WEEKLY UPDATES

DATE : 4th-11th AUGUST

GEOGRAPHY

Cloudbursts in Himachal Pradesh: A Rising Concern

Why in News?

- **Recent Incident:** A cloudburst in Himachal Pradesh recently triggered flash floods, leading to multiple fatalities and leaving several people missing. The disaster caused widespread destruction, including the washing away of buildings, bridges, and roads.

Understanding Cloudbursts:

- **Definition:** As per the India Meteorological Department (IMD), a cloudburst is an extreme weather event where more than 10 cm of rain falls in less than an hour over a small area of about 10 square kilometers. These events are particularly common in mountainous regions like the Himalayas.
- **Formation:** Cloudbursts occur when strong upward air currents trap raindrops, allowing them to grow larger until the upward force weakens, releasing the accumulated water suddenly.
- **Geographical Impact:** The topography of the Indian subcontinent, especially the Himalayas, facilitates these events due to orographic lifting, where moist air is forced upward by mountains, enhancing cloud formation and precipitation.

Differences Between Cloudbursts and Regular Rainfall:

- **Rainfall:** General precipitation from clouds.
- **Cloudburst:** A sudden, intense downpour exceeding 10 cm in an hour, leading to heavy, concentrated rainfall over a small area.

Prediction Challenges:

- **Limitations:** Predicting cloudbursts is difficult due to their localized and short-lived nature. While areas prone to heavy rainfall can be identified, precise predictions require an expensive, fine-grained radar network.

Notable Cloudburst Events:

- **Uttarakhand (July 2021):** Severe cloudbursts in Chamoli, Uttarkashi, and Pithoragarh caused flash floods and landslides, leading to extensive damage.
- **Himachal Pradesh (August 2020):** Cloudbursts in Kullu, Lahaul-Spiti, and Kinnaur resulted in landslides and flash floods, damaging infrastructure.

Consequences of Cloudbursts:

- **Flash Floods:** Sudden surges in water levels during or after intense rainfall, often leading to significant damage.
- **Landslides:** The rapid movement of earth, rock, or debris down a slope, triggered by heavy rainfall, erosion, or other factors.
- **Mudflows:** Dense, viscous flows of water mixed with mud and silt, leading to sediment transport and deposition.

Impact of Climate Change on Cloudbursts:

- **Increased Atmospheric Moisture:** Higher global temperatures lead to more moisture in the atmosphere, increasing the potential for cloudbursts.
- **Altered Precipitation Patterns:** Climate change causes shifts in precipitation, leading to more intense and localized rainfall.
- **Glacier Retreat and Snowmelt:** Faster melting of glaciers due to rising temperatures may contribute to cloudburst events.
- **Land Use Changes:** Deforestation and urbanization can alter local climates,
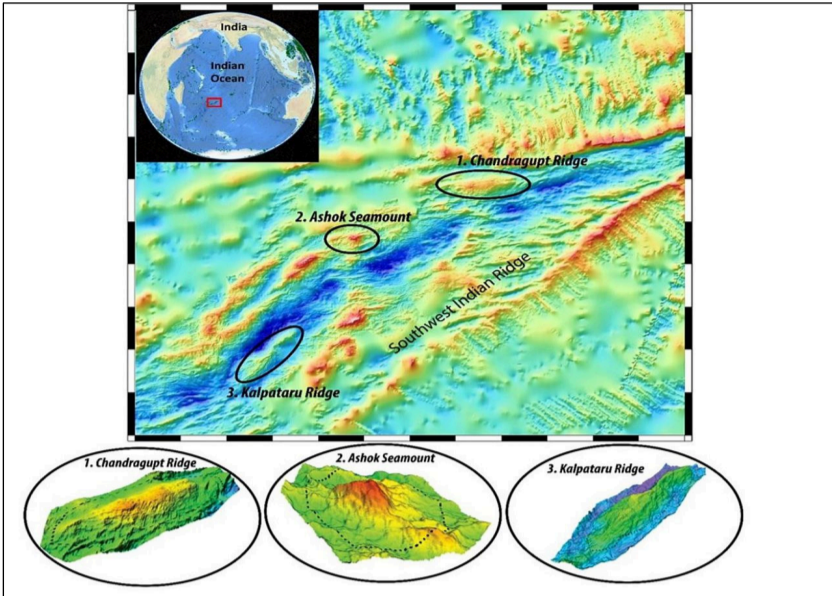

Why forecasting cloudbursts is a challenge

Efforts to monitor and forecast cloudbursts are still at a nascent stage

1. As per the IMD definition, over **100 mm of rainfall in one hour** is called a cloudburst. It usually occurs over a small geographical region (20-30 sq. km)

2. Rainfall of 100 mm per hour translates to **100 litres for every square metre** where a cloudburst occurs. For a small region of 20 sq. km, it is about **two billion litres of water** in an hour

3. Tall cumulonimbus clouds causing cloudbursts can develop quickly (in about **30 minutes**) as the moisture

updraft happens rapidly – 60-120 km/hr

4. Cloudbursts occur mostly over the rugged terrains over **the Himalayas, Western Ghats**, and northeastern hill States of India

5. In India, cloudbursts often occur during the monsoon season, when the **SW monsoon winds bring in** copious amounts of moisture inland

6. Satellites fail to detect cloudburst systems as the **resolution of the**

precipitation radars are much smaller than the area of individual cloudburst events

7. Multiple doppler weather radars can **monitor moving cloud droplets** and help to provide forecast for the next three hours. But **radars are expensive** and installing them widely may not be feasible

8. The change in monsoon extremes and cloudbursts are in response to the **1-degree Celsius rise** in global surface temperature

7 MITIGATION Strategies

1. **Early Warning Systems** — Develop and implement systems to predict and provide timely alerts for cloudbursts.

2. **Urban Planning and Infrastructure** — Build resilient infrastructure, including effective stormwater drainage systems, to manage excess water and reduce flood risks.

3. **Watershed Management** — Implement practices to control water flow and reduce soil erosion in vulnerable areas.

4. **Reforestation and Green Infrastructure** — Increase vegetation cover to absorb excess water, reduce erosion, and stabilize slopes.

5. **Awareness and Education** — Educate communities on cloudburst risks and train them in response and evacuation procedures.

6. **Sustainable Land Use Practices** — Promote responsible land use, avoiding construction in flood-prone areas, and implementing soil conservation measures.

7. **International Cooperation** — Collaborate with neighboring countries and international organizations to share expertise and resources for effective cloudburst risk management.

Indian Ocean Structures Named Ashoka, Chandragupta, and Kalpataru

Overview:

- **Names Approved:** Ashoka Seamount, Chandragupta Ridge, and Kalpataru Ridge in the Indian Ocean have been officially named, as proposed by India.
- **Location:** These structures are situated along the Southwest Indian Ridge.
- **Discovery:** Conducted by the National Centre for Polar and Ocean Research.

Naming Process for Undersea Features:

- **Outside Territorial Sea:**
  - Proposals for naming must adhere to IHO's 2013 guidelines on ''Standardization of Undersea Feature Name.''
  - Features' character, extent, and position must be identified before naming.
  - Reviewed by the IHO Sub-Committee on Undersea Feature Names (SCUFN).
- **Within Territorial Sea:** National authorities must follow the same guidelines for naming features in their territorial waters.

Organizations Involved:

- **International Hydrographic Organization (IHO):**
  - **Established:** 1921.
  - **Role:** Intergovernmental body with observer status at the UN, responsible for hydrography and nautical charting.
- **Intergovernmental Oceanographic Commission (IOC):**
  - **Established:** 1961.
  - **Purpose:** Promotes international cooperation in marine sciences.
- **GEBCO Project:**
  - **Purpose:** Joint IHO & IOC UNESCO project to collect bathymetric data and map the oceans.
  - **SCUFN Role:** Maintains a digital gazetteer of names and feature types.

Antarctica's Winter Heat Wave

Current Situation:

- **Heatwave:** Antarctica is experiencing a winter heatwave for the second time in two years, with ground temperatures averaging 10 degrees Celsius higher than normal since mid-July.

Reason for Heatwaves:

- **Polar Vortex Weakening:** Scientists attribute the higher temperatures to the weakening of the polar vortex.
- **Polar Vortex:** This is a band of cold air and low-pressure systems that usually spins around the Earth's poles in the stratosphere, trapping cold air over Antarctica.
- **Disturbance:** This year, the polar vortex has been disturbed by large-scale atmospheric waves, leading to the unusual warming in Antarctica.

Isostasy

Recent Study:

- **Topological Features:** A recent study explains the formation of new topological features like plateaus and escarpments (high steep slopes) through the concept of isostasy.

About Isostasy:

- **Definition:** Isostasy refers to the equilibrium or balance between the Earth's crust and the underlying mantle.
- **Function:** It involves a line of equality where the mass of land above sea level is supported by material below sea level.
- **Nature:** Isostasy is not a force or process but a natural adjustment mechanism where blocks of crust of varying thicknesses balance gravity. It uses energy to maintain mass balance.
- **Disturbances:** Processes like the melting of ice sheets, erosion, sedimentation, and volcanism can disrupt isostatic balance.

Pyrocumulonimbus Clouds

Recent Occurrence:

- **Wildfires:** Intense wildfires in the US and Canada have generated 'Pyrocumulonimbus' clouds.

About Pyrocumulonimbus Clouds:

- **Formation:** These clouds occur during extremely hot wildfires or volcanic eruptions.
- **Characteristics:** They can produce lightning but generate little rain.
- **Conditions:** Not all wildfires result in pyrocumulonimbus clouds.

Formation Process:

- **Heat and Air Movement:** Intense heat from the fire warms the surrounding air, causing it to rise into the atmosphere.
- **Cloud Formation:** As the hot air, containing water vapor, smoke, and ash, rises, it cools and expands. Water vapor condenses on the ash, forming a pyrocumulus cloud (fire cloud).
- **Evolution:** If the upward movement of hot air intensifies, the pyrocumulus cloud can develop into a pyrocumulonimbus cloud.

Dam Designs to Be Assessed for Vulnerability to GLOFs

Recent Development:

- **Ministry of Power Initiative:** The government has identified 47 dams (38 commissioned and 9 under-construction) as potentially vulnerable to Glacial Lake Outburst Floods (GLOFs).
- **CWC Review:** Following the Teesta-III dam collapse, the Central Water Commission (CWC) will review the design flood parameters of all dams at risk of GLOFs.

About Glacial Lake Outburst Floods (GLOFs):

- **Definition:** GLOFs occur when glacial lakes breach their boundaries, leading to sudden, large-scale flooding into nearby streams and rivers.

Challenges Posed by GLOFs:

- **Unpredictability:** GLOFs can happen suddenly with minimal warning.
- **Loss of Life:** For example, the Kedarnath valley GLOF in 2013 resulted in around 6,000 deaths.
- **Remote Locations:** GLOFs often occur in inaccessible areas, like Chamoli's Rishighanga valley in 2021.

Strategies to Manage GLOF Risks:

- **Risk Zonation and Mapping:** Identifying hazard-prone areas.
- **Monitoring:** Using technology to monitor glacial lakes.
- **Regulation:** Imposing restrictions on construction activities in vulnerable areas.

REASONS FOR GLOFS

1. Geological: Earthquakes, breaches of moraine dams.

2. Morphological: Mass movements into glacial lakes, water seepage through glacial structures.

3. Physical: Excessive precipitation, cryoseism (non-tectonic seismic events).

4. Anthropogenic: Climate change and global warming.

POLITY & GOVERNANCE

Supreme Court Upholds Judicial Authority for Performance Audits of Laws

Why in News?

- Recent Development: The Supreme Court of India has upheld the judiciary's power to direct the government to conduct "performance audits" of statutory laws, emphasizing the judiciary's role in ensuring the effectiveness of legislation. This ruling arose from an appeal concerning the Maharashtra Slum Areas (Improvement, Clearance, and Redevelopment) Act, 1971, highlighting issues with the law's implementation.

Supreme Court's Ruling:

- Performance Audit Ordered: The Court directed the Bombay High Court to perform a performance audit of the Maharashtra Slum Areas Act due to over 1,600 pending cases under the Act.
- Judicial Duty: The Court asserted that the judiciary has both the power and responsibility to ensure that laws achieve their intended outcomes. If a law fails to benefit its target population, a performance audit is justified.
- Institutional Memory: The Court stressed the importance of "institutional memory" in assessing the long-term impact of legislation.

Previous Rulings of the Supreme Court Related to Judicial Activism

Anun Dhawan & Ors. vs. Union of India, 2024:

- **Issue:** Activists filed a Public Interest Litigation (PIL) seeking the establishment of community kitchens to combat hunger and malnutrition, highlighting alarming child mortality rates and arguing that these issues violate fundamental rights, including the right to food and life.
- **Supreme Court Judgment:**
  - The Court declined to direct states to implement a specific scheme for community kitchens.
  - It emphasized the limited scope of judicial review over government policy matters, stating that it cannot compel states to adopt a particular policy merely because it might be considered better.
  - The Court recognized the existing frameworks under the National Food Security Act (NFSA) and left it to states and union territories to explore suitable welfare schemes as they deemed appropriate.

Vishaka vs. State of Rajasthan, 1997:

- **Issue:** The case addressed the need to prevent sexual harassment in the workplace.
- **Supreme Court Judgment:**
  - The Court established the Vishaka guidelines, which provided comprehensive definitions, outlined employer obligations, set up complaint mechanisms, and emphasized the need for training.
  - This landmark ruling eventually led to the enactment of the Sexual Harassment of Women at Workplace (Prevention, Prohibition, and Redressal) Act, 2013, significantly improving workplace safety for women.

Way Forward:

- **Enhanced Stakeholder Engagement:** Involve civil society, experts, and affected communities in the lawmaking process to ensure practical and effective legislation.
- **Data-Driven Legislation:** Use research and data to inform policy decisions and address root causes based on empirical evidence.
- **Streamlined Bureaucratic Processes:** Simplify administrative procedures to reduce delays and ensure timely implementation of laws.
- **Clear Drafting Standards:** Establish guidelines for clear and unambiguous legal drafting to minimize misinterpretation.
- **Robust Monitoring and Evaluation:** Implement mechanisms to assess laws' effectiveness post-enactment, allowing for necessary adjustments and improvements.

Implications of the Judgment:

- Judicial Activism: This ruling represents a shift towards more proactive judicial involvement in governance, setting a precedent for performance audits of other welfare laws and schemes.
- Legislative and Executive Accountability: The ruling reinforces the legislature and executive's constitutional duty to monitor and assess the impact of laws, potentially leading to greater accountability.
- Focus on Marginalized Communities: The Court's emphasis on the law's intent to benefit marginalized groups may drive further legal and policy initiatives to protect vulnerable populations.

REASONS FOR INEFFECTIVE LAWS

Complexity of Issues
India's diverse population and complex social issues make it challenging to draft universally effective laws.
1

Lack of Research
Insufficient empirical evidence and impact assessments often result in poorly designed laws.
2

Political Pressures
Short-term electoral goals can overshadow public interest in lawmaking.
3

Overlapping Jurisdictions
Conflicting laws and jurisdictional disputes lead to inefficiencies in enforcement.
4

Bureaucratic Challenges
Resistance to change and limited resources hinder the implementation of new laws.
5

Right to Be Forgotten: A Developing Legal Concept in India

Why in News?

- Recent Development: The Supreme Court of India has agreed to hear a case that could potentially redefine the "right to be forgotten" in India, where no specific statutory framework currently exists. This right, also known as the "right to erasure," involves an individual's ability to remove their digital footprint from public view when it infringes on their privacy.

What is the Right to Be Forgotten?

- Definition: The right to be forgotten allows individuals to request the removal of personal data from digital platforms when it is outdated, irrelevant, or harmful to privacy.
- European Context: This right was established in 2014 by the Court of Justice of the European Union (CJEU) in the "Google Spain case" and is enshrined in Article 17 of the General Data Protection Regulation (GDPR).
- Global Adoption: Similar laws have been adopted in countries like Canada, the UK, Argentina, and Japan. For example, California's DELETE Act allows adults to delete personal information collected by data brokers.

Interpretation in India:

- Current Status: India lacks a specific legal framework for the right to be forgotten, though it is referenced in discussions on privacy and digital rights.
- Judicial Recognition: In the 2017 Justice K.S. Puttaswamy v. Union of India case, the Supreme Court recognized the right to privacy as a fundamental right, implicitly including the right to be forgotten, but clarified that it is not absolute.
- Legislation: The Digital Personal Data Protection Act, 2023, recognizes the right to "erasure," though its application to court records and public data remains ambiguous.

Challenges from Inconsistent Judicial Approaches:

- **Lack of Uniformity:** Different rulings create confusion about the application of the right to be forgotten, leading to inconsistent enforcement.
- **Balancing Privacy and Public Interest:** Courts struggle to balance individual privacy with open justice and public access to information.
- **Impact on Public Records:** Protecting privacy while maintaining the integrity of public records remains a challenge.
- **Need for Legislative Clarity:** The absence of a clear legal framework leads to inconsistent application of the right.
- **Risk of Overreach:** Varying judicial approaches may lead to concerns about the accuracy and completeness of digital records.

Why 'Right to Be Forgotten' Should Be Adopted:

- **Control Over Personal Information:** Individuals should have control over their personal information in the digital age.
- **Mitigating Digital Damage:** This right helps remove outdated or irrelevant data that could negatively impact personal and professional life.
- **Right to Privacy:** Ensures individuals are not continually penalized for past actions or unlawfully disclosed information.

Way Forward:

- **Legislative Framework:** Enact comprehensive data protection laws, including the right to be forgotten, with clear criteria for data erasure.
- **Prevent Overreach:** Establish clear guidelines to prevent misuse and balance privacy with public interest.
- **Industry Self-Regulation:** Encourage responsible data handling and invest in research to address technical challenges.
- **Public Awareness:** Educate the public on data privacy rights and responsible online behavior.

Judicial Precedents

Rajagopal vs. State of Tamil Nadu (1994)
Discussed the "right to be let alone" but distinguished it from public records like court decisions, which remain open to public comment.

Dharamraj Bhanushankar Dave vs. State of Gujarat (2017)
The Gujarat High Court refused to remove details of an acquittal from public records, emphasizing transparency in court orders.

Orissa High Court (2020)
- Called for a broader debate on the right to be forgotten, highlighting complex issues that require clear legal boundaries.

Delhi High Court (2021)
Extended the right to be forgotten in a criminal case, allowing removal of details from search results to protect an individual's social and career prospects.

Supreme Court Order (July 2022)
Directed removal of personal details from search engines in a contentious marital dispute, expanding the interpretation of the right to be forgotten.

Kerala High Court (December 2023)
Ruled that the right to be forgotten cannot apply to ongoing court proceedings, citing open justice and public interest.

Himachal Pradesh High Court (July 2024)
Ordered redaction of names in a rape case after acquittal to prevent continued stigma.

Power of LG to Nominate MCD Aldermen

Why in News?

- **Supreme Court Ruling:** The Supreme Court (SC) ruled that the Lieutenant Governor (LG) of Delhi can nominate "aldermen" to the Municipal Corporation of Delhi (MCD) without requiring advice from the Delhi Government's Council of Ministers.

SUPREME COURT'S RULING ON THE NOMINATION OF MCD ALDERMEN

- **Legal Basis:** The SC based its decision on Section 3 of the Delhi Municipal Corporation Act, 1957 (DMC Act), which grants the Delhi LG the explicit power to nominate aldermen without needing to consult the Council of Ministers.
- **Reference Case:** The ruling referred to the 2023 five-judge bench decision in Government of NCT of Delhi v. Union of India, which held that Parliament could legislate over State List subjects for the NCT of Delhi, including local government matters under the DMC Act.

Issues in the Nomination of Aldermen:

- **Constitutional Provision:** Article 239AA mandates that the LG must generally act on the advice of the Council of Ministers, except in matters where discretion is allowed by law.
- **Controversy:** The Delhi LG nominated 10 aldermen under the DMC Act, 1957. The Delhi government challenged this in the SC, citing a 2018 ruling that the LG should follow the Council's advice on State and Concurrent list matters.
- **LG's Argument:** The LG argued that the DMC Act gives him the authority to nominate aldermen without consulting the Council of Ministers.

Position of Aldermen in MCD:

- **Role:** Aldermen, with expertise in municipal administration, assist in key decisions.
- **Nomination:** The LG can nominate 10 aldermen aged 25 or above.
- **Voting Rights:** Aldermen can vote in Wards Committees and stand for the MCD Standing Committee, crucial for MCD operations.

Governance Model of Delhi:

- **Article 239AA:** Established by the 69th Amendment, it outlines the LG's role, requiring him to act on the Council's advice, except in matters of Public order, Police, and Land.
- **Judiciary's Interpretation:** The SC ruled in 2018 that the LG must generally follow the Council's advice, with exceptions where matters can be referred to the President.

Oilfields (Regulation and Development) Amendment Bill, 2024 Introduced in Rajya Sabha

Overview:

- **Purpose:** The Bill seeks to amend the Oilfields (Regulation and Development) Act, 1948, which originally regulated oilfields, mines, and minerals together. The Mines and Minerals (Development and Regulation) Act was enacted in 1957 for mines and minerals.

Key Features of the Bill:

- **Expanded Definition:** Broadens the definition of mineral oils to include all naturally occurring hydrocarbons like crude oil, natural gas, and shale gas.
- **Petroleum Lease:** Introduces the concept of a "petroleum lease" for activities related to the exploration and production of mineral oils.
- **Separation of Operations:** Delinks petroleum operations from mining operations.
- **Dispute Resolution:** Enhances dispute resolution mechanisms and decriminalizes certain provisions of the Act.

QCI Introduces Surajya Recognition & Ranking Framework

Framework Overview:

- **Purpose:** Recognizes and rewards states and organizations excelling in quality and innovation to support a Developed (Viksit) India.
- **Four Pillars:**
  - Shiksha (Education)
  - Swasthya (Health)
  - Samriddhi (Prosperity)
  - Sushasan (Governance)

About QCI:

- **Founded:** 1996 as the national accreditation body, an autonomous non-profit under the Societies Registration Act, 1860.
- **Initiative:** Jointly established by the Government of India and Indian Industry (ASSOCHAM, FICCI, CII).
- **Nodal Department:** DPIIT, Ministry of Commerce and Industry.

Governing Council:

- **Composition:** 39 members, including the Chairperson, nominated by the Prime Minister, and representatives from the Government, Industry, and Stakeholders.

QCI's Role:

- **Accreditation:** Promotes global quality standards and third-party assessments of products, services, and processes.
- **Mission:** Enhances the quality of life and well-being in India.

Key Achievements:

- **Healthcare:** Expanded COVID-19 testing labs, ABPMJAY certification with NHA, Kayakalp for healthcare cleanliness.
- **Sanitation:** Certified Urban Local Bodies as ODF, ODF+, ODF++.
- **Education:** Launched eQuest for skill and training.
- **Agriculture:** Developed Good Agriculture Practice (GAP) standards for SAARC countries with FAO.

Habitat Rights Approved for Juangs, a PVTG in Odisha

Recent Development:

- **Approval:** The District Level Committee has approved habitat rights for the Juangs, a Particularly Vulnerable Tribal Group (PVTG) in Keonjhar, Odisha.
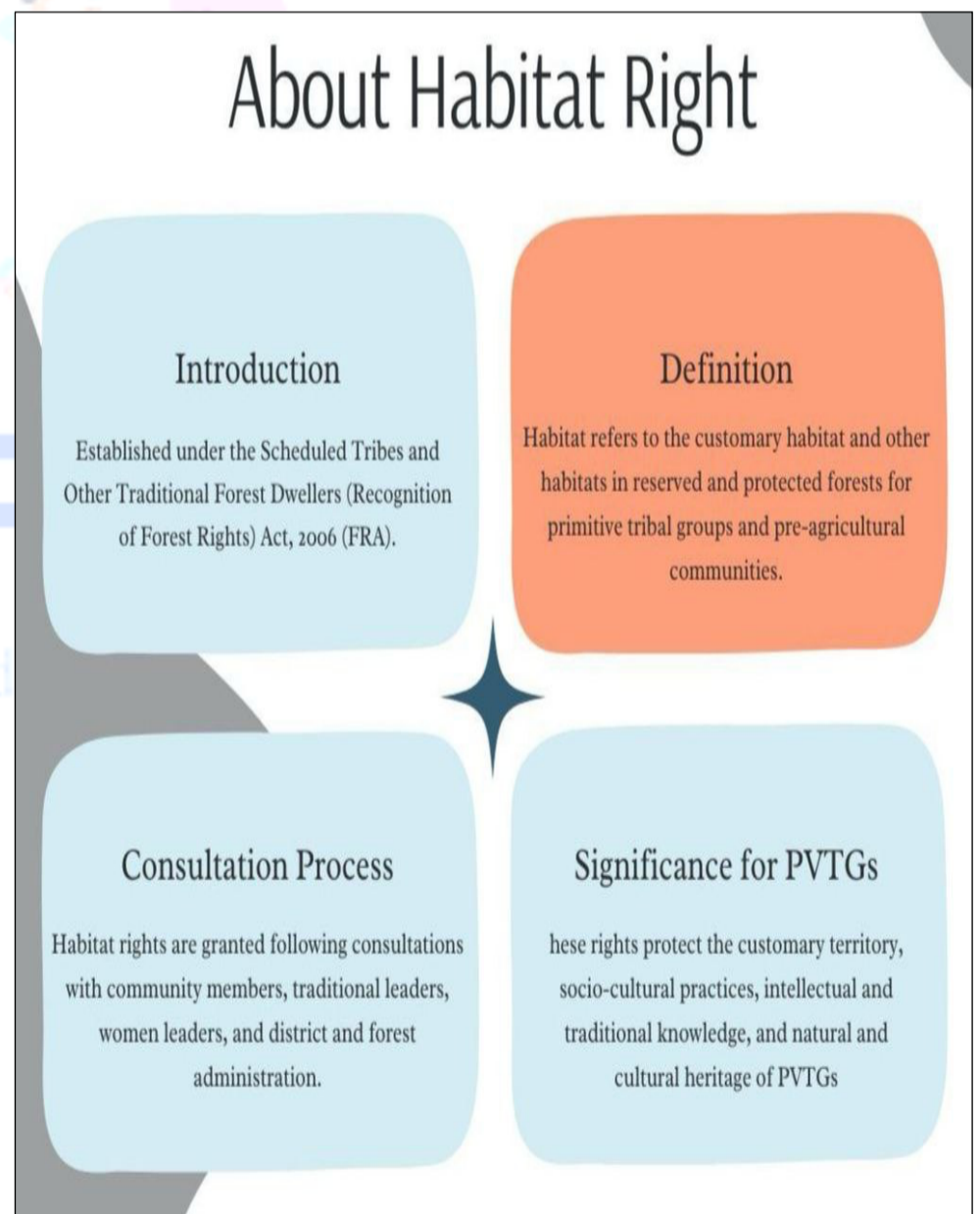
Other Tribes with Habitat Rights:

- Jaungs of Jajpur, Paudi Bhuyans of Deogarh (Odisha)
- Bharia (Madhya Pradesh)
- Kamar and Baiga (Chhattisgarh)

About PVTGs:

- **Recognition:** The government has identified 75 PVTGs across 18 states and one UT, based on recommendations by the Dhebar Committee (1960-61).
- **Odisha's PVTGs:** Odisha hosts 13 PVTGs, the highest among all states and UTs.
- **Identification Criteria:** Pre-agricultural level of technology, low literacy levels, economic backwardness, and declining or stagnant population.

Juang Tribe, Odisha:

- **Location:** Native to the hills of Keonjhar, Pallahara in Anugul, and the plains of Dhenkanal. Divided into Hill (Thaniya) and Plain (Bhagudia) Juang.
- **History:** Originally known as Patuas for their traditional leaf skirt attire.
- **Occupation:** Traditionally practiced shifting cultivation (toila chasa), with some transitioning to settled agriculture. They are also skilled in making decorative combs and tobacco cases.

About Habitat Right

Introduction

Established under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 (FRA).

Definition

Habitat refers to the customary habitat and other habitats in reserved and protected forests for primitive tribal groups and pre-agricultural communities.

Consultation Process

Habitat rights are granted following consultations with community members, traditional leaders, women leaders, and district and forest administration.

Significance for PVTGs

hese rights protect the customary territory, socio-cultural practices, intellectual and traditional knowledge, and natural and cultural heritage of PVTGs

Centre Introduces Waqf (Amendment) Bill, 2024 in Parliament

Key Details:

- **Amendment Overview:** The Waqf Act, 1995 is being amended with the term "Waqf" replaced by "Unified Waqf Management, Empowerment, Efficiency, and Development."
- **Historical Context:** Previous amendments in 2013 were based on recommendations from the High-Level Committee chaired by Justice (Retired) Rajinder Sachar and a Joint Parliamentary Committee report.

Key Features of the Bill:

- **Waqf Property Database:** A comprehensive database of waqf properties to be registered on a portal within six months of the Act's commencement.
- **Waqf Definition:** Defined as property dedicated by any person practicing Islam for at least five years and having ownership of such property.
- **Inclusivity:** Ensures representation of women and non-Muslims on the Central Waqf Council and state boards.

Objectives of the Bill:

- **Efficiency and Management:** Aims to improve the administration and management of waqf properties.
- **Addressing Issues:** Seeks to resolve issues related to the powers of State Waqf Boards, as well as the registration and survey of waqf properties.

About Waqf Properties:

- **Definition:** Waqf properties are moveable or immovable assets dedicated to charitable purposes in the name of God, managed by a Waqf board.
- **Oversight:** The Central Waqf Council (CWC), established in 1964, oversees and advises state-level Waqf Boards across India.

Gender Eligibility Row at Paris Olympics 2024

Why in News?

- **Controversy:** A boxing match at the Paris Olympics 2024 between Algeria's Imane Khelif and Italy's Angela Carini sparked controversy over gender eligibility in women's sports.
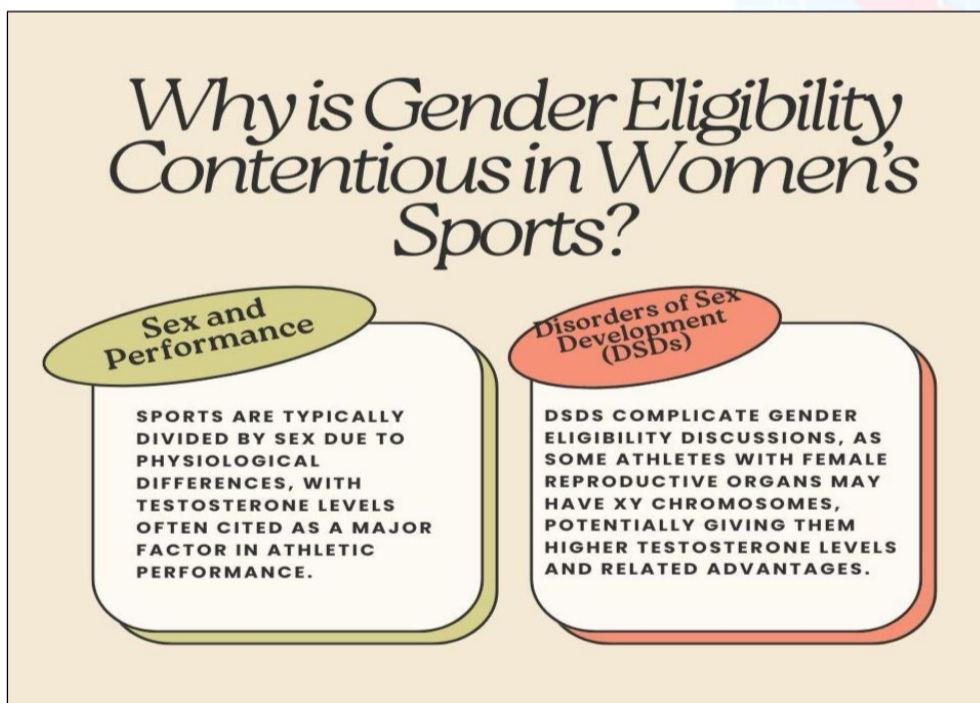
What are Disorders of Sexual Development (DSDs)?

- **Definition:** DSDs are conditions where individuals may have atypical development of sexual characteristics, sometimes displaying traits of both sexes.
- **Examples:**
  - **Androgen Insensitivity Syndrome (AIS):** Individuals with XY chromosomes develop female physical traits due to resistance to male hormones.
  - **Klinefelter Syndrome:** Males with an extra X chromosome (XXY) experience reduced testosterone and developmental differences.
  - **Turner Syndrome:** Females with one missing or incomplete X chromosome face infertility and physical abnormalities.

Why Did Imane Khelif's Win Spark Controversy?

- **Background:** Khelif faced criticism for allegedly having an "unfair advantage" due to accusations of being a "biological man" because of a disorder of sex development (DSD), despite being officially recognized as female.
- **IBA Stance:** In 2023, Khelif and another boxer were barred from competing in the International Boxing Association's (IBA) World Championship due to a "gender eligibility" test, though they competed at the Olympics because the IOC derecognized the IBA in 2023.
- **IOC Response:** The IOC defended its decision to allow Khelif to compete, stating that all athletes met the competition's eligibility criteria and criticized the IBA's decision as "arbitrary."

How Do Sports Federations Address Gender Eligibility?

- **IOC's Approach:** Since 2021, the IOC allows sports federations to create their own eligibility rules based on evidence, balancing fairness and inclusion.
- **Specific Regulations:** Some federations, like World Athletics, still use testosterone levels as criteria, while others debate the need for bans based on the specific skill sets required in different sports.
- **Open Category Debate:** An "open category" for trans athletes has been proposed but is debated due to the limited number of trans athletes and challenges in establishing fair competition.

Way Forward:

- **Biomarkers:** Develop reliable biomarkers to assess athletic potential without compromising privacy or dignity.
- **Athlete Education:** Provide athletes with accurate information about sex, gender, and eligibility rules.
- **Transparent Policies:** Sports federations should create clear, inclusive policies that balance fairness and non-discrimination.
- **Collaboration:** International sports federations should work together to ensure consistent policies across sports.
- **Human Rights:** Protect athletes' rights to participate in sports without discrimination.

INTERNATIONAL RELATIONS

Bangladesh's Political Upheaval and Its Impact on India

Why in News?

- **Recent Development:** The resignation of Sheikh Hasina as Prime Minister of Bangladesh marks a significant turning point in South Asian geopolitics. Her departure amid protests and subsequent refuge in India have raised concerns about the stability of Bangladesh and its relationship with India.

Current Situation in Bangladesh:

- **Protests and Unrest:** Bangladesh is experiencing widespread protests, primarily driven by discontent over job quota issues, authoritarian policies, and the suppression of opposition. The unrest is the largest since Sheikh Hasina took office in 2008.
- **Economic Challenges:** The political upheaval threatens Bangladesh's economic recovery from the COVID-19 pandemic, which has already been strained by rising inflation and currency depreciation.
- **Political Landscape:** The Bangladesh Army is expected to form an interim government. The potential return of radical Islamist forces poses a threat to the country's secular governance.
- **Disruption in Export Flow:** Bangladesh's textile sector, which accounts for 7.9% of global trade in clothing and 85% of the country's merchandise exports, is facing significant disruptions. The unrest has led to supply chain breakdowns, affecting production and shipment schedules. International buyers are reconsidering their sourcing from Bangladesh, which could benefit Indian textile hubs like Tiruppur.
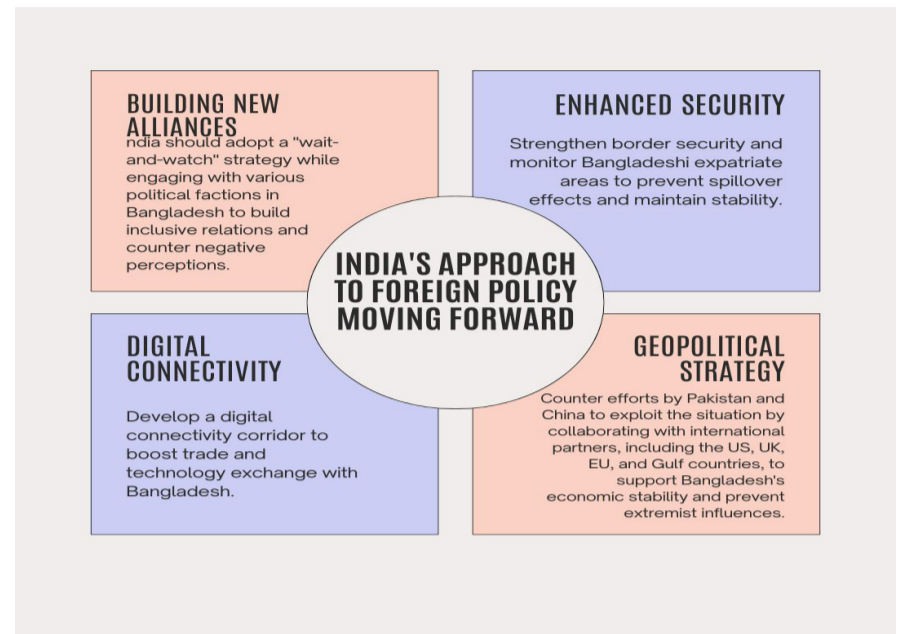
Impact of Political Instability in Bangladesh on India:

- **Loss of a Trusted Ally:** India has lost a key partner in Sheikh Hasina, who played a crucial role in countering terrorism and strengthening bilateral relations. Her leadership allowed India to collaborate closely with Bangladesh on security matters, a relationship now in jeopardy.
- **Economic Ties:** India-Bangladesh bilateral trade reached USD 13 billion in FY 2023–24, making Bangladesh India's largest trade partner in the subcontinent. The current instability threatens this economic relationship, particularly with the ongoing negotiations for a free trade agreement (FTA).
- **Western Scrutiny and Potential Backlash:** India's support for Hasina has created friction with Western allies, especially the US, which has criticized her undemocratic practices. With Hasina's unpopularity growing, India could face backlash from Bangladeshi citizens, straining bilateral relations.

Significance of Bangladesh for India:

- **Strategic Corridor:** Bangladesh acts as an important corridor for trade and transportation, linking India's Northeast with the rest of the country and facilitating access to international markets.
- **Regional Security:** A stable and friendly Bangladesh is essential for regional security, particularly in cooperation on counter-terrorism and border security.
- **Economic Partnership:** Bangladesh is India's biggest trade partner in South Asia, and India is the second-largest trade partner of Bangladesh in Asia. This economic relationship is vital for India's broader economic goals.

India's Foreign Policy Dilemma in West Asia

Recent Developments:

- **Tensions Escalate:** Increased tensions between Iran and Israel following the assassination of Hamas and Hezbollah leaders (groups backed by Iran) have led the US and other regional powers to intensify diplomatic efforts to prevent war in West Asia.
- **India's Challenge:** India faces a foreign policy dilemma, as it has significant interests with both Iran and Israel.

India's Stakes in the Region:

- **Energy Security:** The Gulf-West Asia-North Africa region supplies over two-thirds of India's crude oil imports.
- **Diaspora and Remittances:** Approximately 8-9 million Indians reside in West Asia, with countries like UAE, Saudi Arabia, Kuwait, and Oman being top sources of inward remittances.
- **Strategic Projects:** Key projects include the India-Middle-East-Europe Economic Corridor and Chabahar Port in Iran.

India's Foreign Policy Towards West Asia:

- **Extended Neighbourhood:** India views the Gulf region as part of its 'extended neighbourhood,' with Iran being part of its 'proximate neighbourhood.'
- **Look West Policy:** Initiated in 2005, this policy aims to deepen cooperation with West Asian countries and safeguard India's national interests in the region.
- **De-hyphenation Policy:** India maintains separate and independent diplomatic relations with Israel and Palestine, emphasizing merit-based relations despite their adversarial ties.

ENVIRONMENT & DISASTER MANAGEMENT

Increase in Coastal Erosion: A Growing Concern

Why in News?

- **Recent Study:** A study has revealed significant coastal erosion in Tamil Nadu, threatening the livelihoods of fishers and coastal inhabitants. Nearly 43% of Tamil Nadu's coast faces erosion, with over 4,450 acres of land lost. The erosion is increasing by 3 meters per year on the east coast and 2.5 meters per year on the west coast.

Key Findings of the Study Regarding Tamil Nadu Coast:

- **Natural Sand Movement:** For most of the year, wind and sea currents move from south to north, carrying sand along the coast. During the northeast monsoon, this movement reverses.
- **Impact of Structures:** Structures like ports, breakwaters, or groynes block the natural sand movement, leading to sand accumulation on one side and erosion on the other. This imbalance accelerates coastal erosion, pushing waves further inland and increasing risks to coastal areas.
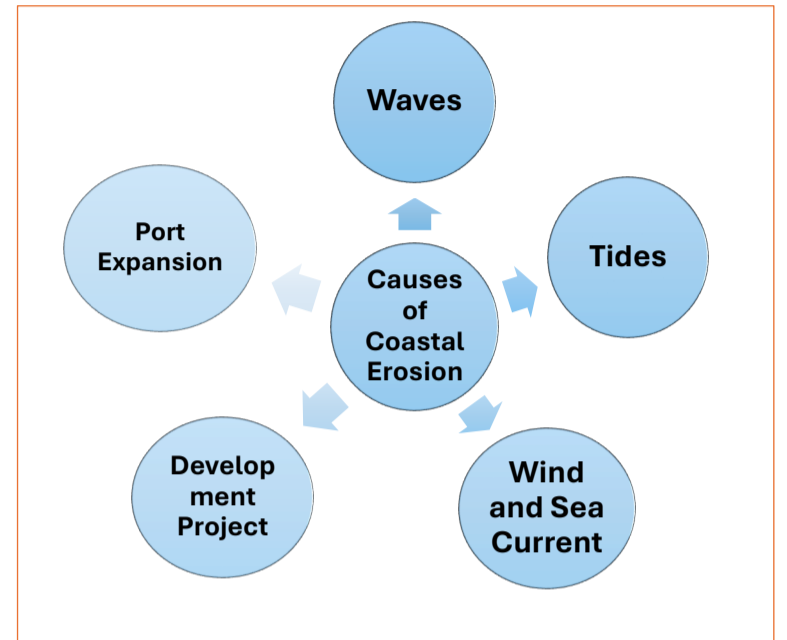
What is Coastal Erosion?

- **Definition:** Coastal erosion occurs when the sea wears away the land, often due to strong wave action. It involves the process of local sea level rise, strong wave action, and coastal flooding, which wear down or carry away rocks, soils, and sands along the coast.
- **Processes:**
  - **Corrasion:** Waves throw beach material like pebbles at the base of a cliff, breaking it down.
  - **Abrasion:** Waves carrying sand and larger fragments wear away the base of a cliff or headland.
  - **Hydraulic Action:** Waves compress air in cracks of a cliff, causing chunks to break off.
  - **Attrition:** Waves cause rocks and pebbles to bump into each other and break up.

Impacts of Coastal Erosion:

- **Loss of Land:** Coastal erosion leads to the loss of valuable land, affecting property and infrastructure.
- **Impact on Ecosystems:** Erosion destroys habitats like mangroves, salt marshes, and sand dunes, crucial for various species.
- **Increased Flooding Risk:** Erosion reduces natural barriers, increasing the risk of flooding.
- **Displacement:** Coastal erosion forces communities to relocate, causing social and economic disruption.
- **Salt Water Intrusion:** Erosion leads to salinization of agricultural land, reducing crop yields.
- **Impact on Biodiversity:** Coastal erosion alters ecosystems and food chains, affecting marine and coastal biodiversity.

How to Prevent Coastal Erosion:

- **Vegetation:** Planting seagrass and coastal plants helps anchor sand and prevent erosion.
- **Beach Nourishment:** Enhancing the natural ability of shorelines to absorb storm energy without interfering with natural coastal processes.
- **Coastal Restoration:** Restoring habitats like wetlands benefits marine species and provides environmental benefits like carbon sequestration.
- **Regulatory Measures:** Implementing zoning laws, building codes, and maintaining minimum distances from the shoreline for new developments.

Causes of Coastal Erosion: Waves, Tides, Wind and Sea Current, Development Project, Port Expansion

Coastline of India:

- **Length:** India has a coastline of 7,516.6 km, touching 13 States and Union Territories (UTs).
- **Longest Coastline:** Gujarat (1,214.7 km) has the longest coastline among states, followed by Andhra Pradesh (973.7 km) and Tamil Nadu (906.9 km).
- **Geographical Features:** The Coromandel coast (Tamil Nadu) is a coast of emergence, while the Konkan coast (Maharashtra and Goa) is a coast of submergence.

Government Initiatives to Tackle Coastal Erosion:

- **Shoreline Mapping System:** The National Centre for Coastal Research (NCCR) observed that 33.6% of the Indian coastline is vulnerable to erosion.
- **Hazard Line:** The Ministry of Environment, Forest & Climate Change (MoEFCC) defines the hazard line to indicate shoreline changes and sea level rise.
- **Coastal Regulation Zone (CRZ) Notification 2019:** Permits erosion control measures and establishes No Development Zones (NDZ) to protect the coastline.
- **Coastal Zone Management Plans (CZMP):** States/UTs are required to finalize CZMPs, including mapping erosion-prone areas.
- **National Strategy for Coastal Protection:** MoEFCC developed guidelines for coastal protection for all Coastal States and UTs.
- **Flood Management Scheme:** Anti-sea erosion schemes are planned and executed by State Governments with Union Government assistance.
- **Coastal Management Information System (CMIS):** Collects nearshore coastal data for planning and maintaining coastal protection structures. An experimental CMIS was set up in Kerala, Tamil Nadu, and Puducherry.

FAO Guidelines on Wildfire Management

Why in News?

- **Recent Release:** The Food and Agriculture Organization (FAO) has updated its "Integrated Fire Management Voluntary Guidelines: Principles and Strategic Actions," revising the previous guidelines to address contemporary climate challenges.

What are the New FAO Fire Management Guidelines?

- **Integration of Knowledge:**
  - Emphasizes combining scientific insights with traditional knowledge from Indigenous Peoples and local communities.
  - Aims to enhance fire management practices, including wildfire prevention, outbreak management, and post-fire restoration.
  - Promotes gender inclusion and diverse perspectives in fire management strategies.
- **Impact and Adoption:**
  - The original guidelines, released nearly 20 years ago, led to the development of public policies and training programs in various countries.
  - The updated guidelines are expected to see broader global adoption and implementation.
- **Global Fire Management Hub:**
  - The FAO and the UN Environment Programme (UNEP) established the Global Fire Management Hub at the 8th International Wildland Fire Conference in May 2023.
  - Supported by countries like Canada, France, Germany, Portugal, South Korea, and the USA, the hub aims to unite the global fire management community and enhance national capacities for integrated fire management.

Forest Fires in India

- **Fire Season:**
  - The forest fire season in India runs from November to June, peaking in April and May.
  - According to the India State of Forest Report (ISFR) 2021, 35.47% of India's forest cover is classified as fire-prone.
- **Regions Most Affected:**
  - Dry deciduous forests are particularly vulnerable, with severe fires prevalent in Northeast India, Odisha, Maharashtra, Jharkhand, Chhattisgarh, and Uttarakhand.
- **Current Scenario (2024):**
  - Uttarakhand reported 1,309 forest fires between January and June 2024, a significant increase from the previous year.
  - High numbers of fires have been recorded in states like Mizoram, Manipur, Assam, Meghalaya, and Maharashtra.

Government Initiatives

- **National Action Plan for Forest Fires (NAPFF):** Launched in 2018 to reduce forest fires by involving forest fringe communities and incentivizing collaboration with state forest departments.
- **Forest Fire Prevention and Management Scheme (FPM):** A government-sponsored program launched in 2017 to assist states in managing forest fires.

Way Forward - NDMA Recommendations on Wildfires

- **Fire Suppression Risks:** Relying solely on suppression can increase fuel loads, leading to uncontrollable fires.
- **Prescribed Burning:** Carefully manage prescribed burns to prevent them from spreading, utilizing organic forest material where appropriate.
- **Community Engagement:** Involve local communities in forest stewardship to enhance ownership and reduce fire risks.
- **Trans-Boundary Management:** Coordinate fire management efforts across borders, as wildfires do not adhere to political boundaries.
- **Risk Communication:** Develop clear, standardized alerts, including smoke and pollution levels, to provide accurate information during fires.
- **Urban-Forest Interface:** Implement building codes and manage construction materials to mitigate fire hazards in urban-forest areas.
- **Training Local Responders:** Equip and train local communities as first responders, with possible remuneration for volunteer firefighters.
- **Specialized Forces:** Develop and train specialized troops, like smokejumpers, for handling fires in remote areas.
- **Recovery Efforts:** Focus on ecosystem recovery post-fire, avoiding monoculture and maintaining seed banks for native plants.
- **Utility Management:** Place utilities underground or maintain them before fire seasons to reduce fire-related accidents.
- **Firefighting Plans:** Prepare action plans considering climate, terrain, vegetation, and water availability, including drought measures.
- **Bioeconomy Development:** Promote bioeconomy strategies with community involvement to support livelihoods and control fires.

WHAT IS A WILDFIRE?

About

- Wildfires, also known as bush, vegetation, or forest fires, are uncontrolled, non-prescribed fires that occur in natural settings like forests, grasslands, and brushlands.
- They spread by consuming natural fuels, influenced by environmental factors like wind and topography.

Classification

- Surface Fire: Burns along the ground, consuming leaves, twigs, and dry grasses.
- Underground Fire/Zombie Fire: Low-intensity fires that burn beneath the surface, spreading slowly and being difficult to detect and control.
- Canopy or Crown Fires: Spread through the upper tree canopy, often fueled by wind and dry conditions, making them intense and hard to control.
- Controlled Deliberate Fires: Also known as prescribed burns, these are intentionally set to reduce fuel loads and mitigate wildfire risks.

Reasons for Wildfires:

- Human Activities: Most wildfires are caused by human actions such as discarded cigarettes, campfires, and burning debris.
- Weather Conditions: Hot, dry weather conditions create an environment conducive to wildfires.
- Aridity: Lack of rainfall and high temperatures dry out vegetation, increasing fire risks.
- Early Availability of Dry Biomass: Early buildup of dry vegetation, particularly in forest areas, heightens the risk and intensity of fires.
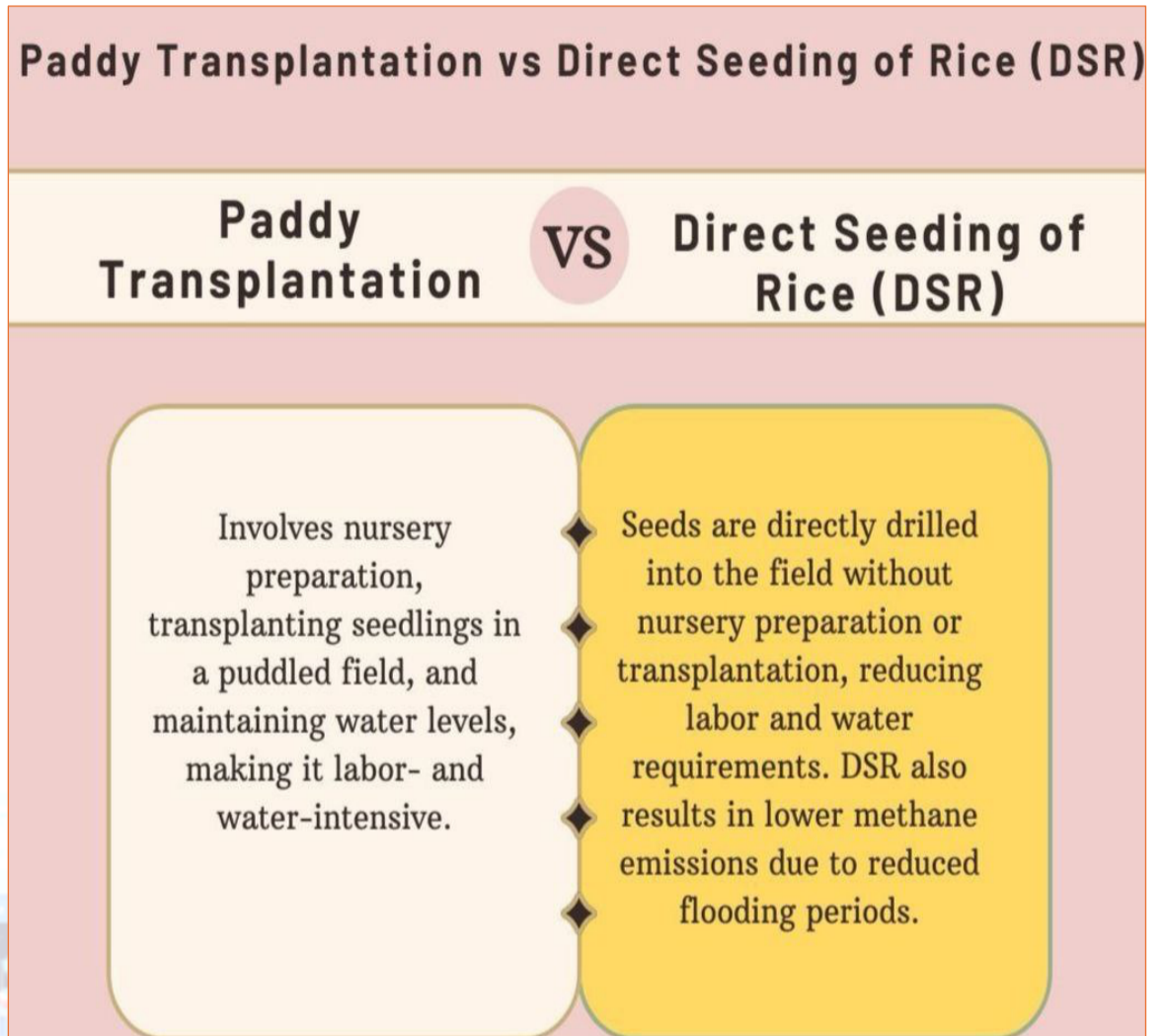
Commercial Cultivation of HT Basmati Rice

Why in News?

- **Recent Development:** The Indian government has allowed the commercial cultivation of two non-transgenic herbicide-tolerant (HT) basmati rice varieties: Pusa Basmati 1979 and Pusa Basmati 1985. These were developed by the Indian Council of Agricultural Research (ICAR) to promote sustainable paddy cultivation that conserves water and reduces carbon emissions.

Key Features of the New Varieties of Rice

- **Herbicide Tolerance:**
  - These varieties contain a mutated AcetoLactate Synthase (ALS) gene, enabling farmers to use the herbicide Imazethapyr to control weeds without affecting the rice plants.
  - The mutated ALS gene prevents the herbicide from binding to the ALS enzymes, ensuring uninterrupted amino acid synthesis, crucial for plant growth.
- **Non-GMO:**
  - Since these varieties are developed through mutation breeding without introducing foreign DNA, they are classified as non-Genetically Modified Organisms (non-GMOs).
- **Significance:**
  - **Sustainability:** These HT rice varieties eliminate the need for traditional nursery preparation, puddling, and transplanting, supporting Direct Seeding of Rice (DSR), which reduces methane emissions.
  - **Environmental Impact:** DSR also reduces water usage and labor, making rice cultivation more sustainable.

Concerns Regarding HT Rice Varieties

- **Super Weeds:** Repeated use of herbicides could lead to the development of "super weeds" resistant to herbicides, complicating weed management.
- **Herbicide Residues:** There are concerns about herbicide residues in food products, which could affect safety standards, especially in markets like the European Union where certain herbicides are banned.
- **Long-term Sustainability:** The increased use of herbicides over time may raise ecological concerns and questions about the long-term viability of HT crops.


Rice in India

- **Cultural Significance:** Rice is a crucial kharif crop requiring high temperatures, humidity, and rainfall above 100 cm.
- **Multiple Crops:** In regions like southern states and West Bengal, favorable climatic conditions allow the cultivation of two or three rice crops annually.
- **Major Producing States:** West Bengal, Uttar Pradesh, and Punjab are the leading producers, while states like Punjab, Tamil Nadu, and Haryana are high-yielding.
- **Global Position:** India is the second-largest rice producer globally, after China.
- **Basmati Rice:**
  - Basmati rice is India's top agricultural export, with 4.56 million tonnes exported in 2022-23, valued at USD 4.78 billion.
  - Basmati's distinctive fragrance is due to 2-acetyl-1-pyrroline (2-AP), which gives it a nutty and aromatic flavor.

Antibiotic-Resistant Bacteria: A Growing Threat

Context:

- **Recent Study:** A study in Nigeria has discovered colistin-resistant bacteria in newborn babies and their mothers, despite neither having been treated with colistin.
- **Critical Concern:** Colistin is a last-resort antibiotic used for treating severe infections. The emergence of resistance to colistin is alarming, especially given its limited use in healthcare settings.

Key Issues:

- **Source of Resistance:** The study suggests that this resistance likely originates from the widespread use of colistin in agriculture, particularly in livestock feed.
- **Antibiotic Use in Farming:** The use of antibiotics in agriculture, especially for non-therapeutic purposes like growth promotion, is a major contributor to antimicrobial resistance (AMR).
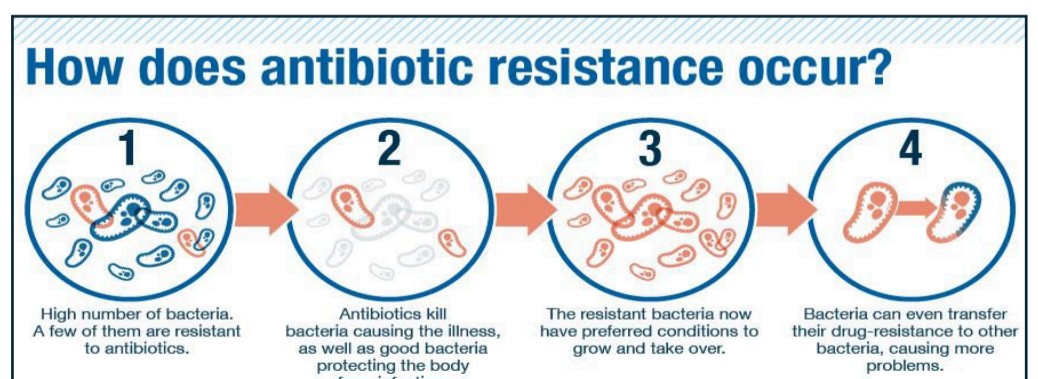
Global Implications:

- **Public Health Risk:** The spread of antibiotic-resistant bacteria poses a severe threat to public healt.h, as it limits the effectiveness of critical antibiotics, making infections harder to treat.
- **Need for Regulation:** There is an urgent need for stricter regulations on the use of antibiotics in agriculture to curb the spread of AMR

Rise in Ground-Level Ozone (Tropospheric Ozone) Pollution Across India's Major Cities: Report

Key Findings on Ground-Level Ozone (GLO):

- **Exceeded Standards:** Ten major metropolitan areas in India have surpassed the national ozone standard, with Delhi being the most affected.
- **GLO Hotspots:** These are found in areas with low levels of NO2 and PM2.5, where the lack of NO2 hinders ozone dissipation.
- **Persistent Night-Time GLO:** Ground-level ozone remains present at night across all metropolitan areas.

Understanding Ground-Level Ozone (GLO):

- **Ozone Composition:** Ozone (O3) consists of three oxygen atoms and occurs in both the Earth's upper atmosphere and at ground level (Tropospheric Ozone).
- **Formation:** GLO is a secondary pollutant formed through the reaction between oxides of nitrogen and volatile organic compounds (VOCs) in sunlight. It peaks during summer.
- **Sources:** Major sources include pollution from vehicles, power plants, industries, and even electronic equipment like photocopiers.

Impact of Ground-Level Ozone (GLO):

- **Health:** GLO can worsen bronchitis, trigger asthma, and cause permanent lung damage.
- **Climate:** It absorbs radiation, acting as a potent greenhouse gas.
- **Agriculture and Ecosystems:** GLO interferes with photosynthesis, stunting the growth of certain plant species.

Strategies to Combat Ozone Pollution:

- **Methane Reduction:** Lowering methane emissions can help reduce ozone levels.
- **Pollution Control:** Reducing emissions from vehicles, power plants, and other industrial sources is crucial in preventing ozone pollution.

Maharashtra Approves Wainganga-Nalganga River Linking Project

Project Overview:

- **Objective:** The Wainganga-Nalganga (Purna Tapi) River linking project aims to irrigate 3.7 lakh hectares of agricultural land across six districts in the Vidarbha region of Maharashtra.
- **Implementation:** Excess water from the Gosikhurd dam in Bhandara district will be diverted to the Nalganga dam in Buldhana district through 426.52 km of link canals.
- **Approval:** The project received approval from the Central Water Commission, following a detailed project report presented by the National Water Development Agency (NWDA) in 2018.
- **Connection to NRLP:** The project will supplement the National River Linking Project (NRLP).

About the National River Linking Project (NRLP):

- **Foundation:** NRLP is based on the National Perspective Plan (NPP) created by the Ministry of Irrigation (now Ministry of Jal Shakti) in 1980 to transfer water from surplus basins to deficit basins.
- **Components:** The NWDA has identified 30 links under NPP—16 under the Peninsular Component and 14 under the Himalayan Component—for feasibility reports.
- **Key Project:** The Union Cabinet approved the implementation of the Ken-Betwa river link in 2021, marking the first interlinking of rivers project.
- **Significance:** NRLP aims to provide additional irrigation in drought-prone areas like Bundelkhand, improve navigation, and reduce flooding issues, such as those in the Kosi River.

Challenges:

- **Resettlement and Rehabilitation:** The project involves significant resettlement and rehabilitation efforts.
- **Environmental Costs:** Concerns include deforestation, soil erosion, and other environmental impacts.

Rivers Involved:

- **Wainganga River:**
  - **Source:** Mahadeo Hills in Madhya Pradesh.
  - **Tributary:** Wainganga is called Pranhita after its confluence with the Wardha River and is a major tributary of the Godavari River.
  - **Riparian States:** Chhattisgarh, Madhya Pradesh, Maharashtra, and Telangana.
- **Nalganga River:**
  - **Tributary:** Nalganga is the main left bank tributary of the Purna River and a sub-tributary of the Tapi River.

Polar Coupled Analysis and Prediction for Services (PCAPS)

Launch: The World Meteorological Organization (WMO) initiated the PCAPS project to enhance weather forecasting in the Arctic and Antarctic regions.

Objective:

- Improve weather, water, ice, and climate information for polar regions.
- Develop observation systems and Earth system models.
- Advocate for better forecasting services.

Affiliation: PCAPS is a part of WMO's World Weather Research Programme (WWRP).

WMO's WWRP:

- **Key Objectives:**
  - Advance Earth system research using the science-for-services value cycle approach.
  - Enhance the warning process to address the changing impacts of extreme weather.

Highest Ocean Heat in Four Centuries Endangers Great Barrier Reef (GBR): Study

Study Highlights:

- **Findings:** A study published in *Nature* reports that the Great Barrier Reef (GBR) is under severe threat due to repeated mass coral bleaching events caused by high sea surface temperatures.
- **Recent Bleaching Events:** From 2016 to 2024, the GBR experienced five mass coral bleaching events.
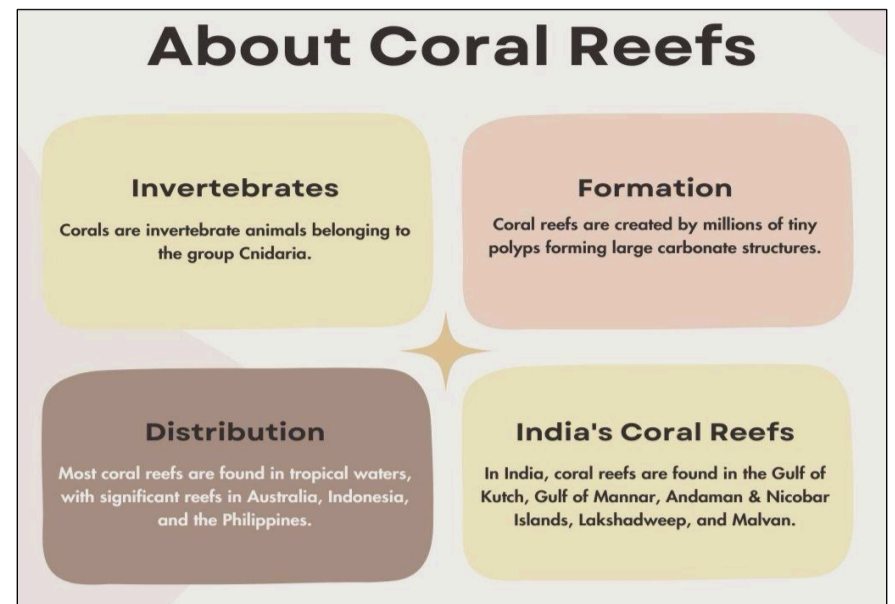
Coral Bleaching Explained:

- **Definition:** Coral bleaching occurs when corals, stressed by changes such as temperature, light, or nutrient levels, expel their symbiotic algae, turning completely white.
- **Causes:** Key factors include heat stress from increased water temperatures, UV radiation, runoff and pollution, extreme low tides, and ocean acidification.

About the Great Barrier Reef (GBR):

- **Location:** The GBR is the world's largest coral reef system, situated off the coast of Queensland, Australia, in the Coral Sea.
- **UNESCO Status:** It was inscribed on the UNESCO World Heritage List in 1981.

Importance of Coral Reefs:

- **Biodiversity:** Coral reefs host the highest biodiversity of any ecosystem on the planet, surpassing even tropical rainforests.
- **Coastal Protection:** They protect coastlines from storms and erosion.
- **Carbon Sink:** Coral reefs act as natural carbon sinks.

About Coral Reefs

Invertebrates
Corals are invertebrate animals belonging to the group Cnidaria.

Formation
Coral reefs are created by millions of tiny polyps forming large carbonate structures.

Distribution
Most coral reefs are found in tropical waters, with significant reefs in Australia, Indonesia, and the Philippines.

India's Coral Reefs
In India, coral reefs are found in the Gulf of Kutch, Gulf of Mannar, Andaman & Nicobar Islands, Lakshadweep, and Malvan.

Conservation Efforts:

- **Global Initiatives:** Efforts include the Global Fund for Coral Reefs, Global Coral Reef Monitoring Network, and the Coral Triangle Initiative.
  - **Coral Triangle:** A marine area in the western Pacific Ocean, encompassing the waters of Indonesia, Malaysia, the Philippines, Papua New Guinea, Timor Leste, and the Solomon Islands.
- **India's Measures:** India has implemented Marine Protected Areas and coral restoration through Biorock technology.

Clouded Leopard

Recent Event:

- **Observation:** International Clouded Leopard Day was recently observed in Aizawl, Mizoram.

Characteristics:

- **Distinctive Markings:** Named for the 'clouds' on its coat—ellipses partially edged in black, with a darker interior.
- **Tail:** Possesses the longest tail relative to body size among all cats, aiding in balance.
- **Habitat Preference:** Primarily arboreal, spending more time in trees than on the ground.

Habitat:

- **Geographic Range:** Found in Southern China, Bhutan, Nepal, northeast India, Myanmar, Thailand, Vietnam, Malaysia, Cambodia, Laos, and Bangladesh.

Threats:

- **Primary Concerns:** Habitat loss and fragmentation, poaching, and illegal wildlife trade.

CLOUDED LEOPARD

Conservation Status

1. IUCN: Vulnerable
2. Wild Life (Protection) Act, 1976: Listed under Schedule I and IV
3. CITES: Appendix I
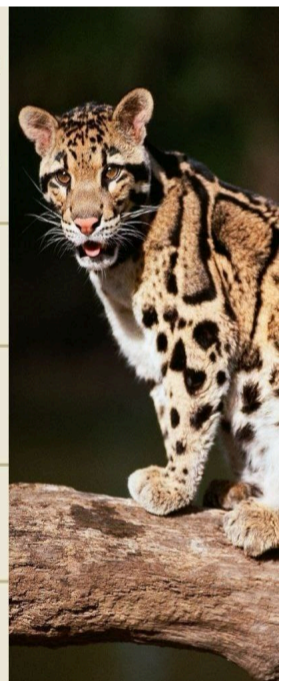
ECONOMY

World Development Report 2024: The Middle Income Trap

Why in News?

- **Recent Findings:** The World Bank's "World Development Report 2024: The Middle Income Trap" highlights the challenges faced by over 100 countries, including India, in transitioning to high-income status in the coming decades.

Key Highlights of the Report:

- **Middle Income Trap:**
  - India, along with other countries like China, risks falling into the "middle income trap," where economic progress stalls, preventing the transition to high-income status.
  - Only 34 middle-income economies have transitioned to high-income since 1990, often due to unique circumstances like EU integration or oil wealth.
  - The report stresses that middle-income countries face diminishing returns on physical capital, making it insufficient to rely solely on increasing savings and investments.
  - Productivity issues are highlighted as a significant barrier, emphasizing that outdated economic strategies focused primarily on investment are inadequate.
- **Global Economic Impact:**
  - Middle-income countries, home to 75% of the global population, generate over 40% of global GDP. Their success or failure will significantly impact global prosperity.
- **Per Capita Income Disparity:**
  - The report notes that while India is the fastest-growing major economy, it would take 75 years at the current growth rate for its per capita income to reach a quarter of the US level.
- **Challenges and Risks:**
  - Middle-income countries, including India, face obstacles such as aging populations, rising debt, geopolitical tensions, and environmental challenges.
- **Strategic Recommendations:**
  - The report suggests a "3i Strategy" for countries:
    - **1i Phase:** Focus on investment for low-income countries.
    - **2i Phase:** Investment and foreign technology infusion for lower-middle-income countries.
    - **3i Phase:** Investment, infusion, and innovation for upper-middle-income countries.
  - South Korea is cited as a successful example of this phased approach.
- **Policy Recommendations:**
  - India needs a comprehensive approach to enhance overall economic performance, rather than focusing on isolated sectors.
  - The report advises improving education and skills, strengthening university-industry connections, and addressing barriers that prevent productive firms from growing.

Understanding the Middle Income Trap:

- **Definition:** The middle-income trap occurs when a country's economic growth slows after reaching middle-income status, preventing further progression to high-income levels.
- **Current Status:** By the end of 2023, 108 countries were classified as middle-income, housing 75% of the global population and generating over 40% of global GDP.

Strategies to Avoid the Middle-Income Trap:

- **Address Income Inequality:** Implement policies for equitable wealth distribution and strengthen social safety nets.
- **Enhance Economic Diversification:** Invest in emerging industries and encourage regional development.
- **Increase Productivity and Innovation:** Focus on innovation, education, and skills development to enhance productivity.
- **Support Local Manufacturing:** Encourage local production and reduce reliance on imports through targeted policies.
- **Strengthen Economic Institutions:** Improve governance, reduce corruption, and streamline regulations to attract investment.
- **Focus on Sustainable Development:** Align growth strategies with environmental sustainability goals.
- **Promote Financial Inclusion:** Improve access to credit and financial services through digital platforms.

Factors Supporting India's Improvement:

- **Global Offshoring:** Increased outsourcing and acceptance of remote work are expected to double employment in outsourced jobs by 2030.
- **Digitalization:** Programs like Aadhaar and IndiaStack are driving financial inclusion and credit access.
- **Energy Transition:** Significant investment in renewables is expected to reduce reliance on imported energy and improve living conditions.
- **Manufacturing Sector:** Incentives and infrastructure spending are projected to boost manufacturing's share of GDP.
- **Services Sector:** Continued growth in the services sector is expected to be a dominant driver of India's economic expansion.
- **Economic Size:** India's GDP is projected to double by 2031, with the country expected to become the world's third-largest economy.

About the World Bank:

- **Creation:** The World Bank was established in 1944 at the Bretton Woods Conference, along with the International Monetary Fund (IMF).
- **Institutions:** It comprises five development institutions, including the International Bank for Reconstruction and Development (IBRD) and the International Development Association (IDA).
- **India's Role:** India, a founding member, has accessed funds for various development projects.
- **Major Reports:** The World Bank publishes key reports like the World Development Report and the Human Capital Index.

Challenges INDIA MUST OVERCOME:

1. **Income Inequality** — Persistent consumption inequality and slowing poverty reduction post-pandemic hinder inclusive growth

2. **Per Capita Income** — India's current per capita income is significantly below the upper-middle-income threshold, requiring sustained growth to transition to high-income status.

3. **Labor Force Participation** — Concerns remain about job quality, real wage growth, and low female labor force participation

4. **Economic Diversification** — Diversifying beyond traditional sectors like mining and manufacturing is essential to avoid over-reliance.

5. **Environmental and Climate Resilience** — Aligning economic growth with climate resilience is necessary for sustainable development.

Finance Bill, 2024 Amends LTCG Tax Provisions on Immovable Properties

Amendment Overview:

- **Context:** Follows the Budget 2024-25 proposal to remove the indexation benefit for calculating Long Term Capital Gains (LTCG) on the sale of immovable properties.
- **Proposed Changes:** Budget suggested a reduced LTCG tax rate of 12.5% on all assets (without indexation), down from 20%.

Indexation Benefits:

- **Purpose:** Adjusts the purchase price of assets based on inflation, reducing the overall tax liability by neutralizing the impact of inflation on capital gains.

Key Provisions of the Amendment Act:

- **Two LTCG Tax Rate Options:**
  1. **12.5% tax rate** without indexation benefit.
  2. **20% tax rate** with indexation benefit, allowing taxpayers to choose the more advantageous option.
- **Applicability:** Applies to real estate properties (land or buildings) acquired before July 23, 2024.

Capital Gain (CG):

- **Definition:** Profits from the sale of any capital asset (real estate, stocks, bonds, etc.), categorized as income and subject to capital gains tax.
- **Types:**
  - **Short-term CG:** Gains on listed financial assets held for less than a year, and unlisted financial assets and non-financial assets held for less than two years.
  - **Long-term CG:** Gains on listed financial assets held for more than a year, and unlisted financial assets and non-financial assets held for at least two years.

Bitumen and Bio-Bitumen: Key Insights

Government Initiative:

- The Indian government plans to allow up to 35% bio-bitumen mixing, potentially saving ₹10,000 crore in foreign exchange outflows.

About Bitumen:

- **Description:** A black, sticky substance produced through the distillation of crude oil, known for its adhesive properties.
- **Applications:** Commonly used for paving roads, waterproofing, and various construction applications.

About Bio-Bitumen:

- **Description:** A type of bitumen made from organic elements like bio-char and bio-oil.
- **Usage:** Can be added to traditional bitumen or used to reduce the amount of conventional bitumen in binder mixtures.

Benefits:

Reduced Imports: Less dependence on imported bitumen.

Environmental Impact: Helps address issues like stubble burning.

Economic Boost: Supports the bio-economy by utilizing organic materials.

Tantalum Deposits: Key Information

Recent Update:

- **Government Action:** The Central Government has designated Tantalum as a Critical and Strategic Mineral under the Mines and Minerals (Development and Regulation) Act, 1957.

About Tantalum:

- **Basic Info:** Tantalum is a rare, grey, heavy, and hard metal with the atomic number 73.
- **Key Characteristics:**
  - **Corrosion-Resistant:** Highly resistant to chemical reactions.
  - **Ductility:** When pure, it can be stretched or drawn into thin wires.
  - **High Melting Point:** It has an extremely high melting point, making it ideal for high-temperature applications.

Uses:

- **Electronics:** Essential for making capacitors in electronic devices.
- **Medical:** Used in surgical equipment and implants.
- **Industry:** Components for chemical plants, nuclear power plants.
- **Defense & Aerospace:** Used in aeroplanes, missiles, and other high-performance applications.

Kasturi Cotton Bharat

Context: The Ministry of Textiles has launched the Kasturi Cotton Bharat programme to improve the traceability, certification, and branding of Indian cotton.

Key Features

- **Technology Integration:** The programme uses QR-based certification and blockchain for end-to-end traceability of Kasturi Cotton Bharat tagged bales.
- **Microsite and Platform:** A dedicated microsite with QR code verification and a blockchain platform supports the initiative.
- **Promotion:** The programme is promoted both domestically and internationally to enhance India's cotton market.

Objective

- **Global Competitiveness:** Enhance the global standing of Indian cotton through self-regulation, branding, traceability, and certification.
- **Sustainability:** Create a sustainable ecosystem for all stakeholders involved in the cotton industry.

Implementing Agency

- **TEXPROCIL:** The Cotton Textiles Export Promotion Council (TEXPROCIL) is the apex body responsible for implementing the traceability, certification, and branding of Kasturi Cotton Bharat.

Anaemia Mukt Bharat (AMB)

Context: The Indian government is actively implementing the Anaemia Mukt Bharat (AMB) strategy to combat anaemia across six key demographic groups: children aged 6-59 months, children 5-9 years, adolescents 10-19 years, women of reproductive age, pregnant women, and lactating women.

Key Interventions

1. **Iron-Folic Acid Supplementation:** Providing necessary supplements to prevent and treat anaemia.
2. **Deworming:** Regular deworming initiatives to reduce anaemia caused by parasitic infections.
3. **Behaviour Change Communication:** Campaigns to educate and promote practices that prevent anaemia.
4. **Anaemia Testing and Treatment:** Regular testing for anaemia and ensuring timely treatment.
5. **Fortified Food Provision:** Distribution of iron-fortified foods to enhance iron intake.
6. **Addressing Non-Nutritional Causes:** Tackling underlying non-nutritional factors contributing to anaemia.

Bio-bitumen

Context: The Indian government plans to allow up to 35% bio-bitumen mixing with petroleum-based bitumen, primarily to reduce foreign exchange outflows.

Key Points:

1. **Source and Production:**
   o Bio-bitumen is derived from paddy straw (parali), which can also produce bio-gas and biochar.
2. **Economic and Environmental Impact:**
   o Aims to decrease dependency on imported bitumen, reduce air pollution from stubble burning, and provide economic opportunities for farmers and MSMEs.
   o Bio-bitumen is more cost-effective than petroleum-based bitumen and offers environmental benefits by lowering greenhouse gas emissions.
3. **Implementation:**
   o The government is promoting the use of bio-bitumen in road construction projects across India, aligning with sustainability goals and reducing the environmental footprint.

WFP and Odisha Government Launch 24/7 'Grain ATM' in Bhubaneswar

Overview:

- **Launch:** India's first 24/7 'Grain ATM,' named 'Annapurti,' is introduced in Odisha to provide food grains under the National Food Security Act (NFSA).
- **NFSA:** Ensures subsidized food grains for up to 75% of the rural and 50% of the urban population.

About Annapurti:

- **Developed by:** WFP India.
- **Functionality:** Dispenses wheat, rice, or millet after biometric authentication, reducing waiting time by 70%.
- **Features:** Energy-efficient, compatible with solar panels for automatic refilling.
- **Recognition:** Awarded as one of WFP's top 5 innovative solutions at the 2022 WFP Innovation Awards.

About UN World Food Programme (WFP):

- **Established:** 1961 by the United Nations.
- **Role:** The world's largest humanitarian organization focused on saving lives in emergencies and providing food assistance.
- **Nobel Prize:** Awarded the Nobel Peace Prize in 2020.

Government Push for Infrastructure Projects

Why in News?

- **Recent Development:** The Cabinet Committee on Economic Affairs, chaired by the Prime Minister, has approved eight National High-Speed Corridor projects under the Public-Private Partnership (PPP) model. These projects are expected to generate approximately 4.42 crore man-days of employment.

Approved National High-Speed Corridor Projects:

- **Corridors and Models:**
  - **Agra-Gwalior:** Build-Operate-Transfer (BOT)
  - **Tharad-Deesa-Mehsana-Ahmedabad:** BOT
  - **Guwahati Ring Road:** BOT
  - **Nashik Phata-Khed:** Hybrid Annuity Model (HAM)
  - **Kharagpur-Moregram:** HAM
  - **Ayodhya Ring Road:** HAM
  - **Raipur-Ranchi:** Engineering, Procurement, and Construction (EPC)
  - **Kanpur Ring Road:** EPC

Types of PPP Models:

- **Build-Operate-Transfer (BOT):** The private partner finances, builds, operates, and transfers the project back to the government after the contract period.
- **Hybrid Annuity Model (HAM):** A mix of EPC and BOT, with the government providing 40% of the project cost and the private partner handling the rest.
- **Engineering, Procurement, and Construction (EPC):** The government finances and the private sector provides engineering and construction services.

Government's Roadmap for Infrastructure Development:

- **Focus on PPP:** Emphasis on project development through PPP to allow private investment and risk management.
- **Amendments to Concession Agreements:** Enhanced terms for private investors, including liberal compensation and extended concession periods.
- **Construction Support Mechanism:** NHAI will provide up to 40% of project costs in installments based on physical progress, enhancing financial viability.

Related Infrastructure Development Schemes:

- **PM Gati Shakti:** Integrated planning and implementation of infrastructure projects to expedite work and create jobs.
- **Bharatmala Scheme:** Focuses on highway development, multimodal integration, and closing infrastructure gaps.
- **National Infrastructure Pipeline (NIP):** A collection of social and economic infrastructure projects aimed at improving the quality of life.
- **Sagarmala Project:** Development of port infrastructure along India's coastline.
- **UDAN Scheme:** Aims to improve air connectivity to remote areas and create employment in aviation.

CHALLENGES TO INFRASTRUCTURE DEVELOPMENT

Physical Infrastructure
Land acquisition, funding, and technological expertise are major challenges.

Geographical Challenges
Diverse topography and extreme weather conditions increase project complexity.

Political and Regulatory Risk
Various approvals, community opposition, and regulatory changes create uncertainties.

Digital Divide
Developing digital infrastructure is hindered by rural-urban disparities and cybersecurity concerns

Steps for Enhancing Infrastructure Development:

- **Investment in Social Infrastructure:** Focus on education, health, and sanitation to improve workforce productivity and social mobility.
- **Increased PPP:** Partner with the private sector to finance, design, and operate infrastructure projects.
- **Improved Project Planning:** Streamline processes to ensure timely and cost-effective project completion.
- **Innovative Financing Solutions:** Explore infrastructure bonds and other financing methods to mobilize additional funds.
- **Encouraging FDI:** Create a favorable environment for Foreign Direct Investment in infrastructure.
- **Building Human Capital:** Invest in job training, quality education, and infrastructure research to support development.
- **Effective Regulation:** Establish and enforce quality and safety standards to ensure the success of infrastructure projects.

SCIENCE & TECHNOLOGY

Ransomware Attack Disrupts Banking Operations

Recent Developments:

- **Incident:** A significant ransomware attack disrupted operations in 150-200 cooperative banks and Regional Rural Banks (RRBs) across India.
- **NPCI Involvement:** The attack was identified by the National Payments Corporation of India (NPCI) and mainly impacted banks serviced by C-Edge Technologies Ltd., a joint venture between Tata Consultancy Services Ltd. (TCS) and State Bank of India (SBI).

Impact on Banking Operations:

- **Service Disruption:** The attack affected C-Edge Technologies Ltd., hindering services to the cooperative banks and RRBs, leading to unavailability of payment systems like UPI and Aadhaar-enabled Payment Systems (AePS).
- **Partial Functionality:** Some RRBs, using different technology providers, remained operational.

Wider Implications for Payment Systems:

- **Vulnerability Exposure:** The incident underscores the importance of securing technology service providers, critical to maintaining the payment infrastructure.
- **Need for Cooperation:** Collaboration between NPCI, banks, and technology providers is essential for swift mitigation and future prevention.

Understanding Ransomware:

- **Definition:** Ransomware is malware that encrypts data or locks devices, demanding a ransom for decryption or access.
- **Evolution:** Attacks have evolved into double-extortion (threatening to leak data) and triple-extortion (targeting customers or partners).
- **Types:**
    - *Encrypting Ransomware (Crypto Ransomware):* Encrypts data, demanding a ransom for the decryption key.
    - *Non-encrypting Ransomware (Screen-locking Ransomware):* Locks the device, showing a ransom demand.
    - *Leakware/Doxware:* Steals and threatens to publish data.
    - *Mobile Ransomware:* Targets mobile devices.
    - *Wipers:* Threaten to or destroy data.
    - *Scareware:* Uses fear tactics to coerce payment.

Cyber Threat Perspective:

- **Financial Impact:** Ransomware attacks can cause significant financial losses, with an average data breach cost in India reaching ₹19.5 crore in FY 2024.
- **Attack Speed:** Hackers can deploy ransomware in less than four days after gaining network access, leaving little time for response.

Ransomware Infection Methods:

- **Phishing:** Using social engineering to trick victims into downloading ransomware.
- **Exploiting Vulnerabilities:** Leveraging system weaknesses to inject ransomware.
- **Credential Theft:** Stealing credentials to deploy ransomware.
- **Drive-by Downloads:** Infecting devices via compromised websites.
- **Ransomware as a Service (RaaS):** Allowing criminals to use pre-developed ransomware for a share of the ransom.

Notable Ransomware Variants:

- **Examples:** Akira, LockBit, CryptoLocker, WannaCry, Petya, Ryuk, DarkSide, Locky, REvil, Conti.

Legislative Protections in India:

- **Legal Framework:** Ransomware attacks violate the Indian Penal Code 1860 and the IT Act 2000, with penalties ranging from three to seven years imprisonment and fines up to ₹1 crore.
- **Ransomware Task Force (RTF):** A specialized unit within the National Cyber Security Coordinator (NCSC) providing assistance to victims.
- **Cybersecurity Guidelines:** RBI's 2018 framework mandates robust cybersecurity measures for banks, including multi-factor authentication, encryption, and regular audits.

Way Forward:

- **Cybersecurity Improvements:** Banks and tech providers must enhance endpoint protection, network security, and employee training.
- **Data Backup:** Implement robust data backup and recovery procedures with offline backups and continuity plans.
- **Enhanced Standards:** Strengthen security assessments for third-party vendors, improve incident response, and obtain cybersecurity certifications.

Vampire Star Discovery by Indian Researchers

Context: Researchers from the Indian Institute of Astrophysics (IIA) have identified a "vampire star," also known as a blue straggler star (BSS), in the M67 star cluster within the Cancer constellation.

Key Details:

- **Vampire Star (WOCS 9005):** This star rejuvenates by drawing material from a companion star, defying conventional stellar evolution models and appearing younger than it actually is.
- **Detection:** The discovery was made using data from the UltraViolet Imaging Telescope aboard AstroSat, India's first space observatory.
- **Spectroscopic Analysis:** The star's atmosphere is enriched with heavy elements like barium, yttrium, and lanthanum, suggesting it has been polluted by material from its binary companion, which has now evolved into a white dwarf.

- **Significance:** This finding offers crucial insights into the mass transfer processes in binary star systems.

Sub-Zero Temperature Batteries by CSIR

Context: The Council of Scientific and Industrial Research (CSIR) has developed a new battery capable of functioning efficiently in sub-zero temperatures, benefiting defence forces and civilians in high-altitude areas.

Key Features:

- **Innovative Design:** The battery incorporates a robust cathode catalyst and an anti-freezing electrolyte, allowing it to operate in extreme cold where conventional batteries typically fail.
- **Hybrid Cathode Material:** Researchers at CSIR-Central Mechanical Engineering Research Institute combined cobalt and iron alloys with nanoparticles to enhance the battery's durability and performance, suitable for both liquid and solid-state zinc-air batteries.
- **Versatility:** The battery is portable, flexible, and lightweight, making it ideal for military personnel and remote communities.
- **Broader Impact:** This development is part of a larger initiative to create efficient energy storage systems, addressing the limitations of traditional lithium-ion batteries and exploring alternatives like metal-air batteries and electro-catalytic methods for sustainable energy solutions.

Indigenous Methane Mitigator: Methylocucumis oryzae

Context: India has identified indigenous methanotrophs, bacteria that naturally mitigate methane, a potent greenhouse gas, from rice fields and wetlands in Western India.

Key Findings:

- **Discovery:** Researchers isolated novel methanotrophs, including a new genus and species named *Methylocucumis oryzae.*
- **Function:** These bacteria efficiently oxidize methane, converting it into CO_2 and water, reducing methane emissions.
- **Unique Characteristics:** *Methylocucumis oryzae* is distinguished by its large size, oval shape, and specific temperature requirements, unable to grow above 37°C.
- **Agricultural Benefits:** This methanotroph also promotes rice plant growth, leading to earlier flowering and increased grain yield.

Ladakh: Potential Site for Martian/Lunar Analogue Research Station

What is an Analogue Research Station?

- A location resembling planetary bodies or extreme space environments for research and testing.
- Currently, 33 such stations exist worldwide, including BIOS-3 (Russia) and HERA (USA). None are in the Indian subcontinent.

Need for Analogue Sites:

- **Technology Testing:** Crucial for testing new technologies and equipment for space missions.
- **Habitat Simulation:** Studies human behavior in extreme environments, focusing on isolation and team dynamics.
- **Contingency Planning:** Prepares for handling various challenges during space missions.

Why Ladakh?

- **Geomorphological Similarities:** Ladakh's dry, cold desert with rocky terrain, flatlands, and permafrost resembles Mars and the Moon.
- **Geochemical Similarities:** Presence of volcanic rocks, saline lakes, and hydrothermal systems akin to Martian conditions.
- **Exobiological Factors:** High UV radiation, reduced atmospheric pressure, and boron-rich hot springs.

Ladakh as an Astronomical Hub:

- **Indian Astronomical Observatory (IAO):** Located in Hanle, Ladakh.
- **Astro Tourism:** Hanle is designated as Hanley Dark Sky Reserve (HDSR).
- **Space Programmes:** Host to initiatives like NASA's Spaceward Bound India Programme 2016.

Tribo-Electric Nanogenerator (TENG) Technology

Recent Development:

- **IIT Indore Innovation:** Developed footwear for military personnel using TENG technology.

About TENG Technology:

- **Function:** Converts mechanical energy from walking into electrical energy through the triboelectric effect, which is stored in an embedded device.
- **Triboelectric Effect:** This is the generation of electrical charge through friction.
- **Advantages:** Portable and renewable energy source.
- **Applications:** The stored energy can be used to power small electronic devices, wearable devices, IoT (Internet of Things) devices, and medical devices.

Scientists Obtain Deepest Rock Sample from Earth's Mantle

Overview:

- **Achievement:** Scientists aboard the US vessel *JOIDES Resolution* have drilled approximately 1.2 km below the Atlantis Massif, surpassing the previous record of 201 meters.

Earth's Mantle:

- **Composition:** The mantle, primarily made of silicate rock, constitutes over 80% of Earth's volume and lies between the Earth's crust and core.
- **Accessibility:** Mantle rocks are usually inaccessible except in areas like seafloor spreading zones, such as the Atlantis Massif.

Atlantis Massif:

- **Location:** An underwater mountain near the Mid-Atlantic Ridge, close to the Lost City Hydrothermal Field.
- **Drilling Programme:** Conducted under the International Ocean Discovery Program, with India as a funding partner.

Key Highlights:

- **Sample Recovered:** The newly obtained sample contains over 70% rock.
- **Significance:**
  - **Understanding Mantle Composition:** The sample provides insights into the upper mantle's composition and the chemical interactions between mantle rock and seawater.
  - **Origins of Life:** These processes might have contributed to the origin of life on Earth billions of years ago.
  - **Potential for Life:** The deeper drilling allows scientists to explore for heat-loving bacteria and other organisms that might exist further down.
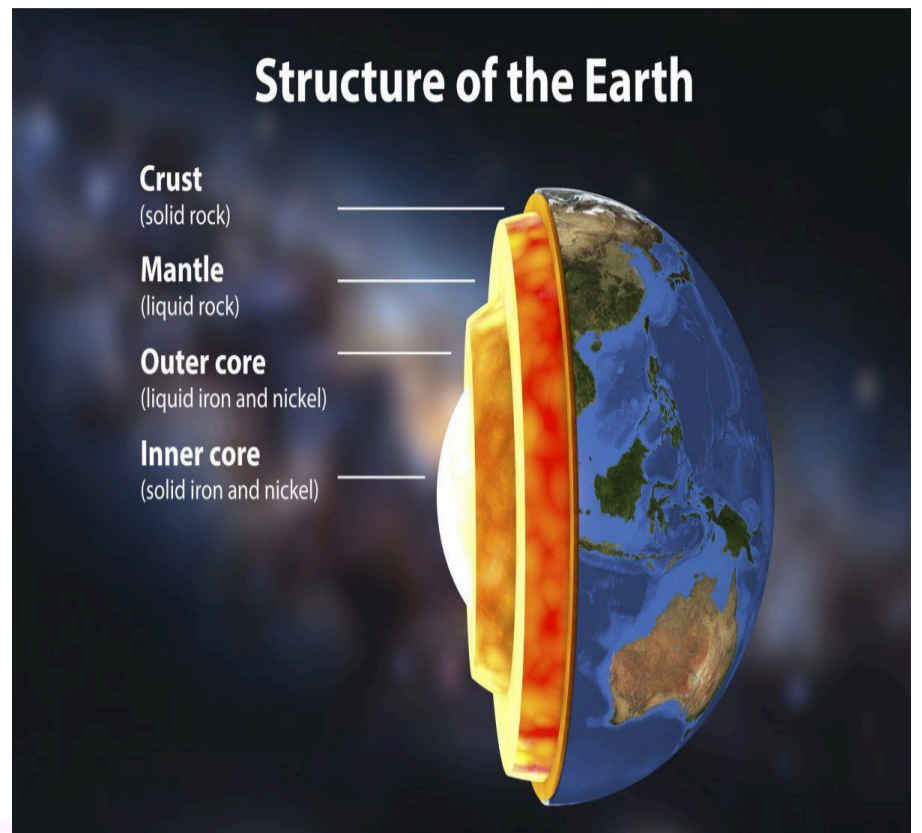
DNA Profiling

Context: The Madras High Court recently overturned a conviction based solely on DNA evidence, emphasizing the need for corroborative evidence in judicial proceedings.

Key Points:

1. **What is DNA Profiling?**
   - DNA profiling involves analyzing specific locations in the 0.1% of human DNA that varies between individuals to identify genetic matches.
2. **Accuracy and Limitations:**
   - While DNA profiling is increasingly accurate, it is not infallible. Factors such as sample contamination and the probabilistic nature of DNA analysis can affect the reliability of results.
3. **Judicial Implications:**
   - The court's decision underscores that DNA evidence should not be used in isolation to determine guilt or innocence; corroborative evidence is necessary to ensure a just verdict.