflect changing attitudes towards marriage and women's rights; recent statistics (*as discussed above*) indicate that divorce rates have nearly doubled over the last decade, particularly in urban areas. This increase can be attributed to greater awareness of legal rights among women and a growing willingness to leave unhealthy marriages.

This can also be seen through the prism that **Article 21**, along with **Articles 14** and **15**, has proven to be a rescue jacket and shield for women in securing their space and letting them live their lives with dignity without discrimination, as laid down under **SDG 5**, **Beijing Plan of Action**, and **Convention on Elimination of All Forms of Discrimination Against Women** (CEDAW).

Delimitation and Discrimination: Balancing Federalism and Representation in India's Democracy

Introduction

Delimitation—the redrawing of parliamentary constituencies in alignment with demographic shifts—looms as one of the most controversial issues in Indian politics today. This process, which has been postponed since the 1971 census, is legally mandated to occur periodically to ensure that each state's representation in Parliament reflects its current population. However, since the implementation of the forty-second and subsequent amendments, delimitation has been deferred to avoid penalising states that have successfully implemented population control measures, primarily in southern India. This freeze is set to lapse by 2026, bringing the delimitation issue back into the political spotlight.

The controversy surrounding delimitation is rooted in the challenge of balancing two competing constitutional ideals: *political equality*—each vote's weight should be proportional to the population size—and *federalism*—the preservation of state representation in a union that respects regional identities and contributions. This essay argues that the impending delimitation risks creating a "perfect cocktail of layered discrimination," favouring populous states while disenfranchising economically contributing regions, primarily in the south, thus threatening the unity of India's federal structure.

The Demographic Imbalance and Its Implications

Population growth rates vary significantly across Indian states. According to data from recent studies, states like Kerala, Tamil Nadu, and Karnataka have managed to stabilise their populations with fertility rates below the replacement level of 2.1, whereas states in the Hindi-speaking heartland, including Uttar Pradesh and Bihar, exhibit much higher fertility rates. This disparity means that populous states will gain increased representation if seats are allocated purely on population, potentially doubling the political clout of these regions in Parliament.

The demographic imbalance has further implications for India's principle of "one person, one vote." As noted in recent studies, the current freeze in delimitation has created significant malapportionment. In populous states, each Member of Parliament (MP) represents more citizens than in less populous states, leading to unequal political power distribution across constituencies. This malapportionment undermines political equality, giving disproportionate representational weight to states with slower population growth.

Federalism and the Risk of Regional Marginalisation

India's federalism is unique in that it accommodates a multitude of linguistic, cultural, and regional identities within a single political framework. States are not merely administrative units but are rooted in historical and ethno-linguistic identities, as highlighted by the Supreme Court of India. Delimitation that disproportionately increases representation in populous Hindi-speaking states risks transforming India from a federal union into what some critics fear could become a majoritarian state dominated by a single ethno-linguistic identity.

This threat to federalism is compounded by the economic contributions of southern and western states, which far exceed their population-based share of resources. These states contribute a significant proportion of the nation's Gross Domestic Product (GDP) and tax revenues, yet receive less in terms of political representation due to their smaller populations. A redistribution of seats based purely on population growth would exacerbate this imbalance, creating what scholars have termed a "double burden": these states would not only bear the fiscal responsibility of supporting less economically prosperous regions but would also lose their influence over the allocation of those funds.

The Fiscal and Economic Dimensions of Representation

The fiscal dynamics between states add another layer of complexity to the delimitation debate. Wealthier states, predominantly in the south, contribute more to the central tax pool but receive less in return, particularly when redistribution is calculated based on population needs. The Sixteenth Finance Commission, which recently recommended using the 2011 census for revenue distribution, intensifies these disparities by favouring population-based allocation over fiscal contribution.

This fiscal structure, combined with a potential seat reallocation, would allow states that receive

significant financial support to wield disproportionate power over national policies, including those that govern resource distribution. This scenario would foster a political environment where economically contributing states lose influence over decisions affecting their contributions, contravening the democratic principle of no taxation without representation.

The Intersection of Population Control and Political Representation

Historically, India's delimitation policy has linked population control efforts with political representation. The forty-second Amendment's freeze on delimitation in 1976 was partly a reward for states that had successfully implemented family planning initiatives, particularly in the south. This approach intended to ensure that states taking proactive measures in population control were not penalised with reduced representation.

However, this policy has inadvertently created a reward and penalty system, whereby states with low population growth are at risk of losing political representation relative to states with higher growth rates. This approach conflicts with democratic ideals, as it penalises regions that have achieved population stabilisation while rewarding those that have not. Linking representation to population control is problematic, as it undermines the broader goal of political equality by making population size the only factor in determining political influence.

Marginalised Communities and Representation in the Delimitation Debate

The implications of delimitation extend beyond inter-state politics to issues of representation for marginalised communities, including Scheduled Castes (SCs), Scheduled Tribes (STs), and women. Delimitation, if conducted without careful consideration, could dilute the political power of these communities. The boundary adjustments can create or dismantle constituencies where marginalised groups hold significant voting power. The practices of "cracking" and "packing" voters can either increase or reduce the voting power of these communities. "Cracking" and "packing" are gerrymandering tactics used to control the voting power of certain communities. Cracking spreads members of a group across multiple districts so they form only a small part of each, weakening their ability to influence election outcomes. Packing, on the other hand, concentrates them into one or a few districts, giving them strong influence in those areas but limiting their impact elsewhere. Both methods reduce fair representation by either diluting (cracking) or isolating (packing) a community's voting power, thus affecting its overall

political influence.

Delimitation is also closely tied to gender representation. The recent passage of the "Nari Shakti Vandan Adhiniyam," reserving one-third of seats for women, is contingent on the upcoming delimitation exercise. However, linking this legislation to delimitation may delay its implementation, thereby postponing gender equity in Parliament. A gender-sensitive delimitation process is crucial for achieving meaningful female representation in the legislature.

Case Studies: Assam and Jammu & Kashmir

Recent delimitation exercises in Assam and Jammu & Kashmir provide insights into the challenges of implementing an impartial process. In Assam, the redrawing of boundaries was criticised for allegedly favouring certain ethnic and religious groups over others, with opposition parties arguing that the delimitation process marginalised Muslim-majority areas. In Jammu & Kashmir, the delimitation exercise was similarly contentious, as it was seen to favour Hindu-majority constituencies in Jammu over Muslim-majority areas in Kashmir.

These cases underscore the importance of transparency and impartiality in delimitation processes. Any future delimitation in India must prioritise equitable representation while considering the unique demographics of each state to avoid deepening existing communal and regional divides.

Potential Solutions and Alternatives

The complexities of delimitation require innovative solutions that balance population-based representation with India's federal principles. Several proposals have been suggested, including:

● **Extending the Freeze on Delimitation:** Some have advocated for extending the freeze on delimitation for another 25 years, following the precedents set by Indira Gandhi and Atal Bihari Vajpayee. However, this approach merely postpones the issue without addressing the underlying imbalances in representation.

● **Degressive Proportionality:** This model would allocate seats in proportion to population but limit the influence of populous states, ensuring that less populous states retain a substantial say in national governance. Degressive proportionality has been used in the European Union to prevent larger member states from overwhelming smaller ones, offering a precedent for its potential application in India.

● **Expanding the Lok Sabha:** Another approach is to increase the total number of

seats in Parliament, allowing populous states to gain representation without reducing the representation of less populous states. This expansion could be paired with reforms to the Rajya Sabha to provide a counterbalance, giving less populous states an equitable voice in the federal structure.

- **Revenue-Based Representation in the Rajya Sabha:** Some scholars have proposed using revenue contribution as a criterion for seat allocation in the Rajya Sabha, which would provide economically contributing states with greater influence over national fiscal policies. This model would align political representation with fiscal contributions, potentially resolving some of the fiscal inequities in the current system.

Conclusion

The impending delimitation exercise presents both a challenge and an opportunity for Indian democracy. A purely population-based approach to seat allocation risks creating a layered system of discrimination, where economically contributing, less populous states are marginalised in favour of populous states. This "perfect cocktail of layered discrimination" threatens India's federal balance and could engender resentment among states that contribute disproportionately to the national economy.

India must strike a careful balance between political equality and federalism. Solutions like degressive proportionality, revenue-based representation, and expansion of the Lok Sabha offer potential pathways to an equitable representation system that respects India's diverse demographics and federal structure. Ultimately, any reform must aim to preserve the unity of the Indian Union by ensuring that all states, regardless of population size, have a meaningful voice in the nation's governance.

India's Hypersonic Missile Technology and the Role of AI in Modern Warfare

In 2024, India successfully tested its first long-range hypersonic missile, a big achievement in the country's defence technology. Hypersonic missiles are special types of missiles that can travel faster than five times the speed of sound, or Mach 5. This means they are extremely fast and can cover vast distances quickly, sometimes over 1,500 kilometres. With this new technology, India joins a select group of powerful countries—including the United States, Russia, and China—that also have hypersonic missiles. But with such fast and powerful technology, there are new challenges and concerns, especially with the use of Artificial Intelligence (AI) to control these weapons.

To understand the importance of this achievement, let us first look at what makes hypersonic missiles different from other missiles.

What are Hypersonic Missiles?

Hypersonic missiles are different from regular missiles because they can travel at hypersonic speeds—this means five times the speed of sound or faster. Imagine a plane flying over 6,000 kilometres per hour! These missiles are not only fast but can also change direction while they are moving, making them difficult to track and stop. Regular ballistic missiles follow a straight or predictable path, making it possible for countries to defend themselves against them with anti-missile systems. But hypersonic missiles are very hard to defend against because they can change paths and are so fast that defence systems may not have time to react.

There are two main types of hypersonic missiles. The first type is called a hypersonic glide vehicle (HGV). This type of missile is launched on a rocket, and after reaching a high altitude, it glides down toward its target at hypersonic speeds. The second type is called a hypersonic cruise missile, which uses special engines called scramjets to stay at hypersonic speeds for a long time. India's hypersonic missile is believed to be a glide vehicle, meaning it reaches high altitude and then glides toward its target. This gives India an important advantage because it can hit distant targets very quickly, making it harder for enemies to defend against such an attack.

Why Hypersonic Missiles are Important for India

India has challenging relationships with some neighbouring countries, like China and Pakistan. China has been building up its military power and has advanced technologies, which has made India want to improve its own defence capabilities. With hypersonic missiles, India has a new way to defend itself and keep potential threats at a distance. These missiles can be used to guard important areas, like the Indian Ocean, which is a vital region for India's security. By having this technology, India can make it harder for enemy forces to operate freely in areas that are important for India's safety.

However, having hypersonic missiles is not enough on its own. India needs to carefully plan how it will use these missiles. This involves making sure that the military has the right strategies and training to use these missiles effectively. For example, India's Army, Navy, and Air Force must work together,

sharing information and coordinating their actions. Hypersonic missiles can be powerful tools, but only if they are used wisely and as part of a larger defence plan.

The Role of Artificial Intelligence in Hypersonic Missiles

One of the newest and most advanced technologies that can be added to hypersonic missiles is Artificial Intelligence, or AI. AI can help these missiles make decisions very quickly, which is necessary when they are travelling at such high speeds. AI can help the missile find and follow its target with great accuracy, even if the target is moving. But while AI can make hypersonic missiles smarter, it also makes them riskier.

With AI, hypersonic missiles could operate on their own, meaning they can make decisions without a human controlling them every moment. For instance, an AI-driven missile could select its path and adjust its speed based on what it "sees" around it. This is useful in combat because it can respond instantly to changes in the situation. But this also raises some concerns because if the AI makes a mistake, it could result in serious accidents. For example, if the AI misunderstands what it is targeting, it might hit the wrong place, which could lead to major problems or even war.

The Risks of AI in Hypersonic Missiles

AI has some challenges that come with its benefits. One of the biggest issues is that AI-driven missiles might make decisions too quickly and without human oversight. In some situations, the AI might mistakenly identify a target, which could lead to accidental attacks. In a high-speed and high-stakes environment, a small error can lead to a big problem very quickly. There is also the risk of AI being "hacked" or tricked by enemies. If someone hacked into the AI, they could control the missile and make it hit unintended targets or even send it back toward its own country. Rootkits are one of the classic examples of it.

Rootkits are a form of **malicious software** designed to provide **unauthorised access** to a computer or network while concealing their presence. They operate at various levels of a system, primarily categorised into **kernel-mode rootkits** and **user-mode rootkits**. **Kernel-mode rootkits** operate at the core of the operating system, modifying kernel functions to gain high-level privileges. Their sophistication allows them to evade detection by altering critical system structures and processes, making them particularly dangerous. In contrast, user-mode rootkits run at the application level, replacing executables and modifying application programming interfaces (APIs) to control system behaviour. Although easier to develop, they can still pose significant risks.

A subtype known as bootkits infects the **Master Boot Record** (**MBR**) or bootloader, ensuring that it loads before the operating system itself, thus making detection and removal extremely difficult. The potential impact of rootkits on military systems, particularly missile systems, is profound. By providing attackers with persistent access and control over critical infrastructure, rootkits can severely compromise national security. Their stealthy nature allows them to remain undetected for extended periods, enabling attackers to gather intelligence or manipulate system operations without raising alarms.

A notable example is **Stuxnet** about which the **author Kim Zetter** has written in the book **"*Countdown to Zero Day*"**, discovered in 2010. This sophisticated worm was specifically designed to target Iran's nuclear facilities, particularly its uranium enrichment centrifuges. Stuxnet exploited multiple zero-day vulnerabilities and employed advanced techniques to sabotage the programmable logic controllers (PLCs) that controlled these centrifuges. By altering their operations, Stuxnet caused significant physical damage—destroying about 1,000 out of 6,000 centrifuges—while remaining hidden for a considerable time.

These risks make it necessary for countries like India to create strong rules and safety measures to protect these weapons. One big challenge here is that different countries have different levels of cybersecurity, which means some countries might not be as well-protected against these kinds of attacks. It is important for all countries with hypersonic weapons to agree on certain security standards so that these powerful weapons are not easily hacked.

Gaps in Global Rules for Hypersonic Missiles and AI

There are international rules and treaties that control nuclear weapons and other powerful arms, but these rules were mostly made before hypersonic missiles and AI technology became so advanced. Right now, there aren't enough international rules to manage hypersonic missiles that use AI. The current treaties focus on limiting the number of weapons a country can have or where they can keep them, but they don't cover issues related to AI and machine-driven weapons that can act independently.

This lack of updated arms control laws means that countries are racing to make the best AI-driven

hypersonic missiles without clear guidelines on safety. This arms race is concerning because it makes the world less safe. When countries are focused on developing the most advanced weapons, they might overlook important safety checks and ethical considerations. To avoid these risks, countries should work together to create new rules that specifically address the dangers of AI in hypersonic weapons.

How Hypersonic Missiles Affect Peace and Security in South Asia

As India improves its defence technology, it also changes the balance of power in South Asia. For example, Pakistan, which is a neighbouring country, might feel that it needs to develop similar technology to keep up with India. This can create a competition between countries to have the most powerful weapons, known as an arms race. While India's hypersonic missiles can act as a deterrent, which means discouraging other countries from attacking, they might also make Pakistan feel pressured to match India's abilities.

This is why it is important for India to not only build strong defence systems but also work with neighbouring countries to avoid misunderstandings. Diplomatic efforts, or talking things out with other countries, can help reduce the risk of conflicts. Hypersonic missiles are mainly for defence, but without clear communication between countries, they could lead to tension and mistrust.

The Economic Impact of Developing Hypersonic Missiles

Developing hypersonic missiles is not just about defence; it also has economic effects. Building and testing these missiles requires a lot of money, advanced technology, and skilled workers. India is trying to become more self-reliant in defence through a policy called "Atmanirbhar Bharat," which means "self-reliant India." By building its own advanced weapons, India can reduce its dependence on other countries and strengthen its own industry. India's government works with private companies like Bharat Dynamics Limited, L&T, and Tata to develop and produce these missiles.

But this self-reliant approach also means that India needs to invest a lot in its defence industry. Hypersonic missiles are expensive to produce, so the government must budget carefully to keep up with the production of these advanced systems. India also

needs to keep investing in other areas of its defence, like its air force and navy, so that it has a balanced and well-rounded military. This is important because having a powerful military is not just about one kind of weapon but about having many types that work together.

Moving Forward with Safety and Collaboration

India's successful hypersonic missile test is an impressive achievement, but it comes with responsibilities. As India continues to advance its technology, it must make sure to develop strong cybersecurity to protect its systems from hacking and other risks. Cybersecurity is especially important for hypersonic missiles because a cyberattack could turn these powerful weapons against their own side or cause major damage unintentionally.

In addition to strengthening its own security, India should work with other countries to develop new rules that focus on hypersonic missiles and AI. Since hypersonic missiles are still a new technology, it is crucial that countries set guidelines that can help prevent misuse and promote peace. For example, countries could agree on international rules that require human oversight in AI weapons, which would help prevent accidents and reduce the risk of unauthorised attacks.

Conclusion

India's development of hypersonic missiles is an important step in making its defence stronger. These missiles give India a way to respond quickly to threats and protect important areas like the Indian Ocean. However, with the addition of AI, hypersonic missiles become more complicated to control. AI can make decisions quickly and without human guidance, which is both a benefit and a risk. If an AI-controlled missile makes a mistake, the results could be disastrous.

To use this technology responsibly, India needs to put strong cybersecurity measures in place and work with other countries to create rules that address the unique challenges of AI in weapons. Hypersonic missiles can make India safer, but only if they are used carefully and with clear rules. By balancing technological advancements with safety and diplomacy, India can help ensure peace in its region and avoid the dangers of an uncontrolled arms race.

Australia's Proposed Social Media Ban for Teenagers: A Step Towards Protecting Adolescent Well-being

Introduction

Social media has transformed the ways young people interact, communicate, and perceive themselves. Platforms like Instagram, Facebook, and TikTok are central to many adolescents' social lives. However, in response to increasing concerns about the adverse effects of social media on young users, the Australian government has proposed legislation to ban children under 16 from accessing these platforms. This legislation aims to shield young people from the mental health challenges, cyberbullying, and unrealistic social comparisons often linked to social media use. The proposed law would make social media companies responsible for preventing underage access, an ambitious move that underscores Australia's commitment to being a world leader in online safety. However, the proposed ban has sparked a lively debate about its feasibility, the risks and benefits, and alternative strategies that could be employed.

The Rationale Behind the Proposed Ban

Australia's initiative to ban social media for teenagers under 16 is based on well-documented concerns about the negative impact of these platforms on adolescent development. Studies have linked excessive social media use to increased rates of anxiety, depression, and body image issues, particularly among adolescents. Social media often promotes unrealistic beauty standards, leading young people to compare themselves unfavourably to idealised images they see online . This pattern of social comparison has been shown to lower self-esteem and can contribute to mental health issues like depression and anxiety, especially for users who frequently view or post idealised content.

Besides, the constant connectivity enabled by social media can contribute to problematic use, which is when users feel compelled to stay online, leading to potential addiction and reducing the time spent on in-person interactions that are critical for healthy social development. Cyberbullying, another pervasive issue, thrives on social media, where the anonymity and distance provided by the screen can lead individuals to engage in behaviours, they might avoid in face-to-face interactions.

Challenges in Implementing the Ban

Despite its intended benefits, implementing a ban on social media for teenagers under 16 presents considerable challenges. One of the primary obstacles is age verification. Most social media platforms currently rely on self-reported birthdates to gauge users' ages, which are easily manipulated. Enhanced verification methods, such as requiring government IDs or employing facial recognition technology, bring their own set of issues. These methods could infringe on user privacy and data protection rights, raising concerns about the surveillance of minors and the handling of sensitive information by private companies.

Another significant challenge is the potential for users to bypass the ban using virtual private networks (VPNs), which allow individuals to mask their location and circumvent regional restrictions. This undermines the effectiveness of any country-specific legislation and would require global cooperation among social media companies and governments to truly enforce age restrictions.

The Debate Over the Ban's Effectiveness and Necessity

The Australian government's proposal has ignited debate among experts, parents, and policymakers about whether a ban is the best approach to address the complex relationship between adolescents and social media. Critics argue that while the intent is commendable, an outright ban may not be the most effective way to protect teenagers. They contend that education and digital literacy would better equip young users to navigate online spaces responsibly. Digital literacy programmes can help adolescents understand the risks associated with social media, develop healthy online habits, and learn how to critically evaluate online content, a skill that will benefit them beyond adolescence.

Moreover, banning social media could potentially push teenagers toward less regulated platforms or obscure internet spaces where harmful content might be even more prevalent. Social media has positive aspects as well, such as allowing for self-expression, connection with friends, and engagement with like-minded communities. During the COVID-19 pandemic, social media played a vital role in keeping people connected and allowed teens to discuss sensitive topics that they might hesitate to address in person.

Alternative Approaches: Education and Parental Empowerment

Instead of a strict ban, experts suggest that a combination of education-focused initiatives, platform regulation, and parental empowerment may provide a more balanced approach. Digital literacy education in schools can teach young people about the benefits and risks of social media, preparing them

to use it responsibly rather than simply prohibiting it. Social media companies could be required to implement more robust content moderation, privacy protections, and features designed to reduce addictive behaviours, addressing some of the key issues without removing access entirely.

Empowering parents to set boundaries on social media usage is another proposed alternative. Educating parents about online safety and equipping them with the tools to monitor their children's social media use could enable families to make informed decisions together about online engagement. This approach preserves adolescents' access to positive social experiences while also providing a layer of guidance and protection. Research has shown that teenagers benefit from guidance in setting boundaries around social media, as well as conversations about responsible online behaviour.

The Potential Benefits of the Ban: Protecting Vulnerable Youth

Despite the criticisms and challenges, the proposed ban could have positive impacts by protecting vulnerable youth from the detrimental aspects of social media. Adolescents are at a crucial developmental stage, and shielding them from harmful online influences could reduce exposure to risky behaviours, such as cyberbullying and social comparison, which negatively affect mental health. This protection is particularly relevant for young people who may be susceptible to social pressures and struggle with issues like body image and self-esteem.

Additionally, restricting access to social media might encourage adolescents to engage in more face-to-face interactions, fostering social skills and emotional resilience. Real-world interactions are crucial for developing empathy, communication skills, and strong, supportive relationships. These real-life connections help adolescents learn to navigate complex social dynamics that are less evident in online interactions where communication often lacks the depth and sincerity necessary for building trust and understanding.

Setting a Global Precedent in Online Child Protection

By moving forward with this legislation, Australia aims to establish itself as a global leader in online safety for children. This "world-leading" approach could inspire other countries to consider similar measures, creating a broader movement toward prioritising adolescent mental health and well-being in the digital age. Setting a precedent might encourage international cooperation on social media regulation, an area that

has long been recognised as challenging due to the global nature of these platforms.

India's Approach to Protecting Teenagers on Social Media

Currently, India does not have a law that completely bans social media for teenagers like the proposed law in Australia. However, India has been active in discussing and implementing measures to protect young people online. Indian authorities have taken steps to increase awareness about digital safety and responsible online behaviour, and there are guidelines for platforms to protect young users. For example, India's *Information Technology (Intermediary Guidelines and Digital Media Ethics Code)* emphasises platform responsibility in content moderation and privacy protections, especially for younger users.

In addition to these guidelines, Indian organisations and government bodies regularly promote digital literacy programs in schools to help young people understand the risks and benefits of social media. These programmes encourage safe and responsible internet use, focusing on issues like cyberbullying, privacy, and healthy online habits. Furthermore, there have been discussions around setting stricter age-verification measures and providing parents with tools to monitor and control their children's social media use. While India has yet to propose a ban on social media for teenagers under 16, it is similar to Australia in recognising the potential impact of digital platforms on youth. Instead of banning access, India's approach has so far focused on encouraging responsible use, educating users about online safety, and promoting stronger guidelines for platforms to safeguard young users.

Conclusion

Australia's proposed social media ban for teenagers under 16 addresses valid concerns about the negative impacts of social media on adolescent mental health, self-esteem, and social development. However, implementing this ban presents significant challenges, particularly with regard to age verification, privacy, and the potential for unintended consequences. While the ban aims to protect young people, alternative approaches—such as digital literacy education, platform regulations, and parental guidance—may provide a more balanced way to mitigate social media's risks while preserving its benefits.

As Australia navigates the complexities of implementing this legislation, it must carefully weigh the advantages of protecting vulnerable youth against the need for digital literacy and responsible online engagement. This nuanced perspective could

offer a model for other countries seeking to balance adolescent safety with the realities of an increasingly digital world. While the debate around Australia's proposal continues, it ultimately highlights the need for a thoughtful, multi-faceted approach to ensure that young people can navigate online spaces safely and responsibly, both now and in the future.

Book Review

The Nehruvian Development Model

When **Hamza Alavi** brought up the idea of an "*overdeveloped state*", he correctly depicted the idea of how political masters of **third-world countries** are going to frame the economic policies right after getting decolonised. The same idea is depicted through **Arvind Panagariya**'s book "*The Nehruvian Development Model*", which discusses the economic trajectory taken by India in its initial years after attaining independence under the leadership of the **first Prime Minister Jawahar Lal Nehru**.
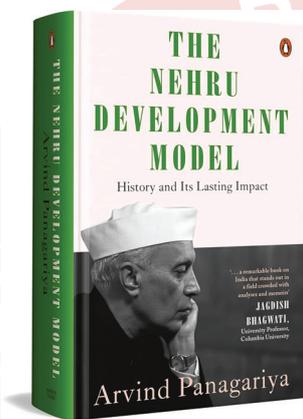
The book begins with a discussion of **Fabian socialism**[4], around which Nehru wanted to develop the idea of modern India. Initially, Nehru's vision leaned towards **radical socialism or communism**, as observed by the author when Nehru visited **Brussels** for a conference organised by socialists of **Europe**, which witnessed a heavy presence of nationalists from **Africa** and **Asia**. However, it started getting re-shaped during the meetings of the **National Planning Committee** (under the presidency of **Subhash Chandra Bose**), where he interacted with different Indian industrialists, which helped him to

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4. **Fabian Socialism** is a form of **socialism** that advocates for **gradual and reformist change** within a **democratic framework**, rather than through revolutionary means. Founded in 1884 by intellectuals in Britain, the **Fabian Society** aimed to **influence political thought and policy** through education and debate, promoting the establishment of a democratic socialist state. The name "Fabian" derives from the Roman general **Fabius Cunctator**, who employed tactics of **delay and attrition** rather than direct confrontation to achieve his goals. Fabians advocate for a strong role of the **state as an arbiter in economic matters**, promoting nationalisation of key industries while allowing for private enterprise in other sectors. They believe that the state should improve social conditions without infringing on individual freedoms.

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lean towards a milder approach and bring the notion of a mixed economy.

Nehru was influenced by the **Mahalanobis model of economic planning**, which reflected Fabian principles by advocating for **state control over key sectors** while allowing some degree of private enterprise. This model aimed at achieving industrialisation and economic development through planned interventions. The emphasis on social welfare in Fabian socialism aligned with Nehru's goals for post-independence India. He sought to eradicate poverty and **improve living standards** through government initiatives, paralleling the Fabians' advocacy for a **welfare state**.

Considering the facets of such socialism, **Panagariya** believes that the idea of Fabian socialism somehow became *Nehruvian socialism*. Panagariya brings up points that highlight the model's inability to accommodate human capital properly. Mahalanobis' plan was to build capital with heavy industries, which, according to the author, had fewer employees. This is because a major chunk was present in **rural areas** and **cottage industries** that were **small-scale,** and the promotion of such industries would somewhere help in income generation that would develop demand for other sectors of the economy, something that was based on the idea of **Gandhian economics**. Though Nehru tried to incorporate some of the principles of Gandhian economics, it was not sufficient to ensure thorough development, which can be seen in the case of **food inflation** occurring during the late 1950s due to stagnation witnessed in agriculture. This is something opposite to the constitutional principles laid under **Article 48** of the **Indian Constitution** that stressed the **modernisation of agriculture**. But what was the reason behind not stressing the cottage and small-scale industries to a great extent?

Arvind Panagariya lays out several reasons for this. *Firstly*, for Nehru, the economic oppression sensed during colonial rule needed to be eradicated as soon as possible. For that, he believed there was a need for **capital goods**[5]. A large investment was required to develop capital goods, which would **crowd out other sectors of the economy**. *Secondly*, for Nehru, the stress on industries would help to build India as a mechanised hub. Unlike other countries that view this model as import substitution, for Nehru, industrial development was necessary for eradicating traces of imperialism and colonialism, aiming to make India self-sufficient and not reliant on other parts of the world. *Thirdly*, Nehru

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5. Economists argue that exports of **capital goods** and **technology-intensive products** are crucial for **economic development**. According to **Ha-Joon Chang**'s book "*Kicking Away the Ladder*", countries that have successfully industrialised, such as the **United States** and **Germany**, initially protected their **infant industries** and **promoted exports of capital goods**. Similarly, **Dani Rodrik**'s research suggests that diversifying exports towards more **sophisticated products**, including **capital goods**, is associated with higher economic growth.

viewed industries as a better means of faster economic growth. In fact, according to **Meghnad Desai**'s book "*Rethinking Development and Politics*", **Nehru** wanted to see **double-digit growth** annually, with the GDP doubling in every decade.

For this, **Arvind Panagariya** provides an account of the **East Asian economy**, especially when it comes to **South Korea**. The evolution of industries in **South Korea** during the 1950s, 1960s, and 1970s marked a significant transformation from an **impoverished**, **predominantly agricultural economy** to a **highly industrialised society**. Following the devastation of the **Korean War** (1950-1953), South Korea faced immense challenges, including a **lack of infrastructure and resources**. The government initiated recovery efforts, focusing on land redistribution and educational improvements to lay the groundwork for future industrialisation. The turning point came with the **military coup** in **1961** led by **Park Chung-hee**, whose administration prioritised economic development through a series of **Five-Year Plans**.

The **First Five-Year Development Plan** (1962-1966) aimed for a growth rate of **7.1%**, which was exceeded by an average growth rate of **8.9%**. This period saw a shift towards **light industries**, particularly **textiles** and **footwear**, which were **labour-intensive** and **geared towards export**. The government played an active role by providing **low-interest loans to businesses** and establishing protective measures for nascent industries, leading to dramatic increases in manufacturing output and exports. In the 1970s, the focus shifted from **light to heavy and chemical industries** (**HCIs**) as part of the **Second Five-Year Plan** (**1967-1971**), which aimed to develop sectors such as **steel**, **petrochemicals**, and **machinery**. A desire for economic self-reliance drove this transition to compete with North Korea's industrial capabilities. The government invested heavily in infrastructure projects, such as the construction of **integrated steelworks** in **Pohang** and advancements in **shipbuilding** and **electronics**. By the end of the 1970s, South Korea had established itself as a major player in global markets, with manufacturing accounting for a significant portion of its GDP.

Why did countries like South Korea choose a different trajectory?

The author, **Arvind Panagariya, explained** the reason behind the kind of **colonial masters** who ruled **India** and **East Asian economies**. When it comes to East Asian economies, it was mainly **Japan**. The faster pace of economic growth that Japan witnessed in its **Industrial Revolution** period was also incorporated into these economies. So, unlike Indian supporters of Socialism who learned about it in Europe during British rule, where socialist ideas were popular in the early 20th century, people in East Asian economies never experienced socialist movements.

The Korean government actively **facilitated exports and encouraged private sector** growth through targeted investments and incentives. In contrast, Nehru's model often led to inefficiencies due to bureaucratic controls and a lack of competition within protected markets. India's focus on heavy industries did not yield similar levels of productivity or growth as seen in South Korea; instead, it resulted in stagnation in many sectors due to **inadequate infrastructure** and **policy paralysis**. According to **Panagariya**, the economic model ignored our **comparative advantage** in **light manufacturing** and **agriculture** based on **cheap labour**, **land availability**, **existing business smarts** and **worker skills**.

This also hampered human capital development. Although **the Nehruvian model** was about building **Indian Institutes of Technology** (IITs), it ignored the tenets of primary education. It focused more on higher education, which would help to build engineers and other personnel who the **heavy industries would absorb**. In addition to this, resource mobilisation was unjust even in the healthcare sector. Therefore, economists like **Bellikoth Raghunath Shenoy** criticised such policies to a great extent as they would have promoted **deficit financing**, which further facilitated and led to **inflation**. This further would restrict the private sector.

Therefore, **Panagariya** dives into the aspect of **license raj**, a system of strict government controls and regulations that governed industrial activity in India from the 1950s until the economic liberalisation in 1991. License raj was established under the **Industries Development and Regulation Act** (**IDRA**) of **1951**. Panagariya argues that the **Nehruvian state** viewed **industrial control** as a necessary tool for achieving self-sufficiency and economic stability in a newly independent nation. The government believed that regulating industries could prevent **monopolies**, ensure **equitable distribution of resources**, and **promote national interests**. However, this approach led to a complex web of **bureaucratic controls** where businesses were required to obtain licenses from multiple agencies before they could operate or expand. Panagariya highlights that this system, which was consolidated by 1965, not only **stifled entrepreneurship** but also fostered a culture of **corruption**, as obtaining licenses often required navigating an intricate **bureaucratic maze**, leading to **bribery** and **favouritism**.

In one chapter, which focuses on the impact of these restrictive policies, Panagariya critiques how the License Raj ultimately hampered **economic growth by limiting competition and innovation** within the private sector. He notes that while Nehru's intentions may have been to **protect smaller enterprises** and **promote equitable growth** as

recommended by the **DK Karwe Committee**, the reality was that only **well-connected individuals** or established businesses could thrive under such a system. This resulted in a **concentration of wealth** among a **few families and conglomerates** who could navigate the regulatory landscape effectively. The chapter underscores that the emphasis on heavy industry at the expense of consumer goods and light industries further exacerbated inefficiencies within the economy, leading to shortages and limited choices for consumers.

However, even after Nehru's demise in 1964, **Nehruvian policies** remained in essence until 1991. The author highlights the Nehru family's ongoing political dominance in India. **Indira Gandhi**, who served as **Prime Minister** from **1966 to 1977** and again from **1980 to 1984**, **advanced socialism** through **extensive nationalisation of private industries** and significant **welfare spending**. This approach solidified a culture of **political**, **bureaucratic**, **business**, and **intellectual inertia** that adhered to socialist economic principles even as the **Soviet Union began to collapse**.

In contrast, **Rajiv Gandhi**, **Prime Minister** from **1984** to **1989**, did not carry the **same socialist legacy** and shifted the economic narrative towards **liberalisation**, **competition**, and **efficiency in fiscal**, **industrial**, and **trade policies**. This happened because, in the eyes of **Panagariya**, **Rajiv Gandhi** witnessed India as a citizen rather than a politician in his initial years, the product of which was the **Union Budget** laid in the early years of his prime ministership. Legal experts like **Nani Palkhiwala** also appreciated such policies. However, his lack of administrative experience and poor political management in terms of pressure of political affiliation led by **Kamlapati Tripathi** led to his early departure from office and his tragic assassination.

Prime Minister P.V. Narasimha Rao (1991-1996), an experienced politician at both **state** and **national levels**, transformed economic policy to embrace **market-oriented reforms** despite a prevailing belief in mixed socialism. The foreign exchange crisis during his tenure garnered support for his initiatives. He cleverly presented significant changes in economic policy—such as **devaluation** and **liberalisation of trade** and **industrial licensing**—as a continuation of **Gandhian** and **Nehruvian ideals**. Meanwhile, **Finance Minister Manmohan Singh**, a respected **technocrat**, became the public face of these reforms. The remarkable economic growth in **Deng Xiaoping's China** also served as a compelling example that could not be ignored.

These economic liberalisation policies were continued during **Prime Minister A.B. Vajpayee's** tenure. He was reform-minded and initiated a **privatisation drive** but faced limitations due to the influence of **socialist-leaning political allies within his party**. Following him, **Prime Minister Manmohan Singh** (2004-2014) continued the trend of **trade** and **licensing liberalisation** but was similarly constrained by left-of-centre colleagues and the adverse effects of the global financial crisis. This was further manifested during the current Narendra Modi regime.

Therefore, the book presents a critical picture of the Nehruvian economic policies for which the author states, "*India's 'stable and vibrant' democracy comes at the cost of a Nehruvian 'socialist' polity and an underperforming economy*." Even the author displayed that more than a colonial hangover, it is the **Nehruvian socialism hangover** that hinders policy-makers from coming out of the box called the **Nehruvian economic model** and making economic reforms.

Who is Equal?

Even after 77 years of independence, if the debate of equality is sustained in **Indian society**, it clearly indicates the penetration of inequality, something that scholars like **Thomas Piketty advocate**. The book by **eminent lawyer Saurabh Kirpal**, "*Who is Equal?*" puts forward the entire idea of equality and why is it needed. The book starts with a daily life example where dissatisfaction among employees ballooned when they heard about **higher packages** of their peers.
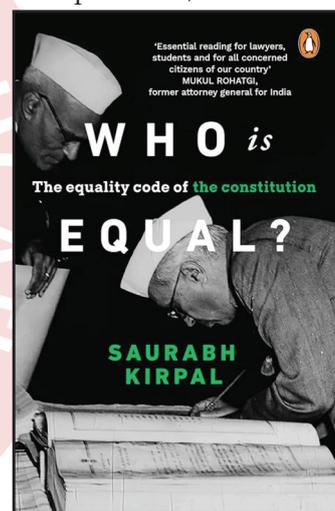
Thus, the author lays the foundation of equality by bringing the aspect of economic inequality lying among different persons, the model that **Thomas Piketty** adopted in his book "*A Brief History of Equality*". According to the author, the **utilitarian approach**[6] is a major issue behind the high levels of inequality, as it lacks fairness and justice. To address this, the author emphasises placing justice at the forefront to ensure equality can be obtained. But this can face hiccups in terms of a judge committed

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6. The **utilitarian approach** is an ethical theory that posits that the best actions are those that promote the greatest happiness for the greatest number of people. Rooted in **consequentialism**, utilitarianism evaluates the **morality of actions** based on their outcomes, specifically focusing on maximising overall well-being and minimising suffering. This principle, often summarised as "the greatest good for the greatest number," serves as a guiding framework for decision-making in various contexts, including social, economic, and political spheres.

to the idea of equality and a conservative one who may strike down any law to deliver redistribution of wealth and resources.

For this, Kirpal discusses the aspect of "*equality of what*" to understand the methodology that needs to be followed to ensure equality. Different interpretations and approaches to equality often lead to contrasting ideas about how best to achieve it. For this, he also brings the aspects of "*equality of opportunity*" and "*equality of outcome.*" When it comes to equality of outcome, Kirpal states that it aims to ensure that everyone attains the same level of goods, income, and living standards. However, its absolute implementation faces significant challenges, including limited resources and extensive government intervention. For instance, if ten students seek admission to five seats in a college, there can never be any equality of outcome. This is because there is no way that each student will have equal resources since five students will get seats and five will not. Even in the case of goods that can be distributed equally, there is a concern about excessive state intervention and efficiency.

Therefore, **equality of opportunity** presents an effective alternative because rather than focusing on the level or amount of distribution, this approach focuses on ensuring a fair process where everyone has an equal chance to succeed. The idea is that **justice requires that no person be disadvantaged from competing for scarce public goods** and that everyone should have a fair shot at improving their lot. However, it does not fully address systemic inequalities or historical injustices. Saurabh Kirpal presents the cons related to this by comparing a girl from a Dalit family with a girl from a reach city dweller. A rural Dalit girl might not truly have the same opportunities as an urban, wealthy girl despite an ostensibly equal process.

Thus, to overcome this aspect, **Kirpal** lays out the notion of **formal** and **substantive equality**, with **substantive equality** ensuring **affirmative actions** to deliver equality. This may lead to positive discrimination, something that has been imposed through **Article 15** of the **Indian Constitution**. With this, Mr Kirpal discusses the historical account of the colonial period and brings the quest for an egalitarian society that was viewed through the **Commonwealth of India Bill** (**1925**), **Nehru Report** (**1928**), and **National Planning Committee** (**1938**). All these events also laid the foundation for the Constitution of India.

Kirpal also traces back to the debates of reservation for backward classes, as proposed by **Dr Bhimrao Ambedkar,** who felt that the "*annihilation of caste*" was the need of the hour. The debate also tracks **religion, minority**, and **gender equality**. However,

to ensure that equality can be delivered holistically, there is a need for the *rule of law*, to which the second chapter is completely dedicated. According to Kirpal, it has become a slogan among policymakers to justify their actions. It is also a contested subject since its exact content is not always clear. In a true sense, it depicts that whatever it may be, it must be obeyed by all—a prerequisite for a liberal and democratic State.

To describe the **rule of law**, Kirpal brings eight essential elements - **generality** (codifying legal set of rules that doesn't work on a case-to-case scenario), **promulgation** (laws are made transparently), **retroactivity** (law should not be imposed retrospectively), **clarity** (it can be easily understood), **consistency** (two provisions of law should not contradict each other), **impossibility** (law should not lay impossible objectives that can never be fulfilled), **constancy** (law should not be subject to constant amendments), and **congruent** (officials follow the law and obey it). For its enforcement, Kirpal states that natural justice is of utmost importance. This is because **violation of natural justice** results in **arbitrariness**, thus promoting **discrimination**, which, in turn, **augments inequality** in society.

The author also clarifies that if any kind of positive discrimination is required, the difference should be intelligible and rationally presented. To consolidate this, the author provides a rich set of examples ranging from **the Anwar Ali Sarkar** case under **the West Bengal Special Courts Act** to **Nawab Waliuddowla** (**Nawab of Hyderabad**). To take it further, the author touches upon education, with the idea of quota and vulnerability coming into play as human capital theory[7] becomes the basis of social and economic inequality.

However, the concept of quota was challenged with the enforcement of the **Mandal Commission** in the early 1990s in the **Indira Sawhney case**. The judgement upheld the constitutional validity but brought the notion of a *creamy layer* to avoid further duplication of reservation, considering that individuals who are socially and educationally backward would surely rise up the stairs of society once they land into a better education system. The notion of a creamy layer for the scheduled castes and scheduled tribes was made applicable through the *Jarnail Singh vs Lachmi Narain Gupta* case (**2022**). However, the *TMA Pai vs Union of India* limited the extent of the reservation to all public institutions. Therefore, by restricting quotas to the public sphere,

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7. **Human capital theory** is an economic concept that views individuals' **skills**, **knowledge**, **experience**, and **attributes** as a form of capital that can contribute to economic productivity. It posits that investments in **education**, **training**, and **health** can enhance a person's productivity and, consequently, their earning potential. This theory emerged in the mid-20th century, primarily through the work of economists such as **Gary Becker** and **Theodore Schultz**.

the court clearly meant that the duty to ensure equality rests upon the State and not the private.

Apart from education, employment is considered one of the means to attain equality. This is because to move up the social ladder, there is a need to secure a job that pays well and is valued by the public at large. Therefore, being employed is something that also ensures living life with dignity, something that echoes through **Article 21** of the **Constitution of India**. For this, the author states that providing reservations in public employment can be a way out to achieve economic equality, especially for socially and economically disadvantaged groups. **Article 16** of the Indian Constitution deals with public employment, with **Clause 4** of the article giving powers to states to take measures for backward classes.

This was necessary because of the **shortage of private jobs,** which, in turn, generated demand for **cushy public sector jobs synonymous with security**. In the *State of Kerala vs NM Thomas* (**1976**), the apex court held that substantive equality (providing reservations) disallowed treating unequally placed people similarly. As opposed to formal equality, substantive equality was not blind to the social differences between two individuals and did not automatically treat them as equals. The author also discusses the caste census done in 1931 under the supervision of **John Henry Hutton**, which was incomplete, considering the current caste census organised in the **State of Bihar**. This, according to the author, has raised a new political debate about ensuring **proportional equality**, i.e., **proportional representation** in **public employment**.

Considering that this reservation was given on the basis of certain groups, i.e. scheduled castes and tribes, after the commencement of the Constitution, the President passed a constitutional order to recognise the initial list of groups as "*scheduled*." This order also led to an outrage as it did not include non-Hindus. However, in due course, members of the **Sikhs** and **Buddhists** were also included in the list. Although **Justice Rangnath Misra Committee** recommended some more, the government has still not accepted all recommendations.

However, the aspect of reservation, in the eyes of **Saurabh Kirpal**, also raises concerns related to equal pay for equal work, thus highlighting **gender equality**. For Kirpal, though this provision is present in **Article 39**(**d**) of the **Constitution**, it is no less than a fundamental right as the doctrine somewhere gives the essence laid under **Articles 14** and **16** of the **Indian Constitution**. To strengthen the notion even in the private sector, the Parliament enacted the **Equal Remuneration Act**, **1976**. But the objectives laid under the laws and in the Constitution have failed to establish gender economic equality, for which the

author lays two reasons. *Firstly*, the law applies to the organised sector, while the vast majority of women work in the unorganised sector. *Secondly*, while the judgements of the courts establish that temporary employees performing the same work as a permanent employee are entitled to the same pay, the basic question of what counts as "*same work or work of a similar nature*" is vexed and is detrimental to women.

This can be seen in the case of the **Punjab Excise Act**, **1914**, which restricted women from working in premises where liquor or other intoxicating substances were served in public. This was declared unconstitutional in the **case** of *Hotel Association vs Union of India*, thus ending the notion of *romantic paternalism*. One can notice such stereotyping of women in certain fields of employment, even in the armed forces, which inducted women as **permanent commissions** in all the services of the army in 2019, after **72 years of independence**.

But the major hindrance that was lying in front of women is the *motherhood penalty*, an exercise practised to date, to counter which the Parliament enacted provisions like the **Maternity Benefit Act**. This was accordingly dealt with by the Court in the case of Air India, which had a severe gender gap in terms of the retirement of **women** (**35 years** with extension up to **45 years**) and **men** (**58 years**) on the grounds of **pregnancy**. Still, some other issues, like sexual harassment, menstrual leave, etc., have been the other cases that have led to the gender gap, thus violating the principles of **Article 39**(**d**).

When it comes to private business ventures, **Saurabh Kirpal** discusses the challenges faced by businesses in India, particularly highlighting the **unpredictability of the legal system** as a significant barrier to smooth operations. He argues that the **absence of consistency** in **legal outcomes** creates an environment where businesses are hesitant to **enforce contracts**, **fearing delays** and **uncertainty in judicial processes**. This lack of predictability can deter investment and stifle growth, as entrepreneurs may be reluctant to enter into agreements that they believe might not be upheld.

To discuss equality more, the author uses democracy, especially the electoral procedure, as a means to achieve equality. However, it is double important that each voter's vote holds the same value. For this, the author references the **US Presidential election** in which **climate change activist Al Gore** secured almost half a million more votes than his competitor yet lost the presidency to **George Bush**. This brings the debate of **Universal Adult Franchise**, an experiment that our country has adopted right since independence, unlike other countries that have called for **constitutional principles** and

constitutionalism. Due to opposition from leaders like **C Rajagopalachari**, the right to vote was kept as a constitutional right but not a fundamental right, although the **Fundamental Rights Sub Committee** approved it to be incorporated under **Part III** of the **Constitution**.

The right to vote has been a beacon of the democratic process with periodic elections. However, the aspect of equality here is questioned due to the first-past-the-post system to establish governments. The **Venkatachelaiah Commission also observed this,** but it failed to provide any recommendations regarding the changes required in the existing system. Kirpal takes the aspect of the electoral process into other domains like qualifications, for which he takes the reference of *Rajbala vs State of Haryana*, where the demand was to declare **Section 58** of the **Haryana Panchayat Raj** (**Amendment**) **Act, 2015**[8], unconstitutional. But, the Supreme Court held the amendments to be constitutional as the classification on the grounds of education, financial health, and toilets in the house was based on "*intelligible difference*".

Saurabh Kirpal explores the intricate relationship between equality and **marriage** within the context of Indian society and its legal framework. He argues that the institution of marriage is deeply intertwined with issues of inequality, particularly as they pertain to gender, caste, and sexual orientation. Kirpal highlights that while the legal recognition of same-sex marriages has gained traction in some jurisdictions, it remains a contentious issue in India, where traditional norms often dictate the parameters of marital relationships.

Kirpal critiques the current **judicial approach to marriage equality**, suggesting that while there have been **progressive rulings**, such as those acknowledging the **rights of the queer community**, these decisions often fall short of providing substantive equality. He posits that the courts have sometimes been hesitant to fully embrace and enforce rights related to **marriage equality**, which can perpetuate existing inequalities. The author emphasises that mere legal recognition does not equate to societal acceptance or equality; thus, there is a pressing need for a broader societal revolution to challenge entrenched prejudices.

Furthermore, Kirpal reflects on how **marriage laws in India can reflect and reinforce social hierarchies**. He points out that traditional marriage structures often uphold **patriarchal norms** and **caste-based discrimination,** which complicates the **quest for genuine equality**. In his view, addressing these structural issues is crucial for achieving true equality

in marital rights. Ultimately, Kirpal's work calls for a re-examination of **marriage as a social contract** that should be inclusive and equitable, advocating for legal reforms that dismantle barriers to equality in all forms of marital relationships.

The book is all about designing the right model of creating equality, along with intelligible differentia doctrine with rational nexus in the fields of **democracy**, **education**, **business**, and **marriage**.

Negotiating India's Landmark Agreements

Many international and national academicians continue to debate whether Indian foreign policy represents continuity or change. This question has become necessary considering the current **geopolitical conditions**, encompassing **geoeconomic risks** and **geocalamity** rising due to **climate change**, which has its spillover effect even in social indicators as well, like poverty, hunger, and development. Thus, it becomes necessary that India manoeuvres through all these since it attained independence. The book "*Negotiating India's Landmark Agreements*" by **former diplomat AS Bhasin** gives a holistic picture of some of the bilateral but significant treaties that India had signed with countries like **Pakistan**, **Sri Lanka**, **China**, **Russia**, and the **USA**.

The **Agreement on Tibet**, signed in **1954**, was the first formal agreement between **India** and **China**, with India being a **seven-year-old independent nation** and **China just five years old**. Before and after India's independence, India had strong ties with Tibet, managing its **postal and telecommunications services**, **establishing trade centres** in major cities, providing security for officials, and even sending doctors and setting up hospitals there. Prior to 1950, Tibetan leaders sought support from India and the United States to strengthen their sovereignty but were unsuccessful.

After **China** occupied **Tibet** in **1950**, the **Tibetan delegation** signed the **17-point agreement** in **Beijing**, which forced **Tibet to become part of China**, even though it was done under pressure. With the signing of the Tibet Agreement, India lost its influence in

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8. People who did not possess the specified educational qualification or did not have a functional toilet at their place of residence were not eligible to contest elections.

the region. The Chinese not only solidified their control over Tibet but also removed Indian presence from the area entirely. The author notes that during the negotiations of this **Agreement**, **Prime Minister Jawaharlal Nehru** seemed more focused on maintaining a good relationship with China than on protecting India's own interests. According to the **author, Bhasin**, the Indian **Prime Minister,** before the failure of the 1962 War, there were many miscalculations regarding Tibet during that time. This is because with the Indian government losing the bargaining chips, things became more difficult.

India-Soviet Union relations during this period also tried to rely upon the axis of deterring China. Relations between India and the Soviet Union took a significant turn with the **Treaty of Friendship**. The Soviet Union proposed this **treaty** based on the idea of "*Asian Collective Security*" to **unite Asian nations against China**. However, India, wanting to maintain its long-standing policy of non-alignment, rejected the Soviet offer for a treaty. Instead, India asked for a formal statement from the USSR promising to support India if another country attacked it.

The Soviet leaders were concerned that if they made such a statement, India might lose interest in the treaty. On **June 5**, **1971**, during a farewell meeting with **Indian Ambassador Durga Prasad Dhar**, **Soviet Defence Minister Marshal Grechko** advised that India should focus on the threat from China rather than Pakistan. He pointed out that China had claimed **1.5 million square kilometres of Soviet territory**, which had a population of 8 million. The Chinese troops had retreated after witnessing the large mobilisation of Soviet military forces at the border.

This context illustrates how geopolitical tensions influenced the relationship between India and the Soviet Union during this period. For example, India's refusal to join a military alliance against China showcased its commitment to non-alignment while navigating complex international relations. However, at the request of **Prime Minister Indira Gandhi**, the clauses of the treaty were reformulated, which also led to the result of the war of **India - Pakistan** in **1971** falling in **India's favour**. This also set the tone of the agreement that was signed between **India** and **Pakistan**.

Moving ahead to the next section, the author deals with the dimension of the **Shimla Agreement** that was signed after the **India-Pakistan War of 1971**. Following the aftermath of the war, Pakistan faced significant fallout, including its division and the creation of Bangladesh. Additionally, Pakistani soldiers were held in Indian prisons, and large parts of Pakistan's territory were under India's control. In this context, Prime Minister Zulfikar Bhutto sought to negotiate terms that would preserve Pakistan's dignity. However, the Indian delegation insisted that Pakistan should not impose preconditions, particularly regarding the Kashmir issue. Bhutto argued that resolving such a long-standing issue, spanning 25 years, was unrealistic within just five days.

In fact, it was also observed by the author that even countries like **France** and the **Soviet Union**, also permanent members of the **United Nations Security Council** (**UNSC**), recommended India to restrain any imposition of resolving Kashmir issues and ensure that it should resolve political stability in the region. The author also noticed a sense of surprise as even bureaucrats like **PN Haksar**, the **Principal Secretary to the Prime Minister**, and **PN Dhar**, the **Secretary to the Prime Minister**, were informed about this meeting by Gandhi, who did not create a record of it; at least none has been found. The conditions were in the plight of cloud that even **Prime Minister Gandhi** wrote a letter to **Sri Lankan Prime Minister Bandaranaike** on August 7, 1972. In it, she mentioned that **India believed lasting peace was not possible without resolving the Kashmir issue**. She noted that President Bhutto expressed his willingness to address this and seemed to accept what was called a "*line of peace*" along the border, but he did not want to make this public at that time.

When it comes to **Sri Lanka**, where the **author** believes that after 1962, the **1987 Accord** signed between **India** and **Sri Lanka** was a **major disaster**. The **Accord** was the reversal of the de-intervention strategy that we adopted when the issue of the **Sinhalese** and **Tamil conflict** started right after the island country became independent. It started with the subject of Sinhalese being declared the country's national language, which facilitated **ethnic clashes** in the country. Seeing the interests of **Tamil origin**, **Prime Minister Shastri** called for intervention from the Sri Lankan government, which culminated in the **Shastri-Bandaranaike Pact**[9].

By the time **Rajiv Gandhi** became the **prime minister**, several rebel groups had been rising in **Sri Lanka**. Due

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9. The **Shastri-Bandaranaike Pact**, also known as the **Sirimavo-Shastri Pact**, was signed on October 30, 1964, between Indian Prime Minister Lal Bahadur Shastri and Sri Lankan Prime Minister Sirimavo Bandaranaike. This agreement aimed to address the **status and future of the Indian-origin population in Sri Lanka**, particularly those who had settled there during British colonial rule to work in plantations. The pact was significant as it provided a framework for the repatriation of approximately 525,000 people of Indian origin to India while granting citizenship to around 300,000 individuals in Sri Lanka.

One of the key features of the pact was its attempt to resolve the long-standing issue of statelessness faced by many Indians in Sri Lanka. The agreement stipulated that India would accept the repatriation of individuals of Indian origin, while Sri Lanka would confer citizenship upon a specified number of these individuals. However, the pact's implementation faced numerous challenges, and by the end of the stipulated period, only about 55% of the repatriation had been completed.

to this, the Prime Minister adopted the realist policy to make a military intervention in the country by stating that it would ensure the constitutional sovereignty and legitimacy of the **Sri Lankan government**. According to the author, there was a sense that the policy could lead to the **fragmentation of Sri Lanka**, along the lines of **Pakistan** in **1971**. However, this proved to be a double-edged sword because it triggered the rebel groups, especially **LTTE** (**Liberation Tigers of Tamil Eelam**).

LTTE became strong because they captured one of the regions (**Jaffna**) on the island, where they **controlled revenue and regulated the administration**. To deter the same, the Sri Lankan government tried to **curb the entry of petrol and other commodities**, which was criticised by the Indian government, which wanted to ensure the supply of raw food materials and goods in the region. This became a point of political contention as the **Sri Lankan government** wanted such supplies by the Indian government to be provided to the **Red Cross Society** present in **Sri Lanka**. Despite all this, the Indian government still sent their contingency, which was returned back. In response to this, the Indian government dropped these supplies through the air route.

To ensure that this political conflict was over, both sides of the government reached the **Accord of 1987** where the provision of the **Indian Peace Keeping Force** (**IPKF**) was kept if the rebel groups did not surrender, something that was not acceptable to LTTE. Due to the way and rush it was signed, even the Ministers in the **Jayawardane cabinet** were not happy, which was something that also occurred in the **Rajiv Gandhi cabinet**, including **PV Narasimha Rao**. The issue rose

to the extent that it took the life of Rajiv Gandhi.

Regarding the **United States**, the author feels that the **Civil Nuclear Agreement** of **2008** signed between **India** and the **US** was no less than a milestone considering the way the **US** as a **superpower,** wanted most of the countries to live under a **nuclear umbrella**, unlike developing their own weapons, which was somewhere challenged by countries like India, firstly in 1974 and then in 1998. Although, in the eyes of international relations experts like **Riedel**, India adopted a realist approach due to the nuclear weapon expansion of **China**, the US didn't want many other countries to go for an arms race.

However, by the time 2008 reached, the Indian government's stand on the **No First Use doctrine** and **no nuclear test** to be **conducted** somewhere allowed the US government to make further strides towards civil nuclear agreement. Behind this, the brains of **former Secretary of State Condoleezza Rice** was working. The agreement was finalised in such a way that it let only the civil nuclear sites on Indian soil be under the supervision of the **International Atomic Energy Agency** in exchange for the **US transferring nuclear technology** to the **Indian contingent** for **civil matters**. This was necessary, considering the growing demand for **enhancing India's energy mix** and consolidating the country's energy security.

Thus, the book covers five major agreements that, according to the **author, Bhasin,** had a **long-lasting effect** on **India's national security**. Considering the nitty-gritty and the way intricacies have been tackled, the book is an interesting read.
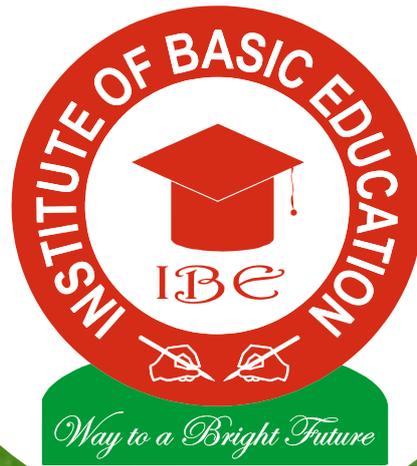
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