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POLITY & GOVERNANCE

Pardon Power: A Comparative Analysis of the U.S. and India

Syllabus: Polity – Separation of Powers and Executive Functions

Context

President Joe Biden recently made history as the first U.S. president to **pardon his son**, reigniting debates over the **use of clemency powers**. The case underscores the unique scope, conditions, and ethical considerations of the **pardon power** in the U.S., which contrasts with India's constitutional framework.

Pardon Power in the United States

1. **Constitutional Basis**:
   - Derived from **Article II, Section 2, Clause 1** of the U.S. Constitution.
   - Grants the President power to pardon **federal offenses**, excluding cases of **impeachment**.
2. **Scope**:
   - **Federal Crimes Only**: Applies exclusively to federal law violations.
   - **Non-Erasure of Record**: Does not erase the criminal record but mitigates penalties and restores rights.
3. **Discretionary Nature**:
   - The President exercises clemency **independently**, without Congressional approval.
4. **Conditions**:
   - **Admission of Guilt**: Acceptance of a pardon implies acknowledgment of guilt (**Burdick vs. U.S., 1915**).
   - **No Civil Protection**: Does not shield against civil lawsuits or related investigations.

Pardon Power in India

1. **Constitutional Basis**: Enshrined in **Article 72** of the Indian Constitution, allowing the President to grant pardons, reprieves, respites, or remissions.
2. **Scope**: Covers **Union and State Offenses**, including military court-martial cases and **death penalties**.
3. **Advisory Nature**: The President exercises this power based on the **advice of the Council of Ministers** under **Article 74**.
4. **State Role**:
   - **Governors' Pardoning Powers**: Governed by **Article 161**, limited to state crimes excluding death sentences.

Comparison of Pardon Powers in the U.S. and India

Aspect	United States	India
Constitutional Basis	Article II, Section 2, Clause 1	Article 72
Scope	Federal crimes only	Union and state offenses, including military and death penalties.
Independence	Fully independent	Based on advice from the Council of Ministers.
Death Sentences	Not under federal purview; pardoned by state governors.	The President can pardon death sentences.
Governors' Role	Can pardon state crimes	Limited to state crimes, excluding death sentences (Article 161).
Process	President exercises authority unilaterally.	President follows ministerial advice.

Debates Around Pardon Power

In the United States

1. **Ethical Concerns**: Critics argue presidential clemency can be misused for **political gains** or **personal interests** (e.g., President Biden pardoning his son).
2. **Legal Controversies**: The unrestricted nature of the power often raises questions about **accountability**.
3. **Public Perception**: Pardons involving prominent individuals may erode **public trust** in the judiciary.

In India

1. **Checks and Balances**: Advisory nature ensures **checks on executive power**, maintaining **constitutional integrity**.
2. **Judicial Oversight**: Courts can intervene in cases of **arbitrariness**, adding a layer of accountability.
3. **Delays**: Execution of clemency petitions often faces delays, especially in **death penalty cases**, causing prolonged uncertainty.

Significance of Pardon Power

1. **Humanitarian Consideration**: Provides an avenue for clemency in cases involving **miscarriages of justice** or **extenuating circumstances**.
2. **Correcting Errors**: Acts as a **safety valve** in the justice system to address judicial or procedural lapses.
3. **Policy Signals**: Reflects the **values and priorities** of a nation's executive, such as leniency in non-violent offenses or drug-related cases.

Way Forward

1. **In the U.S.**:
   - **Introduce Oversight**: Consider checks like requiring **judicial review** for controversial pardons.
   - **Enhance Transparency**: Establish clear guidelines for clemency decisions.
2. **In India**:
   - **Streamline Procedures**: Ensure timely processing of mercy petitions to prevent delays.
   - **Awareness Campaigns**: Educate the public about the significance and limits of pardoning powers.

Conclusion

While the **pardon power** remains a vital tool in both nations, its implementation must balance **justice** with **executive discretion**. Strengthened transparency, accountability, and procedural efficiency can ensure the power serves its intended purpose of **mercy and justice** without undermining public trust.

Inner Line Permit (ILP): Preserving Regional Identity and Interests

Syllabus: Polity – Federalism and Governance

Context

The **Manipur government** recently initiated a review of the **Inner Line Permit (ILP)** system following violations, emphasizing the importance of its **stringent implementation** to protect the **cultural, demographic, and economic interests** of the region.

What is the Inner Line Permit (ILP)?

1. **Definition**: ILP is a **travel document** required by **Indian citizens from outside certain states** to **enter and stay** for a limited time in protected areas.
2. **Legal Origin**:
   - Established during the **colonial era** under the **Bengal Eastern Frontier Regulation Act, 1873** to safeguard Crown interests.
   - Currently governed by the **Foreigners (Protected Areas) Order, 1958** for foreign tourists and state-specific guidelines for Indian citizens.
3. **States Under ILP**: **Arunachal Pradesh**, **Nagaland**, **Mizoram**, and **Manipur**.
4. **Issuing Authority**: ILP is issued by the **respective state authorities** under the supervision of the **Home Department**.

Features of the ILP System

1. **Mandatory for Non-Residents**: Required for **Indian citizens** to enter designated states.
2. **Limited Stay**: Specifies a **restricted time period** for staying in the state.
3. **Categories of Permits**: Includes **labour permits**, **tourist permits**, and **regular permits**, depending on the purpose of the visit.
4. **Purpose**: Aims to preserve:
   - **Local cultural identity**.
   - **Demographic stability**.
   - **Economic interests** of the indigenous population.

Significance of the ILP System

1. **Cultural Preservation**: Protects the unique **heritage, customs, and traditions** of the indigenous communities.
2. **Demographic Safeguards**: Regulates the **influx of migrants**, preventing demographic imbalances.
3. **Economic Benefits**: Ensures **employment opportunities** and **resources** are prioritized for local residents.
4. **Environmental Protection**: Helps mitigate **ecological pressures** in sensitive regions by controlling population inflow.

Challenges in Implementation

1. **Violations and Loopholes**: Unauthorized entries due to **lax enforcement** and forged permits.
2. **Economic Disruption**: Restrictions may hinder **economic integration** with the rest of the country.

3. **Administrative Burden**: Complexities in monitoring and issuing ILPs create **logistical challenges** for state authorities.
4. **Tourism and Development**: Limits the potential of **tourism** and **infrastructure development** in ILP states.
5. **Conflicts with Fundamental Rights**: ILP regulations can be viewed as restricting the **right to freedom of movement** (Article 19 of the Constitution).

Way Forward

1. **Streamlined Enforcement**: Employ **digital systems** for issuing and monitoring ILPs to prevent misuse.
2. **Enhanced Coordination**: Strengthen collaboration between the **state governments** and **central agencies** for better implementation.
3. **Public Awareness**: Educate both residents and visitors about the importance of the ILP system.
4. **Balanced Approach**: Ensure ILP regulations support **cultural preservation** without hindering **economic growth** and **national integration**.
5. **Incorporating Technology**: Use **QR codes** and **biometric verification** for improved security and transparency.

Conclusion

The **Inner Line Permit system** is a vital tool for safeguarding the **cultural identity** and **economic stability** of sensitive regions. By addressing implementation challenges and leveraging technology, India can ensure the ILP achieves its objectives while balancing the rights of all stakeholders, contributing to a **harmonious and inclusive governance framework**.

Supreme Court Directions for Effective Implementation of the POSH Act

Syllabus: Polity – Women Empowerment and Social Justice

Context

The **Supreme Court** has issued directions to ensure the **uniform implementation** of the **Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 (POSH Act)** across all **States and Union Territories**. These measures aim to enhance accountability and accessibility in addressing sexual harassment at workplaces.

Supreme Court Directions for POSH Act Compliance

1. **Appointment of District Officers**:
   - Every State/UT must notify **District Officers** for each district to discharge functions under the POSH Act.
   - **Responsibilities**:
     - Ensure the **constitution of Internal Complaints Committees (ICC)** in organizations within their districts.
     - Facilitate awareness and compliance with the Act.
2. **Constitution of Local Committees**:
   - As mandated under **Section 6 of the POSH Act**, Local Committees must be constituted to handle complaints from:
     - Establishments with **less than 10 employees**, where no ICC exists.
     - Cases where complaints are against the employer.
3. **Designation of Nodal Officers**: Appoint **Nodal Officers** in every **block, taluka, tehsil**, or **municipality** to act as intermediaries between complainants and Local Committees.
4. **Jurisdiction of Local Committees**: Local Committees' jurisdiction should cover the entire district.
5. **Institution of SHe-Box**: States are encouraged to establish **Sexual Harassment electronic Boxes (SHe-Box)** to:
   - Provide a **single-window system** for women to file sexual harassment complaints.
   - Enhance the accessibility and efficiency of the grievance redressal process.

Key Provisions of the POSH Act, 2013

1. **Definition of Sexual Harassment**: Covers **physical contact**, **demands for sexual favors**, **sexually colored remarks**, **pornographic displays**, and **any unwelcome physical, verbal, or non-verbal sexual conduct**.
2. **Applicability**:
   - Encompasses all workplaces, including:
     - **Government and private sector organizations**.
     - **NGOs**, **hospitals**, and **residential spaces**.
     - **Employer-provided transport** and locations visited during employment.
3. **Complaint Committees**:
   - **Internal Complaints Committee (ICC)**:
     - Mandatory for organizations with **10 or more employees**.
     - Investigates complaints and recommends actions to the employer.
   - **Local Committee**:
     - Handles cases from smaller establishments or complaints against employers.

Significance of Supreme Court's Directions

1. **Enhanced Accountability**: Appointment of **District Officers** and **Local Committees** ensures better enforcement of the Act.
2. **Improved Accessibility**: Introduction of **SHe-Box** and nodal officers improves ease of reporting for victims, especially in rural and urban marginalized areas.
3. **Addressing Gaps**: Ensures compliance in small establishments and unorganized sectors where sexual harassment often goes unreported.
4. **Awareness and Prevention**: Promotes awareness through district-level officers and committees, creating safer work environments.

Challenges in Implementation

1. **Low Awareness**: Many employees and employers remain unaware of the POSH Act's provisions.
2. **Non-Compliance**: Organizations, especially in the unorganized sector, fail to constitute ICCs or comply with legal requirements.
3. **Stigma and Retaliation**: Victims fear **social stigma** and **professional retaliation**, discouraging them from filing complaints.
4. **Overburdened Committees**: Local Committees may face challenges in handling large caseloads effectively.

Way Forward

1. **Capacity Building**: Conduct **training programs** for District Officers, ICC members, and Nodal Officers to enhance their capabilities.
2. **Awareness Campaigns**: Launch widespread campaigns to inform employees and employers about the POSH Act and the avenues for redressal.
3. **Technological Integration**: Leverage **digital platforms** like SHe-Box to ensure real-time tracking and resolution of complaints.
4. **Monitoring and Audits**: Periodic reviews of compliance with the Act to ensure that ICCs and Local Committees are functioning effectively.
5. **Support Systems**: Establish support mechanisms such as **counseling services** and **legal aid** for complainants.

Caste-Based Census: Bridging Inequities Through Data

Syllabus: Governance – Affirmative Action and Policy Implementation

Context

The **demand for a caste census** has escalated into a major political and social issue. With recent advocacy by **opposition leaders, NGOs, and even the Rashtriya Swayamsevak Sangh (RSS)**, the discourse around caste-based data collection has gained renewed momentum.

What is a Caste Census?

A **caste census** enumerates India's population based on **caste categories**, beyond the traditionally recorded **Scheduled Castes (SCs)** and **Scheduled Tribes (STs)**. It seeks to include data on **Other Backward Classes (OBCs)** and sub-castes to fill critical gaps in policymaking and affirmative action.

Constitutional Mandate

1. **Equality and Non-Discrimination**: **Articles 14, 15, and 16** of the Constitution mandate **equality before the law** and prohibit caste-based discrimination.
2. **Affirmative Action**: Article 46 directs the state to promote the **educational and economic interests** of SCs, STs, and other weaker sections.

Need for a Caste Census

1. **Addressing Inequities**: Identifies **intra-caste disparities**, enabling **equitable resource allocation**.
2. **Empirical Evidence for Policies**: Provides a **data-driven basis** for affirmative action.
3. **Monitoring Effectiveness**: Evaluates the impact of **existing reservation policies**.
4. **Improved Governance**:
    - Guides resource allocation and welfare schemes.
    - Example: **Bihar's 2023 caste census** revealed **84% of the population** belongs to OBCs, EBCs, and SCs, driving targeted measures.
5. **Social Justice**: Helps fulfill constitutional obligations of **equality and justice**.

Historical Background

1. **Colonial Era**:
    - First caste census conducted in **1871–72**.
    - The last comprehensive caste data was collected in **1931**.
2. **Post-Independence**: **Socio-Economic and Caste Census (SECC) 2011**: Identified **46.7 lakh caste/sub-caste groups**, but the data was riddled with inconsistencies.

Implications of a Caste Census

Social

1. **Positive**:
    - Better identification of disadvantaged groups.
    - Strengthens **targeted welfare** measures.
2. **Negative**:
    - Reinforces **caste-based identities**, potentially deepening societal divisions.
    - Example: **Bihar's caste census** challenged dominant caste narratives.

Political

1. **Positive**:
    - Reshapes political strategies by identifying **neglected caste groups**.
    - Example: Post-Bihar census, calls for **proportional reservations** gained traction.
2. **Negative**: Could weaken the narrative of a **unified Hindu identity**.

Economic

1. **Positive**:
    - Enables resource allocation based on **need rather than assumptions**.
    - Facilitates targeted **economic development** for backward groups.

Governance

1. **Positive**:
    - Improves the **tracking and implementation** of welfare schemes.
    - Prioritizes infrastructure and healthcare interventions.

Legal

1. **Positive**:
    - Provides empirical justification for **affirmative action in courts**.
    - Strengthens implementation of SC, ST, and OBC reservations.

Challenges in Conducting a Caste Census

1. **Complexity in Classification**:
    - Similar-sounding castes or regional variations lead to misclassification.
    - Example: **'Sen' in Bengal** (upper caste) vs. **'Sain'** (OBC barber caste).
2. **Self-Reporting Bias**:
    - Claims influenced by **perceived benefits** of upward/downward mobility.
    - Example: Controversies during Bihar caste census over classification.
3. **Administrative Feasibility**:
    - Inadequate training of enumerators and limited infrastructure.
4. **Data Integrity**:
    - Risks of **manipulation** due to political and social pressures.
5. **Potential Divisions**:
    - Hardened caste identities may exacerbate societal divides.

Case Study: Bihar Caste Census, 2023

Impact:

1. Triggered demands for **proportional reservations**.
2. Strengthened narrative for **caste-based welfare policies**.

Challenges: Faced criticism over data accuracy and classification methods.

Way Forward

1. **Standardized Methodology**: Clear guidelines for classification to avoid errors.
2. **Training Enumerators**: Specialized training to ensure **accurate data collection**.
3. **Data Confidentiality**: Implement strict measures to protect **respondents' privacy**.
4. **Leveraging Technology**: Use AI and geospatial tools for **accurate mapping** and analysis.
5. **Proactive Policy Formulation**: Utilize findings to create **inclusive and targeted welfare programs**.
6. **Stakeholder Engagement**: Involve academia, policymakers, and social leaders to ensure **credibility and inclusiveness**.

Conclusion

A caste census offers an unparalleled opportunity to address systemic inequities and enable **data-driven policymaking**. While challenges remain, transparent and inclusive methodologies can ensure the census fosters **equality, justice, and dignity** for all, aligning with **constitutional ideals**.

Code of Conduct for Judges: Safeguarding Judicial Integrity

Syllabus: Governance – Transparency and Accountability in Judiciary

Context

The absence of a formal **code of conduct for judges** was highlighted by the **Law Minister**, referencing existing frameworks such as the **Restatement of Values of Judicial Life (1997)** and the **in-house procedure** for addressing misconduct. A structured code is essential to ensure **judicial accountability, impartiality**, and public trust.

What is a Code of Conduct?

A **code of conduct** comprises ethical guidelines defining acceptable behaviour and standards for individuals in specific roles. For **judges**, it emphasizes:

- **Impartiality**: Avoiding bias in decision-making.
- **Integrity**: Upholding constitutional principles.
- **Accountability**: Ensuring actions align with ethical standards.

Present Framework for Judicial Conduct

1. Restatement of Values of Judicial Life (1997)

- Adopted by the **Supreme Court**, it sets behavioural standards emphasizing:
  - **Impartiality**: Judges must avoid public commentary on **pending cases**.
  - **Transparency**: Disclosure of **financial interests**.

2. Constitutional Provisions

- **Articles 124 and 217**:
  - Govern the **appointment** and **removal** of judges.
  - Implicitly mandate ethical behaviour.

3. In-house Procedure (1997): Enables the **Chief Justice of India (CJI)** to address complaints of misconduct.

4. Judges (Inquiry) Act, 1968: Provides a legal mechanism for investigating **misconduct or incapacity**.

5. Declaration of Assets: Judges are expected to declare assets, though enforcement mechanisms remain weak.

Need for a Code of Conduct for Judges

1. **Prevent Judicial Misconduct**
   - Ensures accountability and prevents misuse of judicial authority.
   - **Example**: Allegations of bias against some judges raised ethical concerns.
2. **Strengthen Public Trust**
   - Reinforces confidence in the judiciary's **impartiality**.
   - **Example**: The Andhra Pradesh High Court case (2021) highlighted public distrust over alleged judicial bias.
3. **Uniform Standards**: A formal code ensures consistency in addressing **ethical violations** across states and courts.
4. **Combat Corruption**: Tackles financial irregularities and **nepotism** in judicial processes.
5. **Align with International Obligations**: Follows global frameworks like the **Bangalore Principles of Judicial Conduct**, emphasizing independence, integrity, and accountability.

Government Efforts to Ensure Ethical Judicial Conduct

1. **Restatement of Judicial Values (1997)**: Reaffirmed guidelines for ethical behaviour.
2. **Judges (Inquiry) Act, 1968**: Established a mechanism to address allegations of misconduct.
3. **Judicial Standards and Accountability Bill, 2010**: Aimed to enforce ethical standards but was not passed.
4. **Judicial Training Programs**: Conducted by the **National Judicial Academy** to promote ethical awareness.

Significance of a Code of Conduct

1. **Ensures Judicial Independence**: Protects judges from undue influence by defining ethical boundaries.
2. **Strengthens Rule of Law**
   - Reinforces fairness and impartiality.
   - **Example**: The **Ayodhya Verdict** emphasized adherence to legal principles over religious biases.
3. **Enhances Credibility**: Boosts global confidence in the Indian judiciary's integrity.
4. **Encourages Accountability**: Prevents **arbitrary behaviour** and ensures adherence to constitutional mandates.
5. **Addresses Systemic Bias**: Provides mechanisms to address favouritism or discrimination.

Challenges in Implementing a Code of Conduct

1. **Lack of Enforceability**: Existing guidelines are advisory, not binding.
2. **Judicial Independence vs. Accountability**: Overregulation risks undermining judicial autonomy.
3. **Resistance to Change**: Judges may oppose external scrutiny, citing independence concerns.
4. **Political Interference**: Risks of using the code for **targeting dissenting judges**.
   - **Example**: Allegations of executive overreach in judicial appointments.
5. **Limited Awareness**: Absence of regular training on ethical guidelines hinders effectiveness.

Way Forward

1. **Formalize the Code**: Introduce a legally binding code of conduct for judges.
2. **Strengthen Oversight Mechanisms**: Establish an **independent judicial accountability body** to monitor compliance.
3. **Regular Training Programs**: Conduct periodic ethics workshops for judges.
4. **Transparent Appointments**: Ensure openness in judicial appointments and promotions.
5. **Public Engagement**: Involve civil society in discussions on judicial accountability.

Conclusion

A robust **code of conduct for judges** is essential to safeguard **judicial integrity** and **public trust**. By balancing **accountability with independence**, such a framework ensures the judiciary remains a **pillar of democracy**, upholding **transparency**, **impartiality**, and the **rule of law**.

PRAGATI Platform: Revolutionizing Infrastructure Development Through Digital Governance

Syllabus: Governance – E-Governance and Accountability

Context

An **Oxford study** has highlighted the **PRAGATI (Pro-Active Governance and Timely Implementation)** platform as a model for **digital governance**, emphasizing its role in **timely infrastructure development** and overcoming **bureaucratic inertia** in emerging economies.

About PRAGATI Platform

1. **Genesis**: Launched in **2015** under the **Digital India Program** to facilitate **good governance** and expedite project implementation.
2. **Implementing Agency**: Managed by the **Prime Minister's Office (PMO)**.
3. **Objectives**:
   - **Expedite Project Implementation**: Uses **real-time monitoring technologies** such as **video conferencing**, **drone feeds**, and **data analytics**.
   - **Collaborative Approach**: Eliminates administrative silos through coordination among various government agencies.
   - **E-Transparency and Accountability**: Strengthens **grievance redressal** mechanisms.

Impact of PRAGATI Platform (Oxford Study)

1. **Economic Impact**:
   - Resolves critical challenges like **land acquisition** and **inter-ministerial coordination**, enabling:
     - **Faster project execution**.
     - Reduction in costs associated with delays.
   - **Addressing Middle-Income Trap**:
     - Demonstrates how investments in **infrastructure** and **effective governance** can drive sustained economic growth.
2. **Social Impact**: Focuses on **underdeveloped and remote regions**, reducing **regional disparities**.
3. **Environmental Impact**:
   - Promotes **sustainability in planning** and accelerates **environmental clearances** through integration with the **PARIVESH portal**.
   - Encourages **green technologies** to minimize **carbon footprints**.
   - **Example**: Expedites projects with an emphasis on ecological considerations.

4. **Governance Impact**:
    - Ensures **administrative efficiency** and strengthens **accountability**.
    - **Example**: Successful implementation of the **Bogibeel Rail and Road Bridge in Assam**, overcoming years of delays.

Key Features of PRAGATI Platform

1. **Real-Time Monitoring**: Enables on-the-spot assessments of project progress through **technological interventions**.
2. **Collaborative Framework**: Facilitates **coordinated decision-making** among ministries, state governments, and project stakeholders.
3. **Grievance Redressal**: Provides an effective platform for addressing public grievances with real-time updates on resolutions.
4. **E-Governance Model**: Integrates digital solutions for enhancing **efficiency**, **transparency**, and **citizen engagement**.

Challenges in Implementation

1. **Inter-Agency Coordination**: Despite improvements, bottlenecks persist in resolving conflicts among agencies.
2. **Data Accuracy**: Dependence on **real-time data** requires robust mechanisms to ensure accuracy and reliability.
3. **Capacity Constraints**: Limited technical expertise at regional levels may slow implementation.
4. **Stakeholder Inclusion**: Ensuring involvement of local stakeholders in planning and execution phases.

Way Forward

1. **Capacity Building**: Train officials at all levels in **data analysis** and **digital governance tools**.
2. **Public-Private Partnerships (PPPs)**: Encourage private sector participation in **infrastructure projects** for better resource mobilization and execution.
3. **Enhanced Data Integration**: Incorporate **AI** and **big data analytics** to improve accuracy in real-time monitoring.
4. **Citizen Engagement**: Foster greater public participation to ensure **inclusive governance** and address grievances effectively.
5. **Global Benchmarking**: Leverage insights from successful international models of **e-governance** for continuous improvement.

Electronic Tracking of Undertrials: A Humane Alternative to Overcrowded Prisons

Syllabus: Governance – Criminal Justice System and Prison Reforms

Context

With **75.8% of India's prison population** comprising **undertrials**, overcrowding in jails has become a critical issue. The idea of **electronic tracking** is being explored to address this problem while preserving **individual liberty** and ensuring **compliance with court conditions**.

Status of Undertrials in India (NCRB 2022)

1. **Proportion of Undertrials**: **75.8%** of the prison population (4,34,302 out of 5,73,220) are undertrials.
2. **Women Undertrials**: **76.33%** of incarcerated women are undertrials.
3. **Prolonged Detention**: **8.6% of undertrials** have been in prison for over three years due to judicial delays.
4. **Prison Overcrowding**: Indian prisons operate at **131% occupancy**, with a capacity of 4,36,266.
5. **Legal Representation Gap**: Despite **Article 39A** guaranteeing free legal aid, many undertrials lack proper representation due to inadequate lawyer-to-prisoner ratios.

Laws Related to Undertrials in India

1. **Section 479 of BNSS**:
    - **Eligibility**: First-time offenders can be released after serving **one-third** of the maximum sentence.
    - **Limitations**: Not applicable for multiple offenses or ongoing investigations.
2. **Section 436A of CrPC**:
    - Undertrials who have served **half the maximum sentence** can be released on a personal bond.
    - **Exclusions**: Cases punishable by death or life imprisonment.
3. **Judicial Directions**:
    - The **Supreme Court PIL on Prison Conditions (2013)** emphasized:
        - Timely **identification and release** of eligible undertrials.
        - Speedy trials as a **fundamental right** under **Article 21**.

What is Electronic Tracking of Undertrials?

- **Definition**: A system that uses **monitoring technologies** to supervise undertrials outside prison, reducing incarceration while ensuring compliance with legal conditions.
- **Types of Electronic Tracking**:
    1. **GPS-Enabled Ankle Monitors**: Provide real-time location tracking.
    2. **RFID (Radio Frequency Identification)**: Monitors proximity to designated areas.
    3. **Mobile Applications**: Smartphone-based reporting of location and status.

4. **Biometric Systems**: Fingerprint, facial recognition, or voice authentication for identity verification.

Advantages of Electronic Tracking

1. **Cost-Effective**:
   - **Example**: Odisha spends ₹1 lakh per undertrial annually; trackers cost ₹10,000–₹15,000.
2. **Decongests Prisons**:
   - Alleviates **overcrowding** in jails operating at **131% capacity**.
3. **Enables Rehabilitation**:
   - Allows undertrials to **work, care for families**, and avoid social stigmas.
4. **Enhanced Judicial Confidence**:
   - Courts can grant bail with greater assurance of compliance.

Limitations of Electronic Tracking

1. **Privacy Concerns**: Raises surveillance and **data security** issues.
   - **Example**: Supreme Court struck down invasive bail conditions in 2023.
2. **Social Stigma**: Visible devices like ankle monitors can lead to **discrimination and isolation**.
3. **Technical Failures**: Monitoring systems may not function effectively in **remote areas**.
4. **Financial Burden**: Uncertainty over whether the cost should be borne by the **government** or the **accused**.

Global Practices in Electronic Tracking

1. **United States**: Widely used for **pre-trial and parole cases** but criticized for creating **"e-carceration"** and perpetuating social inequities.
2. **European Union**: Countries like the **UK and Sweden** employ electronic tags for conditional pre-trial releases, ensuring compliance with judicial orders.

Way Forward

1. **Privacy Safeguards**: Implement robust policies to protect individual data from misuse.
2. **Equitable Implementation**: Ensure that the costs of tracking are covered by the **state** for economically weaker sections.
3. **Judicial Oversight**: Establish clear guidelines for judicial approval and monitoring of electronic tracking systems.
4. **Technological Reliability**: Invest in **advanced, reliable tracking technologies** that function across rural and remote areas.
5. **Awareness Campaigns**: Inform stakeholders, including law enforcement and the judiciary, about the benefits and limitations of electronic tracking.

MNREGA Job Card Deletion: Issues and Framework

Syllabus: Governance – Social Welfare Programs

Context

The recent **increase in job card deletions** under the **Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA)** has raised concerns about **transparency**, **right to work**, and **implementation challenges** in rural employment schemes.

About MNREGA Job Card Deletion

1. **Legal Framework**:
   - Governed by **Schedule II, Paragraph 23** of the **MGNREGA Act, 2005**.
   - Supported by **Master Circulars** issued by the **Ministry of Rural Development (MoRD)**.
2. **Authority Responsible**:
   - **State Governments** are primarily responsible for job card deletions.
   - The **Program Officer** verifies and oversees the deletion process.
3. **Criteria for Deletion**:
   - **Permanent Migration**: Households relocating permanently outside the Gram Panchayat.
   - **Duplicate Job Cards**: Issued based on **forged or duplicate records**.
   - **Fake Applicants**: Cards issued fraudulently.
   - **Reclassification of Area**: If a Gram Panchayat is upgraded to a **Municipal Corporation**.
   - **Disinterest in Work**: Workers explicitly expressing unwillingness to work under MGNREGA.
4. **Procedure for Deletion**:
   - **Verification**: Independent verification of deletion reasons by the **Program Officer**.
   - **Opportunity to Be Heard**: Workers are allowed to present their case in the presence of **two independent witnesses**.
   - **Documentation**: Reasons for deletion must be documented and updated in the **MGNREGA Management Information System (MIS)**.
   - **Transparency**: Deletion reports must be shared with the **Gram Sabha** or **Ward Sabha** for accountability.

Significance of MNREGA Job Card Deletion

1. **Improving Scheme Integrity**: Deleting **duplicate and fake job cards** enhances the **credibility** of the MGNREGA program.
2. **Optimized Resource Allocation**: Ensures funds and resources are directed toward **genuine beneficiaries**.
3. **Alignment with Rural Dynamics**: Accounts for changes like **urban migration** and **reclassification of rural areas**, keeping the program updated.

Concerns and Challenges

1. **Transparency Issues**:
   - Lack of proper **notification or communication** to affected workers.
   - Insufficient sharing of deletion reports with Gram Sabhas.
2. **Right to Work Violations**: Arbitrary deletions without following due process may violate the **constitutional right to work**.
3. **Inadequate Verification**: Poor oversight in **independent verification** can lead to wrongful deletions.
4. **Bureaucratic Delays**: Delayed updating of **MGNREGA MIS**, affecting grievance redressal mechanisms.
5. **Exclusion of Vulnerable Groups**: Marginalized communities may face **disproportionate deletions** due to lack of awareness or advocacy.

Steps to Enhance Accountability

1. **Strengthen Verification Processes**: Use **digital tools** and **field inspections** to ensure independent and accurate verification.
2. **Public Reporting**: Mandate real-time updates of deletion data on the **MGNREGA MIS** and ensure accessibility to Gram Sabhas.
3. **Increased Awareness**: Conduct awareness programs to inform workers about their rights and the deletion process.
4. **Improved Grievance Mechanisms**: Establish dedicated **helplines** and **ombudsman systems** to address wrongful deletions.
5. **Social Audits**: Conduct regular **social audits** involving local communities to enhance transparency and accountability.

High-Risk Foods: Enhancing Food Safety and Regulatory Measures

Syllabus: Governance – Food Safety and Consumer Protection

Context

The **Food Safety and Standards Authority of India (FSSAI)** has recently designated **packaged drinking water and mineral water** as **high-risk foods**, shifting focus to stricter inspections and audits. This move replaces the previously mandatory **BIS certification**, streamlining compliance and ensuring enhanced consumer safety.

What is High-Risk Food Classification?

1. **Definition**: High-risk foods are products that require **stringent safety protocols** due to their potential to adversely affect **public health** if mishandled.
2. **Governing Authority**: **FSSAI** oversees the classification and regulation of high-risk foods.
3. **Legal Framework**: Governed under the **Food Safety and Standards Act, 2006**.
4. **Purpose of Classification**:
   - Ensure **enhanced safety standards** for products with higher health risks.
   - Replace **dual certification processes**, such as BIS, with FSSAI's streamlined inspections.

Products Categorized as High-Risk Foods

1. **Newly Added**: **Packaged drinking water** and **mineral water**.
2. **Existing High-Risk Categories**:
   - **Dairy Products and Analogues**: Milk, cheese, butter, etc.
   - **Meat, Poultry, and Seafood**: Fresh, processed, or frozen.
   - **Eggs and Egg Products**: Pasteurized and processed products.
   - **Prepared and Fortified Foods**: Fortified rice kernels and similar items.
   - **Specialized Food Products**: For nutritional or medical uses, such as infant formulas and supplements.

Significance of High-Risk Food Classification

1. **Enhanced Safety Standards**: Implements **mandatory inspections and audits** to ensure product quality and public health.
2. **Streamlined Compliance**: Eliminates redundant certifications, such as BIS, reducing regulatory burdens for industries.
3. **Consumer Trust**: Builds confidence in the **safety and quality** of essential food products.
4. **Preventive Measures**: Identifies potential risks early, mitigating the chances of **foodborne illnesses** and **contamination**.
5. **Global Standards Alignment**: Aligns India's food safety practices with **international benchmarks**, facilitating exports.

Challenges in High-Risk Food Regulation

1. **Infrastructure Gaps**: Inadequate **testing labs** and equipment may hinder the effectiveness of inspections.
2. **Compliance Costs**: Stricter regulations may increase **costs for producers**, particularly small and medium enterprises.
3. **Monitoring Capacity**: Ensuring compliance across **diverse food sectors** is resource-intensive for FSSAI.
4. **Consumer Awareness**: Limited knowledge among consumers about high-risk foods and their associated safety standards.

Way Forward

1. **Strengthening Infrastructure**: Expand **food testing laboratories** and improve access to **modern technologies** for quicker, more accurate assessments.
2. **Training Programs**: Conduct capacity-building initiatives for **food handlers**, producers, and regulators to ensure compliance.
3. **Public Awareness Campaigns**: Educate consumers on the importance of high-risk food regulations and **safe consumption practices**.
4. **Collaborative Monitoring**: Partner with state governments and industry stakeholders for **better enforcement** of safety protocols.
5. **Periodic Reviews**: Regularly update high-risk food classifications to include **emerging risks** and adapt to changing consumption patterns.

National Council for Vocational Education and Training: Advancing India's Skill Ecosystem

Syllabus: Governance – Skill Development and Employment

Context

The **National Council for Vocational Education and Training (NCVET)** under the **Ministry of Skill Development and Entrepreneurship (MSDE)** recently recognized the **Indian National Space Promotion and Authorization Center (IN-SPACe)** as an **awarding body**, marking a significant step in integrating **space sector skilling** with India's national skill development agenda.

About NCVET

⇒ **Establishment**

- **Founded**: December 5, 2018.
- **Operational Since**: August 1, 2020.

⇒ **Parent Ministry: Ministry of Skill Development and Entrepreneurship (MSDE)**.
⇒ **Aim:** To **regulate**, **standardize**, and **improve** vocational education, training, and skilling systems across India, enhancing employability and workforce quality.

Functions of NCVET

1. **Recognition and Regulation**: **Recognize**, **monitor**, and, if necessary, **de-recognize awarding bodies** and assessment agencies.
2. **Qualification Standards**: Establish **guidelines for approval**, monitoring, and quality assurance of qualifications in vocational training.
3. **Quality Assurance**: Ensure consistent **quality standards** throughout the training and skilling ecosystem.
4. **Grievance Redressal**: Implement structured systems to address **grievances** and resolve disputes.
5. **Integration**: Streamline the **fragmented regulatory framework** to build a cohesive skilling environment.

Recognizing IN-SPACe as an Awarding Body

What is IN-SPACe?

The **Indian National Space Promotion and Authorization Center** facilitates private sector participation in India's space activities under **ISRO**.

Significance of Recognition

1. **Standardization**: Ensures that **space-sector training programs** meet **national and global benchmarks** for quality and relevance.
2. **Skill Development**: Focuses on specialized areas such as:
    - **Satellite manufacturing**.
    - **Mission design**.
    - **Space propulsion systems**.
3. **Alignment with Skill India Mission**: Advances the **Skill India initiative** by integrating **space-sector training** into the broader national skilling framework.
4. **Global Competitiveness**: Prepares India's workforce for **international opportunities** in the rapidly growing space sector.

Importance of NCVET in India's Skilling Ecosystem

1. **Improved Employability**: Enhances the relevance of vocational training, addressing **industry-specific needs**.
2. **Bridging Skill Gaps**: Reduces the gap between **demand and supply** of skilled professionals in emerging sectors like **space technology**, **AI**, and **green energy**.
3. **Support for MSMEs and Startups**: Encourages skilling programs tailored to **small enterprises**, fostering entrepreneurship and innovation.
4. **Fostering Inclusivity**: Promotes skilling opportunities for **marginalized communities**, increasing **social and economic inclusion**.

Way Forward

1. **Sector-Specific Skilling**: Expand collaborations with **industry leaders** in emerging fields like space, renewable energy, and biotechnology.
2. **Technology Integration**: Leverage **AI**, **VR**, and **big data** for enhanced vocational training methods.
3. **International Partnerships**: Collaborate with global institutions to ensure Indian skilling programs meet **international standards**.
4. **Monitoring Mechanisms**: Develop robust systems for **tracking outcomes** of skilling programs and improving curriculum based on feedback.
5. **Awareness Campaigns**: Increase public awareness about the opportunities provided by **NCVET-recognized programs**.

Boilers Bill, 2024: Enhancing Safety and Streamlining Regulations

Syllabus: Governance – Industrial Safety and Regulatory Reforms

Context

The **Boilers Bill, 2024**, replacing the **Boilers Act, 1923**, was passed in the **Rajya Sabha**, aligning with decriminalization initiatives under the **Jan Vishwas (Amendment of Provisions) Act, 2023**. The Bill seeks to improve **industrial safety**while enhancing **Ease of Doing Business (EoDB)** by modernizing boiler regulations and inspections.

Key Provisions of the Boilers Bill, 2024

1. **Regulation**: Establishes a **Central Boilers Board** to regulate the **design**, **manufacture**, **erection**, and **use** of boilers and their components.
2. **Inspection Framework**: Inspections may be conducted by **State-appointed Inspectors** or **authorized third-party agencies**, ensuring flexibility in compliance mechanisms.
3. **Decriminalization**:
   - Of the **seven offences** under the previous Act, only **four serious offences** involving **loss of life or property**retain criminal penalties.
   - Non-criminal offences are now subject to **executive penalties** instead of judicial fines, streamlining dispute resolution.
4. **Ease of Doing Business (EoDB)**:
   - Simplifies procedures for approvals, repairs, and alterations.
   - Reduces legal hurdles for industrial operators while retaining safety priorities.

Issues and Concerns

1. **Safety Concerns**: **State exemptions** from the Bill's provisions may compromise safety in unregulated zones.
2. **Judicial Recourse**:
   - **Decisions by the Central Boilers Board or state inspectors** cannot be challenged in regular courts.
   - Aggrieved parties must rely on **High Court writ petitions** under **Article 226**, complicating grievance redressal.
3. **Lack of Defined Timelines**: No specific deadlines for inspections or approvals, creating potential delays in industrial operations.

About Boilers

1. **Definition**: A **boiler** is a vessel where **steam is generated under pressure** for industrial applications.
2. **Industrial Importance**: India operates around **40 lakh steam boilers** (as of 2024), essential for sectors like **power generation**, **textiles**, **manufacturing**, and **shipping**.
3. **Constitutional Provision**: Boilers fall under the **Concurrent List** of the Indian Constitution, enabling both **Centre and States** to legislate.

Significance of the Boilers Bill, 2024

1. **Industrial Safety**: Ensures stringent safety measures, mitigating risks of **explosions** that could endanger **lives and property**.
2. **Simplified Compliance**: Shifts focus from judicial penalties to **administrative fines**, fostering a **business-friendly environment**.
3. **Regulatory Modernization**: Adapts to the **modern industrial landscape**, emphasizing **digital mechanisms** and third-party inspections.
4. **Enhanced Accountability**: Establishment of the **Central Boilers Board** ensures **standardized practices** across states.

Way Forward

1. **Strengthen Safety Standards**: Address gaps in **exemption clauses** to ensure uniform safety measures.
2. **Set Defined Timelines**: Introduce **time-bound approvals** and inspections to avoid operational delays.
3. **Judicial Oversight**: Provide mechanisms for **low-cost and accessible grievance redressal**, reducing dependency on High Courts.
4. **Awareness and Training**: Educate industries on **new compliance requirements** and safety protocols to prevent violations.

Modernizing PDS: Anna Chakra and SCAN Portal Initiatives

Syllabus: Governance – Public Distribution System, E-Governance

Context

The **Union Minister of Consumer Affairs, Food and Public Distribution** launched **'Anna Chakra'**, a Public Distribution System (PDS) supply chain optimization tool, and the **SCAN Portal** (**Subsidy Claim Application for NFSA**) to modernize and improve the efficiency of India's **Public Distribution System** and streamline subsidy claim processes.

About Anna Chakra

What It Is: A PDS **supply chain optimization tool** designed to improve **logistics efficiency** and reduce costs across India's food distribution system.

Ministry: Ministry of Consumer Affairs, Food and Public Distribution

Objectives

1. **Optimize Logistics**: Enhance efficiency and reduce transportation costs in the PDS supply chain.
2. **Minimize Carbon Footprint**: Promote eco-friendly transportation.
3. **Timely Delivery**: Ensure timely distribution of essential commodities.

Implementing Agency

- **Department of Food and Public Distribution**
- In collaboration with:
    - **World Food Programme (WFP)**
    - **IIT-Delhi's Foundation for Innovation and Technology Transfer (FITT)**

Features

1. **Route Optimization**: Uses advanced algorithms for optimal delivery routes across **30 states**.
2. **Integration with Platforms**:
    - **FOIS** (Freight Operations Information System) for Railways.
    - **PM Gati Shakti Platform** for integrated logistics.
3. **Geo-Located Resources**: Maps Fair Price Shops (FPSs) and warehouses to facilitate interstate PDS movement.

About SCAN Portal (Subsidy Claim Application for NFSA)

What It Is: A **single-window portal** for submitting and processing subsidy claims under the **National Food Security Act (NFSA)**.

Ministry: Ministry of Consumer Affairs, Food and Public Distribution

Objectives

1. **Streamline Subsidy Submissions**: Simplify claim processes for states.
2. **Faster Approvals**: Expedite scrutiny, approval, and settlement of claims.

Features

1. **End-to-End Workflow Automation**: Digitized processes for claim submission and approval.
2. **Rule-Based Processing**: Ensures accuracy and transparency.
3. **Enhanced Efficiency**: Reduces delays in subsidy settlements and improves resource allocation.

Significance

- Modernizes subsidy mechanisms, ensuring **transparency** and **accountability**.
- Reduces **administrative delays**, leading to better resource management in the food distribution system.

Significance of Anna Chakra and SCAN Portal

1. **Modernizing PDS**: Optimizes food grain distribution under the National Food Security Act (NFSA).
2. **Improving Efficiency**: Reduces logistical and operational inefficiencies in the Public Distribution System.
3. **Enhancing Transparency**: SCAN Portal ensures accurate and faster subsidy claim settlements, reducing bureaucratic delays.
4. **Environmental Sustainability**: Anna Chakra's logistics optimization minimizes carbon emissions, promoting eco-friendly practices.
5. **Integration of Technology**: Leverages advanced technologies like **route optimization** and **workflow automation** to ensure seamless operations.

Way Forward

1. **Capacity Building**: Train state-level officials to use Anna Chakra and SCAN Portal effectively.
2. **Integration with Real-Time Systems**: Extend Anna Chakra's capabilities to include real-time monitoring of food grain stocks and deliveries.
3. **Public Awareness Campaigns**: Educate stakeholders, including Fair Price Shop owners and beneficiaries, on the benefits of these initiatives.
4. **Scalability**: Expand to incorporate additional functionalities, such as AI-based demand forecasting for food grains.
5. **Third-Party Audits**: Ensure accountability and reliability by conducting periodic audits of the subsidy claim and logistics systems.

UGC Draft Regulations 2024: Reshaping Higher Education in India

Syllabus: Governance – Education Reforms

Context

The **University Grants Commission (UGC)** has released the **Draft Minimum Standards of Instruction for the Grant of Undergraduate (UG) and Postgraduate (PG) Degrees Regulations, 2024**, aiming to align Indian higher education with **global standards** and the principles of the **National Education Policy (NEP), 2020**.

Key Proposals in the Draft Regulations

1. Biannual Admissions

- **Change**: Students can now apply for admission **twice a year**.
- **Objective**: Enhance **accessibility** and flexibility for learners.

2. Flexibility Across Disciplines

- **Change**: Students can pursue **any discipline**, irrespective of their schooling background, through **National/University-level entrance exams**.
- **Significance**: Promotes **multidisciplinary learning** and eliminates rigid subject streams.

3. Recognition of Prior Learning (RPL)

- **Definition**: Formal acknowledgment of **skills and knowledge** gained outside traditional education systems, such as workplace training or community learning.
- **Impact**: Expands educational opportunities for **non-traditional learners**.

4. Credit Distribution

- **Structure**:
  - **50% credits** from the core discipline.
  - **50% credits** from skill courses, apprenticeships, and multidisciplinary subjects.
- **Benefit**: Fosters **holistic education** by integrating **academic and skill-based learning**.

5. Simultaneous Programs: Students can pursue **two UG/PG programs** concurrently, with options to switch disciplines, institutions, or modes of learning (online/offline).

6. Multiple Entry and Exit Options: Students can pause and resume their programs without losing academic progress, ensuring **flexibility**.

7. Accelerated Degree Programme (ADP) and Extended Degree Programme (EDP)

- **ADP**: Enables students to **complete degrees faster** by earning more credits per semester.
- **EDP**: Allows students to extend the duration of their degrees by earning fewer credits per semester.
- **Applicability**: Available for UG programs only; students must opt in after their 1st or 2nd semester.

Significance of the Draft Regulations

- **Global Alignment:** Brings Indian higher education in line with **international standards**, enhancing **global employability** of graduates.
- **Inclusivity:** Recognizes **non-traditional learning paths** (RPL), accommodating a **diverse learner base**, including working professionals.
- **Skill Development:** Integration of **skill-based courses and apprenticeships** aligns with the **Skill India Mission** and industry demands.
- **Flexibility:** Biannual admissions, multiple entry-exit points, and concurrent programs offer **learner-centric options**.
- **National Credit Framework (NCrF):** The credit-based structure ensures **uniformity** across institutions and disciplines, fostering **academic mobility**.

Challenges

- **Implementation Feasibility:** Requires **upgrading infrastructure** and administrative systems in institutions.
- **Institutional Capacity:** Smaller institutions may face challenges in accommodating **simultaneous programs** or **flexible credit structures**.

- **Monitoring and Quality Assurance:** Risk of **uneven quality** in courses and programs offered under the new flexible framework.
- **Awareness Among Stakeholders:** Effective communication and training will be necessary to familiarize students and educators with the new system.

Way Forward

1. **Capacity Building**: Invest in **infrastructure development** and **training programs** for faculty and administrators.
2. **Stakeholder Engagement**: Conduct consultations with **academia, industry, and students** to ensure practical implementation.
3. **Robust Monitoring Mechanism**: Establish a regulatory body to oversee compliance with credit structures and multidisciplinary frameworks.
4. **Pilot Programs**: Implement pilot projects in select institutions before nationwide rollout.
5. **Technology Integration**: Use **digital tools** to manage biannual admissions, credit transfer, and program flexibility efficiently.

Supreme Court Case Scheduling

Syllabus: Governance and Judiciary

Context

The **Supreme Court of India** is dedicating special attention to **special leave petitions (SLPs)** to address its mounting backlog. The court has allocated **three workdays** to these cases while reserving **Mondays and Fridays** for fresh matters.

Scheduling of Cases in the Supreme Court

Who is Responsible?

1. **Chief Justice of India (CJI)**: Acts as the **master of the roster**, determining the allocation and scheduling of cases to various benches.
2. **Supreme Court Registry**: Handles the administration of filing, scrutiny, listing, and scheduling.

Law Governing Case Scheduling

- Governed by the **Supreme Court Rules, 2013**, which provide procedural guidelines for filing, listing, and hearing cases.

Procedure for Scheduling Cases

1. **Filing Process**:
    - Cases are filed through:
        - **E-Portal**: Digital submission via the Supreme Court's online platform.
        - **Physical Counter**: Manual submission by **Advocates-on-Record (AoR)**.
2. **Scrutiny**:
    - **Supreme Court Registry** verifies cases for procedural defects.
    - Valid cases are assigned a **diary number** for tracking.
3. **Listing**:
    - Cases are categorized and scheduled based on their type and urgency:
        - **Miscellaneous Days (Mondays and Fridays)**: Reserved for **fresh matters**, including issuing notices and short hearings.
        - **Non-Miscellaneous Days (Tuesdays to Thursdays)**: Dedicated to **after-notice hearings** and **regular cases** requiring detailed arguments.
4. **Admission**: Preliminary consideration determines whether the case warrants a full hearing.
5. **Hearing and Judgment**: **Admitted cases** are scheduled for thorough hearings, culminating in a verdict.

Special Provisions for Backlog Reduction

- **Special Leave Petitions (SLPs)**: Three workdays are allocated weekly to expedite SLP hearings, which form a significant portion of the Supreme Court's workload.
- **Technological Integration**: The use of digital tools like e-filing and **Artificial Intelligence** (AI) to optimize case categorization and scheduling.
- **Bench Strength Management**: Dynamic allocation of benches based on case urgency and type.

Challenges in Case Scheduling

1. **Backlog of Cases**:
    - Approximately **70,000 pending cases** as of 2024.
    - Overburdened dockets delay justice delivery.
2. **Resource Constraints**: Inadequate staff and infrastructure hinder efficient case processing.
3. **Complex Case Categorization**: Diverse case types make scheduling intricate and time-consuming.
4. **Over-Reliance on SLPs**: Frequent filing of SLPs for trivial matters clogs the system.
5. **Judicial Discretion**: The discretionary power of the CJI in roster assignment can create inconsistencies.

Way Ahead

1. **Adopt Technological Solutions**: Expand **AI-based case management systems** for smarter scheduling and prioritization.
2. **Strengthen Registry Functionality**: Enhance staff capacity and provide training for better case scrutiny and listing.
3. **Limit Frivolous SLPs**: Impose stricter criteria for admitting SLPs to reduce unnecessary filings.
4. **Increase Bench Strength**: Appoint more judges and create specialized benches for high-priority matters.
5. **Promote ADR Mechanisms**: Encourage **Alternate Dispute Resolution** to settle less critical cases outside the judicial system.
6. **Public Transparency**: Improve public access to scheduling updates through online portals.

PM e-Vidya: Revolutionizing Inclusive Education

Syllabus: Governance, Education, and Technology

Context

In a groundbreaking initiative, the Indian government launched **Channel 31** under the **PM e-Vidya** program, offering content in **Indian Sign Language (ISL)**. This move underscores the government's commitment to **inclusive and accessible education**.

About PM e-Vidya

Launch Details

- **Initiated**: May 2020 under the Ministry of Education.
- **Context**: Part of the **Atmanirbhar Bharat Abhiyaan**, addressing education disruptions caused by the COVID-19 pandemic.

Objective: Ensure **equitable**, **accessible**, and **quality education** through **digital**, **online**, and **on-air platforms**.

Key Features of PM e-Vidya

1. Digital and Online Platforms

- **DIKSHA Platform**:
  - Offers **QR-coded Energized Textbooks**, interactive content, and over **5.58 crore learning sessions**.
  - Content available in **21 languages**.
- **SWAYAM Platform**:
  - Provides **MOOCs (Massive Open Online Courses)** with over **10,000 courses** for **higher education and school-level students**.
  - Includes **credit transfer** provisions.
- **Virtual Labs**:
  - **750 science and mathematics labs** for Classes 6–12.
  - **75 skilling e-labs** for simulated skill development.

2. On-Air Platforms

- **DTH TV Channels**: Initially 12 channels; expanded to **200 channels**, catering to Classes **1–12** in multiple languages.
- **Radio and Podcasts**: Community-driven education content broadcast through **Shiksha Vani** for regions with **limited internet access**.

3. Inclusivity in Education

- **Indian Sign Language (ISL) Channel**:
  - **Channel 31** delivers **24×7 ISL-based content**, making education accessible for **hearing-impaired students**.
  - Recognizes **ISL as a subject**, fostering inclusivity.

Recognition and Impact

Global Acknowledgment

- **UNESCO Recognition (2022)**: Highlighted as a model **ICT-based education initiative** during the pandemic.
- **UNESCO King Hamad Bin Isa Al-Khalifa Prize (2021)**: Awarded to **Central Institute of Educational Technology (CIET)** for innovative use of ICT in education.

Significance of PM e-Vidya

1. Bridging Learning Gaps

- Reduces **urban-rural education disparities** by leveraging digital platforms.
- Reaches **remote areas** through radio and offline resources.

2. Promoting Accessibility: Supports marginalized groups through **ISL-based content** and other regional-language programs.

3. Skill Development: Virtual labs and skilling platforms enhance **technical education** and **job readiness**.

4. Pandemic Resilience: Ensured continuity of learning for **25 crore students** during COVID-19 lockdowns.

5. Boosting Digital Literacy: Encourages **digital adoption** among educators and learners, aligning with **Digital India** goals.

Challenges

1. **Digital Divide**:
   - Limited internet penetration in rural and remote areas.
   - Affordability issues with digital devices.
2. **Content Localization**: Need for more region-specific and **vernacular content**.
3. **Training for Educators**: Insufficient training to help teachers effectively use **digital tools**.
4. **Infrastructure Deficit**: Inadequate electricity and connectivity in underdeveloped regions.

Way Forward

1. **Infrastructure Development**: Expand **broadband** and electricity access to rural areas.
2. **Teacher Training Programs**: Regular workshops to improve educators' **digital literacy**.
3. **Content Expansion**: Develop **local language** content for regional accessibility.
4. **Public-Private Partnerships (PPPs)**: Collaborate with tech companies for affordable **devices** and robust platforms.
5. **Monitoring and Feedback**: Create feedback loops to assess the program's **reach and effectiveness**.

Indira Gandhi Peace Prize, 2024

Syllabus: International Relations, Governance

Context

Michelle Bachelet, former President of Chile and renowned global advocate for **human rights**, **gender equality**, and **democracy**, has been awarded the **Indira Gandhi Peace Prize for Peace, Disarmament, and Development** for 2024.

About Indira Gandhi Peace Prize

1. Origin and Purpose

- **Established in**: 1986 by the **Indira Gandhi Memorial Trust**.
- **Purpose**: Recognizes exceptional contributions to:
  - **Peace** and global harmony.
  - **Disarmament** and efforts against weapons proliferation.
  - **Development**, particularly those fostering human welfare and scientific progress.

2. Award Components

- **Monetary Prize**: ₹25 lakh.
- **Citation**: Document highlighting the recipient's contributions.

3. Selection Process: Overseen by an **international jury**, chaired in 2024 by **Shivshankar Menon**, former National Security Adviser of India.

Michelle Bachelet: Recipient for 2024

1. Contributions

- **Chile's First Female President**: Advocated for democratic reforms and social inclusion.
- **UN High Commissioner for Human Rights**: Promoted **gender equality**, **indigenous rights**, and **freedom of expression**.
- Champion of **global democratic values** and a **sustainable development agenda**.

2. Recognition for Work

- Honored for her relentless advocacy for **human dignity** and **global justice**.
- Her initiatives align with the **values of Indira Gandhi**: fostering peace, inclusion, and resilience.

Notable Past Recipients

Year	Recipient	Field of Contribution
1987	Mikhail Gorbachev	Disarmament and Cold War de-escalation.
1989	UNICEF	Promoting child rights and global welfare.
1997	Jimmy Carter	Efforts in peace mediation and human rights advocacy.
2013	Angela Merkel	Leadership in European peace and economic stability.
2014	ISRO	Advancements in space science for developmental applications.
2019	Sir David Attenborough	Environmental conservation and awareness.
2021	Pratham NGO	Contributions to education and literacy in India.
2022	Indian Medical Association & Nurses Association	COVID-19 response and healthcare efforts.

Significance of the Prize

1. Global Leadership in Peace and Development

- Highlights efforts toward **global disarmament** and **poverty eradication**.
- Reinforces India's commitment to **global cooperation** and **peacebuilding**.

2. Promoting Social Justice: Celebrates initiatives driving **equality**, **inclusion**, and **sustainability**.

3. Inspiration for the Future: Recognizes exemplary leadership, inspiring individuals and organizations to address **global challenges**.

INTERNATIONAL RELATIONS

Aleppo: A Historic City Amidst Syria's Turmoil

Syllabus: International Relations – West Asian Crisis and Geopolitical Conflicts

Context

For the first time in over a decade, **Islamist rebel factions**, led by **Hayat Tahrir al-Sham (HTS)**, have seized control of **Aleppo**, Syria's **second-largest city**, marking a turning point in the ongoing **Syrian Civil War**.

About Aleppo City

1. **Geographical Location**:
   - Situated in **northern Syria**, approximately **30 miles south of the Turkish border**.
   - The **Quwayq River**, which runs through Aleppo, often dries up due to excessive water use in Turkey.
2. **Historical Significance**:
   - An **ancient trade hub**, located at the crossroads of major commercial routes linking **Europe, Asia, and Africa**.
   - Hosts the **UNESCO World Heritage site** of the **Old City of Aleppo**, renowned for its **iconic citadel**—a masterpiece of medieval Islamic architecture.
3. **Current Crisis**: **Hayat Tahrir al-Sham (HTS)**, an Islamist rebel faction, has taken control, intensifying instability in the region.

About Syria

1. **Geography**:
   - **Capital**: Damascus.
   - **Neighbors**:
     - North: **Turkey**.
     - East: **Iraq**.
     - South: **Jordan**.
     - Southwest: **Israel** and **Lebanon**.
     - West: **Mediterranean Sea**.
   - **Rivers**: Euphrates River, Barada River, Quwayq River.
2. **Civil War (2011–Present)**:
   - Sparked by **authoritarian governance**, **sectarian tensions**, and **geopolitical rivalries**.
   - Focal point of **Shia-Sunni conflicts** and the **Arab Spring movements**.
3. **Significance of the Region**:
   - Part of the **historically rich Levant**, home to ancient civilizations.
   - Geopolitical importance due to its location at the crossroads of global trade and cultural routes.

About the Syrian Civil War

Origin and Timeline

- Began in **2011** during the Arab Spring as protests against Assad's authoritarian governance.
- Evolved into a multi-factional war involving regional and global powers.

Key Causes

- **Authoritarian Rule**: Assad's autocratic governance stifled dissent and suppressed freedoms.
- **Ethnic and Sectarian Divide**: Sunni majority vs. Assad's Alawite-led government.
- **Geopolitical Rivalries**: Proxy wars between the **US, Russia, Iran, and Turkey**.
- **Terrorism**: Rise of **ISIS** and other Islamist groups like **HTS**.

Current Developments in Aleppo

1. **Seizure by Hayat Tahrir al-Sham (HTS)**: HTS, a Sunni Islamist rebel group, has overtaken Aleppo, previously controlled by Syrian government forces.
2. **Strategic Importance of Aleppo**:
    - Vital for controlling trade and supply routes in **northern Syria**.
    - Historically, a symbol of **economic and cultural prosperity** in the region.
3. **Humanitarian Crisis**: The ongoing conflict has displaced millions, severely impacting **infrastructure**, **healthcare**, and **education**in the city.

Organizations Involved in Syria

1. **Hayat Tahrir al-Sham (HTS)**
    - Leadership: Led by **Abu Mohammad al-Julani**.
    - Evolution: Formerly linked to **al-Qaeda**, now spearheading insurgent activities.
2. **Syrian Democratic Forces (SDF)**
    - Nature: **Kurdish-led coalition** controlling northeastern Syria.
    - Role: Engaged in a complex relationship with Assad's forces and the US.
3. **Hezbollah**
    - Affiliation: **Shia militia** aligned with Assad and Iran.
    - Current Status: Weakening due to conflicts with **Israel** and internal challenges.

Geopolitical Implications

1. **Turkey's Role**:
    - Controls parts of **northern Syria**, influencing rebel factions like HTS.
    - Water disputes over the **Quwayq River** aggravate regional tensions.
2. **Regional Rivalries**: Reflects the broader **Shia-Sunni divide**, with **Iran** backing the Syrian regime and **Saudi Arabia** supporting opposition forces.
3. **Global Stakeholders**: **Russia** and **Iran** support the Assad regime, while **Turkey**, **the US**, and **Gulf nations** back various opposition groups.

Challenges in Restoring Stability

1. **Sectarian Divide**: Deep-rooted **Shia-Sunni conflicts** hinder peace-building efforts.
2. **External Interventions**: Prolonged involvement of global powers complicates resolution efforts.
3. **Humanitarian Crisis**: Millions displaced, with inadequate access to basic necessities and healthcare.
4. **Cultural Destruction**: UNESCO World Heritage sites, including Aleppo's Old City, face irreparable damage due to prolonged conflict.

Impacts of the Escalation

Regional Impacts

1. **Humanitarian Crisis**
    - Renewed displacement and refugee flows.
    - **UN estimates**: Over **6.8 million Syrians** internally displaced; 5.4 million are refugees.
2. **Geopolitical Tensions**
    - Increased involvement of global powers like **Russia, Turkey**, and the **US**.
    - Threatens regional stability, spilling into **Lebanon, Turkey**, and **Iraq**.

Global Implications

1. **Terrorism Resurgence**
    - HTS gains may embolden jihadist groups globally.
    - **ISIS sleeper cells** could exploit the chaos.
2. **Refugee Crisis in Europe** Possible migration surge reminiscent of the **2015 refugee crisis**, straining European economies and political systems.
3. **Oil Price Volatility** Unrest in Syria and neighboring countries could disrupt **Middle Eastern oil supply**, increasing global prices.

Steps Taken to Resolve the Conflict

1. **UN Mediation**: Initiatives like the **Geneva Peace Process** aimed at political resolution.
2. **Ceasefires and De-escalation Zones**: Brokered by **Russia**, **Turkey**, and **Iran** in the **Astana Talks**.
3. **Humanitarian Aid**: **World Food Programme (WFP)** and **Red Cross** providing relief in war zones.
4. **Counter-Terrorism Operations**: US-led coalition against ISIS; Russia's military intervention in support of Assad.

Challenges in Resolving the Conflict

1. **Divergent Interests of Global Powers**: **Russia** backs Assad; **US** supports SDF; **Turkey** opposes Kurdish groups.
2. **Fragmentation of Rebel Groups**: Lack of unity among opposition factions like **HTS** and moderate rebels.
3. **Economic Collapse**: Years of war have decimated Syria's economy, complicating reconstruction.
4. **Lack of Accountability**: Widespread human rights violations by all parties involved.

Way Ahead

1. **Inclusive Dialogue**: Revive peace talks involving all stakeholders, including moderate opposition.
2. **International Cooperation**: **UN-led initiatives** with strong backing from major powers like **Russia** and the **US**.
3. **Reconstruction Aid**: Global funding for rebuilding infrastructure and resettling displaced populations.
4. **Counter-Terrorism**: Target jihadist groups like HTS and ISIS while addressing root causes of extremism.
5. **Humanitarian Relief**: Enhance aid delivery mechanisms to reach conflict-affected regions.

South Korea: Geopolitical and Political Landscape

Syllabus: International Relations – Neighbourhood and Geopolitical Developments

Context

South Korea recently faced a **political crisis** when President **Yoon Suk Yeol** declared **martial law**, citing threats from "anti-state forces." However, this declaration was **swiftly overturned by Parliament**, reinstating democracy and highlighting the nation's robust institutional checks.

About South Korea

Geography

1. **Location**:
   - Situated in **East Asia**, forming the **southern half of the Korean Peninsula**.
2. **Capital City**:
   - **Seoul**, a major global financial and technological hub.
3. **Neighbours**:
   - **Land Borders**:
     - **North Korea**: Separated by the **Korean Demilitarized Zone (DMZ)**, a heavily fortified boundary.
   - **Maritime Borders**:
     - **Yellow Sea** (West).
     - **Sea of Japan** (East).
     - **East China Sea** (South).
4. **Rivers**:
   - **Han River**: Flows through Seoul, vital for water and transportation.
   - **Nakdong River**: The **longest river** in South Korea, crucial for agriculture and water supply.

Governance

1. **System of Governance**: **Presidential System** with a strong executive and parliamentary oversight.
2. **Political Structure**: Multi-party democracy with vibrant civil society participation.

Key Geopolitical Features

Demilitarized Zone (DMZ)

1. **Definition**: A **250-kilometer-long buffer zone** established between **North and South Korea** after the **Korean War**.
2. **Historical Context**: The **38th Parallel North** formed the border between North and South Korea before the Korean War (1950–1953).
3. **Strategic Importance**: DMZ remains a focal point of **geopolitical tensions** and **military confrontations** on the peninsula.

Island in News: Yeonpyeong Island

1. **Location**: Close to the **maritime border** with North Korea.
2. **Significance**:
    - Frequently faces **military provocations** and is symbolic of the volatile **North-South relations**.
    - Example: **North Korean artillery fire** and forced evacuations in previous years.

Recent Political Developments

1. **Martial Law Declaration**: President Yoon Suk Yeol declared **martial law**, citing threats from **anti-state forces**.
2. **Parliamentary Overturn**: South Korea's **Parliament quickly invalidated the declaration**, showcasing the strength of **democratic institutions**.
3. **Significance**: Highlights South Korea's **commitment to democracy** despite facing **internal and external security threats**.

Strategic Importance of South Korea

1. **Geopolitical Position**: South Korea serves as a **buffer state** between **China** and **Japan**, influencing regional security dynamics.
2. **Economic Powerhouse**: A leading player in **technology**, **automotive**, and **shipbuilding industries**, with global brands like **Samsung**and **Hyundai**.
3. **Military Alliance with the U.S.**: A cornerstone of the **U.S.-led Indo-Pacific strategy**, hosting **28,500 U.S. troops** under mutual defense treaties.
4. **Challenges with North Korea**: Persistent **nuclear threats** and sporadic military provocations complicate peace and reunification efforts.

DEFENCE & INTERNAL SECURITY

Rafale-Marine (Rafale-M): Boosting India's Naval Air Power

Syllabus: Security – Defence Technology and Naval Capabilities

Context

India is set to procure **26 Rafale-Marine (Rafale-M)** fighter jets from **Dassault Aviation** for deployment on **INS Vikrant** and potentially **INS Vikramaditya**, enhancing the Indian Navy's operational capabilities.

About Rafale-Marine (Rafale-M)

1. **Manufacturer**: Designed and built by **Dassault Aviation**, a French aerospace company.
2. **Features**:
    - **Multi-role Aircraft**:
        - Single-seat, 4+ generation fighter capable of performing diverse missions, including:
            - **Deep Strikes**.
            - **Air Defense**.
            - **Reconnaissance**.
            - **Maritime Operations**.
    - **Advanced Avionics and Radar**:
        - Equipped with an **Active Electronically Scanned Array (AESA) radar** for superior situational awareness.
    - **Weapon Systems**:
        - **Meteor**: Long-range air-to-air missile system.
        - **MICA**: Multi-mission air-to-air missile system.
        - **SCALP**: Long-range cruise missiles for precision strikes.
        - **EXOCET**: Anti-ship missiles for maritime dominance.
3. **Optimized for Naval Operations**:
    - Enhanced landing capabilities for:
        - **Catapult Assisted Take-Off Barrier Arrested Recovery (CATOBAR)**.
        - **Short Take-Off, Barrier Arrested Recovery (STOBAR)** systems.

Differences from Air Force Rafale

1. **Heavier Airframe**: Reinforced to withstand the stress of **naval operations**, including carrier take-offs and landings.
2. **Radar and Electronic Warfare**: **Optimized systems** for maritime applications, ensuring better adaptability to naval environments.

3. **Landing Capabilities**: Designed for operations on **aircraft carriers** with arrestor hooks and robust landing gear.

Shared Features with Air Force Rafale

1. **Common Armaments and Avionics**:
   - Ensures **cost efficiency** in maintenance and logistics.
   - Streamlines training and operational integration across **Air Force** and **Navy**.
2. **Advanced Systems**:
   - Shares state-of-the-art technologies, enhancing interoperability and reducing inventory costs.

Significance for Indian Naval Capabilities

1. **Enhanced Carrier Operations**: Integration with **INS Vikrant** and **INS Vikramaditya** strengthens India's **blue-water navy** capabilities.
2. **Maritime Superiority**: Equipped with **anti-ship and air-to-surface weapons**, the Rafale-M is ideal for securing India's interests in the **Indian Ocean Region (IOR)**.
3. **Technological Leap**: The advanced avionics and weaponry bolster India's **defensive and offensive operations**.
4. **Geopolitical Alignment**: Strengthens defense ties with **France**, a key partner under the **Strategic Partnership Agreement**.

Challenges and Way Forward

1. **Operational Integration**: Ensure seamless integration of **Rafale-M systems** with existing naval infrastructure.
2. **Cost Efficiency**: Focus on leveraging commonalities with the Air Force Rafale for efficient maintenance and training.
3. **Carrier Readiness**: Prioritize timely upgrades and maintenance of **INS Vikrant** and **INS Vikramaditya** to maximize operational effectiveness.
4. **Indigenous Manufacturing**: Collaborate with Dassault Aviation to explore **technology transfer** and boost **domestic aerospace capabilities** under **Atmanirbhar Bharat**.

Bhutan and India: Strengthening Bilateral Ties Through Development Projects

Syllabus: International Relations – India and its Neighborhood

Context

India and Bhutan recently held high-level discussions during Bhutan's King **Jigme Khesar Namgyel Wangchuck's** visit to India, focusing on collaborative development projects like the **Gelephu Mindfulness City Project** and the **Punatsangchhu-II Hydropower Project**.

Key Collaborative Projects

1. Gelephu Mindfulness City Project

- **Location**: Gelephu, a southern Bhutanese town near the Indian border.
- **Aim**:
  - Establish a sustainable urban hub promoting **prosperity**, **well-being**, and **regional economic linkages**.
  - Enhance Bhutan's socio-economic integration with neighboring Indian regions.
- **India's Role**:
  - Providing **financial** and **technical assistance** to foster Bhutan's regional connectivity and economy.
- **Significance**:
  - Supports Bhutan's **Gross National Happiness (GNH)** philosophy.
  - Encourages cross-border trade and cultural exchanges between Bhutan and India.

2. Punatsangchhu-II Hydropower Project

- **Location**: Punakha District, Bhutan.
- **River**: Built on the **Punatsangchhu River**, formed by the confluence of **Phochhu** and **Mochhu** rivers originating from the Himalayas.
  - The river eventually flows into the **Brahmaputra** in India.
- **Capacity**: Part of Bhutan's efforts to leverage its hydropower potential for economic growth.
- **India's Role**:
  - Partner in **funding**, **technical expertise**, and **infrastructure development**.
  - Facilitating Bhutan's energy export to India under the bilateral energy cooperation framework.
- **Significance**:
  - Enhances Bhutan's **hydropower capacity**, contributing to its economy.
  - Reinforces India's position as Bhutan's primary partner in energy and infrastructure.

India-Bhutan Relations: A Strategic Overview

Historical Ties

- **Treaty of Friendship (1949)**: Basis of India-Bhutan relations, emphasizing mutual respect and sovereignty.
- Revised in **2007** to reflect Bhutan's growing sovereignty and international engagements.

Key Areas of Cooperation

1. **Energy**:
   - Bhutan exports **2,000 MW of electricity** annually to India.
   - Projects like **Tala**, **Chukha**, and **Mangdechhu** exemplify successful collaboration.
2. **Economic Assistance**:
   - India remains Bhutan's largest trade partner and donor.
   - Bhutan benefits from **duty-free access** to the Indian market.
3. **Connectivity**:
   - Joint initiatives like road, rail, and air connectivity under **Act East Policy**.
4. **Cultural Exchange**:
   - Shared Buddhist heritage fosters strong people-to-people ties.

Challenges in India-Bhutan Relations

1. **Hydropower Dependency**:
   - Over-reliance on hydropower exports may limit Bhutan's economic diversification.
   - Delays in projects like Punatsangchhu-II strain resources and timelines.
2. **Border Issues**:
   - Bhutan faces challenges managing its borders with **China** while maintaining neutrality.
3. **Youth Aspirations**:
   - Rising Bhutanese youth demand diversified career opportunities, requiring India's support in creating new avenues.

Way Ahead

1. **Energy Diversification**:
   - Expand cooperation to include **renewable energy** sectors like **solar** and **wind energy**.
2. **Trade and Connectivity**:
   - Strengthen cross-border trade and logistical frameworks.
   - Integrate Bhutan with India's **Northeast Corridor** under the **Act East Policy**.
3. **Skill Development**:
   - India could assist Bhutan in **technical training** and **capacity building** to meet future challenges.
4. **Regional Stability**:
   - Collaborate to address **border disputes** with China, ensuring Bhutan's sovereignty and regional peace.

Nepal-China Belt and Road Initiative (BRI) Cooperation Framework

Syllabus: International Relations – India and its Neighborhood

Context

Nepal and China signed the **Belt and Road Initiative (BRI) Cooperation Framework**, laying the foundation for implementing **BRI projects** in Nepal. The agreement includes the development of the **Trans-Himalayan Connectivity Network (THMDCN)** to enhance connectivity in **roads, railways, aviation, and power grids**.

About Belt and Road Initiative (BRI)

- **Genesis**: Launched as **"One Belt, One Road" (OBOR)** in **2013** by China.
- **Aim**:
  - Strengthen regional integration.
  - Enhance trade and infrastructure development.
  - Promote economic growth.
- **Components**:
  - **Silk Road Economic Belt**: Overland network connecting China to Europe via Central Asia.
  - **Maritime Silk Road**: Sea routes linking China with Southeast Asia, Africa, and Europe.
- **Member Nations**:
  - Includes countries like **Pakistan**, **Sri Lanka**, and now actively involving **Nepal**.

Key Provisions of the Nepal-China BRI Framework

1. **Trans-Himalayan Connectivity Network (THMDCN)**:
   - Aimed at developing high-quality infrastructure for roads, railways, and power grids.
   - Enhances connectivity between Nepal and China.
2. **Strategic Projects**:
   - Focus on **Pokhara International Airport** and **hydropower projects**.
   - Includes **road network expansion** to reduce reliance on Indian trade routes.
3. **Economic Goals**:
   - Stimulate Nepal's economy by diversifying trade routes.
   - Reduce the logistical dependence on India.

Potential Impacts on India

1. Security Concerns

- Nepal's **1700 km-long land border** with India makes border areas vulnerable to China's influence.
- Chinese-funded infrastructure, like **Pokhara International Airport**, increases China's ability to project power near India.

2. Regional Geopolitics

- Nepal's growing ties with China could reduce India's **political and strategic influence** in the region.
- Could align Nepal closer to China, altering the **buffer zone dynamics** between India and China.

3. Trade Relations

- India is currently Nepal's **largest trade partner**, with significant investments in **cross-border energy trade**.
- BRI may weaken this relationship as Nepal diversifies trade routes with China's support.

4. Debt Trap Diplomacy

- Risk of Nepal falling into **debt dependency**, as seen in Sri Lanka's Hambantota Port case.
- Chinese financing under BRI often leads to long-term political and economic leverage for China.

Strategic Concerns for India

- **String of Pearls Strategy**:
  - China's BRI aligns with its **encirclement strategy**, using Chinese-friendly nations (e.g., Pakistan, Sri Lanka) to challenge India's strategic space.
- **Infrastructure Competition**:
  - India's **Kalapani-Lipulekh Road** and other border projects may face increased competition from China's superior financial and technical resources.

Way Forward for India

1. **Strengthening Bilateral Ties with Nepal**:
   - Enhance **people-to-people connections** through cultural and religious diplomacy.
   - Expedite completion of joint projects like **hydropower initiatives** (e.g., Arun-III).
2. **Strategic Investments**:
   - Develop **alternative infrastructure projects** under **India-Nepal cooperation frameworks**.
   - Increase funding for projects in **cross-border energy trade** and **connectivity**.
3. **Counteracting Debt Diplomacy**:
   - Promote **transparent financial aid** to Nepal, focusing on **grant-based** rather than **loan-based assistance**.
4. **Leveraging Multilateral Forums**:
   - Utilize regional platforms like **SAARC** and **BIMSTEC** to enhance cooperation and limit Chinese influence.
5. **Border Security Enhancements**:
   - Strengthen **border infrastructure** and surveillance to manage potential risks from Chinese-funded projects near India's borders.

ECONOMY

Global Plastics Treaty: Challenges and Progress from the Busan Summit

Syllabus: Environment – International Efforts for Pollution Control

Context

The **5th Intergovernmental Negotiating Committee (INC-5)** meeting, aimed at formulating a **Global Plastics Treaty**, was held in **Busan, South Korea**. Despite extensive discussions, no consensus was reached on a legally binding framework to combat **plastic pollution**, delaying the treaty's finalization.

Busan INC-5 Overview

- **Objective**: To establish a legally binding treaty under **UNEP** to address **plastic pollution** across its lifecycle.
- **Participants**: Representatives from **170 nations** convened to negotiate key strategies.
- **Timeline**: Initiated in 2022, INC-5 (November 2024) was anticipated as the concluding session. However, disagreements necessitate a potential **INC-5.2 session in 2025**.
- **Outcome**: Lack of agreement on production caps, waste management, and funding mechanisms.

Why a Global Plastic Treaty is Urgent

1. **Escalating Plastic Production**:
   - Production surged from **234 million tonnes in 2000** to **460 million tonnes in 2019**.
   - Projected to **triple by 2050** without intervention.
2. **Low Recycling Rates**: Only **9% of global plastic waste** is recycled, leading to waste accumulation.
3. **Marine Pollution**: Over **8 million tonnes** of plastic enter oceans annually, threatening ecosystems.
4. **Health and Environmental Risks**: Microplastics contaminate air, water, and even human bodies.
5. **Greenhouse Gas Emissions**: Plastics contribute **3.4% of global emissions**, exacerbating climate change.

Key Proposals in the Draft Treaty

1. **Global Targets for Plastic Reduction**:
   - Cap virgin plastic production.
   - Reduce harmful plastic products and chemicals.
2. **Lifecycle Approach**: Address pollution from production to disposal, emphasizing **Extended Producer Responsibility (EPR)**.
3. **Phase-out of Harmful Plastics**: Gradual elimination of single-use plastics and microplastics.
4. **Financial Mechanisms**: Propose a multilateral fund to support technology transfer and compensate developing countries.
5. **Chemical Regulation**: Manage over **3,000 toxic chemicals** used in plastics, prioritizing vulnerable groups like women and children.
6. **Monitoring and Accountability**: Introduce frameworks for tracking pollution and ensuring compliance through transparent reporting.
7. **Flexibility for Nations**: Allow tailored implementation strategies based on developmental and economic contexts.
8. **Stakeholder Inclusion**: Involve private sectors, civil society, and indigenous communities in implementation.

Challenges Leading to INC-5 Stalemate

1. **Divided Views on Plastic Production**:
   - Nations like **Saudi Arabia** opposed capping virgin plastic production, citing oil dependency.
   - Over **100 nations**, including Pacific Island countries, advocated strict production limits to tackle marine pollution.
2. **Scope of the Treaty**:
   - Disagreement on whether to focus on **reducing production** or **improving waste management**.
   - **Panama-supported proposals** emphasized production cuts, while alternative views excluded these measures.
3. **Procedural Delays**: Consensus-based decision-making allowed stalling by nations unwilling to commit to binding measures.
4. **Undefined Terminologies**: Ambiguities in terms like “plastic” and “control measures” complicated negotiations.
5. **Developing Nations’ Concerns**: Countries like **India** emphasized the need for **financial assistance** and **technology transfer** to manage plastic waste sustainably.

India’s Role and Position at INC-5

1. **Stance**: Opposed production caps, highlighting development priorities and national circumstances.
2. **Proposals**: Advocated for **technology transfer**, **financial aid**, and a **multilateral fund** for equitable transitions.
3. **Domestic Efforts**: India has banned several **single-use plastics** but continues to face challenges in managing rising plastic waste.

Way Forward

1. **Clarify Definitions**: Establish clear, universally accepted terms to streamline negotiations.
2. **Shift Decision-Making Approach**: Transition from **consensus-based** to **majority voting** to expedite progress.
3. **Financial Models for Equity**: Develop mechanisms ensuring financial support for **developing countries** to adopt sustainable practices.
4. **Strengthen Regional Collaboration**: Promote **regional agreements** as interim measures to combat plastic pollution.
5. **Foster Global Cooperation**: Encourage international collaboration to promote alternatives to plastics and reduce production rates.

AI-Powered LISA System: Revolutionizing Linen Hygiene in Indian Railways

Syllabus**: Infrastructure – Technological Advancements in Indian Railways**

Context

Indian Railways has introduced the **Linen Inspection and Sorting Assistant (LISA)**, an **AI-powered system**, to improve the quality and hygiene of linens provided to passengers in **air-conditioned coaches**. This innovative step aims to enhance passenger comfort while streamlining operations.

About the LISA System

1. **Definition**: **LISA** is an **AI-based automation system** designed for inspecting and sorting linens like **bed sheets, towels, and blankets** used in **Indian Railways' air-conditioned coaches**.
2. **Origin**: Developed by the **Pune Division of Indian Railways** and deployed at the **Ghorpadi Integrated Coaching Complex (GICC)** in Pune.
3. **Under Ministry**: Operates under the **Ministry of Railways**.
4. **Objective**: To ensure **100% quality inspection**, enhance **hygiene**, streamline operations, and reduce manual labor.

Key Features of the LISA System

1. **100% Quality Inspection**: Detects **stains, defects, or damages** in linens and segregates substandard items.
2. **AI-Based Technology**: Utilizes advanced algorithms for **precise and reliable inspection results**, ensuring high standards of hygiene.
3. **Efficiency**: Capable of processing **large volumes of linens**, significantly improving operational productivity.
4. **Enhanced Passenger Experience**: Ensures **cleaner, more hygienic linens**, contributing to a more **comfortable travel experience** for passengers.
5. **Automation**: Reduces dependency on **manual inspection and sorting**, transforming traditional linen management processes.

Significance of LISA in Indian Railways

1. **Elevated Hygiene Standards**: Addresses long-standing complaints about **poor-quality linens** in air-conditioned coaches.
2. **Operational Efficiency**: Enables faster processing of linens, reducing turnaround time for replenishing linen stocks.
3. **Reduced Human Intervention**: Automation minimizes errors and enhances the **consistency of quality inspections**.
4. **Passenger Satisfaction**: Cleaner linens elevate the overall **travel experience**, reflecting positively on Indian Railways' service quality.
5. **Scalability**: Can be replicated across other zones and facilities in the railway network.

Challenges and Considerations

1. **Implementation Cost**: High initial investment in **AI infrastructure** and training personnel.
2. **Technological Dependence**: Requires regular maintenance and updates to stay effective.
3. **Operational Training**: Need for skilled personnel to operate and manage the system effectively.

Way Forward

1. **Nationwide Deployment**: Expand LISA systems to other railway zones for uniform quality inspection.
2. **Regular Upgrades**: Enhance AI algorithms to adapt to evolving needs and increase accuracy.
3. **Integration with Other Facilities**: Link LISA with **real-time inventory management** for better coordination and efficiency.
4. **Public Awareness**: Inform passengers about initiatives like LISA to enhance their confidence in railway services.

Green Steel: Pioneering Decarbonization in the Steel Industry

Syllabus: Environment – Industrial Emissions and Sustainable Practices

Context

The **steel industry**, responsible for **8% of global CO_2 emissions**, is under pressure to decarbonize. Innovative approaches, like producing **green steel**, are gaining traction, focusing on **renewable energy** and **sustainable technologies**to minimize emissions.

What is Green Steel?

- **Definition** Green steel is steel produced using **renewable energy** and **sustainable processes** to significantly reduce or eliminate **carbon emissions** during production.
- **Key Objective** Shift from traditional **fossil fuel-based methods** to **low-carbon alternatives**, aligning with global climate goals.

Methods of Producing Green Steel

1. **Electric Arc Furnaces (EAF)**:
   - Utilizes **renewable electricity** to melt scrap metal.
   - Reduces CO_2 emissions compared to conventional coal-fired blast furnaces.
2. **Green Hydrogen-Based Reduction**:
   - Replaces coal with **green hydrogen** (produced from renewable energy) to reduce iron ore.
   - Produces **water vapor instead of CO_2** during processing.
3. **Direct Electrolysis**:
   - Similar to **aluminum production**, uses **renewable electricity** to extract iron from ore.
   - Example: Innovations by **Boston Metal**.
4. **Dismantled Ship Scrap**:
   - Incorporates **ferrous scrap** from end-of-life products, such as ships, into the raw material chain.
   - Promotes **circular economy** while reducing carbon emissions.

Significance of Green Steel

1. **Environmental Benefits**: Reduces reliance on fossil fuels, cutting **up to 75% CO_2 emissions** with some methods.
2. **Circular Economy**: Encourages **recycling of ferrous scrap** from end-of-life vehicles, ships, and construction materials.
3. **Economic Potential**:
   - Drives demand for **renewable energy** and **green hydrogen**.
   - Boosts innovation, creating **jobs in decarbonization technologies**.
4. **Global Climate Goals**:
   - Aligns with initiatives like **SteelZero**, which aims for **zero-emission steel by 2050**.
   - Contributes to **net-zero carbon commitments** of major economies.

Role of the Hong Kong Convention in Green Steel

1. **What It Is**:
   - The **Hong Kong International Convention for Safe and Environmentally Sound Recycling of Ships**(adopted June 2009).
   - Aims to regulate **ship dismantling practices** globally.
2. **Key Objectives**:
   - Ensure **safe and environmentally sound recycling** of ships.
   - Protect the health of workers involved in ship recycling.
3. **Timeline**:
   - Takes effect globally in **June 2025** after ratification.
4. **India's Status**:
   - India has **ratified the convention**; 50% of **Alang yards** (in Gujarat) are compliant with the standards.
5. **Limitations**:
   - Allows the "beaching" method, which is less environmentally friendly.
   - Focuses on safety standards but doesn't **eliminate harmful practices** entirely.

Challenges in Scaling Green Steel Production

1. **High Production Costs**: Transitioning to green steel requires significant investments in **renewable energy** and **hydrogen infrastructure**.
2. **Technology Readiness**: New technologies like **direct electrolysis** are still in **early adoption stages**.
3. **Limited Scrap Availability**: Dependency on **ferrous scrap** can strain supply chains in regions with low recycling rates.
4. **Infrastructure Gaps**: Lack of green hydrogen production facilities and **renewable electricity grids** in many regions.
5. **Global Market Competition**: Conventional steel remains cheaper, making green steel less competitive in price-sensitive markets.

Way Forward

1. **Investment in Technology**: Scale up production of **green hydrogen** and **renewable energy-based infrastructure**.
2. **Policy Support**: Introduce subsidies, tax incentives, and carbon pricing to make **green steel cost-competitive**.
3. **Global Collaboration**: Partner with global initiatives like **SteelZero** to accelerate adoption.
4. **Circular Economy Practices**: Encourage **ferrous scrap recycling** from dismantled ships and vehicles to ensure sustainable inputs.
5. **Awareness and Advocacy**: Promote green steel among **consumers and industries**, emphasizing its environmental benefits.

Design Linked Incentive (DLI) Scheme: Boosting India's Semiconductor Design Ecosystem

Syllabus: Economy – Industrial Policy and Digital Infrastructure

Context

India's **first indigenously designed 3GPP-compliant modem system-on-chip (SoC)**, developed by **WiSig Networks**under the **Design Linked Incentive (DLI) Scheme**, highlights the potential and challenges in promoting domestic **semiconductor design**. Despite significant government funding, production bottlenecks remain a concern.

About the Design Linked Incentive (DLI) Scheme

1. **Objective**:
   - To support the growth of **domestic companies, startups, and MSMEs** in **semiconductor design**.
   - Aims to promote **import substitution**, **value addition**, and **self-reliance** in the **electronics sector**.
2. **Scope**:
   - Provides financial incentives and infrastructure for:
     - **Integrated Circuits (ICs)**
     - **Chipsets**
     - **System on Chips (SoCs)**
     - **IP cores**
     - Other semiconductor-linked designs.
3. **Duration**: Initially planned for **three years** from **January 1, 2022**, with provisions for extension.
4. **Nodal Agency**: **Centre for Development of Advanced Computing (C-DAC)** serves as the implementing body.

Components of the DLI Scheme

1. **Chip Design Infrastructure Support**:
   - **C-DAC** will establish the **India Chip Centre** to provide:
     - Advanced design tools.
     - **IP cores**.
     - Multi-Project Wafer (MPW) fabrication.
     - **Post-silicon validation** facilities.
2. **Product Design Incentive**:
   - **Reimbursement** of up to **50% of eligible costs**, capped at **₹15 crore** per application.
3. **Deployment Linked Incentive**:
   - **4%-6% incentive** on **net sales turnover** over five years.
   - Capped at **₹30 crore** per application.

Significance of the DLI Scheme

1. **Promotes Self-Reliance**: Reduces dependence on **imported semiconductor designs** and enhances domestic capabilities.
2. **Supports Startups and MSMEs**: Encourages innovation and entrepreneurship in the **semiconductor design sector**.
3. **Boosts Strategic Sectors**: Strengthens critical areas like **telecommunications**, **defense**, **automotive**, and **consumer electronics**.
4. **Employment Generation**: Expected to create high-skilled jobs in **design engineering**, **validation**, and **manufacturing support**.
5. **Catalyzes R&D Ecosystem**: Provides access to **advanced infrastructure**, fostering innovation and long-term capability building.

Challenges in Implementation

1. **Production Bottlenecks**: Limited availability of **fabrication facilities** for domestic production, delaying commercialization of designs.
2. **Global Competition**: Competing with established global players in **semiconductor design and manufacturing**.
3. **Funding Gaps**: Despite government support, private sector investment remains limited.
4. **Talent Shortage**: Shortfall of skilled personnel in **semiconductor design and R&D**.
5. **Technological Dependencies**: Reliance on **foreign technology** and **fabrication units** for post-design processes.

Way Forward

1. **Enhance Fabrication Capacity**: Invest in establishing **domestic foundries** to support **end-to-end production** of semiconductor designs.
2. **Public-Private Partnerships (PPPs)**: Encourage collaboration between **government, academia, and private companies** to drive innovation and investment.
3. **Upskilling Programs**: Launch targeted initiatives to **train engineers** in advanced **chip design** and **semiconductor technologies**.
4. **Policy Support**: Provide **tax incentives** and subsidies to attract **foreign and domestic investors** in the semiconductor sector.
5. **Global Partnerships**: Collaborate with **leading semiconductor nations** for technology transfer and capacity building.

Revision of GDP Base Year to 2022-23: A Step Toward Economic Accuracy

Syllabus: Economy – GDP Estimation and National Accounts

Context

The Government of India has decided to revise the **GDP base year** from **2011-12 to 2022-23**, reflecting evolving **economic dynamics** and improving the precision of GDP estimation. A **26-member Advisory Committee on National Accounts Statistics (NAS)**, chaired by **Biswanath Goldar**, has been constituted to identify new data sources and refine methodologies for compiling GDP estimates.

What is a Base Year?

- **Definition**: A **base year** serves as a **benchmark** for GDP calculation, allowing comparisons of economic growth by **eliminating the effects of inflation**.
- **Significance**: Provides a consistent frame of reference for assessing **real economic growth** over time.

Why Revise the GDP Base Year?

1. **Incorporating New Data Sources**:
   - Enhanced availability of **high-frequency and high-quality data** due to **digitization** and sectoral advancements since 2011-12.
   - Incorporation of such data improves **precision** in GDP calculations.
2. **Accommodating Structural Changes**:
   - Reflects shifts in:
     - **Consumption patterns**.
     - **Sectoral contributions** (e.g., rise of e-commerce and gig economy).
     - Inclusion of **emerging sectors** such as **renewable energy** and **digital services**.
3. **Updating for Economic Realities**:
   - The **2011-12 base year**, adopted in 2015, is outdated for capturing the complexities of the current economy.
   - Accounts for **post-pandemic dynamics**, like changes in labor markets, supply chains, and consumption behavior.
4. **Global Comparability**:
   - Aligns with **international standards**, enabling better global economic comparisons and **investor confidence**.

Key Features of the Base Year Revision

1. **Advisory Committee Role**:
   - The **NAS Committee**, comprising 26 members, will:
     - Identify **new data sources**.
     - Refine the **methodology** for national account compilation.
2. **Central Statistics Office (CSO)**: CSO will incorporate recommendations from NAS to prepare revised GDP estimates.
3. **GDP Estimation Approaches**:
   - GDP will continue to be estimated using multiple approaches, including:
     - **Production Approach**.
     - **Expenditure Approach**.
     - **Income Approach**.

Implications of Base Year Revision

1. **Revised Growth Estimates**: GDP growth rates for previous years may be revised, reflecting updated data and methodology.
2. **Policy Formulation**: Offers a more **accurate representation** of economic activity, aiding effective **policy-making**.
3. **Investor Confidence**: Enhances **transparency and reliability**, attracting **domestic and global investments**.
4. **International Benchmarking**: Improves India's standing in **global economic assessments** by adhering to international data standards.
5. **Sectoral Insights**: Provides clarity on the **contributions of emerging sectors** like **startups** and **digital platforms**.

Challenges in Base Year Revision

1. **Data Integration**: Integrating data from **new sectors** and ensuring accuracy may require significant resources and coordination.
2. **Transition Complexity**: Revising methodologies and adapting systems to accommodate the new base year may face delays.
3. **Recalibration of Policies**: Revised GDP estimates may require changes to existing **economic forecasts** and **policy targets**.

Way Forward

1. **Robust Data Collection**: Strengthen institutional frameworks for collecting **granular and high-quality data** across all sectors.
2. **Capacity Building**: Train statisticians and analysts to manage new methodologies and data sources effectively.
3. **Public Awareness**: Communicate the benefits of the revision to stakeholders, including policymakers, businesses, and investors.
4. **Technology Integration**: Leverage **big data**, **AI**, and **machine learning** for improved accuracy and timeliness in GDP estimation.

Coastal Shipping Bill, 2024: Unlocking India's Maritime Potential

Syllabus: Economy – Infrastructure Development and Governance

Context

The **Coastal Shipping Bill, 2024**, has been introduced in the **Lok Sabha** to **streamline regulations**, **promote trade and connectivity**, and **encourage domestic participation** in India's **coastal shipping sector**, leveraging the country's vast **7,500 km coastline**.

Key Highlights of the Coastal Shipping Bill, 2024

1. **Prohibition of Unauthorized Coasting Trade**: Prohibits coastal trade by **non-Indian vessels** without a valid license.
2. **Engagement of Inland Vessels**: Allows **inland vessels** to participate in **coastal trade**, expanding operational flexibility.
3. **National Coastal and Inland Shipping Strategic Plan**: Proposes a **strategic plan** for the **development, growth, and promotion** of coastal shipping.
4. **National Database of Coastal Shipping**: Establishes a **centralized database** to enhance **transparency** and facilitate **information sharing**.
5. **Licensing of Chartered Vessels**:
    - Empowers the **Director-General of Shipping** to issue licenses based on:
        - Citizenship of the crew.
        - Vessel building requirements.
    - Ensures licenses are not suspended or revoked without due process.
6. **Compounding of Offenses and Penalties**: Provides mechanisms for **compounding certain offenses** and imposes penalties to ensure compliance.
7. **Director-General's Authority**: Authorizes the **Director-General** to call for specific information to maintain regulatory oversight.

About Coastal Shipping in India

1. **Definition**: Refers to the **movement of goods and passengers** along the **coastline**, within **12 nautical miles** from the baseline of territorial waters.
2. **Regulatory Authorities**:
    - **Directorate General of Shipping**: Governs policies and regulations.
    - **Coastal Regulation Zone (CRZ)** norms: Govern activities in coastal areas.
3. **Cabotage Policy**: Restricts **foreign-flagged vessels** from operating within India's territorial waters, prioritizing **domestic vessels**.
4. **Tariffs and Charges**: Regulated by the **Tariff Authority for Major Ports (TAMP)** for ports engaged in coastal shipping.

Significance of the Coastal Shipping Bill, 2024

1. **Streamlined Regulations**: Consolidates existing laws, bringing **uniformity** in the governance of coastal shipping.
2. **Promotion of Domestic Trade**: Encourages **domestic participation**, supporting the **Make in India** initiative.
3. **Enhanced Connectivity**: Facilitates better **coastal and inland connectivity**, boosting economic growth.
4. **Maritime Potential**: Capitalizes on India's proximity to **global shipping routes**, strengthening its **maritime economy**.
5. **Transparency and Accountability**: National database and licensing reforms ensure **transparent operations** and improved governance.

Challenges in Coastal Shipping

1. **Regulatory Hurdles**: Complex licensing and compliance procedures may delay operations.
2. **Infrastructure Deficit**: Insufficient **port facilities**, **cold storage**, and **last-mile connectivity** hinder growth.
3. **High Operating Costs**: Dependence on **imported fuel** and inefficiencies increase operating expenses.
4. **Cabotage Restrictions**: While protecting domestic players, limits competition and may impact efficiency.

Way Forward

1. **Infrastructure Development**: Expand **modern port facilities**, including **cold chains** and **logistics hubs**.
2. **Policy Reforms**: Reassess **cabotage policies** to allow selective participation by foreign vessels, enhancing competitiveness.
3. **Digital Transformation**: Leverage **AI** and **blockchain technologies** for seamless operations and database management.
4. **Skill Development**: Train maritime professionals to meet the demands of the evolving shipping sector.
5. **Sustainability Measures**: Promote **eco-friendly fuels** and technologies to reduce carbon footprints in coastal shipping.

Oilfields (Regulation and Development) Amendment Bill, 2024: Enhancing India's Energy Sector

Syllabus: Economy – Energy Resources and Policies

Context

The **Oilfields (Regulation and Development) Amendment Bill, 2024** was recently passed in the **Rajya Sabha**, seeking to modernize and streamline the regulation of **petroleum and natural gas exploration and extraction** in India.

Key Features of the Amendment Bill

1. **Delinking Petroleum and Mining Operations**: Petroleum operations are now treated as **independent** of mining activities, simplifying regulatory frameworks.
2. **Expanded Definition of Mineral Oils**:
   - Previously limited to **petroleum and natural gas**, the definition now includes: **Hydrocarbons**, **coal bed methane**, and **shale gas/oil**.
   - **Exclusions**: Coal, lignite, and helium are excluded from the definition.
3. **Introduction of Petroleum Lease**:
   - A new category of lease covering: **Prospecting**, **exploration**, **development**, **production**, and **disposal** of mineral oils.
4. **Central Government's Rule-Making Powers**:
   - Expanded powers to regulate: **Lease mergers**, **facility sharing**, **environmental protections**, and **dispute resolution mechanisms**.
   - Focuses on conservation and **royalty mechanisms**.
5. **Decriminalization of Provisions**: Criminal liabilities under the original Act are replaced with **penalties**, ensuring ease of compliance.
6. **Adjudication of Penalties**: Appeals against adjudicating authority decisions will be directed to the **Appellate Tribunal** under the **Petroleum and Natural Gas Board Regulatory Act, 2006**.

Significance of the Amendment

1. **Enhanced Energy Security**: Reduces dependence on energy imports by encouraging domestic exploration and production.
2. **Attracting Investments**: Simplified rules and expanded definitions create opportunities for global and domestic investors.
3. **Modernized Regulation**: Facilitates technological and operational advancements by addressing emerging challenges in the energy sector.
4. **Environmental Protection**: Strengthened provisions ensure environmentally sustainable exploration and production activities.
5. **Robust Enforcement Mechanism**: Introduces clearer roles for regulatory bodies and mechanisms for **dispute resolution** and **compliance monitoring**.

About the Petroleum and Natural Gas Regulatory Board (PNGRB)

1. **Genesis**: Established under the **Petroleum and Natural Gas Regulatory Board Act, 2006**.
2. **Functions**:
   - Regulates refining, transportation, distribution, storage, marketing, and supply of petroleum and natural gas.
   - Ensures **competitive markets** for gas in India.
3. **Appeals**: Decisions by the PNGRB can be appealed before the **Appellate Tribunals for Electricity**.

Potential Challenges

1. **Implementation Gaps**: Efficient enforcement of rules and monitoring frameworks will be critical.
2. **Environmental Concerns**: Balancing **exploration activities** with ecological sustainability requires vigilance.
3. **Investment Risks**: Attracting consistent investment amidst **global energy transitions** could be challenging.
4. **Dispute Management**: Smooth functioning of the adjudication and appellate mechanisms needs to be ensured.

Way Forward

1. **Capacity Building**: Strengthen institutional capacities of regulatory authorities like PNGRB.
2. **Environmental Safeguards**: Introduce stricter environmental monitoring for shale gas and coal bed methane exploration.
3. **Policy Clarity**: Ensure clear guidelines for lease agreements and penalty adjudications.
4. **Investment Promotion**: Incentivize private and public partnerships to boost energy production.

NITI Aayog's Trade Watch Quarterly: Insights into India's Trade Performance

Syllabus: Economy – External Sector and International Trade

Context

The **NITI Aayog's Trade Watch Quarterly (TWQ)** for **Q1 FY25** highlights **India's trade performance**, emerging opportunities from global trade realignments, and challenges such as **trade fragmentation** and the **EU's carbon tariffs**.

Key Trends and Insights from TWQ

Trade Performance Highlights

1. **Regional Performance**:
   - **North America (21%)** and the **European Union (18.6%)** remain pivotal export markets.
   - Trade with **Free Trade Agreement (FTA) partners** recorded **12% growth in exports** and **10.3% growth in imports**.
2. **Sectoral Performance**:
   - **Growth Sectors**: IT services, pharmaceuticals, electrical machinery, and mineral fuels.
   - **Declining Sectors**: Labour-intensive goods like textiles, pearls, and leather.

Strategic Policy Interventions

1. **Infrastructure Development**:
   - Expansion of the **Trade Connect e-Platform** for streamlined exporter support.
   - Enhanced logistics under the **National Logistics Policy**.
2. **Export Incentives**: Continued support through schemes like **RoDTEP (Remission of Duties and Taxes on Exported Products)**.
3. **Technological Integration**: Emphasis on **digital trade platforms** and fostering **innovation** to unlock potential in high-growth sectors.
4. **Production Linked Incentive (PLI) Schemes**: Scaling up manufacturing in **electronics**, **textiles**, and **automobiles** to boost export competitiveness.
5. **Strengthening FTAs**: Ongoing negotiations with the **UK** and **EU** aim to reduce trade barriers and enhance market access.

Emerging Risks

1. **Geopolitical Shifts**: Opportunities arise from **U.S.-China trade tensions**, but risks of **overdependence on single markets** loom.
2. **EU Carbon Border Adjustment Mechanism (CBAM)**: **Tariffs of 20–35%** on Indian exports of carbon-intensive goods like steel and aluminium will take effect in **2026**.
3. **Manufacturing Challenges**: High input costs and **fragmented production systems** hinder competitiveness.
4. **Labour-Intensive Sector Decline**: Structural inefficiencies in textiles, pearls, and leather sectors reduce global market share.

Future Suggested Roadmap

1. **Boost Digital Integration**: Leverage **digital platforms** for trade facilitation and innovation to strengthen India's trade ecosystem.
2. **Diversify Export Portfolio**: Focus on high-growth sectors such as **IT**, **pharmaceuticals**, and **renewable energy** to reduce dependency on traditional exports.
3. **Build Resilience Against CBAM**: Invest in **green technologies** and align Indian industries with **global sustainability standards** to mitigate the impact of carbon tariffs.
4. **Expand Trade Agreements**: Pursue FTAs with **emerging economies** to access diversified markets and reduce reliance on established partners.
5. **Empower MSMEs**: Simplify regulations, provide targeted credit support, and incentivize small exporters to enhance their contribution to India's trade.

Windfall Gains Tax: Balancing Revenues and Market Stability

Syllabus: Economy – Taxation Policies and Energy Economics

Context

The Government of India recently withdrew the **windfall gains tax** on domestic crude oil production and exports of **diesel**, **petrol**, and **aviation turbine fuel (ATF)**. This decision marks the end of a fiscal tool introduced in **July 2022** to manage super-normal profits amid rising global oil prices.

What is a Windfall Gains Tax?

1. **Definition**: A tax levied on **extraordinary or unexpected profits** earned by companies, especially during **economic or market shocks**, such as a spike in global crude prices.
2. **Introduced in**: **July 2022**, during the post-Ukraine invasion period, when global crude oil prices soared.
3. **Objective**:
   - To **capture excess profits** made by oil producers and fuel exporters.

   - To address **domestic fuel shortages** and stabilize the energy market.
4. **Products Covered**: **Domestic crude oil**, **diesel**, **petrol**, and **aviation turbine fuel (ATF)**.
5. **Tax Framework**:
   - Levied as **Special Additional Excise Duty (SAED)** and **Additional Excise Duty (AED)**.
   - Not covered under the **GST framework**.
6. **Scope**: Applied to both domestic producers and private oil refiners, including multinational corporations operating in India.

Why Was the Windfall Gains Tax Imposed?

1. **Global Energy Crisis**: Crude oil prices surged post the **Russia-Ukraine conflict**, resulting in **super-normal profits** for oil companies.
2. **Domestic Fuel Supply Concerns**: Fuel exporters prioritized **exports to profit from high global prices**, leading to **domestic shortages**.
3. **Revenue Augmentation**: The tax served as a means for the government to **capture surplus profits** and compensate for revenue loss due to **domestic fuel duty cuts**.

Impacts of Windfall Gains Tax on the Indian Economy

Positive Impacts

1. **Revenue Generation**: Generated **₹25,000 crore** in FY23, helping offset fiscal pressures.
2. **Energy Security**: Ensured **steady domestic fuel supply** by discouraging export prioritization during the global energy crisis.
3. **Economic Stabilization**: Helped balance market volatility and provided funds for **welfare schemes** amid inflationary pressures.

Negative Impacts

1. **Discouraged Production**: Disincentivized private refiners from boosting production and **exporting surplus fuels**.
2. **Investor Sentiment**: Created a perception of an **unpredictable tax regime**, deterring potential investments in the energy sector.
3. **Competitive Disadvantage**: Increased costs for Indian refiners compared to **global competitors**.

Reasons for Withdrawal of Windfall Gains Tax

1. **Declining Global Oil Prices**: Crude oil prices have stabilized below the **windfall threshold**.
2. **Economic Recovery**: Reduction in tax burden to **stimulate domestic production** and encourage investments in the sector.
3. **Investor Confidence**: Address concerns of **policy uncertainty** to attract foreign direct investment (FDI).

Broader Implications

1. **Fiscal Policy Balancing**: Windfall taxes can serve as a **short-term fiscal tool** during economic shocks but must align with **long-term stability goals**.
2. **Energy Security**: Highlights the importance of policies that balance **domestic energy needs** with global market dynamics.
3. **Taxation Framework**: Need for a **predictable tax regime** to maintain investor confidence while achieving fiscal goals.

Way Forward

1. **Stable Tax Policies**: Develop a **transparent and predictable framework** for windfall taxation to ensure long-term market stability.
2. **Energy Diversification**: Invest in **renewable energy** and **domestic oil exploration** to reduce reliance on global markets.
3. **Support for Domestic Producers**: Incentivize refiners and producers to enhance domestic output.
4. **Monitoring Mechanism**: Establish thresholds to dynamically impose or withdraw windfall taxes based on **market conditions**.

World Bank's International Debt Report 2024: Rising Global Indebtedness

Syllabus: Economy – Global Financial Systems and External Debt Management

Context

The **World Bank's International Debt Report (IDR) 2024** highlights the rising external debt burden of **low- and middle-income countries (LMICs)** and its socio-economic implications. The report provides **external debt statistics and analysis** for nations reporting to the World Bank's **Debtor Reporting System (DRS)**.

Key Highlights of the IDR 2024

1. **Rising External Debt**
   - External debt of **LMICs** increased by **2.4% in 2023**, reaching **$8.8 trillion**.
   - Interest payments surged, particularly in countries like **India** and **Bangladesh**, which recorded over **90% increases in 2023**.

2. **Factors Driving Indebtedness**
    - **High Interest Rates**: Tight **monetary policies** in high-income countries elevated interest rates to a **20-year high**, making borrowing costlier.
    - **Currency Depreciation**: Weakening currencies in LMICs compounded repayment challenges.
    - **Global Economic Uncertainty**: Factors such as **armed conflicts** and **trade fragmentation** contributed to financial instability.
3. **Impact on LMICs**
    - **Budget Strains**: Rising debt servicing costs reduced fiscal space for **critical sectors**, including:
        - **Healthcare**.
        - **Education**.
        - **Environmental programs**.

Way Ahead: Proposed Solutions for Sustainable Debt Management

1. **Global Financial Reforms**
    - Comprehensive measures to avert a widespread **debt crisis** and create an **inclusive financial system** that prioritizes LMIC needs.
2. **Mitigating Predatory Lending**
    - Increase **concessional financing** to offer lower-cost loans.
    - Address **information asymmetry** between lenders and borrowers to prevent exploitative practices.
3. **Crisis Resilience**
    - Implement **climate-resilient debt clauses** allowing repayment pauses during **climate or economic crises**.
    - Introduce **standstill rules** for repayment deferments in emergencies.
4. **Improved Debt Restructuring Mechanisms**
    - Establish **automatic restructuring rules** to streamline debt renegotiation.
    - Create a **Global Debt Authority** to coordinate and guide **sovereign debt management**.

NITI Aayog's Trade Watch Report Highlights India's Trade Challenges

Syllabus: Economy – International Trade and Global Challenges

Context

NITI Aayog's **First Quarterly 'Trade Watch' Report (Q1 FY25)** identifies critical trade challenges for India, ranging from missed opportunities in the **China-Plus-One strategy** to the looming impact of the **Carbon Border Adjustment Mechanism (CBAM)**. The report emphasizes the need for evidence-based policymaking to overcome structural inefficiencies and secure India's leadership in global trade.

Key Challenges Identified

1. Limited Success in the 'China-Plus-One' Strategy

- **India's Position**: India has struggled to capitalize on the global **China+1** diversification strategy.
- **Other Beneficiaries**: Countries like **Vietnam**, **Thailand**, **Cambodia**, and **Malaysia** have gained more due to:
    - **Cheaper Labor Costs**: Competitive wage structures attract industries.
    - **Simplified Tax Laws**: Investor-friendly regulations enhance ease of doing business.
    - **Proactive FTAs**: Strategic trade agreements have strengthened their global integration.

2. Impact of the Carbon Border Adjustment Mechanism (CBAM)

- **What is CBAM?**
    - A **carbon tax mechanism** by the **European Union**, effective from **2026**, levies duties on carbon-intensive imports like **cement**, **steel**, and **fertilizers**.
- **India's Exposure**:
    - India's **iron and steel exports** to the EU, constituting **23.5% of its total EU exports**, face significant risks.
    - Adapting to CBAM will require **green technologies** and **reduced carbon footprints**, which demand significant investments.

3. Declining Trade Share in Labor-Intensive Sectors

- **Sectoral Issues**: Despite a strong labor force, India's global trade share in sectors like **textiles**, **gems and jewelry**, and **leather** is declining.
- **Causes**:
    - Rising **input costs**.
    - **Outdated technology** in manufacturing.
    - Limited **value addition** and **innovation**.

4. Impact of West Asia Instability

- **Oil Price Volatility**: A $10 per barrel increase in oil prices could worsen India's **Current Account Deficit (CAD)** by **0.5% of GDP**, leading to inflationary pressures.
- **Declining Agricultural Exports**: Exports to critical markets like **Iran** (e.g., basmati rice, tea) have decreased due to geopolitical uncertainties and sanctions.

What is the China-Plus-One Strategy?

- **Definition**: An approach where companies diversify investments outside of China to mitigate risks.
- **Key Drivers**:
  - **China's Zero-COVID Policy**: Disrupted global supply chains.
  - **US-China Tensions**: Escalating trade conflicts.
  - **Rising Labor Costs**: Increasing manufacturing expenses in China.
- **Beneficiaries**: Countries like Vietnam and Thailand have positioned themselves as attractive alternatives.

Way Forward: Policy Recommendations

1. Maximizing China+1 Benefits

- **Labor Reforms**: Implement competitive wage policies to attract investments.
- **Simplified Regulations**: Streamline tax laws and reduce red tape.
- **Proactive FTAs**: Accelerate negotiations with key trade partners for favorable terms.

2. Mitigating CBAM Risks

- **Green Technology Investments**: Promote renewable energy and sustainable production practices.
- **Government Support**: Subsidize transitions to carbon-neutral technologies.

3. Reviving Labor-Intensive Exports

- **Skill Development**: Enhance workforce capabilities through targeted training programs.
- **Modernization**: Invest in state-of-the-art machinery and technology.

4. Managing West Asia Dependencies

- **Energy Diversification**: Explore alternative energy sources like renewables and hydrogen.
- **Export Diversification**: Expand agricultural and industrial export markets beyond West Asia.

UPI Lite: Enhancing Convenience in Small-Value Transactions

Syllabus: Economy – Digital Payment Ecosystem, Financial Inclusion

Context

The **Reserve Bank of India (RBI)** has increased the wallet limit for **UPI Lite** to ₹5,000 and raised the transaction limit for **offline payments** from ₹500 to ₹1,000, further streamlining small-value digital payments.

About UPI Lite

Launched In: Introduced in **2022** by the **National Payments Corporation of India (NPCI)**.

Features

1. **On-Device Wallet**: Stores funds locally on the user's mobile device for **quick small-value transactions**.
2. **Transaction and Wallet Limits**:
   - **New Transaction Limit**: ₹1,000 per transaction.
   - **Increased Wallet Limit**: ₹5,000.
3. **No UPI PIN**: Transactions don't require a UPI PIN, ensuring faster payments.
4. **Offline Mode**: Supports **partially offline functionality**, allowing offline debit and online credit. Plans for fully offline payments are underway.

Difference Between UPI Lite and UPI

Aspect	UPI Lite	UPI
Transaction Limit	₹1,000 per transaction	₹2,00,000 per transaction (varies by bank)
Wallet Limit	₹5,000	No wallet; directly linked to the bank account
Internet Requirement	Partially offline (offline debit, online credit)	Requires active internet connection for all transactions
UPI PIN Requirement	Not required for transactions	Mandatory for every transaction
Purpose	Designed for small-value transactions	Suitable for all transaction values, including high-value payments

Significance of UPI Lite

1. **Convenience for Small Payments**: Reduces dependency on internet connectivity for small-value transactions, benefiting users in **low-network areas**.
2. **Enhanced User Experience**: Eliminates the need for UPI PIN, making payments quicker and easier.
3. **Reduced Load on Banking Systems**: On-device storage minimizes the need for real-time bank authentication, enhancing system efficiency during high traffic.
4. **Financial Inclusion**: Targets small merchants and underserved areas, expanding digital payments to grassroots levels.
5. **Boost to Offline Payments**: Increased offline payment limits improve accessibility in **rural and semi-urban areas**.

Challenges and Limitations

1. **Limited Use Case**: Restricted to small-value transactions (₹1,000 per transaction).
2. **Security Concerns**: On-device wallet storage raises questions about **fraud prevention** and misuse if the device is compromised.
3. **Adoption Barrier**: Users need to set up and fund the wallet separately, which might deter adoption.
4. **Interoperability Issues**: Offline functionality might face limitations across different service providers or merchant networks.

Way Forward

1. **Awareness Campaigns**: Promote UPI Lite among users and merchants, highlighting its **benefits and ease of use**.
2. **Strengthen Security**: Implement robust **encryption** and fraud detection mechanisms to address security concerns.
3. **Integration with Offline Ecosystems**: Expand fully offline capabilities to **broaden accessibility**.
4. **Expand Use Cases**: Allow **utility bill payments** and micro-financial transactions to encourage wider adoption.
5. **Seamless Interoperability**: Ensure compatibility across **platforms and devices** to improve user experience.

Female Labour Force Participation (LFPR): Insights from EAC to PM's Working Paper

Syllabus: Indian Economy – Employment and Labour Issues

Context

The **Economic Advisory Council to the Prime Minister (EAC-PM)** published a working paper analyzing **female Labour Force Participation Rate (LFPR)** trends in India using **Periodic Labour Force Survey (PLFS)** data from 2017-18 to 2022-23.

What is LFPR?

- **Definition**: LFPR is the **percentage of the population aged 15 years and above** that is either **employed** or **actively seeking work**.
- **Formula**:LFPR=(Employed + Unemployed individuals seeking work)Total Population (15+ years)×100LFPR=Total Population (15+ years)(Employed + Unemployed individuals seeking work)×100

Key Highlights of the Report

1. Current Status

- **National Trends**:
  - Significant increase in **female LFPR** across most states.
  - **Rural Female LFPR**: Increased from **24.6% to 41.5%** (69% growth).
  - **Urban Female LFPR**: Rose modestly from **20.4% to 25.4%** (25% growth).

2. Regional Variations

- **States with Significant Growth**: Jharkhand, Bihar, and other northern states witnessed notable improvements.
- **States with Decline**: Goa and Lakshadweep reported slight decreases in rural female LFPR.

3. Age-Related Trends

- **Bell-Curve Pattern**:
  - Female LFPR peaks during **30–40 years**, then declines sharply after.
  - Male LFPR remains consistently high (~100%) from **30–50 years**, declining gradually thereafter.

4. Social and Economic Influences

- **Marriage**: Marriage significantly lowers female LFPR, particularly in **urban areas**.
- **Parenthood**: Presence of children below **14 years** reduces participation, more pronounced among women aged **20–35** in **urban regions**.

Factors Influencing Female LFPR

1. Social Norms

- **Patriarchal Mindsets**: Restrict women's mobility and economic independence.
- **Household Responsibilities**: Women disproportionately bear the burden of unpaid care work.

2. Economic Opportunities

- Limited access to **formal sector jobs** and skill gaps reduce female employability.
- Rural women often engage in informal or agricultural work due to a lack of alternatives.

3. Urban-Rural Divide

- Rural areas show higher growth due to **increased agricultural participation** and **MGNREGA jobs**, while urban areas lag due to limited part-time or flexible work opportunities.

Government Initiatives to Improve Female LFPR

1. Economic Empowerment

- **Pradhan Mantri Mudra Yojana (PMMY)**: Promotes entrepreneurship through collateral-free loans.
- **Stand-Up India Scheme**: Encourages women to start businesses in manufacturing, trading, or services.

2. Women in STEM

- **WISE-KIRAN**: Supports women in science and engineering careers.
- **SERB-POWER**: Funds research and development projects led by women.

3. Skilling and Self-Employment

- **NAMO Drone Didi**: Provides drones to **15,000 women Self-Help Groups** for economic empowerment.
- **Women Industrial Training Institutes (ITIs)**: Focused on equipping women with technical skills.

Way Forward

1. Targeted Policies

- Introduce **flexible work arrangements** and **part-time jobs** to encourage urban female participation.
- Expand access to **childcare services** to reduce the burden of unpaid caregiving.

2. Education and Skilling: Promote vocational training and STEM education for women to align their skills with **market demands**.

3. Societal Transformation: Launch awareness campaigns to challenge **patriarchal norms** and promote gender equality in workplaces.

4. Data-Driven Policy Interventions: Use **PLFS data** to identify regional gaps and design **customized programs** to address specific challenges.

Conclusion

Rising female LFPR reflects a positive trend but requires sustained efforts to **address systemic barriers**. A multipronged approach emphasizing **education, skilling, and social support systems** can ensure equitable participation and drive India's economic growth.

Viksit Bharat 2047: Path to a Developed Nation

Syllabus: Indian Economy and Development Strategies

Context

India aspires to achieve the status of a **developed nation by 2047** under the **Viksit Bharat Vision**, coinciding with its centenary of independence. While significant progress has been made, challenges like slowing growth, global economic risks, and domestic inequalities remain barriers to realizing this ambition.

Targets for Viksit Bharat 2047

1. **Economic Growth**: Achieve a sustained **GDP growth rate of 7-8%** annually.
2. **Social Equity**: Eradicate poverty, ensure **universal healthcare**, and provide **quality education**.
3. **Global Competitiveness**: Position India among the **top three global economies**.
4. **Environmental Sustainability**: Attain **net-zero emissions by 2070** and accelerate renewable energy adoption.
5. **Industrial Modernization**: Boost manufacturing to **25% of GDP** under **Make in India**.

India's Economic Performance in 2024

Sector/Indicator	Key Highlights
GDP Growth	Slowed to **5.4%** (July-September 2024) against RBI's **7% projection**.
Services Sector	Largest contributor at **54.72% of GVA** (~₹146.44 lakh crore in 2023-24).
Industry Sector	Contributed **27.62% of GVA**; impacted by **record-high steel imports from China**.
Agriculture Sector	Accounted for **17.66% of GVA**, showing resilience with robust output.
Inflation	Retail inflation rose to **6.21% (October)**, breaching RBI's tolerance band.
Monetary Policy	RBI retained **interest rate at 6.5%**, reduced **CRR by 50 basis points**, injecting ₹1.16 trillion.

Government Initiatives Supporting Viksit Bharat

Economic Modernization

1. **Make in India & Aatmanirbhar Bharat**: Boost domestic manufacturing, reduce imports.
2. **Production Linked Incentive (PLI) Schemes**: Financial incentives for electronics, pharma, and textiles.
3. **PM Gati Shakti**: Accelerates infrastructure projects by integrating multi-modal transport systems.

Digital & Social Transformation

4. **Digital India**: Expands internet penetration, enhances fintech, and strengthens e-governance.
5. **National Education Policy (NEP 2020)**: Focuses on vocational training and industry-relevant education.

Green Transition

6. **Green India Mission**: Promotes renewable energy, energy efficiency, and sustainable urban development.
7. **National Hydrogen Mission**: Aims to make India a global hub for green hydrogen production.

Challenges Hindering Development

1. **Economic Inequalities**:
   - **Regional Disparities**: Uneven growth between urban and rural regions.
   - **Income Inequalities**: Wealth concentration limits inclusive development.
2. **Infrastructure Deficiencies**:
   - Delayed projects affect connectivity and growth.
   - Insufficient logistics efficiency hampers competitiveness.
3. **Policy Uncertainty**:
   - Retrospective taxation and weak enforcement deter foreign investors.
   - Complex land acquisition laws impede industrial growth.
4. **Global Risks**:
   - **Geopolitical Tensions**: Trade disruptions and commodity price fluctuations.
   - **Climate Change**: Impact on agriculture, water resources, and energy security.
5. **Environmental Concerns**:
   - Striking a balance between industrial growth and ecological sustainability.

Way Ahead for Achieving Viksit Bharat 2047

1. **Policy Reforms**:
   - Maintain fiscal consistency and rationalize taxation to attract investments.
   - Implement predictable trade policies to bolster investor confidence.
2. **Skill Development**:
   - Bridge the education-employment gap with **industry-focused training programs**.
   - Promote **STEM education** to prepare the workforce for emerging technologies.
3. **Export Growth**:
   - Focus on high-potential sectors like **pharma**, **IT**, and **renewable energy**.
   - Strengthen trade partnerships through **FTAs** with key global markets.
4. **Rural Development**:
   - Invest in **healthcare**, **education**, and **infrastructure** to uplift rural economies.
   - Promote agricultural innovation and improve supply chain efficiencies.

5. **Green Transition**:
    - Scale up **renewable energy capacity** to meet rising demands.
    - Adopt **climate-resilient infrastructure** for sustainable urbanization.

De-dollarisation: A Global Shift in Trade and Currency Dynamics

Syllabus: Indian Economy, Global Trade

Context

Reserve Bank of India (RBI) Governor Shaktikanta Das clarified that **India is not actively pursuing de-dollarisation**, despite discussions within **BRICS nations** on reducing reliance on the U.S. dollar through a **common currency**.

What is De-dollarisation?

- **Definition**: The process of **reducing dependency on the U.S. dollar** in **international trade and foreign reserves**, aiming to minimize risks related to **currency volatility** and geopolitical dynamics.
- **Global Context**:
    - **China and Russia**: Initiated **bilateral trade in local currencies** and increased **gold reserves**.
    - **BRICS**: Discussions on developing a **common currency** to strengthen trade within member nations.

India's Approach to De-dollarisation

1. Local Currency Trade Agreements:

- Signed agreements with countries like **Russia, UAE**, and **Sri Lanka** for **bilateral trade in local currencies**.
- Reduces **transaction costs** and minimizes **exchange rate volatility**.

2. Diversification of Forex Reserves: Focused on adding **gold** and **non-dollar currencies** to diversify foreign exchange reserves.

3. Internationalizing the Rupee:

- Measures to make the **Indian Rupee (INR)** a preferred currency for **global trade settlements**:
    - Launched **INR accounts** for international transactions.
    - Engaged with **friendly nations** to promote rupee-based trade.

Global Implications of De-dollarisation

1. On the Global Economy:

- **Reduced Dollar Dominance**: Weakens the role of the U.S. dollar as the **global reserve currency**.
- **Geopolitical Tensions**: May lead to **trade blocs** and **economic realignments**.
- **Alternative Currencies**: Promotes the use of **regional currencies** or **gold** for trade and reserves.

2. On Emerging Economies:

- **Enhanced Autonomy**: Reduces dependency on the dollar, providing **economic resilience**.
- **Complex Trade Dynamics**: Transitioning to local currencies may increase **transactional complexities**.

Impact of De-dollarisation on India

1. Trade Diversification: Encourages trade in **regional currencies**, reducing reliance on **USD fluctuations**.

2. Risk Mitigation: Protects the economy from **dollar-driven shocks**, such as sudden **capital outflows** or **currency depreciation**.

3. Boost for Domestic Currency:

- Strengthens the **INR's credibility** in international markets.
- Attracts more countries to **accept INR** for trade settlements.

Challenges to De-dollarisation

1. **Limited Global Acceptance**: The U.S. dollar remains the most **liquid and trusted** currency for trade and reserves.
2. **Infrastructural Limitations**: Lack of robust frameworks to facilitate **local currency transactions**.
3. **Exchange Rate Volatility**: Regional currencies may not offer the **stability** that the U.S. dollar provides.
4. **Geopolitical Risks**: Disruptions in trade alignments can lead to **economic conflicts**.

Way Forward for India

1. Strengthen Rupee Trade Mechanisms:

- Expand **bilateral trade agreements** to include more **friendly nations**.
- Promote **digital currency solutions** to enhance cross-border trade efficiency.

2. Build Reserves in Alternative Assets: Increase **gold reserves** and diversify into **euro** and **yen-based assets**.

3. Invest in Digital Currency: Develop and promote the **Central Bank Digital Currency (CBDC)** for secure, low-cost global transactions.

4. Engage in Multilateral Cooperation: Collaborate with BRICS and other **regional blocs** to enhance the **adoption of local currencies** in trade.

5. Focus on Economic Stability: Maintain **macroeconomic stability** to ensure the Indian rupee remains an attractive option.

ETHICS, SOCIETY & SOCIAL ISSUES

Historic Assisted Dying Bill Passed by UK Parliament: Ethical and Legal Implications

Syllabus: Ethics – Moral Philosophy and Medical Ethics

Context

The **United Kingdom's Parliament** has voted in favor of the **Terminally Ill Adults (End of Life) Bill**, granting terminally ill adults with less than six months to live the legal right to assisted dying. The legislation requires approval by **two doctors** and a **high court judge** before execution, sparking debates on the ethical, legal, and philosophical aspects of assisted dying.

Key Features of the Terminally Ill Adults (End of Life) Bill

1. **Eligibility**: Applicable to **terminally ill adults** with a life expectancy of less than six months.
2. **Approval Process**:
    - Requires consent from:
        - **Two doctors** after thorough medical evaluation.
        - A **high court judge** to ensure legal scrutiny and prevent misuse.
3. **Method**: The terminally ill patient self-administers **lethal drugs** provided by a medical practitioner to end their life.

Concepts of Assisted Dying and Euthanasia

1. **Assisted Dying**: A **terminally ill patient** receives lethal drugs from a medical practitioner but **self-administers** them to end their own life.
2. **Euthanasia**:
    - A **physician deliberately administers** lethal drugs to end a patient's life.
    - Can apply even to patients who are not terminally ill but are in severe pain or vegetative states.

Ethical and Philosophical Dimensions of Assisted Dying

Pros:

1. **Alleviation of Suffering**: Provides relief from **chronic pain, misery**, or vegetative states, ensuring a **humane end** to prolonged suffering.
2. **Preservation of Dignity and Autonomy**: Recognizes the patient's **right to make end-of-life decisions**, affirming individual **autonomy**.
3. **Professional Oversight**: Involves rigorous **medical evaluations** and **legal scrutiny**, reducing chances of arbitrary decisions.

Cons:

1. **Ethical and Moral Challenges**: Contradicts the **Hippocratic Oath** of preserving life, creating a moral dilemma for physicians.

2. **Risk of Misuse**: Potential for exploitation, such as coercion for **organ transplantation** or **inheritance gains**.
3. **Sociocultural Sensitivities**: Conflicts with cultural, religious, and philosophical beliefs, such as:
    - **Christian Theology**: Emphasizes life as a divine gift, opposing human intervention in ending it.
    - **Immanuel Kant**: Asserts that **suicide is morally unacceptable** as it undermines human dignity and rationality.

Examples and Global Perspectives

1. **Countries Legalizing Assisted Dying**: **Netherlands**, **Belgium**, **Canada**, and some US states allow assisted dying or euthanasia under strict conditions.
2. **India**: **Passive euthanasia** legalized in 2018, allowing withdrawal of life support for terminally ill patients, but active euthanasia remains illegal.
3. **UK's Debate**: Reflects the ongoing tension between **personal autonomy** and **moral obligations**, with strong advocacy on both sides.

Way Forward

1. **Robust Safeguards**: Introduce strict mechanisms to ensure decisions are voluntary and free from external influence.
2. **Public Engagement**: Conduct **debates** and **awareness programs** to involve society in shaping ethical and legal frameworks.
3. **Support Systems**: Enhance **palliative care** and **counseling** for terminally ill patients to provide comprehensive end-of-life support.
4. **Global Collaboration**: Learn from countries with existing assisted dying laws to implement **best practices** while respecting cultural sensitivities.

Conclusion

The UK's decision to legalize assisted dying for terminally ill adults reflects a shift towards prioritizing **autonomy and dignity** in end-of-life care. While this historic bill offers a humane option for those in unbearable suffering, it raises complex **ethical dilemmas** and demands a cautious, well-regulated approach to prevent misuse and maintain societal trust. As other nations watch this development, the debate on assisted dying continues to challenge our understanding of **human rights, morality, and dignity**.

RESET Programme: Empowering Retired Sportspersons for Second Careers

Syllabus: Social Justice – Government Initiatives for Skill Development and Youth Empowerment

Context

The **Ministry of Youth Affairs and Sports** launched the **Retired Sportsperson Empowerment Training (RESET) Programme** to facilitate **career development** for retired athletes by offering tailored education, skill enhancement, and internships.

About RESET Programme

1. **Ministry**: Implemented by the **Ministry of Youth Affairs and Sports**.
2. **Aim**: To empower retired athletes by equipping them with skills for **alternate career pathways** in the sports and fitness industry.
3. **Eligibility**:
    - **Age**: Retired athletes aged **20–50 years**.
    - **Participation**: Winners or participants in **international**, **national**, or **state-level events**, recognized by sports federations or the Ministry.
4. **Features**:
    - Offers **16 specialized courses**, such as:
        - **Strength & Conditioning Trainer**
        - **Sports Nutritionist**
        - **Yoga Trainer**
        - **Sports Entrepreneurship**, among others.
    - Combines **academic enhancement** with **internships** for hands-on experience.
5. **Objective**:
    - Addresses the **human resource gap** in the sports sector.
    - Provides **sustainable career pathways** for retired athletes, ensuring financial security and professional engagement post-retirement.

Significance of the RESET Programme

1. **Career Transition**: Helps athletes seamlessly transition from active sports careers to roles in **coaching**, **management**, and **sports-related industries**.
2. **Skill Development**: Equips athletes with **market-relevant skills** for sustainable employment.
3. **Sectoral Impact**: Enhances the availability of **trained professionals** in the sports ecosystem, addressing critical shortages.
4. **Recognition of Contribution**: Acknowledges the contribution of athletes to national sports by supporting them in their post-retirement phase.
5. **Mental and Financial Stability**: Reduces the stress of retirement by offering **structured career options**.

Challenges and Way Forward

1. **Awareness**: Ensure widespread dissemination of information about the programme to reach eligible athletes.
2. **Integration with Sports Federations**: Collaborate with **national and state sports federations** for better identification and enrollment of retired athletes.
3. **Customized Curriculum**: Continuously update courses to reflect **evolving industry trends** and athlete preferences.

4. **Private Sector Partnerships**: Partner with **sports organizations** and **corporate entities** to provide job placements and mentorship opportunities.
5. **Monitoring and Feedback**: Regularly assess programme outcomes to ensure alignment with participant needs and industry demands.

GEOGRAPHY AND DISASTER MANAGEMENT

Lake-Effect Snow: A Unique Weather Phenomenon

Syllabus: Geography – Weather Phenomena and Natural Hazards

Context

Recent instances of **lake-effect snow** have buried towns in **upstate New York**, **Pennsylvania**, **Ohio**, and **Michigan**, demonstrating the **localized intensity** of this weather phenomenon, particularly in regions near the **Great Lakes**.

What is Lake-Effect Snow?

Definition:
Lake-effect snow is a **localized weather phenomenon** characterized by **intense snowfall** that occurs when **cold air**passes over **warmer lake waters**, leading to the rapid formation of clouds and precipitation.

Where is it Found?

1. **Primary Regions**:
   - Commonly observed near the **Great Lakes** in the United States, particularly in:
     - **New York**
     - **Michigan**
     - **Ohio**
     - **Pennsylvania**
2. **Other Locations**:
   - Similar phenomena occur near other large lakes worldwide, such as the **Caspian Sea** or **Great Slave Lake**.

How Does Lake-Effect Snow Form?

1. **Cold Air Interaction**: **Cold air masses** (often originating from Canada) move over the **warmer, unfrozen waters** of the Great Lakes.
2. **Heat and Moisture Transfer**: The **lake's surface water** warms the lower atmosphere and adds **moisture** to the cold air.
3. **Rising Air and Cloud Formation**: Warm, moist air rises rapidly, cools, and forms **cloud bands**.
4. **Intense Snowfall**: The clouds release **heavy snowfall**, often localized and intense, with rates of **2–3 inches per hour or more**.

Factors Influencing Lake-Effect Snow

1. **Cold Air Temperature**: The air must be **significantly colder** than the lake surface temperature to create strong convection currents.
2. **Wind Direction**: Wind patterns determine **which areas** will receive snowfall, often creating **narrow bands** of heavy snow.
3. **Geography**: The shape of the lakes, surrounding topography, and urban heat effects influence the **intensity and location**of snowfall.
4. **Lake Conditions**: Open, unfrozen waters provide the necessary **heat and moisture** for the phenomenon.

Impacts of Lake-Effect Snow

1. **Localized Heavy Snowfall**:
   - Leads to **significant differences** in snow accumulation within small areas.
   - **Example**: One town may receive several feet of snow, while a nearby town remains unaffected.
2. **Infrastructure Disruptions**:
   - **Roof Collapses** due to snow weight.
   - **Stranded Vehicles** and impassable roads.
3. **Annual Snowfall**:
   - Some regions experience **over 20 feet of snow annually**, disrupting **daily life** and **economic activities**.

4. **Economic Impact**:
    - Increased costs for **snow removal** and **infrastructure repair**.
    - Loss of productivity due to transportation disruptions.

Way Forward: Mitigating Lake-Effect Snow Impacts

1. **Infrastructure Resilience**: Design roofs and buildings to withstand heavy snow loads.
2. **Improved Forecasting**: Leverage **advanced weather models** and satellite data to provide precise, localized snow predictions.
3. **Snow Removal Strategies**: Invest in **efficient snow-clearing equipment** and technology.
4. **Public Awareness Campaigns**: Educate residents on **preparedness measures** for heavy snow events.
5. **Economic Planning**: Allocate funds for snow-related emergencies in highly affected areas.

Tourist Destinations in Jammu and Kashmir

Syllabus: Geography, Governance, and Culture

Context

The **Government of India**, in collaboration with the **World Bank** and the **Jammu and Kashmir administration**, is developing **four new tourist destinations** in Jammu and Kashmir to enhance its tourism potential and support sustainable development.

About the Places in News

1. Kokernag

- **Location**: Anantnag District.
- **Speciality**:
    - Known as the **"Botanical Garden of Kashmir"**.
    - Features **freshwater springs** and **lush gardens**, ideal for nature tourism.
    - Famous for trout fishing and horticulture diversity.

2. Baradari

- **Location**: Reasi District.
- **Speciality**:
    - An **architectural marvel** near the **Chenab River**.
    - Offers a mix of **historical significance** and **picturesque landscapes**.
    - Close to other attractions like **Vaishno Devi Shrine** and **Baglihar Dam**.

3. Bhadarwah

- **Location**: Doda District.
- **Speciality**:
    - Known as **"Mini Kashmir"** for its **breathtaking beauty**.
    - Famous for **dense forests**, **adventure tourism**, and unique local culture.
    - A hub for trekking, paragliding, and other adventure activities.

4. Doodhpathri

- **Location**: Budgam District.
- **Speciality**:
    - A pristine **meadow surrounded by coniferous forests**.
    - The **Shaliganga River** flows through it, adding to its scenic charm.
    - Ideal for eco-tourism and a serene getaway.

Government Initiatives for Tourism in Jammu and Kashmir

1. Infrastructure Development

- Enhanced **road and air connectivity** to remote locations.
- Development of **eco-tourism lodges** and **adventure tourism facilities**.

2. Promotion of Local Heritage

- Showcasing local **crafts**, **cuisine**, and **festivals**.
- Encouraging **community participation** to boost local livelihoods.

3. Partnerships

- Collaboration with **World Bank** for sustainable tourism development.
- Involvement of **private players** in building high-quality infrastructure.

4. Security and Stability

- Improved safety measures to attract domestic and international tourists.

Significance of These Developments

1. Economic Growth: Tourism accounts for **7% of J&K's GDP**, and these initiatives will boost employment and local entrepreneurship.

2. Cultural Preservation: Helps preserve the **unique traditions, crafts, and lifestyle** of the region.

3. Sustainable Development: Focus on eco-tourism aligns with **sustainable tourism goals**, reducing environmental impact.

4. Strategic Importance: Enhances **regional connectivity** and positions J&K as a top tourist destination globally.

HISTORY, ART & CULTURE

Ajmer Sharif Dargah: A Symbol of Syncretic Heritage and Spiritual Harmony

Syllabus: Art and Culture – Religious and Cultural Heritage

Context

The **Ajmer Sharif Dargah**, the revered shrine of **Sufi saint Khwaja Moinuddin Chishti**, has been in the spotlight due to a petition claiming it was constructed over demolished temples. Historically, Ajmer, known as **Ajaymeru**, has been a melting pot of **religious and cultural evolution**.

About Ajmer Sharif Dargah

1. **Who Built It**:
   - The dargah's **earliest structure** was constructed in the **15th century** by the **Khalji rulers of Malwa**.
   - Subsequent expansions were carried out by **Mughal emperors**, including **Akbar** and **Humayun**.
2. **Location**: Situated in **Ajmer, Rajasthan**, the shrine is a central feature of the city's **spiritual and historical identity**.
3. **Architectural Features**:
   - **Buland Darwaza**:
     - Constructed by **Sultan Mahmud Khan Khalji**.
     - Displays a blend of **Hindu and Islamic architectural styles**.
   - **White Marble Dome**:
     - Added during **Humayun's reign in 1532**.
   - **Akbari Masjid**:
     - Built by **Akbar in the 1570s**, enhancing the shrine's prominence.
4. **Historical Significance**:
   - The dargah became a **spiritual refuge for people of all faiths**, embodying **Khwaja Moinuddin Chishti's philosophy** of inclusivity.
   - It is a **testament to Mughal patronage** and showcases India's **syncretic cultural heritage**.

About Khwaja Moinuddin Chishti

1. **Birth**: Born in **Sistan (modern-day Iran)** in **1141 CE**.
2. **Philosophy**:
   - Preached **Sufism** centered on **love, tolerance, and service to humanity**.
   - Advocated for **compassion and generosity**, especially toward the underprivileged.
3. **Journey**: Traveled across **Central Asia and South Asia** before settling in **Ajmer in 1191 CE**.
4. **Legacy**:
   - **Founder of Chishtiyya Sufi Order** in India.
   - Revered as **"Gharib Nawaz"** (protector of the poor).
   - Attracted followers from all walks of life, including **kings, nobles, and commoners**.

5. **Influence**:
    - His teachings were carried forward by disciples like **Qutbuddin Bakhtiyar Kaki**.
    - Inspired the establishment of other **Sufi centers** across India.

Cultural and Religious Significance

1. **Symbol of Syncretism**:
    - Reflects the **harmonious coexistence** of diverse faiths and traditions.
    - The dargah attracts **devotees from all religions**, emphasizing its inclusive nature.
2. **Mughal Patronage**: The shrine gained prominence under the **Mughals**, symbolizing their **support for Sufi traditions**.
    - Akbar's **pilgrimages to Ajmer** are well-documented in historical accounts.
3. **Festivals and Urs**: The annual **Urs of Khwaja Moinuddin Chishti** draws millions of devotees, celebrating his spiritual legacy.

Current Controversy

1. **Allegation**: A **petition claims** the dargah was built over demolished temples, sparking debates about its origins.
2. **Implications**: The controversy raises **questions about cultural heritage**, historical narratives, and religious sensitivities.
3. **Need for Resolution**: Balanced, evidence-based approaches are essential to preserve **historical harmony** and respect religious sentiments.

Way Forward

1. **Preserve Cultural Heritage**: Encourage **interdisciplinary studies** to document the historical and architectural significance of the dargah.
2. **Promote Religious Harmony**: Highlight the inclusive legacy of **Sufi saints** like Khwaja Moinuddin Chishti.
3. **Engage Communities**: Foster dialogue among stakeholders to protect and celebrate India's **syncretic traditions**.

Conclusion

The **Ajmer Sharif Dargah** is a timeless symbol of **spiritual harmony and inclusivity**, transcending religious boundaries. Its significance lies not only in its historical and architectural splendor but also in its ability to unite diverse communities under the philosophy of **love and service to humanity**. As a repository of India's rich cultural heritage, preserving its legacy is essential for nurturing the nation's **pluralistic ethos**.

Hydrological Innovations of Deccan Kingdoms: Lessons for Modern Water Management

Syllabus: History – Art, Architecture, and Cultural Developments | Environment – Sustainable Water Management

Context

Deccan empires, from the **Mauryan** to the **Vijayanagara** period, excelled in **monsoon-driven water management systems**. Their hydrological innovations, built to combat water scarcity and drought, offer valuable insights for addressing **modern water challenges** amidst **climate change**.

Contributions of Ancient Kingdoms to Hydrology

1. Mauryan Empire (322 BCE – 185 BCE)

- **Hydraulic Civilization**: Established India's **first hydraulic civilization** during a prolonged **century-long drought**.
- **Technological Contributions**:
    - Constructed **dams, tanks**, and **lift irrigation systems** for efficient water storage and usage.
    - Early references to **water pricing** and **tank construction** found in the **Brihat Samhita**.
- **Significance**: Laid the foundation for sustainable water management in large agrarian societies.

2. Satavahanas (228 BCE – 224 CE)

- **Technological Advancements**:
    - Introduced **waterwheels** for advanced irrigation practices.
    - Improved **tank systems** to manage drought conditions effectively.
- **Evidence**: **Nashik and Mathura inscriptions** detail the construction and usage of irrigation systems.
- **Significance**: Enhanced agricultural productivity during periods of erratic rainfall.

3. Chola Dynasty (850-1200 CE)

- **Monumental Hydrological Structures**: Built **large reservoirs, tanks**, and **canals** to support agriculture and mitigate droughts.
- **Key Example**:
    - **Grand Anicut (Kallanai)**:

        - Constructed on the **Kaveri River**, it is one of the world's oldest operational water diversion structures.
        - Designed for **irrigation**, this system has supported farming for over a millennium.
- **Significance**:
    - Established a legacy of **durable water management systems** adaptable to climate variability.

4. Vijayanagara Empire (1336–1646 CE)

- **Innovative Water Management**: Transformed **valleys into reservoirs** and built **large tanks** for agricultural irrigation.
- **Key Example**:
    - **Tungabhadra Tank System**:
        - Aimed at **water storage** and enhancing agricultural productivity in semi-arid regions.
- **Significance**:
    - Promoted agricultural expansion and ensured water security for a growing population.

5. Bahamani Sultanate (1347–1527 CE)

- **Eco-Friendly Hydrological Systems**:
    - Introduced the **karez system** for groundwater extraction:
        - Underground shafts and **sloping tunnels** were used to bring water from **upland aquifers** to the surface.
        - Operated solely on **gravity**, avoiding reliance on fuel-powered machinery.
- **Key Examples**: **Karez networks** in **Bidar** and **Gulbarga** regions.
- **Significance**: Demonstrated sustainable methods of water extraction and storage, suited to arid conditions.

Lessons for Modern Water Management

1. **Sustainability**: Ancient systems like the **karez** and **Grand Anicut** exemplify eco-friendly practices using **natural resources**efficiently.
2. **Community Participation**: Many structures were community-driven, fostering **local responsibility** for water conservation.
3. **Adaptation to Climate**: Systems were designed for **drought resilience**, ensuring water availability even in challenging climatic conditions.
4. **Integration of Agriculture and Hydrology**: Empires prioritized **irrigation infrastructure** to boost **agricultural productivity**, a model that remains relevant today.
5. **Long-Term Durability**: Structures like the **Grand Anicut**, still functional, highlight the importance of **durable designs**.

Way Forward

1. **Incorporate Traditional Systems**: Modernize **ancient hydrological innovations** like **karez systems** for current water-scarce regions.
2. **Promote Sustainable Practices**: Emphasize **low-energy, gravity-based systems** for water management.
3. **Community-Based Water Management**: Foster **local participation** in maintaining water infrastructure, as seen in ancient kingdoms.
4. **Climate Resilience**: Design water systems that adapt to **erratic rainfall** and **drought-like conditions**.
5. **Policy Support**: Align modern **water management policies** with **sustainable practices** from historical examples.

Conclusion

The hydrological contributions of ancient kingdoms like the **Mauryas**, **Cholas**, and **Vijayanagara Empire** demonstrate **innovative, sustainable, and community-focused water management practices**. These systems offer valuable lessons for addressing today's **water scarcity challenges** amid **climate change**, emphasizing the importance of integrating traditional knowledge with modern technology for a **sustainable future**.

Kumhrar Site: A Window into Mauryan History

Syllabus: History – Ancient Indian History and Architecture

Context

The **Kumhrar site**, near Patna in Bihar, is undergoing excavation by the **Archaeological Survey of India (ASI)**. This site, associated with **Emperor Ashoka's reign**, aims to uncover the **80-pillar assembly hall**, historically linked to the **third Buddhist Council**.

About the Kumhrar Site

1. **Location**: Situated in **Kumhrar**, near **Patna**, Bihar.
2. **Initial Excavation**: Conducted between **1912–1915** by archaeologist **D.B. Spooner**.
3. **Historical Significance**: Believed to be the **conference hall** for the **third Buddhist Council**, convened by Emperor Ashoka to settle doctrinal disputes and compile Buddhist texts.

Architectural Features

Eighty Pillared Hall

1. **Structure**: Parallel rows of **72 pillars** were initially discovered, with **8 additional pillars** unearthed later, totaling **80 pillars**.
2. **Materials and Craftsmanship**:
   - **Sandstone pillars** sourced from **Chunar, Uttar Pradesh**, known for their **32-foot height** and **lustrous polish**, hallmark features of **Mauryan architecture**.
   - The hall featured a **wooden roof and floor**, with an **entrance on the southern side**.
3. **Significance**: Symbolizes Mauryan architectural excellence and its association with administrative and religious activities.

Arogya Vihar (Gupta Period)

1. **Functionality**: A **hospital-cum-monastery**, attributed to **Dhanvantari**, the ancient Indian physician and proponent of Ayurveda.
2. **Evidence**: Discovery of a **terracotta seal** inscribed with the phrase **"Sri Arogyavihare Bhikshusamghasya"**, indicating its use by a monastic community.
3. **Historical Context**: Reflects the **continuity of medical and religious practices** during the **Gupta period**.

Significance of the Kumhrar Site

1. **Historical Importance**: Offers insights into **Mauryan administrative and religious practices**, particularly Ashoka's contributions to **Buddhism**.
2. **Architectural Heritage**: The **80-pillared hall** exemplifies the grandeur of **Mauryan architecture** and its influence on subsequent architectural styles.
3. **Cultural Integration**: Highlights the **evolution of Buddhist monasteries** into centers of **education, health, and spirituality**, as seen in the **Arogya Vihar**.
4. **Archaeological Value**: Provides material evidence of historical records, connecting texts to tangible structures.

Challenges in Excavation and Preservation

1. **Urban Encroachment**: The site is located near a densely populated area, posing risks to its preservation.
2. **Lack of Awareness**: Limited public knowledge about the site diminishes its cultural significance.
3. **Environmental Degradation**: Exposure to natural elements affects the integrity of unearthed structures.
4. **Funding and Resources**: Insufficient funding for **detailed excavations** and **advanced preservation techniques**.

Way Forward

1. **Enhanced Excavation**: Allocate resources for **comprehensive excavation** to uncover the full extent of the site.
2. **Technological Integration**: Use **3D mapping** and **ground-penetrating radar** to minimize invasive excavation.
3. **Public Engagement**: Develop **museums and visitor centers** to promote awareness of the site's significance.
4. **Heritage Policies**: Collaborate with international agencies like **UNESCO** for heritage recognition and funding.

AGRICULTURE

Atmanirbhar Clean Plant Programme: Boosting Horticulture Productivity

Syllabus: Agriculture – Government Schemes and Horticulture Development

Context

India, in collaboration with the **Asian Development Bank (ADB)**, has signed a **$98 million loan agreement** to enhance horticulture productivity through the **Atmanirbhar Clean Plant Programme**. This initiative aims to provide **disease-free planting materials** to farmers, promoting **sustainable and profitable agriculture** practices.

About the Atmanirbhar Clean Plant Programme

1. **Origin**: Announced in **Budget 2023-24** with a **₹2,200 crore allocation** for a **seven-year period (2023-2030)**.
2. **Ministry**: Implemented under the **Ministry of Agriculture and Farmers Welfare**.
3. **Integration with National Missions**: Operates as part of the **Mission for Integrated Development of Horticulture (MIDH)**.

Key Aims and Objectives

1. **Horticulture Yield Improvement**: Enhance **crop productivity and quality** by providing disease-free and high-yield plant varieties.
2. **Climate-Resilient Agriculture**: Promote **plant varieties resilient to climate variability**, ensuring sustainability in farming.
3. **Farmer Profitability**: Boost **income for farmers** by providing access to certified planting materials.

Key Features of the Programme

1. **Establishment of Clean Plant Centres (CPCs)**:
   - **10 world-class CPCs** will focus on fruits such as **apple, walnut, almond, mango, and pomegranate**.
   - Fully funded by the **Central Government**.
2. **Advanced Technologies**:
   - **Diagnostic labs** for early detection and prevention of plant diseases.
   - Use of **tissue culture techniques** to ensure disease-free planting materials.
3. **Affordable Access**: Provide **high-quality planting materials** at reasonable prices through a **robust certification and traceability system**.
4. **Engagement with Women Farmers**: Encourage the active participation of **women farmers**, ensuring inclusive development.
5. **Region-Specific Technologies**: Focus on the development of planting materials and practices tailored to **regional agro-climatic conditions**.

Implementing Mechanism

1. **National Horticulture Board (NHB)**: Acts as the **anchor institution**, overseeing implementation.
2. **Indian Council of Agricultural Research (ICAR)**: Provides research support for developing disease-free planting materials.
3. **Public-Private Partnership (PPP)**: Collaborates with **research organizations**, **agriculture universities**, and **private sector entities** for efficient execution.

Significance of the Programme

1. **Disease Control in Horticulture**: Tackles crop loss caused by diseases, improving overall productivity.
2. **Boost to Exports**: Ensures that Indian horticulture products meet **global quality standards**, enhancing export potential.
3. **Farmer Empowerment**: Provides **better planting materials**, leading to **higher yields** and **profitability**.
4. **Sustainability**: Promotes climate-resilient agriculture, aligning with **sustainable farming goals**.
5. **Support for Women Farmers**: Encourages their inclusion, fostering **gender equality in agriculture**.

Challenges in Implementation

1. **Infrastructure Development**: Setting up **world-class centres** requires significant resources and expertise.
2. **Farmer Awareness**: Ensuring farmers understand and adopt these technologies may take time.
3. **Private Sector Participation**: Effective PPP models require robust coordination between stakeholders.
4. **Region-Specific Challenges**: Diverse agro-climatic conditions demand tailored solutions, complicating implementation.

Way Forward

1. **Capacity Building**: Train farmers, especially women, in using **disease-free planting materials** and advanced horticulture practices.
2. **Technology Integration**: Leverage **digital platforms** for certification, traceability, and market access.

3. **Strengthening Partnerships**: Deepen collaboration with **private players** and **international agencies** like ADB for expertise and funding.
4. **Community Engagement**: Conduct awareness programs to promote **local participation** in the programme.
5. **Monitoring and Evaluation**: Establish a robust mechanism for tracking progress and addressing challenges promptly.

13th National Seed Congress: Advancing a Sustainable Seed Ecosystem

Syllabus: Agriculture – Seed Technology and Sustainable Farming Practices

Context

The **13th National Seed Congress (NSC)**, organized by the **Ministry of Agriculture & Farmers' Welfare**, concluded with a focus on **"Innovating for a Sustainable Seed Ecosystem"**. The discussions revolved around **seed technologies**, **biofortified crops**, and **climate-resilient agricultural practices** such as **Direct Seeded Rice (DSR)**.

What is a Sustainable Seed Ecosystem?

- **Definition**: According to the FAO, a **sustainable seed ecosystem** ensures **timely access to affordable, high-quality seeds** of suitable crop varieties for farmers.
- **Core Objectives**:
  - Boost agricultural productivity.
  - Promote biodiversity and resilience to climate change.

Significance of Quality Seeds

1. **Genetic and Physical Purity**: Ensures crops are true to type, with resistance to **adverse environmental conditions**.
2. **Increased Productivity**: **10–12% higher yields** when farmers use **certified, high-quality seeds**.
3. **Pest and Disease Resistance**: Produces **vigorous seedlings** capable of withstanding pests and diseases.
4. **Efficient Nutrient Absorption**: Develops strong root systems, improving **nutrient uptake** and crop performance.

Challenges in India's Seed Ecosystem

1. **Low Seed Replacement Rate (SRR)**:
   - **SRR** in India averages **15–20%** (varies with crops). Hybrid crops, however, have a 100% SRR.
   - **Definition**: SRR is the percentage of a crop area sown with **certified seeds** instead of **farm-saved seeds**.
2. **Monoculture Farming**: Extensive reliance on **Bt cotton** reduces **biodiversity** and increases vulnerability to pests.
3. **Seed Market Monopoly**: Multinational corporations like **Bayer** dominate the seed industry, limiting access to **indigenous seed varieties**.
4. **Regulatory Gaps**: Pending **Seed Bill** and lack of emphasis on **seed entrepreneurship** hinder progress.
5. **Climate Impact**: Frequent climatic disruptions affect **seed production and availability**.

Government Initiatives to Strengthen Seed Ecosystem

1. **National Seed Corporation (NSC)**: Established in **1963**, it produces **foundation and certified seeds** for over **600 varieties across 60 crops**.
2. **Seeds Act, 1966**: Regulates seed quality and establishes **State Seed Certification Agencies**.
3. **National Seed Policy, 2002**: Focuses on **varietal development**, **quality control**, and **intellectual property protection**.
4. **Seed Village Programme (Beej Gram Yojana)**: Improves the quality of farmers' **saved seeds** through training and support.
5. **National Seed Reserve**: Maintains reserves to ensure seed availability during **climatic disruptions**.

Innovative Approaches Highlighted at the NSC

1. **Biofortified Crops**: Focus on nutritionally enhanced seeds to combat **malnutrition**.
2. **Climate-Resilient Practices**: Promotion of **Direct Seeded Rice (DSR)** and other techniques to address water scarcity and climatic variability.
3. **Advanced Seed Technologies**: Emphasis on precision farming and improved seed storage methods for long-term sustainability.
4. **Engagement with Private Sector**: Encouraging **Public-Private Partnerships (PPP)** to boost research and distribution networks.

Way Forward

1. **Enhance Seed Replacement Rate (SRR)**: Promote awareness and accessibility of **certified seeds** to increase SRR across all crops.
2. **Promote Biodiversity**: Encourage **crop diversification** to reduce dependency on monocultures like Bt cotton.
3. **Regulatory Strengthening**: Expedite the passage of the **Seed Bill** to ensure better oversight and regulation.
4. **Climate Adaptation Strategies**: Invest in **drought- and flood-tolerant seeds** to mitigate climate risks.
5. **Support Local Seed Entrepreneurship**: Provide financial and technical assistance to **local farmers and small businesses** for seed production.
6. **Leverage Technology**: Use **GIS mapping** and **data analytics** for efficient seed distribution and monitoring.

Draft National Policy Framework on Agricultural Marketing: Transforming Farmer-Market Linkages

Syllabus: Economy – Agriculture Marketing and Policies

Context

The **Draft National Policy Framework on Agricultural Marketing**, prepared under the chairmanship of **Faiz Ahmed Kidwai**, has been released. It aims to create a **vibrant marketing ecosystem** where farmers of all categories can access markets of their choice to secure the **best prices for their produce**.

Key Proposals of the Draft Framework

1. **Establish Empowered Agricultural Marketing Reform Committee**:
    - **Purpose**: Facilitate consensus among states for a **unified national market** for agricultural produce.
    - **Structure**:
        - Comprising **state agriculture ministers**.
        - Chaired by a **State Agriculture Minister** on a rotational basis, similar to the **Empowered Committee on GST**.
    - **Key Feature**: Introduce a **single licensing/registration system** and **single fee** across states.
2. **Improve Farmer-Market Linkages**:
    - **Sub-Market Yards**: Declare warehouses and cold storages as **sub-market yards** to expand market access.
    - **eNAM Expansion**: Consolidate the **electronic National Agriculture Market (eNAM)** beyond APMC markets to include sub-market yards.
3. **Reforms in Agricultural Produce Market Committees (APMCs)**:
    - Encourage APMCs to:
        - Improve income by **notifying new agricultural produce** and promoting **food processing activities**.
        - Avoid imposing **exorbitant market fees** or cess.
4. **Strengthen Value Chain Infrastructure**:
    - Use technologies like **AI** and **blockchain**.
    - Facilitate **private sector participation** to develop robust value chains.
5. **Price Insurance Scheme**:
    - Introduce an **insurance mechanism** to ensure farmers' income is protected at the time of sowing itself.
6. **Ease of Doing Agri-Trade**:
    - Digitize **mandi processes** for seamless operations.
    - Enable **digital issuance of licenses/registrations** to traders and private market operators.

Significance of the Framework

1. **Market Access**: Reduces barriers for farmers, enabling better **price discovery** and **market integration**.
2. **Technological Integration**: Leverages **AI** and **blockchain** for transparency, traceability, and efficiency in agricultural trade.
3. **Income Stability**: **Price insurance schemes** safeguard farmers' earnings against market fluctuations.
4. **APMC Reforms**: Encourages market diversification and innovation while reducing reliance on excessive fees.
5. **Unified National Market**: Simplifies trade regulations, creating a **seamless national agricultural market** akin to the **GST system**.

Agriculture Marketing in India

1. **Constitutional Provisions**:
    - **State Subject**: Agricultural marketing falls under **Entry 28 of List-II (State List)** in the **Seventh Schedule**under **Article 246** of the Constitution.
2. **Challenges**:
    - **Fragmented Supply Chain**: Limited integration across regions.
    - **Market Access**: Restricted by location-specific APMC markets.
    - **Poor Infrastructure**: Lack of storage, processing, and transportation facilities.
    - **Complex Regulations**: Burdensome rules that discourage private participation.
3. **Government Initiatives**:
    - **10,000 Farmer Produce Organizations (FPOs)**: Facilitate collective bargaining for farmers.
    - **Agriculture Infrastructure Fund**: Support for post-harvest infrastructure development.
    - **Agricultural Marketing Infrastructure (AMI)**: Enhance marketing facilities.
    - **Gramin Agricultural Markets (GrAMs)**: Strengthen rural market infrastructure.

Way Forward

1. **Consensus Building**: Ensure states collaborate to adopt **uniform agricultural marketing reforms**.
2. **Technology Adoption**: Scale up the use of **digital platforms** for mandi processes, price discovery, and market operations.
3. **Private Sector Engagement**: Encourage private players to invest in infrastructure, storage, and processing.
4. **Capacity Building**: Train farmers and traders in using **eNAM** and other digital tools for seamless transactions.
5. **Policy Alignment**: Align the framework with existing initiatives like **FPOs** and the **PM-Kisan Samman Nidhi** for holistic development.

ENVIRONMENT & ECOLOGY

Global Plastics Treaty: Challenges and Progress from the Busan Summit

Syllabus: **Environment – International Efforts for Pollution Control**

Context

The **5th Intergovernmental Negotiating Committee (INC-5)** meeting, aimed at formulating a **Global Plastics Treaty**, was held in **Busan, South Korea**. Despite extensive discussions, no consensus was reached on a legally binding framework to combat **plastic pollution**, delaying the treaty's finalization.

Busan INC-5 Overview

- **Objective**: To establish a legally binding treaty under **UNEP** to address **plastic pollution** across its lifecycle.
- **Participants**: Representatives from **170 nations** convened to negotiate key strategies.
- **Timeline**: Initiated in 2022, INC-5 (November 2024) was anticipated as the concluding session. However, disagreements necessitate a potential **INC-5.2 session in 2025**.
- **Outcome**: Lack of agreement on production caps, waste management, and funding mechanisms.

Why a Global Plastic Treaty is Urgent

1. **Escalating Plastic Production**:
   - Production surged from **234 million tonnes in 2000** to **460 million tonnes in 2019**.
   - Projected to **triple by 2050** without intervention.
2. **Low Recycling Rates**: Only **9% of global plastic waste** is recycled, leading to waste accumulation.
3. **Marine Pollution**: Over **8 million tonnes** of plastic enter oceans annually, threatening ecosystems.
4. **Health and Environmental Risks**: Microplastics contaminate air, water, and even human bodies.
5. **Greenhouse Gas Emissions**: Plastics contribute **3.4% of global emissions**, exacerbating climate change.

Key Proposals in the Draft Treaty

1. **Global Targets for Plastic Reduction**:
   - Cap virgin plastic production.
   - Reduce harmful plastic products and chemicals.
2. **Lifecycle Approach**: Address pollution from production to disposal, emphasizing **Extended Producer Responsibility (EPR)**.
3. **Phase-out of Harmful Plastics**: Gradual elimination of single-use plastics and microplastics.
4. **Financial Mechanisms**: Propose a multilateral fund to support technology transfer and compensate developing countries.
5. **Chemical Regulation**: Manage over **3,000 toxic chemicals** used in plastics, prioritizing vulnerable groups like women and children.
6. **Monitoring and Accountability**: Introduce frameworks for tracking pollution and ensuring compliance through transparent reporting.
7. **Flexibility for Nations**: Allow tailored implementation strategies based on developmental and economic contexts.
8. **Stakeholder Inclusion**: Involve private sectors, civil society, and indigenous communities in implementation.

Challenges Leading to INC-5 Stalemate

1. **Divided Views on Plastic Production**:
   - Nations like **Saudi Arabia** opposed capping virgin plastic production, citing oil dependency.
   - Over **100 nations**, including Pacific Island countries, advocated strict production limits to tackle marine pollution.
2. **Scope of the Treaty**:
   - Disagreement on whether to focus on **reducing production** or **improving waste management**.
   - **Panama-supported proposals** emphasized production cuts, while alternative views excluded these measures.
3. **Procedural Delays**: Consensus-based decision-making allowed stalling by nations unwilling to commit to binding measures.
4. **Undefined Terminologies**: Ambiguities in terms like “plastic” and “control measures” complicated negotiations.
5. **Developing Nations’ Concerns**: Countries like **India** emphasized the need for **financial assistance** and **technology transfer** to manage plastic waste sustainably.

India’s Role and Position at INC-5

1. **Stance**: Opposed production caps, highlighting development priorities and national circumstances.
2. **Proposals**: Advocated for **technology transfer**, **financial aid**, and a **multilateral fund** for equitable transitions.
3. **Domestic Efforts**: India has banned several **single-use plastics** but continues to face challenges in managing rising plastic waste.

Way Forward

1. **Clarify Definitions**: Establish clear, universally accepted terms to streamline negotiations.
2. **Shift Decision-Making Approach**: Transition from **consensus-based** to **majority voting** to expedite progress.
3. **Financial Models for Equity**: Develop mechanisms ensuring financial support for **developing countries** to adopt sustainable practices.
4. **Strengthen Regional Collaboration**: Promote **regional agreements** as interim measures to combat plastic pollution.
5. **Foster Global Cooperation**: Encourage international collaboration to promote alternatives to plastics and reduce production rates.

Aravalli Green Wall Project: India's Initiative to Combat Desertification

Syllabus: Environment – Conservation and Sustainable Management of Natural Resources

Context

At the **United Nations Convention to Combat Desertification (UNCCD) COP16** in Riyadh, India is set to showcase the **Aravalli Green Wall Project (AGWP)**. This ambitious initiative aims to address **land degradation** and **desertification**, inspired by Africa's **Great Green Wall Initiative**.

About the Aravalli Green Wall Project

1. **Origin**:
   - Inspired by the **Great Green Wall Initiative** of Africa, which spans **11 countries from Senegal to Djibouti**.
   - Conceptualized to **curb desertification** spreading from the **Thar Desert** into **northern India**.
2. **States Covered**: **Haryana**, **Rajasthan**, **Gujarat**, and **Delhi**.
3. **Aim**:
   - Restore **1.15 million hectares** of degraded land by **2027**.
   - Mitigate **soil degradation**, **erosion**, and **drought impacts**.
   - Rejuvenate **75 water bodies** in the initial phase.
4. **Features**:
   - Creation of a **1,400 km long** and **5 km wide green belt** along the **Aravalli Range**.
   - Focus on **indigenous afforestation**, **biodiversity conservation**, and **advanced water management techniques**.
   - Utilization of **GIS tools** and **Nature-Based Solutions (NBS)** for ecosystem stabilization.
   - Engagement of local communities to promote **sustainable restoration** and generate **green employment opportunities**.

Significance of the Aravalli Green Wall Project

1. **Environmental Restoration**:
   - Stabilizes ecosystems by reducing the spread of **desertification** and land degradation.
   - Prevents soil erosion and enhances **water retention capacity** in the region.
2. **Climate Resilience**: Acts as a buffer against **droughts** and extreme weather events, improving **climate resilience** in the affected regions.
3. **Water Resource Management**: Rejuvenates water bodies, addressing **water scarcity** and supporting agricultural activities.
4. **Biodiversity Conservation**: Protects and restores indigenous flora and fauna of the **Aravalli Range**.
5. **Green Employment Opportunities**: Creates jobs in **afforestation**, **water conservation**, and **ecosystem management**, supporting rural livelihoods.
6. **Alignment with Global Goals**: Supports India's commitment to **land degradation neutrality** under the **UNCCD** and aligns with the **Sustainable Development Goals (SDGs)**.

Challenges in Implementation

1. **Degraded Forest Cover**: Significant parts of the Aravalli Range have **lost forest cover**, reducing natural resilience.
2. **Community Participation**: Ensuring **local engagement** and cooperation for long-term sustainability.
3. **Climate Factors**: Rising temperatures and erratic rainfall patterns may hinder **afforestation efforts**.
4. **Funding and Resource Allocation**: Requires substantial **financial and technical resources** for execution and monitoring.
5. **Urbanization Pressure**: Rapid urban expansion near the Aravalli Range threatens conservation efforts.

Way Forward

1. **Integrated Planning**: Combine **government initiatives**, **NGO efforts**, and **community programs** for effective implementation.
2. **Technology-Driven Solutions**: Utilize **GIS mapping** and **remote sensing** for monitoring progress and adapting strategies.
3. **Sustainable Community Engagement**: Educate and incentivize local populations to participate in afforestation and conservation projects.
4. **Financial Support**: Leverage **public-private partnerships (PPPs)** and international funding for sustainable financing.
5. **Policy Strengthening**: Implement stricter regulations to curb activities like **illegal mining** and **deforestation** in the Aravalli region.

Tackling Illegal Sand Mining: NGT Directs CPCB to Draft National Guidelines

Syllabus: Environment – Resource Exploitation, Sustainable Development, and Environmental Governance

Context

The **National Green Tribunal (NGT)** has directed the **Central Pollution Control Board (CPCB)** to prepare **pan-India guidelines** to address **illegal sand mining**, particularly focusing on the environmental and health hazards caused by **silica sand mining**. The NGT observed issues such as inadequate compliance with laws, improper record-keeping by sand washing plants, and health risks like **silicosis** among workers.

About Sand Resource

1. **Global Perspective**: Sand is the **second-most exploited natural resource globally**, after water (**UNEP**).
2. **Classification in India**: Classified as a **minor mineral** under the **Mines and Minerals (Development and Regulation) Act, 1957 (MMDR Act)**.
3. **Silica Sand**: Produced by crushing **sandstone or quartzite** of open texture, followed by washing and grading to achieve requisite grain distribution.

About Sand Mining

1. **Definition**: Involves the removal of **primary natural sand** and related resources like **metals** and **minerals** from the environment (land, rivers, etc.) for purposes like **construction** or **industrial processing**.
2. **Factors Responsible for Illegal Sand Mining**:
    - **High Demand**: Rapid urbanization and construction projects drive sand demand.
    - **Organized Sand Mafias**: Exploit weak regulations to profit from illegal mining.
    - **Lack of Alternatives**: Limited adoption of **sustainable sand substitutes** like manufactured sand.

Consequences of Illegal Sand Mining

1. **Environmental Degradation**:
    - **Flooding and Sedimentation**: Alters river courses, leading to floods, sedimentation, and loss of fertile land.
    - **Groundwater Depletion**: Sand extraction lowers water tables, impacting wells and causing water scarcity.
2. **Biodiversity Loss**:
    - Threatens aquatic habitats and endangered species like:
        - **Gharials**
        - **Freshwater turtles**
        - **Otters**
        - **River dolphins**
3. **Infrastructure Damage**: Weakens riverbanks and bridges, threatening long-term infrastructure stability.
4. **Health Hazards**: **Silicosis**: Workers face health risks from inhaling **crystalline silica dust**.

Steps Taken to Tackle Illegal Sand Mining

1. **MMDR Act (1957)**:
    - **Section 23C**: Empowers State Governments and UT Administrations to formulate rules to prevent illegal mining, transportation, and storage of minerals.
2. **Sustainable Sand Management Guidelines (2016)**: Focus on restoring **river ecosystems** and ensuring sustainable sand extraction.
3. **Enforcement and Monitoring Guidelines (2020)**: Strengthen enforcement through better monitoring mechanisms.
4. **Sand Mining Framework (2018)**: Encourages **manufactured sand** and use of sand from **overburden coal mines** as sustainable alternatives.
5. **Mining Surveillance System**: Uses **space technology** (satellite imagery) to track and control illegal sand mining activities.

Challenges in Addressing Illegal Sand Mining

1. **Ineffective Enforcement**: Weak compliance with existing laws and poor monitoring by regulatory authorities.
2. **Organized Sand Mafias**: Sand mafias operate with impunity, often exploiting gaps in legal frameworks.
3. **Lack of Public Awareness**: Limited understanding of the environmental impacts of illegal sand mining.
4. **Demand-Supply Mismatch**: High demand for sand, particularly in urban areas, outweighs legal supply.

NGT's Recommendations

1. **National Guidelines by CPCB**: Draft comprehensive guidelines addressing **environmental impacts**, **worker safety**, and **regulatory compliance** for sand mining operations.
2. **Focus on Silica Sand Mining**: Mitigate health risks like **silicosis** through improved workplace practices and monitoring.
3. **Strengthen Statutory Compliance**: Ensure proper record-keeping and regular audits of sand mining and washing facilities.

4. **Leverage Technology**: Expand use of **satellite-based surveillance** for real-time tracking of mining activities.

Way Forward

1. **Promote Alternatives**: Scale up production and adoption of **manufactured sand** and other sustainable substitutes.
2. **Capacity Building**: Train local officials and communities to recognize and report illegal mining.
3. **Public Awareness Campaigns**: Educate citizens on the consequences of illegal sand mining on biodiversity and livelihoods.
4. **Strengthen Regulatory Frameworks**: Enhance collaboration between **central and state governments** to close enforcement gaps.
5. **Adopt Eco-Friendly Practices**: Encourage sustainable mining techniques and rehabilitation of degraded ecosystems.

Ratapani Tiger Reserve: Madhya Pradesh's 8th Tiger Reserve

Syllabus: Environment – Biodiversity and Conservation

Context

The Madhya Pradesh government has officially notified the **Ratapani Wildlife Sanctuary** as the state's **8th Tiger Reserve**, reaffirming its commitment to wildlife conservation and biodiversity protection.

About Ratapani Tiger Reserve

1. **Location**: Situated in the **Vindhyachal Mountain Ranges**, spanning the **Raisen** and **Sehore districts** of Madhya Pradesh.
2. **History**:
   - Declared a **Wildlife Sanctuary** in **1976** and extended in **1983**.
   - Received the **National Tiger Conservation Authority's (NTCA)** approval for a tiger reserve in **2008**.
3. **Geographical Features**:
   - **Rivers**: The **Kolar River** forms its western boundary.
   - **Water Bodies**: Key reservoirs include the **Dahod Reservoir** and **Ratapani Reservoir**.
4. **Flora**: Comprises **dry and moist deciduous forests**, supporting a wide range of vegetation types.
5. **Fauna**:
   - **Tiger Population**: Home to **56 tigers** (2022 census).
   - **Other Wildlife**: **Leopards**, **sloth bears**, **chinkaras**, **crocodiles**, and the **paradise flycatcher** (state bird of Madhya Pradesh).
6. **Cultural Significance**: Includes the **Bhimbetka Rock Shelters**, a **UNESCO World Heritage Site**, renowned for its prehistoric rock art and archaeological importance.

Significance of Ratapani Tiger Reserve

1. **Biodiversity Conservation**: Protects critical habitats for tigers and other species, contributing to **ecosystem balance**.
2. **Cultural and Historical Value**: Bhimbetka Rock Shelters add **international importance** to the reserve.
3. **Ecotourism Potential**: Offers opportunities for sustainable tourism, boosting local livelihoods.
4. **Water Security**: The presence of rivers and reservoirs ensures water availability for wildlife and adjoining human settlements.

Tiger Reserves in Madhya Pradesh

- **Existing Reserves**: **Bandhavgarh**, **Kanha**, **Panna**, **Pench**, **Sanjay-Dubri**, **Satpura**, and **Veerangana Durgavati**.
- **Significance**: Madhya Pradesh is known as the **"Tiger State" of India**, boasting the highest number of tigers in the country.

Way Forward

1. **Strengthen Protection Measures**: Enhance anti-poaching strategies and monitoring mechanisms using **technology** such as camera traps and drones.
2. **Promote Community Involvement**: Engage local communities in conservation efforts through **employment opportunities** in ecotourism and forest management.
3. **Leverage Cultural Heritage**: Integrate **Bhimbetka Rock Shelters** into the ecotourism model to increase awareness of both natural and cultural assets.
4. **Habitat Restoration**: Focus on **reforestation** and reducing human-wildlife conflict to ensure sustainable development around the reserve.
5. **Research and Education**: Conduct studies on **tiger behavior** and ecosystem dynamics to improve conservation strategies.

Coastal Erosion in India: Challenges and Solutions

Syllabus: Environment – Conservation and Disaster Management

Context

India's **7,500-km-long coastline**, a critical buffer between land and sea, faces increasing threats from **coastal erosion**, impacting **livelihoods** and **ecological balance**. The **Union Environment Minister** has highlighted the urgency of addressing this issue, given its widespread implications.

Status of Coastal Erosion in India

1. **Extent of Erosion**: **33.6%** of India's coast is eroding, while **26.9%** is accreting, and **39.5%** remains stable (**National Centre for Coastal Research (NCCR)**).
2. **State-Wise Analysis**:
    - Coastal erosion is most severe in:
        - **West Bengal**: 63%.
        - **Pondicherry**: 57%.
        - **Kerala**: 45%.
        - **Tamil Nadu**: 41%.

What is Coastal Erosion?

- **Definition**:
    - Coastal erosion refers to the **breakdown and removal** of land materials by destructive sea waves.
    - Key **processes** include:
        - **Hydraulic Action**: Force of water against the coast.
        - **Compression**: Trapping of air in cracks and crevices.
        - **Abrasion**: Scraping of the coast by materials carried by waves.
        - **Attrition**: Breaking down of materials into smaller fragments.
- **Erosional Landforms**: Cliffs, terraces, caves, stacks, arches, and stumps.

Causes of Coastal Erosion

1. **Natural Causes**:
    - **Rising Sea Levels**: Due to global warming and melting glaciers.
    - **Mangrove Depletion**: Weakens natural coastal protection.
    - **Cyclonic Activity**: Intensified by climate change.
    - **Waves, Winds, Tides, and Currents**: Natural forces contributing to erosion.
2. **Anthropogenic Causes**:
    - **Unregulated Sand Extraction**: Weakens coastal stability.
    - **Port Construction**: Alters natural coastal dynamics.
    - **Dredging**: Affects tidal entrances and navigational channels.
    - **Damming Rivers**: Reduces sediment flow to coasts.
    - **Beach Nourishment**: Can destabilize natural processes if not managed properly.

Impact of Coastal Erosion

1. **Economic**:
    - Affects **livelihoods of millions**, particularly fishing communities.
    - Damages **infrastructure** like ports, roads, and coastal defenses.
2. **Social**: Leads to **displacement** of communities due to loss of habitable land.
3. **Ecological**:
    - Threatens **mangroves, coral reefs, and coastal biodiversity**.
    - Increases vulnerability to **storm surges** and **flooding**.

Innovative Solutions for Coastal Erosion

1. **Community-Driven Conservation**: Involve **local communities** in protecting and managing coastal ecosystems.
2. **Real-Time Erosion Monitoring**: Use **artificial intelligence (AI)** for early detection and mitigation.
3. **Nature-Based Approaches**:
    - **Climate-Resilient Sand Nourishment**: Strategic replenishment of eroded beaches.
    - **Mangrove Reforestation**: Restores natural coastal defenses.
4. **Shoreline Management Plans**: Develop **local and regional erosion mitigation strategies**, considering unique drivers of erosion.

Initiatives to Tackle Coastal Erosion

1. **Shoreline Management Plans**: Mandated under the **Coastal Regulation Zone (CRZ) Notification, 2019**.
2. **Coastal Regulation Zone (CRZ), 2019**: Provisions for **No Development Zones (NDZ)** to protect coastal ecosystems.
3. **K-SHORE Project**: A **World Bank** initiative for sustainable coastal management.
4. **Coastal Management Information System (CMIS)**: Provides comprehensive data for planning and monitoring coastal management efforts.

Way Forward

1. **Integrated Coastal Zone Management (ICZM)**: Implement holistic plans that balance **ecological preservation** with **economic activities**.
2. **Strengthening Regulations**: Enforce stricter guidelines for **sand mining**, **port construction**, and **development activities** in vulnerable coastal zones.

3. **Technological Interventions**: Expand the use of **satellite monitoring** and **AI-powered tools** for tracking coastal changes.
4. **International Collaboration**: Learn from global best practices, such as **Netherlands' Delta Works**, for innovative coastal defense systems.
5. **Public Awareness**: Educate coastal communities about **erosion risks** and their role in sustainable coastal management.

ICIMOD: Addressing Mountain Development and Air Quality Challenges

Syllabus: Environment – International Organizations and Climate Resilience

Context

The **International Centre for Integrated Mountain Development (ICIMOD)** has introduced an **Air Quality Dashboard** to combat **hazardous air pollution** in the **Indo-Gangetic Plain** and **Himalayan foothills**. This initiative aims to provide **real-time tracking** and **advanced forecasting** to address the growing environmental and health risks associated with **PM2.5 levels**.

About ICIMOD

Foundation and Headquarters

- **Established**: December 5, 1983.
- **Headquarters**: Kathmandu, Nepal.

Member Countries: Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal, and Pakistan.

Primary Aims: To foster **sustainable**, **inclusive**, and **climate-resilient development** in the **Hindu Kush Himalaya (HKH)** region.

Functions

1. **Knowledge Generation**: Develop innovative solutions for mountain-specific challenges.
2. **Policy Bridging**: Connect scientific research with actionable **policy frameworks** and practices.
3. **Collaboration Platform**: Serve as a **regional hub** for cooperation among scientists, policymakers, and practitioners.

Significance of the Air Quality Dashboard

Features

1. **Real-Time Tracking**: Monitors current air quality levels across the region.
2. **Advanced Forecasting**: Predicts air pollution trends to enable preventive measures.
3. **Actionable Insights**: Provides region-specific data to formulate effective mitigation strategies.

Challenges in the HKH Region

1. **Air Pollution**:
   - Persistent PM2.5 pollution due to **agricultural burning**, **urban emissions**, and **industrial activities**.
   - Example: **Delhi NCR** faces frequent hazardous air quality episodes.
2. **Climate Change**: Increased glacial melting and erratic weather patterns disrupt ecosystems and livelihoods.
3. **Biodiversity Loss**: Habitat destruction due to deforestation, urbanization, and unsustainable practices.
4. **Livelihood Threats**: Mountain communities face challenges like **land degradation**, **water scarcity**, and **limited economic opportunities**.

ICIMOD's Other Contributions

1. **Cryosphere Research**: Monitoring the **Himalayan glaciers** to assess impacts of climate change on water resources.
2. **Biodiversity Conservation**: Promotes ecosystem management and sustainable use of **Himalayan biodiversity**.
3. **Community Resilience**: Empowers local communities through **capacity-building initiatives** and **climate adaptation strategies**.
4. **Sustainable Tourism**: Encourages eco-friendly tourism practices to balance economic development with environmental conservation.

Way Forward

1. **Regional Cooperation**: Strengthen collaboration among **member countries** for shared challenges like air pollution and climate change.
2. **Technological Integration**: Leverage **AI** and **remote sensing** for improved environmental monitoring and forecasting.
3. **Policy Advocacy**: Advocate for stricter **emission norms** and sustainable practices across the region.
4. **Public Engagement**: Raise awareness about air pollution’s impacts and encourage community-led solutions.
5. **Funding Support**: Mobilize international and regional resources to scale ICIMOD’s initiatives.

World Drought Atlas: Addressing Global Drought Challenges

Syllabus: Environment – Climate Change and Disaster Management

Context

The **United Nations Convention to Combat Desertification (UNCCD)** and the **European Commission Joint Research Centre** launched the **World Drought Atlas** during **COP16 in Riyadh**. This initiative highlights the alarming rise in droughts globally and the urgent need for **resilient strategies** to mitigate risks and adapt to changing climatic conditions.

About the World Drought Atlas

- **Released By: UNCCD** in collaboration with the **European Commission Joint Research Centre**.
- **Objective:** To provide **data-driven insights** and actionable guidelines to address **global drought risks**, improve **resilience**, and promote sustainable land and water management practices.

Key Findings from the Atlas

1. **Global Drought Increase**: Droughts have increased by **29% since 2000** due to **climate change** and **unsustainable land and water management**.
2. **Population at Risk**: By **2050**, **75% of the global population** could be affected by drought.
3. **Examples of Recent Droughts**: **Great Plains of the United States**, **Barcelona in Spain**, and **Chennai's 2019 water crisis** (Day Zero scenario).
4. **India's Vulnerability**: **Agricultural sector** severely impacted, with **soybean yield losses** and frequent crop failures.

What is Drought?

1. **Definition**: Prolonged periods of **unusually low water availability**, resulting in **imbalances** in water supply, quality, and demand.
2. **Key Causes**:
    - **Climate change**-induced rainfall variability.
    - **Unsustainable water extraction**.
    - Poor land management.
    - **Strong El-Niño effects**.

Impacts of Drought

1. **Water Supply**: Severe water shortages, disrupting **domestic**, **industrial**, and **agricultural** activities.
2. **Agriculture**: Crop failures and reduced yields, leading to **food shortages** and **economic losses**.
3. **Hydropower**: Low water levels in reservoirs affect **electricity generation** and industrial productivity.
4. **Trade and Logistics**: Navigation challenges on inland waterways due to low river levels.
5. **Ecosystems**: **Habitat destruction** and **biodiversity loss** in both aquatic and terrestrial ecosystems.

Drivers of Drought Expansion

1. **Unsustainable Water Usage**: Excessive extraction for agriculture and industry.
2. **Poor Land Management**: Practices like deforestation and monoculture farming exacerbate soil degradation.
3. **Rapid Urbanization**: Increased demand and mismanagement of water resources in urban areas.
4. **Climate Change**: Altered rainfall patterns and increased frequency of extreme weather events.

Measures for Drought Management

Global Efforts

1. **Integrated Drought Management Programme**: Promotes **holistic approaches** to reduce drought risks globally.
2. **UNCCD's DRAMP Framework**: Focuses on **drought resilience, adaptation, and management policies**.
3. **Global Drought Information System**: Provides **real-time data** and supports decision-making for drought management.

India's Initiatives

1. **National Policy on Disaster Management**: Framework for **proactive and reactive disaster risk reduction**.
2. **National Agricultural Drought Assessment and Monitoring System**: Monitors drought conditions using **remote sensing and geospatial tools**.
3. **Other Measures**:
    - Development of **micro-irrigation systems** like drip irrigation.
    - Promotion of **drought-resilient crop varieties**.

Key Approaches to Drought Risk Management

1. **Reactive Measures**: **Immediate relief efforts**, including water supply distribution and financial aid for farmers.
2. **Proactive Measures**: Building **water reservoirs**, **recharging groundwater**, and improving water-use efficiency.
3. **Prospective Measures**: Investing in **sustainable land-use practices** and **climate-resilient infrastructure**.

Way Forward

1. **Sustainable Practices**: Encourage **water conservation** and **efficient irrigation methods**.
2. **Technology Integration**: Use **AI** and **satellite data** for real-time monitoring and early warning systems.
3. **Global Collaboration**: Strengthen partnerships through frameworks like the **UNCCD** to ensure coordinated actions.
4. **Community Engagement**: Empower local communities to adopt **nature-based solutions** like **mangrove reforestation** and **soil conservation techniques**.
5. **Policy Reforms**: Implement stricter **water management policies** to address overextraction and misuse.

16th GRIHA Summit: Advancing Green Building and Climate Action

Syllabus: Environment – Sustainable Development and Urbanization

Context

The **16th GRIHA Summit** was held in **New Delhi**, focusing on the theme **"Accelerating Climate Action in the Built Environment"**, highlighting sustainable urban development, resource efficiency, and climate resilience.

About the GRIHA Summit

Origin and Overview

- **Established**: 2007 by the **Ministry of New and Renewable Energy (MNRE)** and **TERI** to promote **green buildings** in India.
- **Objective**: To bring together global and domestic stakeholders to drive **sustainable practices** in the built environment.
- **Host for 2024**: New Delhi.
- **Organizers**: **GRIHA Council**, in collaboration with **MNRE**, **TERI**, and international partners.

Key Highlights of the 16th GRIHA Summit

1. **Theme**: "Accelerating Climate Action in the Built Environment."
2. **Major Features**:
   - **Launch of GRIHA Version 6.0**: Advanced benchmarks for **resource efficiency** and **climate-resilient construction**.
   - **Green Recognition**: Awards for **4-star** and **5-star projects** under the GRIHA framework.
3. **Notable Achievement**: The **Intermodal Terminal at Kalughat, Bihar** received a **5-star SVAGRIHA rating**, developed under the **World Bank-funded Jal Marg Vikas Project (JMVP)** to enhance National Waterway 1 on the River Ganga.

About GRIHA (Green Rating for Integrated Habitat Assessment)

Purpose:

- To evaluate and promote **environmental performance** in buildings across their lifecycle.
- Tailored to Indian climates and construction practices, focusing on:
  - **Energy efficiency**.
  - **Resource conservation**.
  - **Climate change mitigation**.
  - **Site planning and sustainability**.

Key Benefits:

- Encourages **green building standards**.
- Mitigates climate change impacts.
- Promotes **renewable energy adoption** and **sustainable urban practices**.

Significance of Green Building Practices

1. **Environmental Impact**:
   - Reduction in **carbon footprint**.
   - Conservation of **natural resources** like water and energy.
2. **Economic Benefits**:

    - Lower operational costs through **efficient resource utilization**.
    - Potential tax benefits for adopting **green construction**.
3. **Social Advantages**:
    - Improved **health and well-being** for occupants.
    - Sustainable urban living spaces aligned with **SDG Goals**.

About TERI (The Energy and Resources Institute)

- **Established**: 1974.
- **Nature**: Independent **policy and research institute**.
- **Objective**: Promote innovation and research in:
    - **Energy efficiency**.
    - **Climate change**.
    - **Environmental conservation**.
- **Function**: Develops policies and technologies for sustainability and **renewable energy**.

Way Ahead for Green Initiatives

1. **Adopt Advanced Technologies**: Leverage AI, IoT, and smart energy systems for building sustainability.
2. **Wider GRIHA Adoption**: Encourage private and public sector participation in GRIHA-certified projects.
3. **Government Incentives**: Expand fiscal support for green initiatives and integrate GRIHA into **urban planning policies**.
4. **Capacity Building**: Conduct workshops and awareness campaigns for architects, engineers, and policymakers.

BIOTECHNOLOGY & HEALTH

Extrachromosomal DNA (ecDNA): A Paradigm Shift in Cancer Biology

Syllabus: Science and Technology – Advances in Biotechnology

Context

Recent research on **extrachromosomal DNA (ecDNA)** has unveiled its pivotal role in **cancer progression** and **drug resistance**, challenging foundational genetic principles. Found abundantly in cancer cells, ecDNA offers potential pathways for innovative cancer treatments.

What is Extrachromosomal DNA (ecDNA)?

1. **Definition**: ecDNA refers to **circular DNA fragments** that are **not part of chromosomes** but exist freely within the cell nucleus.
2. **Formation**:
    - Arises due to:
        - **DNA damage**.
        - **Chromosomal rearrangements**.
        - **Errors in cell replication**.
3. **Presence in Cancer Cells**:
    - Found in **17% of tumor samples**.
    - Highly prevalent in cancers such as:
        - **Liposarcomas**.
        - **Brain tumors**.
        - **Breast cancers**.

Key Features of ecDNA

1. **Carries Oncogenes**: Contains multiple copies of genes responsible for driving **cancer growth** (oncogenes).
2. **Dynamic Interactions**: Moves freely within the nucleus, forming **hubs** that amplify the expression of oncogenes.
3. **Violates Mendel's Third Law**:
    - **Mendel's Law of Independent Assortment** states that the alleles of different genes are inherited independently.
    - In contrast, ecDNA clusters **inherit together**, preserving genetic combinations advantageous for tumor survival.

Significance of ecDNA Research

1. **Challenges Genetic Dogma**:
    - Overturns the assumption that **non-linked genes** are inherited independently.
    - Highlights new dimensions of genetic inheritance in **tumor evolution**.

2. **Accelerates Cancer Progression**:
    - ecDNA enhances **tumor evolution** by rapidly amplifying oncogenes, contributing to:
        - **Faster tumor growth**.
        - **Increased drug resistance**.
3. **Drug Development Potential**:
    - Identified **BBI-2779**, a CHK1-inhibiting drug, which selectively targets **ecDNA-driven cancer cells**.
    - Paves the way for **personalized cancer therapies** focusing on ecDNA mechanisms.

Implications for Cancer Biology and Treatment

1. **Targeting Drug Resistance**: By disrupting ecDNA's oncogene hubs, researchers can design drugs to combat **drug-resistant tumors**.
2. **Precision Medicine**: Facilitates tailored treatments by identifying cancers driven by ecDNA activity.
3. **Diagnostic Advancements**: Monitoring ecDNA levels in tumors could become a marker for **cancer progression** and **treatment efficacy**.
4. **Broader Genetic Studies**: Opens new avenues for studying **non-chromosomal genetic factors** influencing diseases.

Challenges in Understanding ecDNA

1. **Complex Behavior**: ecDNA's **dynamic nature** within the nucleus complicates its study and targeting.
2. **Detection Sensitivity**: Requires advanced techniques like **single-cell sequencing** for accurate identification.
3. **Drug Development Hurdles**: Translating findings into safe and effective therapies needs extensive research and trials.

Way Forward

1. **Enhanced Research**: Invest in **high-throughput sequencing technologies** to better understand ecDNA's structure and behavior.
2. **Drug Development**: Focus on drugs like **BBI-2779** that target ecDNA-driven mechanisms.
3. **Integrative Approaches**: Combine ecDNA-targeting therapies with conventional treatments to improve outcomes.
4. **Public Awareness**: Educate healthcare professionals and researchers about the role of ecDNA in cancer biology for effective translation into clinical practice.

Conclusion

The discovery of **extrachromosomal DNA (ecDNA)** as a key driver of **cancer progression** and **drug resistance**represents a paradigm shift in **cancer biology**. With its potential for revolutionizing **diagnosis**, **treatment**, and **research methodologies**, ecDNA offers new hope in the fight against aggressive cancers, pushing the boundaries of **precision medicine** and **genomic science**.

Declaring Snakebite Cases as Notifiable Diseases: A Public Health Initiative

Syllabus: Health – Disease Surveillance and Public Health Interventions

Context

The **Government of India** has urged States and Union Territories to classify **snakebite cases and deaths** as **notifiable diseases**. This initiative is part of the **National Action Plan for Prevention and Control of Snakebite Envenoming (NAPSE)**, which targets a **50% reduction in snakebite-related deaths and disabilities by 2030**.

About Snakebites

1. **Epidemiology**: India reports the **highest number of snakebite cases globally**, with over **58,000 deaths annually** (WHO estimate).
2. **High-Risk Areas**: **Rural regions** with extensive agricultural activity and **forested areas** account for the majority of incidents.
3. **Public Health Impact**: Snakebites cause significant **morbidity and mortality**, particularly among economically vulnerable rural populations.

Notifiable Diseases in India

1. **Definition**: Diseases that are **legally mandated** to be reported to government authorities for **effective monitoring and intervention**.
2. **Examples**: Cholera, Tuberculosis, HIV/AIDS, Dengue, and others.
3. **Authority to Declare**:
    - **State Governments** hold the power under public health laws to classify diseases as notifiable.
    - The **Central Government** can recommend diseases for notification.

Implications of Declaring Snakebites as a Notifiable Disease

1. **Enhanced Surveillance**: Accurate tracking of cases and deaths ensures **better data for public health planning**.
2. **Early Warning Systems**: Facilitates **timely alerts** for potential outbreaks in high-risk regions.
3. **Targeted Interventions**: Improves resource allocation, such as availability of **antivenom**, trained healthcare personnel, and infrastructure in vulnerable areas.

4. **Global Collaboration**: Aligns with **WHO's International Health Regulations**, enhancing global disease monitoring and response capabilities.
5. **Legal Framework**:
    - **Mandatory Reporting**: Healthcare providers must report cases to authorities.
    - **Penalties for Non-Compliance**: Ensures accountability in disease reporting.
6. **Disease Burden Analysis**: Provides comprehensive data on the **prevalence, mortality, and morbidity** associated with snakebites, helping in **evidence-based policymaking**.
7. **Facilitated Disease Control**: Aids in creating effective **preventive strategies**, community awareness, and early treatment protocols.

Challenges in Implementing Notifiable Status for Snakebites

1. **Underreporting**: Many snakebite cases go unreported due to **lack of awareness** or **access to healthcare**.
2. **Rural Healthcare Gaps**: Limited **availability of antivenom** and trained professionals in high-risk regions.
3. **Cultural Barriers**: Use of traditional remedies delays **timely medical intervention**, exacerbating outcomes.
4. **Data Accuracy**: Dependence on **manual reporting** may lead to inconsistencies in tracking cases.
5. **Coordination Issues**: Requires robust collaboration between **state governments, healthcare facilities, and local authorities**.

Way Forward

1. **Awareness Campaigns**: Conduct **community-level programs** to educate the public about snakebite prevention, treatment, and the importance of reporting cases.
2. **Strengthening Rural Healthcare**: Ensure **availability of antivenom** and trained professionals in primary healthcare centers in high-risk areas.
3. **Digital Monitoring Systems**: Implement **real-time reporting platforms** to track snakebite cases efficiently.
4. **Training Programs**: Train healthcare providers in **snakebite management** and reporting protocols.
5. **Collaborative Efforts**: Enhance partnerships with **international organizations** like WHO for expertise and funding.

Land Degradation: A Global Challenge to Sustainability

Syllabus: Environment – Conservation, Degradation, and Sustainable Management of Resources

Context

A **United Nations report** warns that **land degradation** is critically undermining the Earth's capacity to sustain humanity. If unaddressed, it will pose significant challenges for future generations, threatening **food security, biodiversity**, and **climate stability**.

What is Land Degradation?

- **Definition**: Land degradation refers to the **decline in the biological, economic, and ecological productivity** of land caused by **unsustainable practices**, **deforestation**, **soil erosion**, and **climate change**.
- **Impact**: It reduces the land's ability to provide essential services like **food production**, **water security**, and **carbon sequestration**.

Aspects of Land Degradation

1. **Soil Erosion**: Loss of **topsoil** due to wind or water, resulting in reduced soil fertility.
2. **Soil Salinization**: **Salt accumulation** in soil, often from irrigation, renders land unfit for cultivation.
3. **Desertification**: Transformation of fertile land into desert due to **deforestation**, **drought**, and **overgrazing**.
4. **Loss of Vegetation**: **Deforestation** and **overgrazing** destabilize soil, increasing vulnerability to erosion.
5. **Pollution**: **Chemical contaminants** from pesticides and industrial waste degrade soil and water quality.

Present Status of Land Degradation (UNCCD)

1. **Global Scale**: **15 million km²** of land globally is degraded.
2. **Expansion**: **1 million km²** of land becomes degraded annually.
3. **Carbon Sequestration Impacts**: Land ecosystems' capacity to absorb **CO_2** has dropped by **20%** in the last decade.
4. **Regional Disparities**: **Drylands**, covering **46%** of Earth's land area, house one-third of humanity and are most affected.

Causes of Land Degradation

Anthropogenic Causes

1. **Unsustainable Agriculture**: Overuse of **fertilizers**, **pesticides**, and water depletes natural resources.
2. **Deforestation**: Forest clearing for agriculture and urbanization accelerates **erosion** and **biodiversity loss**.
3. **Urbanization**: Rapid city expansion leads to **habitat destruction** and pollution.
4. **Overgrazing**: Excessive grazing reduces vegetation cover, causing **desertification**.

Natural Causes

1. **Climate Change**: **Extreme weather events** like droughts and floods intensify erosion and degradation.
2. **Water Scarcity**: Depletion of **aquifers** and altered water cycles worsen soil quality.
3. **Natural Disasters**: **Landslides** and prolonged droughts accelerate degradation.

Impacts of Land Degradation

1. **Food Security**: Reduced **crop yields** and **nutritional quality** increase malnutrition risks.
2. **Biodiversity Loss**: Habitat destruction threatens species survival and disrupts **ecosystem stability**.
3. **Climate Change**: Degraded land emits **CO_2**, exacerbating global warming.
4. **Human Migration**: Loss of livelihoods forces displacement, increasing risks of **conflicts**.
5. **Water Pollution**: Fertilizer runoff contaminates **water bodies**, harming aquatic ecosystems.

Global Initiatives to Combat Land Degradation

1. **UNCCD (1994)**: A legally binding framework to combat desertification and land degradation.
2. **Land Degradation Neutrality Fund (2018)**: Invests in sustainable land management projects.
3. **UN Decade on Ecosystem Restoration (2021–2030)**: Prevents, halts, and reverses ecosystem degradation.
4. **Glasgow Declaration (2021)**: **145 nations** pledged to halt deforestation by 2030.

Indian Initiatives to Address Land Degradation

1. **Desertification and Land Degradation Atlas (ISRO)**: Tracks degraded land across India.
2. **National Action Programme to Combat Desertification (2001)**: Strategies to address desertification and restore land.
3. **National Afforestation Programme (NAP)**: Focuses on **restoring degraded forests**.
4. **Desert Development Programme (1977)**: Tackles land degradation in **arid regions**.

Measures to Counter Land Degradation

1. **Sustainable Agriculture**: Promote regenerative practices like **no-till farming**, **intercropping**, and use of **organic fertilizers**.
2. **Forest Restoration**: Implement **reforestation** and **afforestation** projects.
3. **Efficient Water Use**: Adopt techniques like **drip irrigation** and **rainwater harvesting**.
4. **Green Infrastructure**: Transition to **nature-based solutions** like floodplain restoration.
5. **Policy Realignment**: Align **agricultural subsidies** with sustainability goals and enforce strict **land-use regulations**.

Conclusion

Tackling **land degradation** is essential for achieving **environmental sustainability**, **food security**, and **climate resilience**. By fostering coordinated **global and local efforts**, adopting **innovative solutions**, and ensuring **equitable governance**, we can restore degraded ecosystems and safeguard the planet's capacity to support future generations.

SCIENCE & TECHNOLOGY

Leveraging AI in Academia: Opportunities and Challenges

Syllabus: Science and Technology – Applications of AI

Context

The growing adoption of **Generative AI** in academia offers innovative tools for teaching and research but also raises **ethical concerns**. A **Punjab and Haryana High Court case** underscored challenges in regulating AI-generated content, highlighting the need to balance its benefits with preserving **academic integrity**.

Key Applications of AI in Academia

1. **Personalized Learning**:
   - Platforms like **Coursera** and **Khan Academy** use AI to provide **tailored lessons** based on individual learning patterns.
   - **Benefit**: Enhances learning outcomes with adaptive progress tracking.
2. **Automated Grading and Feedback**:
   - Tools like **Gradescope** automate evaluations, offering instant and consistent feedback.
   - **Benefit**: Reduces faculty workload and accelerates grading processes.
3. **Research Assistance**:
   - AI platforms like **Semantic Scholar** help researchers find relevant studies, analyze data, and identify gaps in knowledge.
   - **Benefit**: Saves time in literature reviews and data synthesis.
4. **Plagiarism Detection and Academic Integrity**:
   - Tools like **Turnitin** detect AI-generated or plagiarized content.
   - **Benefit**: Ensures originality and upholds academic standards.
5. **Accessibility and Inclusivity**:
   - AI tools such as **text-to-speech** and **real-time translation** enable multilingual and differently-abled students to access learning materials.
   - **Benefit**: Promotes inclusivity in education.
6. **Data-Driven Academic Insights**:
   - AI analytics monitor student engagement, flag at-risk students, and optimize institutional strategies.
   - **Benefit**: Improves academic performance through targeted interventions.

Consequences of AI in Academia

Positive Consequences

1. **Improved Access**:
   - AI democratizes education for underserved regions.
   - **Example**: **Duolingo** offers affordable language learning globally.
2. **Efficient Research**:
   - Accelerates complex analyses and highlights research gaps.
   - **Example**: **PubMed** enhances biomedical research with AI tools.
3. **Enhanced Writing Skills**:
   - Tools like **Grammarly** refine academic writing for clarity and coherence.
4. **Innovative Teaching Methods**:
   - Virtual labs and AI simulations provide practical learning experiences.
   - **Example**: Biology students use virtual dissection tools for hands-on learning.
5. **Data Simplification**:
   - AI facilitates complex data analysis, aiding empirical research.
   - **Example**: Climate researchers predict patterns using AI models.

Negative Consequences

1. **Academic Malpractice**:
   - Students misuse AI to generate content, compromising originality.
   - **Example**: Increased cases of AI plagiarism detected by **Turnitin**.
2. **False Positives in Detection**:
   - Over-reliance on AI tools can result in **unfair plagiarism accusations**.
3. **Skill Erosion**:
   - Excessive dependence on AI reduces critical thinking and writing skills.
4. **Bias in Algorithms**:
   - AI trained on biased datasets may perpetuate inequalities.
   - **Example**: Gender-biased recommendations in hiring or academic evaluations.
5. **Overburdened Faculty**:

- Teachers may resort to rigorous **oral evaluations** to counteract AI misuse, increasing workload.

Way Ahead

1. **Define AI Guidelines**:
   - Establish clear discipline-specific rules for permissible AI usage.
   - **Example**: Create a framework for acceptable AI involvement in research submissions.
2. **Mandatory Disclosure**:
   - Require students and researchers to declare AI usage in their work.
   - **Example**: Label research papers with "AI-assisted" tags.
3. **Innovative Assessment Methods**:
   - Combine **written evaluations** with **oral exams** to assess originality and understanding.
4. **Faculty Training**:
   - Provide educators with **tools and strategies** to identify and address AI-generated content.
5. **Policy Reforms**:
   - Shift focus from a **"publish-or-perish" culture** to quality-based evaluations.
   - **Example**: Encourage **open-access research** over high-impact journal metrics.
6. **Ethical AI Integration**:
   - Collaborate with tech developers to ensure **unbiased and transparent algorithms**.

Proba-3 Mission: Advancing Space Technology and Solar Science

Syllabus: Science and Technology – Space Technology and Collaborations

Context

The **Proba-3 mission**, a collaborative effort between the **European Space Agency (ESA)** and **ISRO**, is set to launch on **December 4, 2024**, from **Sriharikota, India**. This mission represents a significant milestone in **space technology** and **solar science research**.

About Proba-3 Mission

1. **Agencies Involved**:
   - **ESA**: Leads the mission development and scientific objectives.
   - **ISRO**: Facilitates the launch through its **commercial arm, NewSpace India Ltd (NSIL)**.
2. **Full Form**: **Proba-3**: Stands for **"Project for Onboard Autonomy."**
3. **Aims**:
   - Demonstrate **high-precision formation flying** in space.
   - Study the **Sun's corona** and its influence on **space weather**.
4. **Mission Features**:
   - **Two Spacecraft**:
     - **Coronagraph**: Captures images of the solar corona.
     - **Occulter**: Blocks direct sunlight to simulate a **solar eclipse**.
   - **Formation Flying**:
     - The spacecraft operate in tandem with precision down to the **millimeter**.
     - Creates **artificial solar eclipses** to enable extended observation periods.
   - **Scientific Goals**:
     - Detailed study of the **solar corona**, crucial for understanding solar winds, flares, and space weather.
5. **India's Role**:
   - Provides the **PSLV-XL launch vehicle**, renowned for its **reliability and payload capacity**.
   - Manages satellite **deployment** and **mission execution**.
   - Builds on expertise in **solar science** gained from ISRO's **Aditya-L1 mission**.

Significance of Proba-3 Mission

1. **Technological Advancement**: Demonstrates cutting-edge **formation flying technology**, opening avenues for **future satellite missions**involving precision coordination.
2. **Scientific Contribution**:
   - Provides insights into the **solar corona**, a region critical for understanding:
     - **Space weather patterns** that impact Earth's communication systems and satellites.
     - **Solar flares and coronal mass ejections (CMEs)**, which can disrupt power grids.
3. **Global Collaboration**: Highlights successful cooperation between **ESA** and **ISRO**, enhancing India's standing in **global space research**.
4. **Expanding ISRO's Expertise**: Builds on ISRO's success with **Aditya-L1**, strengthening its capabilities in **solar and astrophysical research**.
5. **Economic and Strategic Gains**: Boosts **India's space economy** by showcasing **PSLV-XL** as a reliable launch vehicle for international missions.

Challenges

1. **Precision Requirements**: Coordinating two spacecraft in **millimeter-level formation flying** demands advanced engineering and navigation systems.
2. **Solar Observation Complexity**: Capturing detailed data from the **solar corona** while mitigating interference poses significant scientific challenges.
3. **Data Integration**: Processing and interpreting vast volumes of solar data require robust **computational resources** and **scientific expertise**.

Way Forward

1. **Leveraging Collaboration**: Continue fostering **international partnerships** to share expertise and resources for advanced missions.
2. **Technological Development**: Invest in indigenous technologies for **formation flying** and **solar observation** to build domestic capability.
3. **Expanding Solar Research**: Utilize findings from Proba-3 and **Aditya-L1** to deepen understanding of **space weather** and develop predictive tools.
4. **Commercial Outreach**: Position PSLV-XL as the go-to launch vehicle for similar international collaborations, enhancing **ISRO's commercial footprint**.

Nano Bubble Technology: A Sustainable Innovation for Water Purification

Syllabus: Science and Technology – Innovations in Environmental Management

Context

The **Union Minister of State for Forest, Environment, and Climate Change** has launched **Nano Bubble Technology**at the **National Zoological Park, Delhi**, to ensure efficient and sustainable water purification.

What is Nano Bubble Technology?

1. **Definition**: **Nano Bubble Technology** utilizes **ultra-tiny bubbles**, each less than 200 nanometers in diameter, to clean and purify water efficiently.
2. **Innovative Nature**: Nanobubbles exhibit **neutral buoyancy**, allowing them to remain suspended in water for months, enhancing their ability to **transfer gases** and perform **surface reactions**.
3. **Key Properties of Nanobubbles**:
    - **Size**: Typically **70–120 nanometers**, they are **2,500 times smaller than a grain of salt**.
    - **Surface Charge**: Possess a strong **negative charge**, preventing coalescence and enabling microbial stimulation.
    - **Neutral Buoyancy**: Stay suspended in water for extended periods, ensuring **prolonged interaction**.
    - **Hydrophobic Nature**: Repel water, facilitating the removal of organic and inorganic impurities.

How Does Nano Bubble Technology Purify Water?

1. **Algae Removal**: Breaks down algae in stagnant water and prevents future buildup.
2. **Waste Treatment**: Efficiently digests **biological waste** and separates particles like **oils and grease**.
3. **Gas Transfer**: Facilitates **hyper-efficient oxygen transfer**, enhancing water quality by increasing dissolved oxygen levels.
4. **Surface Cleaning**: Removes organic materials from surfaces without using harmful chemicals, preserving ecological balance.

Significance of Nano Bubble Technology

1. **Improves Aquatic Health**: Provides clean and oxygenated water, benefiting aquatic animals and preventing diseases in zoos, aquariums, and natural water bodies.
2. **Environmental Sustainability**:
    - **Chemical-Free Solution**: Eliminates the need for harsh chemicals in water purification processes.
    - **Energy Efficiency**: Reduces energy consumption compared to conventional water treatment methods.
3. **Wide Applicability**:
    - **Wastewater Treatment**: Enhances efficiency in industrial and municipal waste management.
    - **Agriculture and Aquaculture**: Improves crop yields and fish health by enriching water with oxygen.
    - **Food and Beverage Industry**: Aids in fermentation and ensures high-quality cleaning processes.

Applications Across Sectors

1. **National Zoological Parks**: Ensures clean and safe habitats for animals and reduces disease transmission.
2. **Industrial Waste Management**: Supports the treatment of heavy industrial waste by breaking down complex contaminants.
3. **Healthcare and Sanitation**: Provides clean water for hygiene-sensitive environments like hospitals.
4. **Urban Water Management**: Improves the quality of urban water bodies by addressing algae blooms and organic pollution.

Advantages Over Conventional Methods

1. **Longevity**: Nanobubbles remain effective in water for an extended duration compared to traditional bubbles.
2. **Chemical-Free Purification**: Reduces the ecological footprint by eliminating chemical usage.
3. **Cost-Effective**: Decreases operational and maintenance costs in water treatment systems.
4. **Energy Savings**: Operates with lower energy requirements, enhancing overall efficiency.

Challenges in Adoption

1. **High Initial Cost**: The installation of advanced systems requires significant investment.
2. **Limited Awareness**: Adoption is hindered by the lack of knowledge about the technology's benefits and applications.
3. **Scaling for Large Projects**: Scaling the technology for larger water bodies or municipal use may require further innovation.

Way Forward

1. **Increased Awareness**: Conduct public awareness campaigns to highlight the benefits and applications of **Nano Bubble Technology**.
2. **Research and Development**: Invest in scaling up the technology for broader industrial and municipal use.
3. **Public-Private Partnerships**: Foster collaborations between government agencies, research institutions, and industries for widespread implementation.
4. **Policy Support**: Develop incentives and frameworks to encourage the adoption of sustainable water purification technologies.

Gait Analysis: An Advanced Tool for Movement Evaluation and Criminal Investigations

Syllabus: Science and Technology – Applications in Forensics, Health, and Sports

Context

The **Kolkata Police** recently used **walking gait analysis** to solve a child rape case by matching the accused's walking pattern with **CCTV footage**, highlighting its potential in **criminal investigations**.

About Gait Analysis

What It Is: Gait analysis is the **study of human movement**, focusing on the body's **walking or running patterns** to detect abnormalities, optimize performance, or identify individuals.

Types of Gait Analysis

1. **Observational Gait Analysis**: A **visual assessment** by experts to evaluate walking patterns.
2. **Instrumented Gait Analysis**: Uses advanced tools like **infrared markers, sensors, and cameras** to analyze **kinetic and kinematic data**.

How It Works

1. **Data Collection**: Captures movement details using tools such as **infrared markers, electrodes, and sensors**.
2. **Analysis Metrics**:
   - **Step Length**: Distance between two successive foot placements.
   - **Stride Length**: Distance covered in a full walking cycle.
   - **Cadence**: Steps taken per minute.
   - **Joint Angles**: Movement dynamics of the knees, hips, and ankles.
3. **Phases of Gait**:
   - **Stance Phase** (60%): When the foot is in contact with the ground.
   - **Swing Phase** (40%): When the foot is off the ground.

Applications of Gait Analysis

1. Medical Diagnosis and Rehabilitation

- Identifies issues like **skeletal misalignments, muscle dysfunction**, and progression of conditions such as **Parkinson's disease**.
- Aids in designing **rehabilitation plans** for patients recovering from injuries or surgeries.

2. Injury Prevention: Detects **asymmetries** or abnormal movement patterns that could lead to **injuries**, especially in **athletes**.

3. Sports Performance Optimization: Analyzes running or walking mechanics to **improve efficiency** and develop **personalized training plans** for athletes.

4. Criminal Investigations: Matches **unique walking patterns** with surveillance footage, aiding in **suspect identification**.

   - **Example**: Kolkata police solved a rape case by using gait analysis to link CCTV footage to the accused.

Significance

1. **Advanced Forensics**: Enhances **evidence collection** by using individuals' unique walking patterns for **criminal identification**.
2. **Healthcare Benefits**: Helps diagnose and treat **movement disorders**, reducing long-term health issues.
3. **Improved Safety**: Prevents injuries by identifying movement abnormalities early.
4. **Performance Enhancement**: Assists athletes in achieving their **peak physical potential**.

Challenges

1. **High Costs**: Advanced tools like **infrared systems and motion-capture devices** are expensive.
2. **Privacy Concerns**: Using gait patterns for **criminal investigations** could raise **ethical questions** about surveillance and privacy.
3. **Accuracy Limitations**: Environmental factors like **lighting or uneven surfaces** can distort data.
4. **Specialized Expertise**: Requires trained professionals for data collection and interpretation.

Way Forward

1. **Affordability**: Develop **cost-effective solutions** to make gait analysis accessible in **healthcare and law enforcement**.
2. **Awareness Campaigns**: Educate professionals in **law enforcement** and **medicine** about the benefits and ethical use of gait analysis.
3. **Technological Advancements**: Invest in **AI-based systems** to improve accuracy and automate the analysis process.
4. **Policy Framework**: Establish guidelines to ensure **privacy** and **ethical use** in surveillance and forensic applications.

Conclusion

Gait analysis represents a cutting-edge tool with **diverse applications** in healthcare, sports, and forensic science. By leveraging advanced technologies and addressing challenges, it has the potential to revolutionize **movement evaluation**and **criminal investigations**, ensuring better outcomes in both **public safety** and **individual well-being**.

International Advisory Body for Submarine Cable Resilience

Syllabus: Science and Technology – Infrastructure Development

Context

The **International Telecommunication Union (ITU)** and the **International Cable Protection Committee (ICPC)** have jointly launched the **International Advisory Body for Submarine Cable Resilience**, addressing the need for global coordination in safeguarding critical submarine cable infrastructure.

About the Advisory Body

Aim: To enhance the resilience of submarine cables by reducing risks, promoting best practices, and ensuring robust connectivity for the global digital economy.

Key Functions

1. **Strategic Guidance**: Provides recommendations for addressing **increasing traffic demands**, **aging infrastructure**, and **environmental threats**.
2. **Damage Prevention**:
   - Develops and disseminates best practices for minimizing damage risks.
   - Tackles frequent faults, which average **150–200 incidents globally per year**.
3. **Collaboration**: Brings together governments, regulatory authorities, and industries for joint solutions.

Structure and Operations

- **Members**: 40, including ministers, regulators, industry executives, and technical experts.
- **Leadership**: Co-chaired by **Nigeria** and **Portugal**.
- **Frequency of Meetings**: At least twice a year.

About Submarine Cables

What Are Submarine Cables?

- **Definition**: Fiber optic cables laid under oceans, connecting two or more landing points.
- **Key Features**: Serve as the backbone of the global digital economy, carrying over **99% of international data exchange**.
- **Critical Services Supported**: Global commerce, financial transactions, internet services, and communication.

India's Role

- **Significance**: India is a critical hub in the global submarine cable network.

- **Network**: Hosts **17 international submarine cables** across **14 landing stations** in cities like **Mumbai** and **Chennai**.

About ITU

- **Headquarters**: Geneva, Switzerland.
- **Established**: 1865.
- **Role**:
  - Allocates **global radio spectrum** and **satellite orbits**.
  - Facilitates **international communication network connectivity**.
- **Membership**: 194 nations, including India.

About ICPC

- **Established**: 1958.
- **Objective**:
  - Enhances **undersea cable security** through sharing **technical**, **legal**, and **environmental** knowledge.
  - Works closely with governments and private players to improve cable infrastructure resilience.

Significance of Submarine Cable Resilience

1. **Economic Impact**

   - **Global Digital Economy**: Submarine cables are vital for commerce, banking, and digital trade.
   - **Critical Dependency**: Disruptions could cripple international connectivity, affecting services like **e-commerce** and **stock exchanges**.

2. **National Security:** Ensures secure data exchange, preventing breaches or espionage.
3. **Environmental Concerns:** Environmental threats like **earthquakes**, **tsunamis**, and **human activities** (e.g., fishing, anchoring) frequently damage cables.
4. **Future Needs:** Aging infrastructure and growing global data traffic call for robust, future-proof systems.

Challenges in Submarine Cable Management

1. **Frequent Damage:** Submarine cables are prone to damage due to natural and man-made causes.
2. **High Costs:** Repairs and resilience measures require significant financial and technical investment.
3. **Geopolitical Risks:** Vulnerabilities in transnational cables increase risks of **geopolitical conflicts** disrupting communication.

Way Forward

1. **Technological Innovations:** Adopt **AI and predictive analytics** for monitoring and maintenance.
2. **International Collaboration:** Enhance global partnerships for coordinated responses to cable disruptions.
3. **Legal Frameworks:** Strengthen international treaties for the protection and management of submarine cables.
4. **Investment in Infrastructure:** Prioritize funding for upgrading aging networks and building redundant cable systems.