June 2024

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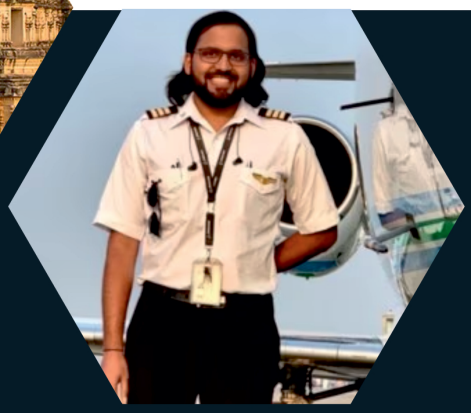

CURRENT AFFAIRS MAGAZINE

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June-2024

Current Affairs

Contents

Neolithic Discoveries in Mauxi Village

Syllabus: GS1/Ancient History

Context

- Mauxi (Mhaus) village in the Sattari taluka of Goa has emerged as a hotbed of neolithic discoveries.

About

- The 11th edition of the Cultural and Heritage Walk, also known as Parikrama, organised inside the Ravalnath Temple.
- The Lord Shiva is a form of the universal god worshipped by Hindus. He is also called Shivnath Ravalnath in Konkani as a mark of reverence.
- The Archaeological Survey of India (ASI) has confirmed that the Ancient rock carvings that were found etched into the meta basalt rock along the dry riverbed of the Zarme river some two decades ago belong to the neolithic period.
- The carvings were initially discovered by local residents some 20 years ago and tell a lot about the early inhabitants of the region.

Archaeological Survey of India (ASI)

– ASI is the premier organization for the archaeological research and protection of the cultural heritage of the nation under the Ministry of Culture.
– Maintenance of ancient monuments and archaeological sites and remains of national importance is the prime concern of the ASI.
– It regulates all archaeological activities in the country as per the provisions of the Ancient Monuments and Archaeological Sites and Remains Act, 1958. It also regulates the Antiquities and Art Treasure Act, 1972.

Major Findings

- The carvings are of animals such as zebus, bulls, and antelopes, alongside footprints and cupules.
- The circular cavities on the rock surface signifies the community involvement in discovering historical artifacts.
- Some 20 rock etchings, showcasing the use of the bruising technique, have been identified in this region, with tools from the same period found on the riverbed. This validates the site's historical significance.
- Another worth-mentioning feature is a rock done with cupules, revered outside the Puravati Temple.
- Initially interpreted as representing a star constellation with 27 cupules, further research revealed 31 cupules, which made people curious about their significance but the exact purpose of these remains unknown.

Significance

- The ASI have confirmed its Neolithic origins, as this period signifies an important period when humans started domesticating cattle.
- A carving at Mauxi depicting a trident—a symbol associated with the Iron Age—suggests the site's enduring significance through various historical epochs.
- The presence of the Dhawad community, early settlers, and ironsmiths adds another layer to the historical narrative, although eventually displaced by new settlers.

The Stone Age

– The Stone Age is a prehistoric period characterized by the use of stone tools. It's typically divided into three major periods: the Paleolithic, Mesolithic, and Neolithic, based on technological advancements, cultural developments, and changes in human societies.

a. Paleolithic Age: Also known as the Old Stone Age, this period began around 2.6 million years ago with the earliest known stone tool usage by hominids such as Homo habilis. It lasted until around 10,000 BCE. During this time, humans were primarily hunter-gatherers, relying on stone tools for tasks such as hunting, butchering, and processing food.

b. Mesolithic Age: This transitional period occurred roughly between 10,000 BCE and 5,000 BCE, depending on the region. It was characterized by the development of more specialized tools, as well as adaptations to changing environments and the domestication of certain plants and animals.

c. Neolithic Age: The New Stone Age began around 12,000 years ago and ended in various parts of the world between 4500 BCE and 2000 BCE. It is distinguished by the widespread adoption of agriculture and the domestication of animals, leading to settled communities, the development of pottery, weaving, and more complex social structures.

d.The transition to agriculture revolutionized human societies, allowing for the rise of civilizations.

Hampi's Virupaksha Temple

Syllabus: GS1/Art & Architecture

Context

- A section of the pillars holding up the pavilion at Hampi's Virupaksha temple collapsed recently following heavy rains.

About the Virupaksha Temple of Hampi

- It is a historic Hindu temple located in Hampi, Karnataka, India.
- It holds immense religious and cultural significance and is part of the Group of Monuments at Hampi, which has been designated as a UNESCO World Heritage Site.

Historical Significance

- It dates back to the 7th century CE. Some historians suggest that it existed even before the Vijayanagara Empire established its capital in Hampi.
- During the 14th to 16th centuries, under the Vijayanagara rulers, the temple underwent extensive expansion and flourished as a vital centre for religious and cultural activities.
- The Vijayanagara empire was founded by Harihara I of the Sangama dynasty, it expanded from a strategic position on the banks of the Tungabhadra river to become one of the most powerful kingdoms of its time.

Architectural Marvels

- The Vijayanagara Empire (1336 to 1646), known for its grand architecture, built Dravidian-style temples and palaces in Hampi, including the Virupaksha Temple.
- Notable features include towering gopurams (gateways), pillared halls, and shrines dedicated to various deities.
- The Vitthala Temple within the complex stands out for its exquisite ornate structure, representing the pinnacle of Vijayanagara temple architecture.
- It features a grand bazaar street, a stepped tank, and beautifully carved mandapas.

Religious Significance

- The temple is dedicated to Lord Virupaksha, a form of Lord Shiva.
- It is associated with the local goddess Pampadevi, linked to the Tungabhadra River.
- Worship at the Virupaksha Temple has persisted over centuries, even after the city's destruction in 1565.

Chapter-
2

POLITY

Personality Rights

Syllabus: GS2/Polity and Governance

Context

- The Delhi High Court has protected the personality and publicity rights of a Bollywood actor.
- The court has restrained various entities – e-commerce stores, AI chatbots, social media accounts etc – from misusing the actor's name, image, voice, and likeness without his consent.

What are Personality Rights?

- Personality rights refer to the right of a person to protect his/her personality under the right to privacy or property.
- These could include a pose, a mannerism or any aspect of their personality.
- These rights are important to celebrities as their names, photographs or even voices can easily be misused in various advertisements by different companies to boost their sales.
- Many celebrities even register some aspects as a trademark to use them commercially.
- For example, Usain Bolt's "bolting" or lightning pose is a registered trademark.

Reasons for providing these Rights

- The idea is that only the owner of these distinct features has the right to derive any commercial benefit from it.
- Exclusivity is a big factor in attracting commercial dividends for celebrities.
- Personality rights are not expressly mentioned in a Laws in India but fall under the right to privacy and the right to property.

Are Personality Rights different from Publicity Rights?

- Personality rights consists of two types of rights:
- Firstly, the Right of Publicity, or the right to keep one's image and likeness from being commercially exploited without permission or contractual compensation, which is similar (but not identical) to the use of a trademark;
- Secondly, the Right to Privacy or the right not to have one's personality represented publicly without permission.
- Publicity rights fall into the realm of the 'tort of passing off', when someone intentionally or unintentionally passes off their goods or services to another party. This type of misrepresentation damages the goodwill of a person or business, resulting in financial or reputational damage.
- Publicity rights are governed by statutes like the Trade marks Act 1999 and the Copyright Act 1957.

Legality of Personality Rights

- Celebrities can move the Court and seek an injunction when an unauthorised third party uses their personality rights for commercial purposes.
- Personality rights or their protection are not expressly mentioned in a statute in India but are traced to fall under the right to privacy and the right to property.
- Many concepts in intellectual property rights used in protection of trademarks such as passing off, deception can be applied while deciding whether a celebrity deserves to be protected through an injunction.
- An ex-parte injunction is when relief is granted to a party without hearing the other side.
- An omnibus injunction refers to an injunction granted against any unauthorised use- even those that are not mentioned in the plea.

Criteria for Granting Injunction

In the Titan case, the HC in its order listed out the "basic elements comprising the liability for infringement of the right of publicity."

- Validity of the Right: The plaintiff owns an enforceable right in the identity or persona of a human being.
- Easy to Identify in the alleged misuse: The defendant's unauthorized use must make the celebrity identifiable easily.
- Celebrity is identifiable: The unaided identification should be enough if the celebrity is well-known. Otherwise, the plaintiff will have to bring evidence which adds up at a geometric rate to associate with the plaintiff.

Previous Cases on Personality Rights

- Anil Kapoor had moved the Delhi High Court in a civil suit seeking protection of his personality- his name, photographs, manner of speaking, gestures etc.
- He also claimed protection of his copyright in the dialogue and in the image and other associated works.
- In 2022, the Delhi High Court had dealt with a similar case involving Amitabh Bachchan.
- From using variations of his name such as "Big B" to including his "unique style of addressing the computer the HC injuncted the use of his personality rights.
- In 2015, the Madras High Court, in a similar case involving actor Rajnikanth had observed that "personality right vests on those persons, who have attained the status of celebrity".

SC Reserves 33% Seats for Women in Bar Association Committee

Syllabus: GS2/Polity/GS1/Society

Context

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

About

- The court directed that a minimum of three out of nine seats in the executive committee and at least two out of six senior executive members be reserved for women members of the Bar.
- The bench clarified that this reservation will not bar eligible women members from contesting for other posts as well, and directed that one post of the office-bearers of SCBA shall be exclusively reserved for women by turn and on a rotation basis.
- The reservation is only to guarantee a minimum and women members of the SCBA, subject to their eligibility, shall be entitled to contest the election for all the posts in the Executive Committee.

Supreme Court Bar Association

- The Supreme Court Bar Association (SCBA) in India is an organization comprising lawyers who are enrolled as members of the Supreme Court of India.
- It represents the interests of lawyers practicing in the Supreme Court and aims to uphold the standards of the legal profession and promote the administration of justice.
- It also engages in activities aimed at enhancing the legal system and protecting the independence of the judiciary.
- The association is governed by its own set of rules and regulations and elects office bearers to represent its members and manage its affairs.

Representation of Women in Judiciary

- Justice Beevi became the first Muslim woman judge of the Supreme Court, as well as the first woman Supreme Court Justice in Asia in 1989.
- Since 1989, only 11 women have made it to the Supreme Court. Currently, there are only three female judges of the 33 Supreme Court judges.
- Only 4.1% of all Supreme Court judges have been women, while the remaining 96% are men.
- There are more women judges at the district court level than at the High Court level.
- Justice Nagarathna is in line to become the first-ever female Chief Justice of India in 2027.

- The appointment of Justices Kohli, Nagarathna, and Trivedi to the top court in 2021 created history, as this marked the first time that so many females were appointed to the SC in one go.
- Earlier this year, the Supreme Court elevated 56 advocates as senior advocates, and out of those, 20 percent were women advocates.
- It was the first time in judicial history when 11 women advocates were given senior designation in one go.

Reasons for the Lack of Representation of Women

- Historical Reasons: Historically, legal and judicial systems worldwide have been male-dominated, and India is no exception. The legal profession has traditionally been perceived as a male domain, and this mindset has persisted over the years.
- Societal Expectations and Stereotypes: Societal expectations often dictate traditional gender roles, and there are stereotypes that cast women in roles that are seen as less compatible with the demands of a judicial career.
- Educational Barriers: Limited educational opportunities for women result in fewer female candidates entering law schools and subsequently pursuing a career in the judiciary.
- Family and Cultural Expectations: Cultural norms and expectations regarding women's responsibilities within the family dissuade them from pursuing demanding and time-consuming careers, such as a judicial career.
- Gender Bias and Discrimination: Stereotypes about women's capabilities lead to their exclusion from consideration for higher judicial positions.
- Networking and Mentorship Opportunities: Male-dominated networks and mentorship structures within the legal profession make it challenging for women to access the same opportunities for career advancement.
- Appointment Procedure: The lower judiciary has a better representation of women than the High Court and Supreme Court.
- That's perhaps because entry to the lower judiciary is through an examination, while the High Court and Supreme Court are decided by the collegium.

Importance of Representation of Women in Judiciary

- Gender Equality: A diverse judiciary ensures a more inclusive and representative legal system.
- Fairness and Impartiality: Having a judiciary that reflects the diversity of the population helps in dispelling biases and promoting impartial decision-making.
- Inspiration and Role Modeling: Women judges can act as role models, encouraging more women to pursue careers in law.
- Access to Justice for Women: Women may feel more comfortable and understood when their cases are heard by judges who share similar life experiences and perspectives.
- Legal Interpretation and Legislation: Women judges can provide unique insights into legal interpretation and the development of legislation, particularly in areas related to gender-based issues, family law, and women's rights.
- Their presence can influence legal discourse and contribute to the evolution of more gender-sensitive laws.
- Global Norms and Commitments: Internationally, there is a growing recognition of the importance of gender diversity in all sectors, including the judiciary.

Conclusion

- The lack of representation of women in the judiciary, combined with the traditional exclusionary attitude towards women, has led to a lack of diversity within the judicial system.
- Therefore, it is essential that efforts to increase diversity in the judiciary are made to ensure a more equitable court system.
- There is a requirement to enhance transparency in the judicial system. This will create more opportunities for women to prove their mettle and create a level playing field.

An Overview of the AMRUT Scheme

Syllabus: GS2/Governance

Context

- India is rapidly urbanizing, around 36% of India's population is living in cities and by 2047 it will be more than 50%.
- The World Bank estimates that around $840 billion is required to fund the bare minimum urban infrastructure over the next 15 years.

About

- Looking at the rapid urbanisation and to address the infrastructure need, AMRUT (Atal Mission for Rejuvenation and Urban Transformation) scheme was launched by the government in 2015, with its 2.0 version launched in 2021.
- The mission was drawn to cover 500 cities and towns with a population of over one lakh with notified municipalities.
- The purpose of the AMRUT mission was to:
- ensure that every household has access to a tap with assured supply of water and a sewerage connection;
- increase the value of cities by developing greenery and well-maintained open spaces such as parks and;
- reduce pollution by switching to public transport or constructing facilities for non-motorised transport.
- AMRUT 2.0: Aimed at making cities 'water secure' and providing functional water tap connections to all households in all statutory towns.
- Ambitious targets were set up such as providing 100% sewage management in 500 AMRUT cities.
- Other components of AMRUT 2.0 are:
- Pey Jal Survekshan to ascertain equitable distribution of water, reuse of wastewater, mapping of water bodies and promote healthy competition among the cities /towns.
- Technology Sub-Mission for water to leverage latest global technologies in the field of water.
- Information, Education and Communication (IEC) campaign to spread awareness among masses about conservation of water.

Need for the Scheme

- It is estimated that about 2,00,000 people die every year due to inadequate water, sanitation and hygiene.
- In 2016, the disease burden due to unsafe water and sanitation per person was 40 times higher in India than in China.
- The 150 reservoirs monitored by the central government, which supplies water for drinking and irrigation, and are the country's key source of hydro-electricity, were filled to just 40% of its capacity a few weeks ago.
- Around 21 major cities are going to run out of ground water.
- In a NITI Aayog report it was stated that 40% of India's population will have no access to drinking water by 2030.
- Nearly 31% of urban Indian households do not have piped water; 67.3% are not connected to a piped sewerage discharge system; and average water supply per person in urban India is 69.25 litres/day, whereas the required amount is 135 litres.

Challenges

- Narrow Approach: The basic fundamental of the scheme was erroneously constructed. Instead of a holistic approach, it took on a project-oriented attitude.
- Furthermore, AMRUT was made for cities with no participation from the cities. It was quite mechanical in design, with hardly any organic participation of the elected city governments, and driven by mostly private interests.
- Delays in Implementation: Like many government schemes, AMRUT projects often face delays in implementation due to bureaucratic hurdles, land acquisition issues, and other administrative challenges.
- Maintenance and Sustainability: While AMRUT focuses on building new infrastructure, ensuring its long-term maintenance and sustainability is equally important.
- Without proper maintenance, the infrastructure deteriorates over time, undermining the benefits of the scheme.

- Inclusivity: There is a need to ensure that the benefits of AMRUT reach all sections of society, including marginalized communities and informal settlements.
- Inclusive planning and implementation strategies are essential to address the needs of all urban residents.
- Environmental Impact: The rapid urbanization and infrastructure development under AMRUT may have adverse environmental consequences if not implemented sustainably.
- Measures should be taken to minimize environmental degradation and promote eco-friendly practices.

Way Ahead

- The scheme needs nature based solutions and a comprehensive methodology with a people centric approach and empowering local bodies.
- By addressing these challenges effectively, AMRUT can play a crucial role in improving the quality of life in urban areas across India.

Contesting Polls and Voting Rights from Prison

Syllabus: GS2/Indian Polity

Context

- Delhi Chief Minister has received interim bail from the Supreme Court to join his party's campaign for the ongoing Lok Sabha elections until June 1, the last phase of the polls.

Background

- In 1975, the Supreme Court in the case of Indira Gandhi v Raj Narain recognised that free and fair elections are a part of the 'basic structure' of the Constitution of India.
- However the Supreme Court has held that the rights to elect and be elected do not enjoy the same status.
- In 2006, in the case of Kuldip Nayar v. Union of India the supreme court held that the right to vote (or the right to elect) is "pure and simple, a statutory right".
- This means that voting is not a fundamental right and can be repealed.
- The same was held for the right to be elected by the Bench, ruling that laws enacted by Parliament could regulate both these statutory rights.

Bar Against Contesting Elections

- Section 8 of the Representation of People Act, 1951 (RP Act) is titled "Disqualification on conviction for certain offenses".
- No one is barred from contesting elections unless convicted. Even for convicted politicians, the disqualification is not more than 6 years post the expiry of the jail term.
- This disqualification only kicks in once a person has been convicted and does not apply if they have only been charged with criminal offenses.
- Exceptions to Disqualification: The Election Commission of India (ECI) is empowered under Section 11 of the RP Act to "remove" or "reduce" the period of disqualification.
- In 2019 the Supreme Court held that once a conviction is stayed "the disqualification which operates as a consequence of the conviction cannot take or remain in effect".

Bar Against the Right to Vote

- Article 326 of the Constitution of India provides voting right in elections to the Parliament or the assembly based on adult suffrage.
- Section 62 of the RP Act provides a series of restrictions on the right to vote.
- Its sub-clause (5) which states in broad terms "No person shall vote at any election if he is confined in a prison, whether under a sentence of imprisonment or transportation or otherwise, or is in the lawful custody of the police".
- With an exception provided for those in preventive detention, this provision effectively bars every individual who had criminal charges framed against them from casting their vote unless they have been released on bail or have been acquitted.

Anukul Chandra Pradhan, Advocate, Supreme Court v. Union of India, 1997

- The Supreme Court in this case rejected a challenge to Section 62(5) of RPA on four grounds that;
- The right to vote was a statutory right and could be subject to statutory limitations.
- There is a "resource crunch" as infrastructure would have to be provided and police would have to be deployed.
- A person in prison because of their conduct "cannot claim equal freedom of movement, speech and expression".
- Restrictions on prisoners' right to vote are reasonable as it is connected to keeping "persons with criminal background away from the election scene".

Menstrual Hygiene in Indian Prisons

Syllabus: GS1/Society, GS2/Governance

Context

- Several issues have been found in access to sanitary products and safe and dignified means of managing menstrual hygiene among the women in Indian prisons.

Background

- The fifth round of the National Family Health Survey (NFHS 2019-2020) revealed that about eight out of 10 young women aged 15-24 years are now using safe menstrual hygiene products.
- While urban areas and certain demographics have seen improved usage of menstrual hygiene products, the plight of women in Indian prisons remains overlooked.

Status of Menstrual Hygiene in Prisons

- According to the National Crime Records Bureau, there are 23,772 women in Indian prisons and 77% of them are in the reproductive age group (18-50 years) and are likely to be regular menstruators.
- The availability of sanitary napkins has been inconsistent across different prisons in the country and the quality of sanitary napkins has also been unsatisfactory.
- Despite recommendations outlined in the 2016 Model Prison Manual, many States have not implemented provisions like supplying adequate water and washroom facilities for female prisoners.
- Overcrowding and poor socio-economic conditions further exacerbate the struggle of incarcerated women to secure basic necessities such as water, sanitary napkins, detergent, and soap during menstruation.

Challenges faced by women in Indian Prisons

- The lack of continuous water supply forced women to store water, taking up valuable space in the limited number of toilets available.
- Women also reported feeling discouraged from using the filthy washrooms for urination, which led to a greater incidence of urinary infections.
- Prison authorities depended on sanitary napkins donated by non-governmental organizations.
- Decisions about the type, quality, and quantity of menstrual absorbents were left to these organizations, often resulting in the supply of substandard products.
- There is a dearth of empirical evidence highlighting an urgent need to conduct research to understand the current state of menstrual hygiene within prison walls.

Menstrual Hygiene and Health schemes in India

- Menstrual Hygiene Scheme: It was launched in 2011 for adolescent girls in the age group of 10-19 years and focussed on the distribution of low cost sanitary napkins in communities through ASHAs.
- Swachh Bharat Abhiyan: The Ministry of Jal Shakti and Education launched the National Guidelines on Menstrual Hygiene Management (MHM) for rural areas.
- The Ministry of Chemicals and Fertilizers implements the Pradhan Mantri Bharatiya Janausadhi Pariyojna (PMBJP), under which the Janaushidhi Kendras have been set up that provides Oxo-biodegradable sanitary napkins named Suvidha at Rs. 1/- per pad only.
- National Menstrual Hygiene Policy to recognise menstruation as a natural process that demands more meaningful attention.

- The draft policy states, Prioritize equity to enable all menstruating individuals, regardless of their socioeconomic status and geographical location, to have equal opportunities to access and manage their menstruation in a safe and hygienic way.

Way Ahead

- The experience of menstruation within prisons presents unique challenges that demand attention through a public health lens, particularly as part of the fight against 'period poverty'.
- The government must ensure that basic standards of menstrual hygiene for women in captivity are met.
- The need is to encourage collaboration between public health authorities and prison administrators to develop a comprehensive strategy to ensure access to adequate menstrual hygiene products and facilities while prioritizing the health and dignity of women behind bars.

Corporate Governance Regulations for Insurers (2024)

Syllabus: GS2/Government Policies & Interventions; GS4/Transparency & Accountability; Corporate Governance

Context

- Recently, the Insurance Regulatory and Development Authority of India (IRDAI) has introduced new corporate governance rules to prevent conflicts of interest in key management roles and to ensure that no individual holds multiple significant positions.

Corporate Governance

- It refers to the system of rules, practices, and processes by which a company is guided and controlled.
- It aims to ensure that the company operates in a fair and responsible manner, safeguarding the interests of all stakeholders.
- It is a critical aspect that ensures transparency, accountability, and ethical conduct within companies.
- It defines the relationship between the Board of Directors, senior management, and shareholders.
- It is a system of financial and other controls within a corporate entity.
- Robust corporate governance is essential for sustainable growth, investor confidence, and long-term success.

Historical Context of Corporate Governance

– Corporate governance is not a new concept in India.
– As far back as the 3rd century BC, Chanakya elaborated on the duties of a king, which align with modern corporate governance principles.
– These duties included:
1. Raksha: Protecting shareholders' wealth.
2. Vriddhi: Increasing income through proper asset utilisation.
3. Palana: Maintaining profitability.
4. Yogakshema: Safeguarding shareholders' interests.

Regulatory Framework

- India has a well-defined regulatory framework for corporate governance. Key institutions include the Securities and Exchange Board of India (SEBI), the Insurance Regulatory and Development Authority of India (IRDAI), the Ministry of Corporate Affairs (MCA), and the Companies Act, 2013.

Corporate Governance for Insurers Regulations, 2024 of IRDAI

- These regulations aim to enhance governance structures within insurance companies to safeguard the interests of stakeholders, including policyholders.
- IRDAI's Role: The IRDAI outlines governance responsibilities of the Board in managing insurance functions through various regulations.
- These comprehensive guidelines supplement provisions of the Companies Act, 1956, Insurance Act, 1938, and other relevant laws.

Key Provisions

- The regulations focus on promoting transparency, accountability, and ethical practices in the insurance sector.

- Objective: The regulations aim to provide a robust governance structure for insurers by focusing on the responsibilities and functions of the board and management, ensuring sound and prudent principles and practices while meeting stakeholder expectations, especially policyholders.
- Applicability: These guidelines are applicable to all insurers, including Foreign Reinsurance Branches and Insurance Intermediaries regulated by the IRDAI. They came into force on April 1, 2024 and will be reviewed every three years.
- Governance Structure: The regulations cover various aspects of corporate governance, including:
- Appointment of directors, key management persons, and statutory auditors.
- Powers and roles of the board of directors: To promote checks and balances, it is good practice for the chair of the board to be a non-executive board member and not serve as chair of any board committee.
- Other governance aspects such as disclosure, reporting to IRDAI, and environmental, social, and governance considerations.
- Four Fundamental Keystones
- Fairness: Ensuring fair treatment of all stakeholders.
- Transparency: Providing clear and accurate information to stakeholders.
- Accountability: Holding management accountable for their actions.
- Responsibility: Fulfilling obligations toward shareholders and society.
- Conflict of Interest: The regulations prohibit conflicts of interest in key management positions. Holding both business and control functions by a single key management person or holding multiple control positions by one individual is forbidden.

Insurance Regulatory and Development Authority of India (IRDAI)

– It was constituted in 1999 as an autonomous body after the recommendations of the Malhotra Committee report to regulate and develop the insurance industry.
– It was incorporated as a Statutory Body in 2000, after passing of the Insurance Regulatory and Development Authority Act, 1999.
– It has the power to frame regulations under Section 114A of the Insurance Act, 1938.
– It is under the jurisdiction of the Ministry of Finance, Government of India.

Objective

– To protect the interests of the policyholder and regulate the insurance industry.
– It has framed regulations ranging from registration of companies for carrying on insurance business to protection of policyholders' interests.

Benefits of Corporate Governance

- Greater Accountability: Improved accountability to shareholders.
- Lower Cost of Capital: Good governance attracts investors and reduces capital costs.
- Higher Firm Valuation: Well-governed companies tend to have higher valuations.
- Objectivity and Transparency: Decision-making processes become more objective and transparent.
- Effective Compliance: Ensures compliance with regulatory requirements and ethical business conduct.

Issues/Obstacles and Solutions

- Selection Procedure and Term of Board Members: It is a significant challenge for good corporate governance. Ensuring that qualified and independent directors are appointed is crucial.
- The tenure of board members impacts governance. Striking a balance between continuity and fresh perspectives is essential.
- Performance Evaluation of Directors: Regular evaluation of directors' performance is essential. However, many companies struggle with effective evaluation mechanisms.
- Evaluating directors based on their contributions, independence, and adherence to governance principles is critical.
- Independence of Directors: Independence is vital for effective governance. Ensuring that independent directors maintain their autonomy and act in the best interest of the company is challenging.
- Avoiding conflicts of interest and undue influence from promoters or dominant shareholders is crucial.
- Transparency and Data Protection: Transparency in financial reporting, disclosures, and decision-making processes is essential. However, achieving transparency remains a challenge.

- Balancing transparency with data protection and confidentiality is a delicate task.
- Business Structure and Internal Conflicts: Companies with complex structures (such as conglomerates) face challenges in managing internal conflicts and ensuring alignment across subsidiaries.
- Addressing conflicts of interest between different stakeholders (shareholders, management, employees, etc.) is critical.
- Founder/Promoter's Role: Balancing the influence of founders or promoters with the need for independent decision-making is a challenge.
- Ensuring that the founder's vision aligns with the company's long-term interests is crucial.
- Regulatory Oversight and Multiplicity of Regulators: Effective regulatory oversight is necessary to enforce governance norms. However, coordinating among multiple regulators can be complex.
- Harmonising regulations across different sectors and ensuring consistent enforcement is a challenge.
- Linkage of Good Governance to Good Performance: Demonstrating the positive impact of good governance on business performance remains a challenge.
- Companies need to communicate how strong governance practices contribute to sustainable growth and shareholder value.

Conclusion

- The Corporate Governance for Insurers Regulations, 2024 emphasises transparency, accountability, and ethical behaviour within insurance companies, ultimately benefiting all stakeholders.
- These regulations play a crucial role in ensuring the long-term sustainability and trustworthiness of the insurance industry in India.

Juvenile Justice Board (JJB)

Syllabus: GS2/Governance

Context

- Recently, the Juvenile Justice Board (JJB) cancelled the bail of accused minors and issued a notice to appear before it.

About Juvenile Justice Board (JJB)

- Juvenile Justice Board (earlier Juvenile Court) was established after the enactment of the Juvenile Justice (Care and Protection of Children) Act, 2000.
- Section 4 (1) of the Juvenile Justice Act, 2015 deals with the Juvenile Justice Board (JJB).
- It consists of a metropolitan magistrate or a judicial magistrate of the first class (with at least three years' experience), along with two social workers, one of whom is mandated to be a woman.
- The State Government needs to constitute for every district, one or more JJBs for exercising the powers and discharging its functions relating to children in conflict with law under the Juvenile Justice Act, 2015.
- The primary responsibility of setting up the JJBs vests with the State Governments/UT Administrations concerned.

Child under Juvenile Justice (Care and Protection of Children) Act, 2015

– A child is defined under Section 2(12) of the Act as a person who has not completed eighteen years of age.
– The Act recognises two kinds of Children:
a. Child in Conflict with Law (who has committed some offence);
b. Child in Need of Care and Protection (who is a victim of crime or circumstances).

Functions

- To deal with cases of juveniles in conflict with the law, ensuring their rights, protection, and rehabilitation.
- To ensure that the child's rights are protected throughout the process of apprehending the child, inquiry, aftercare and rehabilitation.
- To ensure the availability of legal aid for the child through the legal services institutions.
- Board conducts at least one inspection visit every month of residential facilities for children in conflict with law and recommends action for improvement in quality of services to the District Child Protection Unit and the state government.
- Children in conflict with the law are facilitated in Observation Homes and Special Homes.

Functioning of CBI

Syllabus: GS2/Polity and Governance

Context

- The Supreme Court has rejected the Centre's contention that it has no authority over the Central Bureau of Investigation (CBI).

Background

- The Supreme court was dealing with a suit filed by the state of West Bengal under Article 131 of the constitution, accusing the Union government of "interfering" in cases originating within the state's jurisdiction by unilaterally authorizing the CBI to probe them.
- West Bengal said the Centre continues to employ the CBI despite withdrawal of general consent to CBI investigations within its territory under Section 6 of the Delhi Special Police Establishment (DSPE) Act, 1946.

Central Bureau of Investigation (CBI)

- CBI, functioning under the Ministry of Personnel, Pension & Public Grievances, Government of India, is the premier investigating police agency in India.
- History: The CBI came into being during World War II, when the colonial government felt the need to probe cases of corruption in the War and Supply Department. A law came in 1941. It became the DSPE Act in 1946.
- It was established by a resolution of the Ministry of Home Affairs, Government of India, in 1963.
- The Santhanam Committee on Prevention of Corruption recommended the establishment of the CBI.
- Functions: CBI was established with a view to investigate serious crimes related to the defense of India, corruption in high places, serious fraud, cheating, and embezzlement and social crime, particularly hoarding, black marketing, and profiteering in essential commodities, having all-India and inter-state ramifications.
- It is also the nodal police agency in India that coordinates investigations on behalf of Interpol member countries.
- Jurisdiction: CBI derives power to investigate from the Delhi Special Police Establishment Act, 1946.
- Section 2 of the Act vests DSPE with jurisdiction to investigate offenses in the Union Territories only.
- The jurisdiction can be extended by the Central Government to other areas including Railway areas and States under Section 5(1) of the Act, provided the State Government accords consent under Section 6 of the Act.

How many types of consent are there for the CBI?

- There are two types of consent for a probe by the CBI. These are: general and specific.
- When a state gives a general consent to the CBI for probing a case, the agency is not required to seek fresh permission every time it enters that state in connection with investigation or for every case.
- Specific Consent: When a general consent is withdrawn, CBI needs to seek case-wise consent for investigation from the concerned state government.
- If specific consent is not granted, the CBI officials will not have the power of police personnel when they enter that state.

Issues in functioning of CBI

- Legislative Problems: The conduct or continuance of investigation into offenses committed within the territory of a state, consent of the state is required which most of the time is delayed or even denied.
- Political Issues: In 2013, the Supreme Court described the CBI as "a caged parrot speaking in its master's voice" (Politicization of CBI).
- The observation was made in the context of government interference in the functioning of the CBI in its investigation of the coal blocks allocation cases.
- Transparency Issues: The CBI is exempted from the purview of the Right to Information (RTI) Act, 2005.
- Overlapping Functions: There is an overlap in jurisdictions of Central Vigilance Commission (CVC), CBI and Lokpal in certain cases leading to problems.

Way Ahead

- The role, jurisdiction and legal powers of the CBI need to be clearly laid down. It will give it goal clarity, role clarity, autonomy in all spheres and an image makeover as an independent autonomous statutory body.
- The Second Administrative Reforms Commission (2007) also suggested that "a new law should be enacted to govern the working of the CBI".
- The 19th and 24th reports of the parliamentary standing committees (2007 and 2008) recommended that "the need of the hour is to strengthen the CBI in terms of legal mandate, infrastructure and resources".

16th Finance Commission

Syllabus: GS2/Polity

Context

- The 16th Finance Commission invited suggestions from the general public, institutions and organisations on relevant issues for it and those related to its terms of reference.

About Finance Commission

- Under Article 280 of the Constitution, the President of India is required to constitute a Finance Commission at an interval of five years or earlier.
- Members: It has a chairman and four members appointed by the President.
- Function: It determines the method and formula for distributing the tax proceeds between the Centre and states, and among the states as per the constitutional arrangement and present requirements.
- Significance: The recommendations of the Finance Commission are important in determining the fiscal relations between the central and state governments.
- The idea is to ensure a fair and equitable distribution of financial resources.

16th Finance Commission

- The advance cell for the 16th Finance Commission was established in 2022.
- Arvind Panagariya is appointed as the Chairman of Sixteenth Finance Commission.
- It shall make recommendations as to the following matters:
- The distribution between the Union and the States of the net proceeds of taxes and the allocation between the States of the respective shares of such proceeds;
- The principles which should govern the grants-in-aid of the revenues of the States out of the Consolidated Fund of India.
- The measures needed to augment the Consolidated Fund of a State to supplement the resources of the Panchayats and Municipalities in the State on the basis of the recommendations made by the Finance Commission of the State.

Floor Test

Syllabus: GS2/Indian Polity

Context

- Recently, it was found that Haryana is facing a 'Floor Test' amidst independent MLAs withdrawing support from the government.

About Floor Test (aka Trust Vote)

- It is a constitutional mechanism used to determine whether the incumbent government enjoys the support of the legislature.
- Under it, a Chief Minister appointed by the Governor can be asked to prove majority on the floor of the Legislative Assembly.
- It is primarily taken to know whether the executive enjoys the confidence of the legislature.

Do you know?

1. The appointed chief minister usually belongs to the single largest party or the coalition which has the 'magic number'.
2. The magic number is the total number of seats required to form a government, or stay in power. It is the half-way mark, plus one.
a. In case of a tie, the Speaker casts the deciding vote.

Composite Floor Test

– It is conducted only when more than one person or party stakes a claim to form the government.
– When the majority is not clear, the governor might call for a special session to see who has the majority.
– The majority is counted based on those present and voting and this can be done through voice vote also.

Role of the Governor

- Under Article 175(2), the Governor can summon the House and call for a floor test to prove whether the government has the numbers.
- However, the Governor can exercise the above only as per Article 163 of the Constitution which says that the Governor acts on the aid and advice of the Council of Ministers headed by the Chief Minister.
- Article 174(2)(b) of the Constitution gives powers to the Governor to dissolve the Assembly on the aid and advice of the cabinet.
- When the Assembly is not in session, the Governor's residuary powers under Article 163 allow him to call for a floor test.
- But, when the Assembly is in session, it is the Speaker who can call for a floor test.

Inter-Services Organisations (ISOs) (Command, Control, and Discipline) Act

Syllabus: GS3/Defence, GS2/ Governance

Context

- The Government has notified the Inter-Services Organisations (ISOs) (Command, Control, and Discipline) Act to be enforced from May 10, 2024.

About

- In order to bolster effective command, control and efficient functioning of Inter-Services Organisations (ISOs), the bill was passed by both the Houses of Parliament during the Monsoon Session of 2023.
- Inter-services organisations include soldiers from the Army, the Air Force and the Navy, like joint training institutes National Defence Academy, National Defence College (NDC), Defence Services Staff College (DSSC), and the Andaman and Nicobar Command (ANC).

Key Provisions

- Inter-services Organisation: Existing Inter-services Organisations will be deemed to have been constituted under the Act.
- The central government may constitute an Inter-services Organisation which has personnel belonging to at least two of the three services: the army, the navy, and the air force.
- Control of Inter-services Organisations: It empowers the Commander-in-Chief or the Officer-in-Command of an Inter-services Organisation to exercise command and control over the personnel serving in or attached to it.
- He would be responsible for maintaining discipline and ensuring proper discharge of duties by the service personnel.
- The supervision of an Inter-services Organisation will be vested in the central government.
- Commander-in-Chief: The officers eligible to be appointed as the Commander-in-Chief or Officer-in-Command are:
- a General Officer of the regular Army (above the rank of Brigadier),
- a Flag Officer of the Navy (rank of Admiral of the Fleet, Admiral, Vice-Admiral, or Rear-Admiral), or an Air Officer of the Air Force (above the rank of group captain).
- Commanding Officer: The Act provides for a Commanding Officer who will be in command of a unit, ship, or establishment.

- The officer will also perform duties assigned by the Commander-in-Chief or Officer-in-Command of the Inter-services Organisation.
- The Commanding Officer will be empowered to initiate all disciplinary or administrative actions over the personnel appointed, deputed, posted, or attached to that Inter-services Organisation.

Need for the Act

- Theaterisation: The development comes amid a renewed push for theaterisation, a long-awaited military reform for the best use of the military's resources to fight future wars.
- Challenges in Present Framework: At present, armed forces personnel are governed by the provisions of three separate laws for the three services — the Air Force Act, 1950, the Army Act, 1950, and the Navy Act, 1957.
- Only an officer of the same service holds disciplinary powers over persons governed by the respective Act.
- The lack of such powers had a direct impact on command, control and discipline.
- Financial Cost: The existing framework is time-consuming and involves financial costs to move the personnel.
- The proposed legislation aims to address these impediments to ensure discipline is maintained and targets faster disposal of cases, which in turn is likely to save time and public money.

Significance

- With the notification, the Act will empower the heads of ISOs and pave the way for expeditious disposal of cases, avoid multiple proceedings and will be a step towards greater integration and jointness among the armed forces personnel.
- It is imperative to safeguarding national interests in today's complex security landscape.

Use of Mother Tongue in Early Stages of Education

Syllabus: GS2/Governance

Context

- The Central Board of Secondary Education (CBSE) has instructed all its schools to make use of educational material which will focus on learning in one's mother tongue and encourage multilingual education.

Constitutional Provisions/ Laws

- Under Article 350A of the Constitution, the government must try to ensure that children from linguistic minority groups are educated in their mother tongue.
- Article 29(1) states Any section of the citizens residing in the territory of India or any part thereof having a distinct language, script or culture of its own shall have the right to conserve the same.
- Section 29(f) of Chapter V under Right to Education Act, 2009 states that, "medium of instructions shall, as far as practicable, be in child's mother tongue."

Importance of mother tongue in children development

- Early education in the mother tongue could serve as a crucial factor in learning new languages, fostering understanding, confidence and a love for learning.
- It enables a deeper grasp of concepts, encourages critical thinking and strengthens cultural connections.
- India is incredibly diverse linguistically, with hundreds of languages spoken across the country. Children learning in their mother tongue, preserve their cultural heritage and contribute to its continuation for future generations.
- Language plays a significant role in social integration. Children educated in their mother tongue, facilitates better communication within their community and strengthens social bonds.

Steps taken by Government

- The Jharkhand government and UNICEF initiated a pilot programme for multilingual education in 259 schools.
- It involved the development of resources and content in the Ho, Mundari, Khariya, Santali and Kurukh languages spoken by Tribals.

- Odisha's government, with UNICEF, created 'Nua Arunima,' (New Horizons) a mother tongue-based early childhood education curriculum available in 21 languages.
- The National Education Policy 2020 focuses on multilingualism and the use of familiar language for learning until at least Grade 5, but preferably till Grade 8 and beyond.
- The policy recommends preparing textbooks and related reading material in home languages and asks teachers to use them for communication in the classroom.
- The NIPUN Bharat Mission: The Mission Implementation Guidelines suggests that the teaching learning process and development of teaching learning material should be done in mother tongue.

Way Ahead

- In India, a multilingual educational approach that uses familiar languages as a foundation could deliver positive outcomes.
- Effective implementation on the ground requires sustained efforts from diverse stakeholders.
- Empowering teachers through multilingual training, developing mother tongue-based learning materials that are engaging, and supporting local communities in the advocacy of their languages are all crucial steps.

Interim Bail

Syllabus: GS2/Polity and Governance

Context:

- Recently, the Supreme Court of India granted Delhi Chief Minister Arvind Kejriwal interim bail in the liquor policy case till June 1, 2024.

About Interim Bail

- It is a temporary bail granted for a shorter time period during which the court can call the documents to make a final decision on the regular or anticipatory bail application.
- It is granted based on the individual facts of each case.
- In bailable offences, bail is a right and not a favour according to Section 436 of CrPC.
- However, in the case of non-bailable offences, the grant of bail, including interim bail, is at the discretion of the court and is based on several factors including the gravity of the offence, the character of the accused, the likelihood of the accused absconding, etc.

Bail Provisions in India

– The Code of Criminal Procedure (CrPC), 1973 governs the terms of the 'Bail in India'.
– Though the Act does not define 'bail', it expressly mentions phrases 'bailable offence' and 'non-bailable offence'.

Other Types of BailRegular Bail:

– A regular: bail is basically the release of an accused from custody to ensure his presence at the trial.
– Anticipatory Bail: It is a type of bail that is given to someone who is in anticipation of getting arrested for a non-bailable offence by the police.

Affordable Housing Schemes in India (PMAY)

Syllabus: GS2/Governance

Context

- According to the Indian Council for Research on International Economic Relations (ICRIER), India's urban housing shortage rose by 54% from 18.78 million in 2012 to 29 million in 2018.

Housing scenario in India

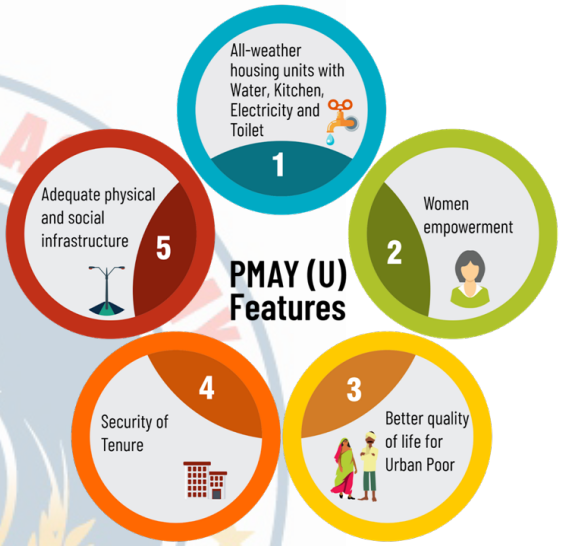
- The 2011 census found that over 65 million people, about 5% of India's total population, lived in slums.
- India has around 1.7 million homeless people, as per the 2011 Census. Even for people with houses, the quality of build, congestion, and inadequate infrastructure remain major concerns.
- As Per the government's definition, affordable housing properties are those with an area not more than 60 sq.m, with the price capped at 45 lakh.

History of housing schemes in India

- A right to housing has been held to be a part of the fundamental right to life under Article 21 of the Constitution by the Supreme Court.
- The first policy intervention from the Government came in 1985, with the Indira Awaas Yojana, which was focused on rural housing.
- Urban housing came into focus with programmes such as the Jawaharlal Nehru National Urban Renewal Mission (JNNURM), launched in 2005.
- In 2008, the Parekh Committee report on housing led to urban housing interventions such as the Rajiv Awas Yojana and Rajiv Rinn Yojna.
- The Housing for All schemes (2015-22) were launched with two wings
- Pradhan Mantri Awas Yojana- Gramin (PMAY-G) and,
- Pradhan Mantri Awas Yojana-Urban (PMAY-U).

What is PMAY-U?

- The Ministry of Housing and Urban Affairs (MoHUA) launched the Pradhan Mantri Awas Yojana – Urban (PMAY-U) in 2015, as a flagship Mission of the Government of India.
- Objective: It addresses urban housing shortage among the Economically Weaker Section (EWS)/Low Income Group (LIG) category including the slum dwellers by ensuring a pucca house to eligible urban households.
- Components of the scheme are as;
- In-situ Slum Redevelopment (ISSR)
- Credit Linked Subsidy Scheme (CLSS)
- Affordable Housing in Partnership (AHP)
- Beneficiary-led Individual House Construction/ Enhancement (BLC-N/ BLC-E)
- Implementation period: The scheme was earlier from 25.06.2015 to 31.03.2022. Now it has been extended up to 31.12.2024, except Credit Linked Subsidy Scheme (CLSS) vertical, to complete all the houses sanctioned under the scheme.



Status of the PMAY

- Around 83% of the houses to be constructed under PMAY-U are not meant for the urban landless poor, but rather for families having access to capital and land.
- The slum rehabilitation scheme within PMAY-U has sanctioned only 2.96 lakh homes.
- Under PMAY-G more than 2.94 crore houses have already been sanctioned to the eligible beneficiaries by the States/UTs and over 2.55 crore houses have already been completed as on 01.02.2024.

What is PMAY-G?

- The Ministry of Rural Development is implementing Pradhan Mantri Awaas Yojana- Gramin (PMAY-G) to provide assistance to eligible rural households with an overall target to construct 2.95 crore pucca houses with basic amenities.
- The beneficiaries are provided financial Assistance of Rs.1.20 lakh in plain areas and Rs.1.30 lakh in hilly States.

Schemes launched by the State

- The Andhra Pradesh government has undertaken schemes such as the Navaratnalu-Pedalandariki Illu.
- Under this, the State had taken up construction of 21.76 lakh houses, with an outlay of 56,700 crore.

Challenges in implementation of the schemes

- Acquiring land for housing projects at affordable rates, especially in urban areas, poses a significant challenge.
- Identifying and verifying eligible beneficiaries is a complex process. Many potential beneficiaries are not aware of the PMAY.

- Delays in implementation of the projects due to lack of funds, bureaucratic red tape etc.
- The PMAY-U promised houses for 1.18 crore families by December 2024. As of March 2024, it has only achieved around 67% of its target, that is, around 80 lakh.

Way Ahead

- Continuous monitoring and evaluation of the scheme's progress are essential to identify bottlenecks, measure outcomes, and make necessary course corrections.
- Also Incorporating sustainability measures and environmental considerations into housing projects is important for long-term viability.
- Ensuring equitable distribution and addressing the needs of marginalized communities are critical for the success of PMAY.

Juvenile Justice Act

Syllabus: GS2/Governance

Context

- The Supreme Court has attempted to plug significant gaps in the Juvenile Justice (Care and Protection of Children) Act (JJA), 2015.

Background

- The SC was dealing with an appeal in a criminal case involving charges of rape and wrongful confinement under the Indian Penal Code (IPC) and the Protection of Children from Sexual Offences Act (POCSO).
- The case in question revolved around an appeal against the Children's Court's decision to treat the appellant as an adult rather than a "child in conflict with law" — a term used when a minor is accused of an offense.
- A Session Court deals with ordinary criminal offenses, while a Children's Court is a specialized court that deals with heinous offenses involving minors.

Juvenile Justice Act, 2015

- It was introduced and passed in Parliament in 2015 to replace the Juvenile Delinquency Law and the Juvenile Justice (Care and Protection of Children Act) 2000.
- The Act seeks to achieve the objectives of the United Nations Convention on the Rights of Children as ratified by India on December 11, 1992.
- It allows the trial of juveniles in conflict with the law in the age group of 16-18 years as adults, in cases where the crimes were to be determined.

Procedures for handling legal violations by minors

- The JJA outlines procedures for handling legal violations by minors, managed by the Juvenile Justice Board (JJB), which also fulfills various socio-legal roles.
- According to the JJA, a minor who encounters the criminal justice system due to an alleged offense is identified as a "child in conflict with law".
- In such cases, the case is presented before the JJB.
- The JJB is endowed with the authority to adjudicate matters concerning minors, ensure they have access to legal representation, and oversee the conditions of juvenile residential establishments.
- Should the board conclude that the minor should face trial as an adult, it will issue an order to that effect, which is subsequently forwarded to the Children's Court for a final decision.

Supreme Court Judgement

- The supreme court ruled that an appeal against the JJB order should be filed within 30 days and also made it mandatory for the board to mention details, such as reasons for adjourning the hearing in a case in its orders.
- The court also addressed the interchangeable use of "Children's Court" and "Court of Sessions" within the Act, noting the frequent absence of a clear appellate process.
- If Children's Court is available, even if the appeal is said to be maintainable before the Sessions Court, it has to be considered by the Children's Court.

- Whereas, where no Children's Court is available, the power is to be exercised by the Sessions Court.
- This ensures that minors have the opportunity to appeal decisions in situations where the alternate court was not previously specified.

SC outlines State's Duty Before Acquiring Private Property

Syllabus: GS2/Polity and Governance

Context

- The Supreme Court underscored the constitutional safeguards required before the State can acquire private property.

About

- It is a step to protect private property from arbitrary state takeover for a public purpose.
- The judgement highlighted the necessity of adhering to fair procedures and upholding the rights of property owners under the Indian Constitution.
- The compulsory acquisition without following mandatory procedures followed by a grant of compensation to the owners will not make the accession constitutional.

Major Highlights of the Judgement

- As per th SC, The right to property is protected as a constitutional right and has even been interpreted to be a human right.
- It is generally assumed that for a valid acquisition all that is necessary is to possess the power of eminent domain [power of the sovereign to acquire property of an individual for public use without consent] to acquire, followed by grant of reasonable and fair compensation.
- Article 300 A: The court stated that procedural justice is a cornerstone of Article 300A when the acquisition of private property by the State is for a public purpose and on the payment of compensation.
- The phrase 'authority of law' in the Article should not be understood as merely the power of eminent domain vested in the state.
- The requirement of a 'law' in Article 300A does not end with the mere presence of a legislation which empowers the state to deprive a person of his property.
- Seven basic rights: The court laid down seven basic procedural rights of private citizens which constitute the "real content of the right to property under Article 300A" that the state should respect before depriving them of their private property.
- They include, the right to notice or the duty of the state to inform the person that it intends to acquire his property;
- the right of the citizen to be heard or the duty of the state to hear the objections to the acquisition;
- the right of the citizen to a reasoned decision or the duty of the state to inform the person of its decision to acquire property;
- the duty of the state to demonstrate that the acquisition is exclusively for public purpose; the right to fair compensation of the citizen;
- the duty of the state to conduct the process of acquisition efficiently and within prescribed timelines;
- and finally, the conclusion of the proceedings leading to vesting or the right of conclusion.

Significance of the Judgement

- The ruling not only clarified the State's obligations but also strengthened the procedural protections afforded to property owners, reinforcing the constitutional principles of justice and fairness in property rights.

Right to Property

– Since the Constitution of India came into force, the right to property was given fundamental status.
a. Article 31 and Article 19(1)(f) ensured that any person's right against his property remains protected.
– But by the Constitutional 44th Amendment act 1978, these two above-mentioned articles were deleted and were added in Part XII, containing only one article 300A.
a. The legal status of the Right to Property was changed from the fundamental right to constitutional right.
– In Jilubhai Nanbhai Khachar v. State of Gujrat, it was held that the Right to property u/A 300A is not a basic structure of the Constitution. It is only a constitutional right.

Supreme Court limits ED's power to arrest PMLA accused

Syllabus: GS2/Polity and Governance

Context

- The Supreme Court held that a person summoned by a designated special court under the Prevention of Money Laundering Act (PMLA), is presumed to be not in custody and need not apply for bail.

About Prevention of Money Laundering Act (PMLA) 2002

- The Parliament enacted the PMLA as a result of international commitment to deal with the menace of money laundering.

Provisions:

- Sec. 3 of PMLA defines the offense of money laundering as any process or activity connected with the proceeds of crime and projecting it as untainted property.
- Prescribe obligation: PMLA prescribes the obligation of banking companies, financial institutions and intermediaries for verification and maintenance of records of the identity of all its clients.
- Empowerment of officers: PMLA empowers Directorate of Enforcement to carry out investigations in cases involving offense of money laundering and also to attach the property involved in money laundering.
- Special Courts: It envisages the designation of one or more courts of sessions as Special Court to try the offenses punishable under PMLA.
- Agreement for Central Government: It allows the Central Government to enter into an agreement with the Government of any country outside India for enforcing the provisions of the PMLA.

Stringent norms of PMLA

- The twin conditions of bail under Section 45 of the PMLA pose stringent thresholds for an accused.
- For one, the person has to prove in court that he or she is prima facie innocent of the offense.
- Secondly, the accused should be able to convince the judge he would not commit any offense while on bail. The burden of proof is entirely on the incarcerated accused.
- The twin conditions make it almost impossible for an accused to get bail under the PMLA.

Supreme Court Judgment

- The judgment limits the power of arrest by the Directorate of Enforcement (ED) after a special court takes cognisance of a case.
- The ED would have to separately apply for the custody of a person who appears in court. The Central agency would have to show specific grounds that necessitated custody.
- However, when the ED wants to conduct a further investigation concerning the same offense, it may arrest a person not shown as an accused in the complaint filed under Section 44(1)(b) of the PMLA, provided the requirements of Section 19 (procedures of arrest) under the Act were fulfilled.
- Section 19 of the PMLA allows ED officers to arrest an individual "on the basis of material in possession (and) reason to believe (to be recorded in writing) that the person is guilty".
- An accused, who appears in a special court pursuant to its summons, could be exempted from personal appearance in the future.
- On the other hand, if an accused does not appear after a summons is served, the special court could issue a bailable warrant followed by a non-bailable one.

Directorate of Enforcement (ED)

– The Directorate of Enforcement is a multi-disciplinary organization mandated with investigation of offenses of money laundering and violations of foreign exchange laws.
– It functions under the Department of Revenue of the Ministry of Finance.
– The origin of this Directorate goes back to 1st May, 1956, when an 'Enforcement Unit' was formed in the Department of Economic Affairs for handling Exchange Control Laws violations under Foreign Exchange Regulation Act, 1947 (FERA '47).
– In 1957, this Unit was renamed as 'Enforcement Directorate', and another branch was opened at Madras (now Chennai).
– In 1960, the administrative control of the Directorate was transferred from the Department of Economic Affairs to the Department of Revenue.

Open Network for Digital Commerce (ONDC)

Syllabus: GS2/Government Policies & Interventions

Context

- Recently, the Department for Promotion of Industry and Internal Trade (DPIIT) organised the 'ONDC Startup Mahotsav' in collaboration with the Open Network for Digital Commerce (ONDC) and Startup India.

About ONDC

- It is a network based on open protocol that enables local commerce across various segments such as mobility, grocery, food order and delivery, hotel booking, and travel, among others.
- It allows these services to be discovered and engaged by any network-enabled application.
- It aims to democratise and revolutionise the e-commerce landscape in the country.
- It recognises the unique opportunity to increase e-retail penetration from the existing 4.3% to its maximum potential.
- It facilitates the rapid adoption of e-commerce, alongwith the boosts and strengthens the growth of startups in India.

Key Pillars of ONDC

- Buyer-Side Apps: The demand side of any transaction where the transaction originates.
- Seller-Side Apps: The supply side of any transaction. Publish sellers' catalogue of goods and services and fulfil buyer orders.
- Adaptor Interfaces: Adaptor interfaces are the open APIs developed based on the open-source interoperable specification of Beck protocol.
- Gateway: Application that will ensure discoverability of all sellers in the network by multicasting the search request received from the buyer application.
- Open Registries: Application(s) that maintains the list of participants who join ONDC, list of network policies, etc.

Impact

- ONDC provides opportunities to accelerate growth for all entities engaged in e-commerce.
- It has already made a significant impact with over 4.27 lakh sellers/service providers and 10 domains live on the network.
- It has also facilitated the rapid adoption of products and services and achieving scale in go-to-market efforts.

Why can accused persons in prison contest polls but not vote?

Syllabus: GS2/Polity and Governance

Context

- Amritpal Singh, the jailed head of the pro-Khalistan outfit Waris Punjab de, announced his intention to contest the Lok Sabha elections.

Background

- In 1975, the Supreme Court in the case of Indira Gandhi v Raj Narain recognised that free and fair elections are a part of the 'basic structure' of the Constitution of India.
- However the Supreme Court has held that the rights to elect and be elected do not enjoy the same status.
- In 2006, in the case of Kuldip Nayar v. Union of India the supreme court held that the right to vote (or the right to elect) is "pure and simple, a statutory right".
- This means that voting is not a fundamental right and can be repealed.
- The same was held for the right to be elected by the Bench, ruling that laws enacted by Parliament could regulate both these statutory rights.

Bar against contesting elections

- Section 8 of the Representation of People Act, 1951 (RP Act) is titled "Disqualification on conviction for certain offenses".
- If a person is convicted of any of the offenses in the exhaustive list provided in the provision, they will be disqualified from contesting elections to Parliament or state legislatures from the date of conviction onwards and face further a six-year disqualification from contesting in elections beginning from the date of their release.
- This disqualification only kicks in once a person has been convicted and does not apply if they have only been charged with criminal offenses.

Exceptions to disqualification

- The Election Commission of India (ECI) is empowered under Section 11 of the RP Act to "remove" or "reduce" the period of disqualification.
- In 2019 the Supreme Court held that once a conviction is stayed "the disqualification which operates as a consequence of the conviction cannot take or remain in effect".

Bar against the right to vote

- Section 62 of the RP Act provides a series of restrictions on the right to vote.
- Its sub-clause (5) which states in broad terms "No person shall vote at any election if he is confined in a prison, whether under a sentence of imprisonment or transportation or otherwise, or is in the lawful custody of the police".
- With an exception provided for those in preventive detention, this provision effectively bars every individual who had criminal charges framed against them from casting their vote unless they have been released on bail or have been acquitted.

Anukul Chandra Pradhan, Advocate, Supreme Court v. Union of India, 1997

- The Supreme Court in this case rejected a challenge to Section 62(5) on four grounds that;
- The right to vote was a statutory right and could be subject to statutory limitations.
- There is a "resource crunch" as infrastructure would have to be provided and police would have to be deployed.
- A person in prison because of their conduct "cannot claim equal freedom of movement, speech and expression".
- Restrictions on prisoners' right to vote are reasonable as it is connected to keeping "persons with criminal background away from the election scene".

Chapter-
3

GEOGRAPHY

Water ice Found in Polar Craters of the Moon

Syllabus: GS1/ Geography

In News

- ISRO study has revealed evidence for enhanced possibility of water ice occurrence in the polar craters of the Moon.

Key Findings of the Study

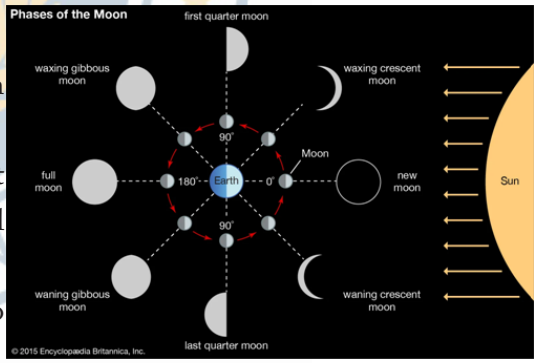
- Source of Ice: The primary source of sub-surface water ice in the lunar poles is outgassing during volcanism in the Imbrian period.
- Presence of Water Ice: There is twice as much water ice in the northern polar region compared to the southern polar region.

Significance

- This study is crucial for supporting ISRO's future in-situ volatile exploration plans on the Moon and long-term human presence.
- The findings of this study also supports the earlier study of Chandrayaan-2 related to presence of water on the moon.

Related Facts on the Moon

– The Moon is the only natural satellite orbiting Earth.
– The Moon has a diameter of approximately 3,474 kilometers, which is about one-quarter the size of Earth.
– The Moon's gravity is about one-sixth of Earth's gravity. However, it plays a significant role in creating tides on Earth due to the differential gravitational pull on different parts of the planet.
– The Moon exhibits different phases throughout the month due to its relative positions with Earth and the Sun.



– India has undertaken three lunar missions, Chandrayaan-1 (2008), Chandrayaan-2 (2019) &.Chandrayaan-3 (2023). These missions have contributed to our understanding of the Moon's composition, mineralogy, potential resources & soft landing on the moon's South pole.

Volcanism on Venus

Syllabus: GS1/Natural Phenomena

Context

- Recently, researchers detected evidence of volcanic eruption on Venus' surface using data from NASA's Magellan mission provided by NASA's Jet Propulsion Laboratory.

Planet Venus

– Earth's Twin: Venus is Earth's closest planetary neighbour which is similar in structure but slightly smaller than Earth.
a. It is the second planet from the sun.
– Thick & Toxic Atmosphere: Venus has an atmosphere 50 times denser than Earth.
a. It is wrapped in a thick, toxic atmosphere filled with carbon dioxide that traps in heat.
– Inhabitable: Venus is the hottest planet in the solar system. The temperature of Venus is too high (about 471°C), and its atmosphere is highly acidic.
– Other Features: It has no moons and no rings.
a. Venus' solid surface is a volcanic landscape covered with extensive plains featuring high volcanic mountains and vast ridges.
b. It spins from east to west, the opposite direction from all other planets in our solar system but the same as Uranus.

Volcanism on Venus

- The Magellan Mission of NASA, launched in 1989, provided crucial insights into Venus' geology. The spacecraft used Synthetic Aperture Radar to map 98% of Venus' surface between 1990 and 1992 that revealed features that hinted at a tumultuous volcanic past.

Specific Sites

- Sif Mons: A volcano approximately 200 miles (300 km) wide located in the Eistla Regio region. It exhibited signs of eruption during the early 1990s.
- Radar images show a lava flow covering about 12 square miles (30 square km) of rock.
- It changed the perception that Venus is a dormant world.
- Niobe Planitia: A large volcanic plain where approximately 17 square miles (45 square kilometres) of rock were produced by lava flow.

Venusian Volcanic Activity

- A 2023 study revealed that a volcanic vent on Maat Mons in a region called Atla Regio expanded and changed shape during the Magellan mission.
- Maat Mons: In 2023, Magellan's Radar images captured changes near the volcano Maat Mons.
- These changes indicated a recent eruption, providing direct geological evidence of volcanic activity on Venus.
- The outflow of molten rock filled the vent's crater and spilled down its slopes.

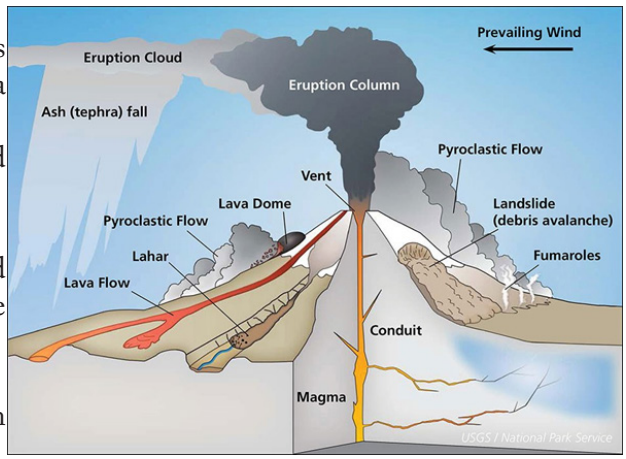
Implications

- Venus' Evolution: The discovery of recent volcanism suggests that Venus may be more volcanically active than previously thought.
- Understanding its volcanic history helps explain why Venus took a different evolutionary path than Earth.
- Climate Alterations: Massive volcanic outpourings in Venus' ancient past likely altered its climate.
- Venus boasts scorching surface temperatures and a thick atmosphere that may have originated from intense volcanic activity.

Volcanoes

– It is a vent or fissure in Earth's crust through which lava, ash, rocks, and gases erupt. It can be active, dormant or extinct.
– An eruption takes place when magma (a thick flowing substance), formed when the earth's mantle melts, rises to the surface.
– The magma is lighter than solid rock, it is able to rise through vents and fissures on the surface of the earth.
a. After it has erupted, it is called lava.
– Not all volcanic eruptions are explosive since explosivity depends on the composition of the magma.

Types and Characteristics



– Cinder Cones: These are small, steep-sided volcanoes formed by the accumulation of volcanic fragments around a single vent.
a. Eruption Style: They erupt mostly small pieces of scoria and pyroclastics.
b. Example: Capulin Volcano in New Mexico.
– Composite Volcanoes (Stratovolcanoes): These are tall and steep with layers of lava, ash, and rock debris. They often have a conical shape.
a. Eruption Style: High-viscosity lava, ash, and rock debris.
b. Examples: Mount Rainier in Washington, Mount Fuji in Japan.
– Shield Volcanoes: These have gentle slopes and are shaped like a bowl or shield. They result from basaltic lava flows.
a. Eruption Style: Low-viscosity lava that can flow great distances from the vent.
b. Examples: Mauna Loa in Hawai'i, Iceland's volcanic chain.
– Lava Domes: These form when thick, viscous lava accumulates near the volcanic vent. They have steep sides.
a. Eruption Style: Slow eruptions of highly viscous lava.
b. Example: Novarupta dome in Alaska.

Landslide Vulnerability in India

Syllabus: GS1/Geography

Context

- Heavy rain caused by the cyclone Remal triggered landslides in several places in Meghalaya, Mizoram, Assam, and Nagaland.

What is Landslide?

- Landslides are a geological phenomenon that involves the sudden and rapid movement of a mass of rock, soil, or debris down a slope under the influence of gravity.
- Landslides, usually, occur in areas having characteristics like Steep terrain such as hilly or mountainous areas, Presence of joints and fissures or areas where surface runoff is directed or land is heavily saturated with water.

Landslide vulnerability in India

- According to the Geological Survey of India (GSI) about 0.42 million square km of India's landmass, or about 13% of its area, spread over 15 states and four Union Territories, is prone to landslides.
- About 0.18 million square km, or 42% of this vulnerable area is in the Northeastern region, where the terrain is mostly hilly.
- This area is also prone to earthquakes, which too, are a major trigger for landslides.

Causes of Landslides

Natural Causes:

- Heavy Rainfall: Heavy rainfall is one of the most common triggers of landslides. It increases pore water pressure as well as the weight of soil by making it saturated.
- Erosion: Clay and vegetation present within the soil or rock act as cohesive elements and help bind particles together. By removing these cohesive elements, erosion makes an area more prone to landslides.
- Earthquakes: Intense ground shaking due to earthquakes causes instability in rocks and soils, thus triggering landslides.
- Volcanic Eruptions: Ash and debris deposited by volcanic eruptions overload slopes while the accompanied seismic activity causes instability.

Anthropogenic Causes

- Deforestation: By holding soils as well as obstructing the flow of falling debris, vegetation cover plays an important role in preventing landslides in any area. Deforestation takes away this preventive cover and increases vulnerability to landslides.
- Encroachment in Vulnerable Terrains: Of late, humans have been encroaching in landslide-prone areas such as hilly terrains. This has led to increased construction activities in these areas and increased chances of landslides.
- Uncontrolled Excavation: Unauthorized or poorly planned excavation activities, such as mining, quarrying, etc destabilize slopes and increase the chances of landslides.
- Climate Change: Climate change caused by various anthropogenic activities has led to abrupt alterations in precipitation patterns and increased frequency of extreme weather events.

Measures taken in India

- The Disaster Management Act, of 2005 provides a comprehensive legal and institutional framework for the management of various disasters including landslides.
- The National Landslide Risk Management Strategy (2019) covers all aspects of landslide disaster risk reduction and management, such as hazard mapping, monitoring, and early warning systems.
- The National Disaster Management Authority (NDMA) has issued Guidelines on Landslide Hazard Management (2009) that outline the steps that should be taken to reduce the risk of landslides.
- The National Institute of Disaster Management (NIDM) has been providing capacity building and other support to various national and state-level disaster management authorities.
- Early Warning system: Efforts have been made towards better prediction of weather. E.g. Ensemble Prediction System. This will help predict disasters like landslides.

Way Ahead

- Every mountainous area has a carrying capacity. However development is essential, and one cannot stop the creation of infrastructure.Hence sustainability has to be factored in, so that the load does not exceed the carrying capacity.
- The National Disaster Management Authority (NDMA) has been working with GSI and other agencies to mitigate and manage the risks from landslides.

IMD's forecast for El Niño-Southern Oscillation (ENSO)

Syllabus :GS 1/Geography

In News

- India Meteorological Department (IMD) said that El Nino Southern Oscillation (ENSO) neutral conditions would emerge in June and during July – September, ENSO would transition into La Nina.

Key Points

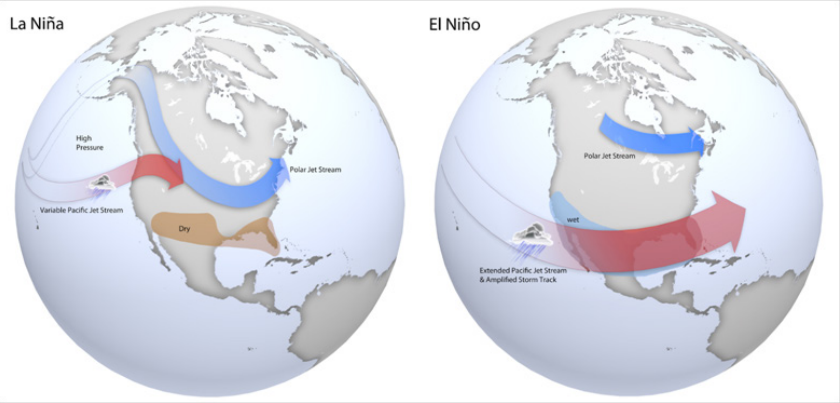
- South peninsular and central India is expected to receive 'above' normal rainfall, northwest India would receive normal rainfall whereas east and northeast India is expected to receive below average rainfall during the June – September period.

About El Niño-Southern Oscillation (ENSO)

- It is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean.
- In periods ranging from about three to seven years, the surface waters across a large swath of the tropical Pacific Ocean warm or cool by anywhere from 1°C to 3°C, compared to normal.
- This oscillating warming and cooling pattern, referred to as the ENSO cycle, directly affects rainfall distribution in the tropics and can have a strong influence on weather across different parts of the world.
- ENSO is one of the most important climate phenomena on Earth due to its ability to change the global atmospheric circulation, which in turn, influences temperature and precipitation across the globe.

ENSO phases and Impacts

- El Niño: A warming of the ocean surface, or above-average sea surface temperatures (SST), in the central and eastern tropical Pacific Ocean.
- Over Indonesia, rainfall tends to become reduced while rainfall increases over the central and eastern tropical Pacific Ocean.
- The low-level surface winds, which normally blow from east to west along the equator ("easterly winds"), instead weaken or, in some cases, start blowing the other direction (from west to east or "westerly winds").



- In general, the warmer the ocean temperature anomalies, the stronger the El Niño (and vice-versa).
- La Niña: A cooling of the ocean surface, or below-average sea surface temperatures (SST), in the central and eastern tropical Pacific Ocean.
- Over Indonesia, rainfall tends to increase while rainfall decreases over the central and eastern tropical Pacific Ocean.
- The normal easterly winds along the equator become even stronger. In general, the cooler the ocean temperature anomalies, the stronger the La Niña (and vice-versa).
- Neutral: Neither El Niño or La Niña. Often tropical Pacific SSTs are generally close to average.
- However, there are some instances when the ocean can look like it is in an El Niño or La Niña state, but the atmosphere is not playing along (or vice versa).

Repercussions for India

- The El Nino Southern Oscillation (ENSO) has had a greater impact on northern parts of India, lesser impact on the central parts and relatively constant impact on the southern parts of the country in recent decades.
- The warming phase known as the El Nino is generally known to suppress monsoon rainfall while the cooling phase known as the La Nina generally enhances monsoon rainfall.
- Even though there are multiple other factors, like the monsoon low pressure systems and depression, which affect the monsoon rainfall, La Nina is one of the major factors.
- In a La Nina year, one could expect above normal rainfall.

Denotified and Nomadic Tribes

Syllabus: GS1/Human Geography

Context

- Denotified and Nomadic Tribes, a group of marginalised communities across Andhra Pradesh, have been silently suffering neglect and caste-based discrimination for centuries.

About

- According to a report published by the National Commission for Denotified, Nomadic and Semi-Nomadic Tribes in 2008, there are 59 Denotified communities and 60 nomadic tribes in Andhra Pradesh.
- They continue to battle impoverished conditions and social stigma.
- Of DNT communities, Lambadas (STs) are the most vocal and visible, followed by Vadderas (BCs) in government sector and political spheres.
- The other communities, including Yanadis, Yerukulas, Nakkalas, Pamulollu and those falling in the SC group, rarely get their voices heard.

Nomadic, Semi Nomadic, and Denotified Tribes (NTs, SNTs, and DNTs)

- Nomadic and semi-nomadic communities are defined as those who move from one place to another rather than living at one place all the time.

- Denotified tribes (DNTs) are communities that were 'notified' as being 'born criminal' during the British regime under a series of laws starting with the Criminal Tribes Act of 1871.
- While most DNTs are spread across the Scheduled Castes (SC), Scheduled Tribes (ST) and Other Backward Classes (OBC) categories, some DNTs are not covered in any of the SC. ST or OBC categories.

Background

- The term 'De-notified Tribes' stands for all those communities which were once notified under the Criminal Tribes Acts, enforced by the British Raj between 1871 and 1947.
- These Acts were repealed by the Independent Indian Government in 1952, and these communities were "De-Notified". A few of these communities which were listed as de-notified were also nomadic.
- Terms such as nomads and semi-nomads are applied to social groups who undertook a fairly frequent, usually seasonal physical movement as port of their livelihood strategy in the recent past.
- The distinction between nomads and semi-nomods do not involve distinguishable ethnic categories or social groups, it rather describes the degree of mobility practiced by them.

Status in India

- It has been estimated that South Asia has the world's largest nomadic population.
- In India, roughly 10 percent of the population is Denotified and Nomadic.
- While the number of Denotified Tribes is about 150, the population of Nomadic Tribes consists of about 500 different communities.
- While the Denotified Tribes have almost settled in various States of the country, the Nomadic Communities continue to be largely nomadic in pursuit of their traditional professions.

Challenges faced by NTs, SNTs, and DNTs

- Lack of Recognition and Documentation: Denotified communities lacking citizenship documents, which makes their identity invisible and causes hindrances in obtaining government benefits, constitutional, and citizenship rights.
- Limited Political Representation: Inadequate representation for these communities making it challenging for them to voice their concerns and advocate for their rights.
- Social Stigma and Discrimination: NTs, SNTs, and DNTs often face discrimination and social stigma, both due to their historical denotified status and their distinct way of life.
- Economic Marginalization: Lack of access to resources, markets, and employment opportunities results in economic marginalization of these communities.
- Educational Deprivation: Educational opportunities for these tribes are limited, leading to high illiteracy rates.

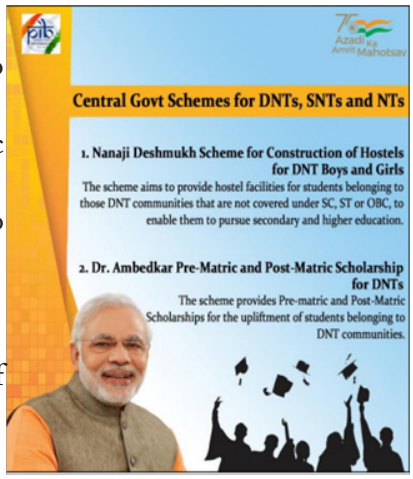
Idate Commission

- In 2014 , a National Commission for Denotified, Nomadic and Semi Nomadic Tribes was constituted under the Chairmanship of Bhiku Ramji Idate for a period of three years.
- The commission has given the following recommendations;
- There is a need to identify challenges faced by the NTs, SNTs, and DNTs owing to the stigma imposed by the enactment of the Criminal Tribes Act, 1871 and later by the Habitual Offenders Act, 1952 and figure out a way to modify discriminatory provisions of the latter.
- It also suggested the non-inclusion of DNTs/NTs/SNTs under the SC/ST/OBC and formulation of specific policies for the former, among many others.
- Setting up a permanent commission for Nomadic, Semi Nomadic, and Denotified Tribes (NTs, SNTs, and DNTs) in India.
- It stressed on taking measures to discern hurdles endured by the communities in availing basic facilities such as education, employment, health care, and legal documents, among others.

Steps taken by government

- Based on the recommendations of the Idate Commission the Government of India constituted the Development and Welfare Board for DNTs, SNTs &NTs (DWBDNCs) in 2019.

- A committee has also been set up by the NITI Aayog to complete the process of identification of the De-Notified, Nomadic and Semi-Nomadic Communities (DNCs).
- Scheme for Economic Empowerment of DNTs (SEED): The scheme was launched in 2022 for the welfare of Denotified, Nomadic and Semi Nomadic Communities.
- Budget: The Ministry has been allocated Rs. 200 crore for this scheme to be spent over five financial years from 2021-22 to 2025-26.
- Components: The four components of the Scheme for Economic Empowerment of DNTs are;
- To provide good quality coaching for DNT candidates to enable them to appear in competitive examinations;
- To provide Health Insurance to them;
- To facilitate livelihood initiative at community level; and
- To provide financial assistance for construction of houses for members of these communities.



Way Ahead

- The colonial mindset about the Denotified Tribes having "criminal tendencies" needs to change to ensure their human rights are not violated.
- Proper documentation of their identities needs to be speeded up so that they get the benefits of welfare schemes and the basic needs are provided to them.
- The NHRC has suggested that there is a need to ensure representation of Denotified tribes in parliament, government institutions and higher education to mitigate the challenges faced by them.

National Human Rights Commission (NHRC) of India

– The NHRC is a statutory public body constituted in 1993.
– It is responsible for the protection and promotion of human rights, defined by the act as "Rights Relating to Life, liberty, equality and dignity of the individual guaranteed by the constitution or embodied in the international covenants and enforceable by courts in India.

La Nina and Its Impacts

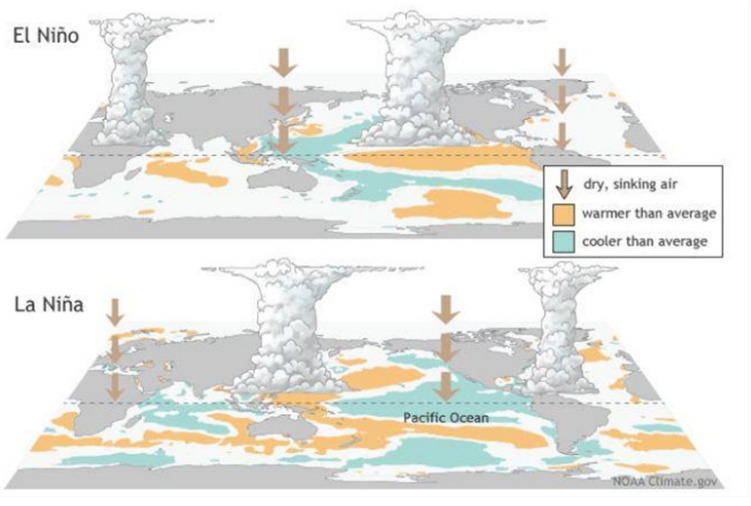
Syllabus: GS1/Climatology

Context

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

About

- El Niño and La Nina are climate phenomena that are a result of ocean-atmosphere interactions, which impact the temperature of waters in the central and eastern tropical Pacific Ocean.
- El Niño events are far more frequent than La Nina ones. Once every two to seven years, neutral ENSO conditions get interrupted by either El Niño or La Nina.
- Coriolis Effect: The Earth's east-west rotation causes all winds blowing between 30 degrees to the north and south of the equator to slant in their trajectory.
- As a result, winds in the region flow towards a southwesterly direction in the northern hemisphere and a northwesterly direction in the southern hemisphere. This is known as the Coriolis Effect.



- Due to this, winds in this belt called trade winds blow westwards on either side of the equator.

- Normal Conditions: During normal conditions in the Pacific ocean, trade winds blow west along the equator, taking warm water from South America towards Asia.
- To replace that warm water, cold water rises from the depths — a process called upwelling.
- The warmer surface waters near Indonesia create a region of low-pressure area, causing the air to rise upwards. This also results in formation of clouds and heavy rainfall.
- The air flow also helps in building up the monsoon system which brings rainfall over India.

La Niña:

- It means Little Girl in Spanish. La Niña is also sometimes called El Viejo, anti-El Niño, or simply "a cold event." La Niña has the opposite effect of El Niño.
- The trade winds become stronger than usual, pushing more warmer waters towards the Indonesian coast, and making the eastern Pacific Ocean colder than normal.

Impacts

- Increased rainfall: Regions such as Southeast Asia, northern Australia, and parts of South America often experience above-average rainfall during La Niña events.
- Except in east and northeast India, all remaining regions are expected to receive normal or above seasonal rainfall during La Nina.
- Similar to India, Indonesia, the Philippines, Malaysia and their neighbouring countries receive good rainfall during a La Nina year.
- Drier conditions in some areas: Conversely, regions like the southwestern United States and parts of Africa experience below-average rainfall, leading to drought conditions.
- Stronger Atlantic hurricanes: La Niña tends to reduce wind shear in the Atlantic, creating conditions that are more conducive to the development of hurricanes.
- For instance, the Atlantic Ocean churned out a record 30 hurricanes during the La Nina year 2021.
- Cooler temperatures: Some areas experience cooler temperatures than normal, particularly in the Pacific Northwest of the United States and parts of South America.

What is El Nino?

- El Niño means Little Boy in Spanish. South American fishermen first noticed periods of unusually warm water in the Pacific Ocean in the 1600s.
- It is a climate phenomenon characterized by the periodic warming of sea surface temperatures in the central and eastern equatorial Pacific Ocean.
- During El Niño, trade winds weaken. Warm water is pushed back east, toward the west coast of the Americas and as a result cold water is pushed towards Asia.

Impact of El Nino

- Low Rainfall: El Niño often correlates with below-average monsoon rainfall in India, leading to droughts in many parts of the country. This can have severe consequences for agriculture, water resources, and the economy.
- Increased Temperature: El Niño also lead to an increase in temperatures across various parts of India.
- Forest Fires: The drier conditions associated with El Niño increase the risk of forest fires, particularly in regions with dense vegetation. These fires cause environmental damage, loss of biodiversity, and air pollution.
- Water Scarcity: Decreased rainfall during El Niño events lead to water scarcity in many parts of India. This affect drinking water supplies, irrigation for agriculture, and hydropower generation.
- Impact on Fisheries: El Niño also affect marine ecosystems and fisheries along India's coastline. Changes in sea surface temperatures and ocean currents disrupt fish migration patterns and lead to fluctuations in fish populations.

Conclusion

- Scientists say that climate change is set to impact the ENSO cycle. Many studies suggest that global warming tends to change the mean oceanic conditions over the Pacific Ocean and trigger more El Niño events.
- The World Meteorological Organization (WMO) has also said that climate change is likely to affect the intensity and frequency of extreme weather and climate events linked to El Niño and La Nina.

World Migration Report 2024

Syllabus: GS1/Human Geography

Context

- The International Organisation for Migration (IOM) has released its World Migration Report 2024.
- Since 2000, IOM has been producing its flagship world migration reports every two years.

Findings

- International remittances surged by 650 percent, from USD 128 billion to USD 831 billion between 2000 and 2022.
- Migrant remittances surpass foreign direct investment in boosting the GDP of developing nations.
- In 2022, India, Mexico, China, the Philippines and France were the top five remittance recipient countries.
- India received over USD 111 billion in remittances in 2022, the largest in the world, becoming the first country to reach and even surpass the USD 100 billion mark.
- India was the top country receiving remittances in 2010, 2015, and 2020.
- India is also the origin of the largest number of international migrants in the world, with large diasporas living in countries such as the United Arab Emirates, the United States and Saudi Arabia.
- Pakistan and Bangladesh were the sixth and eighth largest international remittance recipients in 2022.
- Largest Regional Inflow of Remittance: Southern Asia receives some of the largest inflows of remittances globally.
- Three countries in Southern Asia – India, Pakistan and Bangladesh, rank among the top ten recipients of international remittances in the world, underscoring the significance of labour migration from the subregion.
- Reasons for Migration: Political or economic instability as well as climate change and other disasters.
- In 2022, there were 117 million displaced people in the world, and 71.2 million internally displaced people.
- The number of asylum-seekers has risen more than 30 percent since 2020.
- Destination Countries: Migrants continue to comprise high proportions of the total populations in many Gulf Cooperation Council (GCC) States.
- In the United Arab Emirates, Kuwait and Qatar, migrants made up 88 percent, nearly 73 and 77 percent of the national populations, respectively.
- Most migrants work in sectors such as construction, hospitality, security, domestic work and retail.
- Mobile Students: Countries in Asia are the origins of the largest number of internationally mobile students in the world.
- In 2021, more than one million internationally mobile students were from China and the US is the largest destination country for international mobile students, followed by the UK, Australia, Germanyand Canada.
- Concerns: Migrant workers continue to face financial exploitation, excessive financial debt due to migration costs, xenophobia and workplace abuses.
- The impact of the pandemic has been severe on both internal and international Indian emigrant workers, particularly low-skilled emigrants on short-term contracts.
- Loss of jobs along with wage theft and lack of social security during the pandemic has plunged many Indian migrants into deep debt and insecurity.

Factors Responsible for Global Displacement

- Conflict and War: Armed conflict and war are primary drivers of displacement, forcing millions of people to flee their homes to seek safety in other regions or countries.
- Ongoing conflicts in countries like Ukraine, Israel, Iraq, Syria, Yemen, South Sudan, and Afghanistan have led to significant displacement.
- Human Rights Violations: Persecution based on ethnicity, religion, political beliefs, or other factors forces individuals and communities to flee their homes.
- Natural Disasters: Floods, hurricanes, earthquakes, and droughts displaced populations, either temporarily or permanently.
- Climate change is exacerbating the frequency and intensity of some of these disasters, leading to more displacement.
- Economic Hardship: Economic instability, poverty, lack of job opportunities, and inequality compel people to leave their homes in search of better economic prospects elsewhere.

- Ethnic and Religious Conflict: Tensions between different ethnic or religious groups lead to violence and displacement, particularly in areas where these identities are deeply entrenched and where there's a history of conflict.
- Discrimination and Marginalization: Discrimination based on factors such as ethnicity, race, gender, or sexual orientation lead to marginalization and exclusion, forcing people to leave their homes in search of acceptance and safety elsewhere.

Challenges Faced by Migrants:

- Legal and Administrative Hurdles: Migrants face legal barriers and administrative hurdles related to obtaining visas, residency permits, or asylum status in their destination countries.
- Language and Cultural Barriers: Communication barriers make it difficult to access services, find employment, or integrate into local communities.
- Economic Challenges: Finding employment and economic stability in a new country can be challenging for migrants, especially if they lack formal education, job skills, or legal authorization to work.
- Social Exclusion and Discrimination: Migrants encounter discrimination, prejudice, and social exclusion in their destination countries due to their nationality, ethnicity, religion, or immigration status.
- Mental Health Issues: Migrants experience psychological distress, trauma, and mental health issues due to the stress of displacement, separation from family and support networks, experiences of violence or persecution, and uncertainty about their future.
- Exploitation: Migrants, especially those in irregular or undocumented status, are vulnerable to exploitation, human trafficking, and abuse by smugglers, traffickers, employers, or criminal networks.
- Housing and Shelter: Migrants often struggle to find affordable and safe housing in their destination countries, especially in urban areas where housing shortages and high rents are common.
- Many end up living in overcrowded and substandard conditions or are at risk of homelessness.
- Lack of Legal Protection: Migrants, particularly asylum seekers and refugees, face violations of their human rights, including detention, deportation, arbitrary arrest, or denial of due process.
- They also lack access to legal representation and advocacy to defend their rights and seek justice.

Suggestions

- Implement policies and programmes for refugees and migrants that promote their social integration, their participation in society and reduce anti-migrant sentiment and discrimination.
- Ensure that migrant policies recognize and address the social determinants of mental health and prioritize basic needs, including food, housing, safety, and education or employment.
- Strengthen the capacity of health care workers to assess and treat mental health conditions among refugees and migrants from diverse cultural backgrounds.
- Safeguard the human rights of all refugees and migrants regardless of legal status by strengthening national and international policies and criminal justice measures that protect migrants from discrimination and violence.

International Organization for Migration (IOM)

– It is part of the United Nations System as the leading inter-governmental organization promoting humane and orderly migration for the benefit of all since 1951.
– It has 175 member states and a presence in 171 countries.
– The organization collaborates with governmental, intergovernmental and non-governmental partners to improve the resilience of people on the move, particularly those in situations of vulnerability.
– It is headquartered in Geneva, Switzerland.

Supreme Court Order for Aravallis Range

Syllabus: GS 1/GS2/Geography/Governance

In Context

- The Supreme Court has prohibited Gujarat, Rajasthan, Haryana and Delhi from granting new mining leases and renewals in the vulnerable ecosystem of the Aravallis.

About Aravallis

- "Aravalli" is a Sanskrit word which can be broken down into Ara and Valli which translate to the "line of peaks".
- The Aravallis are one of the oldest landforms on the Earth (dating back 350 million years).
- It is the oldest mountain range in India.
- They stretch across four states (Delhi, Haryana, Rajasthan and Gujarat)
- The highest point is in the Mount Abu called Gurushikhar
- It is characterized by rugged hills, rocky outcrops, and sparse vegetation, and it plays a crucial role in the region's ecology and hydrology.

Importance

- Natural barrier: Aravalli is the geographical feature that stops dry winds from coming to the Gangetic Plains — dry winds that come from Afghanistan and Pakistan.
- Therefore it acts as a natural barrier against desertification, and helps regulate the climate.
- Biodiversity hotspot: the Aravallis are home to a rich diversity of flora and fauna. The range supports a variety of ecosystems, including dry deciduous forests, scrublands, grasslands, and wetlands, providing habitat for numerous species of plants, birds, mammals, reptiles, and insects.
- Water catchment area: The Aravalli Range acts as a crucial water catchment area for the region, serving as a source of rivers, lakes, and groundwater recharge.
- Cultural heritage: The Aravalli Range is steeped in history and cultural significance, with numerous archaeological sites, temples, and forts dotting its landscape. Ancient civilisations have left their mark on the region, with relics and ruins dating back thousands of years.
- Tourism hub: Several famous tourist destinations are nestled within the Aravalli Range, showcasing the region's rich cultural heritage, breathtaking landscapes, and ancient history.
- Breathtaking scenery: The Aravallis are renowned for their breathtaking natural beauty, characterised by rugged hills, deep valleys, and panoramic vistas.

Threats

- Illegal mining and real estate continue to threaten the biodiversity of the Aravalli hill range in north-western India.
- Illegal activities persist due to the connivance of unscrupulous elements and administrative authorities.
- Urbanisation, posing a threat to the flora and fauna of one of the world's oldest mountain ranges.

Way Ahead

- There is a need for a balance between protecting the environment and the livelihood of the people engaged in mining activities,
- The issue related to mining activities in the Aravalli Hills needs to be jointly addressed by the Ministry of Environment, Forest and Climate Change as well as all the four states.

26th meeting of the SBSTTA of the Convention on Biological Diversity (CBD)

Syllabus: GS3/Environment and Conservation

Context

- The 26th meeting of the Subsidiary Body on Scientific, Technical and Technological Advice (SBSTTA-26) of the Convention on Biological Diversity (CBD) has concluded recently.

About

- The SBSTTA, is a multidisciplinary body open to all Contracting parties, which provides scientific and technical assessments of the status of biodiversity.
- It recommended fully implement The Biodiversity Plan adopted at Montreal in 2022.

The Kunming-Montreal Global Biodiversity Framework (GBF)

1. GBF was adopted by the COP15 to the Convention on Biological Diversity in 2022.
2. Its tentative title had been the "Post-2020 Global Biodiversity Framework".
3. It has been promoted as a "Paris Agreement for Nature".
4. The GBF contains 4 global goals and 23 targets.
5. "Target 3" is especially referred to as the "30X30" target.

COP15 Outcomes: '30X30 target

1. Under it, delegates committed to protecting 30% of land and 30% of coastal and marine areas by 2030, fulfilling the deal's highest-profile goal, known as 30-by-30.
2. The deal also aspires to restore 30% of degraded lands and waters throughout the decade, up from an earlier aim of 20%.
3. Also, the world will strive to prevent destroying intact landscapes and areas with a lot of species, bringing those losses "close to zero by 2030".
   - They would be deliberated upon further at the 16th meeting of the Conference of the Parties (COP16).
   - The conference will be held in the Colombian city of Cali from October 21-November 1, 2024.

Issues Discussed at the Meeting

- Scientific and technical needs to support the implementation of the Kunming-Montreal Global Biodiversity Framework.
- Detection and identification of living modified organisms.
- Risk assessment and risk management.
- Synthetic biology.
- Marine and coastal biodiversity: Ecologically or biologically significant marine areas and Conservation & sustainable use of marine and coastal biodiversity.
- Biodiversity and health.
- Monitoring framework for the Kunming-Montreal Global Biodiversity Framework.
- The meeting set the stage for a potential agreement on how the world defines — and consequently protects — ecologically or biologically significant marine areas (EBSA).

Convention on Biological Diversity (CBD)

- CBD is the international legal instrument for "the conservation of biological diversity, the sustainable use of its components and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources".

- It was signed by 150 government leaders at the 1992 Rio Earth Summit, it has been ratified by 196 nations.
- Its overall objective is to encourage actions, which will lead to a sustainable future.
- It has two supplementary agreements, the Cartagena Protocol and Nagoya Protocol.
- Cartagena Protocol on Biosafety seeks to protect biological diversity from the potential risks posed by genetically modified organisms resulting from modern biotechnology.
- Nagoya Protocol aims for the fair and equitable sharing of benefits arising out of the utilization of genetic resources.
- The CBD's governing body is the Conference of the Parties (COP).
- All parties that have ratified the treaty meets every two years to review progress, set priorities and commit to work plans.
- The Secretariat of the CBD is based in Montreal, Canada.

6 million Trees Disappeared from Farmlands

Syllabus: GS3/Environment

Context

- Researchers have revealed that India may have lost close to 5.8 million full-grown trees in agricultural lands from 2019 to 2022.

About

- Agroforest trees in India are remnant trees from forests cleared for agricultural use, offer shade, soil fertilization and other benefits to the land.
- Agroforestry is the practice of retaining large trees in and along croplands.
- Trees such as mahua, coconut, sangri, neem, babul, shisham, jamun, vegetable hummingbird, karoi and jackfruit in farmlands provide fruits, fuelwood, sap, medicine, mulch, fiber, fodder and wood for animal and human use.

Benefits of Agroforestry

- Agroforestry systems act as carbon sinks, reducing greenhouse gas emissions.
- Trees can provide shade, windbreaks, and microclimate regulation, which benefit crops by reducing stress from extreme weather conditions.
- Tree roots absorb excess water during heavy rains, reducing flooding, while also improving groundwater recharge.
- It provides a range of non-timber forest products such as fruits, nuts, and medicinal plants, which can contribute to food security and income generation.

Reasons for loss in Agroforest trees

- The conversion of diverse agroforestry systems to monoculture agriculture, such as paddy fields, result in the removal of large trees.
- Farmers perceive that the benefits provided by trees in agroforestry systems do not outweigh the costs or effort required to maintain them.
- This perception leads to deliberate removal of trees to make farming practices more convenient or profitable.
- In regions where water availability is a limiting factor for agriculture, farmers remove trees to establish bore wells or irrigation systems to access additional water sources.
- Tree mortality due to natural disturbances such as wildfires, fungal infections, insect infestations, and droughts is a natural part of ecosystem dynamics.

Agroforestry in India

- The area under agroforestry in India covers about 8.65% of India's total geographical area.
- About 56% of India is covered by farmland and 20% by forest.
- The highest concentration is in the states of Uttar Pradesh (1.86 million ha), followed by Maharashtra (1.61 million ha), Rajasthan (1.55 million ha) and Andhra Pradesh (1.17 million ha).
- The Sub-Mission on Agroforestry (Har Medh Par Ped) Scheme was launched in 2016-17 to encourage tree plantation on farm land along with crops/ cropping systems to help the farmers get additional income and make their farming systems more climate resilient and adaptive.

Way Ahead

- India's tree cover has notably expanded in recent years, but it's crucial to recognize that our reporting only accounts for gross losses, without distinguishing tree gains separately.
- A certain loss rate is natural, and the cutting of trees is also part of agroforestry management systems, and not every lost tree is related to climatic disturbances or human appropriation.
- Moreover, mature trees in fields are often removed, with newer trees cultivated in separate block plantations, generally possessing lower ecological significance.

Hydropower Concerns over Climate Change

Syllabus: GS3/Infrastructure/Environment

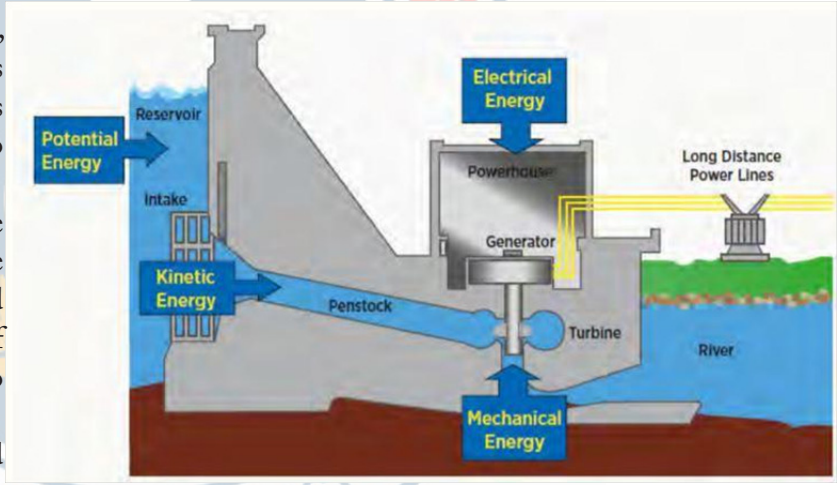
Context

- Droughts — and sudden floods which can damage hydropower dams — made more frequent and severe by climate change are an "increasing concern" for hydropower.

About

- Recent droughts in Colombia and Ecuador have severely hampered energy supplied by hydropower.
- This has led Ecuador to declare a state of emergency and institute power cuts.
- Hydropower accounts for over 80% of electricity generation in the Democratic Republic of Congo, Ethiopia, Malawi, Mozambique, Uganda and Zambia — many of which are also struggling with severe droughts.

What is Hydropower?



- Hydropower, or hydroelectric power, is one of the oldest and largest sources of renewable energy, which uses the natural flow of moving water to generate electricity.
- Hydropower currently generates more electricity than all other renewable technologies combined and is expected to remain the world's largest source of renewable electricity generation into the 2030s.
- Classification of Hydro Projects based on Installed Capacity:
  - Micro: upto 100 KW
  - Mini: 101KW to 2 MW
  - Small: 2 MW to 25 MW
  - Mega: Hydro projects with installed capacity >= 500 MW
- India: In 2022-23, hydropower accounted for 12.5 percent of power generation in India. India had about 4745.6 MW pumped storage capacity in operation in 2023.
- The hilly States of India mainly Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir and Uttarakhand constitute around half of this potential.
- Other potential States are Maharashtra, Chhattisgarh, Karnataka and Kerala.

Do you Know?

– Three Gorges Dam in China on Yangtze River is the largest hydro power station in the world.
– In India, the oldest Hydropower power plant is in Darjeeling District in West Bengal. Its installed capacity is 130KW and was commissioned in the year 1897.

Significance of Hydro Power:

- Renewable Energy Source: Hydropower is a renewable energy source because it relies on the water cycle, which is continuously replenished by rainfall and snowmelt.

- This makes it a sustainable alternative to fossil fuels, which are finite and contribute to climate change through greenhouse gas emissions.
- Clean Energy: Hydropower produces minimal greenhouse gas emissions compared to fossil fuels, making it an environmentally friendly option for generating electricity.
- Reliable and Predictable: Unlike solar and wind energy, which are intermittent and dependent on weather conditions, hydropower provides a consistent and reliable source of electricity.
- Flexible and Controllable: Hydropower plants can quickly adjust their output to match changes in electricity demand.
- Multipurpose Use: Hydropower projects often serve multiple purposes beyond electricity generation.
- They can provide flood control by regulating water flow, irrigation for agriculture, water supply for communities, and recreational opportunities such as boating and fishing.
- Long Lifespan: Hydropower infrastructure, such as dams and turbines, can have long lifespans, often exceeding 50 years with proper maintenance. This longevity ensures a stable and enduring source of energy for a longer period of time.

Challenges

- Environmental Impact: Large-scale hydropower projects often require damming rivers, which alter ecosystems, disrupt fish habitats, and impact local biodiversity.
- It also leads to issues like sediment buildup and water temperature changes downstream, affecting aquatic life.
- Social Impacts: Building dams and reservoirs displace communities and disrupt livelihoods, especially those relying on the affected rivers for fishing or agriculture.
- High Initial Costs: Constructing hydropower facilities involves significant upfront investment costs.
- Climate Change Vulnerability: Hydropower generation relies on consistent water flow, which can be affected by climate change-induced variations in precipitation patterns and glacial melt.
- A UK based thinktank found that the drought — likely exacerbated by climate change — drove an 8.5% drop in hydroelectricity around the world over the last two decades.
- Sedimentation: Dams trap sediment flowing downstream, leading to reservoirs gradually filling up with sediment over time.
- This reduces the reservoir's capacity and impacts the efficiency and lifespan of the hydropower facility.
- Maintenance Challenges: Hydropower infrastructure requires regular maintenance to ensure safe and efficient operation.

Way Ahead

- The solution for the countries is to diversify their power sources by incorporating other renewable technologies — such as wind and solar — into their energy mix.
- Innovations around placing floating solar panels on the water's surface in hydropower plants — as countries such China and Brazil are exploring — have significant potential.
- Building more medium scale plants, rather than the mega dams of the past, would help mitigate the climate-risks associated with overdependence on one big piece of infrastructure.
- Without major policy changes, global hydropower expansion is expected to slow down this decade.

Antarctic Treaty

Syllabus: GS3/ Environment

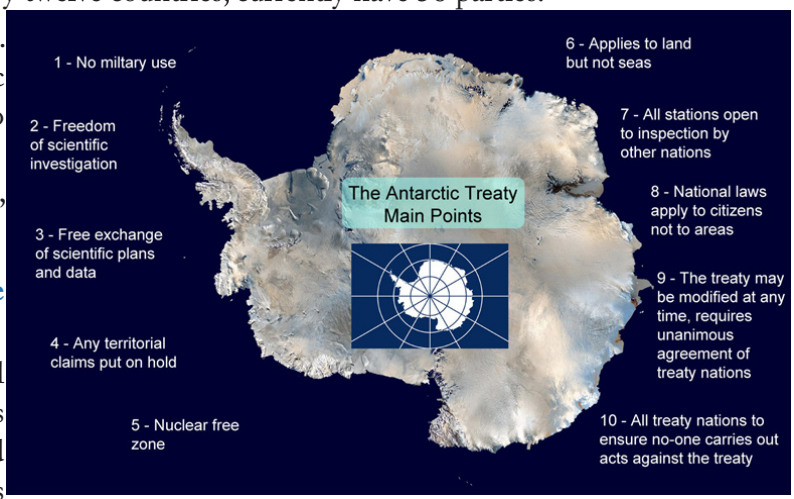
In News

- India to host 46th Antarctic Treaty Consultative meeting in Kochi, Kerala.
- The meeting reflects India's growing role as a responsible global stakeholder in efforts to preserve Antarctica.

About Antarctic Treaty

- Signed: In 1959 by 12 countries and came into effect in the mid-1960s.
- Objective: Demilitarization and peaceful use of Antarctica, Freedom of scientific cooperation and environmental protection.

- Member Nations: Initially treaty signed by twelve countries, currently have 56 parties.
- India became a party to the Treaty in 1983. Recently, India enacted Indian Antarctic Act, 2022 reaffirming its commitment to Antarctic Treaty.
- Secretariat headquarter: Buenos Aires, Argentina.



Protocol on Environmental Protection to the Antarctic Treaty

- The Protocol on Environmental Protection to the Antarctic Treaty was signed in Madrid on October 4, 1991 and entered into force in 1998. It designates Antarctica as a "natural reserve, devoted to peace and science".
- The Environmental Protocol is best known for its ban on commercial mining in Antarctica.
- To mark its 25th anniversary in 2016, all Parties underlined their commitment to the mining ban at the Antarctic Treaty Consultative Meeting in May 2016

World Intellectual Property Organization (WIPO) Treaty

Syllabus: GS3/Environment

Context

- After 25 years of negotiations, the World Intellectual Property Organization (WIPO) Treaty, associated with the genetic resources and traditional knowledge was concluded in Geneva.

What are Genetic Resources and associated Traditional Knowledge?

- Genetic resources (GRs) are present in things like medicinal plants, agricultural crops, and animal breeds.
- While genetic resources themselves cannot be directly protected as intellectual property, inventions developed using them can, most often through a patent.
- Associated Traditional Knowledge: Some genetic resources are also associated with traditional knowledge through their use and conservation by Indigenous Peoples as well as local communities, often over generations.
- This knowledge is sometimes used in scientific research and, as such, may contribute to the development of a protected invention.

About the treaty

- The treaty will establish in international law a new disclosure requirement for patent applicants whose inventions are based on genetic resources and associated traditional knowledge.
- The treaty after entering into force will require contracting parties to put In place mandatory disclosure obligations for patent applicants to disclose the country of origin or source of the genetic resources when the claimed invention is based on genetic resources or associated traditional knowledge.
- This will offer added protection to Indian Genetic Resources and Traditional Knowledge, which while currently protected in India are prone to misappropriation in countries, which do not have disclosure of obligations.

Significance

- This is the first WIPO treaty to address the interface between intellectual property, genetic resources and traditional knowledge
- It is also the first WIPO treaty to include provisions specifically for indigenous peoples and local communities.

Way Ahead

- The treaty on intellectual property, genetic resources and associated traditional knowledge at the World Intellectual Property Organization (WIPO) is a "significant win" for India and the global South ,comprising mainly low-income and developing countries.
- It paves the way for bridging conflicting paradigms within the Intellectual Property (IP) system.

World Intellectual Property Organization (WIPO)

– It is a self-funding agency of the United Nations, that serves the world's innovators and creators, ensuring that their ideas travel safely to the market and improve lives everywhere.
– Members: The organization has 193 member states including both developing and developed nations like India, Italy, Israel, Austria, Bhutan, Brazil, China, Cuba, Egypt, Pakistan, the U.S. and the U.K.
– Headquarters: Geneva, Switzerland.

German Cockroach

Syllabus :GS 3/Species in news

In News

- A new study traces the German cockroach's evolution throughout human history,

About German cockroach(Blattella germanica)

- It is one most widely found around the world.
- It seeks warm moist conditions with access to food and water.
- It is common in domestic kitchens and commercial food-handling areas and is active at night, hiding during the day in dark, secure places.
- The recent analysis revealed that the German cockroach evolved from the Asian cockroach (Blattella asahinai) about 2,100 years ago.
- The two species are still very similar today.
- According to the researchers, the insects originally adapted to human settlements in India and Myanmar.
- Issues and Concerns : Cockroaches act as vectors for a great many bacteria, viruses and fungi.
- They can trigger allergies and cause diarrhea, colitis, hepatitis A, anthrax, salmonella and tuberculosis. Cockroaches can also spread foot-and-mouth disease.

Challenges of Combating Oil Spills

Syllabus: GS3/Environment

Context

- The Indian Coast Guard (ICG) organized a 'Pollution Response Seminar and Mock Drill' in West Bengal to address critical challenges of combating oil spills at sea.

What is an Oil Spill?

- An oil spill is the release of a liquid petroleum hydrocarbon from tankers, offshore platforms, drilling rigs or wells into the environment, especially marine areas.
- Spilled substances: It may be refined petroleum products, such as gasoline and diesel fuel, as well as their by-products — heavier fuels used by large ships such as bunker fuel or oily refuse of any kind.

Past incidences

International Incidence:

- Venezuela: In 2020 oil leakage from the El Palito refinery in Venezuela.
- Japanese ship MV Wakashio carrying fuel oil split into two parts near Blue Bay Marine Park in south-east Mauritius.
- Russia: Arctic (Norilsk diesel fuel spill) Oil Spill
- Deepwater Horizon oil spill: Gulf of Mexico, 2010
- Indian incidents:
- Chennai 2017: Two ships collided off Kamarajar Port Limited's (KPL) harbor and resulted in a major oil spill disaster.
- Sundarban 2014: Oil spill in Sela River, Bangladesh created an environmental concern for India too.
- ONGC Uran Plan leaked oil in the Arabian Sea in 2013.
- Mumbai coast: In 2010 two ships collided causing the 800 tonnes of the oil spill.

Damage caused by oil spill

- Environmental Impact: Oil spills harm various species of fish, birds, mammals, and other marine life. The oil can coat and damage the fur or feathers of animals, making it difficult for them to swim or fly.
- Habitat Destruction: Oil can contaminate coastal habitats, including beaches, marshes, and mangroves, leading to long-term damage.
- Fisheries and Aquaculture: Contaminated waters can lead to reduced fish populations and damage to fishing gear, affecting the livelihoods of communities dependent on these activities.
- In the case of Ennore, fishermen have not been able to venture into fishing as fish catch smells of oil.
- Tourism: Coastal areas affected by oil spills often experience a decline in tourism due to the negative perception of polluted beaches and waters. This can result in economic losses for local businesses and communities.
- Exposure to Toxic Substances: The chemicals present in oil, such as polycyclic aromatic hydrocarbons (PAHs), pose health risks to humans. Inhalation of fumes, ingestion of contaminated seafood, or direct skin contact with oil can lead to respiratory problems, skin irritation, and long-term health effects.

International Efforts for dealing with Oil Spill

- International Convention for the Prevention of Pollution from Ships (MARPOL): It was rolled out by the International Maritime Organisation (IMO) in 1973 and recognised the need for international coherent efforts for curbing oil spill.
- International Convention on Oil Pollution Preparedness, Response and Cooperation 1990: It is the international instrument that provides a framework designed to facilitate international cooperation and mutual assistance in preparing for and responding to major oil pollution incidents.

Indian Efforts for dealing with Oil Spill

- National Oil Spill Disaster Contingency Plan (NOS-DCP): The Indian Coast Guard (ICG) is responsible for maintaining and implementing the Plan. It was promulgated in 1996 and revised in 2015. Its Objectives are:
  - Effective reporting of spillage
  - Prompt response to prevent, control and combat oil pollution
  - Adequate protection to Public Health and Welfare along with Marine Environment
  - Use of Science and Technology for preventing and managing oil spills and pollution and residuals.
  - Merchant shipping Act, 1958: The Act, describes the power to give a notice to the owner, when the central government is satisfied the ship is not as per the prescribed rules. After notice, if the person fails to comply, the government can convict the person of an offense.

Control measures for Oil Spills

- Bioremediation: It refers to the use of specific microorganisms to remove any toxic or harmful substances
- TERI has developed Oil Zapper Bacteria which can degrade the oil quickly.
- Oil Booms: They are temporary floating barriers used to contain marine spills, protect the environment, and assist in recovery.
- Using Dispersants: Dispersal agents are chemicals that are sprayed upon the spill with the help of aircraft and boats, which aid the natural breakdown of oil components.

Indian Coast Guard (ICG)

– ICG is a maritime law enforcement and search and rescue agency of India with jurisdiction over its territorial waters including its contiguous zone and exclusive economic zone.
– Established in 1977 by the Coast Guard Act, 1978 of the Parliament of India.
– Parent Agency: Ministry of Defence
– Headquarters: New Delhi

Study Finds Presence of Microplastics in Testicles of Humans & Canines

Syllabus: GS3/Environment and Conservation

Context

- Study finds pervasive presence of microplastics in testicles of humans & canines.

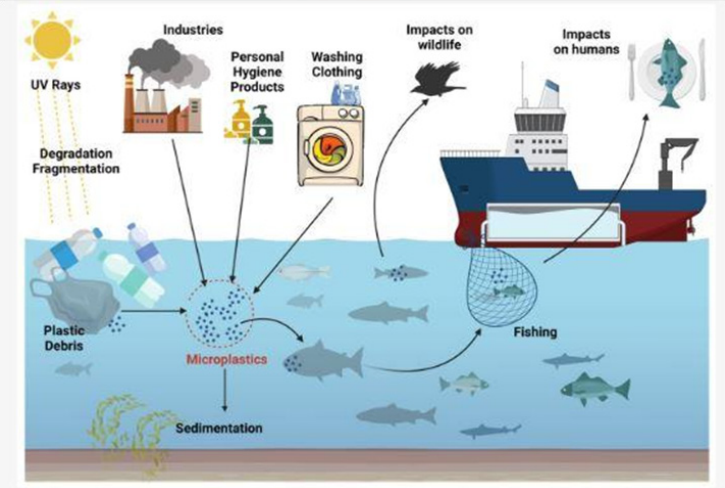
Findings of Study

- Humans are potentially exposed to microplastics through oral intake, inhalation and skin contact.
- The effects of microplastics consist of oxidative stress, DNA damage, organ dysfunction, metabolic disorder, immune response, neurotoxicity, as well as reproductive and developmental toxicity.

Menace of Plastic Pollution

- In 2024, the global Plastic Overshoot Day (POD) was projected to occur on September 5.
- POD marks the point in time when the amount of plastic waste generated exceeds the world's capacity to manage it, resulting in environmental pollution.
- China, India, the United States and Japan will account for 51 percent of this volume, according to the 2024 POD Report by EA Earth Action.
- India will be the second leading polluter of the water bodies, after China in the world.
- A 2023 report by the Nordic Council of Ministers indicated that without global action, the annual levels of mismanaged plastics would continue to rise and could almost double from 110 million tonnes (Mt) in 2019 to 205 Mt by 2040.

What is Plastic and Microplastics?



- The word plastic is derived from the Greek word plastikos, meaning "capable of being shaped or moulded."
- Plastic refers to a wide range of synthetic or semi-synthetic materials that use polymers as a main ingredient with their defining quality being their plasticity – the ability of a solid material to undergo permanent deformation in response to applied forces.
- This makes them extremely adaptable, capable of being shaped as per requirement.
- The basic building blocks of plastics are monomers, which are small molecules that can join together to form long chains called polymers through a process called polymerization.
- Microplastics: Plastics break down into their smaller units called microplastics – officially defined as plastics less than five millimetres in diameter.
- These microplastics find their way across the planet, from the depths of the Pacific Ocean to the heights of the Himalayas.
- According to the most recent global estimates, an average human consumes at least 50,000 microplastic particles annually due to contamination of the food chain, potable water, and air.

Environmental Concerns of Microplastics

- Marine Pollution: Microplastics enter oceans through various pathways, including direct disposal, runoff from land, and fragmentation of larger plastic debris.
- Marine organisms ingest microplastics, leading to physical harm, blockages in digestive systems, and potential transfer of toxins up the food chain.
- Freshwater Contamination: Microplastics are also found in freshwater environments, such as rivers, lakes, and streams.
- Bioaccumulation and Biomagnification: Microplastics have the potential to accumulate in the tissues of organisms through processes like ingestion and adsorption.

- As predators consume prey containing microplastics, these contaminants biomagnify, reaching higher concentrations in organisms at the top of the food chain, including humans.
- Habitat Degradation: Microplastics presence interfere with nutrient cycling, sediment stability, and the behavior of organisms.
- In some cases, microplastics create microenvironments that favor the growth of harmful bacteria or invasive species, further disrupting ecosystem dynamics.
- Global Distribution: Microplastics have been detected in diverse environments worldwide, including remote and pristine locations far from major sources of plastic pollution.
- Their global distribution highlights the pervasive nature of plastic contamination and underscores the need for coordinated international efforts to address this issue.
- Effect on Human Health: Notably, microplastics contain a number of toxic chemicals which pose severe risks to human health. The biggest health risk associated is with the chemical BPA or Bisphenol A , which is used to harden the plastic.
- BPA contaminates food and drinks, causing alterations in liver function, insulin resistance, fetal development in pregnant women, the reproductive system and brain function.

India's Efforts In Tackling Plastic Waste

- Ban on single-use plastics: India has banned the production, use, and sale of single-use plastics such as bags, cups, plates, cutlery, and straws in many states.
- Extended Producer Responsibility (EPR): The Indian government has implemented EPR, making plastic manufacturers responsible for managing and disposing of the waste generated by their products.
- Plastic Waste Management Rules: India introduced the Plastic Waste Management Rules in 2016, which provide a framework for managing plastic waste through various measures, including recycling and waste-to-energy initiatives.
- Plastic Waste Management (Amendment) Rules, 2022:
- The guidelines on EPR(Extended Producer Responsibility) coupled with the prohibition of identified single-use plastic items.
- It banned the manufacture, import, stocking, distribution, sale and use of carry bags made of virgin or recycled plastic less than seventy-five micrometers.
- Swachh Bharat Abhiyan: The Indian government launched the Swachh Bharat Abhiyan, a national cleanliness campaign, which includes the collection and disposal of plastic waste.
- Plastic Parks: Government has set up Plastic Parks, which are specialized industrial zones for recycling and processing plastic waste.
- Beach clean-up drives: The Indian government and various non-governmental organizations have organized beach clean-up drives to collect and dispose of plastic waste from beaches.
- India is a signatory to MARPOL (International Convention on Prevention of Marine Pollution).
- The "India Plastic Challenge – Hackathon 2021
- It is a unique competition calling upon start-ups /entrepreneurs and students of Higher Education Institutions (HEIs) to develop innovative solutions to mitigate plastic pollution and develop alternatives to single-use plastics.

Orangutan Diplomacy

Syllabus: GS2/IR, GS3/Environment

Context

- Malaysia intends to gift orangutans to palm oil-purchasing countries as part of an initiative similar to China's panda diplomacy.

Orangutan

- Characteristics: Orangutans are the largest arboreal mammal, spending most of their time in trees.
- They are the closest living relatives of humans and they share 96.4% of Human genes and are highly intelligent creatures.
- There are three species of Orangutan – the Bornean, Sumatran and Tapanuli – which differ a little in appearance and behavior.
- Eating habitats : Orangutans mainly eat fruits, such as mangoes, lychees and figs, but they also feed on young leaves, flowers, insects, and even small mammals.
- Habitat and Distribution: They can occur up to 1,500m above sea level, most are found in lowland areas and prefer forests in river valleys or floodplains.
- These great apes are only found in the wild on the islands of Borneo and Sumatra.
- IUCN status: All three orangutan species are critically endangered.

Palm Oil

– It's an edible vegetable oil that comes from the fruit of oil palm trees, having the scientific name Elaeis guineensis.
– The oil palm tree is native to West and Central Africa. It also grows extensively in Malaysia and Indonesia.
– Palm oil, obtained from the fruits, is used in making soaps, cosmetics, candles, biofuels, and lubricating greases and in processing tinplate and coating iron plates.
– Palm kernel oil, from the seeds, is used in manufacturing such edible products as margarine, ice cream, chocolate confections, cookies, and bread, as well as many pharmaceuticals.

Nitrogen dioxide Pollution

Syllabus: GS3/ENvironment

Context

- A recent study has raised concerns about the health risks associated with gas and propane stoves as it can significantly increase indoor air pollution levels of nitrogen dioxide (NO2).

About

- The study found that homes with gas or propane stoves expose residents to an estimated 4 parts per billion (ppb) increase in nitrogen dioxide (NO2)on average over a year.
- Nitrogen dioxide is a reddish-brown, pungent, acidic gas that is corrosive and strongly oxidizing.

Sources of nitrogen dioxide (NO2)

- Anthropogenic activities: The main source of nitrogen dioxide resulting from human activities is the combustion of fossil fuels (coal, gas and oil) especially fuel used in cars.
- It is also produced from making nitric acid, welding and using explosives, refining of petrol and metals, commercial manufacturing, and food manufacturing.
- Natural sources of other nitrogen oxides include volcanoes and bacteria.

Effects of nitrogen dioxide (NO2)

- Health: Nitrogen dioxide can decrease the lungs' defenses against bacteria making them more susceptible to infections. It can also aggravate asthma.
- Ecosystem: Nitrogen dioxide is toxic to plants in short-term concentrations of 120 µg/m3. It reduces plant growth.
- Along with sulfur dioxide, nitrogen dioxide can cause acid rain.
- Nitrogen dioxide can form secondary particles called nitrates that cause haze and reduce visibility.

East Sundarbans

Syllabus: GS3/Environment

Context:

- Recently, a fire broke out in the East Sundarbans region of Bangladesh, which is occurring almost every year during the dry season.

About the East Sundarban

- It is a part of the Sundarbans, world's largest mangrove forest, that stretches across the coastal region of the Bay of Bengal in the Indian Ocean.
- It is home to a wide variety of flora and fauna, including several endangered species.
- Reasons highlighted for repeatedly catching fire in East Sundarbans are reduced water inflow in canals, region's elevation, dry seasons, climate change, and lack of management.

Sundarban Wetland and Mangrove Forest

– It is one of the largest mangrove forests in the world (140,000 ha), lies on the delta of the Ganges, Brahmaputra and Meghna rivers on the Bay of Bengal in India and Bangladesh.
– The Indian Sundarban, covering the south-westernmost part of the delta, constitutes over 60% of the country's total mangrove forest area and includes 90% of Indian mangrove species.

Fauna

– The Sundarbans are the only mangrove habitat which supports a significant population of tigers, and they have unique aquatic hunting skills.
a. The Sundarban Tiger Reserve has been declared a 'critical tiger habitat' under national law and also a 'Tiger Conservation Landscape' of global importance.
– It is home to a large number of rare and globally threatened species such as:
a. Northern River Terrapin (Batagur Baska): Critically Endangered;
b. Irrawaddy Dolphin (Orcaella Brevirostris): Endangered;
c. Fishing Cat (Prionailurus Viverrinus): Vulnerable.
– Two of the world's four Horseshoe Crab Species, and eight of India's 12 species of Kingfisher are also found in Sundarbans.

Flora

– The Sundarbans host more than 78 species of mangroves, making it the richest mangrove forest in the world.
a. The Sundarbans is named after the mangrove plant Sundari (Heritiera Minor).

Significance

– The mangrove forests protect the hinterland from storms, cyclones, tidal surges, and the seepage and intrusion of saltwater inland and into waterways.
a. They serve as nurseries to shellfish and finfish and sustain the fisheries of the entire eastern coast.
– These mangroves dominate the fringing areas along the creeks and backwaters, and grow along the sides of rivers in muddy as well as in flat, sandy areas.

Conservation

– UNESCO: Four protected areas in the Sundarbans are enlisted as UNESCO World Heritage Sites, viz. Sundarbans National Park (India), Sundarbans West (Bangladesh), Sundarbans South (Bangladesh) and Sundarbans East (Bangladesh).
– Ramsar Site: It is a 'Wetland of International Importance' under the Ramsar Convention.

Iberian lynx

Syllabus: GS3/Environment

Context

- The number of endangered Iberian lynx in the wild in Spain and Portugal has nearly doubled since 2020 to surpass 2,000 last year.

About

- Scientific Designation: Lynx pardinus
- Characteristics: The Iberian lynx is a medium-sized nocturnal cat with a short tail, a short body, long legs, tufted ears, and a relatively small head.
- It has bright yellowish to tawny coloured spotted fur.
- Distribution: Once distributed throughout the Iberian Peninsula, the species is now sparsely distributed in Spain and Portugal.
- Threats: It is threatened by habitat loss, road accidents, and illegal hunting. In 2007, several individuals died of feline leukemia.

Conservation Status

- IUCN status: Endangered
- It is protected under appendix II of the Convention on International Trade in Endangered Species (CITES).

Chapter-
5

SCIENCE & TECHNOLOGY

Inflammatory Bowel Disease

Syllabus: GS3/ S&T

In Context

- A girl from Andhra Pradesh was diagnosed with severe Crohn's disease.

About Inflammatory Bowel Disease

- A chronic autoimmune condition where the body's immune system attacks the gastrointestinal tract, causing inflammation and ulcers.

Types of IBD:

- Ulcerative Colitis: Limited to the inner lining (mucosa) of the large intestine (colon) and rectum.
- Crohn's Disease: Can affect any part of the gastrointestinal tract from the mouth to the anus.

Treatment:

- There is no cure for IBD, but treatments aim to manage symptoms.
- Steroids and Biologics are used to control inflammation and suppress the immune system.
- Maintaining remission with milder immunosuppressants.

Rising Cases in India

- Rising cases in India are attributed to lifestyle changes, including the adoption of a Westernized diet.

GM Mosquitoes to Fight Malaria

Syllabus: GS3/Science and Technology

Context

- Genetically modified (GMO) mosquitoes were released in Djibouti, East Africa to fight malaria.

What is Malaria?

- Malaria is a life-threatening disease spread to humans by some types of mosquitoes. It is mostly found in tropical countries.
- Transmission: It is caused by plasmodium protozoa.The plasmodium parasites spread through the bites of infected female Anopheles mosquitoes.Blood transfusion and contaminated needles may also transmit malaria.
- Types of parasites: There are 5 Plasmodium parasite species that cause malaria in humans and 2 of these species – P. falciparum and P. vivax – pose the greatest threat. The other malaria species which can infect humans are P. malariae, P. ovale and P. knowlesi.
- P. falciparum is the deadliest malaria parasite and the most prevalent on the African continent. P. vivax is the dominant malaria parasite in most countries outside of sub-Saharan Africa.
- Symptoms: Fever and flu-like illness, including chills, headache, muscle ache and fatigue.

Disease burden

- According to the World malaria report, there were 247 million cases of malaria in 2021 and the estimated number of malaria deaths stood at 619 000.
- According to the World Health Organization, Africa bears the brunt of the global malaria burden, accounting for 96% of malaria deaths worldwide in 2021.
- Four African countries accounted for just over half of all malaria deaths worldwide: Nigeria (31.3%), the Democratic Republic of the Congo (12.6%), United Republic of Tanzania (4.1%) and Niger (3.9%).

How GM mosquitoes help to fight malaria?

- The method targets female mosquitoes, which are predominantly responsible for malaria transmission.
- It involves releasing genetically engineered male mosquitoes carrying a special gene into the wild, which then mate with females.
- The introduced gene prevents female offspring from surviving to adulthood, effectively reducing the population of malaria-transmitting mosquitoes.
- Male mosquitoes do not bite and therefore cannot transmit malaria.

Initiatives to control Malaria by WHO

- The WHO's Global technical strategy for malaria 2016–2030 aims to reduce malaria case incidence and mortality rates by at least 40% by 2020, at least 75% by 2025 and at least 90% by 2030 against a 2015 baseline.
- 'E-2025 Initiative': The WHO has identified 25 countries with the potential to eradicate malaria by 2025 under the initiative.
- High Burden to High Impact (HBHI) initiative: WHO has initiated the initiative in 11 high malaria burden countries, including India.

Indian government Initiatives to Control Malaria:

- The Government of India set a target to eliminate malaria in India by 2027.
- In India, a National Framework for Malaria Elimination (NFME) has been developed and launched in 2016 aligned with the Global Technical Strategy (GTS) for malaria elimination 2016-2030.
- Malaria Elimination Research Alliance-India (MERA-India): It was established by the Indian Council of Medical Research (ICMR) as a conglomeration of partners working on malaria control.

Tool to Detect Viral Infection

Syllabus: GS3/Science and Technology

Context

- A viral infection can stress cells and change their shapes and sizes. Researchers have built a tool to detect these changes.

About

- It can detect if cells have been infected by a virus using only light and some knowledge of high-school physics.
- A viral infection can stress cells and change their shapes, sizes, and features. As the infection gains the upper hand and the body becomes 'diseased', the changes become more stark.
- The researchers behind the new study translated these cellular changes into patterns that could be used to say if a cell had been infected.
- The method can differentiate between uninfected, virus-infected, and dead cells.
- Virus-infected cells were elongated and had more clear boundaries than uninfected cells.

Significance

- Light-based methods could detect viral infections as accurately or even more accurately than the standard method.
- The new method was also cheaper than the standard: while the equipment cost for the standard method using chemical reagents is about $3,000 (Rs 2.5 lakh), the cost of the new method described in this paper was about a tenth.
- The new method takes only about two hours to detect virus infected cells, against the 40 hours the current standard required.
- The new method could help catch viral infections early — which could be very helpful during, say, a virulent bird flu outbreak.

PREFIRE Mission

Syllabus: GS3/Science and Technology

Context

- NASA has successfully launched the climate satellite named "Ready, Aim, PREFIRE," to study heat emissions at Earth's poles.

What is PREFIRE mission?

- PREFIRE stands for "Polar Radiant Energy in the Far-InfraRed Experiment".
- The mission consists of two shoebox-sized CubeSats, each equipped with a Thermal Infrared Spectrometer capable of measuring the far-infrared radiation emitted by the Earth's coldest and most remote regions.
- The satellite launched is one of the two climate satellites that are part of the PREFIRE mission.
- The other is "PREFIRE and ICE," and will be launched in the coming days.

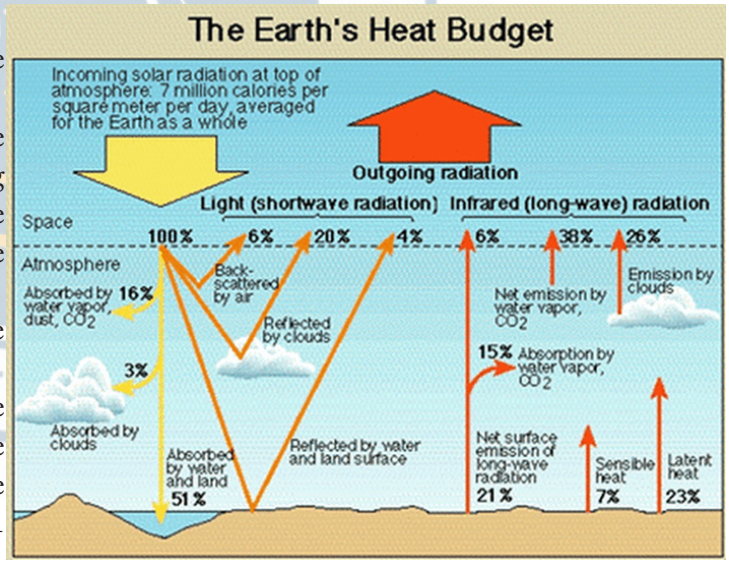
Significance

- Its observations will help in understanding the fundamentals of Earth's heat balance, allowing us to better predict how ice, seas, and weather will change in the face of global warming.
- The mission also focuses on heat emitted as far-infrared radiation by the Arctic and Antarctica, which is currently not measured in detail.

Heat Budget of Earth

- A heat budget is a perfect balance between incoming heat (insolation) absorbed by the earth and outgoing heat (terrestrial radiation) escaping it in the form of radiation.
- The equilibrium that exists between the insolation (short waves) and the terrestrial radiation (long waves) is called the heat budget of the earth.

Explanation of Heat Budget



- Let's consider that the top of the atmosphere receives 100% of the insolation.
- Approximately 35 units of insolation are reflected back into space before even reaching the Earth's surface. Out of these, 27 units are reflected from the top of clouds, and 2 units are reflected from snow and ice-covered areas.
- The reflected radiation is referred to as the Earth's albedo.
- The remaining 65 units of insolation are absorbed, with 14 units absorbed within the atmosphere and 51 units absorbed by the Earth's surface. The Earth then radiates back 51 units of terrestrial radiation.
- Out of these, 17 units are radiated directly into space, while the remaining 34 units are absorbed by the atmosphere.
- Additionally, 48 units absorbed by the atmosphere are also radiated back into space.
- Therefore, the total radiation returning from the Earth and the atmosphere is 17 + 48 = 65 units, which balances the total of 65 units received from the Sun.

Impacts of imbalance of Heat Budget

- Rising Global Temperatures: Increased greenhouse gases trap more heat in the atmosphere, leading to higher global temperatures.
- Melting Polar Ice and Glaciers: Warmer temperatures cause ice sheets and glaciers to melt, contributing to rising sea levels.
- Higher sea levels erode coastlines and increase the frequency and severity of coastal flooding.

- Ocean Warming: The ocean absorbs most of the excess heat, leading to thermal expansion and further sea level rise.
- Coastal and marine habitats, such as mangroves and coral reefs, are threatened by rising waters.
- Increased Frequency of Heatwaves: Prolonged periods of excessive heat become more common.
- Ocean Acidification: Higher levels of carbon dioxide dissolve in ocean water will lead to acidification.
- Acidic waters harm calcifying organisms like corals, mollusks, and some plankton species, disrupting marine ecosystems.

Golden rice

Syllabus :GS 3/S&T /Crops

In News

- A court in the Philippines recently revoked biosafety permits for commercial propagation of genetically modified golden rice and Bt eggplant.

About Golden rice

- Golden Rice is a new type of rice that contains beta carotene (provitamin A, a plant pigment that the body converts into vitamin A as needed).
- This compound is what gives this grain its yellow-orange or golden colour, hence its name.
- Golden Rice is developed through genetic engineering.
- Like ordinary rice, Golden Rice does not require any special cultivation practices, and generally has the same yield and agronomic performance.
- In July 2021, the Philippines became the first country in the world to approve Golden Rice for commercial propagation.
- Golden Rice has been assessed to be as safe as ordinary rice with the added benefit of beta-carotene in the grains by Food Standards Australia New Zealand, Health Canada , the United States Food and Drug Administration and Department of Agriculture-Bureau of Plant Industry.

Private Sector Participation in Space Activities

Syllabus :GS 3/Space

In News

- New Space India Limited (NSIL), invited applications from private firms for "end-to-end" manufacturing of Launch Vehicle Mark-III or LVM3, the rocket that was used in the Chandrayaan-2 and Chandrayaan-3 lunar missions.

Do you know ?

LVM3 is the new heavy lift launch vehicle of ISRO for achieving a 4000 kg spacecraft launching capability to GTO (Geosynchronous Transfer Orbit) in a cost effective manner.

About space sector

- The Indian Space Sector was valued at $9.6 Bn in 2020, contributing 2%-3% of the global space economy.
- The size of the sector is expected to reach $13 Bn by 2025, and by 2030 India further aims to capture a larger share of close to 10% of the global economy.

Private Sector's Participation

- India's space sector has entered a new era of growth and innovation with the government's decision to open up the sector to private enterprises.
- This strategic move is aimed at boosting the development of the segment and increasing India's share in the global space economy.
- the Department of Space (DOS) desires to encourage the participation of private companies in space activities.
- ISRO's role has shifted from being the sole operator to becoming a facilitator for private sector growth.
- The organisation is now focused on supporting private enterprises through technology transfer, sharing expertise, and providing access to infrastructure.

- The successful landing of Chandrayaan-3 on the moon's south pole has acted as a catalyst, encouraging private sector investment in space.

Benefits

- Innovation and Competition: With private companies like Skyroot Aerospace making headlines for their achievements, the sector is poised for a surge in innovation and healthy competition1.
- Global Collaboration: The influx of FDI not only brings in capital but also fosters international collaborations, enhancing India's global standing in space technology1.
- National Development: A strong space sector contributes to national development by improving connectivity, especially in remote areas, and aiding in disaster management and climate monitoring.
- Cost competitive: Promoting the private sector will enable the Indian space program to remain cost competitive within the global space market, and thus create several jobs in the space and other related sectors

Challenges

- Regulatory hurdles,
- Technology transfer complexities, and
- The need for a skilled workforce are some of the issues.

Governments steps

- In February, 2024, Centre amended its FDI policy, allowing up to 74% FDI for satellite manufacturing and operation, up to 49% FDI for launch vehicles, spaceports and associated systems and 100% FDI to manufacture components and systems/sub-systems for satellites, ground and user segments.
- Beyond the above mentioned limits investment is allowed in these segments via the government route.
- The investment in Indian Space Start-Ups has increased to $ 124.7 Million in 2023.
- In 2020 ,the Indian National Space Promotion and Authorisation Centre (IN-SPACe) was established to promote, authorise and supervise various space activities of non-governmental entities (NGEs).
- IN-SPACe has been instrumental in facilitating the entry of private players into the space sector.
- In February 2021, Centre issued guidelines for private companies to acquire all geospatial data and maps from government agencies without licences, and permission or clearances for collection, use and dissemination, except certain categories.
- The Centre unveiled the National Geospatial Policy on December 28, 2022, laying down a framework for the development of a geospatial ecosystem, allowing democratisation of data and a strengthened integrated interface for all digital data that have location.
- The Indian Space Policy 2023: The Union Cabinet's approval of the Indian Space Policy 2023 outlines the roles and responsibilities of key organisations like the Indian Space Research Organisation (ISRO), NewSpace India Limited (NSIL), and private sector entities, providing clarity and direction for future endeavours.

Conclusion

- The privatisation of the Indian space sector is a bold step towards harnessing the potential of private enterprises.
- There is a need to promote private sector activity in all high technology areas including space, to fully unlock the potential of India's youth and entrepreneurs
- Therefore ,it is necessary to enable private entities within the Indian space sector to establish themselves as independent players capable of endto-end space activities.
- With the government's supportive policies and ISRO's collaborative approach, India is poised to make significant strides in the global space industry.
- Addressing the existing issues will be crucial for sustaining the momentum and ensuring the long-term success of India's privatised space sector.

PREFIRE Mission

Syllabus: GS3/Science and Technology

Context

- Recently, NASA launched one of two climate satellites as part of the PREFIRE (Polar Radiant Energy in the Far-InfraRed Experiment) Mission.

PREFIRE Satellites

- The PREFIRE satellites are 6U CubeSats, measuring around 90 cm in height and nearly 120 cm in width when their solar panels are deployed.

What Are CubeSats?

- CubeSats are miniature satellites, each resembling a **10 cm x 10 cm x 10 cm cube *(equivalent to 'one unit' or '1U')*** and weighing no more than 1.33 kg.
- Developed initially as educational tools, CubeSats have gained popularity due to their **low cost and versatility.**

- Two 6U CubeSats aim to orbit at an altitude of about 525 kilometres in a near-polar orbit.
- Each satellite carries a miniaturised infrared spectrometer, covering the 0-45 μm range at 0.84 μm spectral resolution.
- Operating for one seasonal cycle (approximately a year), PREFIRE aims to provide unprecedented data on far-infrared emissions from Earth's poles.

PREFIRE's Objectives

- Quantifying Far-Infrared Emission: PREFIRE aims to document the variability in spectral fluxes from 5 μm to 45 μm, shedding light on the energy radiated by Earth's polar regions.
- Nearly 60% of Arctic emission occurs at wavelengths > 15 μm (FIR), which has remained uncharted territory until now.
- Anchoring Climate Predictions: By measuring far-infrared radiation, PREFIRE improves Arctic climate predictions.
- It provides critical data for understanding Arctic warming, sea ice loss, ice sheet melt, and sea level rise.
- Earth's Thermostat: The Arctic acts as Earth's thermostat, regulating the climate by venting excess energy received in the tropics.
- PREFIRE's insights into Arctic heat emissions contribute to a more accurate understanding of our planet's climate dynamics.

Significance: Earth's Energy Budget

- Understanding Earth's energy balance is crucial for predicting climate changes, as incoming solar radiation and outgoing heat determines our planet's temperature and climate.
- However, a significant portion of heat radiated from the Arctic and Antarctica occurs as far-infrared radiation (wavelengths of 3 μm to 1,000 μm), which has never been systematically measured.
- PREFIRE aims to bridge this gap in knowledge by capturing spectral fluxes from 5 μm to 45 μm on hourly to seasonal timescales.

Centre for Carbon Fiber and Prepregs

Syllabus :GS 3/S&T

In News

- The Vice President inaugurated the Centre for Carbon Fiber and Prepregs during his visit to National Aerospace Laboratories.

About Centre for Carbon Fiber and Prepregs

- Established by the National Aerospace Laboratories (NAL) in Bengaluru, India.
- It focuses on developing and producing carbon fiber, a high-strength, lightweight material used in various industries, including aerospace, automotive, and renewable energy.
- It helps in reducing India's dependence on imported carbon fiber, promotes innovation in composite materials, and supports the growth of various industries.

Prepregs & Carbon fibers

- Prepregs are laminate composites of fibre sheets that are impregnated with polymer resins (plastics) that have not been fully cured.
- Carbon fibers are produced by thermal conversion of organic fibers with a lower carbon content such as polyacrylonitrile (PAN) containing several thousand filaments .
- Carbon fiber is a high strength, high-stiffness and low weight material, used extensively in aircraft, missiles,launch vehicles and satellites. It is also an important raw material in many vital industrial applications such as wind energy, infrastructure, sports and transportation, to name a few.

Do you know ?

– National Aerospace Laboratories (NAL), a constituent of the Council of Scientific and Industrial Research (CSIR), India, established in the year 1959 is the only government aerospace R&D laboratory in the country's civilian sector.
– It is a high-technology oriented institution focusing on advanced disciplines in aerospace.
– It aims to develop aerospace technologies with strong science content, design and build small, medium sized civil aircraft, and support all national aerospace programmes.

Astronomical Transients

Syllabus:GS3/Science and Technology

Context

- Recently the Indian-American astronomer Shrinivas Kulkarni was awarded the Shaw Prize for Astronomy in 2024 for his work on the physics of astronomical transients.

What are Astronomical Transients?

- In astronomy, a 'transient' is any celestial object whose brightness changes in short spans of time.
- There are many kinds of astronomical transients, all of them united by phenomena that are violent in some measure.
- Astronomers study transients to understand where their violence comes from and what that can tell us about non-transient events.

Examples of Astronomical Transients

- Supernovae: A supernova is what happens when a star has reached the end of its life and explodes in a brilliant burst of light.
- Active galactic nucleus (AGN): The centers of massive galaxies host supermassive black holes. Sometimes, these black holes actively feast on matter in their orbit.
- Interactions between the black holes and the matter in this process cause the latter to acquire energy and glow with a changing brightness.
- Fast radio burst (FRB): It was discovered in 2007 and can emit more than 10-times as much energy as the Sun in a few milliseconds.

Zero Debris Charter

Syllabus:GS3/Science and Technology

Context

- Twelve nations and the European Space Agency (ESA) have signed the Zero Debris Charter at the ESA/ EU Space Council.

About

- The Zero Debris Charter is a world-leading effort to become debris neutral in space by 2030 that was unveiled at the ESA Space Summit in Seville meeting in November 2023.
- Parties: Austria, Belgium, Cyprus, Estonia, Germany, Lithuania, Poland, Portugal, Romania, Slovakia, Sweden and the United Kingdom have all pledged to adhere to the charter.

Need for the charter

- ESA estimates that there are currently more than one million pieces of space debris larger than one cm in Earth orbit.
- Each of these objects is capable of causing catastrophic damage to space assets.
- Hence quick and decisive action is required to improve the sustainability of space activities.

India steps up critical mineral acquisition plans in Africa

Syllabus: GS3/Science and Technology

Context

- India is looking to ramp-up its critical mineral play in Africa as it keys resource securitisation and an upsetting of the Chinese apple-cart in the region.

Critical Minerals

- These are minerals that are essential for economic development and national security.
- The lack of availability of these minerals or the concentration of extraction or processing in a few geographical locations could potentially lead to "supply chain vulnerabilities and even disruption of supplies".

Applications of Critical Minerals

- Clean technologies initiatives such as zero-emission vehicles, wind turbines, solar panels etc.
- Critical minerals such as Cadmium, Cobalt, Gallium, Indium, Selenium and Vanadium and have uses in batteries, semiconductors, solar panels, etc.
- Advanced manufacturing inputs and materials such as defense applications, permanent magnets, ceramics.
- Minerals like Beryllium, Titanium, Tungsten, Tantalum, etc. have usage in new technologies, electronics and defense equipment.
- Platinum Group Metals (PGMs) are used in medical devices, cancer treatment drugs, and dental materials.

List of Critical Minerals

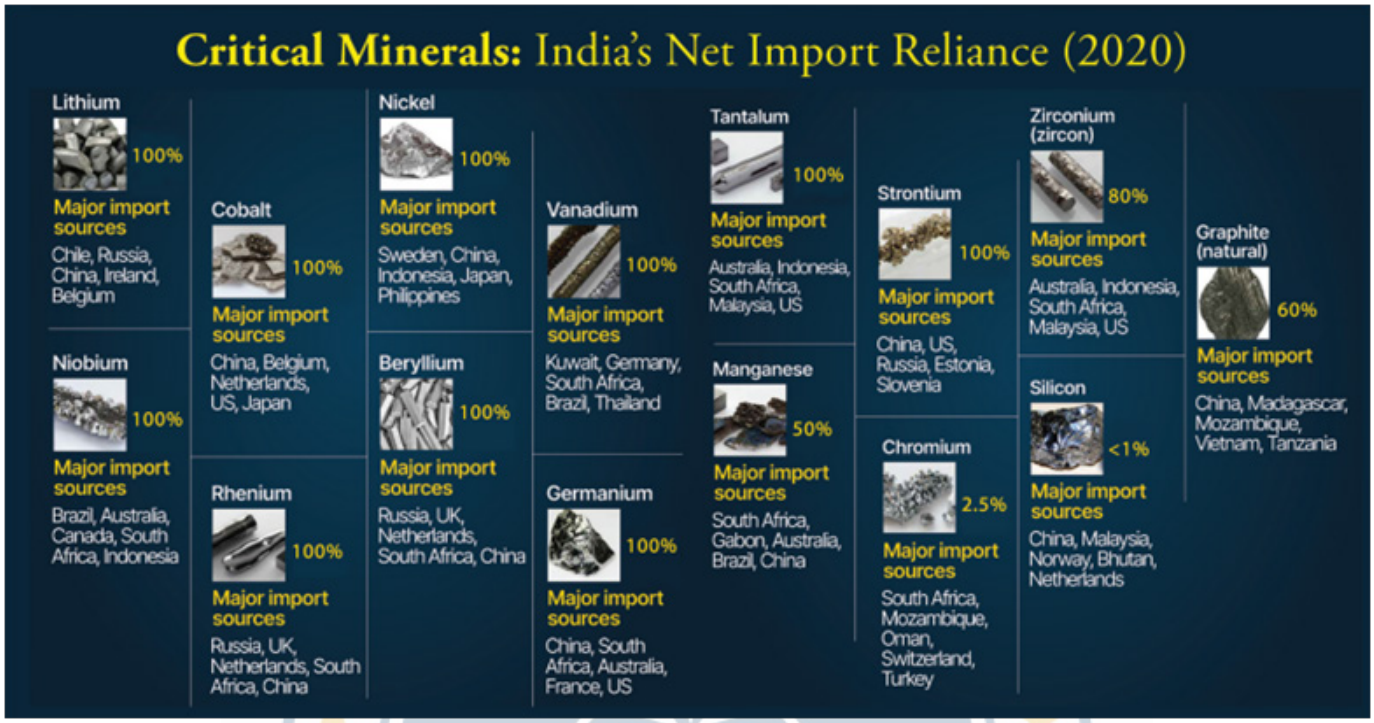
- Different countries have their own unique lists of critical minerals based on their specific circumstances and priorities.
- A total of 30 minerals were found to be most critical for India, out of which two are critical as fertilizer minerals: Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.

Indian Presence in africa

- In Tanzania, India is pitching for access to resources such as niobium and graphite; in Zimbabwe for lithium, and for copper and cobalt in Congo and Zambia.
- India signed an MoU with the Republic of Cote d'Ivoire for collaboration in the field of geology and mineral resources.

Khanij Bidesh India Limited (KABIL)

– It was formed in 2019 as a joint venture of state-run miners NALCO, HCL and MECL to source strategic minerals such as lithium and cobalt etc. from abroad.
– KABIL carries out identification, acquisition, exploration, development, mining and processing of strategic minerals overseas for commercial use and meeting the country's requirement of these minerals.



Chinese Presence

- In Congo, China is said to control over 5 percent of the cobalt processing facilities.
- Chinese companies are estimated to own 80 per cent in Tenke Fungurume, a copper-cobalt mine, which produces nearly 12 percent of the world's resources.
- Around 95 per cent of stake in a yet to be developed cobalt and copper project Kinsafu was picked up by the Chinese.
- In Zimbabwe substantial Chinese investments are being made towards securing lithium.

Mineral Security Partnership (MSP)

– It is a US-led collaboration of 14 countries that would focus on the supply chains of minerals such as Cobalt, Nickel, Lithium, and also the 17 'rare earth' minerals.
– Members: Australia, Canada, Finland, France, Germany, India, Italy, Japan, the Republic of Korea, Norway, Sweden, the UK, U.S., and the EU.
– Mandate: To catalyze public and private investment in critical mineral supply chains globally. It directly addresses four major critical minerals challenges:
a. Diversifying and stabilizing global supply chains;
b. Investment in those supply chains;
c. Promoting high environmental, social, and governance standards in the mining, processing, and recycling sectors; and
d. Increasing recycling of critical minerals.

Way Ahead

- Critical minerals have become essential for economic development and national security in the country.
- Minerals such as Lithium, Cobalt etc. have gained significance in view of India's commitment towards energy transition and achieving net-zero emission by 2070.

Cybercrime Surge In India

Syllabus: GS3/Cyber Security

Context

- Recently, the CEO of the Indian Cyber Crime Coordination Centre (I4C) highlighted that India has witnessed a sharp increase in cybercrime incidents.

About the Cyber Crime

Do You Know?

- Cyber Crime is **not defined in Information Technology Act 2000** nor in the I.T. Amendment Act 2008 **nor in any other legislation in India.**
- However, the IT Act defines a computer, computer network, data, information and all other necessary ingredients that form part of a cyber crime.
- It is interpreted as **any offence or crime** in which a **computer is used is a cyber crime.**

- It is the use of digital technologies such as computers and the internet to commit criminal activities.
- It includes financial fraud (credit card fraud, online transaction fraud), crime against women and children with regard to sexually explicit material, and deep fake content etc.
- Reasons for increase in Cybercrime: Rapid Digitalisation, Large Internet User Base, Inadequate Cybersecurity Infrastructure, Insider Threats, Payment Systems Vulnerability, and Vulnerable population because of Low digital literacy etc.

Rise in Cybercrime in India

- Daily Complaints: India is facing a rise in cybercrime, averaging more than 7,000 complaints daily up to May this year.
- Cyber Fraudsters' Locations: Many cyber fraudsters targeting India are believed to be operating from key locations in Southeast Asia, including Pursat, Koh Kong, Sihanoukville, Kandal, Bavet, and Poipet in Cambodia; Thailand; and Myawaddy and Shwe Kokko in Myanmar.
- Upward Trend in Cybercrime: Complaints surged by 113.7% from 2021 to 2022 and 60.9% from 2022 to 2023. The number of complaints has steadily increased over the years.

Cyber Fraud Incidents in 2024

- Types of Scams: Most cyber fraud incidents involve fake trading apps, loan apps, gaming apps, dating apps, and algorithm manipulation.

CHINA CONNECTION?

- **6L+ complaints involving ₹7,061cr** received on India's national cyber crime portal
- **3.2L mule accounts frozen** in last 4 months & **over 3k URLs and 595 apps blocked**
- **5.3L SIM cards** and over **80,000 IMEI numbers suspended** since July 2023
- India doesn't rule out China's involvement in these scams as many Chinese people work in these hubs

- Reported Scams: Between January and April, the I4C received 4,599 complaints about digital fraud amounting to Rs 1,203.06 crore.
- Additionally, trading scams, investment scams, and dating scams were reported.

Modus Operandi of Fraudsters

- Contact Method: Victims are contacted via normal call from India number using call spoofing.
- Impersonation: The fraudsters also make calls posing as officers of various law enforcement agencies.

Challenges and Necessities

- Alarming Trend: This surge in cybercrime cases suggests an alarming trend and underscores the increasing challenges related to cybersecurity in the country.
- Need for Enhanced Cyber Defence: This also highlights the necessity for enhanced cyber defence mechanisms, public awareness, and robust legal frameworks to tackle the burgeoning issue of cybercrime.
- Challenges and impacts of cyber crime are multifaceted that include Financial Losses, Data Breaches, Identity Theft, Disruption of Services, Loss of Intellectual Property, Reputational Damage, and National Security Concerns etc.

Actions Taken by Law Enforcement

- Freezing of Mule Bank Accounts: The I4C and various law enforcement agencies have frozen nearly 325,000 mule bank accounts in the past four months.
- Blocking of SIM Cards and Social Media Accounts: Additionally, 530,000 SIM cards and 3,401 social media accounts, including WhatsApp groups, have been blocked.

Related Key Provisions

- Constitution of India: According to the Seventh Schedule of the Indian Constitution, cybercrimes are within the purview of State Subjects.
- Information Technology Act, 2000: Section 43, 66, 70, and 74 of the IT Act, 2000 deal with hacking and cyber crimes.
- Indian Computer Emergency Response Team (CERT-In) issues alerts and advisories regarding latest cyber threats/vulnerabilities and countermeasures to protect computers and networks on a regular basis.
- National Cyber Coordination Centre (NCCC) has been set up to generate necessary situational awareness of existing and potential cyber security threats and enable timely information sharing for proactive, preventive and protective actions by individual entities.

Indian Cyber Crime Coordination Centre (I4C)

– It is an initiative of the Union Ministry of Home Affairs (MHA) to deal with cyber crime in the country in a coordinated and comprehensive manner.
– It focuses on tackling all the issues related to Cybercrime for the citizens, which includes improving coordination between various Law Enforcement Agencies and the stakeholders.

Objectives

– To act as a nodal point to curb Cybercrime in the country.
– To strengthen the fight against Cybercrime committed against women and children.
– Facilitate easy filing Cybercrime related complaints and identifying Cybercrime trends and patterns.
– To act as an early warning system for Law Enforcement Agencies for proactive Cybercrime prevention and detection.
– Assist States/UTs in capacity building of Police Officers, Public Prosecutors and Judicial Officers in the area of cyber forensic, investigation, cyber hygiene, cyber-criminology, etc.

Strengthening the Cyber Security

- Data localisation: Most cyber crimes are trans-national in nature with extra-territorial jurisdiction.

Therefore, 'data localisation' is required, so that enforcement agencies are able to get timely access to the data of suspected Indian citizens.

- Upgrade cyber labs: The cyber forensic laboratories of States must be upgraded with the advent of new technologies.
- Cyber insurance: Designing cyber insurance policies tailored to the unique requirements of diverse businesses and industries is essential.
- Stringent Data Protection Law: Data necessitates a robust data protection framework in India. India's Personal Data Protection Bill, 2019 is a good step in the right direction.

Related International Measures

- Budapest Convention: It is the 1st international treaty to address cybercrime.
- India is not a signatory to the treaty.
- Internet Corporation for Assigned Names and Numbers (ICANN): It is a US-based not-for-profit organisation for coordinating & maintenance of several databases.
- Internet Governance Forum: It is the United Nations forum for multi-stakeholder policy dialogue on Internet governance issues.

Conclusion

- As the digital landscape continues to evolve, so does the nature of cyber threats. It is crucial for individuals, businesses, and the government to stay vigilant and proactive in the face of these challenges.
- With collective efforts and robust cybersecurity measures, we can hope to mitigate the risks and safeguard our digital space.

Phase II Trials of TB vaccine MTBVAC

Syllabus: GS3/Science and Technology

Context

- The Central Drug Standard Control Organisation's (CDSCO) has approved a proposal to conduct the phase II clinical trial of the Mycobacterium Tuberculosis (Live Attenuated) Vaccine.

About

- MTBVAC is derived from a genetically modified form of the pathogen isolated from humans Mycobacterium tuberculosis which contains all the antigens present in strains that infect humans.
- MTBVAC is being developed for two purposes;
- As a more effective and potentially longer-lasting vaccine than BCG for newborn children, and
- For the prevention of TB in adults and adolescents, for whom there is currently no effective vaccine.
- The only vaccine in use today, BCG [Bacillus Calmette and Guérin], is an attenuated variant of the bovine TB pathogen.
- It is more than a hundred years old and has a very limited effect on pulmonary tuberculosis.

What is Tuberculosis?

– Tuberculosis (TB) is an infectious disease that most often affects the lungs and is caused by the bacteria Mycobacterium tuberculosis.
– It spreads through the air when infected people cough, sneeze or spit.
– TB can manifest in two forms: Latent TB infection and active TB disease.
a. In latent TB infection, the bacteria are present in the body, but the immune system keeps them in check, and the person does not exhibit symptoms.
b. However, the bacteria can become active later, leading to active TB disease, which is characterized by symptoms such as persistent cough, chest pain, weight loss, fatigue, and fever.
– Symptoms: prolonged cough (sometimes with blood), chest pain, weakness, fatigue, weight loss, fever, night sweats.
a. The symptoms people get depend on where in the body TB becomes active. While TB usually affects the lungs, it also affects the kidneys, brain, spine and skin.
– Treatment: Tuberculosis is preventable and curable.
a. Tuberculosis disease is treated with antibiotics.
b. TB Vaccine: The Bacillus Calmette-Guérin (BCG) vaccine remains the only licensed vaccine against TB; it provides moderate protection against severe forms of TB (TB meningitis) in infants and young children.

Widal Test For Typhoid

Syllabus :GS 3/S&T

In News

- Recently, it has been observed in India, clinicians use the Widal test extensively to diagnose typhoid in both public and private sectors.

About Widal Test

- It is named after its inventor, Georges-Fernand Widal.
- It is done to detect the presence of serum agglutinins or antibodies (H and O) in individuals who have typhoid and paratyphoid fever.
- It's a point-of-care test and doesn't need special skills or infrastructure.
- The aim of this test is to analyse infection caused by contaminated food and beverages.
- Issues : Widal Test which is widely followed is not a reliable test for typhoid.
- The test's propensity for erroneous results is obfuscating India's typhoid burden, increasing expenses, and risking more antimicrobial resistance.

Typhoid

- Typhoid fever is a life-threatening infection caused by the bacterium Salmonella Typhi.
- Salmonella Typhi lives only in humans.
- It is also known as enteric fever.
- It is usually spread through contaminated food or water.
- Causes: Lack access to safe drinking water or adequate sanitation, urbanization and climate change, antibiotic resistance.
- Symptoms: It presents with a high fever, stomach pain, weakness, and other symptoms like nausea, vomiting, diarrhoea or constipation, and a rash.
- Threat : If left untreated, typhoid can be life-threatening. Per the World Health Organisation, 90 lakh people are diagnosed worldwide with typhoid every year and 1.1 lakh die of it.
- Treatment : Typhoid fever can be treated with antibiotics although increasing resistance to different types of antibiotics is making treatment more complicated.

World's Largest Facility Designed to Remove CO2 from Atmosphere

GS3/Science and Technology

Context

- The World's largest facility designed to remove carbon dioxide from the atmosphere started operations in Iceland.

About

- It is named Mammoth and it is the second commercial direct air capture (DAC) facility in the nation and is significantly larger than its predecessor, Orca, which began in 2021.
- It is situated on a dormant volcano in Iceland and 50 kilometres from an active volcano.
- The facility draws in air and chemically extracts captured carbon by turning it into stone beneath the earth's surface, utilizing Iceland's abundant geothermal energy to power the process.
- It aims to remove 36,000 tons of carbon annually— equivalent to removing about 7,800 gas-powered cars from the road each year.

Direct Air Capture (DAC) Facility

- DAC technologies extract CO2 directly from the atmosphere at any location, unlike carbon capture which is generally carried out at the point of emissions, such as a steel plant.
- The CO2 can be permanently stored in deep geological formations or used for a variety of applications.
- To date, 27 DAC plants have been commissioned in Europe, North America, Japan and the Middle East capturing almost 0.01 Mt CO2/year.

Concerns of Direct Air Capture (DAC) Facility

- Energy Requirements: DAC facilities require significant amounts of energy to operate, which could potentially exacerbate rather than alleviate carbon emissions if the energy source is not renewable or low-carbon.
- Cost: Building and operating DAC facilities is expensive, especially at scale.
- Scalability: While DAC technology shows promise, its scalability remains uncertain.
- It's unclear whether DAC can be scaled up sufficiently to make a meaningful impact on global carbon dioxide levels and climate change mitigation efforts.
- Diversion from Natural Solutions: Some argue that investing in DAC technology may divert attention and resources away from natural climate solutions like reforestation.

Carbon Capture Technologies

- The technologies can be broadly categorized into three main types: pre-combustion capture, post-combustion capture, and oxy-fuel combustion.
- **Pre-Combustion Capture:**
  - Gasification: Involves converting carbon-containing feedstock, such as coal or biomass, into a synthesis gas (syngas) composed primarily of carbon monoxide (CO) and hydrogen (H2). The CO2 can then be separated from the syngas before combustion.
  - Chemical Looping Gasification: Utilizes metal oxide particles to indirectly convert carbon-containing fuel into syngas. The metal oxide captures the carbon from the fuel, and then the CO2 can be separated from the metal oxide.
  - Integrated Gasification Combined Cycle (IGCC): Integrates gasification technology with a combined cycle power plant, allowing for efficient power generation while capturing CO2 before combustion.
- **Post-Combustion Capture:**
  - Amine Scrubbing: Involves passing the flue gas from combustion through a liquid solvent, typically an amine solution, which absorbs CO2. The CO2-rich solvent is then heated to release the captured CO2 for storage or utilization.
  - Membrane Separation: Uses selective membranes to separate CO2 from other gases in the flue gas based on differences in permeability. Adsorption: Utilizes solid materials, such as activated carbon or zeolites, to adsorb CO2 from the flue gas. The adsorbent is then regenerated by desorbing the CO2, allowing for multiple cycles of capture and release.
- **Oxy-Fuel Combustion:**
  - Involves burning fossil fuels in oxygen instead of air to produce a flue gas consisting mainly of CO2 and water vapor.
  - The CO2 can then be easily separated from the water vapor and other impurities, resulting in a concentrated stream of CO2 for storage or utilization.

Emerging DAC technologies

- Electro swing adsorption (ESA)-DAC is based on an electrochemical cell where a solid electrode absorbs CO2 when negatively charged and releases it when a positive charge is applied.
- It is currently being developed in the United States and United Kingdom.
- Zeolites are now being adopted for DAC due to their porous structure suitable for CO2 adsorption.
- The first operational DAC plant relying on zeolites was commissioned in 2022 in Norway, with plans to scale the technology up to 2 000 tCO2/year by 2025.
- Passive DAC relies on accelerating the natural process that transforms calcium hydroxide and atmospheric CO2 into limestone.
- This process is being engineered in the United States by a company using renewably powered kilns to separate CO2 from limestone.

Way Ahead

- Current global carbon removal efforts are capable of handling only about 0.01 million metric tons per year, far from the 70 million tons per year by 2030 to meet climate targets.
- With larger DAC plants under construction and more ambitious plans for future facilities, there is hope that significant progress can be made in combating climate change.
- Innovation in CO2 use opportunities, including synthetic fuels, could drive down costs and provide a market for DAC.
- Early commercial efforts to develop synthetic aviation fuels using air-captured CO2 and hydrogen have started, reflecting the important role that these fuels could play in the sector.

National Technology Day

Syllabus: GS3/Science and Technology

Context

- Recently, the Technology Development Board (TDB) of the Department of Science and Technology (DST) celebrated the National Technology Day (2024).

About

- It is celebrated annually on 11th May, dedicated to honouring the relentless efforts of scientists, engineers, and innovators who work tirelessly to advance technology and simplify our lives.
- The Rashtriya Vigyan Puraskar Awards, akin to the prestigious Padma awards, are announced annually on National Technology Day.
- Theme for 2024: 'Promoting Clean and Green Technologies for a Sustainable Future'.

Brief History

– The inception of National Technology Day dates back to May 11, 1998, when India successfully conducted Pokhran-II Nuclear Tests under the codename 'Operation Shakti'.
– The then Prime Minister, Atal Bihari Vajpayee, declared May 11 as National Technology Day, and since then, the day has been celebrated annually to highlight India's technological progress.
a. The Indira Gandhi Centre for Atomic Research (IGCAR) and the Bhabha Atomic Research Centre (BARC) played pivotal roles in advancing nuclear science within the country.

Major Highlights of India's Technological Progress Since 1998

- Since 1998, India has continued steadily in its journey of technological developments.
- Among the visible examples of India's impactful technological progress are the digital payment gateways that have democratised financial transactions like never before, and exemplify India's leadership in the world in this area.
- Other lesser-known milestones that have quietly been achieved are making of indigenous BioJet fuels, mapping of subsurface water channels for sustainable use of water, making of indigenous light combat aircraft, development of variety of crops by traditional methods of breeding, digitisation of many aspects of trade, and moving firmly towards a Hydrogen economy.
- Supercomputing in India began in the mid-1980s when access to the CRAY supercomputer was denied.

- The Centre for Development of Advanced Computing (C-DAC) launched PARAM 10,000 in 1998 that is capable of performing 100-gigaflop operations, demonstrating India's capacity to build high-performance computing systems.
- India is currently making progress in more advanced and sophisticated technologies such as neutrino, gravitational waves, scramjets, tokamak and sending human missions into space.

Technology Development Board (TDB)

- It was constituted in 1996 under the **Technology Development Board Act, 1995**, as a **statutory body**, to promote development and commercialization of indigenous technology and adaptation of imported technology for wider application.
  - It is the **first organisation** of its kind within the government framework with the **sole objective of commercialising the indigenous research.**
- It provides **equity capital or loans** *(at a simple interest rate of 5% per annum)* to industrial concerns and financial assistance to research and development institutions.

Importance of Clean and Green Technologies

- Clean and green technologies, often referred to as 'Greentech' or 'clean technology', are crucial for a sustainable future, offering innovative solutions that protect our environment while also providing economic and health benefits.
- Mitigating Climate Change Impacts: These technologies reduce greenhouse gas emissions, a major contributor to global warming.
- By utilising renewable energy sources such as solar, wind, and hydro power, we can significantly cut down our reliance on fossil fuels, thereby reducing our carbon footprint.
- Conserving Natural Resources: These 'Greentech' promote the efficient use of resources.
- For instance, water-saving technologies can help conserve water, a precious resource that is becoming increasingly scarce due to climate change and overuse.
- Economic Growth: Green technologies can contribute to economic growth.
- They can create new industries and jobs, stimulate innovation, and provide opportunities for investment and trade.

Major Hurdles

- Funding Challenges: The level of investment in research and development in India is often insufficient to support cutting-edge scientific endeavours and technological innovations.
- Educational Variability: Disparities in the quality of science and technology education across the country hinder the development of a skilled workforce.
- Infrastructure Issues: Lack of adequate infrastructure can pose a significant challenge to technological progress.
- Navigating Synthetic Media: In an era dominated by synthetic media, discerning authenticity in a landscape inundated with manipulated content is a significant challenge.
- Technical Debt to Technical Wellness: The transition from managing technical debt to prioritising technical wellness emerges as a guiding principle, fostering sustainable technology ecosystems that can adapt and thrive in the face of evolving challenges.

Major Steps towards Clean and Green Technologies in India

- National Electric Mobility Mission Plan and Faster Adoption and Manufacturing of Hybrid and Electric Vehicles (FAME) to promote electric mobility and manufacturing of electric & hybrid vehicles and their components, and to support the transport sector in adopting green technologies.

- Green Hydrogen Mission which focuses on using green hydrogen as an energy source, and India's journey towards a net-zero target by 2070.
- Carbon Capture Utilisation and Storage (CCUS) Technologies that involve the capture of CO2, generally from large point sources like power generation or industrial facilities that use either fossil fuels or biomass as fuel.
- Other major initiatives like Pradhan Mantri Ujjwala Yojana, Make in India program, Energy Transition and Energy Storage Projects, Renewable Energy Evacuation, Green Credit Program, PM-PRANAM and GOBARdhan Scheme, Bhartiya Prakritik Kheti Bio-Input Resource Centres, MISHTI, Amrit Dharohar, Coastal Shipping, and Vehicle Replacement are focusing on various aspects of green technology, including waste management, heritage conservation, maritime transport, and vehicle replacement.

ISRO Tests 3D-Printed Rocket Engine

Syllabus: GS 3/S&T

In News

- Indian Space Research Organisation (ISRO) successfully tested a liquid rocket engine made with the help of Additive Manufacturing Technology — commonly known as 3D printing.

About Rocket Engine

- The PS4 engine, designed for the fourth stage of the Polar Satellite Launch Vehicle (PSLV), was redesigned by ISRO for production using 3D printing.
- The PS4 engine uses a bipropellant combination of nitrogen tetroxide as the oxidizer and monomethyl hydrazine as the fuel
- Laser Powder Bed Fusion technique used in the manufacturing process. Laser Powder Bed Fusion (LPBF) is a metal 3D printing technique where a laser selectively melts and fuses metal particles together, building up a 3D object layer by layer.
- The technology helped ISRO bring down the number of parts in the engine from 14 to a single piece.

What is 3D Printing?

About:

- The term 3D printing is typically used to refer to all types of additive manufacturing.
- It refers to the transformation of a digital CAD (Computer-Aided Design) file into a three-dimensional physical solid object or part.
- It typically does this by depositing material layer by layer in precise geometric shapes using a printhead, nozzle, or other printing technology.
- It is an additive process, in which layers of a material like plastic, composites or bio-materials are built up to construct objects that range in shape, size, rigidity, and colour.

Process:

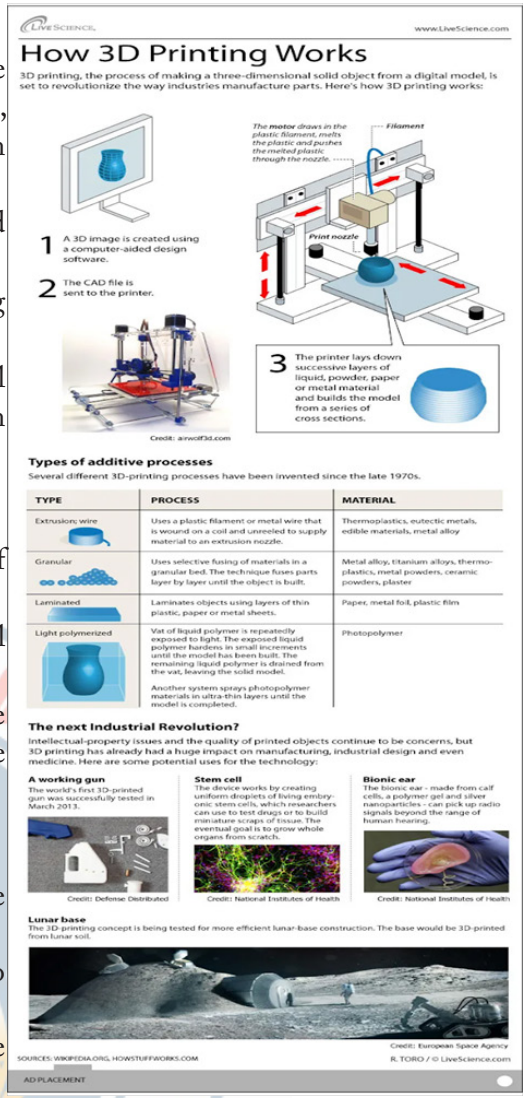
- The process of 3D printing a building involves the use of computer-aided design (CAD) software to create a digital blueprint.
- This blueprint is then converted into a format the 3D printer can understand, typically a .STL or .OBJ file.

Application:

- It has widely been applied towards the agricultural, biomedical, automotive, and aerospace industries
- There are numerous applications of 3D printing technology for producing biomedical products such as drugs, artificial skin, bone cartilage, tissue, and organs, and in cancer research and education.
- It is used widely in the manufacturing industry and medical education field.
- It has been used to create complex walls , endodontic guides , sport shoes , engine parts for the aviation industry, and tumour reconstruction.

Benefits

- 3D printing technology, which has the potential to revolutionize the construction industry, offers unprecedented design freedom, reduces material waste, and significantly reduces construction time.
- It enables the creation of complex architectural forms that would be challenging to achieve with traditional methods.
- It allows for the customization and optimization of building components.
- The layer-by-layer approach of 3D printing allows precise control over material distribution and structural integrity, resulting in highly efficient and robust structures.



Challenges

- The slow adoption in India can be attributed to the lack of understanding about 3D printing.
- In the 3D printing industry, parts to build the printer are still very expensive.
- Lack of investment and fewer R&D centres for 3D printing are some of the additional factors that are holding back large scale adoption.

Future Outlook

- 3D printing technology has emerged in recent years as a flexible and powerful technique in advanced manufacturing.
- The future demand for 3D printing lies in its capability to perform different print functions and "print-it-all" structures.
- These functions are progressively perceived as the driving force for researchers and practitioners .
- A better understanding of 3D printing technology and its applications among users will definitely help increase its adoption
- The successful hot testing of the 3D printed PS4 engine is a significant step in leveraging additive manufacturing technology for rocket engines in the future.
- This paves the way for the induction of the additively manufactured PS4 engine into the regular PSLV program, ushering in a new era of advanced manufacturing techniques for India's space endeavours

Regulatory Sandboxes in Artificial Intelligence

Syllabus: GS 3/S&T

In News

- Many governments and regulatory bodies have turned to innovative approaches such as "AI regulatory sandboxes" to strike a balance between fostering AI innovation and ensuring responsible development.

About Regulatory Sandbox

- A regulatory sandbox is a tool allowing businesses to explore and experiment with new and innovative products, services or businesses under a regulator's supervision.

Applications in AI

- Sandbox provides a controlled environment for experimentation, offering invaluable insights into AI technologies capabilities and limitations while fostering collaboration between innovators and regulators.
- It promotes transparency and accountability by requiring participants to disclose information about their AI models, addressing concerns about opacity and enabling tailored regulations.
- by mandating risk assessments and safeguards, the sandbox encourages responsible innovation, mitigating potential societal impacts of AI applications and nurturing a culture of ethical development within the industry.

Relevance

- It has become a significant instrument in various countries, used to evaluate innovations within a defined and monitored time frame while being subject to regulatory oversight and controlled constraints.
- It empowers policymakers to adopt a well-informed stance in crafting legal and policy responses that foster beneficial innovation.
- It enhances access to funding by mitigating information imbalances and reducing regulatory costs.
- It is a catalyst for supporting economic growth, and ensuring responsible governance in a rapidly evolving landscape of emerging technologies.

Progress across the globe

- The inception of the first formal regulatory sandbox is often attributed to the Financial Conduct Authority in the U.K.
- Numerous other nations have subsequently introduced or announced similar initiatives to assess innovations spanning various industries.
- According to data from the World Bank, as of November 2020, there were approximately 73 regulatory sandboxes, both announced and operational, within the financial sector across 57 jurisdictions.
- Article 53 of the European Union's AI Act, has the provision of a regulatory sandbox to test technology before making it mainstream.
- Spain became the first European country to have established the statute of the Spanish Agency for the Supervision of Artificial Intelligence (AESIA), ahead of the European regulation on artificial intelligence.

Status in India

- In India, all financial sector regulators, including the Reserve Bank of India, Securities and Exchange Board of India, Insurance Regulatory and Development Authority of India, Pension Fund Regulatory and Development Authority, and International Financial Services Centre Authority, have launched their respective regulatory sandboxes.
- The recently passed Telecommunications Act 2023 proposed a regulatory sandbox where the central Government has the authority to establish one or more regulatory sandboxes, as prescribed, to promote and facilitate innovation and technological development in the field of telecommunications, specifying the manner and duration for their implementation.

Conclusion and Way Forward

- India's interest in regulating AI is grounded in a multifaceted approach encompassing economic ambitions, ethical considerations, job creation, industrial transformation, and overall societal welfare.
- As a global technology hub, the chair of the Global Partnership on Artificial Intelligence and the Delhi Declaration, India aspires to foster innovation in alignment with its cultural and ethical values.
- A comprehensive regulatory sandbox can be envisioned to guide businesses, researchers, and policymakers, steering AI development towards sustainable growth.
- A regulatory sandbox should not be viewed as an approach to directly govern AI, but rather as a progressive step preceding formal legislation.
- It serves as a preparatory measure tailored to India's specific circumstances, paving the way for future regulatory actions aligned with the country's needs and developments in the AI landscape.

Additional Information

– In India, NITI Ayog released a discussion paper outlining a national strategy for AI, which led to the establishment of the national AI Portal.
– The Ministry of Electronics and Information Technology (MeitY), released a report on AI Innovation 2023 highlighting India's AI vision through seven working groups.
– The latest proposal of the Digital India Act, 2023 also talks about regulating AI by creating a separate set of laws and regulations.

NISAR Satellite will Monitor Tectonic Movements

Syllabus: GS3/Science and Technology

Context

- Recently the ISRO Chairman S. Somanath said that the NISAR satellite will be able to monitor tectonic movements accurately and can fully map the earth twice a month.

NISAR Satellite

- NISAR is an Earth-observation satellite that stands for (NASA-ISRO Synthetic Aperture Radar).
- It is Jointly developed by the National Aeronautics and Space Administration (NASA) and the Indian Space Research Organisation under a partnership agreement signed in 2014.
- It will be launched into a polar Sun-synchronous dawn-dusk orbit.
- NISAR is the first satellite mission to collect radar data in two microwave bandwidth regions, called the L-band and the S-band.
- The S-band payload has been made by the ISRO and the L-band payload by the U.S.

Monitoring of Earth Surface

- The NISAR system comprises a dual frequency, fully polarimetric radar, with an imaging swath greater than 150 miles (240 km).
- This design permits complete global coverage every 12-days, allowing researchers to create time-series interferometric imagery and systematically map the changing surface of Earth.
- It can monitor various aspects in very high resolution.
- After a 90-day commissioning period, the mission will conduct a minimum of three full years of science operations with the L-band radar to satisfy NASA's requirements,
- ISRO requires five years of operations with the S-band radar.

Objectives of the Mission

- NISAR can measure tectonic plate movements accurately. So a lot of geological, agricultural and water-related observations can be obtained from this satellite.
- It can study the water-stressing, climate change-related issues, agricultural changes through patterns, yield, desertification and continental movements precisely with respect to annual water cycle movements.
- NISAR's data can help people worldwide better manage natural resources and hazards, as well as providing information for scientists to better understand the effects and pace of climate change.

Chapter-
6

INTERNATIONAL RELATION

First Round Of Talks On India-Middle East-Europe Economic Corridor

Syllabus: GS2/International Relations

Context

- The Indian delegation concluded its first round of talks with UAE officials on developing the ambitious India-Middle East-Europe Economic Corridor (IMEEC).

India-Middle East-Europe Economic Corridor (IMEC)

- Participants: During the Delhi G20 Summit, India, USA, UAE, Saudi Arabia, France, Germany, Italy and the European Union signed a Memorandum of Understanding (MoU) to establish the India-Middle East-Europe Economic Corridor.
- Objective: The corridor will encourage and provide impetus to economic development through enhanced connectivity and economic integration between Asia, West Asia, the Middle East and Europe.

Components

- The India-Middle East-Europe Economic Corridor will consist of two separate corridors,
- The East corridor connecting India to West Asia/Middle East and
- The Northern corridor connecting West Asia/Middle East to Europe.
- The project would involve the building of a railway line across the Arabian Peninsula through the United Arab Emirates and Saudi Arabia and develop shipping connectivity to India and Europe on either end of this corridor.
- The corridor could be further developed to transport energy through pipelines and data through an optical fiber link.

Ports Which are Part of IMEC

- India: Ports in Mundra (Gujarat), Kandla (Gujarat), and Jawaharlal Nehru Port Trust (Navi Mumbai).
- Europe: Piraeus in Greece, Messina in Southern Italy, and Marseille in France.
- Middle East: Ports include Fujairah, Jebel Ali, and Abu Dhabi in the UAE, as well as Dammam and Ras Al Khair ports in Saudi Arabia.
- Israel: Haifa port.
- Railway Line: The railway line will link Fujairah port in the UAE to Haifa port in Israel, passing through Saudi Arabia (Ghuwaifat and Haradh) and Jordan.

Significance

- Economic Development: By linking Asia, West Asia, the Middle East and Europe through enhanced connectivity and economic integration, the corridor aims to give a boost to economic development in the regions.
- Connectivity: The corridor will include a rail line, which, upon completion, will provide a reliable and cost-effective cross-border ship-to-rail transit network.
- The rail line will supplement the existing multi-modal transport routes enhancing trans-shipment of goods and services from South East Asia through India to West Asia/Middle East and Europe.
- Eco-friendly Infrastructure: It places emphasis on developing environmentally friendly infrastructure.
- Transformative Integration: It intends to increase efficiency, reduce costs, secure regional supply chains, increase trade accessibility, enhance economic cooperation, generate jobs and lower greenhouse gas emission, resulting in a transformative integration of Asia, Europe and the Middle East (West Asia).

Opportunities for India

- Alternative to BRI: It is an alternative to China's Belt and Road Initiative (BRI), which seeks to establish trade and infrastructure networks connecting Asia, Europe, and Africa.
- Bypassing Pakistan: IMEC breaks Pakistan's veto over India's overland connectivity to the West. Since the 1990s, India has sought various trans-regional connectivity projects with Pakistan. But Pakistan was adamant in its refusal to let India gain access to land-locked Afghanistan and Central Asia.
- Indo-US collaboration in the Middle East: This project has broken the myth that India and the United States might work together in the Indo-Pacific but not in the Middle East.

Hurdle before IMEC

- The Israel-Palestine conflict has put a pause on the normalization of Arab-Israel relations which is a key element of the multi-nation initiative.
- Vulnerability of the Strait of Hormuz: The entire trade of the IMEC architecture flows through the Strait of Hormuz and with Iran's proximity and control over the strait, the risk of disruptions remain very high.
- The security challenges in the region have made other partners reluctant to invest in the project.

Way Forward

- The geopolitical concerns need to be managed by striking a delicate balance in accommodating the geopolitical interests of the participating nations and addressing potential political sensitivities.
- There is also a need to maintain the required security apparatus as the project passes through certain unstable regions of the world.

46th Antarctic Treaty Consultative Meeting

Syllabus: GS2/IR

Context

- India successfully concluded hosting of the 46th Antarctic Treaty Consultative Meeting (ATCM-46) and the 26th Committee on Environmental Protection (CEP-26).

About

- The ATCM-46 and CEP-26 were hosted by the Ministry of Earth Sciences through the National Centre for Polar and Ocean Research (NCPOR), Goa, with support from the Antarctic Treaty Secretariat headquartered in Argentina.
- The ATCM-46 was held with the overarching theme of Vasudhaiva Kutumbakam, a Sanskrit phrase that means one Earth, one family, one future.
- The event witnessed the reaffirmation of the Antarctic Treaty (1959) and the Protocol on Environmental Protection to the Antarctic Treaty (the Madrid Protocol, 1991) by the Parties.

More about the News

- The ATCM and CEP are crucial global forums for Antarctic affairs convened annually that set collective and concerted dialogue and action towards preserving one of Earth's most pristine and fragile ecosystems.
- An additional working group discussed the development of a tourism framework for the southern white continent this year.
- Following the advice of the CEP, the Parties adopted 17 revised and new management plans for ASPAs (Antarctic Specially Protected Areas).
- The ATCM also encouraged efforts to increase renewable energy use and to ensure robust implementation of biosecurity measures to minimize the risks of Highly Pathogenic Avian Influenza.

Significance of Research in Antarctica

- Climate Change and Global Warming: Antarctica plays a crucial role in regulating Earth's climate. The Research helps scientists understand the dynamics of ice melting, sea level rise, and the impact of climate change on the polar regions and beyond.
- Ozone Layer Depletion: Research in Antarctica monitors the recovery of the ozone layer and helps assess the effectiveness of international agreements, such as the Montreal Protocol, in addressing ozone-depleting substances.

- Space Analog: Antarctica's extreme conditions, including low temperatures and isolation, make it an ideal analog for studying the challenges humans might face in future space exploration, such as missions to Mars.
- Scientific Discovery: Antarctica provides opportunities for the discovery of the remains of ancient organisms, meteorites, and insights into Earth's geological history.

India and Antarctica

- Antarctic Treaty: The Treaty covers the area south of 60°S latitude. It was signed at Washington D.C. in 1959 with the objective of the Demilitarisation of Antarctica.
- The signatories are supposed to bring laws so that no activity in contravention of the treaty takes place. India signed the treaty in 1983.
- The Convention on the Conservation of Antarctic Marine Living Resources (CCAMLR): CCAMLR was signed in Canberra in 1980 to protect and preserve the Antarctic environment and, particularly, for the preservation and conservation of marine living resources in Antarctica.
- India ratified the CCAMLR in 1985.
- Madrid Protocol: The Protocol on the Environmental Protection to the Antarctic Treaty (Madrid Protocol) was signed in Madrid in 1991. It aims to strengthen the Antarctic Treaty system and develop a comprehensive regime for the protection of the Antarctic environment and dependent and associated ecosystems.
- India ratified the Madrid Protocol in 1998.
- Council of Managers of the National Antarctic Programme (COMNAP)
- India is also a member of the COMNAP and the Scientific Committee of Antarctica Research (SCAR), which shows the significant position that India holds among the nations involved in Antarctic research.

About Antarctica

– Antarctica is the world's southernmost and fifth largest continent. It is also the world's highest, driest, windiest, coldest, and iciest continent.
– The continent is divided into East Antarctica (Greater Antarctica) and West Antarctica (Lesser Antarctica). They are separated by Transantarctic Mountains.
– East Antarctica is composed of older, igneous and metamorphic rocks whereas West Antarctica, is made up of younger, volcanic and sedimentary rock.
a. West Antarctica, is part of the "Ring of Fire," a tectonically active area around the Pacific Ocean.
– Mount Erebus, located on Antarctica's Ross Island, is the southernmost active volcano on Earth.
– Longest River: Onyx
– Largest Lake: Vostok

India offers $1-million aid to Papua New Guinea

Syllabus :GS 2/IR

In News

The Government of India has granted $1 million as immediate assistance for Papua New Guinea, which has been hit by a devastating flood and landslide that has so far killed 2,000 people.

- India had earlier supported Papua New Guinea in 2018 when the country was rocked by an earthquake and subsequently in 2019 and 2023 when volcanic eruptions hit the country.

India and Papua New Guinea

- Diplomatic relations between India and the Independent State of Papua New Guinea (PNG) were established when the latter got independence from Australia in 1975.
- PNG appointed its first defence adviser to India for taking forward defence cooperation
- PNG has been cooperative in issues taken up by India at various international fora including UN, Commonwealth, etc.

ECONOMIC & COMMERCIAL RELATIONS

10. Bilateral trade figures between India & PNG for the last few years are as follows:
Value: US$ million *(Source: Dept of Commerce, GOI)*

Year	2018-19	2019-20	2020-21	2021-22	2022-23
Export from India to PNG	49.72	56.02	56.17	69.95	85.84
Import into India from PNG	88.97	55.70	125.85	357.58	643.36
Total Bilateral Trade	138.69	111.72	182.02	427.53	729.20

About Papua New Guinea

– Papua New Guinea is an island country that lies in the south-western Pacific.
– It includes the eastern half of New Guinea and many small offshore islands. Its neighbours include Indonesia to the west, Australia to the south and Solomon Islands to the south-east.
– It is mainly mountainous but has low-lying plains in southern New Guinea. The country has several active volcanoes.

Ireland, Spain, and Norway to Formally Recognise Palestine

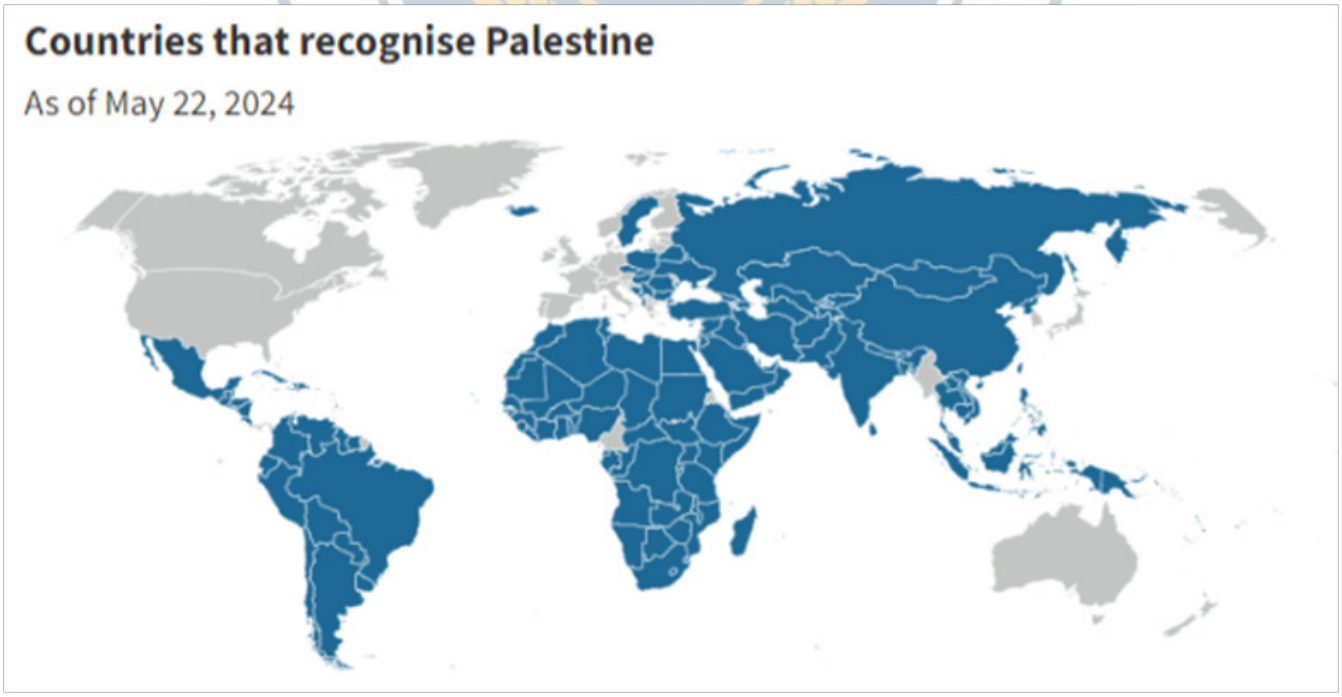
Syllabus: GS2/International Relations

Context

- Norway, Ireland and Spain announced that they will formally recognise the state of Palestine.

About

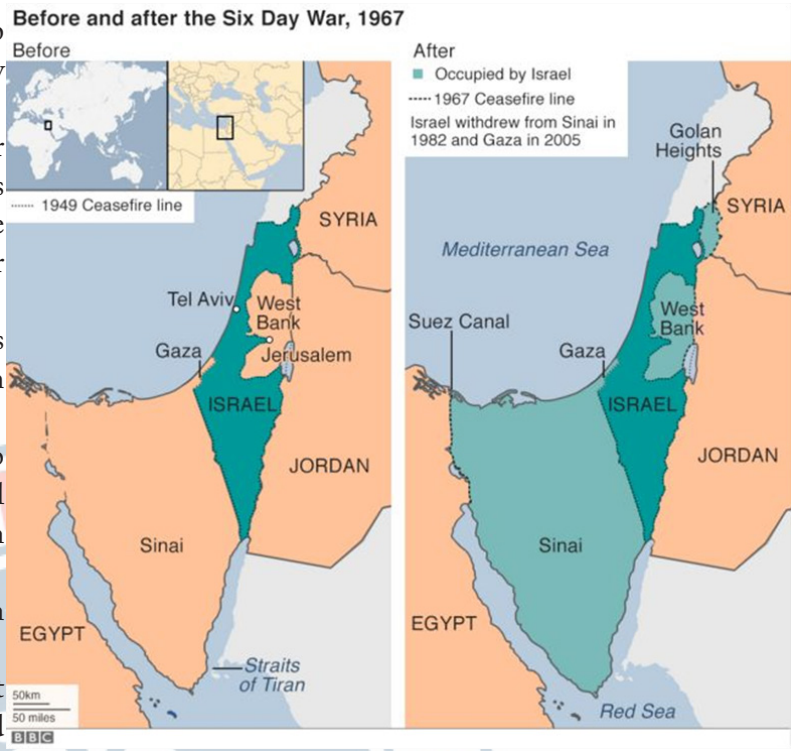
- A total of 143 out of 193 member-states of the UN have recognised a Palestinian state. The UK and the US are among nations that do not formally recognise a Palestinian state.
- Israel does not recognise Palestinian statehood and opposes the creation of a Palestinian state in the West Bank and Gaza. It argues such a state would be a threat to Israel's existence.



Israel-Palestine Conflict

- Inception of Conflict: The United Nations (UN) proposed an Arab-Jewish partition of Palestine between Palestine and the new state of Israel.
- This partition plan mandated 53 percent of the land to the Jewish-majority state (Israel) and 47 percent to the Palestinian-majority state (Palestine).

- This idea didn't receive well by the Arab countries in the Middle East.
- First Arab-Israeli war: Jewish paramilitary groups, however, formed the state of Israel by force in 1948. This prompted a deadly war with its Arab neighbors – Egypt, Iraq, Lebanon, Syria, and Jordan in 1948. This was the first Arab-Israeli war.
- Israel won this war and ended up occupying more land than previously envisaged in the 1947 UN partition plan.
- The Palestinians were forced out of their homes when the State of Israel was created in historical Palestine in 1948 (the Palestinians call the events 'Nakba', or catastrophe).
- Twenty-eight of those Palestinian families moved to Sheikh Jarrah in East Jerusalem to settle there.
- Six-Day War of 1967: In 1967, the Arab countries again refused to recognise Israel as a state, which led to another war, known as the Six-Day War.
- Israel won this war too and occupied even more parts of Palestine.
- The West Bank, the Gaza Strip and East Jerusalem, which houses the holy Old City, came under Israel's control.



- It also occupied Syrian Golan Heights and Egypt's Sinai Peninsula.
- By the early 1970s, Jewish agencies started demanding the families leave the land.
- Oslo Accords: It was backed by the United Nations (UN) and signed between the Israeli government and the Palestine Liberation Organization (PLO) in 1993.
- Under this, a part of the West Bank came under the control of the Palestinian Authority.
- Abraham Accords: Abraham Accords are a series of agreements to normalize relations between Israel and several Arab states.
- The accords are named after the patriarch Abraham regarded as a prophet in Judaism and Islam.
- The accords, all of which were signed in the latter half of 2020, consist of a general declaration alongside bilateral agreements between Israel and the United Arab Emirates, Bahrain, and Morocco.
- The accord has normalized the relations between many West Asian countries and Israel.
- 11 days war: In May 2021, Israeli police raided Al-Aqsa Mosque in Jerusalem, the third-holiest site in Islam, which set off an 11-day war between Israel and Hamas that killed more than 200 Palestinians and more than 10 Israelis.

Way Ahead

- Peace based on a "two-state solution" is much needed with the help of international organizations and can only be achieved from Israel-Palestine talks.

BIMSTEC Charter Came into Force

Syllabus: GS2/International Relations

Context

- The Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) will now be open to new members and observers after a historic first charter of the grouping came into force.

Background

- The seven members of BIMSTEC first signed the charter in 2022 at the fifth BIMSTEC summit held virtually in Colombo, Sri Lanka.

- However, it could come into force only after every country ratified the document, which finally happened in April 2024.

What is BIMSTEC?

- BIMSTEC is a regional organization that was established in 1997 with the signing of the Bangkok Declaration.
- Permanent Secretariat: Dhaka, Bangladesh
- Members: Bangladesh, Bhutan, Sri Lanka, Nepal, Thailand, Myanmar and India.
- Significance: The BIMSTEC countries are home to 22 percent of the total world population and have a combined gross domestic product (GDP) of about $3.6 trillion.

About Charter

- The charter establishes a legal and institutional framework for cooperation among the seven countries surrounding the Bay of Bengal.
- The document also gives the organization a legal personality, establishes a mechanism for admitting new members and observers, and enables negotiations and agreements with countries and other regional and international groupings.

Significant aspects of charter

- According to the charter all decisions will be taken by consensus among current members.
- The charter gives the institution a clear process for the admission of new members, including adding the criteria of geographical contiguity or "primary" dependence on the Bay of Bengal for trade and transport purposes.
- The charter also highlights that the leaders' summit will be held every two years and indicates the procedure for the rotational chairmanship of the organization.
- It also empowers the BIMSTEC ministerial meeting to set up any further criteria as required.

BIMSTEC and SAARC

- The idea of BIMSTEC also gained prominence after the 2016 Uri attack when India was able to get SAARC (South Asian Association for Regional Cooperation) nations on its side to boycott the organizations' summit, which was to be held in Pakistan.
- SAARC and BIMSTEC focus on geographically overlapping regions. But, they are not equal alternatives.
- SAARC is a purely regional organization, whereas BIMSTEC is inter-regional and connects both South Asia and ASEAN.
- Unlike SAARC, which is burdened by India-Pakistan hostilities, BIMSTEC is relatively free of sharp bilateral disagreements and promises to provide India with a co-operative sphere of its own.
- India is often accused by Nepal for deactivating SAARC in favor of BIMSTEC due to the membership of Pakistan in the former organization.

South Asian Association for Regional Cooperation (SAARC)

– SAARC was established in 1985.
– Secretariat: It was set up in Kathmandu, Nepal, in 1987.
– It aims to accelerate the process of economic and social development in its member states through increased intra-regional cooperation.
– SAARC has eight member countries: Afghanistan, Bangladesh, Bhutan, India, Maldives, Nepal, Pakistan and Sri-Lanka.

Way Ahead

- The BIMSTEC Charter is a testament to the shared commitment of the Member States to promote regional cooperation in key sectors such as security, connectivity, trade, agriculture, environment, science and technology, agriculture and people to people contact.
- It is an important step towards promoting regional cooperation and allowing for agreements to be signed with other countries and regional organizations.

15th Foundation Day of Competition Commission of India (CCI)

Syllabus: GS2/Statutory Bodies

Context

- Recently, the Attorney General for India highlighted the need for new ideas of coexistence between the engine of free market and the umbrella of social benefit on 15th Annual Day commemoration of Competition Commission of India (CCI).

About the Competition Commission of India (CCI)

- It was established as a statutory body in 2009 by the Government under the Competition Act, 2002.
- It comes under the Ministry of Corporate Affairs. It is a quasi-judicial body.
- It consists of a Chairperson and not more than 6 Members appointed by the Central Government.
- It aims to establish a robust competitive environment through proactive engagement with stakeholders and enforcing professionalism, transparency, resolve, and wisdom in its operations.

Objectives:

- To eliminate practices that have an adverse effect on competition;
- To promote and sustain competition;
- To protect the interests of consumers, and ensure freedom of trade in the markets of India.

Powers and Responsibilities:

- The CCI has been entrusted with the enforcement and implementation of the Competition Act (2002).
- It has the authority to investigate anti-competitive agreements, abuse of dominant position, and regulate combinations (acquisitions, mergers, and amalgamations) to ensure they do not have an adverse effect on competition in India.

India and Nepal's Border Issue

Syllabus: GS2/International Relations

Context

- Nepal's announcement of printing the new Rs 100 currency note featuring Indian territories, has reignited discourse over border disputes with India.

Background

- The territorial dispute is about a 372-sq-km area that includes Limpiyadhura, Lipulekh, and Kalapani at the India-Nepal-China trijunction in Uttarakhand's Pithoragarh district.
- In 2019, Lipulekh, Kalapani, and Limpiyadhura had been included in India's map.
- Tensions between both the nations emerged after Nepal issued a political map in 2020, which included the same territories.

Controversy over Nepal-India border

- Nepal has asserted its claim based on the Sugauli Treaty of 1816, signed between the East India Company and Guru Gajraj Mishra.
- Under the Treaty, the Kali River was marked as Nepal's western boundary with India.
- According to Nepal the east of the Kali river should begin at the source of the river which is in the mountains near Limpiyadhura.
- While India claims the border begins at Kalapani, where the river begins.
- The Kali River has changed direction over the years, causing confusion in defining the border.

Susta Border dispute

- Susta is a disputed territory between Nepal and India. It is administered by India as part of West Champaran district of Bihar.
- Nepal claims the area a part of West Nawalparasi District under Susta rural municipality, alleging that over 14,860 hectares of Nepali land in Susta has been encroached upon by India.

India and Nepal Relations

- Nepal is important for India in the context of its overall strategic interests in the region. There is an age-old 'roti beti' relationship, which refers to cross-border marriages between people of the two countries.
- Shared Border: The country shares a border of over 1,850 km with five Indian states – Sikkim, West Bengal, Bihar, Uttar Pradesh and Uttarakhand.
- Land-locked Nepal relies heavily on India for the transportation of goods and services and access to the sea is through India.
- The India-Nepal Treaty of Peace and Friendship: Signed in 1950, it forms the bedrock of the special relations that exist between India and Nepal.
- Nepalese citizens avail facilities and opportunities on par with Indian citizens in accordance with the provisions of the Treaty.
- Nearly 8 million Nepalese citizens live and work in India.
- Defense Cooperation: India has been assisting the Nepal Army (NA) in its modernisation by supplying equipment and providing training.
- The 'Indo-Nepal Battalion-level Joint Military Exercise SURYA KIRAN' is conducted alternately in India and in Nepal.
- The Gorkha regiments of the Indian Army are raised partly by recruitment from hill districts of Nepal.
- Connectivity and Development Partnership: India has been assisting Nepal in development of border infrastructure through upgradation of 10 roads in the Terai area; development of cross-border rail links at Jogbani-Biratnagar, Jaynagar-Bardibas; and establishment of Integrated Check Posts at Birgunj, Biratnagar, Bhairahawa, and Nepalgunj.
- Energy Cooperation: India and Nepal have had a Power Exchange Agreement since 1971 for meeting the power requirements in the border areas of the two countries.
- An Agreement on 'Electric Power Trade, Cross-border Transmission Interconnection and Grid Connectivity' between India and Nepal was signed in 2014.
- Trade and Economic: India remains Nepal's largest trade partner, with bilateral trade crossing US$ 7 billion in FY 2019-20.
- India's export to Nepal has grown over 8 times in the past 10 years while exports from Nepal have almost doubled.
- Nepal is India's 11th largest export destination, up from 28th position in 2014.
- In FY 2021-22, it constituted 2.34% of India's exports. The exports from India constitute almost 22% of Nepal's GDP.
- Mahakali River bridge: Recently, a MoU was signed between India and Nepal for the construction of a motorable bridge across the Mahakali River connecting Dharchula (India) with Darchula (Nepal), under Indian grant assistance.
- Operation Maitri & post-earthquake reconstruction assistance: In the wake of the 2015 earthquake in Nepal, GoI was the first responder and carried out its largest disaster relief operation abroad (Operation Maitri).

Issues between India & Nepal

- Treaty of Peace and Friendship of 1950: On 31 July 1950, India and Nepal signed a treaty of peace and friendship in an effort to "strengthen and develop these ties and to perpetuate peace between the two countries".
- As time passed, Nepal believed the treaty was "incompatible with national self-respect".
- Madhesi Issue: India's entrenched interests in Nepal suffered a setback in 2015, when a blockade at the borders ensued following protests by Madhesis and some other ethnic groups against marginalization of their interests in the newly-passed Nepalese Constitution.

- Chinese Interference: China's involvement in Nepal's infrastructure projects through its Belt and Road Initiative poses a threat to Nepal's role as a buffer state between India and China.
- Security challenges with Porous borders: The porous and poorly guarded border between India and Nepal allows terrorist groups to exploit it for smuggling weapons, ammunition, trained members and fake currency, which poses a significant security risk to India.

Way Ahead

- India-Nepal has a long history of cultural connections. Nepal is important for India's economic and strategic interests. Having a friendly and supportive Nepal will serve as a buffer between India and an assertive China.
- To manage border disputes both parties should explore realistic solutions. The successful boundary dispute resolution between India and Bangladesh can serve as a model for the way forward.

Pillars of India-Maldives Relations

Syllabus:GS2/ International Relations

Context

- Recently India's External Affairs Minister said that India's relations with Maldives rest on the twin important pillars of 'mutual interests' and 'reciprocal sensitivity'.

Background

- The undiplomatic words used by ministers in Maldives against Prime Minister Narendra Modi in particular and Indians in general has deteriorated the relations between both the nations.
- The new government led by President Mohamed Muizzu asked India to withdraw military personnel and chose China for one of his first overseas visits.

Significance of Maldives for India

- Trade Route: Situated along crucial maritime trade routes between the Gulf of Aden and the Strait of Malacca, the Maldives acts as a "toll gate" for nearly half of India's external trade and 80% of its energy imports.
- Strategic Location: The Maldives is strategically located in the Indian Ocean, and its stability and security are of interest to India.
- Counterbalancing China: Maldives presents an opportunity for India to counterbalance China's growing influence in the Indian Ocean, fostering regional balance of power.
- Economic partnership: India is one of the biggest investors and tourism markets for the Maldives, with significant trade and infrastructure projects underway.
- Defense and Security Cooperation: Since 1988, defense and security has been a major area of cooperation between India and Maldives.
- A comprehensive Action Plan for Defence was also signed in 2016 to consolidate defense partnership.
- Estimates suggest that almost 70 percent of Maldives' defense training is done by India — either on the islands or in India's elite military academies.

Significance of India for Maldives

- Essential Commodities: India supplies Maldives with its everyday essentials: rice, spices, fruits, vegetables, poultry, medicines and life-saving drugs.
- Education: Every year, Maldivian students come to Indian higher educational institutions.
- Economic dependence: Of the Rs 50 crore total trade between India and Maldives in 2022, Rs 49 crore was India's exports to Maldives. India emerged as Maldives' second largest trade partner in 2022.
- Disaster Relief Assistance: When a tsunami struck the islands in 2004, India was the first to send in help.
- In 2014 Male had a drinking water crisis as the major desalination plant broke down, India overnight airlifted drinking water to the islands.
- During the Covid-19 pandemic, India sent essential medicines, masks, gloves, PPE kits and vaccines for the island country.

Challenges in Relations

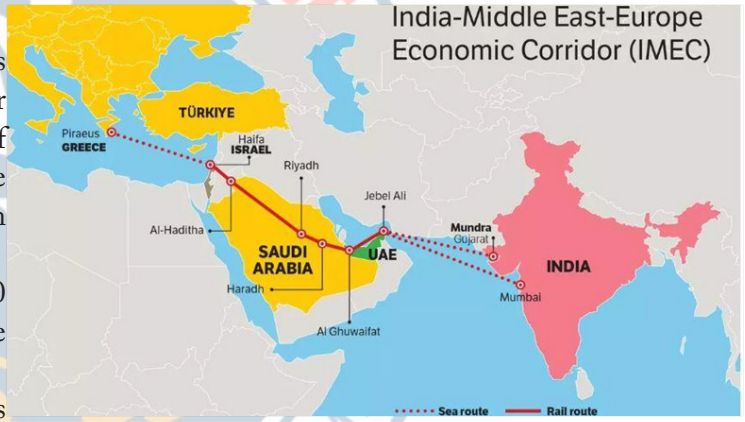
- Domestic turmoil in the Maldives: Recent political upheavals and changes in government have created uncertainty and complicated long-term cooperation projects.
- Chinese Influence: China's growing economic presence in the Maldives, evidenced by investments in infrastructure projects and debt-trap diplomacy, is perceived as a challenge to India's strategic interests in the region.
- Military ambitions: Chinese naval expansion and potential military ambitions in the Indian Ocean with the active support from Maldives has raised concerns for India.
- Trade imbalance: The significant trade imbalance between India and the Maldives could lead to resentment and calls for diversifying trade partnerships.

Way Ahead

- The evolution of India-Maldives relations reflects a combination of geopolitical dynamics, changes in leadership, and shared regional interests.
- India is steadfast in its commitments towards Maldives and has always walked the extra mile towards building relations.
- By acknowledging and addressing the ongoing issues, India and Maldives can navigate the complexities of their relationship and build a stronger, more resilient, and mutually beneficial partnership for the future.

India-Middle East EU Economic Corridor (IMEC) Project

Context



- With uncertainty gripping the ambitious India-Middle East EU Economic Corridor (IMEC) project due to the deepening of the West Asia crisis, India is examining the possibility of beginning work on the eastern leg of the corridor.
- Background: The IMEC, a proposed 4,800 km long route was announced in 2023 on the sidelines of the G20 Summit.
- This followed a meeting between the leaders of India, the US, the United Arab Emirates, Saudi Arabia, Italy, France, Germany, and the European Commission.
- Members: India, European Union, France, Germany, Italy, Saudi Arabia, UAE and US announced the India-Middle East-Europe Economic Corridor (IMEC).
- Aim: Integration of Asia, Europe and the Middle East.
- The IMEC will comprise of two separate corridors:
- The east corridor connecting India to the West Asia/Middle East and
- The northern corridor connecting West Asia/Middle East to Europe.

Ports Which are Part of IMEC

- India: Ports in Mundra (Gujarat), Kandla (Gujarat), and Jawaharlal Nehru Port Trust (Navi Mumbai).
- Europe: Piraeus in Greece, Messina in Southern Italy, and Marseille in France.
- Middle East: Ports include Fujairah, Jebel Ali, and Abu Dhabi in the UAE, as well as Dammam and Ras Al Khair ports in Saudi Arabia.
- Israel: Haifa port.
- Railway Line: The railway line will link Fujairah port in the UAE to Haifa port in Israel, passing through Saudi Arabia (Ghuwaifat and Haradh) and Jordan.

Significance

- Economic Development: By linking Asia, West Asia, the Middle East and Europe through enhanced connectivity and economic integration, the corridor aims to give a boost to economic development in the regions.

- Connectivity: The corridor will include a rail line, which, upon completion, will provide a reliable and cost-effective cross-border ship-to-rail transit network.
- The rail line will supplement the existing multi-modal transport routes enhancing trans-shipment of goods and services from South East Asia through India to West Asia/Middle East and Europe.
- Eco-friendly Infrastructure: It places emphasis on developing environmentally friendly infrastructure.
- Transformative Integration: It intends to increase efficiency, reduce costs, secure regional supply chains, increase trade accessibility, enhance economic cooperation, generate jobs and lower greenhouse gas emission, resulting in a transformative integration of Asia, Europe and the Middle East (West Asia).

Concerns

- Gaza War: Long-term trend towards greater trade and strategic links between Israel and Arab nations that was championed by the Abraham Accords will suffer a blow due to the Gaza war.
- Connecting Al Haditha in Saudi to Haifa in Israel is at the core of IMEC but it is going to be challenging now.
- The security challenges in the region have made other partners reluctant to invest in the project.
- The instability in the Middle East has given a fatal blow to the project which aimed to radically quicken trade, reduce port costs and aid India's National Logistics Policy.
- The delay in the project could negatively impact the aspirations of India to deepen ties with Arabian Peninsula and Europe.

Way Forward

- The geopolitical concerns need to be managed by striking a delicate balance in accommodating the geopolitical interests of the participating nations and addressing potential political sensitivities.
- There is also a need to maintain the required security apparatus as the project passes through certain unstable regions of the world.

India-US Dialogue on Africa

Syllabus: GS2/International Relations

Context

- The second round of the India-US Dialogue on Africa is being held in Washington.

About

- This is the first such dialogue on Africa between India and the US after the inclusion of the African Union as a permanent member of the G20 during India's presidency.
- The two day India-US dialogue aims to share ideas and perspectives and explore ways to develop institutional, technical and bilateral synergies to work together in Africa.
- It also targets identification of developmental projects and programs of cooperation in Africa, leveraging the strengths of India and the US, in accordance with African priorities.

Significance of Africa for India

- Economic Partnership and Growth Rate: Indian investments in Africa reached $98 billion in 2023, with trade totalling $100 billion.
- Forty-two African countries are the second-largest recipients of all credit extended by India.
- Around 200 developmental projects have been completed in the region.
- Africa's significant growth rate of 3.8 per cent and its young population, with 60 percent under the age of 25, estimated to reach 1.1 billion people by 2040.
- Influence on Global Forums: Africa's influence in global forums will be important for India's vision for global governance.
- Global South houses three-fourths of humanity and over 39 percent of the global GDP.
- Cooperation in Critical Minerals: Africa, with 30 percent of the world's mineral reserves, is vital to power the energy transition.
- Given the geographical concentration of critical minerals, diversifying sources and fostering strategic partnerships with resource-rich nations are imperative for India's growth and national security.

- Support in UNSC: India is keen to garner the support from Africa for Permanent Membership of the UNSC.

African Union

- The African Union (AU) was officially launched in 2002 in Durban, South Africa.
- It is made up of 55 Member States representing all the countries on the African continent.
- The African Union is a key driving force for the continent's political and economic development, its primary purpose being African integration and increased cooperation among African countries, with a view to achieving peace, security, and prosperity for all the people of the continent.

India Africa Relations

- Long history of partnership:
  - o India has a long history of partnership with Africa, with solidarity and political affinity going back to the early 1920s when both regions were fighting against colonial rule and oppression.
  - o After India gained independence, it became a leading voice in support of African decolonization at the United Nations.
  - o Diplomatic Relations: India has diplomatic relations with all African countries. The Forum for India-Africa Cooperation (IAFS) serves as the primary framework for engagement.
  - o It was established in 2008 to deepen political and economic cooperation between India and African nations.
  - o Trade Relations: India-Africa trade has grown 18 percent annually since 2003, reaching $103 billion in 2023. This makes India Africa's third largest trading partner after the European Union and China.
  - o India is now one of the top five investors in Africa.
  - o Global Cooperation: Together, India and Africa have also made effective contributions to protect the interests of developing countries at international fora, particularly the World Trade Organisation (WTO).
  - o They moved joint proposals such as the Agriculture Framework Proposal and more recently, India and South Africa proposed an intellectual property right waiver for COVID-19 vaccines at the WTO.
- Concerns:
  - o Competition from Global Players: Africa has become the playground for major powers like the US, Russia, China and European countries, all vying for political and economic influence in the resource-rich continent.
  - o Chinese Presence: China has been aggressively pursuing its own economic interests in the resource-rich African continent through investments in infrastructure and mining under the Belt and Road Initiative though, it has faced criticism for burdening African countries with debt, much like Sri Lanka.

Way Ahead

- The African Union's inclusion to G20 is seen as a big win for India, which has been championing the cause of Global South.
- In this era of geopolitical competition and realignment, India's multifaceted relationship with African nations is poised for a fundamental transformation.
- As India's aspirations for the Global South take shape, leveraging historical partnerships with African countries remains imperative.

First Indian Space Tourist and India's Space Tourism Potential

Syllabus :GS 3/Space

In News

- Blue Origin successfully completed its seventh human spaceflight and the 25th flight for the New Shepard program

About

- The recent Blue Origin journey was a sub-orbital space flight, meaning it did not get into an orbit around the Earth.
- However, plans are afoot for having deeper space trips in the future, potentially to destinations around the Moon, other planets or asteroids.

About Space tourism

- Space tourism refers to human space travel for recreational or leisure purposes.
- It encompasses various types of experiences related to space, including both suborbital and orbital journeys..
- The world's first space tourist was Dennis Tito, an American multimillionaire.
- Indian expatriate Gopi Thotakura made history as the first Indian space tourist and the second Indian to venture into space, joining the crew for Amazon founder Jeff Bezos' Blue Origin's NS-25 mission.
- Wing Commander Rakesh Sharma, a former Indian Air Force pilot, was the first Indian citizen to fly to space in 1984.

Potential of Space Tourism in India

- Emerging Market: India's space industry has been growing steadily, with successful missions by the Indian Space Research Organisation (ISRO).
- The country's achievements in satellite launches, lunar exploration, and Mars missions have garnered global attention.
- Cost-Effective: India has a reputation for cost-effective satellite launches.
- The Polar Satellite Launch Vehicle (PSLV) and the Geosynchronous Satellite Launch Vehicle (GSLV) have demonstrated reliability and affordability.
- Leveraging these capabilities, India could offer competitive pricing for suborbital and orbital space tourism.
- Diverse Landscape and Culture: India's diverse landscapes, from the Himalayas to coastal regions, provide picturesque views from space.
- Tourists could witness iconic landmarks, lush greenery, and ancient historical sites.
- Cultural experiences, such as yoga and meditation, could be integrated into space tourism packages.
- Collaboration with Private Players: The government's decision to ease foreign direct investment (FDI) in the space sector will help attract foreign players as well as startups and will boost demand for high-tech jobs.
- The government has eased FDI norms in the sector by allowing 100 per cent overseas investment in making components for satellites, as part of efforts to attract overseas players and private companies into the segment.

Challenges

- Infrastructure Development: Establishing spaceports, launch facilities, and spacecraft manufacturing centers requires significant investment and expertise.
- Overcoming skepticism and fear associated with space travel will be a challenge.
- Space tourism generates carbon emissions during launches. Balancing economic benefits with environmental concerns is essential.
- Competition : Established space tourism companies like SpaceX, Blue Origin, and Virgin Galactic dominate the market.

- Convincing the public about the safety and feasibility of space tourism is crucial
- Safety and Regulation related challenges

Steps of India

- India is making significant strides in the field of space tourism, with the Indian Space Research Organisation (ISRO) leading the charge.
- ISRO is working on a space tourism program that aims to be operational by 2030.
- The Indian National Space Promotion and Authorization Center (IN-SPACe) is working to promote private participation in large-scale space missions, including space tourism

Conclusion and Way Forward

- India's space tourism potential lies in its cost-effective launch services, diverse landscapes, and collaboration with private players.
- However, addressing challenges related to infrastructure, safety, public perception, and environmental impact is crucial for successful space tourism ventures.
- Sustainable practices, such as reusable rockets and eco-friendly propulsion systems, should be prioritized.
- India must differentiate itself by offering unique experiences, competitive pricing, and a strong value proposition.
- Regulatory frameworks need to address liability, insurance, and certification for commercial spaceflights.

Shaksgam Valley

Syllabus: GS3/Internal Security

Context

- India has registered its protest against China's "illegal attempts" to build a road into the lower Shaksgam valley in the Pakistan Occupied Kashmir (POK).

About

- The Shaksgam Valley or the Trans Karakoram Tract is part of Hunza-Gilgit region of Pakistan Occupied Kashmir (POK), and is a disputed territory claimed by India but controlled by Pakistan.
- It borders Xinjiang Province of the People's Republic of China (PRC) to the north, the Northern Areas of POK to the south and west, and the Siachen Glacier region to the east.
- The Shaksgam valley was ceded by Pakistan to China in 1963, a year after the India-China war.
- India has never accepted the so-called China Pakistan Boundary Agreement of 1963 and India has consistently conveyed its rejection of the same.

Exercise Red Flag

Syllabus: GS3/ Defence

In News

- The Indian Air Force (IAF) has joined a 16-day multi-nation mega military exercise in Alaska.

About Exercise Red Flag

- Exercise Red Flag is a premier international aerial combat training event hosted by the United States Air Force.
- It is held several times a year and brings together air forces from around the world to engage in advanced aerial combat training.
- India's participation in Exercise Red Flag signifies the strengthening of the US-India strategic partnership. The exercise allows both nations to share expertise, test tactics, and enhance interoperability.

Other Joint Exercises conducted by the Air Force

- Israel: Blue Flag
- Oman: Eastern Bridge
- Russia: Indra
- Thailand: SIAM BHARAT
- UAE: DESERT EAGLE
- UK: INDRADHANUSH
- USA: RED FLAG
- Multinational Air Exercise: Ex Samvedna with Bangladesh, Nepal, Sri Lanka, UAE

RudraM-II

Syllabus: GS3/Defence

Context

- Defence Research & Development Organisation (DRDO) flight-tested the RudraM-II missile from Su-30 MK-I platform off the coast of Odisha.

About

- The RudraM-II is an indigenously developed solid-propelled Air-to-surface anti-radiation missile.
- The missile has a range of 300 kilometers.
- The missile has a speed of Mach 5.5 and can carry a 200 kilogramme payload.

International Day of United Nations (UN) Peacekeepers

Syllabus: GS2/International Organisation, GS3/Defence

Context

- The Indian Army commemorated the 76th International Day of United Nations (UN) Peacekeepers (also called Blue Berets or Blue Helmets because of their light blue berets or helmets).

About

- On this day in 1948 the first UN Peacekeeping Mission, "UN Truce Supervision Organisation (UNTSO)" began operations in Palestine.
- Each year on this day, the UN and countries across the globe pay rich tributes to the professionalism, dedication and courage of men and women who have served/ are serving in UN Peacekeeping Missions.
- Peacekeeping forces are contributed by member states on a voluntary basis.
- This day also honours the memory of sacrifices of those who have laid down their lives for the cause of peace.
- India has a rich legacy of contribution to UN Peacekeepers operations and is one of the largest contributors of troops.
- In 2007, India became the first country to deploy an all-women contingent to a UN peacekeeping mission.

NSA suggests integration of Central Armed Police Forces (CAPF)

Syllabus: Internal Security

Context

- National Security Adviser Ajit Doval suggested the integration of Central Armed Police Forces (CAPF) on the lines of joint theater commands in the armed forces.

Central Armed Police Forces (CAPF)

- The Central Armed Police Forces (CAPF) is the collective name of central police organizations under the Ministry of Home Affairs of India.
- These forces are responsible for internal security and guarding the borders. CAPF is classified as;
- Assam Rifles (AR): It is a central police and paramilitary organization responsible for border security, counter-insurgency, and law and order in Northeast India.

- Border Security Force (BSF): It is primarily deployed along the Pakistan and Bangladesh borders, since 2009 it is also posted in Left Wing Extremism (LWE) affected areas.
- Indo-Tibetan Border Police (ITBP): It is deployed for guarding duties on the Indo-China border
- Sashastra Seema Bal (SSB): It guards the Indo-Nepal and Indo-Bhutan borders.
- National Security Guard (NSG): It is a counter-terrorism unit under the Ministry of Home Affairs. All personnel are deputed from other CAPFs and the Indian Army.
- Central Reserve Police Force (CRPF): It is deployed for internal security duties and has a large presence in North East, LWE theater and Jammu and Kashmir.
- Central Industrial Security Force (CISF): It provides security to various Public Sector Undertakings (PSUs) and other critical infrastructure installations, major airports across the country and provides security during elections and other internal security duties and VVIP protection.

Challenges faced by CAPF

- High Stress: Continuous deployment in challenging environments with little rest leads to high stress and low morale among personnel.
- According to data provided by the Ministry of Home Affairs (MHA), over 50,000 CAPF personnel had quit their jobs in the past five years,
- Overburdening: There are often vacancies within the forces, leading to overburdening of the existing personnel, which affects their efficiency and mental health.
- Bureaucratic Hurdles: Slow decision-making processes and bureaucratic red tape hinder timely procurement of equipment, sanctioning of welfare measures, and implementation of reforms.
- Issue of selecting leaders for the top level: There is a lot of resentment in the forces when officers with no experience in the CAPF are just para-dropped as head of that force.
- Lack of coordination with State Police: Collaboration and coordination between CAPFs and state police are crucial. often issues arise due to differences in jurisdiction, communication gaps, or conflicting strategies.

Way Ahead

- Homogeneity: The integration was required in CAPFs or the paramilitary and it was not only about saving money but also to bring in homogeneity in deployment whether it is “war or peace.”
- Optimal use of Resources: The forces will be able to pool their resources efficiently, resulting in the optimum utilization of platforms, weapon systems, and assets.
- Better Coordination: With an integrated structure, the communication processes between different forces will be simpler and more efficient.

Department of Military Affairs

Syllabus: GS3/Defence

Context

- The Department of Military Affairs (DMA) has sought feedback from the forces on the Agnipath scheme.

About

- The Government of India is responsible for ensuring the defence of India.
- The Supreme Command of the Armed Forces vests in the President. The responsibility for national defence rests with the Cabinet.
- This is discharged through the Ministry of Defence, which provides the policy framework in the context of the defence of the country.
- The Raksha Mantri (Defence Minister) is the head of the Ministry of Defence.
- The Ministry of Defence comprises five Departments viz.Department of Defence (DOD), Department of Defence Production (DDP), Department of Defence Research & Development (DDR&D) and Department of Ex-Servicemen Welfare and also Finance Division.
- The Department of Military Affairs was created in 2019.
- DMA is headed by Chief of Defence Staff (CDS) as Secretary and was created to facilitate optimal utilization of resources and promote jointness among the three Services.

Project UDBHAV

Syllabus: GS3/Defense

Context:

- Recently, the Indian Army said that it is exploring India's military heritage under 'Project UDBHAV'.

About

- Project UDBHAV (translates as 'origin' or 'genesis') is a collaboration between the Indian Army and the United Service Institution of India (USI), which aims to revisit the roots of India's ancient military thoughts.

Objectives

- To synthesise ancient wisdom with contemporary military practices;
- Forging a unique and holistic approach to address modern security challenges;
- To integrate age-old wisdom with contemporary military pedagogy through interdisciplinary research, workshops and leadership seminars;
- To facilitate in-depth understanding of our knowledge systems and philosophies;

Embracing Ancient Texts and Narratives

- Project Udbhav has embraced ancient texts from the 4th century BCE to the 8th century CE, with a focus on Kautilya, Kamandaka, and the Kural.
- Arthashastra of Chanakya: It underscores the importance of strategic partnerships, alliances and diplomacy, aligning with modern military practices such as international cooperation and soft power projection.
- Thirukkural of Thiruvalluvar: It advocates ethical conduct in all endeavours, including warfare, that aligns with modern military codes of ethics of just war and principles of Geneva Convention.
- The Naval Battle of Saraighat in 1671, led by Lachit Borphukan, stands as a stellar example of the use of clever diplomatic negotiations to buy time, employ psychological warfare, focus on military intelligence and exploiting the strategic weakness of the Mughals.

Survey on Agnipath scheme

Syllabus: GS3/Defence

Context

- The Army is conducting an internal survey on the Agnipath scheme to assess its impact on its recruitment process so far, based on which it is likely to draw up recommendations for possible changes to the scheme.

About

- Introduced in 2022, the Agnipath scheme — also called the Tour of Duty scheme is a short-term recruitment scheme for the Indian Army.
- Under the policy, soldiers — called 'Agniveers' — are recruited for four years, at the end of which only 25 percent of recruits from a batch are retained for regular service.
- Age Limit : Candidates between the age of 17.5 years to 21 years will be eligible for enrolling in the Agnipath scheme.
- The scheme provides an avenue to Indian youth, desirous of serving the country to get recruited in the Armed Forces for a short duration.
- The scheme enhances the youth profile of the Armed Forces.

Border Roads Organisation (BRO)

Syllabus :GS 3/Security

In News

- The Border Roads Organisation (BRO) celebrated its 65th Raising Day.

About Border Roads Organisation (BRO)

- It was raised with just two projects in 1960 – Project Tusker (now Vartak) in the East and Project Beacon in the North.

- In order to ensure coordination and expeditious execution of projects, the Government of India set up the Border Roads Development Board (BRDB) with the Prime Minister as Chairman of the Board and Defence Minister as Deputy Chairman.
- The BRO has today become a vibrant organisation with 18 projects operating in 11 States and three Union Territories.
- Officers and personnel from the General Reserve Engineer Force (GREF) form the parent cadre of the BRO.
- The BRO executes road construction and maintenance works at altitude ranging from 9,000 ft up to 19,000 ft along the Northern and Western frontiers, primarily to meet the strategic requirements of the Armed Forces.
- The BRO has been at the forefront of promoting gender equality and inclusivity, offering key roles and opportunities to women. Officers like Col Ponung Doming are leading critical projects in Eastern Ladakh.
- Recent and upcoming Projects: In 2023-24, the BRO completed a total of 125 infrastructure projects worth Rs 3,611 crore.
- This includes the construction of Sela Tunnel in Arunachal Pradesh on Balipara-Chardwar-Tawang Road.
- The BRO will soon commence the construction of the 4.10-km long Shinkun La Tunnel. Once completed, this tunnel will become the world's highest tunnel at 15,800 ft by passing Mila Tunnel in China at 15,590 ft.

India Contributed to the U.N. Counter-Terrorism Trust Fund

Syllabus: GS3/Internal Security

Context

- India has contributed $500,000 to the U.N. Counter-Terrorism Trust Fund, underscoring commitment to support the global fight against the terrorism.
- With its current contribution, India's cumulative financial support to the trust fund now stands at $2.55 million.

About

- India's contribution would support UNOCT's global programmes — mainly Countering Financing of Terrorism (CFT) and Countering Terrorist Travel Programme (CTTP).
- They are aimed to combat the financing of terrorism and prevent the movement of terrorists in Africa.
- Addressing the issue of the growing threat of terrorism in Africa has been one of the counter-terrorism priorities of India for the past few years.

U.N. Counter-Terrorism Trust Fund

– The Fund was established in 2009 by the Secretary-General and transferred to the United Nations Office of Counter-Terrorism when it was created in 2017.
– The Fund accepts contributions from Governments, inter-governmental and non-governmental organizations, private institutions and individuals.
– Since its inception in 2009, UNOCT mobilized US$379.5 million in pledges from 42 funding partners and through allocations from the United Nations Peace and Development Trust Fund.

What is Terrorism?

- Terrorism encompasses a range of complex threats: organized terrorism in conflict zones, foreign terrorist fighters, radicalized 'lone wolves', and attacks using chemical, biological, radiological, nuclear and explosive materials.
- It typically involves the deliberate targeting of civilians and it aims to create a sense of terror.
- It's a complex and multifaceted phenomenon, often rooted in socio-political grievances, extremism, or radical ideologies.

The modus operandi of the Global Terrorist Groups is as under:

- Use of Advanced Technology: There has been a shift in terms of access to advanced technology by terrorist groups that has given terrorist groups a tactical edge to carry out their operations seamlessly.

- Encrypted Messaging: GTGs are highly dependent on the encrypted messaging platforms for instructions and preparations of terror attacks, revival of their sleeper cells.
- Funding: Crowd funding and virtual currencies like bitcoins are heavily used for terror financing.
- Lone Wolf Attacks: GTGs continue to urge sympathizers and followers across the world to carry out lone wolf attacks.
- Radicalisation: They radicalized youth through misinformation and false narrative via extensive use of social media platforms.

Challenges in Tackling Terrorism

- Use of Evolving Techniques: Terrorist groups continuously evolve their tactics, techniques, and procedures to evade detection and carry out attacks.
- There has been notable increase in use of drones for cross-border trafficking of arms and drugs as well as launching terror attacks.
- Transnational Nature: Terrorism often transcends national borders, making it difficult for individual nations to address the threat effectively.
- Root Causes: Addressing the root causes of terrorism, such as poverty, inequality, political grievances, and extremist ideologies, requires long-term strategies that go beyond traditional security measures.
- Civil Liberties and Human Rights Concerns: Balancing security measures with the protection of civil liberties and human rights presents a significant challenge.
- Measures such as surveillance, detention without trial, and restrictions on freedom of speech raise ethical concerns.
- Cyberterrorism: The internet provides a platform for terrorist propaganda, recruitment, and coordination.
- Addressing online radicalization and countering terrorist narratives in cyberspace requires collaboration between governments, tech companies, and civil society organizations.
- Financing and Resources: Tracking and disrupting terrorist financing networks can be challenging due to the use of informal channels, money laundering techniques, and legitimate financial institutions.
- Lone Actors: The rise of homegrown terrorists and lone actors presents a challenge for counterterrorism efforts.
- These individuals may not have direct connections to established terrorist groups, making them harder to detect and prevent.

Global Measures Taken to Combat Terrorism

- United Nations Counterterrorism Framework: The UN Security Council has adopted several resolutions that provide a legal framework for counterterrorism actions, including measures to prevent terrorist financing, stem the flow of foreign fighters, and strengthen border security.
- Financial Action Task Force (FATF): FATF is an intergovernmental organization that sets standards and promotes policies to combat money laundering and terrorist financing.
- Member countries implement FATF recommendations to strengthen their anti-money laundering and counterterrorism financing regimes.
- Global Counterterrorism Forum (GCTF): GCTF is a multilateral forum that facilitates cooperation and capacity-building initiatives to strengthen counterterrorism efforts worldwide.
- Intelligence Sharing and Cooperation: Bilateral and multilateral intelligence-sharing agreements enable countries to exchange information on terrorist threats, suspects, and activities.
- Aviation Security Measures: In response to the threat of aviation terrorism, countries have implemented stringent security measures at airports and aboard aircraft.
- Cybersecurity Collaboration: International initiatives promote information sharing, capacity building, and the development of common standards to enhance cyber defenses.

Terrorism in India

– It is mainly cross-border terrorism, sponsored by neighboring countries.
– The means and methods adopted by terrorists include infiltration through the land borders, sea routes, illegal immigration through sea/land routes etc.
– India has been a victim of terrorism for more than three decades.
– Pakistan's Inter Service Intelligence (ISI) has close links with terrorist outfits like Lashkar-e- 10 Taiba (LeT), Jaish-e- Mohammad (JeM), Hizb-ul-Mujahideen (HM), Indian Mujahideen (IM), etc. and provides them safe havens, material support, finance and other logistics to carry out terrorist activities in India.

India's Efforts to Combat Terrorism

– India's annually tables a resolution in the United Nations General Assembly First Committee titled "Measures to prevent terrorists from acquiring weapons of mass destruction".
– India is party to all the 13 universal instruments against terrorism, including the International Convention for the Suppression of Acts of Nuclear Terrorism (ICSANT). India is a party to the Convention on the Physical Protection of Nuclear Material (CPPNM) and its Amendment.
– Legislative Measures: India has enacted several laws to combat terrorism, including the Unlawful Activities (Prevention) Act (UAPA), which provides legal mechanisms to deal with terrorist activities, organizations, and financing.
– Diplomatic Initiatives: Government consistently raises the issue of Pakistan's continuing support to cross-border terrorism and terrorist infiltration at the bilateral, regional and multilateral level.
– Strategic Partnerships: India has cultivated strategic partnerships with countries like the United States, Israel, and various Gulf states to enhance counterterrorism cooperation. These partnerships involve intelligence sharing, defense cooperation, and capacity-building initiatives.
– Technology and Cybersecurity: Implementation of Drone Rules by the Ministry of Civil Aviation.
a. The mandate of the National Investigation Agency has been expanded by including Cyber Terrorism in the list of scheduled offences.
b. Indian Computer Emergency Response Team (CERT-In), has been designated under the Information Technology Act, 2000 to serve as the national agency in the area of cyber security incident response.

Conclusion

- Countering radicalization and addressing socio-economic and political grievances are essential components of comprehensive counterterrorism efforts.
- Collaboration on cybersecurity is essential for combating cyberterrorism and preventing terrorist use of the internet for recruitment and propaganda.

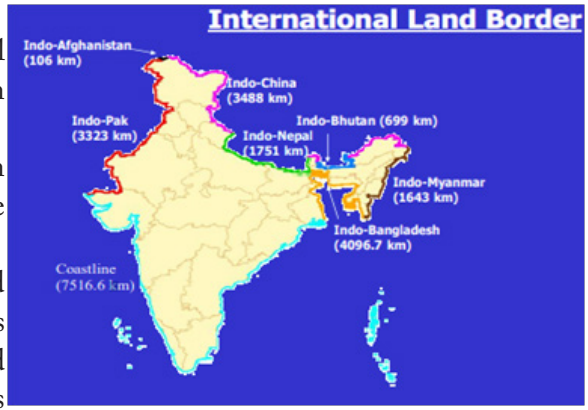
India's Border Management

Syllabus: GS 3/Internal Security

In News

- A huge cache of military grade arms, ammunition and other war-like stores were seized by Assam Rifles in Mon district of Nagaland, close to the Myanmar border.

About Borders



- India has a land boundary of about 15,200 km and the total length of the coastline of the mainland, including Andaman and Nicobar and Lakshadweep, is 7,516.6 km.
- India shares its land boundaries with Pakistan ,Afghanistan ,China , Nepal Bhutan ,Myanmar and Bangladesh in the east.
- Southern neighbours across the sea consist of the two island countries, namely Sri Lanka and Maldives. Sri Lanka is separated from India by a narrow channel of sea formed by the Palk Strait and the Gulf of Mannar, while Maldives Islands are situated to the south of the Lakshadweep Islands.

- All states except Madhya Pradesh, Chattisgarh, Jharkhand, Delhi and Haryana have an international border or a coast line.

Challenges

- Indian borders run through plains, hills and mountains, deserts, riverine territories and marshes.
- Land borders are not fully demarcated and Border guarding forces are often under resourced and ill equipped.
- Institutional mechanisms for coordinating intelligence gathering, sharing and intelligence coordination are weak.
- Managing such a diverse border is a complex task but vital from the point of view of national security
- Several of India's neighbours are undergoing political and economic instability.
- India also has continuing border disputes with several of its neighbours.
- Uncertain borders not only raise bilateral tensions but also facilitate cross border infiltration, illegal migration, smuggling and crime
- Human trafficking is a complex and rampant phenomenon
- Females including children are entangled in the vicious circle of forced labour, sexual brutality, and forced matrimony.
- The Northeast receives drugs, arms and other contraband through the porous borders.
- The management of Coastal borders is a problem of a different scale altogether. The Mumbai terror attacks brought home the need to strengthen coastal surveillance.
- Sea routes are used to smuggle people, arms, drugs and other contraband.

Steps of Government

- India has spent a lot of resources in building fences and associated infrastructure over the last three decades.
- It has also built the capabilities of border guarding forces to guard and manage the borders. This has had a positive impact on checking infiltrations, reducing smuggling, curbing contrabands etc.
- MHA has also professionalised the border guarding forces – BSF, ITBP, SSB, AR, Coast Guard.
- Several initiatives have been undertaken by the Border Management-I Division
- These include construction of fence, floodlighting, roads, Border Out Posts (BOPs), Company Operating Bases (COBs) and deployment of technological solutions along the India-Pakistan, India-Bangladesh, India-China, India-Nepal, India-Bhutan and India-Myanmar borders.
- Border Infrastructure and Management (BIM) Scheme: Border Infrastructure and Management (BIM) Scheme is a Central Sector Scheme comprising projects aimed at infrastructure development of India's international borders to enhance the security along the borders of the country .
- Comprehensive Integrated Border Management System: To improve situational awareness at different levels of hierarchy to facilitate prompt and quick response to emerging situations along the India-Pakistan Border (IPB) and India-Bangladesh Border (IBB), a Comprehensive Integrated Border Management System (CIBMS) has been conceptualized which is the integration of manpower, sensors, networks, intelligence and command control solutions.
- Government has decided to construct a fence along the entire1643-kilometre-long Indo-Myanmar border.

Suggestion

- India is in the process of evolving a robust and balanced border management system that balances the cross border flows with national security interests.
- India has the vision of integrating South Asia into an economic whole.
- SAARC, BIMSTEC and BBIN are efforts in that direction. This will require connectivity and relatively free movements.
- The challenge of border management is how to ensure that borders are secure and yet they are accessible.
- The key to border management is to take people-centric approaches and make them partners in national security.
- Good cooperation with the neighbours is also essential.
- We need to study and evolve good borer management practices.
- Further, we should harness space technologies, IT, and modern methods of infrastructure construction to ensure better border management.

- Coastal police need to be strengthened. The problems of island territories require a special focus and approach
- Border guarding forces need material and financial resources, training and aptitude for border management.
- Close coordination between central and state agencies is essential.

Phishing Attacks in India

Syllabus: GS3/Internal Security

Context

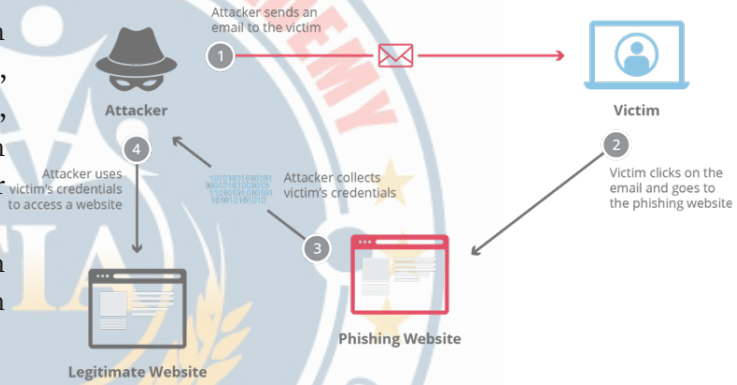
- According to the 2024 Data Breach Investigations Report by Verizon Business, India is one of the key countries affected by phishing attacks.

Key Findings

- The espionage attacks dominate Asia-Pacific's (APAC) cyber security landscape, including that of India.
- Some 25% of APAC cyberattacks are motivated by espionage, significantly greater than the 6% and 4% in Europe and North America, respectively.
- System intrusion, social engineering, and basic web application attacks represent 95% of breaches in APAC.
- The most common types of data compromised are credentials (69%), internal (37%), and secrets (24%).

What is a Phishing Attack?

- Phishing is a type of cyberattack which attempts to steal sensitive information, typically in the form of usernames, passwords, credit card numbers, bank account information or other important data in order to utilize or sell the stolen information.
- By pretending as a reputable source with an enticing request, an attacker lures in the victim in order to trick them.



Reasons for phishing attacks

- The report mentioned that In 2023, 15 percent of breaches involve a third party, including data custodians, third-party software vulnerabilities, and other direct or indirect supply chain issues.
- About 68 percent of breaches, whether they include a third party or not, involve a non-malicious human element, which refers to a person making an error or falling prey to a social engineering attack.

Steps taken by Government

- Information Technology Act, 2000: Section 43, 66, 70, and 74 of the IT Act, 2000 deal with hacking and cyber crimes.
- Indian Computer Emergency Response Team (CERT-In) issues alerts and advisories regarding latest cyber threats/vulnerabilities and countermeasures to protect computers and networks on a regular basis.
- National Cyber Coordination Centre (NCCC) has been set up to generate necessary situational awareness of existing and potential cyber security threats and enable timely information sharing for proactive, preventive and protective actions by individual entities.
- Cyber Swachhta Kendra (Botnet Cleaning and Malware Analysis Centre) has been launched for detection of malicious programs and provides free tools to remove the same.
- Bharat National Cyber Security Exercise 2023: Bharat NCX will help strategic leaders to better understand cyber threats, assess readiness, and develop skills for cyber crisis management and cooperation.
- Chakshu Facility: It is a newly introduced feature on the Sanchar Saathi portal that encourages citizens to proactively report suspected fraudulent communications received via call, SMS, or WhatsApp.

International Measures

– Budapest Convention: It is the 1st international treaty to address cybercrime. India is not a signatory to the treaty.
– Internet Corporation for Assigned Names and Numbers (ICANN): It is a US-based not-for-profit organization for coordinating & maintenance of several databases.
– Internet Governance Forum: It is the United Nations forum for multi-stakeholder policy dialogue on Internet governance issues.

Concluding Remarks

- India is one of the key countries affected by phishing attacks, where employees often click on malicious links or attachments, often leading to severe financial losses.
- However, there's a silver lining as reporting practices have improved, with 20 percent of users now identifying and reporting phishing during simulation tests.

Increase in Goods and Services Tax (GST) Revenues

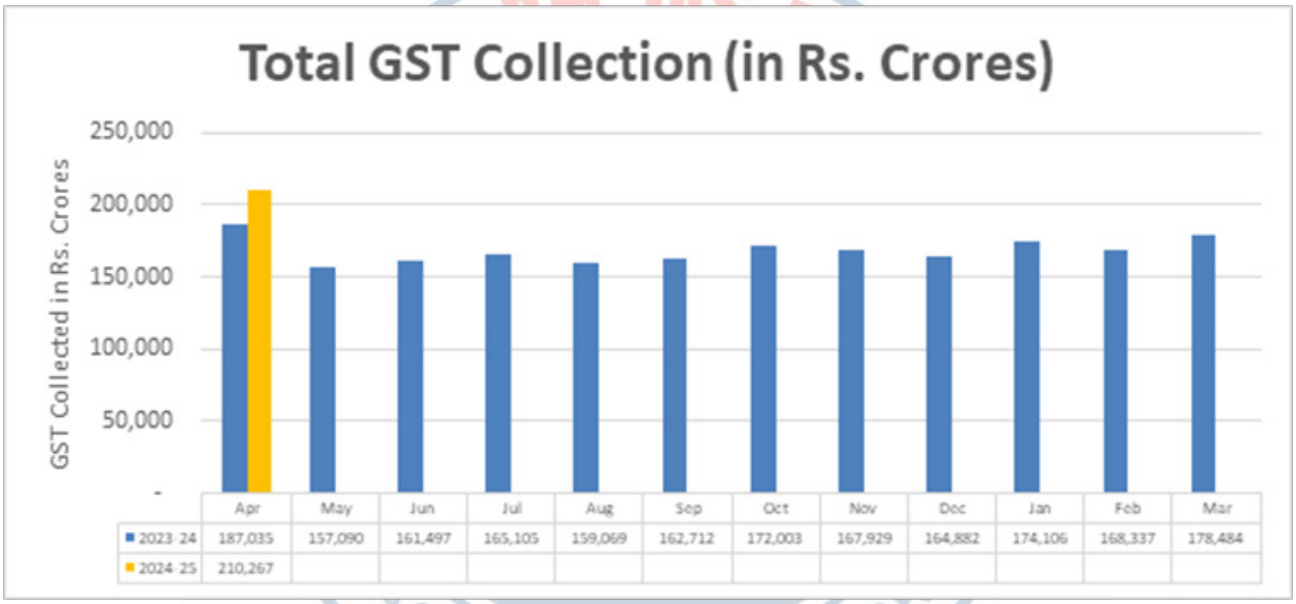
Syllabus: GS3/ Economy

In News

- Revenues from the Goods and Services Tax (GST) crossed the 2 lakh crore mark for the first time in April. It stood at Rs 1.87 lakh crore in April 2023.

About

- This represents a significant 12.4 per cent year-on-year growth, driven by a strong increase in domestic transactions (up 13.4 per cent) and imports (up 8.3 per cent).



Goods and Services Tax (GST)

- Goods and Services Tax is an indirect tax used in India on the supply of goods and services.
- It is a value-added tax levied on most goods and services sold for domestic consumption.
- It was launched in India in 2017 as a comprehensive indirect tax for the entire country.
- It is a comprehensive, multistage, destination-based tax–
- Comprehensive because it has subsumed almost all the indirect taxes except a few state taxes.
- It is paid by the consumers and is remitted to the government by the businesses selling the goods and services.
- It is of three types i.e.
- CGST to be levied by the Centre,
- SGST to be levied by the States and
- IGST a tax levied on all Inter-State supplies of goods and/or services.
- All these taxes are levied at rates mutually agreed upon by the Centre and the States.
- The GST Council headed by the Union Finance Minister is the governing and key decision-making body for GST.
- Recently, the GST compensation Act has been enacted which provides a detailed mechanism for compensation to the states for loss on account of implementation of GST.
- For the purpose of GST compensation to states, a cess known as Compensation Cess is being levied on luxury and demerit goods and proceeds of such cess is being credited to a separate Public Account fund known as Compensation Fund.

GST Council

– Goods and Services Tax Council is a constitutional body for making recommendations to the Union and state government on issues related to GST. The GST Council is chaired by the Union Finance Minister.
– As per Article 279A of the amended Constitution, the GST Council, which will be a joint forum of the Centre and the states, shall consist of the following members:
a. The Union finance minister (chairperson).
b. The Union minister of state in charge of revenue or finance.
c. The minister in charge of finance or taxation or any other minister nominated by each state government.
– As per Article 279A(4), the Council will make recommendations to the Union and the states on important issues related to GST, like the goods and services that may be subjected or exempted from GST, model GST Laws, principles that govern Place of Supply

Achievements of GST

- Better Compliance: GST helped in achieving better tax compliance by subsuming multiple taxation and reduction in taxation burden in the last four years.
- Automated tax ecosystem: It helped the country in transitioning to an automated indirect tax ecosystem. From electronic compliances, generation of e-invoices to tracking movement of goods through e-waybill – everything is now online
- E-invoice & More Revenue: The E-invoicing system helped reduce fake invoicing. Use of technology with online bill generation has resulted in smoother consignment movement and much fewer disputes with officials. After the introduction of E-invoice, GST collections have risen steadily since November 2020, surpassing the Rs. 1 lakh crore mark on several occasions.
- Logistical efficiency, production cost cut: Another major achievement of this regime is the fact that over 50% of logistics effort and time is saved since GST has ensured the removal of multiple checkpoints and permits at state border checkpoints.
- Lesser transaction costs: After the introduction of GST, there has been a significant reduction in transaction costs. This reduction has been a huge breakthrough in the interstate movement of products, allowing the country to boast of a single national unified market for businesses.
- Cooperative Federalism: The customs portals are linked with the GST portal for credit availing on imports constitution of the GST Council and ensuring Centre-State partnership in the decision-making process. It ensured cooperative federalism to be its major part.
- Ease of doing business: India's ease of doing business ranking has improved significantly in the last four years. Before GST was implemented, India's Ease of Doing Business ranking was 130 in 2016. In 2020, India was ranked 63rd on the list.
- More Freedom: Since the GST rate is the same across the country for a particular supply, traders and manufacturers in the organised sectors have gained more freedom to choose the best vendors, suppliers, and other stakeholders with better pricing, regardless of their location.
- Improved Competitiveness: GST has improved the competitiveness of domestic industries in the international market by removing hidden and embedded taxes.
- Boosting Make in India Initiative: GST will give a major boost to the 'Make in India' initiative of the Government of India by making goods and services produced in India competitive in the National as well as International market.

Shortcomings of GST

- Increased compliance burden: GST involves multiple tax returns and can be complex for small and medium-sized enterprises (SMEs) to navigate. This can be especially challenging for businesses that operate in multiple states.
- Higher tax burden for some SMEs: Previously, some small businesses were exempt from certain taxes. Under GST, the registration threshold is lower, bringing more businesses into the tax net, which can strain their resources.
- Software costs: Migrating to a new tax system often requires upgrading accounting software to be GST-compliant. This can be an additional expense for businesses.
- Impact on the unorganized sector: The unorganized sector, a large part of the Indian economy, has faced challenges adapting to GST. Formalizing these businesses can take time.

- GST rates and complexities: The current multi-tier GST structure with various tax rates can be intricate for businesses to deal with.
- Adoption & Technical Issues: Small and medium businesses are still grappling to adapt to the tech-enabled regime. The fundamental principles on which the GST law was built viz. seamless flow of input credits and ease of compliance has been impaired by IT glitches,
- Other Concerns: Further, the 15th Finance Commission, in its report, has also highlighted several areas of concern in the GST regime relating to:
- multiplicity of tax rates,
- shortfall in GST collections vis-à-vis the forecast,
- high volatility in GST collections,
- inconsistency in filing of returns,
- dependence of States on the compensation from Centre

Reforms Needed

- Simplification of GST compliance: This could involve reducing the number of tax return filings, streamlining the return format, and making the process more user-friendly for small businesses.
- Reviewing the GST rate structure: There's discussion about potentially:
- Reducing the number of tax slabs: This would make the system less complex for businesses to manage.
- Raising the threshold for GST registration: This could exempt some small businesses from GST altogether, reducing their compliance burden.
- Rationalizing tax rates: This might involve merging some tax slabs or adjusting rates to ensure a balance between revenue collection and affordability for consumers.
- Technological solutions: Investing in user-friendly technology platforms can simplify GST filing and compliance for businesses.
- Addressing the challenges of the unorganized sector: Initiatives to help informal businesses transition smoothly into the GST system could be beneficial. This might involve providing training and support.
- Improving coordination between Central and State authorities: Streamlined communication and data sharing between federal and state GST authorities can enhance efficiency and reduce compliance hassles for businesses operating across states.

IMF's Regional Economic Outlook

Syllabus: GS3/Economy

Context

- In its latest Regional Economic Outlook for Asia and Pacific, the International Monetary Fund (IMF) has emphasised the crucial role played by public investment in driving India's economic growth, making it the world's fastest-growing major economy.

About

- The IMF had earlier this month raised India's growth forecast for the financial year 2024-25 to 6.8 per cent, up from the previous estimate of 6.5 per cent.
- The IMF attributed this upward revision to the resilience of domestic demand, propelled by factors such as public investment.

Domestic Investments in India

- Domestic investments in India are divided into two parts – public investments and private investments.
- Private investments are further divided into two parts, which are household investments and corporate investments.
- Private domestic investments depend on – macroeconomic stability, high household savings, productivity, access to credit, resolution of non-performing assets, clearing up of balance sheets, etc.
- Public investment remains an important driver for India, making it the world's fastest growing major economy.

Public Investment

- Infrastructure: India has been focusing on bolstering its infrastructure across various domains such as transportation (roads, railways, airports, ports), energy (power generation, transmission, renewable energy), water supply, and urban development (smart cities, affordable housing).
- Public investments in these sectors aim to enhance connectivity, reduce logistics costs, and improve the overall quality of life.
- Healthcare: The government has been increasing investments in healthcare infrastructure, including building new hospitals, upgrading existing facilities, and expanding access to healthcare services, especially in rural areas.
- Initiatives like Ayushman Bharat aim to provide health insurance coverage to millions of people.
- Education: Investments in education focus on improving the quality of schools and universities, expanding access to education in remote areas, and enhancing skill development programs to meet the demands of a rapidly evolving job market.
- Agriculture: Public investments target areas such as irrigation, crop diversification, agricultural research, and rural infrastructure to enhance productivity and farmers' incomes.
- Manufacturing: The government's "Make in India" initiative aims to boost domestic manufacturing by attracting investment, improving infrastructure, and streamlining regulations.
- Technology and Innovation: Government is focusing on building a robust digital infrastructure, promoting research and development, and fostering entrepreneurship in emerging technologies like artificial intelligence, biotechnology, and clean energy.
- Social Welfare: Public investments in social welfare programs target poverty alleviation, social inclusion, and empowerment of marginalized communities.
- Initiatives like the National Rural Employment Guarantee Scheme (NREGA), rural electrification programs, and subsidized food distribution aim to improve living standards and reduce inequality.

Significance of Public Investment

Public investment plays a crucial role in driving economic growth in India, primarily due to the following reasons:

- Infrastructure Development.
- Human Capital Development by investment in education, healthcare, and skill development programs.
- Stimulating Private Investment by creating an enabling environment.
- Regional Development by reducing regional disparities and promoting inclusive growth.
- Fostering Innovation and Entrepreneurship by setting up technology parks, incubators, and R&D institutions.
- During economic downturns or recessions, public investment can serve as an important tool for stimulating aggregate demand and stabilizing the economy.
- Investments in renewable energy, clean technology, and sustainable infrastructure not only contribute to economic growth but also mitigate environmental risks.

Way Ahead

- India's ongoing economic reforms have created investment opportunities in various sectors like renewable energy, health, ports, shipping, circular economy and water management, and invited other foreign countries to invest in these sectors.
- Initiatives like Vibrant Gujarat Summit and Production-Linked Incentive (PLI) schemes have demonstrated good results.
- Various government initiatives, such as ease of doing business reforms, infrastructure development, and policy support are further aiding in driving domestic investments.

About the International Monetary Fund (IMF)

– It is an international financial institution and major financial agency of the United Nations established in 1944 with the primary goal of promoting global monetary cooperation, exchange rate stability, balanced trade growth, and financial stability.
– The IMF is headquartered in Washington, D.C., and it currently has 190 member countries.
– It is regarded as the global lender of last resort to national governments, and a leading supporter of exchange-rate stability.
– Publications: World Economic Outlook, Global Financial Stability Report, Fiscal Monitor, Global Policy Agenda.

Framework for Self-Regulatory Organizations in Fintech Sector

Syllabus: GS3/Economy

Context

- The Reserve Bank of India (RBI) released the framework for recognising self-regulatory organizations in the financial technology sector (SRO-FT).

About

- An SRO is a non-governmental organization that acts as a bridge between industry players and the regulator. It also sets standards for the conduct of entities operating in the country.
- Key responsibilities of SROs include establishing and enforcing regulatory standards, promoting ethical conduct, resolving disputes, and fostering transparency and accountability among members.

India's Fintech Sector

- India is the 3rd largest fintech ecosystem globally. The Fintech sector in India has witnessed funding accounting to 14% share of Global Funding.
- The Indian FinTech industry's market size was $50 Bn in 2021 and is estimated at ~$150 Bn by 2025.
- India accounted for 46% of all real-time transactions worldwide in 2022.

Significance of Fintech Sector

- Innovation and Efficiency: Fintech companies leverage technology to introduce innovative financial products and services. These innovations enhance efficiency, reduce costs, and streamline operations in the financial sector.
- Financial Inclusion: Fintech has significantly improved financial inclusion by providing access to financial services for unbanked and underbanked populations.
- Economic Growth: The fintech sector contributes to economic growth by fostering entrepreneurship and creating new jobs.
- Global Connectivity: Fintech facilitates global financial connectivity, enabling seamless cross-border transactions and remittances. This connectivity supports international trade, investment, and economic integration.

Guidelines Issued by RBI

- Independent entity: SROs in the fintech sector should be independent entities, free from external influence, and committed to upholding regulatory standards.
- The SROs need to be representative bodies, drawing upon the collective expertise and experience of their members to develop pragmatic and widely accepted standards.
- Membership: SROs should have diversified shareholding, with no single entity holding more than 10% of its paid-up share capital.
- Additionally, fintech companies domiciled outside India may also be eligible for membership.
- Applicants will be required to have a minimum net worth of Rs 2 crore within a year of being recognised as an SRO-FT. The entity should be a not-for-profit company.
- Oversight and enforcement: SROs are encouraged to establish structured frameworks for monitoring fintech activities and ensuring compliance with regulatory standards.
- Surveillance: There is a requirement for SROs to address instances of 'user harm,' such as fraud, misselling, and unauthorized transactions.

- Surveillance mechanisms should be deployed to detect exceptions, with a focus on maintaining confidentiality and collecting only essential information.
- Grievance redress: SRO-FTs will be required to establish a dispute resolution framework for its members.

Superfast Method for Producing Diamonds

Syllabus :GS 3/Economy

In News

- Scientists developed a superfast method for producing diamonds.

Key Points

- The group of 15 scientists created a cocktail of gallium, iron, nickel and silicon by putting them in a graphite crucible.
- Then they pumped in methane at 1,175oC.
- Diamonds formed at the bottom, where the liquid metal had solidified

About Lab grown diamonds (LGD)

- LGD are manufactured in laboratories, as opposed to naturally-occurring diamonds.
- However, the chemical composition and other physical and optical properties of the two are the same.
- Naturally-occurring diamonds take millions of years to form; they are created when carbon deposits buried within the earth are exposed to extreme heat and pressure.
- Lab Grown Diamonds are basically made from two processes: Pressure High Temperature (HPHT) or Chemical Vapour Deposition (CVD).

Steps of India

- India is promoting the manufacturing of lab-grown diamond (LGD) in the country.
- In the Budget for 2023-24, Finance Minister Nirmala Sitaraman announces reduction in customs duties for 'seeds' for lab grown diamonds, to give a fillip to diamond manufacturing in India.
- The government also gave a grant of 242 crore to IIT Madras for setting up an India Centre for Lab Grown Diamonds (InCent-LGD) for research into LGDs.

Importance

- Good quality lab-grown diamonds with qualified certification, produced from the developed equipment and process parameters will attract many foreign customers increasing the export volume of lab-grown diamonds and scalability of production.
- the environmental footprint of a diamond grown in a laboratory is much lesser than that of a naturally-occurring diamond
- Also, the production cost is lesser making them more affordable than their counterparts.
- Though there is an initial cost in setting up the laboratory, and equipment, the production cost is significantly less than the real diamonds.

Challenges

- The scale of the past year's geopolitical and economic disruptions has left a mark on the overall demand dynamics of the diamond market.
- competition from lab-grown rivals included slowing economic growth in the all-important U.S. and China markets, as well as oversupply and sanctions against Russian rough-cut diamonds.
- India's natural diamond industry was forced into a rare voluntary import ban on rough diamonds.

Conclusion and Way Forward

- The demand for naturally mined diamonds will continue to stay relevant in the market, while the demand for LGDs is expected to grow manifold during 2024, with steeper competition from India to other prominent LGD-producing countries.
- This growing demand for LGD in both domestic and international markets will not only help mitigate the impact of export decline, but also provides a platform for the development and improvement of the industry at large.

Sovereign Bond Yields

Syllabus: GS3/Economy

Context

- Recently, it is found that the 10-year bond yield fell to near-one-year low on RBI's record surplus dividend transfer to government.

About the Sovereign Bond Yield (aka Government Bond Yield)

- It refers to the annual interest rate paid by a national government or sovereign entity to the holder of its bonds.
- These bonds are issued as a means of borrowing money from investors to finance government spending, infrastructure projects, and other budgetary needs.

Key Features of Sovereign Bond

- Issuance and Purpose: Sovereign bonds are debt securities issued by a national government. They serve as a way for governments to raise capital.
- When one invests in a sovereign bond, it effectively lends money to the government.
- Risk-Free Assets: Sovereign bonds are often considered risk-free assets because they are backed by the issuing government.
- Since governments can always issue more currency to pay off the bonds at maturity, they do not have credit risk built into their valuation.
- Yield Calculation: The yield on a sovereign bond is the interest rate paid to the bondholder. It is expressed as an annual percentage.
- It represents the return an investor receives for holding the bond until maturity. The yield

Factors Influencing Bond Yield

- Creditworthiness: The credit risk rating of the issuing government affects the yield.
- Stronger economies and stable political environments tend to have lower yields.
- Currency Exchange Rate Risk: The value of the issuing currency on the exchange market impacts the yield.
- Local Interest Rates: The prevailing interest rates in the country play a role.
- Credit Ratings: International credit rating agencies (such as Moody's, Standard & Poor's, and Fitch) assess the creditworthiness of sovereign bonds.
- They consider factors like GDP growth, history of default, per capita income, inflation rate, external debts, and economic development within the nation.
- Risk Premium: The spread between sovereign bond yields and highly-rated corporate bond yields is often used as a measure of the risk premium placed on corporations.

Impact of Lowering Bond Yield

- Lower borrowing costs within the economy, overseas investment, and crude oil Prices etc are mostly affected by this.

ZiG: Zimbabwe's Gold Backed Currency

Syllabus: GS3/Economy

Context

- Recently, Zimbabwe has introduced the ZiG (Zimbabwe Gold), a gold-backed currency amid its monetary crisis marked by hyperinflation and currency collapses.

ZiG: A Brief Overview

- Background: The ZiG is Zimbabwe's sixth national currency in the last 15 years.
- It follows the spectacular collapse of the Zimbabwe dollar in 2009 due to hyperinflation, which reached a staggering 5 billion per cent—the world's worst currency crash.
- Gold-Backed: Unlike its predecessors, the ZiG stands out as a currency backed by physical gold reserves.
- It ensures that its value is supported by the actual gold held by the government.

- Denominations: ZiG notes and coins are available in various denominations: 1ZiG, 2ZiG, 5ZiG, 10ZiG, 20ZiG, 50ZiG, 100ZiG, and 200ZiG.

Why Backed By Gold?

- The gold backing aims to provide stability and prevent currency devaluation.
- By linking the ZiG to a tangible asset, Zimbabwe hopes to restore public confidence in its monetary system.

Challenges and Skepticism

- Public Mistrust: Zimbabweans remain skeptical due to past currency failures. People are still clamoring for U.S. dollars, which have been widely accepted as an alternative currency.
- Black Market Fluctuations: While the ZiG has held its value on the official market, it has tumbled on the black market.
- Exchange rates there can reach up to 17 ZiGs per U.S. dollar.

Sovereign Bonds

Syllabus: GS3/Economy

Context

- Recently, the Reserve Bank of India (RBI) has announced its plan to buy back government bonds worth Rs 40,000 crore in its upcoming auction.

Bond

– It is a debt instrument in which an investor loans money to an entity (typically corporate or government) which borrows the funds for a defined period of time at a variable or fixed interest rate.
– It is used by companies, municipalities, states and sovereign governments to raise money to finance a variety of projects and activities.

Government Security (G-Sec)

– It is a tradable instrument issued by the Central Government or the State Governments.
– It acknowledges the Government's debt obligation.
a. Short Term: Treasury Bills, with original maturities of less than one year;
b. Long Term: Government Bonds or Dated securities with original maturity of one year or more.
– In India, the Central Government issues both, treasury bills and bonds or dated securities while the State Governments issue only bonds or dated securities, which are called the State Development Loans (SDLs).
– G-Secs carry practically no risk of default and, hence, are called risk-free gilt-edged instruments.

Sovereign Bonds

- It is a debt security issued by a national government to raise capital. Governments use these bonds for various purposes:
- Financing Operations: Sovereign bonds help fund government operations, infrastructure projects, and public services.
- Debt Management: They allow governments to refinance existing debt or pay down old obligations.
- Interest Payments: Governments use the proceeds to pay interest on current debt.
- Currency Denomination: Sovereign bonds can be denominated in either the government's domestic currency or a foreign currency.

Key Features

- Risk Profile: The yield on sovereign bonds depends on the issuer's risk profile.
- Countries perceived as higher risk may offer higher yields.
- Credit Ratings: Rating agencies assess sovereign bonds based on economic stability, exchange rates, outstanding debts, and political stability.
- These ratings guide investors in evaluating risks.
- Denomination: Some developing countries issue bonds in foreign currencies due to currency risk.
- For instance, Indonesia might issue bonds denominated in Japanese yen.
- Investment Limits: Sovereign bonds have minimum and maximum investment limits.

- These vary based on the investor type (individuals, trusts, etc.) and are subject to government notifications.
- Interest Payment: Sovereign bonds provide periodic interest payments, with the option to exit after a specified period (usually 5 years) on interest payment dates.
- Issue Price: The price is determined based on the average closing price of gold for the preceding week.
- Online subscribers paying through digital modes receive a discount.

New Initiatives of RBI for Enhancing Public Access to Bank

Syllabus :GS 3/Economy

In News

- The Reserve Bank of India has launched three major initiatives – the PRAVAAH portal, the Retail Direct Mobile App and a FinTech Repository

More in news

- The RBI has also launched a related repository called the EmTech Repository meant for RBI-regulated entities (banks and NBFCs).

About initiatives

- The PRAVAAH (Platform for Regulatory Application, Validation, and Authorisation) portal: It is a secure and centralized web-based platform for individuals and entities to apply online for various regulatory approvals from the RBI.
- The portal streamlines the process of seeking authorizations, licenses, or regulatory approvals by providing a single point of contact for applicants. It is expected to improve the efficiency of the RBI's regulatory approval and clearance processes.
- Retail Direct Mobile App :It offers retail investors easy access to the Retail Direct platform and facilitates transactions in government securities (G-Secs).
- The app enables retail investors to open Retail Direct Gilt accounts with the RBI, participate in primary auctions for G-Secs, and buy and sell G-Secs in the secondary market.
- The app is available for download on the Play Store for Android users and the App Store for iOS users.
- The Fintech Repository: It is a comprehensive database containing information on the Indian fintech sector.
- The repository aims to provide a better understanding of the sector from a regulatory perspective and facilitate the design of appropriate policy approaches. It includes information on Indian fintech companies, their products and services, and the regulatory framework applicable to them.
- The EmTech Repository : It contains information on the adoption of emerging technologies such as artificial intelligence (AI), machine learning (ML), cloud computing, distributed ledger technology (DLT), and quantum computing by these entities.

Purpose :

- These initiatives are aimed at enhancing public access to the central bank and facilitating regulatory approvals and transactions.

Structural Shift Towards Formal Employment in India

Syllabus: GS3/Indian Economy

Context

- ISF unveiled "India@Work: Vision Next Decade," a blueprint for formalisation of informal workforce and implementation of labour codes in the country.

About

- ISF stressed the need of formalising the country's informal workforce of over 400 million and anticipated organised staffing companies would be able to contribute to this exercise.
- A noticeable distinction was seen during the pandemic, where the formal workforce, comprising less than 15%, had access to their social security, which aided them in overcoming the challenges.

- ISF would be looking majorly into three crucial aspects to address the challenges posed: increasing the social security ambit; improving the concept of in-hand wage; implementation of labour codes; to minimise any obstacle to a favourable working condition.
- Recommendations: Some of the recommendations made by ISF included:
- removing employment bottlenecks, urgent implementation of the four labour codes in India, policy changes and encouraging schemes, consideration of employment services as 'merit services', with lower GST slab tax rates at 5% with ICT benefits instead of the current 18% and linking of skilling initiatives to employment.

About ISF

– It was established in 2011 and plays a crucial role in promoting the benefits of flexible staffing solutions to businesses, policymakers, and other stakeholders.
– It works towards creating a conducive regulatory environment for the industry and fosters ethical and professional standards among its members.
– The ISF also conducts research and publishes reports to provide insights into the flexi staffing industry's growth, challenges, and opportunities.

Difference Between Formal and Informal Sector

- The formal sector has a written contract between the employer and the employee, as well as pre-defined labour conditions.
- This sector is made up of a well-organized group of people who operate in the same environment and are legally and socially conscious of their rights.
- Informal Sector: All unincorporated private enterprises owned by individuals or families involved in the sale and production of products and services on a proprietary or partnership basis are classified as informal.

Informal Sector of Indian Economy

- The Indian Economy is characterized by the existence of a vast majority of informal or unorganized labour employment.
- India with almost 85% informal labour is generating more than half of the country's GDP.
- A high proportion of socially and economically underprivileged sections of society are concentrated in informal economic activities.

Challenges Related to Informal Sector in India

- Impact on Women Labour Force Participation: Women make up the majority of informal participants, yet they receive the fewest benefits and face lower salary, income volatility, and a lack of a strong social safety net. It has also greatly hampered women's labor-force participation.
- According to the Periodic Labour Force Survey statistics, female labour force participation fell to 21.2% in March 2021, down from 21.9% the previous year.
- Low Wages and Exploitation: Informal employment, by definition, lacks a written contract, paid leave, and hence does not pay minimum wages or pay attention to working conditions.
- Working hours that exceed labour standards are widespread in India's unorganised sector.
- Lack of Social Security: Workers in the informal sector often lack access to social security benefits such as healthcare, pensions, and unemployment insurance.
- This leaves them vulnerable to economic shocks and health crises.
- Limited Access to Finance: Informal sector workers and businesses often struggle to access formal financial services such as bank loans and credit, hindering their ability to invest in their businesses or improve their living standards.
- Poor Quality of Life: Unorganized sector workers were far more likely to be poor than their organised sector counterparts.
- Poor nutrition intake, as a result of low salaries and health problems, endangers their life.
- Tax Evasion: Because the informal economy's firms are not directly regulated, they typically dodge one or more taxes by concealing revenue and expenses from the legal system.
- This is a problem for the government because a large portion of the economy is not taxed.
- Lack of formal Data for Policymaking: There are no official statistics available that reflect the true state of

the economy, making it difficult for the government to formulate policies affecting the informal sector in particular and the economy as a whole.

Way Forward

- There is a need to relax restrictions for informal business conduct in order to pull informal businesses and their employees into the fold of formality.
- A self-help group effort that gathers informal employees can help to foster self-sufficiency and address concerns linked to their working conditions.
- As part of the National Data System, a comprehensive statistical base on many elements of the informal economy is required to enable policymakers to make informed decisions.
- Grievances from informal employees should be heard and resolved on a regular basis through a transparent and officially regulated procedure.
- Equal compensation for equal effort is a directive principle of state policy (Article 39(d)), but women farm labourers typically earn less than their male colleagues.
- Through appropriate legislative support, the government should enhance and enforce this DPSP.

Conclusion

- The plight of lower-income and semi-skilled workers underscores the pressing need for concerted action. Income inequality and rising poverty levels serve as stark reminders of the challenges India face.
- With 85% of India's workforce operating in the informal sector, it was imperative to initiate a structural shift towards formalisation to ensure equitable opportunities and sustainable livelihoods for all.

Trade Deficit of India

Syllabus: GS 3/Economy

In News

- India has recorded a trade deficit, the difference between imports and exports, with nine of its top 10 trading partners, including China, Russia, Singapore, and Korea, in 2023-24

Key Highlights

- The data showed that the deficit with China, Russia, Korea, and Hong Kong increased in the last fiscal compared to 2022-23, while the trade gap with the UAE, Saudi Arabia, Russia, Indonesia, and Iraq narrowed.
- China has emerged as India's largest trading partner with $118.4 billion of two-way commerce in 2023-24, edging past the U.S.
- India's total trade deficit in the last fiscal narrowed to $238.3 billion as against $264.9 billion in the previous fiscal.

Do you know ?

– India has a free trade agreement with four of its top trading partners — Singapore, the UAE, Korea and Indonesia (as part of the Asian bloc).

What is the trade deficit ?

- A trade deficit occurs when a country imports more than it exports. In other words, when a country buys more than it sells, it has a trade deficit.

Causes

- There are multiple factors that can be responsible.
- One of them is some goods not being produced domestically.
- In that case, they have to be imported.
- This leads to an imbalance in their trade.
- A weak currency can also be a cause as it makes trade expensive.

Impacts

- A bilateral trade deficit with a country isn't a major issue unless it makes us overly reliant on that country's critical supplies.

- However, a rising overall trade deficit is harmful to the economy.
- A rising trade deficit, even from importing raw materials and intermediates, can cause the country's currency to depreciate because more foreign currency is needed for imports.
- This depreciation makes imports more expensive, worsening the deficit
- More imports than exports, according to economists, impact the jobs market and lead to an increase in unemployment
- To cover the growing deficit, the country might need to borrow more from foreign lenders, increasing external debt and this can deplete foreign exchange reserves and signal economic instability to investors, leading to reduced foreign investment.

Steps of India for reducing trade deficit

- Government has taken several steps to reduce import reliance so as to curb the trade deficit.
- These include creating/enhancing of domestic capacity,
- incentivizing domestic manufacturing through Production Linked Incentive (PLI) schemes,
- phased manufacturing plans,
- timely use of trade remedy options,
- adoption of mandatory technical standards,
- enforcement of FTA Rules of Origin (RoO) and
- development of import monitoring system
- Government launched the Foreign Trade Policy 2023 which aims at process re-engineering and automation to facilitate ease of doing business for exporters

Suggestions

- A deficit is not always bad, if a country is importing raw materials or intermediary products to boost manufacturing and exports.
- However, it puts pressure on the domestic currency.
- Cutting the trade deficit requires boosting exports, reducing unnecessary imports, developing domestic industries, and managing currency and debt levels effectively.

Quarter (Q1) Periodic Labour Force Survey

Syllabus: GS2/Government Policies & Interventions; GS3/Employment; Growth & Development

Context

- Recently, the Ministry of Statistics and Programme Implementation (MOSPI) released the Periodic Labour Force Survey (PLFS) for the first quarter (Q1) of 2024.

About the Periodic Labour Force Survey (PLFS)

- It was launched by the National Sample Survey Office (NSSO) in April 2017, considering the importance of availability of labour force data at more frequent time intervals.
- The data on Employment and Unemployment is collected through Periodic Labour Force Survey (PLFS).

Objectives:

- To estimate the key employment and unemployment indicators (viz. Worker Population Ratio, Labour Force Participation Rate, Unemployment Rate) in the short time interval of three months for the urban areas only in the 'Current Weekly Status' (CWS).
- To estimate employment and unemployment indicators in both 'Usual Status' (ps+ss) and CWS in both rural and urban areas annually.

National Sample Survey Office (NSSO)

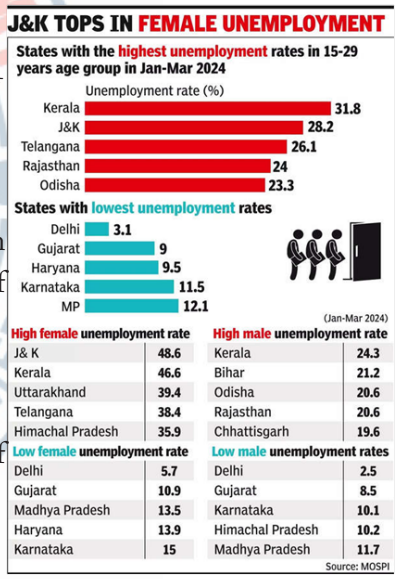
– It is an organisation responsible for conducting large-scale sample surveys on an all-India basis.
– It was merged with the Central Statistical Office (CSO) to form the National Statistical Office (NSO) in 2019 and now headed by the Ministry of Statistics and Programme Implementation (MOSPI).
a. Earlier, NSSO was headed by a Director General and was responsible for conducting large-scale sample surveys in diverse fields on an all-India basis.
– Data were primarily collected through nationwide household surveys on various socio-economic subjects, Annual Survey of Industries, etc.
– It maintained a frame of urban area units for use in sample surveys in urban areas.

Divisions

– Survey Design and Research Division (SDRD): Located at Kolkata, this division was responsible for technical planning of surveys, formulation of concepts and definitions, sampling design, designing of inquiry schedules, drawing up of tabulation plan, analysis, and presentation of survey results.
– Field Operations Division (FOD): With its headquarters at Delhi/Faridabad, this division was responsible for the collection of primary data for the surveys undertaken by NSS.
– Data Processing Division (DPD): Located at Kolkata, this division was responsible for sample selection, software development, processing, validation, and tabulation of the data collected through surveys.
– Survey Coordination Division (SCD): Located at New Delhi, this division coordinated all the activities of different divisions of NSS.

Key Findings of PLFS

- Unemployment Rate (UR) in Urban Areas: It decreased from 6.8% (Q1 2023) to 6.7% (Q1 2024) for persons of age 15 years and above.
- For Male: It increased from 6.0% to 6.1%
- Female UR decreased from 9.2% to 8.5%
- Labour Force Participation Rate (LFPR) in Urban Areas: It has shown an increasing trend from 48.5% (Q1 2023) to 50.2% (Q1 2024) for persons of age 15 years and above.
- Male LFPR: It increased from 73.5% to 74.4%
- Female LFPR: It increased from 22.7% to 25.6%
- Worker Population Ratio (WPR): Increasing Trend in WPR for persons of age 15 years and above from 45.2% (Q1 2023) to 46.9% (Q1 2024).
- For Male: It increased from 69.1% to 69.8%
- For Female: It increased from 20.6% to 23.4%



State Wise Data on Unemployment

- Kerala had the highest unemployment rate in the 15-29 age group in urban areas in Q1 2024, while Delhi had the lowest joblessness rate among 22 states and Union territories.
- J&K, Telangana, Rajasthan and Odisha were among the five states with the highest unemployment rates in the 15-29 years category.
- Three out of the 22 states and UTs recorded unemployment rates in single digits – apart from Delhi (3.1%), the other states were Gujarat (9%) and Haryana (9.5%).
- The other two states among the five with low joblessness rates were Karnataka (11.5%) and Madhya Pradesh (12.1%).
- PLFS data showed that the unemployment rate for women was the highest in J&K at 48.6%, followed by Kerala (46.6%), Uttarakhand (39.4%), Telangana (38.4%) and Himachal Pradesh (35.9%).

Employment Prevailing in an Indian Economy

– Wage employment: It is a result of labour demanded by employers in their pursuit of profits.
– Self-employment: Labour supply and labour demand are identical. The worker employs herself.

- **Employed:** Individuals who are currently engaged in economic activities.
- **Unemployed:** Individuals who are seeking or available for work but are currently without employment.
- **Not seeking or available for work:** Individuals who are neither actively seeking nor available for employment.

– The wage labour includes all forms of labour done for an employer including daily wage work at one extreme and highly paid corporate jobs at the other.

Related government initiatives to boost overall employment scenario in India:

- Atmanirbhar Bharat Rojgar Yojana (ABRY): Launched as part of the Atmanirbhar Bharat package 3.0, to incentivise employers for creating new employment along with social security benefits and restoration of loss of employment during the Covid-19 pandemic.
- Pradhan Mantri Rojgar Protsahan Yojana (PMRPY): tTo incentivize employers for the creation of new employment.
- National Career Service (NCS) Project: It provides a variety of career-related services like job matching, career counselling, vocational guidance, information on skill development courses, apprenticeships, internships, etc.
- Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA): It provides at least 100 days of guaranteed wage employment in a financial year to every rural household whose adult members volunteer to do unskilled manual work.
- Pradhan Mantri Garib Kalyan Rojgar Abhiyaan (PMGKRA): To boost employment and livelihood opportunities for returnee migrant workers and similarly affected persons in rural areas.
- Pradhan Mantri Mudra Yojana (PMMY): It facilitates self-employment by providing collateral-free loans up to Rs. 10 lakh to micro/small business enterprises and individuals.
- Garib Kalyan Rojgar Abhiyaan (GKRA): To provide immediate employment and livelihood opportunities to the distressed and to saturate the villages with public infrastructure and creation of livelihood assets.
- PM GatiShakti: It is a transformative approach for economic growth and sustainable development, driven by seven engines, namely, Roads, Railways, Airports, Ports, Mass Transport, Waterways, and Logistics Infrastructure.

Wilful Defaulter

Syllabus: GS3/Economy

Context

- Recently, the Bombay High Court banned the Public Sector Banks (PSBs) from seeking Look-out Circulars (LOCs) against Wilful Defaulters.

About the Wilful Defaulter

- As per the RBI guidelines, a 'wilful default' is deemed to have occurred if the borrower has defaulted in meeting its payment/repayment obligations to the lender, even when it has the capacity to honour the said obligations.
- RBI has broadened the definition of wilful default, and called for a review by the bank within six months of an account being declared as a non-performing asset.
- A wilful defaulter is someone who, as a borrower or guarantor, has deliberately defaulted on their financial obligations, with an outstanding amount of Rs 25 lakh or more.

- A large defaulter is a borrower whose outstanding balance is Rs 1 crore or more, and their account has been classified as doubtful or a loss.
- Commercial lenders like Banks and NBFCs have legal powers to classify certain defaulted borrowers as wilful defaulters.

Laws dealing with Wilful Defaulters

- The SARFAESI Act of 2002 stipulates that if a borrower does not furnish asset information and the lender does not take possession of the mortgaged property within 30 days, a three-month penalty is now applicable.
- The Fugitive Economic Offenders Act of 2018, legal framework introduced in India to deal with individuals who have committed economic offenses and have fled the country to avoid facing prosecution.

Status of Market and Non Market Economy

Syllabus: GS3/Economy

Context

- Recently, Vietnam has pushed to change its 'non-market economy' classification to 'market economy', in a bid to avoid high taxes imposed by the US on goods imported from the Southeast Asian nation.

'Market Economy' Status

- It is an economic system in which economic decisions and the pricing of goods and services are guided by the interactions of a country's individual citizens and businesses.
- In a market economy, the laws of supply and demand dictate the production of goods and services, and the prices are determined using the same principle.
- Market economies work using the driving principle that supply and demand are the best determinants of what is right for a nation's well-being.
- It leads to competition, which allows for innovation and diversity.

'Non-Market Economy' Status

– A non-market economy is a type of economic system where the government controls the allocation of resources, price and output decisions.
– The US designates a country as a non-market economy based on several factors, including:
a. If the country's currency is convertible;
b. If wage rates are determined by free bargaining between labour and management;
c. If joint ventures or other foreign investment are allowed;
d. Whether the means of production are owned by the state; and
e. If the state controls the allocation of resources and price and output decisions.
f. Other factors like human rights are also considered.
– It allows the US to impose 'anti-dumping' duties on goods imported from designated countries.
a. Anti-dumping duties essentially compensate for the difference between the imported good's export price and their normal value.

Thirty years of Marrakesh Agreement

Syllabus: GS3/ Economy

Context

- India has called for re-energising discussions in the World Trade Organisation (WTO) on the development dimension to achieve tangible progress and meaningful outcomes.

About

- Development agenda refers to issues being pushed by developing and least developed nations. These issues include access to finance and technology, food security, and supply chain resilience.
- In a paper on '30 years of WTO: how has the development dimension progressed? – A 'way forward' submitted recently to the WTO General Council, India asked all members to submit proposals on such issues to bring back focus on the development dimension of WTO.

World Trade Organization (WTO)

- WTO is the international organization that deals with the rules of trade between countries.
- History:WTO is the successor to the General Agreement on Tariffs and Trade (GATT) established in the wake of the Second World War.
- The Marrakesh Agreement establishing the World Trade Organization was signed by 123 countries in 1994, leading to the birth of the WTO on 1 January 1995.
- Headquarters: Geneva, Switzerland
- Member: The WTO is run by its 164 members.
- Mandate: Its aim is to promote free trade, which is done through trade agreements that are discussed and signed by the member states.
- The preamble of the Marrakesh Agreement accords primacy to the developmental objectives of this organization.

Organizational Structure of WTO

- Ministerial Conference: The WTO's apex decision-making body is the Ministerial Conference, which usually takes place every two years.
- All members of the WTO are involved in the Ministerial Conference and they can take decisions on all matters covered under any multilateral trade agreements.
- General Council: It is just below the Ministerial Conference that meets several times a year at the WTO's headquarters in Geneva.
- It meets as the Trade Policy Review Body and the Dispute Settlement Body.
- Trade Related Intellectual Property Rights (TRIPS) Council: It is for the Goods, Services, and Intellectual Property, and it reports to the General Council.

India and WTO

- India has been a WTO member since 1 January 1995.
- Peace Clause: WTO members at the Bali ministerial meeting in 2013 put in place a mechanism called the Peace Clause to tackle the differences between nations on food subsidy.
- Under this clause, developing nations could not be dragged to arbitration if they did breach the prescribed limit of 10 per cent on support to farmers.
- However, there was confusion over whether the temporary reprieve would continue after four years.
- Concerns of Western nations: Large agriculture commodity exporters such as the US and Canada are critical of such a move as they believe that higher subsidies are distorting agriculture prices in the global market.
- It is also argued that public stockholding at administered prices gives countries such as India an unfair competitive advantage in trade, contradicting the WTO's principles of open and fair trade.
- Protectionist Measures: India has expressed serious concerns in a WTO meeting over an increase in the use of trade protectionist measures by certain countries in the name of environment protection.

India's stand

- India, proposed that domestic support provided by a developing country for PSH programmes should be considered compliant with the WTO's AoA (Agreement on Agriculture) rules and not subject to reduction commitments.
- The external reference price for calculating the subsidy element is pegged to 1986-88 prices, which leads to inflated subsidy calculations because existing international prices are much higher.

Way Ahead

- The WTO must adapt to the changing dynamics of global trade and ensure that it continues to play its role effectively in the years to come.
- India has suggested that WTO bodies, which hold thematic sessions, should devote at least one session to discuss specific needs of LDCs, LLDCs and Small Island Development States.
- WTO bodies which are underutilized such as the Working Group on Trade and Transfer of Technology and the Working Group on Trade, Debt and Finance should be reinvigorated, bringing in greater coherence with relevant intergovernmental organizations.

Meghalaya Coal Mining Damage

Syllabus: GS3/Economy

Context

- Justice Katakey committee has flagged the lack of progress in restoring the environment damaged by rat-hole coal mining in the northeastern State.

Background

- The National Green Tribunal (NGT) banned the practice of rat-hole coal mining in 2014 as it causes environmental degradation and is a threat to the life of miners.
- The Meghalaya High Court appointed a single-member committee under justice Brojendra Prasad Katakey in 2022 to recommend measures to the state government in compliance with the directions issued by NGT.

What is rat-hole mining?

- The term "rat hole" refers to the narrow pits (3-4 feet high) dug into the ground, typically just large enough for one person to descend and extract coal.
- Once the pits are dug, miners descend using ropes or bamboo ladders to reach the coal seams.
- The coal is then manually extracted using primitive tools such as pickaxes, shovels, and baskets.

Concerns of Rat hole mining

- Safety Concerns: Rat hole mining is often carried out in very small and unstable tunnels, lacking safety measures such as proper ventilation, structural support, or safety gear for the workers.
- In 2018, around 15 rat hole miners died inside a coal mine in the East Jaintia Hills district in Meghalaya.
- Environmental issues: The mining process can cause land degradation, deforestation, and water pollution.
- Rat-hole mining in Meghalaya had caused the water in the Kopili river (it flows through Meghalaya and Assam) to turn acidic.
- Loss of lives: This method of mining has faced severe criticism due to its hazardous working conditions, and numerous accidents leading to injuries and fatalities.
- Child labor: Due to the small size of the tunnels, Children are employed in the as they can crawl through these cramped spaces on their knees.

Reasons for the persistence of rat hole mining

- Lack of Alternative Livelihood: In some areas, there are limited alternative employment opportunities. Hence it is difficult for miners to transition to other professions.
- Lack of political will: For many regions rat hole mining is the main source of revenue.Thus authorities do not take strict action to regulate the practice.
- Poverty: Economic challenges and poverty drives individuals to engage in rat hole mining as a means of survival.
- Economic Viability: No other method would be economically viable in Meghalaya, where the coal seam is extremely thin. Removal of rocks from the hilly terrain and putting up pillars inside the mine to prevent collapse would be costlier.

Key issues highlighted by the Committee

- The people living in areas around the mines continue to suffer due to continued acid mine drainage from the mine pits that have not been closed yet.
- It underlined the non-utilisation of the Meghalaya Environment Protection and Restoration Fund (MEPRF).
- The transportation of re-assessed or re-verified inventoried coal to the designated depots has not been completed yet.

Way Ahead

- There is a need to take necessary steps for restoring the mining-affected ecology of Meghalaya with 400 crore in the MEPRF and another 100 crore with the Central Pollution Control Board.
- The panel recommended the conduct of the drone survey immediately after the completion of the transportation of re-assessed or re-verified inventoried coal to the Coal India Limited-designated depots.

- The objective of the survey is to locate deposits of coal illegally mined after the imposition of the NGT ban and to take the required steps including the seizure of such coal under the provisions of the Mines and Minerals (Development and Regulation) Act, 1957.

Hydro Capacity to Meet Rising Peak Demand

Syllabus: GS3/ Infrastructure

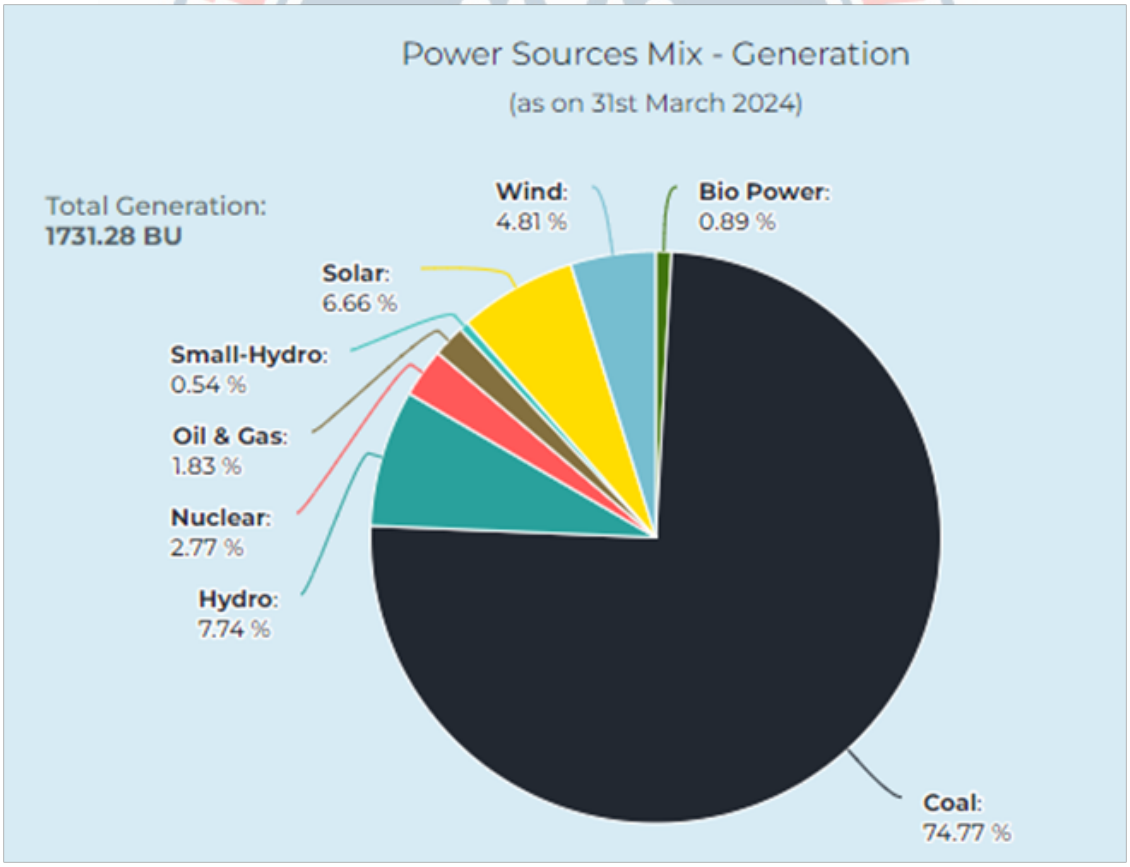
Context

- The Ministry of Power has optimized hydropower generation to avoid supply shortfall as peak power demand is set to touch 240 GW during the summer months.

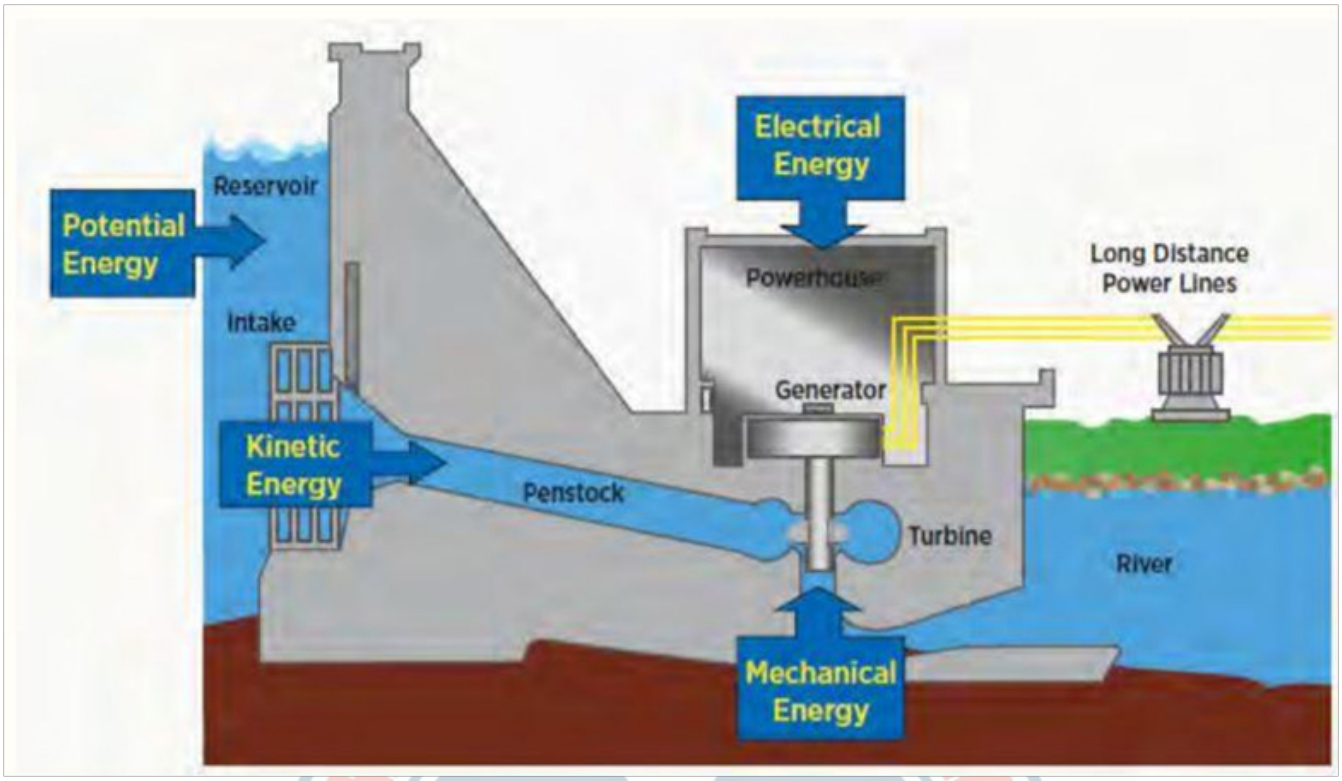
Renewable energy generation in India

- India is the world's third largest producer of renewable energy and around 40 percent of installed electricity capacity comes from non-fossil fuel sources.
- India has added a renewable capacity of over 18 GW in FY24.
- This green push has resulted in a sharp 24 percent reduction in emission intensity of GDP between 2005 and 2016, but it has also thrown up challenges in meeting peak demand with a grid being increasingly powered by renewables.
- However the reliance on coal and gas along with hydro power is preferred more to meet peak demand.

Energy Generation in India



What is Hydropower?



- Hydropower, or hydroelectric power, is one of the oldest and largest sources of renewable energy, which uses the natural flow of moving water to generate electricity.
- Hydropower currently generates more electricity than all other renewable technologies combined and is expected to remain the world's largest source of renewable electricity generation into the 2030s.
- Classification of Hydro Projects based on Installed Capacity:
  - Micro: up to 100 KW
  - Mini: 101KW to 2 MW
  - Small: 2 MW to 25 MW
  - Mega: Hydro projects with installed capacity >= 500 MW
- India: In 2022-23, hydropower accounted for 12.5 percent of power generation in India. India had about 4745.6 MW pumped storage capacity in operation in 2023.
- The hilly States of India mainly Arunachal Pradesh, Himachal Pradesh, Jammu & Kashmir and Uttarakhand constitute around half of this potential.
- Other potential States are Maharashtra, Chhattisgarh, Karnataka and Kerala.

Potentials of Hydro Electric power in meeting Energy demand

- Abundant water resources: India is endowed with several major rivers and their tributaries, which offer immense potential for hydroelectric power generation.
- Potential for small-scale projects: In addition to large-scale projects, India also has potential for small-scale hydroelectric projects, especially in hilly regions and remote areas where grid connectivity is limited.
- Storage capacity: Hydroelectric power plants with reservoirs offer the advantage of energy storage, which can be crucial for managing peak demand and providing stable electricity supply.
- Long Lifespan: Hydropower infrastructure, such as dams and turbines, can have long lifespans, often exceeding 50 years with proper maintenance. This longevity ensures a stable and enduring source of energy for a longer period of time.
- Reliable and Predictable: Unlike solar and wind energy, which are intermittent and dependent on weather conditions, hydropower provides a consistent and reliable source of electricity.
- Clean Energy: Hydropower produces minimal greenhouse gas emissions compared to fossil fuels, making it an environmentally friendly option for generating electricity

Challenges associated with Hydro Power generation

- Environmental Impact: Large-scale hydropower projects often require damming rivers, which alter ecosystems, disrupt fish habitats, and impact local biodiversity.
- It also leads to issues like sediment buildup and water temperature changes downstream, affecting aquatic life.
- Social Impacts: Building dams and reservoirs displace communities and disrupt livelihoods, especially those relying on the affected rivers for fishing or agriculture.
- High Initial Costs: Constructing hydropower facilities involves significant upfront investment costs.
- Climate Change Vulnerability: Hydropower generation relies on consistent water flow, which can be affected by climate change-induced variations in precipitation patterns and glacial melt.
- A UK based thinktank found that the drought — likely exacerbated by climate change — drove an 8.5% drop in hydroelectricity around the world over the last two decades.
- Sedimentation: Dams trap sediment flowing downstream, leading to reservoirs gradually filling up with sediment over time.
- This reduces the reservoir's capacity and impacts the efficiency and lifespan of the hydropower facility.
- Maintenance Challenges: Hydropower infrastructure requires regular maintenance to ensure safe and efficient operation.

Way Ahead

- The solution to address the rising peak demand is to diversify the power sources by incorporating other renewable technologies into the energy mix.
- Innovations around placing floating solar panels on the water's surface in hydropower plants — as countries such China and Brazil are exploring — have significant potential.
- To compensate for the intermittency, pumped-storage hydroelectric plants – where it stores energy in the form of the gravitational potential energy of water with the help of renewable power is being seen as the most viable alternative

Draft Digital Competition Bill

Syllabus: GS2/Governance/GS3/Economy

Context

- India has proposed The draft law, called the Digital Competition Bill, 2024.

About

- It has provisions to set presumptive norms to curb anti-competitive practices before they actually take place, and promises to impose heavy penalties for violations.
- The law could stop tech giants like Google, Facebook, and Amazon from self-preferencing their own services, or using data gathered from one company to benefit another group company.
- The proposal is similar to the EU's Digital Markets Act (DMA), which requires large tech firms like Alphabet, Amazon and Apple to open their services, and not favour their own at the expense of rivals.
- The law came in on the back of a long history of anti-competitive practices by these companies.

Background

- In March this year, the Committee on Digital Competition Law (CDCL) published its report outlining the challenges associated with anti-competitive practices of digital enterprises such as anti-steering, self-preferencing, tying, and bundling in the digital markets in India.
- The committee had proposed a Digital Competition Bill in the report, providing for ex-ante regulations to curb these anti-competitive practices.

Key Highlights

- Predictive Regulation: It proposes a forward-looking, preventive, and presumptive law (an ex ante framework) that foresees the potential harms that can arise out of antitrust issues and prescribes pre-determined no-go areas is perhaps the way forward.
- Currently, India follows an ex post antitrust framework under the Competition Act, 2002.

- One of the biggest criticisms of the law has been that regulating after the incidence of market abuse involves delays — by the time the offending company has been penalised, market dynamics change to rule out smaller competitors.
- Significant entities: The Bill proposes that for certain "core digital services" like search engines, and social media sites, the Competition Commission of India (CCI) should designate companies as "Systematically Significant Digital Enterprise (SSDE)" depending on various quantitative and qualitative parameters such as turnover, user base, market influence etc.
- Entities that don't fall under these parameters can still be designated as SSDEs if the CCI believes that they have a significant presence in any given core digital service.
- Entities which are designated as SSDEs, have been prohibited from engaging in practices such as self-preferencing, anti-steering, and restricting third party applications.
- If they violate these requirements, they can be fined up to 10% of their global turnover.
- Associate Digital Enterprises: Understanding the role that data collected by one company of a major technology group can play in benefitting other group companies, the Bill proposes to designate associate digital enterprises (ADEs).
- If an entity of a group is determined to be an associate entity, they would have the same obligations as SSDEs depending on the level of their involvement with the core digital service offered by the main company.
- Enforcement of provisions: The draft Bill empowers the Director General, appointed under the 2002 Act, to investigate any contraventions when directed by the CCI.

Need for the Bill

- The big tech companies have shown a history of engaging in anti-competitive practices, and a presumptive framework would work better to address this.
- Last year, Google was fined Rs 1.337 crore by the CCI for its anti-competitive conduct in the Android ecosystem.
- There is also concern that in the last decade or so, a majority of the innovation has been confined to within the stables of a handful of big tech companies, mostly from the US.
- Officials believe that a big reason for this are the high market barriers for new entrants in the sector — in the online market.

Criticism of the Draft Bill

- Compliance Burden: For big tech companies, an ex ante framework with its strict prescriptive norms could lead to significant compliance burden, and shift focus from innovation and research.
- As a result, the tech giants are calling for the current competition law to be strengthened rather than moving towards an ex ante framework.
- Broad Definition of Entities: Companies are also understood to be concerned about the broad definition — both quantitative and qualitative — of who a significant platform could be.
- Unlike EU's DMA which specifically names the 'gatekeeper' entities, that decision in India's draft law has been left to the discretion of the CCI.
- Companies believe that could lead to arbitrary decision making, which could potentially also impact start-ups.

Conclusion

- Ex-ante regimes tell businesses precisely how to behave, or what to do.
- Under the current ex-post regime of the Competition Act, companies are only required to ensure that their conduct in the market is not anti-competitive.
- An overlapping ex-ante regime proposed under the digital competition Bill will force tech companies to comply with parallel legislation and undertake measures for additional compliance.

Balanced Fertilisation

Syllabus: GS3/Economy/Agriculture

Context

- Balanced fertilisation is likely to be on the priority list of the government post the Lok Sabha polls.

About

- Balanced fertilisation means supplying these primary (N, phosphorus-P and potassium-K), secondary (sulphur-S, calcium, magnesium) and micro (iron, zinc, copper, manganese, boron, molybdenum) nutrients in the right proportion, based on soil type and the crop's own requirement.
- Farmers apply too much urea, di-ammonium phosphate (DAP) or muriate of potash (MOP), which only have primary nutrients in high concentrations.
- The fiscal ended March 2024 saw urea consumption hit a record 35.8 million tonnes (mt), 16.9% higher than the 30.6 mt in 2013-14.

What is DAP?

– Di-ammonium Phosphate (DAP) is a type of fertilizer that contains phosphorus and nitrogen, two essential nutrients for plant growth.
– It has the chemical formula $(NH_4)_2HPO_4$.
– DAP is commonly used in agriculture to provide a quick and readily available source of nutrients to plants.
– It is the second most commonly used fertilizer in India after urea.

What is Nano DAP?

– It is a unique liquid fertilizer product that contains nanoparticles of Diammonium Phosphate (DAP).
– It is a source of nitrogen and phosphorus – 2 key primary nutrients essential for the growth of crops.
– The small size of Nano DAP (< 100 nm) and high surface area drive the easy absorption by plant leaves.
– It is a novel nano-formulation which helps in better crop growth and yield, reduced environmental burden and increased farmer profitability.

Concerns of Using Urea in High Concentration

- Environmental Impact: Excessive use of urea leads to nitrogen runoff into water bodies, causing eutrophication and disrupting aquatic ecosystems.
- Soil Health: Overuse of urea leads to soil acidification and depletion of organic matter, reducing soil fertility in the long run.
- Crop Damage: Many farmers in fruit producing areas use a lot of urea, resulting in tree death, with very serious consequences.

Government Initiatives

- Neem-coated urea: The government has introduced 100% Neem Coating on all subsidized agricultural grade urea in the country in order to increase the nutrient efficiency, crop yield, soil health and check the diversion of agricultural grade urea for non-agricultural activities.
- PM PRANAM scheme: PM Programme for Restoration, Awareness Generation, Nourishment and Amelioration of Mother – Earth (PMPRANAM)" was launched to incentivize States/ Union Territories to promote alternate fertilizers and balanced use of chemical fertilizers.
- Nano Urea: It is a liquid fertilizer developed by IFFCO. It is an alternative to conventional urea.
- Nutrient-Based Subsidy (NBS) Policy: Under the NBS policy, subsidies are provided based on the nutrient content of fertilizers rather than on a per-unit basis.
- This encourages farmers to use a balanced mix of fertilizers, including nitrogen, phosphorus, and potassium, thereby reducing the overreliance on urea.
- Soil Health Card Scheme: The Soil Health Card Scheme aims to assess the nutrient status of soil and provide customized recommendations for nutrient management to farmers.
- Promotion of Precision Farming: Initiatives like the Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) promote precision farming techniques, including drip irrigation and fertigation, which enable more efficient use of fertilizers, including urea, by delivering nutrients directly to plants' root zones.

Way Ahead

- Addressing these concerns requires a holistic approach, including promoting the use of balanced fertilizers, improving soil health through organic farming practices, enhancing nutrient management techniques, and investing in research and development of sustainable agricultural practices.
- Additionally, policies that incentivize the efficient use of fertilizers and promote alternatives to urea can help mitigate these issues.

Chapter-
9

DISASTER & MANAGEMENT

State of Fire Safety Standards in India

Syllabus: GS3/ Disaster Management

In Context

- Recent devastating fires in Delhi and Rajkot have brought to light the critical lack of fire safety measures in Indian cities.

About

- Despite established fire preparedness disciplines worldwide and repeated fire outbreaks over the past three decades, public spaces, housing, hospitals, and commercial buildings in India remain vulnerable.
- In 2022, over 7,500 fire accidents resulted in the deaths of 7,435 people in India, according to the National Crime Records Bureau (NCRB).
- Maharashtra and Gujarat, two of the most urbanized states, account for approximately 30% of fire-related deaths in the country.
- Past incidents like the Uphaar Cinema fire (1997), AMRI hospital fire (2011), Kamala Mills inferno (2017), and various hospital fires during the COVID-19 pandemic reveal a persistent neglect of safety standards.

Challenges in Preventing FIre Accidents in India

- Non-compliance with Safety Regulations: Many establishments, like the Rajkot gaming centre, operate without necessary fire safety clearances and flout basic safety norms.
- Weak Municipal Oversight: Municipal bodies responsible for fire safety inspections are often understaffed and lack resources, leading to infrequent and ineffective checks.
- Neglect of Existing Guidelines: Detailed guidelines in the National Building Code and state-specific fire safety rules are often ignored, resulting in hazardous conditions.
- National Building Code of India, 2016, it includes provisions for 'Fire and Life Safety' audits, these are only recommendatory, not mandatory.
- Inadequate Firefighting Infrastructure: A study indicates urban India has less than 40% of the required fire stations, and the existing infrastructure needs modernization.

Fire Safety Standards in India

- Fire safety standards in India are governed by the National Building Code (NBC) 2016, which provides comprehensive guidelines for fire prevention, protection, and life safety in buildings.
- Part 4 of the NBC details fire and life safety requirements, including building materials, fire exits, firefighting equipment, and alarm systems.
- Each state has its own Fire Services Act, which outlines the powers and responsibilities of fire services and enforces fire safety regulations.
- The BIS sets standards for fire safety equipment like extinguishers, hoses, and alarms.
- Director-General of Civil Defense, Home Guards, & Fire Services under the Ministry of Home Affairs oversees fire management.
- National Fire Service College, Nagpur provides training and education for fire service personnel.

Steps Taken For Fire Safety

- Scheme for Expansion and Modernization of Fire Services in the States: Launched by the Centre in 2023, this scheme aims to strengthen fire services in states until 2025-26 by providing financial assistance for upgrading equipment, training personnel, and establishing new fire stations.
- Model Bill to Provide for the Maintenance of Fire and Emergency Service for the State: This model

bill, circulated by the Centre, aims to facilitate the establishment and maintenance of efficient fire and emergency services at the state level.
- National Disaster Management Authority (NDMA) guidelines: The NDMA has released guidelines covering scaling, types of equipment, and training for fire services across the country.
- Fire Safety Audits: Mandating fire safety audits in all buildings over 15 meters tall every two years by an independent entity.

Way Ahead

- Strict Enforcement of Regulations: Authorities must rigorously enforce fire safety regulations and penalize violators.
- Investing in Infrastructure: A 2018 FICCI-Pinkerton study revealed that urban India has less than 40% of the required fire stations. The 15th Finance Commission highlighted the need for modernizing firefighting infrastructure.
- Strengthening Municipal Capacity: Municipal bodies need increased resources and training to conduct regular and thorough fire safety inspections.
- Policy Implementation and Monitoring: Ensure strict adherence to the National Building Code and state-specific fire safety regulations.
- Regular audits of compliance, particularly in vulnerable facilities like hospitals.
- Accountability and Legal Reforms: Hold violators accountable through stringent penalties and legal action.
- Fast-track the implementation of recommendations from past disaster investigations.
- Prioritizing Healthcare Facilities: Special attention must be given to fire safety in healthcare facilities, considering the presence of flammable materials and vulnerable patients.

Boiler Blast at Chemical Company in Maharashtra

Syllabus: GS3/Disaster Management

Context

- Eight people were killed and around 60 were injured in a boiler blast at a chemical company in Maharashtra.

Industrial Accidents in India

- In the last decade, 130 significant chemical accidents have been reported, which resulted in 259 deaths and left 563 people with major injuries, according to data by the National Disaster Management Authority (NDMA).
- Several industrial accidents have occurred over the years, resulting in loss of life, injuries, and environmental damage.
- Bhopal Gas Tragedy (1984): One of the most catastrophic industrial disasters in history, where a pesticide plant owned by Union Carbide leaked methyl isocyanate gas, leading to thousands of deaths and long-term health effects for many more.
- Visakhapatnam Gas Leak (2020): A gas leak at LG Polymers plant in Visakhapatnam resulted in the death of several people and caused injuries to many others.
- Chennai Oil Spill (2017): Two ships collided near the Kamarajar Port in Ennore, Chennai, resulting in a massive oil spill. The spill polluted the coastline, affecting marine life and local communities.
- Neyveli Boiler Blast (2020): An explosion in a boiler at the Neyveli Lignite Corporation (NLC) power plant in Tamil Nadu caused several fatalities and injuries to workers.

Factors Responsible for Industrial Accidents

- Poor Safety Regulations and Enforcement: Some industries do not adhere to safety standards due to loopholes in regulations or insufficient monitoring by regulatory authorities.
- Lack of Training and Awareness: Insufficient training of workers regarding safety procedures and hazard awareness lead to accidents.
- Equipment Failure: Lack of regular maintenance, outdated machinery, or using equipment beyond its operational capacity increase the risk of accidents.
- Chemical and Process Safety: Negligence in handling or storing chemicals, improper ventilation systems, or inadequate emergency response plans lead to disasters.

- Lack of Emergency Preparedness: This includes insufficient firefighting equipment, emergency exits, and communication systems.
- Informal Workforce: In industries where contractual labor or informal workers are prevalent, safety standards are compromised to cut costs, leading to a higher risk of accidents.

Government Initiatives

- Occupational Safety and Health (OSH) Code: The government introduced the Occupational Safety, Health, and Working Conditions Code, 2020, which aims to consolidate and amend laws regulating occupational safety and health in India.
- The code seeks to enhance the safety and welfare of workers by specifying standards for working conditions, safety measures, and welfare amenities.
- National Policy on Safety, Health and Environment at Workplace (NPSHEW): The government formulated the NPSHEW to promote a preventive safety culture in industries and workplaces. This policy aims to integrate safety, health, and environmental concerns into the decision-making processes of industries and improve the overall safety performance.
- Industrial Safety and Disaster Management Plans: The government mandates industries to develop and implement safety and disaster management plans to mitigate the risks of industrial accidents.
- These plans include measures for risk assessment, emergency response, evacuation procedures, and training programs for employees.
- National Disaster Management Authority (NDMA): The NDMA plays a crucial role in disaster preparedness, response, and mitigation across various sectors, including industrial safety.
- It formulates policies, plans, and guidelines for disaster management and works with relevant stakeholders to ensure effective coordination during emergencies.
- Bureau of Indian Standards (BIS): BIS develops and maintains standards for industrial safety equipment, materials, and processes to ensure compliance with safety regulations.
- Labour Inspection and Enforcement: The government conducts regular inspections of industrial establishments to assess compliance with safety regulations and identify potential risks.
- Strict enforcement measures are taken against violators to ensure accountability and deterrence.

Way Ahead

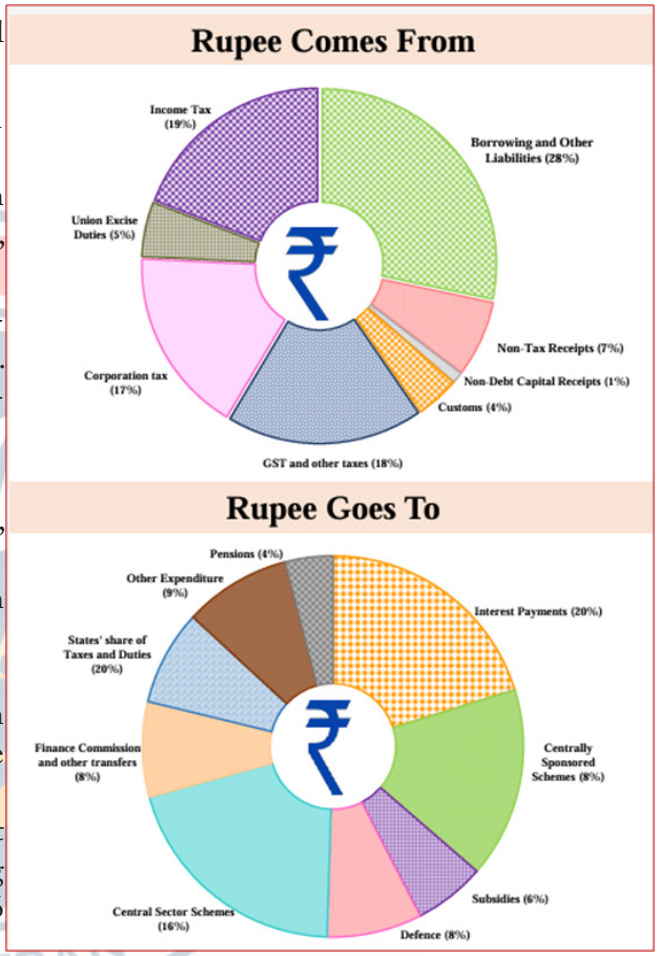
- Bhopal Tragedy teaches us lessons not about better technology or stricter regulation, but about a basic respect for life – of the living and the yet-to-be-born; about the primacy of life over profits.
- The right of citizens to a safe workplace and clean environment can only be achieved if the imbalance of power between citizens and corporations is corrected.
- The International Medical Commission on Bhopal had recommended that citizen organisations be adequately represented in national and state commissions dealing with disasters; that compensation criteria should include medical, economic and social damage to victims; and that resources should be allocated for the economic and social rehabilitation of people and their communities.
- If India wishes to transform itself into an economic powerhouse, it should guard both its people and environment against the deadly effects of this transformation.

Chapter-
10

MAJOR HIGHLIGHTS OF THE INTERIM BUDGET 2024-25

Major Highlights of the Interim Budget 2024-25

- **Capital Expenditure:** An 11.1% increase in the capital expenditure outlay for 2024-2025 was announced.
  - The capital expenditure is set at Rs 11,11,111 crore, constituting 3.4% of the GDP.
- **Economic Growth Projections:** The GDP growth for FY 2023-24 real GDP growth is projected at 7.3%, aligning with the RBI's revised growth projection.
  - The International Monetary Fund upgraded India's growth projection to 6.3% for FY 2023-24. It also anticipates India becoming the third-largest economy in 2027.
- **Revenue and Expenditure Estimates (2024-25):**
  - **Total Receipts:** Estimated at Rs 30.80 lakh crore, excluding borrowings.
  - Total Expenditure: Projected at Rs 47.66 lakh crore.
  - **Tax Receipts:** Estimated at Rs 26.02 lakh crore.
- GST Collections: Reached 1.65 lakh crore in December 2023, crossing the 1.6 lakh crore benchmark for the seventh time.
- **Fiscal Deficit and Market Borrowing:** Fiscal deficit is estimated at 5.1% of GDP in 2024-25, aligning with the goal of reducing it below 4.5% by 2025-26 (announced in budget 2021-22).
  - Gross and net market borrowings through dated securities in 2024-25 are estimated at Rs 14.13 and 11.75 lakh crore, respectively.
- **Taxation:** The Interim Budget maintains the existing rates for direct and indirect taxes, including import duties.
  - **For Corporate Taxes:** 22% for existing domestic companies, 15% for certain new manufacturing companies.
  - No tax liability for taxpayers with income up to 7 lakh under the new tax regime.
  - Certain tax benefits for Start-Ups and investments extended by one year up to March 31, 2025.
- **Priorities:** Emphasizing the focus on the Poor, Women, Youth and Farmer.
  - **Poor:** Successful movement of 25 crore people out of multidimensional poverty.
- Credit assistance was provided to 78 lakh street vendors under PM-SVANidhi.
  - **Women:** Disbursement of 30 crore Mudra Yojana loans to women entrepreneurs.
- 43% of female enrolment in STEM courses.
- Assistance to 1 crore women through 83 lakh SHGs, fostering 'Lakhpati Didis.'
- 28% increase in female enrolment in higher education over a decade.
  - **Youth:** Training of 1.4 crore youth under the Skill India Mission.



- Fostering entrepreneurial aspirations with 43 crore loans sanctioned under PM Mudra Yojana.
  - o **Farmers:** Direct financial assistance was provided to 11.8 crore farmers under PM-KISAN.
- Crop insurance extended to 4 crore farmers through Fasal Bima Yojana.
- Integration of 1,361 mandis under eNAM for streamlined agricultural trade.

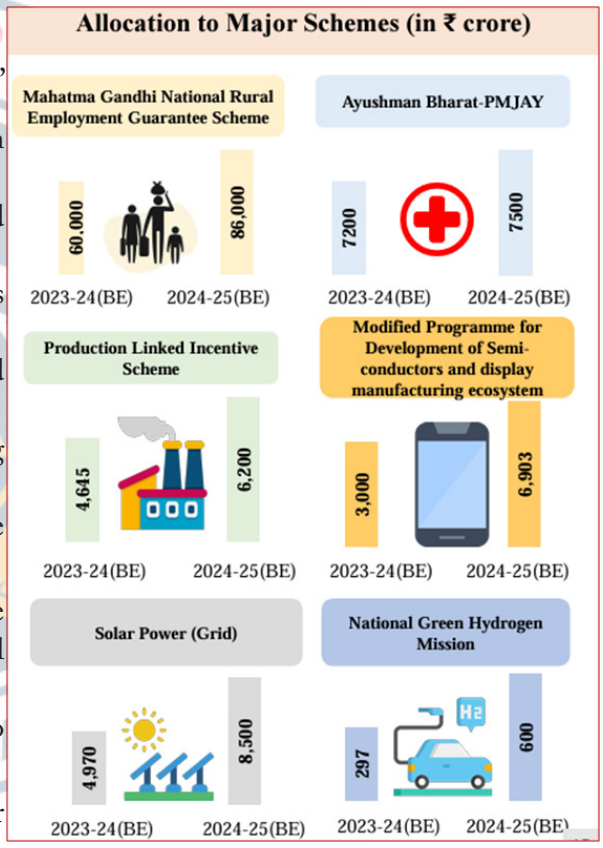
Major Development Plans:

- o **Infrastructure:**
- **Railways:** Three major economic railway corridor programmes will be implemented- energy, mineral & cement corridors, port connectivity corridors, and high traffic density corridors.
- Forty thousand normal rail bogies will be converted to Vande Bharat standards for enhanced safety, convenience, and passenger comfort.
- **Aviation:** Expansion of existing airports and comprehensive development of new airports under the UDAN scheme.
- Urban Transport: Promotion of urban transformation via Metro rail and NaMo Bharat.

Clean Energy Sector:

Viability gap funding for wind energy

- It will help in harnessing offshore wind energy potential, aiming for an initial capacity of 1 gigawatt.
- Establishment of coal gasification and liquefaction capacity of 100 million tonnes by 2030.
- Phased mandatory blending of CNG, PNG and compressed biogas.
- Financial assistance for procurement of biomass aggregation machinery.
- **Rooftop solarization:** 1 crore households will be enabled to obtain up to 300 units of free electricity per month.
- Strengthening e-vehicle ecosystem by supporting manufacturing and charging.
- New scheme of biomanufacturing and bio-foundry to be launched to support environment friendly alternatives.
  - o **Housing Sector:** Government plans to subsidize the construction of 30 million affordable houses in rural areas.
- Housing for Middle Class scheme to be launched to promote middle class to buy/built their own houses
  - o **Healthcare Sector:** Encouraging Cervical Cancer Vaccination for girls (9-14 years).



- U-WIN platform for immunization efforts of Mission Indradhanush to be rolled out.
- Expanding the Ayushman Bharat scheme to include all ASHA workers, Anganwadi workers, and helpers.
  - o **Agricultural Sector:** Encouraging the use of 'Nano DAP' for various crops across all agro-climatic zones.
- Formulating policies to support dairy farmers and combat Foot and Mouth Disease.
- Strategizing for AtmaNirbharta (self-reliance) in oilseeds, covering research, procurement, value addition, and crop insurance.
- Nano-DAP (Di-ammonium Phosphate) is a nanotechnology-based agri-input developed by the Indian Farmers Fertilizer Cooperative Limited (IFFCO). It helps in correcting the Nitrogen & Phosphorus deficiencies in standing crops.
  - o **Fishery Sector:** Establishing a new department, 'Matsya Sampada,' to address the needs of fishermen.
  - o **For States Capex:** The continuation of the fifty-year interest-free loan scheme for capital expenditure to states was announced.
- A total outlay of Rs 1.3 lakh crore, with a provision of Rs 75,000 crore for fifty-year interest-free loans to support state-led reforms.

- Special attention will be paid to the eastern region to make it a powerful driver of India's growth.
- Others:
  - Establishment of a corpus of Rs 1 lakh crore with a fifty-year interest-free loan to encourage research and innovation in sunrise domains.
- Also, aiming to boost private sector participation in research and innovation.
  - To address rapid population growth and demographic shifts, the government will form a high-powered committee.
- The committee will provide comprehensive recommendations aligned with the goal of 'Viksit Bharat.'

Chapter-
11

Yojana June 2024

1- Weaves of India

Weaving in India is an ancient art form with a rich history dating back to the Indus Valley Civilization (3300-1300 BCE).

- It is not just a way of creating textiles, but also a deep-rooted cultural tradition that has been passed down through generations.
- There are more than 136 unique weaving styles found all across the country, each with its own distinct design, technique, and cultural significance.
- These weaves are often named after the regions where they originated and are known for their intricate patterns, vibrant colors, and the use of natural fibers like cotton, silk, and wool.

S. No	State/UT	Weave
1.	Gujarat	Mashru Weaving Dhabla Shawl Weaving Kharad Weaving Tanchoi Silk Weave Tangaliya Weave Patola weave Pachedi Weave Kachchh Shawls Kutch Weaving
2.	Rajasthan	Dari weaving Pattu Weaving Kota Doria Weave Jaipuri Rajai Weave
3.	Jammu and Kashmir	Kani Weave KashmirI Pashmina Pattu weave
4.	Uttar Pradesh	Kimkhab Weave bhadohi carpets Mirzapur Handmade Dari Agra durries Jamdani weaves Naqsha brocade weaving Tanchoi
5.	Manipur	Wangkhei phee weave Shapee lanphee
6.	Karnataka	Ilkal Weave Molkalmuru Silk Weave Patteda anchu sari weave Navalgund Durries Mysore Silk Weave udupi sarees
7.	Leh Ladhakh	Challi-Woolen Weaving
8.	Punjab	Khes Weave
9.	Arunachal Pradesh	Singpho Weaving Pailibo Weaving Mishmi weaving Tuensung shawls Apatani Tsug-dul and Tsug- gdan
10.	Haryana	Panja Weave
11.	Nagaland	Chakhesang shawl Tsungkotepsu
12.	Goa	Kunbi weave
13.	Assam	Gadu or Mirijim weave Bodo Weaving Eri Silk Weaving Muga Silk Weaving
14.	Maharashtra	Himru Weave Paithani Weave Ghongadi Weave Chindi Dhurries Karvath Kathi Sari Weaving

Banarasi Silk Weaving:

- Known for opulence, elegance, and intricate patterns.
- Embodies the concept of 'Shringar' (ornamentation) in Indian culture.
- Motifs inspired by Mughal art.
- Use of metallic threads, Emphasis on beauty, adornment, and celebration.
- Associated with weddings, festivals, and auspicious occasions.
- Symbolizes prosperity and good fortune.

Kanchipuram Silk Weaving:

- Embodies the philosophical concept of 'Dharma' (righteousness, duty, and virtue).
- Known for rich texture and vibrant colors.
- Distinctive zari borders woven with gold or silver threads.
- Created using traditional pit looms and techniques passed down through generations.

Paithani Weaving:

- It embodies the concept of 'Lakshya' (aspiration, goal-setting, and spiritual elevation).
- Known for intricate weave and vibrant colors.
- Features peacock motifs representing beauty, fertility, and divine protection.
- Traditionally crafted from pure silk with gold or silver threads.
- Utilizes a unique 'tapestry weaving' technique where the design is woven directly into the fabric.

Patola Craft from Gujarat:

- It exemplifies the concept of 'Vasudhaiva Kutumbakam' (the world is one family).
- Features intricate geometric patterns and motifs symbolizing harmony, balance, and cosmic order.
- Crafted using the double ikat weaving technique.
- Celebrates the cultural diversity and communal harmony of Gujarat.
- Reflects the unity of humanity amidst differences.

2- Indian Weaves Promoting Sustainability

Indian weaves are distinguished in the quest for sustainability by their inherent eco-friendliness.

- Traditionally, Indian weavers have used natural fibers such as cotton, silk, jute, and wool, which are locally sourced and processed with age-old techniques that minimize environmental impact.
- These fibers are biodegradable, renewable, and support biodiversity, in contrast to synthetic alternatives that contribute to pollution and resource depletion.
- Traditional Indian weaving practices support local communities by providing livelihoods to millions of artisans, particularly in rural areas.
- Investing in sustainable fashion that incorporates Indian weaves helps preserve these crafts and supports artisan welfare.
- The Cotton Corporation of India (CCI) is crucial in ensuring the sustainability of cotton farming and weaving practices, aligning with the global embrace of sustainability.
- The Cotton Corporation of India (CCI) serves as a central agency ensuring Minimum Support Price operations for cotton, safeguarding the economic interests of farmers against market volatility.
- Its pioneers' efforts to promote sustainability through the promotion of Indian weaves, furthering its role in the global embrace of sustainable practices.
- International Operations CCI has a presence in major cotton-producing countries like the United States, Brazil, and Australia. It also has offices in major textile centers like Mumbai, Delhi, and Kolkata.

Challenges to Indian Weaves:

- Competition from mass-produced textiles: Traditional Indian weaves face tough competition from cheaper, mass-produced textiles, both domestically and internationally.
- Lack of infrastructure: Many weaving communities lack adequate infrastructure, such as reliable power supply, transportation facilities, and access to modern equipment, hindering their productivity and efficiency.
- Dwindling interest among the younger generation: Younger generations are often less interested in pursuing traditional weaving practices, leading to a decline in skilled artisans and threatening the continuity of these crafts.
- Economic viability: Weaving communities often struggle with low wages and inconsistent income, making it difficult to sustain livelihoods and invest in modernizing their practices.
- Access to markets: Limited access to markets, both domestic and international, restricts the reach of Indian weaves, limiting opportunities for growth and profitability.
- Sustainability concerns: Environmental issues such as water usage, chemical pollution, and unsustainable farming practices pose challenges to the sustainability of Indian weaving, necessitating efforts towards eco-friendly production methods.
- The launch of 'Kasturi Cotton Bharat' introduces a pioneering approach to transparency in the cotton textile industry through blockchain technology.
- This initiative aims to elevate the value of Indian cotton by integrating traditional craftsmanship with luxury elements, thereby promoting India's rich textile heritage.

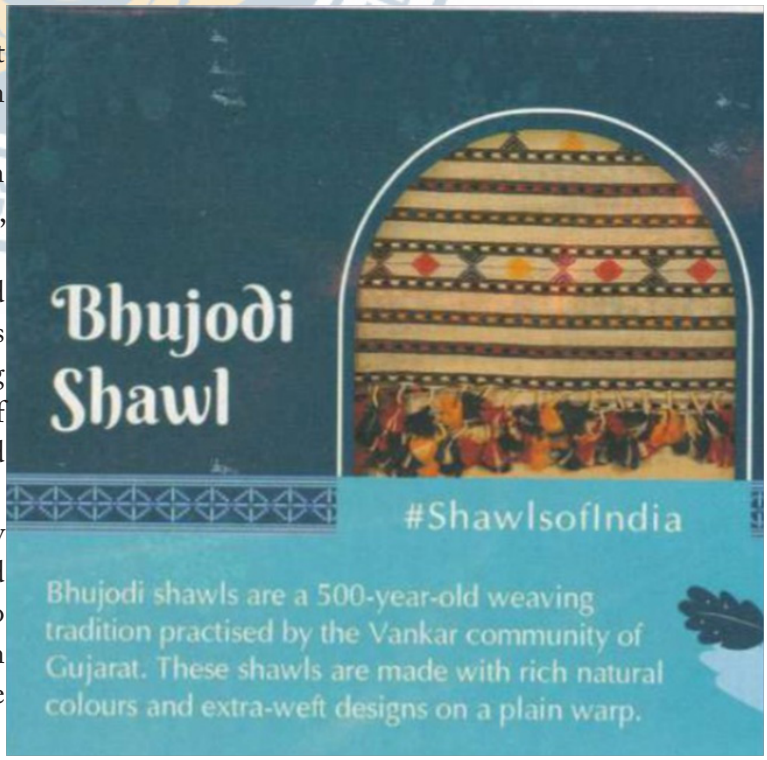
Conclusion:

The initiatives of the CCI offer hope amidst global environmental challenges, blending tradition with innovation and sustainability. By preserving India's rich weaving heritage and championing local artisans, CCI sets a precedent for a brighter, greener future. Through partnerships and campaigns, it showcases the transformative potential of promoting sustainable Indian craftsmanship.

3- Exploring Rare Weaves and Textiles of Gujarat

Gujarat's textile heritage is a rich tapestry woven from centuries of diverse cultural influences. Within this tapestry, rare weaves emerge, distinguished by their intricate craftsmanship, distinct designs, and historical importance.

Bhujodi Weaving:

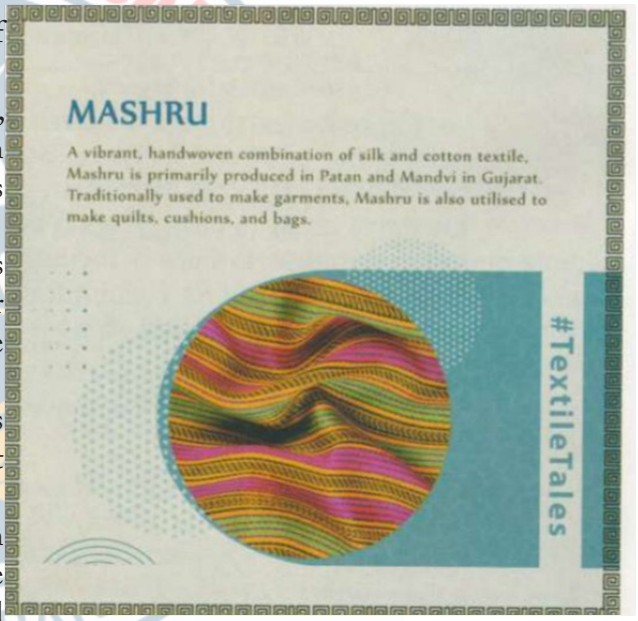


- Bhujodi weaving is a traditional craft originating from the village of Bhujodi in Gujarat, India.
- It is renowned for its exquisite handloom textiles, characterized by vibrant colors, intricate patterns, and fine craftsmanship.
- This weaving tradition has been passed down through generations, with artisans using techniques such as pit loom weaving and hand spinning to create a wide range of textiles, including shawls, stoles, sarees, and blankets.
- It stands out for its utilization of locally sourced materials like sheep wool and camel hair, skillfully spun and woven into intricately patterned fabrics. Artisans in Bhujodi uphold this tradition through the application of time-honored techniques.
- It not only preserves Gujarat's rich textile heritage but also provides livelihoods for local artisans and contributes to the cultural identity of the region.

Ashavalli Sarees:

- These sarees originate from the town of Ashavalli in Gujarat, India, where skilled artisans meticulously weave each saree by hand.
- The history of Ashavalli sarees dates back to the Mughal era, characterized by royal patronage that fostered the flourishing of handloom weaving.
- Artisans from Ahmedabad mastered the craft, utilizing fine silk and cotton yarns to create intricate designs adorning sarees worn by nobility and aristocracy.
- The hallmark of Ashavalli sarees lies in their intricate designs, often inspired by traditional motifs and patterns.
- These sarees are typically made from fine silk or cotton, with luxurious embellishments such as zari work or intricate embroidery.
- These sarees are treasured for their beauty, quality, and cultural significance, making them a symbol of grace and sophistication in Indian fashion.

Mashru Textiles:



- Mashru textiles are known for their unique blend of silk and cotton fibers.
- The word "Mashru" translates to "permitted" in Arabic, referencing the Islamic tradition of wearing silk, which is forbidden against the skin, and cotton, which is permissible.
- This innovative blend allows for the creation of textiles that possess the luxurious feel of silk on the outer surface while maintaining the comfort of cotton on the inner side.
- Mashru textiles are characterized by their lustrous appearance, soft texture, and often feature vibrant colors and intricate patterns.
- Historically, Mashru fabrics were popular among both Hindu and Muslim communities in Gujarat and were used to make garments such as sarees, turbans, and other traditional attire.
- Today, Mashru textiles continue to be celebrated for their cultural significance and craftsmanship.

Patola Silk Sarees:

- These sarees are renowned for their intricate double ikat weaving technique, wherein both the warp and weft threads are dyed before weaving to create intricate geometric patterns and designs.
- The term "Patola" is derived from the Sanskrit word "Pattakulla," which means "woven with a silk thread."
- Patola silk sarees are highly prized for their vibrant colors, fine craftsmanship, and rich cultural heritage.
- Historically, they were worn by aristocrats and royalty as a symbol of wealth and status. The intricate weaving process requires exceptional skill and precision, often taking months or even years to complete a single saree.
- They are considered valuable heirlooms and are passed down through generations.

- They continue to be highly sought after for special occasions such as weddings, festivals, and ceremonial events, showcasing the enduring allure of traditional Indian textiles.

4- Khadi: The Icon of Indian Independence

Khadi is a handspun, handwoven natural fiber cloth originating from India.

- Khadi is typically made from cotton, although other fibers like silk and wool can also be used.
- It is known for its coarse texture and versatility, used to create a wide range of clothing items such as sarees, dhotis, kurtas, and scarves.
- The production of khadi involves traditional spinning on a charkha (spinning wheel) and weaving on handlooms, emphasizing sustainability and artisanal craftsmanship.
- It holds significant historical and cultural importance, particularly due to its association with Mahatma Gandhi and the Indian independence movement.

Traditional Textile Knowledge:

- Indian textile history is rich and diverse, with evidence of its influence found in various ancient civilizations.
- Indigo-dyed cotton ikat and rose madder cloth have been discovered in archaeological sites, showcasing India's early mastery of textile dyeing techniques.
- Greek and Roman traders documented the fine fabrics traded from the Indian subcontinent, indicating India's reputation for high-quality textiles in ancient times.
- Ajanta and Ellora paintings provide visual representations of the intricate designs and styles found in Indian textiles throughout history.

Khadi Movement:

- The Khadi Movement was a significant aspect of India's struggle for independence from British rule.
- It was initiated by Mahatma Gandhi as part of his vision for swadeshi (self-reliance) and to promote the use of hand-spun and hand-woven cloth, known as khadi, as opposed to industrially manufactured textiles.
- The movement aimed to boycott foreign goods, particularly British textiles, which were seen as a symbol of colonial exploitation, and to encourage self-sufficiency and economic empowerment at the grassroots level.
- Gandhi believed that khadi could serve as a unifying force among Indians of different social and economic backgrounds, as it involved the participation of millions of villagers in spinning and weaving, thus providing employment and income opportunities in rural areas.
- The Khadi Movement gained widespread support across India, with khadi becoming a symbol of nationalist pride and a means of asserting cultural identity.
- It also played a crucial role in empowering women, as spinning and weaving were traditionally considered women's work, and the movement provided them with a means of economic independence.

Benefits of Khadi:

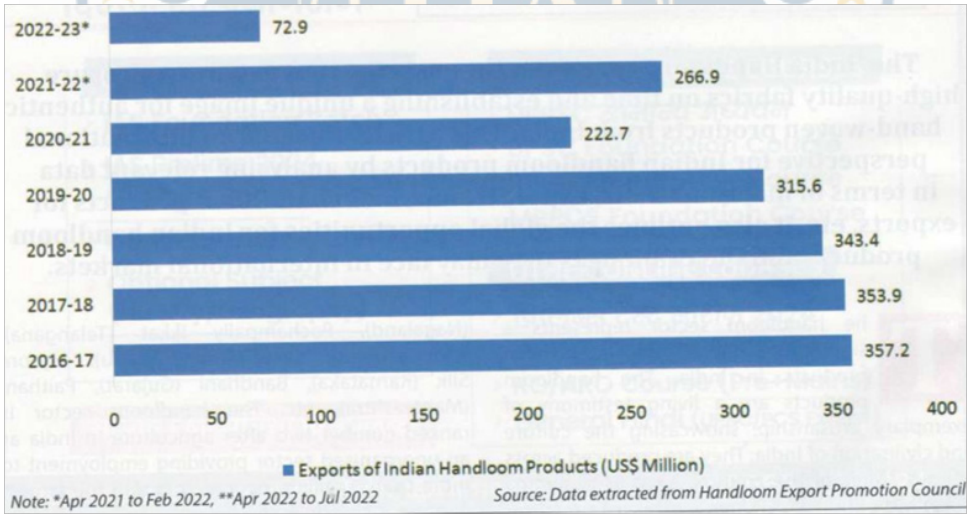
- Economic Empowerment: Khadi production provides employment opportunities, especially in rural areas where traditional skills like spinning and weaving are prevalent. By supporting khadi, consumers contribute to sustainable livelihoods for artisans and weavers, thus promoting economic development at the grassroots level.
- Promotion of Cottage Industries: Khadi is often produced through cottage industries, which are small-scale, decentralized units. Supporting khadi helps in the revival and sustenance of these cottage industries, preserving traditional craftsmanship and skills passed down through generations.
- Environmental Sustainability: It involves natural fibers like cotton, silk, or wool, which are biodegradable and have a lower environmental impact compared to synthetic textiles. Additionally, khadi production processes are generally less resource-intensive and involve minimal chemical usage, making it a more sustainable choice.

- Cultural Preservation: Khadi is deeply rooted in Indian culture and heritage, symbolizing self-reliance, simplicity, and traditional values. By promoting khadi, individuals contribute to the preservation and celebration of India's rich cultural heritage.
- Empowerment of Women: Historically, spinning and weaving were traditionally women's occupations, and the Khadi Movement provided opportunities for women to earn a livelihood and gain economic independence. Supporting khadi production continues to empower women by providing them with meaningful employment and income-generating opportunities.
- Ethical Consumption: Choosing khadi over mass-produced textiles aligns with principles of ethical consumption, as it supports fair wages, sustainable practices, and the preservation of traditional craftsmanship.

Government Efforts to Promote Khadi:

- The Ministry of Micro, Small and Medium Enterprises has taken initiatives to promote Khadi through the Khadi and Village Industries Commission (KVIC).
- The development and implementation of 'Khadi Mark' was launched in September 2013 to guarantee the genuineness of Khadi products and promote Khadi as a brand with social, cultural, and environmental values.
- KVIC engaged a fashion designer for designing Khadi products to make them competitive and appealing in domestic and overseas markets.
- MoUs were signed with various organizations to invigorate business opportunities in overseas markets.
- Agreements were made with retail clothing stores chains for setting up 'Khadi Korner' and a franchise scheme was launched to expand the sales distribution network.
- Tie-ups with e-Commerce platforms like Paytm were established for online marketing.
- Special efforts were made to attract youth by introducing attractive T-shirts, Khadi jeans, jackets, kurtis, and a range of casual wear called 'vicharvastra'.
- Sales outlets were opened at domestic and international airports.

5: Handloom Products: From Local to Global



Note: *Apr 2021 to Feb 2022, **Apr 2022 to Jul 2022 Source: Data extracted from Handloom Export Promotion Council

Table 2: Top 10 Export Markets for Indian Handloom Products (Figures in US$ Million)

Country	2018-19	2019-20	2020-21	2021-22	2022-23*
USA	94.2	100.5	83.1	105.3	58.1
UAE	16.3	11.2	3.4	5.9	12.7
Spain	25.2	33.4	10.1	13.9	12.5
UK	17.8	17.3	19.0	22.9	11.9
Italy	16.5	10.8	9.0	11.3	8.9
Australia	13.5	11.1	10.7	9.4	8.0
France	13.9	12.1	9.7	11.8	7.2
Germany	14.7	12.3	9.9	10.6	6.0
Netherlands	12.1	8.3	5.4	5.4	5.6
Greece	5.7	5.2	3.5	5.6	4.9

Note: * 2022-23 data only for few months and not for entire 2022-23. Source: Handloom Export Promotion Council Data

- The handloom sector is ranked number 2 after agriculture in India as an unorganised sector providing employment to more than 3 million people.
- It is also the largest cottage industry in the country, with around 24 lakh looms.
- Indian handloom products have recognition all over the world for their uniqueness, quality, variety, and endurance.
- The charts below show the exports of Indian Handloom Products (in USD Million) and Export Markets for Indian Handloom Products.

Following are the observations from the Chart:

- Consistent Performance Pre-Covid: Indian handloom product exports maintained a robust performance, exceeding USD 300 million annually from 2016-17 to 2019-20.
- Post-Covid Decline: Exports experienced a significant downturn of 30% immediately after the onset of the Covid-19 pandemic in 2020-21.
- Partial Recovery in 2021-22: Some recovery in export figures has been observed in 2021-22; however, exports have not yet reached the pre-Covid levels.

Key Export Markets:

- Indian handloom products have significant demand in over 20 countries worldwide, particularly in developed countries and the Middle East.
- US Market Dominance: The United States stands out as a major market for Indian handloom products, accounting for approximately 40% of export demand in international markets in 2021-22.
- Importance of Developed Countries: Developed countries play a crucial role in driving demand for Indian handloom products, reflecting the appeal of these products in affluent markets.
- Growing Demand in the Middle East: The Middle East region also represents a significant market for Indian handloom products, indicating their popularity and acceptance in diverse cultural settings.
- Factors Driving Demand: The appeal of Indian handloom products in international markets is driven by factors such as their unique craftsmanship, cultural heritage, eco-friendliness, and aesthetic appeal.
- India's handloom exports primarily consist of home decor products such as bed linen, curtains, table and kitchen linen, cushion covers, etc., which contribute over 60% of the exports. Mats and mattings make up around 30% of the exports.
- The major items include mats, carpet, rugs, bedsheets, cushion covers, and other handloom articles.
- The key exporting cities are Karur, Panipat, Varanasi, and Kannur, which produce a variety of products including bed linens, table linens, kitchen linens, toilet linens, floor coverings, and embroidered textiles.

Branding of Handloom Products: The "India Handloom" Trademark:

- It serves as a symbol of authenticity and quality assurance for handloom products.
- It ensures that customers receive products that are not only genuine but also of high quality, with zero defects and minimal environmental impact.
- By introducing the "Handloom Mark," customers are provided assurance regarding the authenticity of handloom products.
- This initiative aims to establish a unique identity for Indian handwoven products and encourages exporters to procure high-quality fabrics promptly.

Figure 2: Logo of 'India Handloom' Trade Mark and Products covered under the Trade Mark

- Additionally, "India Handloom" has been officially registered as a trademark under the Trade Marks Act of 1999.

IPR protection for Indian Handloom Products in International Markets:

- Intellectual property (IP) protection for handloom producers in India is granted through the Geographical Indications of Goods Act, 1999, and the Designs Act, 2000.

- These acts intend to provide IP protection to exported handloom products not only in India but also in foreign markets.

Potential Global Opportunities:

- Indian handloom products have new opportunities in spite of significant technological advancements in the production of machine-made products.
- In present times, a lot of the focus of buyers and sellers is on sustainable products.
- The new generation is style-conscious but environment-savvy and prefers products that are stylish but do not cause harm to the environment.
- Handwove products are unique, stylish, culture-oriented and environment-friendly.

Conclusion:

The handloom products from India represent tradition and modernity at the same time. The unique designs, quality, and variety of these products helped create a niche market in other countries over the years.
Therefore, it could be concluded that the handloom products of India are making significant global imprints with their local characteristics.

Chapter-
12

Kurukshetra June 2024

Green Technologies

1- Understanding Green Technologies for Future

Green technologies, also known as sustainable or clean technologies, are innovations aimed at addressing environmental challenges and promoting sustainability. These technologies strive to minimize negative environmental impacts, conserve natural resources, and reduce greenhouse gas emissions.

- It encompasses a wide range of scientific research areas, including energy, atmospheric science, agriculture, material science, and hydrology.
- The goal of green tech is to protect the environment, repair past environmental damage, and conserve Earth's natural resources.

Types of Green Technology:

- Green technology can be broadly categorized into 4 main areas: renewable energy sources, sustainable transportation, waste management and recycling, and energy efficiency solutions.
- Each of these categories plays a crucial role in minimizing our impact on the environment and ensuring a greener future.

Cleantech vs Greentech:

- Cleantech aims to improve the environmental performance of existing technologies.
- Greentech promotes the adoption of new, sustainable solutions and encourages the use of renewable resources.

Environmental Benefits of Green Technology:

1. Reduced Carbon Emissions: Green technologies often focus on renewable energy sources such as solar, wind, hydro, and geothermal power. By harnessing these sources, emissions can be significantly reduced, thus helping to mitigate climate change.
2. Energy Efficiency: Energy-efficient appliances, LED lighting, smart thermostats, and building insulation reduces energy consumption, less fossil fuel needs to be burned, leading to lower emissions.
3. Water Conservation: By reducing water usage, these technologies help conserve freshwater resources, especially important in regions facing water scarcity.
4. Waste Reduction and Recycling: Advanced recycling technologies and processes help minimize waste by recovering valuable materials from discarded products.
5. Improved Air Quality: Green technologies that replace fossil fuel combustion with cleaner alternatives, such as electric vehicles (EVs) lead to improved air quality by reducing emissions of pollutants such as nitrogen oxides (NOx), sulfur dioxide (SO2), and particulate matter.
6. Long-Term Sustainability: By reducing reliance on finite resources and minimizing environmental degradation, these technologies help ensure that future generations can meet their needs without compromising the ability of future generations to meet theirs.

Economic Implications of Green Technology:

1. Job Creation: Sectors such as renewable energy, energy efficiency, and sustainable transportation can stimulate employment growth, offering opportunities for skilled workers and boosting local economies.
2. Market Growth and Innovation: The shift towards green technology drives innovation and market growth as businesses invest in research and development of cleaner and more sustainable products and services.
3. Cost Savings: While initial investments in green technology may be higher, they often result in long-term cost savings.

4. Resource Efficiency: Green technologies promote resource efficiency by minimizing waste and maximizing the use of renewable resources.
5. Energy Independence: Investing in domestic renewable energy sources enhances energy security and reduces dependence on imported fossil fuels, thereby stabilizing energy prices and reducing exposure to geopolitical risks.
6. Financial Incentives and Subsidies: Governments often provide financial incentives, subsidies, tax credits, and grants to encourage the adoption of green technologies. These policies can stimulate private sector investment, drive innovation, and accelerate market adoption, ultimately boosting economic growth and competitiveness.
7. Resilience to Climate Change: Investing in green technology and infrastructure enhances resilience to climate change impacts, such as extreme weather events and sea-level rise.

Social Impact and Equity Considerations:

1. Environmental Justice: Green technology plays a critical role in addressing environmental injustices by reducing pollution and mitigating the impacts of climate change, which disproportionately affect low-income and marginalized communities.
2. Job Creation and Training: Training programs and workforce development initiatives can help create pathways to employment in the green economy, offering opportunities for economic advancement and social mobility for marginalized populations.
3. Community Resilience and Adaptation: Investing in green infrastructure enhances community resilience to climate change impacts, protecting vulnerable populations and reducing disparities in exposure to environmental risks.
4. Public Transportation and Mobility Equity: Sustainable transportation options promote mobility and accessibility for underserved communities, reducing transportation costs and improving air quality, while ensuring that everyone can access essential services and opportunities.
5. Digital Divide and Access to Technology: Bridging the digital divide is essential for ensuring that all communities can fully participate in the green economy and benefit from technological advancements, promoting equity and inclusion in the digital age.

Key Areas of Green Technology Adoption:

1. Renewable Energy: This includes solar, wind, hydroelectric, geothermal, and biomass energy technologies. Renewable energy sources offer alternatives to fossil fuels, reducing greenhouse gas emissions and dependence on finite resources.
2. Energy Efficiency: Green technology focuses on improving energy efficiency across industries, buildings, appliances, and transportation. This includes advancements in insulation, LED lighting, smart thermostats, and energy-efficient appliances to reduce energy consumption.
3. Green Building: Green building technologies promote sustainable design, construction, and operation of buildings. This involves incorporating energy-efficient materials, passive design strategies, green roofs, and efficient HVAC systems to minimize environmental impact and enhance occupant comfort.
4. Sustainable Transportation: This area includes electric vehicles (EVs), hybrid vehicles, public transit systems, cycling infrastructure, and alternative fuels. Sustainable transportation options aim to reduce greenhouse gas emissions, air pollution, and reliance on fossil fuels.
5. Waste Management and Recycling: Green technology innovations focus on waste reduction, recycling, and waste-to-energy conversion. Advanced recycling processes, composting systems, and waste-to-energy facilities help minimize landfill waste and recover valuable resources.
6. Water Conservation and Treatment: Technologies for water conservation, purification, and reuse play a crucial role in sustainable water management. This includes low-flow fixtures, rainwater harvesting systems, wastewater treatment technologies, and desalination.
7. Agroecology and Sustainable Agriculture: Green technology promotes sustainable agricultural practices that minimize environmental impact and enhance productivity. This includes organic farming, precision agriculture, agroforestry, and soil conservation techniques.

8. Environmental Monitoring and Management: Technologies for environmental monitoring, data analytics, and modeling help assess environmental quality, track pollution levels, and inform decision-making for resource management and conservation.
9. Circular Economy and Sustainable Materials: Green technology advances circular economy principles by promoting resource efficiency, recycling, and the use of sustainable materials. This includes innovations in eco-friendly materials, product design for disassembly and recycling, and closed-loop manufacturing processes.

Challenges and Barriers to Adoption of Green Technology:

1. High Initial Costs: Many green technologies, such as renewable energy systems and energy-efficient appliances, often have higher upfront costs compared to conventional alternatives, which can be a significant barrier for individuals, businesses, and governments.
2. Limited Access to Capital: Access to financing and capital for green technology projects can be challenging, especially for small businesses and individuals. Banks and financial institutions may be hesitant to provide loans for innovative or perceived high-risk projects, hindering adoption.
3. Technological Barriers: Some green technologies may still be in the early stages of development or face technological limitations, such as intermittent energy production for renewables or energy storage capacity for electric vehicles.
4. Regulatory and Policy Constraints: Inadequate or inconsistent regulations, permitting processes, and zoning restrictions can hinder the deployment of green technologies. Uncertainty about regulatory requirements and compliance can deter investment and innovation.
5. Lack of Public Awareness and Education: Limited awareness and understanding of green technologies among the general public, businesses, and policymakers can hinder adoption.
6. Infrastructure Limitations: Inadequate infrastructure, such as charging stations for electric vehicles or grid interconnections for renewable energy systems, can limit the scalability and adoption of green technologies.

Policy Frameworks and Strategies for Promoting Green Technology:

1. Financial Incentives: Financial incentives such as tax credits, grants, subsidies, and low-interest loans to support green technology adoption can help offset the higher upfront costs and encourage investment in renewable energy, energy efficiency, sustainable transportation, and other green initiatives.
2. Regulatory Measures: This may include setting renewable energy targets, energy efficiency standards for buildings and appliances, emissions reduction requirements for vehicles, and renewable portfolio standards for utilities.
3. Research and Development Funding: Investing in R&D can drive technological advancements, reduce costs, and improve the performance and scalability of green solutions.
4. Public Procurement Policies: Using government procurement policies to prioritize the purchase of green products and services can create market demand for sustainable goods and services, driving innovation and lowering costs through economies of scale.
5. Education and Outreach Programs: Developing educational campaigns and outreach programs to raise awareness about the benefits of green technology and provide training and technical assistance to businesses, communities, and individuals.
6. Partnerships and Collaboration: Fostering partnerships and collaboration among governments, businesses, academia, and civil society to promote green technology innovation, deployment, and diffusion.
7. Capacity Building and Technical Assistance: Providing capacity building support and technical assistance to help businesses, communities, and governments navigate the challenges of adopting and implementing green technologies. This may include training programs, feasibility studies, and knowledge sharing platforms.
8. Integrated Planning and Policy Coherence: Ensure coherence and alignment across policies, plans, and sectors to create an enabling environment for green technology adoption. Integrated planning approaches can address cross-cutting issues and promote synergies between economic, environmental, and social objectives.
9. International Cooperation and Knowledge Sharing: Engaging in international cooperation and knowledge sharing to exchange best practices, experiences, and lessons learned in promoting green technology can facilitate technology transfer, capacity building, and collective action on climate change and sustainability.

The Role of International Collaboration and Cooperation:

International collaboration and cooperation play a pivotal role in advancing green technology and addressing global environmental challenges. Let's explore how international efforts contribute to the development and adoption of sustainable solutions:

1. Knowledge Sharing and Research: Collaborating across borders allows scientists, researchers, and experts to share knowledge, data, and best practices. International research partnerships accelerate innovation, leading to breakthroughs in green technology.
2. Joint Research and Development (R&D): Countries pool resources to conduct joint R&D projects. Collaborative efforts enhance the development of clean energy sources, efficient materials, and eco-friendly processes.
3. Standardization and Harmonization: International cooperation establishes common standards for green technologies. Harmonized regulations facilitate the adoption of sustainable practices across different regions.
4. Policy Alignment: International agreements (such as the Paris Agreement) promote policy alignment. Shared goals drive countries to adopt similar policies, regulations, and incentives for green technology adoption.
5. Capacity Building: Developing countries benefit from capacity-building programs. Knowledge transfer, training, and technology transfer enhance their ability to adopt and implement green solutions.
6. Global Impact: Environmental challenges (such as climate change) require collective action. International collaboration ensures a coordinated response to global issues.

Future Directions and Opportunities:

- The future of green technology holds immense potential for innovation and sustainability.
- Advancements in technology, including artificial intelligence and digitalization offer new opportunities for enhancing resource efficiency and environmental protection.
- Embracing circular economy principles and decentralized energy systems can further promote sustainability, fostering a transition towards a more resilient and regenerative economy that meets the needs of both present and future generations.

2- Green Technologies for Clean and Renewable Energy

According to a 'Electricity, 2024 Report' from International Energy Agency, global growth of demand for electricity is expected to speed up to a 3.4% average from this year through 2026.

- Approximately 85% of the global increase in demand for electricity is predicted to come from India, China and South-East Asian countries.
- Renewable and clean energy sources with low-emissions made up only 40% of the planet's electricity generation in 2023.
- Energy is the dominant contributor to climate change, accounting for around 60% of total global greenhouse gas emissions.

Present Renewable Energy Scenario:

- As per the statistics released by the International Renewable Energy Agency (IRENA), Global renewable power capacity reached 3,870 GW by the end of 2023, with solar accounting for the largest share at 1,419 GW.
- Deployment of solar PV, wind power, nuclear power, electric cars, and heat pumps from 2019 to 2023 avoided around 2.2 billion tonnes of emissions annually.
- Renewable hydropower and wind energy had total capacities of 1,268 GW and 1,017 GW, respectively.
- Other renewable capacities included 150 GW of bioenergy, 15 GW of geothermal, and 0.5 GW of marine energy.

In India:

- In India, renewable energy sources, including large hydropower, had a combined installed capacity of 183.49 GW, with about 13.5 GW added in 2023.
- Solar energy dominated in India, contributing 75.57 GW, followed by wind energy at 44.15 GW.
- India aims for 500 GW of renewable energy installed capacity and five million tonnes of green hydrogen by 2030.

- India has set targets to reduce carbon intensity by less than 45% by 2030, achieve 50% cumulative electric power installed by 2030 from renewables, and achieve net-zero carbon emissions by 2070.
- India also aims to produce 5 million tonnes of green hydrogen by 2030.

Green Technologies for Clean Energy:

- According to IEA, Clean energy investment saw a substantial increase of nearly 50% from 2019 to 2023, reaching USD 1.8 trillion in 2023.
- This growth trend is expected to continue, with clean energy investments growing at around 10% per year during this period.
- These technologies aim to make renewable energy projects more efficient, cost-effective, and scalable, contributing to the transition towards a more sustainable energy future.

Solar Energy:

- Solar energy is abundant and renewable, with sunlight containing more energy in a single hour than the world needs in a year.
- Photovoltaic (PV) cells convert sunlight directly into electricity and have been the backbone of solar power generation.
- Emerging technologies such as multi-junction cells, tandem cells, and perovskite-silicon hybrid cells are enhancing efficiency and reducing costs in PV technology.
- Concentrated Solar Power (CSP) systems utilize mirrors or lenses to focus sunlight onto a receiver, generating heat for electricity production.
- Innovations in CSP, such as molten salt storage and advanced heat transfer fluids, improve efficiency and storage capabilities, enabling continuous power generation.
- Tandem solar cell technology, which stacks an ultrathin perovskite solar cell on top of a standard silicon solar cell, achieves power-conversion efficiencies of over 30%.
- 'Passivated Emitter and Rear Contact' (PERC) solar cells technology enables cells to produce 6 to 12% more energy than conventional solar panels by adding an extra layer within the back side of the cell.
- Heterojunction (HJT) technology combines amorphous and crystalline silicon layers, resulting in panels with higher efficiency and superior temperature performance.
- Vehicle-integrated photovoltaics integrate solar panels into various parts of vehicles, reducing reliance on fossil fuels and lowering greenhouse gas emissions.
- Offshore solar power, by installing solar panels on bodies of water, conserves land resources, efficiently uses water bodies, and benefits from the cooling effect of water, enhancing solar panel efficiency.

Wind Power:

- Wind power grew by 13% in 2023, reaching a total capacity of 1,017 GW, with increased installations both on-shore and off-shore.
- The wind power industry is experiencing rapid innovation, including rooftop bladeless wind turbines, vertical-axis turbines, floating multi-turbine technology platforms, and more.
- Taller wind turbines with longer blades have increased energy capture capacity, even in areas with less wind.
- Offshore wind is growing significantly, with floating turbine technology tapping into stronger wind currents and opening up new development areas.
- Vertical axis wind turbines (VAWTs) capture wind from any direction, suitable for urban environments and areas with complex wind patterns.
- Kite wind energy systems use large kites tethered to the ground to capture high-altitude winds, requiring fewer resources than conventional turbines.
- Enabling technologies such as advanced sensing, power electronics, permanent magnet generators, superconductor technology, and artificial intelligence (AI) enhance wind turbine efficiency, maintenance, and energy production.

Hydroelectric Energy:

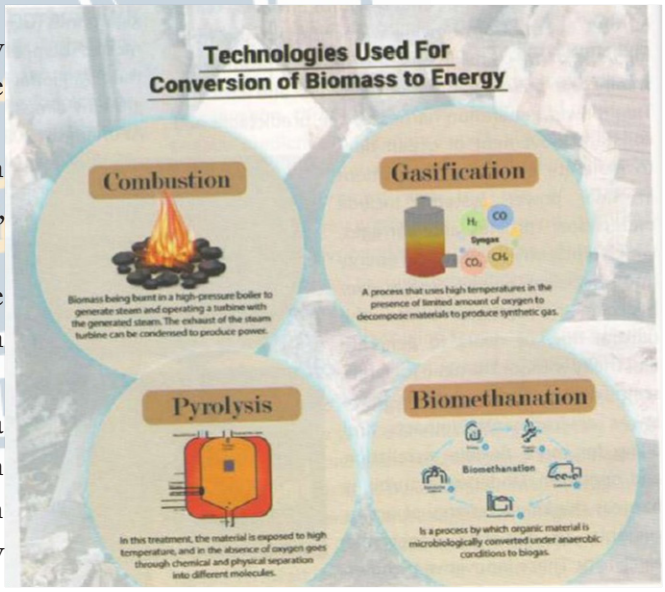
- Hydropower remains the largest renewable source of electricity, generating more than all other renewable technologies combined.

- In the Net Zero Emissions by 2050 Scenario, hydropower maintains an average annual generation growth rate of close to 4% in 2023-2030, providing approximately 5,500 Terawatt hours (TWh) of electricity per year.
- Hydroelectric generation increased by almost 70 TWh (up close to 2%) in 2022, reaching 4,300 TWh.
- Advanced turbine designs in hydropower are fish-friendly and operate efficiently at low water velocities, reducing environmental impact and extending hydroelectricity's viability to previously unsuitable locations.
- Kinetic hydro turbines harvest energy from flowing water without large dams or reservoirs, showing promise for small-scale power generation in rivers and streams.

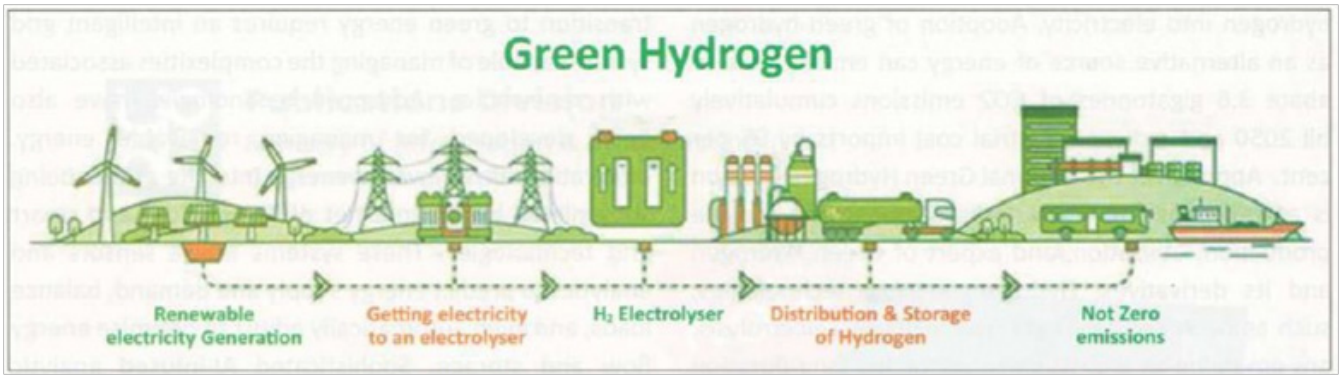
Nuclear Power:

- Nuclear power is the second-largest source of low-carbon electricity, operating in 32 countries with around 413 gigawatts (GW) of capacity.
- Global nuclear power generation is forecast to grow by almost 3% annually on average through 2026.
- Small modular reactors (SMRs) are advanced nuclear reactors typically generating up to 300 MW(e), expanding global access to nuclear energy, especially for small electricity grids and integration with renewable energy sources.
- New nuclear reactor technologies are utilizing substances like molten salt or liquid metals as heat transfer mediums, allowing for safer operation at higher temperatures and lower pressures with reduced construction and design costs.
- Micro-reactors, which are one percent or less the size of traditional reactors, produce 1 to 10 megawatts and are mobile, providing clean energy solutions for remote areas currently reliant on fossil fuels. They can be easily transported and operated for weeks or months before being moved to another location as needed.

Energy Storage-Advanced Technologies in Batteries:



- Batteries are essential for energy storage, especially with the incorporation of renewable resources, due to their compact size and wide availability.
- Present battery technologies have limitations in meeting cost criteria for stability, power operation, energy efficiency, and large-scale storage.
- Lithium-ion batteries (LiBs) dominate the stationary electric energy storage market, with an annual demand of around 1 TWh.
- Sodium-ion batteries (SIBs) are emerging as a viable substitute for LiBs due to abundant sodium availability and lower cost. They can use aluminum for the anode current collector, enhancing safety during transportation.
- Aqueous zinc ion batteries offer safety, environmental friendliness, and cost-effectiveness, utilizing a water-based electrolyte and abundant zinc resources.
- Potassium-ion batteries use potassium as the anode material and offer potential for high energy density, rapid energy transfer, and increased safety.
- Solid-state batteries use a solid electrolyte, offering improved safety, higher energy density, and faster charging rates compared to traditional Li-ion batteries.
- Redox flow batteries (RFBs) store energy in electrolytes rather than electrodes, with reversible electrochemical reactions facilitating charge/discharge processes.



Bio-Energy:

- Bioenergy is derived from organic material, or biomass, primarily from plants.
- Biomass absorbs carbon through photosynthesis, and when used for energy production, the carbon is released during combustion, but it is considered near-zero-emission because it simply returns to the atmosphere.
- Modern bioenergy is the largest source of renewable energy globally, accounting for 55% of renewable energy and over 6% of global energy supply.
- Microbial fuel cells (MFCs) are bio-electrochemical devices that directly convert chemical energy in biodegradable organic matter to electrical energy, utilizing exo-electrogenic bacteria as catalysts. Geobacter and Shewanella species are predominantly used in MFC technology.
- Plant-Microbial Fuel Cells (PMFC) technology utilizes rhizodeposition, the excretion of organic compounds from roots, as a source of electrons and electricity generation by electrochemically active bacteria in a microbial fuel cell.

Geothermal Energy:

- Geothermal energy is heat contained within the Earth, generated by the decay of radioactive isotopes and primordial energy from planetary accretion.
- Geothermal fluids occur in reservoirs at depths of up to 3,000 meters and can be recovered by drilling wells.
- About 14,000 megawatts (MW) of geothermal electricity are produced globally as of 2023.
- Conventional geothermal power plants are typically located near geysers and steam vents, indicating hydrothermal resources belowground.
- Next-generation technology includes 'superhot rock energy,' utilizing deep drilling to reach temperatures 400°C or hotter, theoretically capable of fulfilling a significant portion of the world's power requirements.
- Medium/low-temperature hydrothermal resources exist at depths of 1,500 to 3,000 meters, with temperatures ranging from 150°C to 300°C. Energy is harnessed through deep drilling and fluid injection to capture heat.

Green Hydrogen:

- Green hydrogen is produced by splitting water into hydrogen and oxygen using electrolysis, with electricity sourced from renewable energy, making it a clean and sustainable fuel.
- It can be used to power fuel cells, converting hydrogen's chemical energy into electricity.
- Adoption of green hydrogen can significantly reduce CO2 emissions and decrease reliance on industrial coal imports.
- The approval of the National Green Hydrogen Mission in India aims to establish the country as a global hub for green hydrogen production, utilization, and export.
- Hydrogen storage technologies, including hydrogen fuel cells and electrolysis, offer solutions for long-duration energy storage and transportation.

3-Empowering Rural Communities

Rural communities face serious waste mismanagement practices e.g., open dumping, e-waste open burning, river dumping, pollution from plastic waste etc. due to lack of or poor access to formal waste management systems.

- Rural landscapes face threats from urbanization and agribusiness, impacting organic farming, natural habitats, and biodiversity.
- Rural communities also face climate-induced hazards and socio-economic challenges such as migration, poverty, and poor infrastructure.

- Waste management in rural areas presents both challenges and opportunities, including solid waste (organic material, plastic waste, biomedical waste, e-waste, construction and demolition waste).
- Bridging urban-rural socio-economic gaps and ensuring equitable resource distribution are crucial for a circular economy transition and achieving Net Zero Targets by 2070.

Analysis of the Impact of Green Waste Technologies on Rural Communities:

- India's rural areas face environmental challenges due to fossil fuel use and inadequate waste management systems.
- Utilizing such technologies offers economically viable and eco-friendly energy solutions while addressing resource depletion.

Benefits of Implementing Green Waste Technologies:

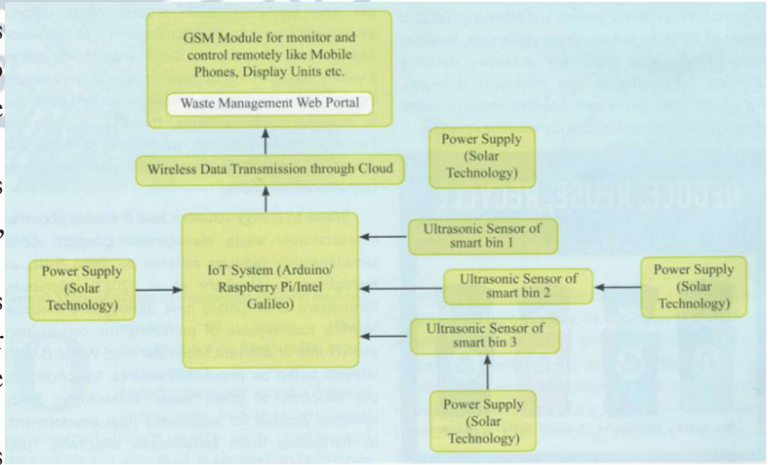
1. Empowering Rural Communities: Green waste technologies provide environmental conservation and socio-economic development benefits to rural areas.
2. Environmental Sustainability: Technologies like composting and biogas generation help manage organic waste sustainably, improve soil fertility, and reduce greenhouse gas emissions.
3. Economic Opportunities: Implementation of green waste technologies creates income streams through the sale of compost and biogas, encouraging rural entrepreneurship.
4. Climate Resilience: Proper waste management contributes to the reduction of greenhouse gas emissions, thereby mitigating the impacts of climate change.
5. Community Engagement and Awareness: Promoting green waste technologies empowers communities by imparting knowledge and skills, encouraging ownership and responsibility.

Barriers to the Adoption of Green Technologies in Rural Regions

- Rural areas face challenges with open burning of agricultural residues, e-waste, and plastics, releasing harmful pollutants and worsening air pollution and climate change.
- Inefficient waste management systems in rural areas deprive communities of potential resources and economic opportunities.
- Limited infrastructure, resources, and awareness about proper disposal practices contribute to improper waste management in rural villages.

Potential Solutions and Innovations:

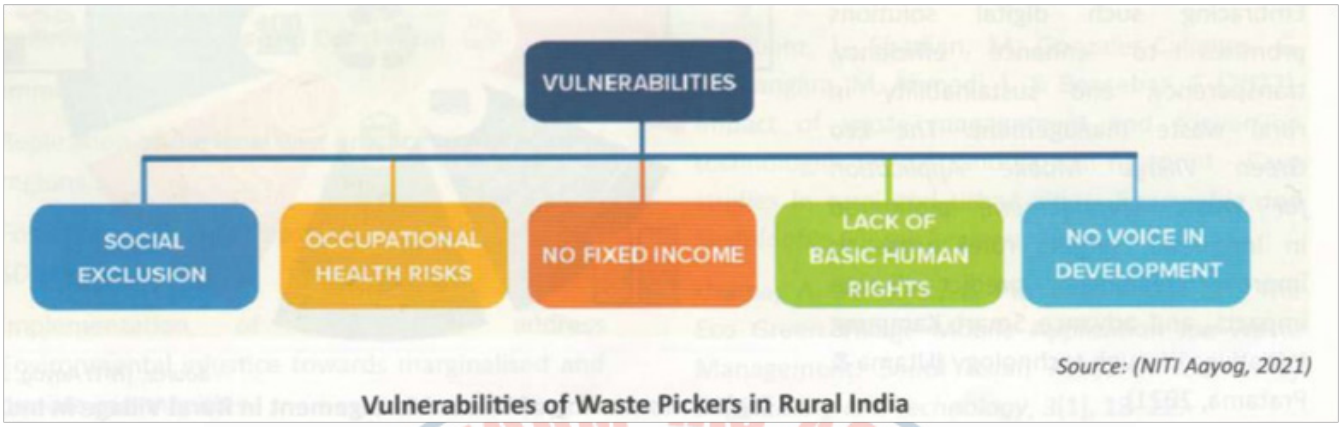
Smart Waste Management System (SWM):



- Smart Waste Management Systems (SWMs) employ IoT technology to revolutionize waste processing, enhance efficiency, and promote sustainability.
- Ultrasonic sensor-equipped smart bins are strategically placed across rural areas, collecting real-time data on waste levels.
- Data collected from smart bins is communicated to a central control center via cloud platforms, allowing for remote monitoring and management.
- Solar-powered sensors ensure continuous operation of the system, reducing dependence on traditional power sources.
- Optimized route scheduling based on real-time data minimizes fuel costs and maximizes efficiency in waste collection.
- GPS-guided trucks are deployed when waste levels exceed a certain threshold (e.g., 80%), ensuring timely and resource-efficient waste collection.
- Integration of IoT-based SWMs empowers rural communities with greener and smarter waste management solutions, contributing to environmental sustainability.

Strategies for Overcoming Barriers to Adoption and Scaling up Green Technologies in Rural Regions

- Social Inclusion of Waste Pickers in Rural Villages:
- Waste pickers play a crucial role in rural India by diverting recyclable materials from landfills and contributing to environmental conservation.
- Approximately 4 million waste pickers in India earn their livelihoods from waste management, but they often face humiliation, discrimination, and socio-economic marginalization.



Vulnerabilities of Waste Pickers in Rural India

- Digital Monitoring of Waste Management:
- Digital monitoring systems utilizing IoT, mobile apps, and data analytics offer innovative solutions to streamline waste collection and disposal.
- These systems integrate stakeholders such as waste pickers, recyclers, ULBs (Urban Local Bodies), and citizens through mobile apps, creating a digital cloud.
- Real-time data tracks the waste supply chain from collection points to recycling facilities, facilitating seamless monitoring and management.

Conclusion and Way Forward:

- Supportive policy frameworks are essential for incentivizing the adoption of green waste technology and creating a conducive environment for sustainable waste management.
- Financial incentives, subsidies, and technical assistance are crucial for small rural entrepreneurs and rural enterprises to adopt green waste technologies.
- Public-private partnerships can facilitate technology transfer, fostering innovation and entrepreneurship in rural areas.
- By promoting the adoption and scaling up of green waste technologies, India can pave the way towards a greener and more inclusive future for its rural population.

4- Usage of Green Technology in Sustainable Water Management

The sustainable water management approach views the whole water system as an integrated system. This whole system includes drinking water, wastewater, rainwater, and stormwater drainage in a collective form which should be managed together to be truly efficient and sustainable.

Key Facts:

- Population Growth: The increasing population in India has led to a decline in the per capita availability of water over the years.
- Water Availability: From 1816 cubic meters per capita in 2001, it reduced to 1544 cubic meters in 2011, and it is projected to further decrease to 1140 cubic meters by 2050.
- Scarcity Threshold: International agencies consider any situation where the per capita availability of water is less than 1000 cubic meters as scarcity conditions.
- Projected Water Demand: By 2030, it is estimated that the country's water demand will be twice the available supply, resulting in severe water scarcity affecting millions of people.
- Impact on GDP: The water scarcity situation is expected to lead to about a 6% loss in the country's GDP (NITI Ayog), highlighting the significant economic implications of water shortages.

Green Technologies in Water Sector:

Green technologies are increasingly being adopted in the water sector to address challenges related to water scarcity, pollution, and inefficient water management.

1. Water Treatment: Green technologies are used in water treatment processes to purify water for drinking, industrial, and agricultural purposes. Advanced treatment methods, such as membrane filtration, ozone treatment, and UV disinfection, are more energy-efficient and environmentally friendly compared to traditional chemical treatment methods.
2. Desalination: Desalination technologies, such as reverse osmosis (RO) and electrodialysis reversal (EDR), are used to convert seawater or brackish water into freshwater. Green desalination technologies utilize renewable energy sources like solar and wind power to reduce energy consumption and minimize environmental impacts.
3. Water Conservation: Green technologies promote water conservation through efficient water use practices and technologies. Low-flow fixtures, water-efficient appliances, and smart irrigation systems help minimize water wastage and optimize water use in households, industries, and agriculture.
4. Rainwater Harvesting: Rainwater harvesting systems capture and store rainwater for various purposes, including irrigation, toilet flushing, and groundwater recharge. Green technologies, such as rooftop rainwater harvesting systems and rain gardens, help reduce stormwater runoff, replenish groundwater, and conserve freshwater resources.
5. Greywater Recycling: Greywater recycling systems collect and treat wastewater from sinks, showers, and laundry for non-potable uses like irrigation and toilet flushing. These systems reduce freshwater demand and wastewater discharge, contributing to water conservation and sustainability.
6. Constructed Wetlands: Constructed wetlands mimic natural wetland ecosystems to treat wastewater and improve water quality. These green infrastructure solutions use vegetation, soil, and microbial processes to remove pollutants and nutrients from wastewater before it is discharged into water bodies.
7. Smart Water Management: Smart water management systems integrate sensors, data analytics, and automation to monitor and optimize water distribution, usage, and quality in real-time. These systems improve operational efficiency, reduce water losses, and enable proactive water resource management.

Some other methods to filter waste water:

S. No	Green Technology	Principles	Advantages
1.	Forward Osmosis	It uses a new eco-friendly chemical compound to draw the water molecules through a membrane leaving the salt behind. Then we separate the chemical from water through a heating process. This chemical can be reused in the process.	Use waste heat to drive separation. Low in energy use.
2.	Clathrate desalination	This technique traps water molecules in carbon dioxide and pressurises water molecules into clathrate crystals. Later, these crystals are broken down to release freshwater. This technique humidifies a stream of heated air by running a stream of saline water on a heated surface. Then collect the condensed water when the saturated air is moved along condensing heat transfer films.	New technology has been developed which increases the size of crystals. This technique is low on energy use and can be used for any kind of water quality. Newer energy sources such as waste heat and/or solar are used in the process. The technique is highly cost-effective.

3.	Dewvapouration	This technique humidifies a stream of heated air by running a stream of saline water on a heated surface. Then collect the condensed water when the saturated air is moved along condensing heat transfer films.	Newer energy sources such as waste heat and/or solar are used in the process. The technique is highly cost-effective
4.	Freeze Desalination	It uses the phase shift of water from liquid to solid state to remove salt from the ice crystals. These ice crystals are then melted to produce fresh water. It uses density gradients to work.	

Energy and cost-effective method

- Biofilters: Microorganisms or bacteria are allowed to grow on biofilters to form a biofilm. Wastewater is then passed through this biofilm, accelerating the degradation of pollutants and organic matter.
- Bioremediation: Microorganisms are applied to wastewater sites to remove hazardous species or convert toxins into less or non-toxic materials. It is a cost-effective method that doesn't require excavation or incineration.
- Electrowinning: In this process, current is passed through wastewater using electrodes. Metals are electro-extracted from their oxidized forms and deposited on the cathode. Heavy metals like copper, nickel, silver, gold, cadmium, and others can be recovered from wastewater through electrowinning.

5: Green Technologies for Sustainable Agriculture

Green technology application in agriculture offers opportunities to increase yield, improve product quality, maintain soil fertility, and adopt to eco-friendly techniques.

Green Technologies Adopted in Agriculture:

1. Organic Farming:

- Techniques: Organic farming relies on methods like crop rotation, green manure, compost, and biological pest control.
- Weed and Soil Management: It emphasizes weed management without pesticides and soil management through crop rotation.
- Resource Utilization: It utilizes animal manure and green manure crops for fertility.
- Consumer Demand: Increased awareness of sustainable development and consumer demand for organic products have driven its adoption.
- Green Technology: Organic farming is considered a green technology, leveraging ecological processes to enhance soil fertility and productivity.
- Environmental and Health Benefits: It minimizes negative impacts on the environment and human health.

2. Agroforestry:

- Integration of Trees with Crops/Livestock: Agroforestry involves the intentional integration of trees with crops or livestock on the same land.
- Ecological and Economic Interactions: It fosters ecological and economic interactions between trees, crops, and livestock, creating a dynamic system.
- Diversification and Sustainability: Agroforestry diversifies and sustains production, offering benefits to farmers at all levels.
- Environmental Sustainability: It is environmentally sustainable, utilizing natural resources to ensure a healthy farming environment.
- Benefits: Agroforestry enhances food supply, income, and health for farmers.
- Practical Applications: Practical applications include using windbreak trees for protection, hedgerow barriers for erosion control and organic matter, and live fences for managing animal movement and providing fodder and nutrients.

3. Integrated Pest Management:

- Integrated Pest Management (IPM) provides a sustainable approach that utilizes natural pest control mechanisms instead of relying solely on chemical pesticides.
- IPM aims to minimize disruption to ecosystems and reduce environmental risks associated with conventional pest control methods.
- IPM is applicable in both urban and rural settings, offering a versatile solution to pest management challenges.
- IPM involves proactive measures such as growing disease-resistant crops and employing deterrent strategies to discourage pest infestations.
- Despite its benefits, implementing IPM may pose challenges for farmers, including limited resources and expertise in pest management.

4. Biogas:

- It utilizes agricultural waste to produce renewable energy and fertilizers, rendering it environmentally friendly.
- Anaerobic Digestion: Through anaerobic digestion, agricultural waste is transformed into fuel and fertilizer.
- Organic Crop Production: By-products of biogas technology are used for organic crop production, enhancing soil fertility and serving as a sustainable alternative to inorganic fertilizers.
- Benefits: Provides nutrients for crops, improves soil penetration capacity, and contributes to environmental sustainability by reducing agricultural waste and dependence on non-renewable energy sources.

5. Mixed Farming:

- Mixed farming is an agricultural practice where different types of crops and/or livestock are raised on the same farm. This method integrates crop production with animal husbandry, allowing for a more diversified and sustainable approach to farming.

6. Crop Rotation:

- Crop rotation enhances profitability by introducing high-value crops and mitigating economic risks through crop combination.
    - o It reduces reliance on synthetic fertilizers, thereby lowering pollution and greenhouse gas emissions.
    - o Crop rotation revives farmland biodiversity, offering socio-economic and environmental benefits for sustainable agriculture.

7. Drones and Digital Sensors:

- Drones and digital sensors support sustainable agriculture by enabling remote monitoring of crop development and gathering essential field data.
- They reduce transportation emissions and produce zero emissions during operation, optimizing field time and minimizing crop loss to increase environmental sustainability and reduce food waste.
- Digital sensors monitor various farming aspects, such as microclimate and soil pH, contributing to sustainability by reducing environmental impacts and health hazards.
- This technology empowers farmers to make informed decisions, optimize production, enhance yields, conserve resources, minimize waste, and boost productivity.

9. Smart Irrigation Systems:

- Smart irrigation systems utilize weather data and soil moisture levels to schedule irrigation, responding to changes in plant environment and water needs.
- These systems reduce outdoor water usage compared to traditional timers.
- Modern technology, including wireless and remote monitoring systems, empowers farmers to optimize irrigation practices, promoting smarter decision-making for sustainable agriculture.

10. Green Nanotechnology:

- It enhances productivity while reducing pesticide usage, offering an eco-friendly and cost-effective solution.
- Its applications include pathogen detection, targeted delivery of nano-pesticides, and improved nutrient absorption in plants.

- It conserves energy, protects soil and water resources, and addresses future agricultural challenges.
- Particularly, it contributes to food security in developing countries, presenting a sustainable approach to agricultural practices.

Advantages of Green Technology in Agriculture

Green technology in agriculture provides numerous benefits, enhancing sustainability and efficiency in farming practices.

- It helps farmers achieve a balance between productivity, profitability, and environmental stewardship, ensuring a more sustainable and resilient food production system.

Challenges for the adoption of Green Technologies by Farmers:

- High Costs: High initial investment and ongoing operational expenses associated with green technologies can be a significant barrier for farmers, particularly those with limited financial resources.
- Limited Access to Financing: Lack of access to affordable financing options or credit facilities can make it difficult for farmers to invest in green technologies.
- Technical Knowledge and Skills: Farmers may lack the technical knowledge and skills required to understand, operate, and maintain green technologies effectively.
- Availability and Accessibility: Limited availability and accessibility of green technologies, particularly in rural areas or developing countries, can hinder adoption.
- Infrastructure and Connectivity: Inadequate infrastructure, such as unreliable electricity or internet connectivity, may limit the feasibility and functionality of certain green technologies.
- Perceived Risks and Uncertainties: Farmers may perceive green technologies as risky or uncertain, especially if they are unfamiliar with the technology or its potential impacts on their farm operations.
- Compatibility with Existing Practices: Green technologies may not always align with farmers' existing practices, cropping systems, or cultural preferences, making adoption more challenging.
- Policy and Regulatory Environment: Policy and regulatory barriers, including lack of supportive policies, standards, or incentives, can impede the adoption of green technologies.

Future of Green Technologies in Agriculture

- Growing demand for quality food favors the adoption of green technology in agriculture for sustainable food production and environmental conservation.
- Recommendations include educating farmers and promoting literacy through adult education centers in rural areas to ensure sustainable farming practices and enhance profitability while safeguarding the environment and human health.
- Technological advancements, such as internet and GPS-based smart technologies, have led to the rise of precision agriculture, increasing crop production and enabling efficient management of fertilizers, pesticides, and irrigation.
- Unmanned Aerial Vehicles (UAVs) equipped with multiple sensors offer real-time, precise data for enhancing agricultural practices.
- Robotics and sensing equipment allow for monitoring vegetable growth, crop health, soil conditions, and other parameters.
- Advances in greenhouse technologies, including hydroponics, aeroponics, and aquaponics, offer promising prospects for vertical farming in urban areas.

Conclusion:

- Green technologies are revolutionizing agriculture by enhancing resource efficiency, reducing environmental impact, and improving agricultural productivity.
- There is a growing emphasis on cleaner and eco-friendly agricultural technologies to create a more resilient and sustainable global food chain.
- Collaboration between farmers and policymakers is essential to develop reliable and profitable green technologies that benefit all stakeholders while minimizing environmental footpri.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