

CURRENT AFFAIRS

WEEKLY



MAINS ARTICLE

GS-I

- UNCHECKED URBANISATION RENDERS DELHI VULNERABLE TO FLOODING

GS II

- CHINA'S 'FIVE PRINCIPLES' OF FOREIGN POLICY
- INDIA ACHIEVES 'OUTSTANDING OUTCOME' IN FATF EVALUATION
- THE FEDERAL DEBATE: EDUCATION AND STATE RIGHTS
- RISING GLOBAL DRUG USE: A GROWING CONCERN
- ANUSANDHAN NATIONAL RESEARCH FOUNDATION (ANRF)
- PROGRESS ON 'ZERO HUNGER' NOW IN REVERSE

GS-III

- PROJECT NEXUS
- DECLINE OF POVERTY IN INDIA: NCAER
- SMART CITIES MISSION
- CRITICAL MINERAL RECYCLING
- 90% OF EARTH'S LAND COULD BE DEGRADED BY 2050: UNESCO
- FOSSIL FUELS STILL DOMINATE GLOBAL ENERGY
- PENCH TIGER RESERVE'S AI SYSTEM FOR FOREST FIRE DETECTION
- BIAS IN AI: ADDRESSING A GROWING CONCERN
- VEGFR1, MEDICAL SOLUTIONS FOR COLON AND RENAL CANCERS
- UTTARAKHAND TO STUDY RISK POSED BY 13 GLACIAL LAKES
- HATHRAS STAMPEDE

GS-IV

- NHRC ISSUES NOTICE OVER 'DISCRIMINATION' BY FOXCONN

PRELIMS ARTICLE

GEOGRAPHY

- Bannerghatta National Park
- Pantanal

HISTORY

- The Santhal Hul of 1855

ART & CULTURE

- Abhaya Mudra

POLITY & GOVERNANCE

- Multilevel Regression and Post-stratification (MRP) Modelling

ECONOMY

- Petrodollars
- Manufacturing Purchasing Managers' Index
- Base Year Update
- Mumbai-Ahmedabad Bullet Train Project

SCIENCE & TECHNOLOGY

- Project-76
- World's first Brain Implant to control Epileptic Seizures
- Abhyas (High Speed Expendable Aerial Target)

ENVIRONMENT

- Kuno's Chital Population
- PM 2.5 Pollution
- The New Species discovery in India
- Conservation of GIB and Lesser Florican
- Borneo Elephant (*Elephas maximus borneensis*)
- Mainland Serow (*Capricornis sumatraensis*)
- Red Panda (*Ailurus fulgens*)

TERMS OF THE WEEK

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DISCLAIMER

*T*he current affairs articles are segregated from prelims and mains perspective, such separation is maintained in terms of structure of articles. Mains articles have more focus on analysis and prelims articles have more focus on facts.

However, this doesn't mean that Mains articles don't cover facts and PT articles can't have analysis. You are suggested to read all of them for all stages of examination.

CONTENT

1st WEEK - JUNE, 2024

SECTION - A

GEOGRAPHY (GS-I)

- Unchecked urbanisation renders Delhi Vulnerable to Flooding06

INTERNATIONAL RELATIONS (GS-II)

- China's 'Five Principles' of Foreign Policy07
- India achieves 'outstanding outcome' in FATF evaluation07

POLITY & GOVERNANCE (GS-II)

- The New Criminal Laws08
- The Federal Debate: Education and State Rights10
- Rising Global Drug Use: A Growing Concern10
- Anusandhan National Research Foundation (ANRF)11
- Progress on 'Zero Hunger' now in Reverse12

ECONOMY (GS-III)

- Project Nexus13

- Decline of Poverty in India: NCAER13
- Smart Cities Mission15

ENVIRONMENT (GS-III)

- Critical Mineral Recycling16
- 90% of Earth's land could be degraded by 2050: UNESCO17
- Fossil Fuels Still Dominate Global Energy17
- Pench Tiger Reserve's AI System for Forest Fire Detection19

SCIENCE & TECHNOLOGY (GS-III)

- Bias in AI: Addressing a Growing Concern19
- VEGFRI, Medical Solutions for Colon and Renal Cancers20
- DISASTER MANAGEMENT20
- Uttarakhand to study risk posed by 13 glacial lakes21

ETHICS (GS-IV)

- NHRC issues notice over 'discrimination' by Foxconn23

SECTION B: QUICK BYTES

GEOGRAPHY

- Bannerghatta National Park25
- Pantanal25

HISTORY

- The Santhal Hul of 185526

ART & CULTURE

- Abhaya Mudra27

POLITY & GOVERNANCE

- Multilevel Regression and Post-stratification (MRP) Modelling29

ECONOMY

- ▣ Petrodollars.....29
- ▣ Manufacturing Purchasing Managers'30
Index
- ▣ Base Year Update30
- ▣ Mumbai-Ahmedabad Bullet30
Train Project

SCIENCE & TECHNOLOGY

- ▣ Project-76.....32
- ▣ World's first Brain Implant to control32
Epileptic Seizures

- ▣ Abhyas (High Speed Expendable34
Aerial Target)

ENVIRONMENT

- ▣ Kuno's Chital Population34
- ▣ PM 2.5 Pollution34
- ▣ The New Species discovery in India35
- ▣ Conservation of GIB and Lesser Florican...35
- ▣ Borneo Elephant (Elephas maximus36
borneensis)
- ▣ Mainland Serow36
(Capricornis sumatraensis)
- ▣ Red Panda (Ailurus fulgens).....37

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SECTION-A

MAINS ISSUES

UNCHECKED URBANISATION RENDERS DELHI VULNERABLE TO FLOODING

CONTEXT

Recent heavy rainfall in Delhi has once again highlighted the chronic issue of urban flooding in the city, exacerbated by unchecked urban expansion and inadequate drainage systems.

How urbanisation is responsible?

Delhi is undergoing one of the world's fastest urban expansions. The geographic size of Delhi almost doubled from 1991 to 2011. This urban expansion, however, has paid little heed to **Delhi's natural topography**.

- **Unchecked Urban Growth:** Rapid and unplanned urbanization has expanded Delhi without adequate consideration for natural drainage patterns.
- **Impact on Drainage:** Historical areas of Delhi were built on higher ground, allowing rainwater to naturally drain. Modern construction in low-lying areas disrupts these natural drainage routes.
- **Concrete Jungle:** Extensive concretization reduces the land's ability to absorb rainwater, leading to increased surface runoff during heavy rains.
- **Drainage Infrastructure:** Existing drainage systems, including nallahs (drains), are often insufficiently maintained and become clogged easily.
- **Role of Civic Authorities:** Inadequate desilting of drains by civic bodies exacerbates flooding during monsoon seasons.

- **Infrastructure:** The introduction of infrastructure like railways and roads in flood plains has further compromised natural drainage systems.
- In short, Delhi is grappling with urban flooding caused by a combination of factors: unprecedented and extreme rainfall patterns, silt buildup, and encroachment on floodplains.

How Sustainable urban planning can help?

- Cities must prioritise **sustainable urban planning, comprehensive infrastructure development**, and the preservation and restoration of natural water bodies to effectively address urban flooding.
- Measures such as **green roofs, rainwater harvesting systems, and permeable pavements** can reduce surface runoff and alleviate pressure on drainage systems. These solutions are crucial in building flood-resilient communities.



FACT BOX

Government Measures for Urban Flooding

- **Atal Mission for Rejuvenation and Urban Transformation (AMRUT) 2.0 Scheme:** It provides for rainwater harvesting through storm water drains into water body (which is not receiving sewage/effluent) & creation/ strengthening of storm water drains around water body.
- **Other measures:** Jal Shakti Abhiyan (JSA), Amrit Sarovar Mission, Atal Bhujal Yojana, Model Building Bye Laws (MBBL), 2016

CHINA'S 'FIVE PRINCIPLES' OF FOREIGN POLICY

CONTEXT

China recently celebrated the **70th anniversary of the Five Principles of Peaceful Coexistence**, a cornerstone of its foreign policy. This concept, originally proposed by China in 1954, is also known as **Panchsheel** in India.

What are these Five Principles?

- The Five Principles were first articulated during talks between India and China, reflecting a mutual desire for peaceful relations amidst their emergence on the global stage post-independence (India in 1947 and China in 1949).
- **The Five Principles**
 - ▶ **Mutual Respect for Territorial Integrity and Sovereignty:** Both countries agreed to respect each other's borders and territorial sovereignty.
 - ▶ **Mutual Non-Aggression:** Commitment to refrain from acts of aggression or hostility towards each other.
 - ▶ **Mutual Non-Interference:** Agreement not to interfere in each other's internal affairs.
 - ▶ **Equality and Mutual Benefit:** Interactions based on equality and mutual benefit, fostering cooperation.
 - ▶ **Peaceful Coexistence:** Promoting harmony and peaceful relations between nations.
- Panchsheel was later included in the **Ten Principles of International Peace and Cooperation** at the **Bandung Conference** in April 1955, attended by Afro-Asian countries.

Impact and Evolution

- Initially aimed at enhancing trade and cooperation, the Five Principles gained broader recognition at the **Bandung Conference** in 1955, influencing the **Non-Aligned Movement (NAM)**.
 - ▶ The Non-Aligned Movement, founded by Jawaharlal Nehru, that rose in the 1960s adopted the 'Panchsheel' or Five Principles as its guiding principles.
- However, the **Sino-Indian War of 1962** strained relations and diluted the principles' influence.
- Current Perspective on China's Foreign Policy

Modern Context

Despite its historical emphasis on peaceful coexistence, China's contemporary foreign policy under President Xi Jinping has shown assertiveness:

- **Economic Growth and Assertiveness:** China's economic rise has been accompanied by assertive territorial claims in the South China Sea and confrontations with neighboring countries.
- **Global Relations:** Relations with the United States have been marked by competition and tension, challenging American influence globally.

- **Current Issues:** Tensions persist between India and China, notably along the Line of Actual Control (LAC) in Ladakh, despite attempts at diplomatic resolution.



FACT BOX

Non-Aligned Movement

- **Founded:** 1961
- Formed during the height of the Cold War, the Non-Aligned Movement served as a middle ground for countries unwilling to ally themselves with either the United States or the Soviet Union.
- NAM builds its work on ten **Bandung principles** (including the Panchsheel).
- **India's position**
 - ▶ India, a founding member and the largest participant in NAM, played an active role in meetings until the 1970s.
 - ▶ However, India's leaning towards the USSR caused divisions among smaller NAM members.
 - ▶ India is now a member of the G20 and has declared itself a **nuclear power**, shifting focus away from **global nuclear disarmament**.
 - ▶ India engages with both new and traditional global powers, participating in initiatives like the **Quadrilateral Security Dialogue (Quad)** and the **Shanghai Cooperation Organisation (SCO)**.

INDIA ACHIEVES 'OUTSTANDING OUTCOME' IN FATF EVALUATION

CONTEXT

India has achieved an outstanding outcome in the 2023-24 mutual evaluation by the Financial Action Task Force (FATF). This milestone highlights India's efforts to combat money laundering (ML) and terrorist financing (TF), placing India in the "regular follow-up" category, a distinction shared by only four other G-20 countries.

FATF Evaluation and Its Significance:

- **High-Level Compliance:** The FATF plenary concluded that India has reached a high level of technical compliance with FATF requirements. The anti-money laundering (AML), countering the financing of terrorism (CFT), and counter-proliferation financing (CPF) regimes of India are achieving good results, including international cooperation and access to beneficial ownership information.
 - ▶ **Effective Measures:** India's AML/CFT/CPF framework has been effective in using financial intelligence and depriving criminals of their assets. The evaluation highlighted India's success in transitioning from a cash-based to a digital economy to reduce ML/TF risks.

- ▶ **Recognition of Efforts:** The FATF has recognized India's rigorous measures over the past decade to safeguard its financial system from ML/TF threats, including efforts to mitigate risks arising from corruption, fraud, and organized crime.
- **Areas Needing Improvement:**
 - ▶ **Supervision and Implementation:** The FATF observed that India needs to strengthen the supervision and implementation of preventive measures in some non-financial sectors.
 - ▶ **Delays in Prosecutions:** India needs to address delays in concluding ML and TF prosecutions to ensure timely justice.
 - ▶ **CFT Measures for NPOs:** Improvements are required to ensure that CFT measures aimed at preventing the non-profit sector from being abused for TF are implemented effectively, including conducting outreach to NPOs about their TF risks.
- **Policy Implications and Future Directions:**
 - ▶ **Enhancing Supervision:** Strengthening the supervision of non-financial sectors will be crucial to maintaining and improving compliance with FATF standards.
 - ▶ **Speeding Up Legal Processes:** Addressing delays in ML and TF prosecutions will enhance the effectiveness of India's AML/CFT framework and ensure quicker justice.
 - ▶ **Outreach to NPOs:** Conducting regular outreach and providing guidance to NPOs will help them understand and mitigate TF risks, ensuring compliance with FATF's risk-based approach.

Initiatives by the Indian government against money laundering

- Guidelines and rules under the Prevention of Money Laundering Act (PMLA), 2001
- Know Your Customer (KYC) procedures
- Fugitive Economic Offenders Act in 2018
- Anti-black money Act, 2015
- Foreign Exchange Regulation Act (FERA), 1973
- Foreign Exchange Management Act (FEMA) in 1999
- Indian Customs Act, 1962
- Smugglers and Foreign Exchange Manipulators Forfeiture of Property Act, 1975
- Foreign Contribution (Regulation) Act, 1976
- The promulgation of the Prevention of Terrorism Act (POTA), 2002
- India is a signatory to the 1988 United Nations Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (the Vienna Convention).



FACT BOX

FATF

- The **Financial Action Task Force (FATF)** is an independent **inter-governmental body** that develops and promotes policies to protect the **global financial system** against money laundering, terrorist financing and the financing of proliferation of weapons of mass destruction.
- **What are the Black List and Grey List?**
- Those are **two types** of lists that FATF maintains;
 - ▶ **A blacklist** is given to the countries that FATF considers uncooperative tax havens. These countries are known as **Non-Cooperative Countries or Territories (NCCTs)**.
 - ▶ **A Grey list** is a warning given to the country that it might come on the Black list.
 - ▶ But even when a country comes under a grey list it faces many problems like problems in getting loans Economic sanctions Reduction in trade.

THE NEW CRIMINAL LAWS

CONTEXT

Three new criminal laws came into effect from July 1, 2024. **The Bharatiya Nyaya Sanhita (BNS), the Bharatiya Nagrik Suraksha Sanhita (BNSS), and the Bharatiya Sakshya Adhinyam (BSA)**, passed in Parliament will replace the Indian Penal Code (IPC), 1860, the Criminal Procedure Code (CrPC), 1973, and the Indian Evidence Act, 1872 respectively.

About the New Law

Previous Act/Code	New Law
Indian Penal Code, 1860	Bharatiya Nyaya Sanhita (BNS)
Criminal Procedure Code, 1898	Bharatiya Nagrik Suraksha Sanhita (BNSS)
Indian Evidence Act, 1872	Bharatiya Sakshya Adhinyam (BSA)

- The new law seeks to **replace the colonial-era sedition law** which was mainly used against Indian political leaders seeking independence from British rule.
- Also, the **state-of-the-art technologies** have been incorporated in these laws.
- The objective of these laws is **not to punish anyone** but **give justice** and in this process punishment will be given where it is required to create a sense of prevention of crime.

Why there is a need for reforms?

- **Colonial Legacy:** The laws we currently use for justice are leftovers from British rule, designed to control the nation. Their relevance in today's world is questionable.
- **Ineffective Justice System:** Instead of protecting the innocent and punishing the guilty, the justice system often harasses ordinary people.
- **Backlog of Cases:** There are about 35 million pending cases in India's courts, especially in local and district courts. This delay denies justice to many.
- **High Number of Undertrials:** India has one of the highest numbers of undertrial prisoners globally. Over two-thirds of our prison population are awaiting trial.
- **Police Challenges:** The police, crucial in the justice system, face issues like corruption, heavy workloads, and lack of accountability. These hinder fair and timely justice delivery.

Key Changes Introduced by Bharatiya Nyaya Sanhita (BNS)	
Deceitful Sexual Intercourse	Clause 69 of the BNS criminalizes sexual intercourse obtained through deceitful means, such as false promises of marriage or employment.
Murder Based on Race, Caste, or Community	Recognizes murder motivated by factors like race or caste as a distinct offense (Clause 103).
Inclusion of Other Offenses	
Organized Crime and Terrorism	Covers crimes like organized crime and terrorism, previously handled under separate laws like UAPA.
Mob Lynching and Hate Crimes	BNS defines mob lynching as murder committed by a group of five or more individuals based on factors like race, caste, community, or personal belief. Offenders face life imprisonment to death penalty, aligning with murder charges.
Attempt to Suicide	Criminalizes attempts to commit suicide to influence or restrain public servants from performing their duties. Penalty includes jail time up to one year and potential community service.

Snatching	Defined separately from theft, with stricter penalties.
Revised Structure	
Offenses Against Women	Given higher priority in the law's structure compared to previous laws. Changes in BNSS
Fake News	Criminalizes the dissemination of false and misleading information that could harm communal harmony.
Sedition	Renamed as 'deshdroh,' expands to include acts supporting separatist activities.
Procedural Changes	
Extended Police Custody	Allows police to detain suspects for up to 90 days for investigation, an increase from the previous 15-day limit.
Trials in Absentia	Introduces the concept of trials in absentia, where accused individuals can be tried even if they are not present in court.
Victim-Centric Approach	
Timely Trials	Imposes stricter timelines for completing trials, ensuring victims are heard before cases are withdrawn by the government.

Positive Aspects and Concerns

Positive Changes	Remaining Concerns
<ul style="list-style-type: none"> • Community Service: Introduced as an alternative to jail time for certain offenses. • Protection of Minors: Includes provisions to protect minor wives under rape laws. 	<ul style="list-style-type: none"> • Sedition: Despite claims to abolish sedition laws, the BNS introduces a broader definition of the offense. • Gender Neutrality: Does not address the issue of gender neutrality in rape laws, leaving male victims with limited legal recourse.

THE FEDERAL DEBATE: EDUCATION AND STATE RIGHTS

CONTEXT

In recent times, controversies have engulfed key exams like NEET-UG, allegations of paper leaks, and irregularities have surfaced. Similarly, the UGC-NET exam was canceled post conduct, while NEET-PG and CSIR-NET have been postponed. These incidents highlight a crucial debate: **the balance between federalism and centralized governance**, particularly in 'education'.

Background and Constitutional Shifts

- Originally, education was **solely under the purview of state legislatures** as a **State subject** in the Constitution. However, during the **Emergency in 1976**, through the **42nd Constitution Amendment**, it was moved to the **Concurrent List**. This amendment expanded the powers of both state assemblies and Parliament, but granted Parliament supremacy in case of conflict.
- The shift placed education alongside other subjects like forests and weights & measures, diluting state autonomy. This move was based on recommendations to consolidate governance and ensure uniform standards across the nation. However, it sparked debates about federal principles and state rights.

Impact of Centralisation

- Centralizing education under the Concurrent List means both the Union and states can legislate, but once Parliament acts, states cannot enact laws without Presidential assent if they conflict with Union laws. This setup has implications, particularly in areas like admissions policies.
- For instance, the introduction of NEET for medical admissions standardized the process nationwide but curtailed states' ability to tailor admissions to local needs.
- States argue that such centralization **ignores their educational investments and unique regional requirements, impacting diversity and state-specific educational goals**.
- Critics argue that while a Concurrent List is necessary for national issues, subjects like education, crucial for local development and identity, should revert to the State List. This shift, they contend, would empower states to innovate, preserve diversity, and cater education to grassroots needs effectively.
- Education is not merely about imparting knowledge but also about preserving cultural identity and linguistic diversity.



FACT BOX

- 'Education' was originally a **State subject** in the Constitution.
- In 1976 (during Emergency) by **42nd Constitution Amendment**, it was shifted to the Concurrent List (List III under Article 246).
- Now, both state Assemblies and the Parliament have the power, with Parliament having supremacy over state Assemblies.
- This is why the National Education Policy (NEP), or the National Eligibility cum Entrance Test (NEET), which are brought in by the Union government, take precedence over state governments' own policies.
- The **42nd Constitutional Amendment Act** brought a lot of changes in the Seventh Schedule, which took away some important entries in the State List.
 - The fields of legislation under Entry 11 (Education), 19 (Forest), 20 (Wild animals and birds) and 29 (Weights and measures) of List II were shifted to List III.

RISING GLOBAL DRUG USE: A GROWING CONCERN

CONTEXT

The United Nations Office on Drugs and Crime (UNODC) has reported a significant increase in global drug use, highlighting the need for a comprehensive strategy to address the issue.

Increasing Trends in Global Drug Use

- Introduction to the Issue:** The UNODC report, released on June 27, 2024, reveals that global drug users numbered 292 million in 2022, marking a 20% increase over the past decade.
- Cannabis as the Most Widely Used Drug:** Cannabis remains the most commonly used drug with 228 million users, followed by opioids (60 million), amphetamines (30 million), cocaine (23 million), and ecstasy (20 million).

Types of Drugs: In 2016, 6 drug types accounted for nearly all drug trafficking offenses:

- Methamphetamine: 33.6%
- Cocaine: 19.8%
- Marijuana: 17.6%
- Heroin: 14.4%
- Crack: 8.1%
- Oxycodone: 2.8%
- Other: 3.7%

- ▶ **Treatment Gap:** Despite 64 million people suffering from drug use disorders, only one in 11 receives treatment, with women facing even greater barriers—only one in 18 women with drug use disorders receive treatment compared to one in seven men.
- **Implications for Gender Equality and Social Stability**
 - ▶ **Gender Disparities in Treatment:** The significant barriers faced by women in accessing treatment for drug use disorders underscore the need for gender-sensitive approaches in health care and rehabilitation.
 - ▶ **Impact on Young People:** Evidence-based prevention programs are crucial, especially for young people, to equip them with the knowledge and skills to avoid drug use.
 - ▶ **Empowerment of Organized Crime:** Drug trafficking fuels organized crime, which diversifies into other illegal economies, such as wildlife trafficking, financial fraud, and illegal resource extraction, exacerbating social instability.
- **Strategies for Addressing Drug Use and Its Consequences**
 - ▶ **Comprehensive Strategy Needed:** A multifaceted approach involving prevention, treatment, and law enforcement is essential to tackle the issue effectively.
 - ▶ **Law Enforcement and Health Rights:** Strengthening law enforcement to disrupt criminal networks must be balanced with upholding human rights and providing health services to those struggling with addiction.
 - ▶ **Decline in Global Opium Production:** A significant decline in opium production, particularly in Afghanistan (95% decrease in 2023) and Myanmar (36% increase), has long-term implications for global drug markets and treatment services.

- **National Action Plan for Drug Demand Reduction (NAPDDR)** is an umbrella scheme of the Ministry of Social Justice & Empowerment (MoSJ&E) under which financial assistance is provided to State Governments/ Union Territory (UT) Administrations for Preventive Education and Awareness Generation.
- **Global stance:** India is signatory of the following international treaties and conventions to **combat the menace of Drug Abuse:**
 - ▶ United Nations (UN) Convention on Narcotic Drugs (1961)
 - ▶ UN Convention on Psychotropic Substances (1971)
 - ▶ UN Convention against Illicit Traffic in Narcotic Drugs and Psychotropic Substances (1988)
 - ▶ UN Convention against Transnational Organized Crime (UNTOC) 2000.

ANUSANDHAN NATIONAL RESEARCH FOUNDATION (ANRF)

CONTEXT

The government notified the governing board and the executive council of the Anusandhan National Research Foundation (ANRF). However, the executive and governing boards of ANRF has no representation from Indian industry. There is also no presence of State universities, who the ANRF had said would be among the major beneficiaries of the new structure.

About ANRF

- Anusandhan National Research Foundation (ANRF) is a new research funding agency with an outlay of Rs 50,000 crore over the next five years.
- ANRF aims to consolidate research funding previously managed by the **Science and Engineering Research Board (SERB)**.
- It will foster research and innovation across India's universities, colleges, and laboratories in natural sciences, engineering, health, agriculture, and more and enhance the country's Research and Development (R&D) capabilities.
- **Structure and Leadership:**
 - ▶ **Governing Board (15 members):** Headed by Prime Minister Narendra Modi as President, with Ministers of Science & Technology and Education as Vice Presidents. Includes Secretaries from key departments and advisors.
 - ▶ **Executive Council:** Chaired by the Principal Scientific Adviser, consisting of Secretaries from various ministries and CEOs.
- The bill (**Anusandhan National Research Foundation Bill, 2023**) to establish the ANRF was passed by both the Houses of Parliament in August last year.

UN Office on Drugs and Crime (UNODC):

- The agency's focus is the **trafficking and abuse of illicit drugs, crime prevention and criminal justice, international terrorism, and political corruption**.
- It is a member of **the United Nations Development Group**.

Efforts to combat drug problem:

- **Narcotics Drugs and Psychotropic Substance (NDPS) Act, 1985:** It prohibits a person from producing, possessing, selling, purchasing, transporting, storing, and/or consuming any narcotic drug or psychotropic substance.
 - ▶ The NDPS Act has since been amended thrice – in 1988, 2001 and 2014.
 - ▶ The Act extends to the whole of India and it applies also to all Indian citizens outside India and to all persons on ships and aircraft registered in India.

ENasha Mukht Bharat: The 'Nasha Mukht Bharat', or Drug-Free India Campaign which focuses on community outreach programs.

- The ANRF is a move to provide a high-level strategic direction for research, innovation and entrepreneurship in the fields of natural sciences, including mathematical sciences, engineering and technology, environmental and earth sciences, health and agriculture, and have long-term effect and outcomes for each citizen.

Comparison with SERB Act, 2008:

	SERB Act, 2008	Anusandhan National Research Foundation (ANRF) Act
Funds	SERB funded solely by the government.	ANRF seeks contributions from both government and private sources
Governance	Chaired by the Secretary of the Department of Science and Technology	Led directly by high-level officials
Scope	Promoting basic research in Science and Engineering	ANRF expands beyond natural sciences to include mathematics, humanities, social sciences, and art, aiming to address national priorities like clean energy and sustainable infrastructure
Participation	Hard for private research organisations to contribute to NRF funding body.	Aims to involve Government institutions, colleges, Universities, higher educational institutions and private sector organisations

PROGRESS ON 'ZERO HUNGER' NOW IN REVERSE

CONTEXT

A recent report by the International Panel of Experts on Sustainable Food Systems (IPES-Food) has highlighted alarming trends in global hunger, exacerbated by recent global crises and climate impacts. The report coincides with the United Nations' review of progress towards Sustainable Development Goal 2 during its High-level Political Forum on Sustainable Development.

Key Findings of the Report:

- Nearly 30% of the world's population faces food

insecurity, with 42% unable to afford a healthy diet.

- Projections suggest around 600 million people could be hungry by 2030, moving the 'zero hunger' goal further away.
- **Impact of Global Crises:** The COVID-19 pandemic, Russia-Ukraine war, and climate crisis have severely impacted the global food system's resilience.
- **Role of Localized Food Supply Chains:** Local food systems, termed 'territorial markets', have demonstrated resilience and equity in the face of shocks. These systems include public markets, street vendors, cooperatives, and urban agriculture, supporting smaller-scale producers and ensuring community access to nutritious foods.
- **Benefits of Localized Systems:**
 - ▶ Access to diverse and nutritious foods.
 - ▶ High resilience to global shocks and adaptability to local needs.
 - ▶ Affordable prices and environmental sustainability benefits.
 - ▶ Support for livelihoods of small-scale producers and preservation of food cultures.
- **Challenges Faced by Local Markets:**
 - ▶ Penalized by trade policies, investment priorities, and agricultural subsidies favoring corporate interests.
 - ▶ Lack of infrastructure such as sanitation and storage facilities poses challenges to scalability.

What is Zero Hunger?

- **Sustainable Development Goal 2** aims to achieve "zero hunger". It aims to end hunger, achieve food security and improved nutrition and promote sustainable agriculture.
- To measure the success of achieving this, the UN outlines five targets to indicate our progress towards **Zero Hunger**:
 - ▶ Access to safe, nutritious, and sufficient food year-round
 - ▶ End malnutrition in all its forms
 - ▶ Increase agricultural productivity
 - ▶ Sustainable food systems and agricultural resilience
 - ▶ Diversified crops and seeds

Situation in India:

- As per the **2023 Global Hunger Index**, India is ranked 111 out of 125 countries and falls into the *serious* category of hunger.
- India has by far the highest number of '**zero-food**' children at 6.7 million (67,00,000), accounting for almost half of all 'zero-food children' across 92 countries
- According to the **UN's Food and Agricultural Organisation (FAO) 'The State of Food Security and Nutrition in the World, 2022 Report'**, 224.3 million people, or 16 per cent of India's population, are undernourished with 53 per cent of reproductive-age women also being anemic.

- According to the “**State of Food Security and Nutrition in the World 2021**” report, around 9.8% of the Indian population is undernourished.
- Causes:** The compounding impacts of have exacerbated social and economic inequalities and slowed or reversed previous progress in reducing hunger in many countries.
 - Climate change
 - Conflicts
 - Economic shocks (Unemployment, poverty)
 - Food wastage
 - Global pandemic
 - Russia-Ukraine war
- Key Initiatives in India:** National Food Security Act, 2013; Mid-Day Meal Scheme; Pradhan Mantri Matru Vandana Yojana; National Nutrition Mission (Poshan Abhiyan)

Recommendations for Policy Action:

- Redirect Public Procurement:** Support sustainable small-scale producers through government purchasing policies.
- Shift Subsidies:** Invest in infrastructure for ‘territorial markets’ to enhance their capacity and reach.
- Protect Local Markets:** Safeguard local food systems from corporate dominance through policy interventions.
- Promote Sustainable Practices:** Encourage biodiverse farming and diverse diets to ensure food security and environmental sustainability.

UPSC PYQ

- Q: How far do you agree with the view that the focus on lack of availability of food as the main cause of hunger takes the attention away from ineffective human development policies in India? (2018)**
- Q: Hunger and Poverty are the biggest challenges for good governance in India still today. Evaluate how far successive governments have progressed in dealing with these humongous problems. Suggest measures for improvement. (2017)**

PROJECT NEXUS

CONTEXT

The Reserve Bank of India (RBI) has joined Project Nexus, a multilateral international initiative to enable instant cross-border retail payments by interlinking domestic Fast Payments Systems (FPSs). India’s Unified Payments Interface (UPI) and FPSs of Malaysia, the Philippines, Singapore and Thailand will be interlinked through Nexus. Going ahead, the platform can be extended to more countries.

What is Project Nexus?

- Project Nexus is a multilateral international initiative among central banks and financial authorities to enable instant cross-border retail payments.

- Initiated by:** Innovation Hub of the Bank for International Settlements (BIS)
- It is the **first BIS Innovation Hub project** in the payments area to move towards live implementation
- It focuses on linking domestic instant payment systems (IPS) globally, enabling near-instantaneous transactions between countries.
- Founding members of Project:** Central banks of India, Malaysia, Philippines, Singapore, and Thailand.
- The platform standardizes the connection process, making it easier for countries to join and allowing for rapid expansion of cross-border payment capabilities.
- Key Objectives**
 - Standardization of IPS Connections:** Instead of creating custom connections for each country, Nexus provides a unified platform where a single connection enables access to all member countries.
 - Facilitation of Instant Cross-Border Payments:** By interlinking FPSs, Project Nexus aims to reduce the time and cost associated with cross-border transactions, aiming for transaction times within 60 seconds in most cases.
- The platform is expected to go live by 2026.

Benefits of Project Nexus

- Enhanced Efficiency:** Standardized connections streamline the process of linking domestic FPSs, reducing the complexities involved in establishing cross-border payment networks.
- Reduced Costs:** Near-zero costs to both senders and recipients are expected due to the efficiency gains and elimination of intermediary fees associated with traditional cross-border transactions.
- Improved Accessibility:** Enables broader access to instant cross-border payments, promoting financial inclusion and facilitating smoother international transactions for individuals and businesses alike.

DECLINE OF POVERTY IN INDIA: NCAER

CONTEXT

Recent research by the **National Council of Applied Economic Research (NCAER)** has highlighted a significant decline in poverty in India, despite challenges posed by the pandemic. According to the study titled ‘Rethinking Social Safety Nets in a Changing Society’, poverty has decreased from 21.2% in 2011-12 to 8.5% in 2022-24.

What is Poverty?

- Poverty goes beyond income scarcity, encompassing challenges like poor health, inadequate education, unsafe living conditions, and vulnerability to violence.
- The NITI Aayog currently measures poverty through **Multidimensional Poverty Index (MPI)**. The MPI

captures overlapping deprivations (dimensions of poverty) in health, education and living standards.

- **Multidimensional Poverty:** Measures multiple deprivations in daily life such as poor health, lack of education, inadequate living standards, disempowerment, poor quality of work, the threat of violence, and living in areas that are environmentally hazardous, among others.
- **Multidimensionally poor:** An individual who is deprived of one-third or more of the weighted indicators.
- **Extreme Multidimensional Poverty:** Any person deprived of one-half or more of the weighted indicators.

Key-findings of the Report

- Poverty declined significantly between 2004-2005 and 2011-12 (from a headcount ratio of 38.6 to 21.2), and it continued to decline between 2011-12 and 2022-24 (from 21.2 to 8.5) despite the challenges posed by the pandemic.
- **Responsible factors for decline in poverty:** Economic growth played a crucial role in this positive trend. Even amidst pandemic difficulties, poverty continued to decrease, underscoring the resilience of India's economic fabric.
- **Challenges:** As India progresses towards equitable development, adapting social protection programs becomes crucial.
- **Required measures:** The research emphasizes that traditional strategies for chronic poverty may need revision, as economic growth shifts the focus towards addressing transient factors like **natural disasters, health crises, and changes in employment opportunities.**

How poverty impacts India's economy?	Benefits of reducing Poverty
<ul style="list-style-type: none"> ◦ Less number of people getting resources. ◦ Growth inclination as rich becomes richer and poor becomes poorer ◦ Low income generation ◦ Drop in standard of living conditions ◦ Cheap labour and man-power available ◦ Gender inequality ◦ Low rate of education 	<ul style="list-style-type: none"> ◦ Enhanced Quality of Life (health, education, and living standards) ◦ A more skilled and healthy workforce, potentially boosting productivity, innovation ◦ Empowerment of Marginalized Communities ◦ Higher Consumer Demand ◦ Increased school attendance and educational attainment ◦ Greater social cohesion ◦ Increased awareness and capacity for environmental stewardship



FACT BOX

- **Poverty Line**
 - ▶ The poverty line recommended by the Tendulkar Committee Report was set to Rs 447 and Rs 579 for rural and urban areas, respectively, but varied between states for 2004-2005. These poverty thresholds were subsequently adjusted by The Planning Commission to Rs 860 and Rs 1,000 for 2011-12.
 - ▶ So far, 6 Official Committees have estimated the number of people living in poverty.
 - ▶ The working group of 1962
 - ▶ V N Dandekar and N Rath (1971)
 - ▶ Y K Alagh (1979)
 - ▶ D T Lakdawala (1993)
 - ▶ Suresh Tendulkar (2009)
 - ▶ C Rangarajan (2014)
 - ▶ Government Measures to eliminate poverty:
 - ▶ October 17 is observed as the International Day for the Eradication of Poverty.
 - ▶ National Food for Work Programme: The National Food for Work Programme was launched on November 14, 2004 in 150 most backward districts of the country with the objective to intensify the generation of supplementary wage employment.
 - ▶ Swarnajayanti Gram Swarozgar Yojana (SGSY): SGSY, launched in April 1999, aims at bringing the assisted poor families (Swarozgaris) above the poverty line by organizing them into Self Help Groups (SHGs) through a mix of Bank credit and Government subsidy.
 - ▶ Sampoorna Grameen Rozgar Yojana (SGRY): SGRY, launched in 2001, aims at providing additional wage employment in all rural areas and thereby food security and improve nutritional levels. The SGRY is open to all rural poor who are in need of wage employment and desire to do manual and unskilled work around the village/habitat. The programme is implemented through the Panchayati Raj Institutions (PRIs).
 - ▶ Pradhan Mantri Gramodaya Yojana (PMGY): PMGY launched in 2000-01 envisages allocation of Additional Central Assistance (ACA) to the States and UTs for selected basic services such as primary health, primary education, rural shelter, rural drinking water, nutrition and rural electrification.
 - ▶ Rural Employment Generation Programme (REGP): To create self-employment opportunities in rural areas and small towns, it is being implemented by the Khadi and Village Industries Commission (KVIC).
 - ▶ Prime Minister's Rozgar Yojana (PMRY): The objective is making available self-employment opportunities to the educated unemployed youth by assisting them in setting up any economically viable activity.

UPSC PYQ

Q: ‘Despite the implementation of various programmes for the eradication of poverty by the government in India, poverty is still existing’. Explain by giving reasons. (2018)

Q: “An essential condition to eradicate poverty is to liberate the poor from the process of deprivation.” Substantiate this statement with suitable examples. (2016)

- Significant challenges hindering urban development and economic growth:
 - Poor local governance
 - Inadequate infrastructure and services
 - Outdated urban planning
 - Megacities (Delhi, Mumbai) are regarded as the economic engines of India, and yet every year, heavy rainfall lasting a couple of hours or days causes havoc there.
 - Slums

SMART CITIES MISSION

CONTEXT

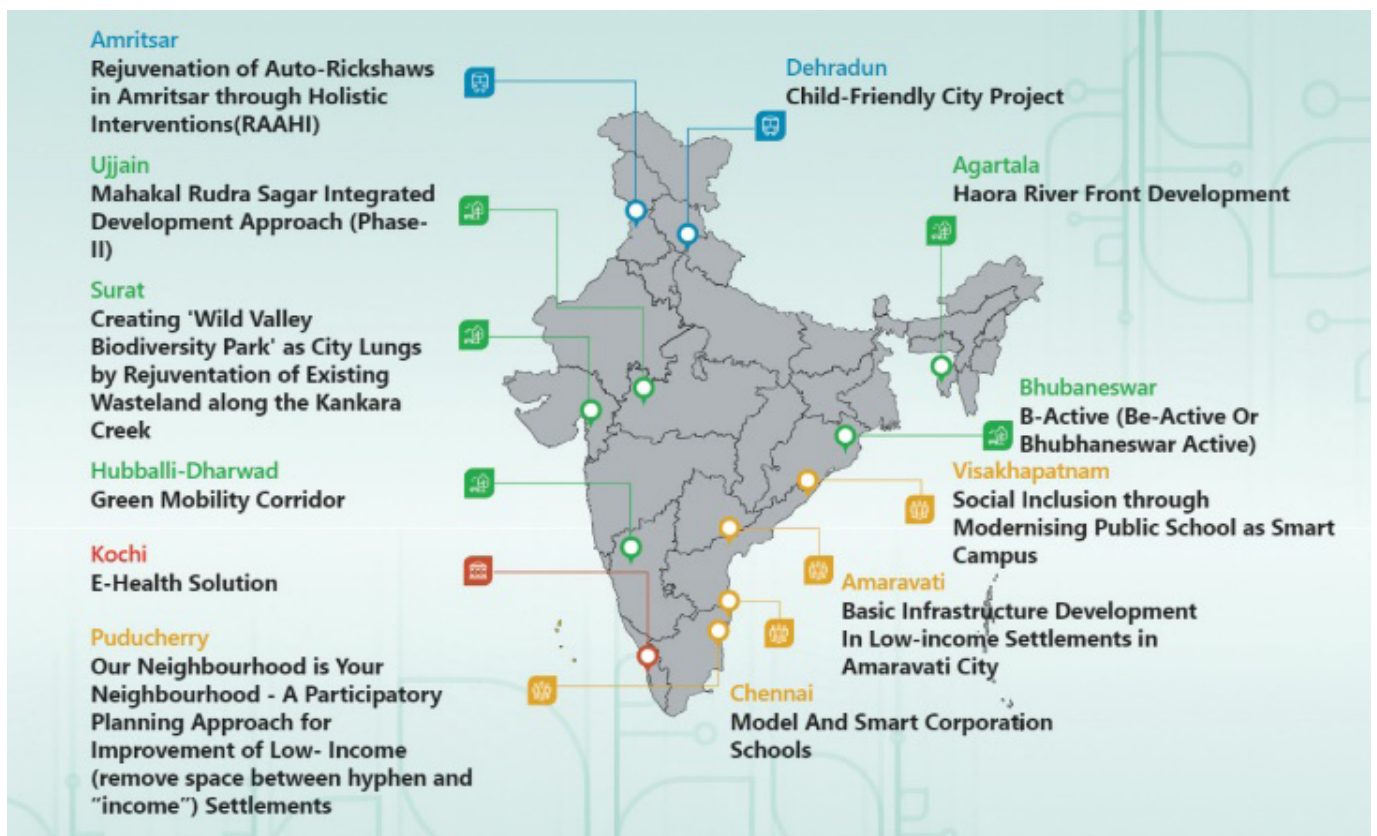
The Ministry of Housing and Urban Affairs has extended the deadline for the **Smart Cities Mission** till March 2025, allowing cities to complete ongoing projects, which account for around 10% of the total projects.

What is the concept of Smart Cities?

- The concept of smart cities emerged after the 2009 financial crash. It aimed to integrate urban centres with advanced communication networks and infrastructure.
- In India, the Smart Cities Mission (SCM) was initiated in 2015, aiming to develop 100 cities.
- **Need of smart cities in India (unprecedented urban expansion):**
 - By 2030 India will be home to 60 cities with a population of more than 1 million and 6 megacities with a population of more than 10 million.

Smart Cities’ Report Card (Progress so far)

- As of July 3, 2024, the 100 cities involved in the Smart Cities Mission have successfully completed 7,188 projects, which accounts for 90% of the total projects planned. These projects amount to ₹1,44,237 crore. Additionally, 830 more projects worth ₹19,926 crore are nearing completion.
- **Budget Allocation and Utilization:**
 - The Government of India (GOI) allocated ₹48,000 crore for the Smart Cities Mission.
 - As of now, GOI has released ₹46,585 crore, which is 97% of the allocated budget.
 - Cities have utilized 93% of the released funds for various development projects.
- **Financial Support:** GOI has provided full financial support to 74 out of the 100 cities participating in the Mission.
- **Multi-Sectoral Projects:** Across the 100 cities, more than 8,000 multi-sectoral projects are underway, with a combined worth of approximately ₹1.6 lakh crore.



Challenges

- Urban Local Bodies (ULBs) lack core competence, trained manpower and finances for completion of urban infrastructure projects.
- Local challenges** related to land, labor etc., has also led to slowdown in progress.
- Irregularities in implementation** of works such as redoing of same work again & duplication of work, project cost higher than the market rate, frequent dropping of projects after finalization of proposals, etc.
- Special Purpose Vehicles (SPVs):** SPVs face uncertainty as they won't receive further funding for operations, including Integrated Command and Control Centers (ICCCs).
 - SPVs can't initiate new projects with Mission funding since the original Smart Cities Mission period ended in June 2021.

Solution:

- Information and communication technology, sensors, geospatial, IoT, AI and blockchain are crucial to tackle the emerging problems in the city and maintain law and order through detailed data analysis.
- Geospatial visualization, HD maps, and interactive 3D models and dashboards are also of great help.

UPSC PYQ

Q: What are 'Smart Cities'? Examine their relevance for urban development in India. Will it increase rural-urban differences? Give arguments for 'Smart Villages' in the light of PURA and RURBAN Mission. (2016)

Q: Q2: Discussion the various social problems which originated out of the speedy process of urbanization in India. (2013)

CRITICAL MINERAL RECYCLING

CONTEXT

The **Ministry of Mines** in India is gearing up to introduce a **Production Linked Incentive (PLI) scheme** aimed at enhancing the recycling of critical minerals. This initiative comes in response to a tepid response observed in recent auctions of critical mineral blocks. The scheme aligns with recommendations from NITI Aayog and complements the **Battery Waste Management Rules (BWMR), 2022**.

What is Critical Mineral Recycling?

- Critical mineral recycling involves the extraction and reuse of essential minerals like **lithium, cobalt, and graphite** from **electronic waste (e-waste)** and spent batteries.
- These minerals are vital components in technologies such as **solar panels, wind turbines, energy storage systems, electric vehicles (EVs), and consumer electronics**.

Challenges

- Indian recyclers currently face challenges in extracting battery-grade minerals from e-waste, highlighting the need for capacity-building initiatives.
- The scheme aims to address these challenges by providing incentives based on the type and value of minerals recycled, thereby encouraging innovation and technological advancements in the recycling sector.

How will the proposed PLI Scheme help?

- The proposed PLI scheme aims to foster a circular economy by reducing reliance on virgin ores and promoting sustainable practices.
- It targets enhancing domestic supply chains for critical minerals, thereby boosting India's self-reliance in clean energy technologies and reducing environmental impacts associated with mining.
- The PLI scheme is designed to incentivize the production of recycled critical minerals through advanced recycling technologies and infrastructure investments. It seeks to encourage the recovery of high-purity minerals suitable for reuse in primary inputs.

What is the need?

- Increasing demand:** The growing demand for critical minerals is sustaining supply to meet the anticipated boom. The IEA predicts that meeting future demand will require doubling current mineral inputs for clean energy technology by 2040.
- Critical Minerals forms part of multiple strategic value chains**, including
 - Clean technologies initiatives** such as zero-emission vehicles, wind turbines, solar panels
 - Information and communication technologies**, including semiconductor
 - Advanced manufacturing inputs and materials** such as defence applications, permanent magnets, and ceramics
- Green commitments:** India's international commitments towards reducing carbon emissions, which require the country to urgently relook at its mineral requirements for **energy transition and net-zero commitments**. While the clean energy transition will undoubtedly require greater mining, recycling will play a role in sustaining future mineral supply.



FACT BOX

Critical Minerals in India

- The Centre has identified '30 critical minerals', which are essential for the country's economic development and national security.
 - The **Ministry of Mines** constituted a committee (chaired by **Dr. Veena Kumari Dermal**) for the identification of critical and strategic minerals.

- Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.
- ▶ **Import-dependent:** Ten minerals on the list are 100 per cent import-dependent. These are lithium cobalt, nickel, vanadium, niobium, germanium, rhenium, beryllium, tantalum, and strontium.

90% OF EARTH'S LAND COULD BE DEGRADED BY 2050: UNESCO

CONTEXT

The **United Nations Educational, Scientific and Cultural Organization (UNESCO)** issued a stark warning, stating that a staggering 90 per cent of the planet's land surface could be degraded by 2050. According to the World Atlas of Desertification, 75 per cent of soils are already degraded, directly affecting 3.2 billion people. If business as usual continues, the current trend may increase the impact to 90 per cent by 2050.

Causes of Land Degradation

- Land degradation is the deterioration of land quality, often resulting from human activities and natural processes, which adversely affect its productivity and ecosystem functions. Several factors contribute to land degradation:
 - ▶ **Deforestation:** Clearing of forests reduces vegetation cover and disrupts ecosystems.
 - ▶ **Overgrazing:** Excessive grazing by livestock leads to soil compaction and loss of vegetation.
 - ▶ **Unsustainable Land Use:** Practices like intensive agriculture without proper soil conservation measures degrade land fertility.
 - ▶ **Urbanization and Industrial Expansion:** Conversion of natural landscapes for urban and industrial purposes reduces vegetative cover and disrupts ecosystems.

Impacts of Land Degradation

- The consequences of land degradation are widespread:
 - ▶ **Loss of Soil Fertility:** Reduced capacity of soil to support plant growth and agriculture.
 - ▶ **Erosion:** Soil erosion accelerates, leading to loss of fertile topsoil.
 - ▶ **Ecosystem Destruction:** Disruption of natural habitats and loss of biodiversity.
 - ▶ **Economic Loss:** Decline in agricultural productivity and increased costs for land restoration.
 - ▶ **Climate Impact:** Contributes to climate change through reduced carbon sequestration and altered water cycles.

- ▶ **Health Effects:** Impacts human health through food insecurity and water scarcity.



FACT BOX

Government Initiatives in India

India has implemented several initiatives to address desertification and land degradation:

- **Integrated Watershed Management Programme:** Focuses on restoring degraded natural resources and rural employment generation.
- **National Afforestation Programme:** Aims to afforest degraded forest lands since 2000.
- **National Mission on Green India:** Part of the National Action Plan on Climate Change, focusing on enhancing forest cover and biodiversity conservation.
- **Fodder and Feed Development Scheme:** Improves vegetation cover on degraded grasslands and problematic soils.

Combatting Desertification

Effective measures to combat desertification include:

- **Terracing and Contour Binding:** Soil conservation techniques to prevent erosion on slopes.
- **Drip Irrigation:** Efficient water use in agriculture to minimize soil salinization.
- **Afforestation and Reforestation:** Planting trees to restore degraded lands and enhance carbon sequestration.
- **Climate-Smart Agriculture:** Sustainable farming practices that adapt to climate change impacts.
- **Policy Interventions:** Implementation of national programs and international agreements like the UNCCD to promote sustainable land management.

UPSC PYQ

Q: The process of desertification does not have climate boundaries. Justify with examples. (2020)

FOSSIL FUELS STILL DOMINATE GLOBAL ENERGY

CONTEXT

The **2023 Statistical Review of World Energy (SRWE)** reveals a record high in primary energy consumption, highlighting the persistent dominance of fossil fuels and the contrasting energy trends between the Global North and Global South.

Trends and Data on Energy Consumption:

- **Record Primary Energy Consumption:** The world saw a 2% increase in primary energy consumption in 2023 compared to 2022. Despite the growth in renewable energy, fossil fuels still constitute 81.5% of the global energy mix.

- **Regional Disparities:** The Global South, particularly the Asia-Pacific region, accounted for 56% of total energy consumption in 2023, with significant contributions from China, India, and Indonesia. In contrast, energy demand in Africa fell by 0.4%.
- **Greenhouse Gas Emissions:** Global emissions rose by 2.1%, crossing 40 billion tonnes of CO₂ equivalents. The Global North continues to have higher per capita emissions, with North America averaging 11.5 tonnes of CO₂ per person compared to 2 tonnes in the Global South.

Fossil Fuel Production and Consumption:

- **Oil Production and Consumption:** Oil consumption reached a record 100 million barrels per day, driven mainly by China. The United States remains the largest oil producer, with an 8.5% increase in production, while Russia's production fell by 1%.
- **Natural Gas and Coal:** The US set a new record in natural gas production, surpassing Qatar as the largest exporter of LNG. Coal production reached record levels, with 80% of output from the Asia-Pacific region, led by China and India.
- **Impact of Sanctions:** Russia's oil production decline is attributed to international sanctions following the conflict with Ukraine.

Renewable Energy Trends:

- **Growth in Renewables:** Renewable energy accounted for 14.6% of total primary energy consumption in 2023. Renewables generated 30% of the world's power, with significant contributions from solar and wind.
- **Regional Contributions:** The Southern and Central American region had 72% of its power generation from renewables, despite significant growth in oil production.
- **Record Installations:** Record levels of renewable capacity installation, especially in China and Europe, reached 67%.

Challenges and Future Outlook:

- **Energy Demand in Developing Regions:** Despite low current energy demand, the population growth in Africa and South Asia positions these regions for increased future demand.
- **Fossil Fuel Transition:** The Global North, as historical polluters, must lead the transition away from fossil fuels. However, the transition remains slow in these regions.
- **Policy Implications:** The SRWE underscores the need for robust policies to balance economic growth with environmental sustainability, particularly in developing regions heavily reliant on fossil fuels.



FACT BOX

Fact Box: India's Energy Demand and Infrastructure:

- India is the world's third-largest energy consumer. Electricity accounts for 34 per cent of India's total GHG emissions.
- The country has achieved an installed capacity exceeding 400 GW, leveraging a mix of traditional fuels like **coal, oil, and gas**, alongside renewables such as **solar, wind, biomass, and hydroelectric power**.
- **India's Climate Commitments**
 - ▶ Net Zero by 2070
 - ▶ India aims to reduce its emission intensity by at least 45% from 2005 levels by 2030.
 - ▶ At least 50% of the country's total electricity will come from renewable sources by 2030.
- As of May 2024, Renewable energy sources, including large hydropower, have a combined installed capacity of 193.57 GW.
- **Installed capacity for Renewables:**
 - ▶ **Wind power:** 46.42 GW
 - ▶ **Solar Power:** 84.27 GW
 - ▶ **Biomass/Co-generation:** 10.35 GW
 - ▶ **Small Hydro Power:** 5 GW
 - ▶ **Waste To Energy:** 0.59 GW
 - ▶ **Large Hydro:** 46.92 GW
- **India's initiatives:**
 - ▶ **Electric Mobility and Vehicle Scrapping Policy:** India has launched the Faster Adoption and Manufacturing of Hybrid & Electric Vehicles Scheme to accelerate the transition to electric vehicles (EVs).
 - ▶ **Green Hydrogen Production:** India plans to establish a green hydrogen electrolyzer gigafactory in Bangalore, capable of producing 20 million tonnes (MT) of green hydrogen annually by 2030 at \$1 per kilogram, valued at \$20-25 billion.
 - ▶ **Transportation Revolution:** To achieve Net Zero Emissions by 2070, India is focusing on enhancing "walkability," public transportation, rail networks, roads, and improving vehicle efficiency.
 - ▶ **Electric Vehicles (EVs):** Aligned with global climate goals under the Paris Agreement, India supports the EV30@30 campaign, aiming for a 30% EV sales share by 2030.
 - ▶ **Ethanol Blending in Petrol:** India has advanced its target of 20% ethanol blending in petrol to 2025, aiming to reduce petroleum-related pollution.
 - ▶ 100% FDI is allowed for renewable energy generation and distribution projects subject to provisions of **The Electricity Act 2003**.
- **Transition to Renewable Energy:** Despite fossil fuels dominating the power sector, India has set ambitious goals to increase the share of renewable and nuclear energy.

UPSC PYQ

- Q:** The question of India’s Energy Security constitutes the most important part of India’s economic progress. Analyze India’s energy policy cooperation with West Asian Countries. [2016]
- Q:** Q2: Give an account of the current status and the targets to be achieved pertaining to renewable energy sources in the country. Discuss in brief the importance of the National Programme on Light Emitting Diodes (LEDs). (2016)
- Q:** Q3: Clean energy is the order of the day.’ Describe briefly India’s changing policy towards climate change in various international for in the context of geopolitics. [2022]

PENCH TIGER RESERVE’S AI SYSTEM FOR FOREST FIRE DETECTION

CONTEXT

- The Pench Tiger Reserve in Maharashtra has launched an **advanced Artificial Intelligence (AI) system** for early detection of **forest fires**, marking a significant technological advancement in forest conservation efforts.
- About the Technological Advancements in Forest Fire Detection
 - The AI system features a high-resolution PTZ camera with a 15-kilometer visual range, covering over 350 sq km of the reserve.
 - Satellite Integration:** The system integrates alerts from fifteen commercial satellite services, providing a pioneering approach to forest fire management. The AI platform, Pantera, uses both camera feeds and satellite data to deliver real-time alerts within 3 minutes.
 - Differentiation and Accuracy:** The AI system can distinguish between smoke and clouds and features Infra-Red capabilities for 24x7 detection, minimizing false alarms and ensuring accurate and reliable alerts.

Benefits and Impact on Forest Fire Management

- Real-time Data Analysis:** The system receives data on temperature, precipitation, and wind, allowing it to forecast probable fire incidences based on past data. This enables proactive fire control planning.
- Resource Integration:** The system can be integrated with water tanks and forest vehicles equipped with GPS, allowing real-time tracking and management of resources during fire incidents.
- Improved Response Efforts:** The swift detection and alert mechanism is expected to substantially improve forest fire management practices, enabling rapid response efforts to protect vast forest areas and the diverse wildlife within the reserve.

Collaborative Efforts and Implementation

- Collaborative Implementation:** The project is a joint effort between Pench Tiger Reserve, Satpuda Foundation, Umgrameio (Brazil), and Forest Fire Tech (Scaale Inc, USA).
- Funding and Support:** Funding for the project was provided by Solar Industries India Ltd, Nagpur, and the Maharashtra government.
- Anticipated Outcomes:** The forest department anticipates significant improvements in fire management practices, with the potential to save vast forest areas and protect wildlife through swift and effective response measures.

Types of Forest Fire

- Surface fires:** Surface fire is the most common forest fires that burn undergrowth and dead material along the floor of the forest.
- Underground fires:** The fires of low intensity, consuming the organic matter beneath and the surface litter of forest floor are sub-grouped as underground fire.
- Ground fires:** There is no clear distinction between underground and ground fires. The smoldering underground fire sometime changes into ground fire.
- Crown fires:** Crown fire is the most unpredictable fires that burn the top of trees and spread rapidly by wind.

India State of Forest Report (ISFR) 2021

- 35.46% of India’s forest cover is susceptible to forest fires.
- Of this, 2.81% are extremely prone, 7.85% are very highly prone, and 11.51% are highly prone.
- India’s 45–64% of forests will be impacted by changing climate and rising temperatures by 2030.

UPSC PYQ

- Q:** Examine the importance of integrating satellite data and AI technology in environmental conservation efforts. How can these technologies be effectively utilized to address other environmental issues?

BIAS IN AI: ADDRESSING A GROWING CONCERN

CONTEXT

The rise of artificial intelligence (AI) and machine learning (ML) has brought significant advancements in various fields. However, the increasing reliance on AI/ML algorithms has also highlighted the need to eliminate biases within these systems.

Challenges of Bias in AI/ML:

- **Inherent Biases in Data:** AI/ML systems often learn from historical data that may contain inherent biases. These biases can lead to discriminatory outcomes, perpetuating existing inequalities and prejudices.
- **Lack of Diversity in Development:** The lack of diversity among AI/ML developers can contribute to biased algorithms. When development teams are not representative of the broader population, the algorithms they create may not account for the diverse needs and perspectives of all users.
- **Complexity of Bias Detection:** Identifying and mitigating biases in AI/ML systems is a complex task. Biases can be subtle and may not be immediately apparent, requiring sophisticated techniques and constant vigilance to detect and address them.

Efforts to Address AI/ML Bias:

- **Regulatory Frameworks:** Regulatory bodies, including the RBI, are focusing on creating guidelines and frameworks to ensure fairness and transparency in AI/ML systems. These frameworks aim to promote ethical AI development and deployment practices.
- **Inclusive Development Practices:** Encouraging diversity in AI/ML development teams can help create more balanced and unbiased algorithms. Including people from various backgrounds ensures a wider range of perspectives and reduces the risk of overlooking potential biases.
- **Bias Audits and Evaluations:** Conducting regular audits and evaluations of AI/ML systems for biases is crucial. These audits help identify biases in data and algorithms, enabling organizations to take corrective measures and improve the fairness of their systems.

Machine Learning	Deep Learning
This term was coined by Artur Samuel in 1959, meant "the ability to learn without being explicitly programmed."	It is a technique for implementing Machine Learning. It was inspired by the structure and function of the brain, specifically the interconnecting of many neurons.
It involves the use of algorithms to parse data and learn from it, and making a prediction as a result.	Artificial Neural Networks (ANNs) are algorithms that are based on the biological structure of the brain.
The machine gets "trained" using large amounts of data and algorithms, and in turn gains the capability to perform specific tasks.	In ANNs, there are 'neurons' which have discrete layers and connections to other "neurons". Each layer picks out a specific feature to learn. It's this layering that gives deep learning its name.

VEGFR1, MEDICAL SOLUTIONS FOR COLON AND RENAL CANCERS

CONTEXT

Researchers at the Indian Institute of Science Education and Research (IISER), Kolkata, have decoded the molecular mechanism of VEGFR1, a cell surface receptor, and its role in preventing cancers. This discovery offers potential medical solutions for colon and renal cancers by stabilizing the inactive state of VEGFR1.

VEGFR1 and its Mechanism:

- VEGFR1 is part of the family of enzymes known as Receptor Tyrosine Kinases (RTK), which are crucial for converting extracellular signals into cellular responses.
- VEGFR1 remains auto-inhibited in the absence of a ligand.
- **Role in Cellular Functions:** RTKs, including VEGFR1, regulate cell differentiation, proliferation, survival, metabolism, and migration. Activation of these receptors leads to the formation of a signalling complex that controls diverse cellular functions.
- **Autoinhibition and Pathology:** Spontaneous activation of RTKs, in the absence of ligands, is associated with various human pathologies, including cancers. Researchers are exploring how cells maintain the autoinhibited state of these enzymes and why autoinhibition is breached in diseases.

VEGFR1's Unique Behavior and Therapeutic Potential:

- **Differential Activation:** Among the VEGFR family, VEGFR1 cannot be spontaneously activated even when overexpressed, unlike VEGFR2, which can activate without its ligand. VEGFR1 binds with ten-fold higher affinity to its ligand VEGF-A, inducing transient kinase activation.
- **Cancer Associations:** Activation of VEGFR1 is linked to cancer-associated pain, tumor cell survival in breast cancer, and migration of colorectal cancer cells.
- **Ionic Latch Mechanism:** A unique ionic latch present only in VEGFR1 keeps the kinase autoinhibited. This latch hooks the juxtamembrane segment onto the kinase domain, stabilizing the autoinhibited state.

Implications for Cancer Treatment:

- **Therapeutic Modulation:** The research proposes the role of cellular tyrosine phosphatase in modulating VEGFR1 activity, highlighting the therapeutic potential of phosphatase modulators in regulating pathological angiogenesis.
- **Research and Discoveries:** The research, conducted using advanced facilities at IISER Kolkata and published

in Nature Communications, underscores the potential of small molecules targeting the autoinhibited state of VEGFR1 for treating cancers such as colorectal carcinoma and renal cancer.

- **Future Directions:** This discovery opens avenues for developing therapeutic interventions against diseases caused by spontaneous VEGFR signalling activation, particularly in cancers where VEGFR1 is overexpressed.

UTTARAKHAND TO STUDY RISK POSED BY 13 GLACIAL LAKES

CONTEXT

The Uttarakhand State Disaster Management Department (USDMA) is initiating a vulnerability study of 13 glacial lakes, including five in the "high-risk zone", to prevent potential calamities such as lake outbursts during the monsoon season.

Identifying High-Risk Glacial Lakes:

- USDMA identified 13 new glacial lakes through satellite imaging in early 2023.
 - ▶ **Five lakes categorized as "high-risk"** based on size, location, and potential impact. High-risk lakes located in Pithoragarh and Chamoli districts, known for their fragile ecological balance
- **Geographical Characteristics of High-Risk Lakes:** Located in Darma, Lasaryanghati, Kutiyangti Valley (Pithoragarh), and Dhauli Ganga basin (Chamoli). Lake sizes range from 0.02 sq. km to 0.5 sq. km, indicating significant water volume. Situated at elevations of 4,000 meters above sea level, making access and monitoring challenging
- **Climate Change and Glacier Dynamics:** Himalayan glaciers retreating at an average rate of 30-60 meters per decade. Rapid glacier melting leading to formation of new lakes and expansion of existing ones.

Comprehensive Study Approach:

- **Advanced Bathymetry Study:** Teams to employ state-of-the-art bathymetry techniques starting July 2023. Study aims to determine precise lake depths, volumes, and surrounding terrain characteristics. Data crucial for developing early warning systems and evacuation plans for downstream communities
- **Multi-Agency Collaboration for Risk Assessment:** USDMA collaborating with Indo-Tibetan Border Police for on-ground intelligence. Expert teams formed in March 2023 include specialists from five premier institutions:
 - ▶ Indian Institute of Remote Sensing
 - ▶ Geological Survey of India
 - ▶ National Institute of Hydrology, Roorkee
 - ▶ Centre for Development of Advanced Computing

- ▶ Wadia Institute of Himalayan Geology
- **Innovative Risk Mitigation Strategies:** Plans to implement controlled lake drainage by installing pipes in high-risk lakes. Technique aims to gradually reduce water pressure and minimize sudden outburst risks. Similar methods successfully employed in Nepal and Bhutan, reducing GLOF risks by up to 35%

Historical Context and Urgency:

- **Devastating GLOF Events in Uttarakhand:**
 - ▶ **Kedarnath valley GLOF in June 2013:** Over 6,000 fatalities and economic losses exceeding \$3.8 billion.
 - ▶ **Rishiganga Valley GLOF in Chamoli (February 2021):** 72 lives lost and severe damage to infrastructure. These events highlight the catastrophic potential of GLOFs and the need for proactive management
 - ▶ Global Climate Change Context IPCC Sixth Assessment Report (2021) warns of increased GLOF risks in Hindu Kush Himalaya region. Projected temperature rise of 1.8-2.2°C in the region by 2050 could accelerate glacier retreat. Uttarakhand's initiative aligns with global efforts to adapt to and mitigate climate change impacts
 - ▶ **Monsoon Preparedness and Long-term Planning:** Study timing coincides with monsoon onset, when GLOF risks typically peak. Part of Uttarakhand's broader climate adaptation strategy, including:
 - Development of climate-resilient infrastructure
 - Community-based early warning systems
 - Integration of traditional knowledge in disaster preparedness



FACT BOX

- **Formation of Glacial Lakes:**
 - ▶ Glacial lakes are primarily formed by the accumulation of meltwater in depressions created by glacier movement.
 - ▶ ISRO categorizes glacial lakes into following types based on their formation mechanisms:
 - moraine-dammed
 - ice-dammed
 - erosion-based, and others
- **Glacial Lake outburst**
 - ▶ When the boundary around unstable glacial lake breaks, and huge amounts of water rush down the side of the mountains, which could cause flooding in the downstream areas.
 - ▶ This is called glacial lake outburst floods or GLOF.
 - ▶ **Factors causing GLOF:** earthquakes, extremely heavy rains, landslides and ice avalanches.

UPSC PYQ

Q: Discuss the challenges posed by glacial lakes in the Himalayan region and evaluate the effectiveness of current mitigation strategies. Suggest innovative approaches to enhance disaster preparedness in vulnerable areas.

HATHRAS STAMPEDE

CONTEXT

Stampedes during religious gatherings are tragically common in India, often due to poor crowd management and safety oversights. Recently, a stampede in Uttar Pradesh's Hathras district claimed the lives of at least 116 people, predominantly women, highlighting the urgent need for effective crowd control strategies.

What is a Stampede?

- A stampede is characterized by the chaotic movement of a crowd, resulting in injuries and fatalities. It typically occurs due to panic triggered by perceived danger, overcrowding, or the rush to achieve something desirable.
- **Causes of Stampedes:** Stampedes are primarily caused or exacerbated by panic and can be prevented through improved design and management of spaces where mass gatherings occur. Factors contributing to stampedes include:
 - ▶ Lack of adequate lighting
 - ▶ Uncontrolled flow of crowds
 - ▶ Structural failures like collapsed barriers or buildings
 - ▶ Blocked exits or evacuation routes
 - ▶ Inefficient design of infrastructure such as entrance doors
 - ▶ Fire hazards and other safety oversights
- Reason behind casualties:
 - ▶ **Traumatic asphyxia:** There is partial or complete cessation of respiration due to external compression of the thorax and/or upper abdomen.
 - ▶ **Myocardial infarction:** Heart attack, caused by decreased or complete cessation of blood flow to a portion of the heart
 - ▶ **Direct crushing** injury to internal organs, head injuries, and neck compression.

Preventive Measures

- Effective crowd management is crucial in mitigating stampede risks. Strategies include:
 - ▶ **Live Surveillance:** Monitoring crowd density, bottlenecks, and disturbances to anticipate and prevent incidents.
 - ▶ **Communication:** Coordination between organizers, local authorities, and law enforcement to manage crowd behavior and ensure timely interventions.

NDMA's guidelines for Crowd Management

- The National Disaster Management Authority (NDMA) has formulated guidelines for integrated crowd management, which are crucial for ensuring public safety during various types of events. Here are the simplified pillars and considerations as per NDMA's guidelines:
- **Pillars of Integrated Crowd Management:**
 - ▶ **Capacity Planning:** Assessing the venue's capacity to accommodate the expected number of attendees. Ensuring adequate facilities like exits, seating arrangements, and emergency services.
 - ▶ **Risk Assessment:** Identifying potential hazards and risks associated with the event. Evaluating factors like crowd density, weather conditions, and infrastructure vulnerabilities.
 - ▶ **Preparedness Planning:** Developing detailed plans and procedures for managing crowds effectively.
 - ▶ **Incident Response:** Establishing protocols for responding to emergencies such as medical emergencies, fires, or crowd disturbances.
 - ▶ **Capacity Building:** Training personnel involved in crowd management on safety protocols and crowd control techniques. Educating the public on safe behavior during events to prevent panic and stampedes.
- **Parameters for Planning and Management:**
 - ▶ **Type of Event:** Whether it's religious, educational, sports, entertainment, etc.
 - ▶ **Expected Crowd:** Considering demographics like age, gender, and economic backgrounds.
 - ▶ **Crowd Motives:** Understanding why attendees are coming (social, academic, religious, etc.).
 - ▶ **Venue:** Assessing location, layout (open or closed), accessibility, and infrastructure.
 - ▶ **Stakeholders:** Involving NGOs, local authorities, and community members to enhance coordination and support.

Notable Stampede Incidents

- **Moscow, Russia (1896):** Over 1,000 deaths due to a crowd surge over souvenir rumors.
- **Allahabad, India (1954):** Around 800 fatalities during the Kumbh Mela due to poor crowd control.
- **Lima, Peru (1963):** 326 deaths after tear gas use during a football match triggered panic.
- **Wai, India (2005):** Over 340 deaths during a temple pilgrimage due to slippery steps.

NHRC ISSUES NOTICE OVER 'DISCRIMINATION' BY FOXCONN

CONTEXT

The **National Human Rights Commission (NHRC)** has taken note of reports alleging **discrimination against married women at Foxconn's iPhone assembly plant** in Sriperumbudur, Tamil Nadu. It issued notices to the **Union Labour Ministry** and the Tamil Nadu government, citing potential violations of **gender equality norms under Indian and international law**.

Ethical Issues

The case revolves around ethical principles of **equality and non-discrimination in employment**, particularly concerning marital status. It raises questions about corporate ethics, gender inclusivity, and compliance with labor laws.

- **Gender Equality:** Discrimination based on marital status violates principles of equality and fairness. All individuals should have equal access to employment opportunities irrespective of their marital status.
- **Corporate Responsibility:** Companies have an ethical obligation to ensure non-discriminatory practices

and create inclusive work environments. Excluding married women from employment opportunities contradicts these principles.

- **Transparency and Accountability:** Job seekers should have clear and transparent information about eligibility criteria. Misinformation or lack of clarity in hiring processes can lead to unfair practices and distrust.
- **Compliance with Laws and Regulations:** Companies must adhere to national and international laws that prohibit discrimination based on gender or marital status. Failure to comply reflects ethical lapses in governance and corporate culture.
- **Impact on Individuals and Society:** Discriminatory practices not only harm individual job seekers but also perpetuate gender inequalities in society. Upholding ethical standards in employment contributes to social justice and equal opportunities for all.
- **Role of Regulatory Bodies:** Regulatory bodies play a crucial role in safeguarding rights and enforcing ethical standards. Prompt action and investigation are essential to address grievances and uphold ethical norms in corporate practices.

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AISHWARYAM PRAJAPATI (AIR-10, CSE 2023)



I am truly grateful to GS SCORE for their guidance. They offered genuine mentorship.

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SECTION-B

QUICK BYTES

BANNERGHATTA NATIONAL PARK

CONTEXT

South India's first and the country's largest leopard safari was inaugurated at the Bannerghatta Biological Park (BBP).

About:

- It is a national park in India, located near Bangalore, Karnataka. It was founded in 1970 and declared as a national park in 1974.
- In 2002, a small portion of the park became a zoological garden, the Bannerghatta Biological Park.
- The park has a hilly terrain of granite sheets under moist deciduous forest valleys and scrubland on higher areas.
- Flora:** Include Narcissus latifolia, Schleicheria oleosa, Sandalwood, Neem, Tamarind, Bamboo, Eucalyptus etc.
- Fauna:** Prime habitat for several species, including the endangered Asian Elephant, Indian gaur, Tiger, Sambar deer, Spotted deer, Leopard, Wild dog, Wild pig, Sloth bear, Common mongoose, Pangolin, Slender loris, Black-naped hare, etc.
- Geography (Location in News)**

PANTANAL

CONTEXT

This year, the Pantanal, the **world's largest tropical wetland**, has experienced unprecedented fires due to severe water loss. A recent study highlighted that the area covered by water in 2023 was 61% below average, significantly affecting the ecosystem.

Key Points:

- Pantanal's Water Loss:** In 2023, only 2.6% of the Pantanal was covered by water, a drastic reduction compared to previous years. This has led to **extreme dry conditions**, making the region prone to wildfires.
- Impact on Biodiversity:** The Pantanal is renowned for its biodiversity, hosting species like jaguars and capybaras. The drying has endangered these species and their habitats.
- Amazon and Other Biomes:** The Amazon also faced challenges with a reduced water surface, impacting fish and dolphin populations due to severe droughts. The **Pampa grasslands and the Cerrado** showed mixed results in water surface changes.

About Pantanal (Brazil, South America)

- The Pantanal is the world's largest freshwater wetland, a seasonally flooded plain fed by the tributaries of the **Paraguay River**. At 68,000 square miles, it is more than 20 times the size of the Everglades.
- Location:** Located in the upper Paraguay River basin, the Pantanal straddles Brazil's border with Bolivia and Paraguay. About 80 percent of the Pantanal is in Brazil. It sprawls across three countries—**Bolivia, Brazil, and Paraguay**.
- Major Habitat Type:** Flooded Grassland Savanna
- The Pantanal is also one of the world's most productive habitats.
- Flora and Fauna:** Iconic species found in the Pantanal include the jaguar (the highest density in the world), giant otters, capybaras (the largest rodent species), anteaters, tapirs, caimans, and a diverse array of birds such as toucans and jabiru storks.



THE SANTHAL HUL OF 1855

CONTEXT

June 30 marks the 169th anniversary of the Santhal Hul, one of the earliest uprisings against British colonial oppression in India.

About the Uprising

- The Santhal Hul (revolution) was a tribal revolt against the atrocities of the upper-caste landlords, moneylenders, traders, police, and administrative officials from the East India Company in the erstwhile Bengal presidency.
- **Led by:** Murmu brothers — **Sidho, Kanho, Chand, and Bhairav** — along with sisters **Phulo and Jhano**.
- The Santhals, originally settled in areas of present-day Jharkhand, faced severe exploitation following their displacement from various regions under British rule.
- Promised lands for settlement and agriculture, they instead experienced **land-grabbing and bonded labor practices known as begari**.
- **The Uprising**
 - ▶ In response to these injustices, around 60,000 Santhals rallied against the East India Company in 1855.
 - ▶ Their resistance was guided by their belief in Thakur Bonga, their spiritual deity.
 - ▶ Engaging in guerrilla warfare, they fought for nearly six months before the British finally suppressed the revolt in January 1856.
 - ▶ The brutal aftermath saw over 15,000 Santhals killed and thousands of villages destroyed.
- **Legacy and Impact:** Despite the suppression, the Santhal Hul left an enduring impact. The sacrifices of leaders like Sidho and Kanho Murmu catalyzed legislative changes aimed at protecting Adivasi rights.
- The Santhal Pargana Tenancy Act of 1876 (SPT Act) and the Chhotanagpur Tenancy Act of 1908 (CNT Act) were direct outcomes of these struggles.
 - ▶ **The Santhal Pargana Tenancy Act of 1876 (SPT Act):** Prohibits the transfer of Adivasi lands (urban or rural land) to non-Adivasis, was the result of the Hul. The land can only be inherited as per the Act, thus retaining the rights of Santhals to self-govern their land.
 - ▶ **The Chhotanagpur Tenancy Act, (CNT Act)** enacted by the British in 1908 a result of the **Birsa Movement**, allows land transfers within the same caste and certain geographical areas with the approval of the District Collector. This Act also restricts the sale of Adivasi and Dalit land, while allowing land transfers between Adivasi individuals from the same police station and Dalits in the same district.

Major Tribal Uprisings

Year	Tribal Uprising	Features
1776	Chuar Uprising	It was initiated by indigenous tribespeople of Midnapore, in response to land revenue demands and economic hardships.
1818-1831 and 1913	Bhil Uprising	The Uprising took place in the Western Ghats as a resistance against the rule of the Company. It resulted in the formation of Bhil Raj. In 1913, under the leadership of Govind Guru, the Bhil community reorganized and continued their fight for the establishment of Bhil Raj.
1820-37	Ho and Munda Uprisings	The Ho and Munda Uprisings were initiated by the Ho tribals under the leadership of Raja Parahat in the Singhbhum and Chottanagpur regions. These uprisings were in response to the implementation of a new farming revenue policy. Over time, the Ho uprising transformed into the Munda rebellion.
1822-29	Ramosi Uprising	It was led by the Ramosi tribals residing in the Western Ghats. Under the leadership of Chittur Singh, they revolted against the British occupation of the region.
1829	Koli Uprising	The Uprising witnessed multiple revolts by the tribal communities of Gujarat and Maharashtra. They rebelled against the control of the East India Company in the years 1829, 1839, and once more during the period of 1844-48.
1832	Kol Rebellion	It occurred when the tribal communities of Chottanagpur, led by Buddho Bagat, revolted against the British colonial rule and oppressive money lenders.
1837-56	Khond Rebellion	The Rebellion saw the tribal communities residing in the hills from Tamil Nadu to Bengal, led by Chakra Bisoi, rise up against the interference in their tribal customs and the imposition of new taxes.
1899-1900	Munda Rebellion	It involved the tribal population of the Chotanagpur area who, under the leadership of Birsa Munda, revolted against the 'Dikus' (a term used to refer to outsiders or non-tribal people).
1879-80	Koya Uprising	The Uprising witnessed the tribal communities of the eastern Godavari region, led by Tomma Sora and Raja Annantyar, rebelling against the oppressive actions of the police and moneylenders.
1910	Bastar Revolt	The Revolt was staged by the tribal population of Jagdalpur as a protest against the imposition of new feudal and forest levies.
1921-22	Chenchus Uprising	The Uprising took place when the tribal community of Nallamalla Hills, led by K. Hanumanthu, revolted against the forest laws imposed by the British authorities.
1922-24	Rampa Rebellion	It was led by Alluri Sitaraman Raju, a member of the Koya tribe in Andhra Pradesh. The rebellion was launched in response to British interference in the region.

ABHAYA MUDRA

CONTEXT








'Abhaya mudra' or the motif of an open palm, has become a topic of discussion in India's Parliament.

What is Abhaya Mudra?

- In Sanskrit, "mudra" translates to 'seal', 'mark', or 'gesture'. It holds deep cultural significance in Hinduism, Buddhism, and Jainism, influencing various aspects like **iconography, dance forms, yoga, tantra, and martial arts**.

- **Abhaya Mudra:** This specific mudra represents an open palm gesture symbolizing fearlessness and protection.
- It can be widely seen in **Hindu, Buddhist, and Jain iconography**, it is a powerful symbolic gesture.
- The Abhaya Mudra typically involves the right hand raised to shoulder height, with the palm facing outward and fingers upright. The left hand may rest in the lap or perform another gesture simultaneously.
- **Symbolic Meaning:** Known for its **protective qualities**, the Abhaya Mudra signifies the dispelling of fear and offers reassurance to those who perceive it.
- In Indian culture, the Abhaya Mudra serves as a timeless emblem of courage and safeguarding, depicted prominently in religious art and practices across various traditions.

Other Important Mudras (in Buddhism)

Mudras	Symbol
<p>Dhyana Mudra The gesture of absolute balance, of meditation. The hands are relaxed in the lap, and the tips of the thumbs and fingers are touch each other.</p>	
<p>Dharmachakra Mudra The gesture of teaching, usually interpreted as turning the Wheel of Law. The hands are held level with the heart, the thumbs and index fingers form circles.</p>	
<p>Vitarka Mudra (Intellectual argument discussion) The circle formed by the thumb and index finger is the sign of the Wheel of Law.</p>	
<p>Tarjani Mudra (Threat warning) The extended index finger is pointed at the opponent.</p>	
<p>Jnana Mudra (Teaching) The hand is held at chest level and the thumb and index finger again form the Wheel of Law</p>	
<p>Karana Mudra Gesture with which demons are expelled</p>	
<p>Uttarabodhi Mudra (The gesture of Supreme Enlightenment) Two hands placed together above the head with the index fingers together and the other finger intertwined.</p>	

MULTILEVEL REGRESSION AND POST-STRATIFICATION (MRP) MODELLING

CONTEXT

As election campaigns intensify in Britain, the role of opinion polls, particularly those utilizing **Multilevel Regression and Post-stratification (MRP) modelling**, has gained prominence. MRP is employed by pollsters to estimate voting patterns at a local level based on national sample data.

What is MRP?

- Multilevel Regression and Post-stratification (MRP) is a **statistical technique** used by pollsters to predict voting behavior across different geographical areas.
- Unlike traditional polls that survey a few thousand respondents, MRP draws from tens of thousands of respondents, providing more granular insights into voter preferences.
- **Key Features of MRP:**
 - **Statistical Modelling:** Pollsters build models that analyze how voting intentions vary based on respondent characteristics such as age, income, education, and past voting history.
 - **Post-stratification:** This involves adjusting survey data to match demographic characteristics of the population, ensuring accurate representation of various voter groups.
 - **Local Level Estimations:** MRP allows for predictions at a local level, which is crucial for understanding electoral dynamics in different regions.

Opinion Poll in India

- Opinion polls are conducted well before voting day to gauge public sentiment and voting intentions.
- **Sampling Methods:** The method include random, stratified, and cluster sampling to ensure diverse representation of the electorate.
- **Limitations of Opinion Polls:**
 - **Sampling Errors:** Inaccuracies due to sampling methods and size.
 - **Response Biases:** Potential distortions in results based on how questions are framed or answered.
 - **Volatility:** Voter behavior can change rapidly, impacting the reliability of predictions.

Exit Polls

- They are conducted right after voters leave polling stations to predict election outcomes.

- They are often more reliable than pre-election polls due to proximity to actual voting behavior.
- **Limitations of Exit Polls:**
 - **Sampling Biases:** Challenges in capturing diverse voter demographics due to timing and location constraints.
 - **Legal Restrictions:** Some regions prohibit early release of results to prevent influencing remaining voters.

PETRODOLLARS

CONTEXT

Recently, the US-Saudi Arabia petrodollar deal, which began in 1974, has come to an end after 50 years. This agreement was crucial as it involved Saudi Arabia selling oil exclusively for US dollars, thus strengthening the dollar's role in global finance.

About Petrodollars:

- Petrodollars are US dollars earned by **oil-exporting nations** through the sale of crude oil.
- This arrangement began after the US made a deal with Saudi Arabia and other OPEC countries to stabilize oil prices and ensure oil transactions were conducted in US dollars.
- **Background:** Initially, the US dollar became the **world's main reserve currency** under the **Bretton Woods Agreement** after **World War II**. This system tied the **dollar to gold**, ensuring stability in global trade.
- However, in 1971, President Nixon ended this gold backing, leading to **floating exchange rates** and economic uncertainties.
- Following the **Yom Kippur War in 1973**, OPEC imposed an oil embargo, causing oil prices to surge. In response, the US negotiated with Saudi Arabia and OPEC to ensure oil sales in dollars, thus establishing the petrodollar system. In return, the US provided military and economic support.

Impact of Ending the Petrodollar Deal:

- Saudi Arabia can sell oil for currencies like **yuan, euros, rubles, and yen**, and may even consider digital currencies such as **Bitcoin**.
- This shift could encourage more countries to use **alternative currencies for global trade**.
- **The decline in global demand for the US dollar** might lead to **higher inflation, interest rates, and a weaker bond market in the US**.

MANUFACTURING PURCHASING MANAGERS' INDEX

CONTEXT

Despite having elevated inflationary pressures, India's manufacturing activity in June witnessed a rebound, thanks to strong demand leading to the fastest rate of hiring in more than 19 years. The seasonally adjusted HSBC India Manufacturing Purchasing Managers' Index or PMI increased from 57.5 in May to 58.3 in June, indicating a sharper improvement in business conditions. In PMI parlance, print above 50 means expansion while, a score below 50 denotes contraction

What is manufacturing PMI?

- Manufacturing PMI, or Purchasing Managers' Index, is an economic gauge derived from monthly surveys of companies.
- It assesses business conditions in manufacturing and services sectors.
- Types of PMI:
 - ▶ Manufacturing PMI
 - ▶ Services PMI
- PMI helps determine if conditions are expanding, contracting, or stable, offering insights into current and future economic health.
- Variables: For manufacturing PMI, surveys are sent to manufacturing firms with factual questions about key areas: new orders (30%), output (25%), employment (20%), suppliers' delivery times (15%), and stock levels (10%).
 - ▶ A PMI number above 50 indicates growth, below 50 signals contraction.
- Started in 1948 by the Institute for Supply Management, PMI is produced globally.
- It's a leading indicator, often released before GDP data, providing early signals about economic trends. Investors and businesses use PMI to gauge economic conditions and make informed decisions.

BASE YEAR UPDATE

CONTEXT

The updated new base year for national accounts and other macro-indicators is expected to come into effect from January-February 2026, coinciding with the first and second advance estimates of national income for FY26.

What is base year?

- The base year for national accounts and macro-indicators such as GDP, CPI, WPI, and IIP serves as a benchmark to measure economic performance and inflation trends accurately.

- Previous Base Year: India's last update was in January 2015, setting **2011-12 as the base year**, replacing the older 2004-05 base year. This update was in line with **NSC recommendations** for periodic revisions.
- Establishment of ACNAS: The Ministry of Statistics and Programme Implementation has set up the **Advisory Committee on National Accounts Statistics (ACNAS)**. ACNAS will advise on the selection of the new base year for GDP and ensure alignment with other macro-indicators.
 - ▶ The new base year is slated to take effect from January-February 2026. This timeline coincides with the release of the first and second advance estimates of national income for FY26, ensuring a seamless transition.
- The development comes at a time when the government is planning to update the base year for major macro-indicators such as:
 - ▶ Gross Domestic Product (GDP)
 - ▶ wholesale price index (WPI) used for wholesale inflation
 - ▶ consumer price index (CPI) used to determine consumer inflation,
 - ▶ index of industrial production (IIP) used for calculation of industrial growth

Important Concepts

- **GDP (Gross Domestic Product):** GDP measures the total monetary value of all finished goods and services produced within a country's borders in a specific time period (usually annually or quarterly). It is a key indicator of the economic health and size of a country's economy.
- **WPI (Wholesale Price Index):** The WPI measures and tracks changes in the price of goods traded in bulk by wholesale businesses. It is used to calculate inflation at the wholesale level and serves as an indicator of cost pressures in production.
- **CPI (Consumer Price Index):** The CPI measures changes in the prices paid by consumers for a basket of goods and services. It is a crucial indicator of inflation as experienced by households and is used to adjust income and assess economic policies.
- **IIP (Index of Industrial Production):** The IIP measures the changes in the volume of production in the industrial sector of an economy over a specific period. It provides insights into the growth or contraction of industrial output, including manufacturing, mining, and electricity generation.

MUMBAI-AHMEDABAD BULLET TRAIN PROJECT

CONTEXT

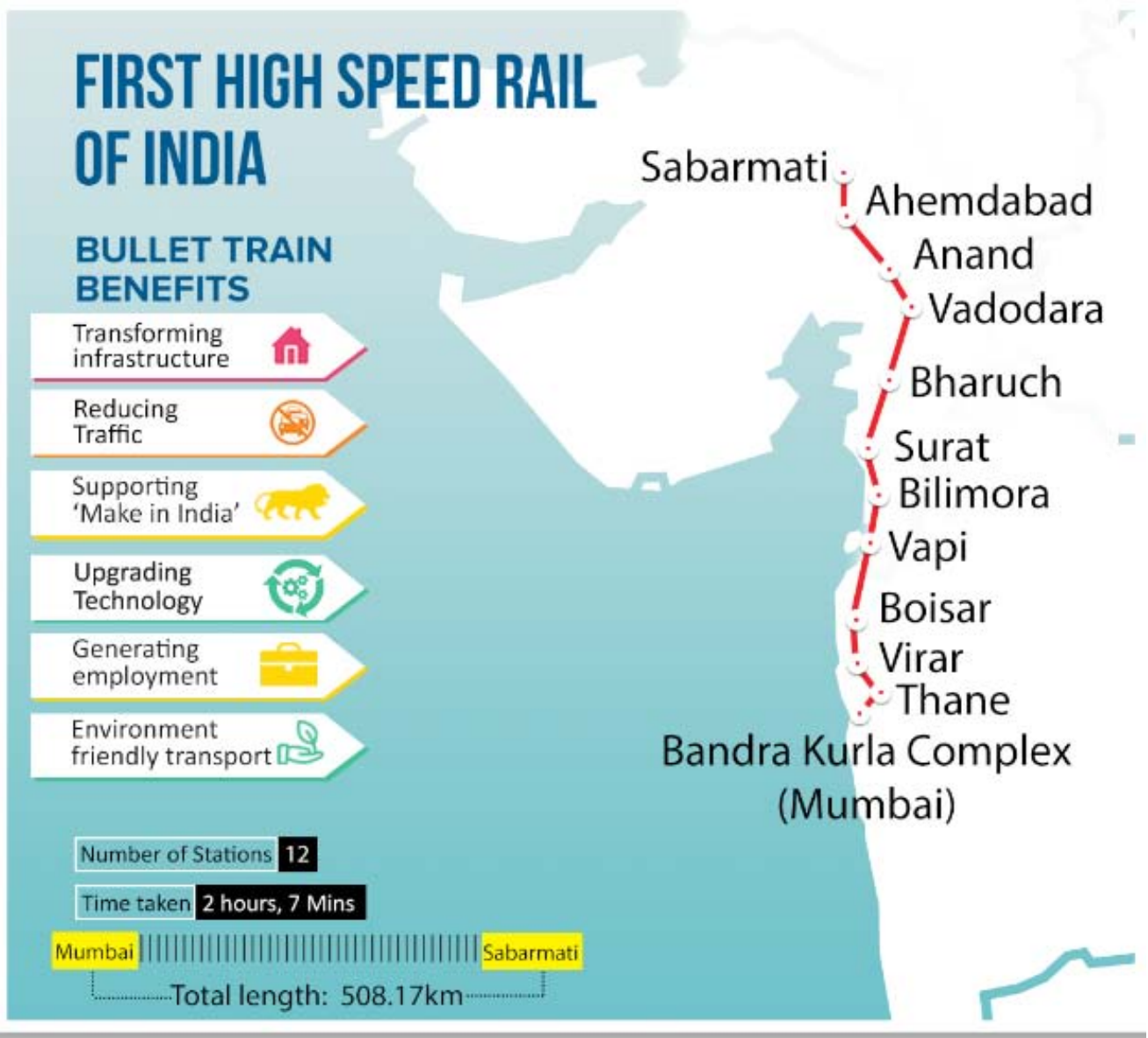
The Mumbai-Ahmedabad bullet train is expected to begin operations in Gujarat by 2027 end and will later be extended to Maharashtra, according to the National High Speed Rail Corporation Limited (NHSRCL).

About Mumbai-Ahmedabad Bullet Train Project:

- The foundation stone for the Mumbai-Ahmedabad bullet train project was laid in 2017.
- **Speed and Distance:** The bullet train will zip along at 320 kmph, covering the 508.17 km distance between Mumbai and Ahmedabad in just about two hours.
- **Cost and Completion:** Estimated at Rs 1.65 lakh crore, the project is slated for completion by 2028.
- **National High-Speed Rail Corporation Limited:** Established under the Companies Act, 2013, NHRCL aims to finance, construct, maintain, and manage high-speed rail corridors across India.
- **The Need for High-Speed Rail**
 - ▶ **Challenges of Indian Railways:** With over 67,415 route km, Indian Railways forms the backbone of the nation’s transport system. However, overcrowding on main routes, with some operating at 150% capacity, has slowed down travel speeds and shifted traffic to less efficient road transport.

- ▶ **Logistical Constraints:** Congestion on rail routes increases turnaround times for goods, impacting manufacturing efficiency and competitiveness.
- **Benefits of High-Speed Rail**
 - ▶ **Capacity Release and Safety:** High-speed rail will alleviate congestion on existing lines, enhancing passenger safety and comfort.
 - ▶ **Environmental Impact:** Powered by indigenous electric power, high-speed rail reduces dependence on imported fuels, lowering greenhouse gas emissions.
 - ▶ **Airport Congestion:** By reducing short-haul flights, high-speed rail frees up airport capacity for more economical long-haul flights.
 - ▶ **Global Examples:** Successful implementations in Japan, Europe, and China demonstrate how high-speed rail enhances connectivity and boosts economic growth.

A study found that towns connected by high-speed rail saw their GDP rise by at least 2.7 per cent compared to those not on the route.



PROJECT-76

CONTEXT

While India continues to buy advanced submarines under **Project-75I**, the Defence Research and Development Organisation (DRDO) has started a **preliminary study for Project-76**. This project aims to develop a **new type of submarine** that relies heavily on **Indian-made technology and equipment**.

About Project-76

- Project-76 focuses on building a **conventional submarine** with many parts and systems made in India. This includes weapons, missiles, communication systems, and more.
- The goal is to reduce dependence on foreign suppliers and boost India's ability to make its own submarines.
- Strategic Importance:** The Indian Navy has a 30-year plan to build submarines, showing its commitment to strengthening its maritime defenses. After Project-75I, the Navy plans to shift towards making submarines within India.

Air Independent Propulsion (AIP) module

- DRDO** has made significant strides in naval technology with its development of an **Air Independent Propulsion (AIP) module**. This module is designed to enhance the operational capabilities of conventional submarines, particularly by allowing them to **stay submerged for longer durations** without needing to surface.
- Technical Details:**
 - Fuel Cell Technology:** The AIP module developed by DRDO utilizes phosphoric acid-based fuel cells, which are known for their reliability and wide availability.
 - Power Output:** Each fuel cell in the AIP module currently generates 13.5 kW of power, with plans to scale up to 20 kW to meet future submarine requirements, including those under Project-76 (P-76).
 - Configuration:** The module comprises a stack of 24 fuel cells, designed to exceed operational requirements to ensure redundancy and optimize performance under various conditions.
 - Integration and Future Plans:** The first integration of DRDO's AIP module is slated for the Scorpene-class submarine Kalvari during its refit scheduled for 2025. This integration process, expected to span 2-3 years, will involve rigorous testing to ensure the module's reliability and effectiveness under simulated and actual maritime conditions.

What is Project-75 (India)?

- Project-75 (India), also known as P-75(I), is a **military acquisition initiative** by the Ministry of Defence (MoD).
- Aim:** to procure **diesel-electric attack submarines with fuel cells and Air-Independent Propulsion System (AIP)** for the Indian Navy.
- Project 75I is a follow-up to Project 75

Difference between Project 75 and Project 75I

- Project 75** is aimed at building six conventional Scorpene class submarines indigenously.
 - Kalvari-Class Submarine (2017)
 - Khanderi (2019)
 - INS Karanj (2021)
 - INS Vela (2021)
 - INS Vagir (2023)
 - INS Vagsheer (not commissioned yet)
- Project 75i** is aimed at building submarines that would be larger than the Project 75 submarines along with the **Air-Independent Propulsion (AIP) system**.

WORLD'S FIRST BRAIN IMPLANT TO CONTROL EPILEPTIC SEIZURES

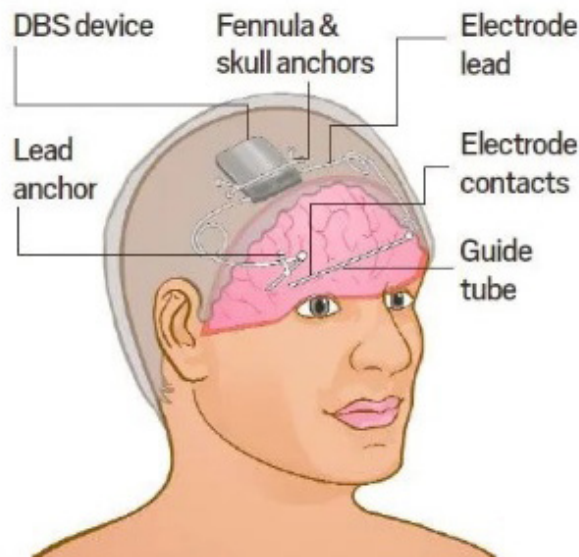
CONTEXT

Oran Knowlson, a teenager from the UK, recently made headlines for becoming the **first person worldwide to receive a brain implant** aimed at reducing epileptic seizures. This deep brain stimulation (DBS) device, surgically implanted into his skull and connected to electrodes targeting the brain's thalamus, has successfully reduced his daytime seizures by an impressive 80%.

About DBS device

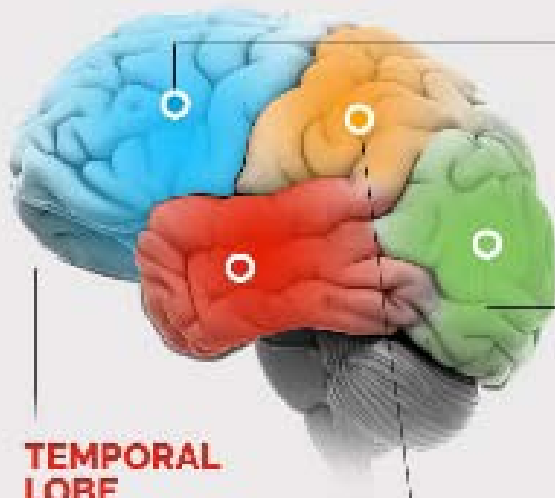
- The DBS device delivers constant **electrical impulses** to disrupt **seizure-causing brain signals**.
- It offers a promising alternative for patients resistant to traditional anti-seizure medications or those for whom surgery is not viable.
- It is surgically placed in the skull, electrodes inserted into the **thalamus (brain's relay station)**.
- Effectiveness:** Reduced Knowlson's seizures by 80%.
- Comparison with Existing Treatments:**
 - Medication:** Many patients are resistant (30%) to available anti-seizure drugs.
 - Surgery:** Effective but invasive; removes seizure-originating brain areas.
 - Ketogenic Diet:** High-fat, low-carb diet also used to control seizures.

DBS BRAIN IMPLANT



FACT BOX

- Epilepsy is a condition characterized by recurring seizures due to abnormal brain activity.



FRONTAL LOBE

Seizures that begin here may cause loss of motor control, a change in behavior, or change in language expression.

OCCIPITAL LOBE

Seizures that begin here may cause a person to see multi-colored shapes, such as circles and flashes, or experience temporary loss of vision.

TEMPORAL LOBE

Seizures that begin here may cause a person to experience an odd smell, odd taste, buzzing or ringing in the ears, fear or panic, déjà vu, or abdominal discomfort.

PARIETAL LOBE

Seizures that begin here may cause a person to feel numbness or tingling, or feel burning or cold sensations.

- Causes include **head trauma, brain tumors, infections, or genetics.**
- It affects daily life and increases the risk of accidents.
- **Epilepsy Prevalence in India:** 3 to 11.9 per 1,000 people (Lancet, 2022).
- **Effectiveness Comparison:**
 - ▶ **DBS:** Reduces seizures by about 40%.
 - ▶ **Surgery:** Decreases seizures by nearly 90%.

ABHYAS (HIGH SPEED EXPENDABLE AERIAL TARGET)

CONTEXT

Defence Research and Development Organisation (DRDO) has successfully completed six consecutive developmental trials of **High Speed Expendable Aerial Target (HEAT) 'ABHYAS'** with improved booster configuration from the **Integrated Test Range (ITR)**, Chandipur, Odisha.

About:

- ABHYAS is an autonomous aerial target developed at **Aeronautical Development Establishment (ADE) by DRDO**.
- It simulates realistic threats for training in weapon systems.
- Equipped with autopilot, it uses systems like RCS, Visual, and IR augmentation.
- This indigenous system is designed for autonomous flying with the help of an auto pilot, a laptop-based Ground Control System for aircraft integration, pre-flight checks, and autonomous flight.
- It also has a feature to record data during flight for post-flight analysis.

KUNO'S CHITAL POPULATION

CONTEXT

The **Cheetah Project** has made headlines due to plans to relocate surplus cheetahs from **Kuno National Park** to **Gandhi Sagar Wildlife Sanctuary**. This decision follows concerns over a **decline in the chital population**, the primary prey for cheetahs, and challenges posed by leopard predation.

Key Findings:

- Kuno National Park currently hosts 26 cheetahs, including 13 cubs.
- Concerns arose as **Kuno's chital population**, the main prey for cheetahs, decreased by over 25% since 2022.
- Leopard predation on chital is a significant issue, despite efforts to control it.
- Introducing Larger Cats:** To address the issue of leopard predation and balance the predator-prey dynamics, the project is considering introducing larger cats like tigers into Kuno. Tigers are viewed as natural competitors to leopards and could potentially reduce their impact on the chital population.
- Project Challenges and Efforts:** Efforts are ongoing to bolster the chital numbers in Kuno, including plans to bring in 1,500 more from other areas. Meanwhile, Gandhi Sagar Wildlife Sanctuary faces hurdles in removing leopards from prey enclosures to facilitate the introduction of cheetahs.



FACT BOX

About Cheetal (*Axis axis*)

- Chital or cheetal (*Axis axis*), also known as the spotted deer, chital deer, and axis deer, is a deer species native to the Indian subcontinent.
- Distribution:** India, Sri Lanka, Bangladesh, Bhutan and a small group in Pakistan
- Only males have antlers, and their bodies are larger than females.
- IUCN:** Least Concern

Kuno National Park (Madhya Pradesh)

- Kuno National Park has spread over an area of 748.76 sq. km.
- Kuno River**, one of the major tributaries of **Chambal River** flows through the entire length bisecting the National Park division.
- It is known for the leopard, Jackal, Chinkara.

Gandhi Sagar Wildlife Sanctuary (Madhya Pradesh)

- Gandhi Sagar is a wildlife sanctuary located at eastern Madhya Pradesh.
- This region is known as a **Nimar region** which touches its border with Rajasthan.
- The forest of this sanctuary is part of **Khathiar-Gir dry deciduous forest**.
- It is part of World famous **Chaturbhuj Nala rock shelters**.

PM 2.5 POLLUTION

CONTEXT

The Lancet study reveals a serious link between air pollution and deaths in Indian cities like Delhi. Pollution particles like **sulfur dioxide and nitrogen dioxide** can cause respiratory issues like coughing and chest tightness.

Key-highlights of the Study

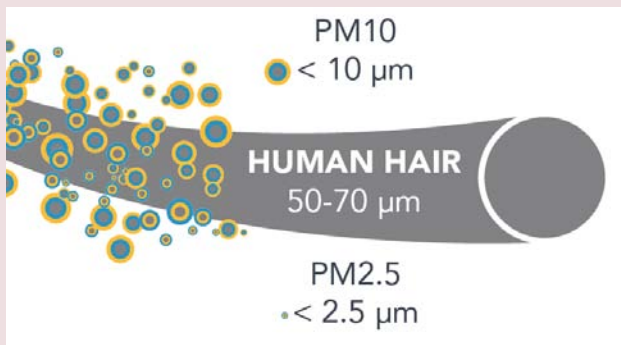
- Between 2008 and 2019, 7.2% of all deaths (approximately 33,000 each year) in 10 cities in India every year can be attributed to air pollution levels that are below India's national clean air threshold.
 - Delhi recorded the highest number of air pollution-related deaths in the study period - a staggering 11.5% i.e. 12,000 deaths each year.
- India's clean air norms are presently well above the World Health Organisation guideline of 15 micrograms in every cubic meter of air.



FACT BOX

What is PM 2.5?

- PM 2.5 are tiny particles smaller than 2.5 microns, much smaller than a human hair. They're a mix of various chemicals and can be partly liquid, unlike solid dust particles. When these particles are mainly liquid, they're called aerosols.



- Natural kinds of aerosols** include dust, sea salt and volcanic ash.
 - Man-made sources** include factory and auto emissions, coal combustion and biomass burning for clearing land or farming.
- PM 2.5 particles are especially harmful as they can bypass our body's defenses like nose hairs and mucus. They can penetrate deep into our lungs, reach the alveoli, and even enter the bloodstream, posing serious health risks.

Animal Discoveries:

- Significant animal discoveries include *Capra himalayensis*, distinguishing the **Himalayan Ibex** from the **Siberian Ibex**, and *Miniopterus srinii*, a new species of bat found in Karnataka.
- Kerala reported the highest number of new animal species** with 101 additions, followed by West Bengal and Tamil Nadu.
- Invertebrates** dominated with 564 new species, particularly insects (369 species), while vertebrates accounted for 77 discoveries, primarily fish species.

Regional Contributions:

- Southern states like **Kerala, West Bengal, and Tamil Nadu** recorded the most new species discoveries, emphasizing the region's biodiversity richness.
- The **Western Ghats and North Eastern Regions** were highlighted as **hotspots** contributing 14% of the total new discoveries.

Scientific Publications:

- The **Zoological Survey of India** and the **Botanical Survey of India** published annual reports documenting these discoveries—'**Animal Discoveries 2023**' and '**Plant Discoveries 2023**', respectively.
- These publications underscore India's ongoing efforts in taxonomy and conservation biology.
- Fauna of India Checklist Portal:** Launched by the Environment Minister, this portal provides comprehensive information on all known animal taxa in India, covering 36 phyla and over 1,04,561 species.
- It includes endemic, threatened, and scheduled species, supporting biodiversity conservation initiatives nationwide.

THE NEW SPECIES DISCOVERY IN INDIA

CONTEXT

In 2023, India witnessed the discovery of 641 new species, comprising both plants and animals. This marks a significant contribution to biodiversity science and conservation efforts in the country.

Key Findings:

Plant Discoveries:

- Notable discoveries include *Curcuma kakchingense*, a new species of **turmeric** found in Manipur, and *Asystasia venui*, a flowering plant discovered in West Bengal.
- West Bengal led in new plant discoveries** with 52 taxa, followed by Kerala and Uttarakhand.
- The discoveries encompass wild relatives of horticultural, agricultural, medicinal, and ornamental plants, enriching India's botanical diversity.

CONSERVATION OF GIB AND LESSER FLORICAN

CONTEXT

The Ministry of Environment, Forest and Climate Change (MoEFCC) has approved Rs 56 crore for the next phase of the conservation of Great Indian Bustard (GIB) and Lesser Florican.

Background

- The conservation programme has been running since 2016 for long-term recovery of critically endangered GIB and Lesser Florican. As of now, around 140 GIBs and fewer than 1,000 Lesser Floricans are surviving in the wild.
- The two species have faced severe decline over the years due to hunting, habitat loss and depredation of eggs by other predators.

About Great Indian Bustard (*Ardeotis nigriceps*)

- The Great Indian Bustard (*Ardeotis nigriceps*) is a large bird native to the Indian subcontinent, known for its presence in dry grasslands and steppe regions. It is often referred to as the Indian Bustard and is one of the heaviest flying birds alive today.
- **Population:** Less than 140 individuals remain, mostly in fragmented areas of western Rajasthan and Gujarat.
- **Habitat:** Historically found across India, it now survives in small numbers primarily in Rajasthan's Desert National Park and Gujarat's Banni Grassland Reserve.
- **Threats:** Hunting, loss of natural habitats, and infrastructure development like electric poles.
- **Significance:**
 - ▶ **State Bird:** Designated as the State bird of Rajasthan, it symbolizes the region's natural heritage.
 - ▶ **Flagship Species:** Known as a flagship species for grassland ecosystems, its presence reflects the overall health of these habitats.
- **Protection Status:**
 - ▶ **IUCN Red List:** Critically Endangered, indicating a high risk of extinction in the wild.
 - ▶ **CITES:** Listed under Appendix I, which prohibits international trade to protect its survival.
 - ▶ **CMS:** Also listed under Appendix I, ensuring international cooperation for its conservation.
 - ▶ **Wildlife (Protection) Act, 1972:** Listed under Schedule 1, providing legal protection within India.

About Lesser Florican

- The Lesser Florican is the **smallest bird in the bustard family**, known for its impressive leaping breeding display. Once abundant in Indian grasslands, it is now critically endangered and on the brink of extinction.
- **Population and Distribution:**
 - ▶ **States:** Madhya Pradesh, Gujarat, Maharashtra, Karnataka, Telangana, Andhra Pradesh, and Rajasthan.
 - ▶ **Breeding Grounds:** It survives mainly in the Ajmer landscape of Rajasthan, which is one of its last remaining breeding habitats despite human activity.
- The species is known for its **strong flying ability**, it undertakes a long annual migration from breeding grounds in Gujarat to wintering grounds in southern India, crossing the **Gulf of Khambhat** in a single journey.
- **Protection Status:**
 - ▶ **IUCN:** Critically Endangered

BORNEO ELEPHANT (*ELEPHAS MAXIMUS BORNEENSIS*)

CONTEXT

The **smallest elephant** known to mankind namely the **Bornean elephant** has unfortunately been classified as '**Endangered**' officially by the **International Union for the Conservation of Nature (IUCN)**.

About:

- The Bornean elephant is the largest mammal on the island of Borneo (despite being smaller than their African counterparts, standing at 8.2-9.8 feet tall)
- They are unique to the island of Borneo.
- These elephants inhabit the Malaysian state of Sabah and the Indonesian state of Kalimantan on the island of Borneo.
- They have long tails that sometimes touch the ground, relatively large ears, and straighter tusks.
- While Borneo elephants are smaller in size than their African counterparts, at 8.2-9.8 feet tall, the Bornean elephant is the largest mammal on the island.
- More than half of the animals' forest habitat (60 per cent) has been lost in the last four decades, mainly due to logging and the widespread planting of commercial oil palm.

MAINLAND SEROW (*CAPRICORNIS SUMATRAENSIS*)

CONTEXT

- The mainland serow, a mammal that looks like a cross between a goat and an antelope, has been recorded at the lowest elevation beyond Bhutan, its natural home, in Assam.
- **About:**
- The Mainland Serow (*Capricornis sumatraensis* *thar*) is a mammal that resembles a cross between a goat and an antelope.
- It is found across various habitats extending from the Himalayas on the Indian subcontinent to southern China, mainland Southeast Asia, and Sumatra.
- The mainland serow inhabits areas at altitudes of 200 metres to 3,000 metres.
- Its habitat is across the border in the **Phibsoo Wildlife Sanctuary** and the **Royal Manas National Park** in Bhutan.
- The species possesses guard hairs on its coat that are bristly or coarse and cover the layer of fur closest to its skin to varying degrees.
- The animal has a mane that runs from the horns to the middle of the dorsal aspect of the animal between the scapulae covering the skin.
- There are four additional species of serow:
 - ▶ Japanese Serow (*C. crispus*)
 - ▶ Formosan Serow (*C. swinhoei*)

- ▶ Burmese Red Serow (*C. rubidus*)
- ▶ Thar, or Himalayan Serow (*C. thar*)
- **Conservation Status:**
 - ▶ **IUCN status:** Vulnerable
 - ▶ **CITES:** Appendix I

RED PANDA (*AILURUS FULGENS*)

CONTEXT

A Red Panda, also called as lesser Panda, was sighted by a team of forest department officials at Mayudia in **Lower Dibang valley** district of Arunachal Pradesh for the first time in this area.

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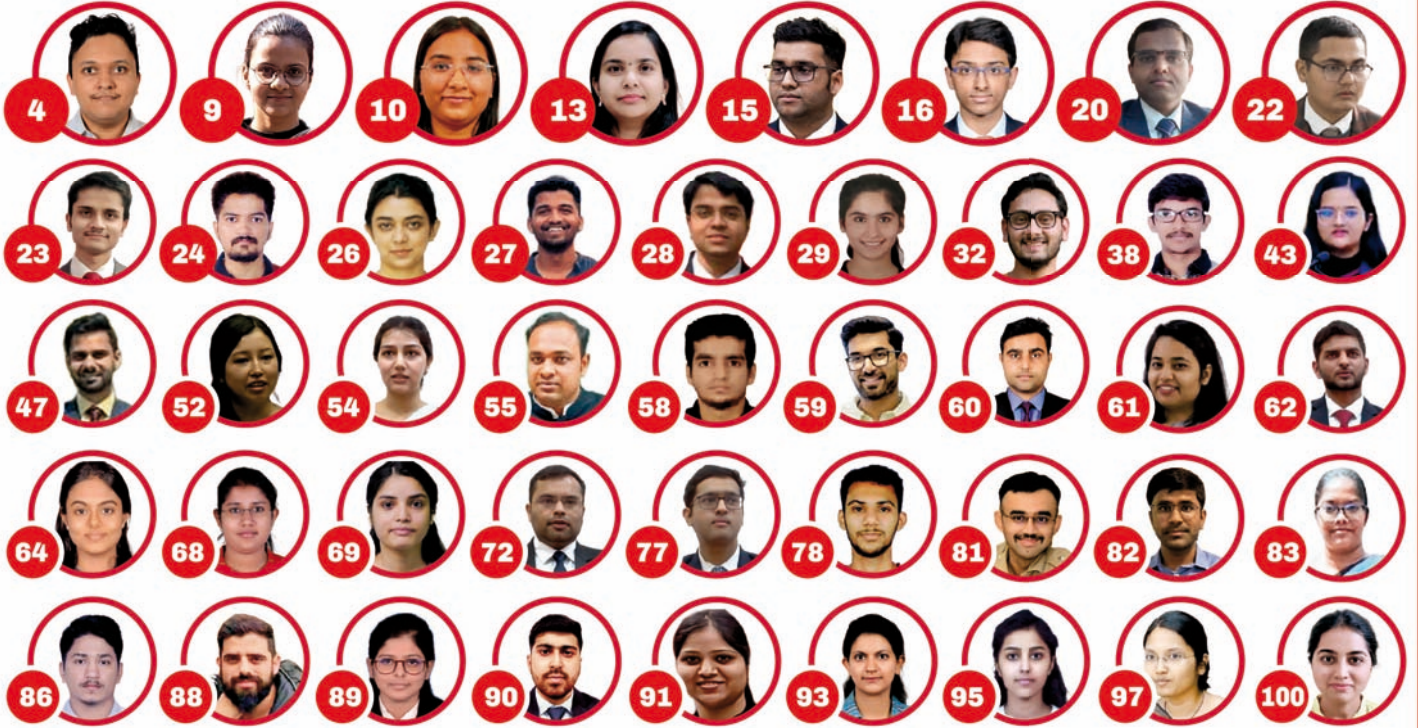
About:

- It is a small mammal native to the **eastern Himalayas and southwestern China**.
- The red panda is slightly larger than a domestic cat with a bear-like body and thick russet fur.
- The belly and limbs are black, and there are white markings on the side of the head and above its small eyes.
- Red pandas are very skillful and acrobatic animals that predominantly stay in trees. Almost 50% of the red panda's habitat is in the Eastern Himalayas.
- **IUCN Status:** Endangered



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