THE IAS GAZETTE

A House Journal of **APTI PLUS**

JUNE 2024

APTI PLUS
Academy for Civil Services Pvt. Ltd.
CREATING CIVIL SERVANTS FOR THE NATION

73 RD EDITION

PRIVATE PLAYERS IN INDIAN SPACE SECTOR

Other topics

- The evolution and essentials of India's climate policy
- Cybercrimes in SE Asia
- Statehood of Palestine
- Share of Religious Minorities: A Cross-Country Analysis (1950-2015)
- India's Agricultural Export Decline

CONTENTS

Sources

THE HINDU · The Indian EXPRESS · livemint · ET · PIB · PRS Legislative Research · NITI Aayog · BusinessLine · Government Reports

1. POLITY & GOVERNANCE

1.1 UNLAWFUL ACTIVITIES (PREVENTION) ACT (UAPA)

Context

- The Supreme Court deemed the Delhi Police's arrest and remand of NewsClick founder Prabir Purkayastha as "invalid in the eyes of law," thereby requiring his release from custody.

Details

- The court ruled that Purkayastha and his counsel were not informed of the grounds for his arrest in writing, violating Article 22(1) of the Constitution.
- The court stated that the **right to be informed about arrest grounds extends to detentions, and any violation would invalidate the arrest and remand procedure.**

About UAPA

- **The Unlawful Activities (Prevention) Act (UAPA) was enacted in 1967 to prevent unlawful activities threatening India's sovereignty and integrity**. It has undergone several amendments, with the most recent significant one being the UAPA 2019.

Key Provisions of UAPA

Designation of Individuals as Terrorists

- The UAPA 2019 expanded the government's power to designate individuals as terrorists without following a formal judicial process, which was previously limited to designated organizations. This provision has been contentious as it raises concerns about due process and the potential for misuse.

Expansion of Investigative Powers

- The amendment empowered investigating agencies, particularly the National Investigation Agency (NIA), by allowing officers of higher ranks to investigate cases related to terrorism. While aimed at enhancing efficiency, critics worry about the implications for accountability and human rights.

Seizure of Property

- Stricter provisions were introduced regarding the seizure of property suspected to be connected with terrorism, requiring prior approval from designated authorities. This provision aims to disrupt the financial networks of terrorist organizations but raises concerns about due process and property rights.

Alliance of International Treaties

- The UAPA includes international treaties related to terrorist activities in its definition, broadening its scope to align with global efforts to combat terrorism.

Prosecution and Bail Provisions

- The UAPA imposes strict provisions related to prosecution and bail. For instance, it extends the pre-charge sheet investigation period to 180 days, which is longer than the usual 60 days, and normal bail rules do not apply to accused persons under certain sections. This can lead to prolonged pre-trial detention and hinder access to justice.

Criticism and Controversies

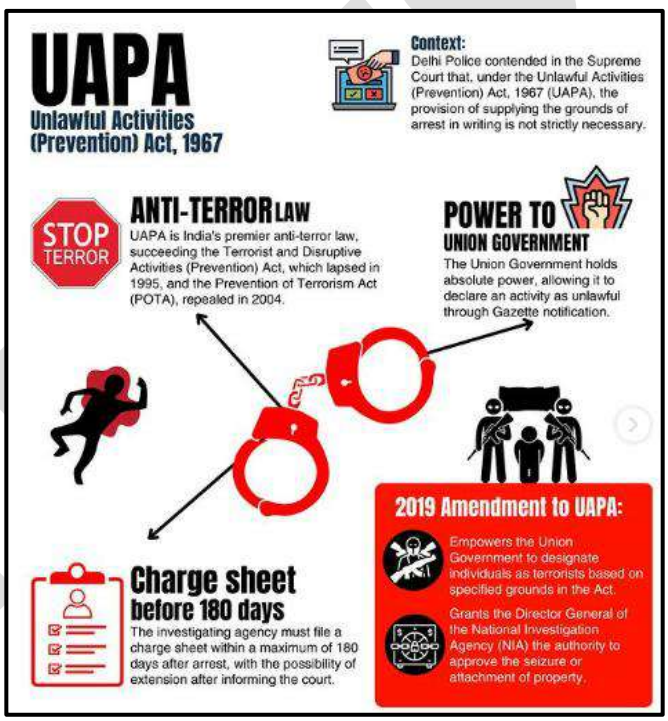
- **Broad Definitions and Misuse:** Critics argue that the broad and vague definitions of "terrorist" and related terms could lead to misuse by law enforcement agencies, undermining civil liberties and due process.
- **Low Conviction Rate:** Despite numerous arrests made under the UAPA, the conviction rate remains low, raising questions about the effectiveness and fairness of the law. The People's Union for Civil Liberties (PUCL) Report (2020) found that between 2015 and 2020, only 2.8% of arrests made under the UAPA resulted in convictions.

- **Violation of Human Rights:** Concerns have been raised that provisions of the UAPA 2019 contradict international human rights standards, particularly regarding due process and the presumption of innocence.
- **Denial of Bail:** The Act's stringent bail provisions can lead to prolonged pre-trial detention, potentially infringing upon the rights of the accused.
- **Political Misuse:** The UAPA has been criticized for its potential misuse by authorities to target political dissenters, activists, and minority groups, raising concerns about freedom of expression and civil liberties.

Legal Challenges and Judicial Pronouncements

Bikramjit Singh v/s The State Of Punjab (2020)

- The Supreme Court upheld the fundamental right to default bail under Section 167(2) of the Code of Criminal Procedure (CrPC).
- The court highlighted default bail as a constitutional right under Article 21, guaranteeing life and personal liberty.
- The court emphasized the importance of procedural safeguards to prevent undue detention.



Thwaha Faisal v/s Union of India (2020)

- The Supreme Court emphasized strict construction of UAPA terms and necessity for specific and factual allegations.
- The court emphasized the need for legal clarity and precision in applying UAPA provisions.

Instances of Misuse highlighted by High Courts:

- Delhi High Court and other high courts highlighted instances of misuse of UAPA, particularly in broadening the definition of "terrorist activity" to include ordinary penal offences.

Way Forward

Clear Definition of Offences

- Providing clear and precise definitions of "unlawful activities" and "terrorist acts" is essential to prevent arbitrary use of the law and ensure legal certainty. This reform would enhance clarity in the interpretation and application of UAPA provisions, reducing the potential for misuse.

Safeguards against Misuse

- Introducing stringent safeguards is crucial to prevent the misuse of UAPA for political purposes or to target dissenting voices. This could include stricter oversight mechanisms, such as independent review boards or parliamentary committees, to monitor the application of the law and prevent abuse by law enforcement agencies.

Bail Provisions

- Reviewing and amending bail provisions under Section 43D(5) to strike a balance between preventing terrorism and protecting the rights of the accused is important.
- Bail should be granted based on merit, evidence, and constitutional principles, ensuring timely access to justice and preventing prolonged pre-trial detention.

Judicial Scrutiny and Oversight

- Enhancing judicial oversight over UAPA cases is essential to ensure fair trials, protection of fundamental rights, and adherence to due process. Regular monitoring by higher courts and special review mechanisms for UAPA-related cases would help prevent miscarriages of justice and uphold the rule of law.

Transparency and Accountability

- Improving transparency in the application of UAPA is vital to maintain public trust in law enforcement. Requiring detailed documentation of arrests, detention, and charges, along with establishing mechanisms for public accountability and reporting, would enhance transparency and ensure accountability for the use of UAPA powers.

Human Rights Compliance

- Ensuring that all provisions of the UAPA comply with international human rights standards and principles is paramount. Safeguards against torture, arbitrary detention, and discrimination based on religion, ethnicity, or political beliefs must be integrated into the law to uphold human rights and prevent abuse.

Legal Aid and Support

- Guaranteeing access to legal aid and support for individuals charged under UAPA is essential, considering the complex nature of terrorism-related cases.
- Strengthening legal assistance programs and ensuring representation for vulnerable populations would help uphold the right to a fair trial and protect the rights of the accused.

Regular Review

- Implementing regular reviews for UAPA provisions to assess their effectiveness, relevance, and impact on civil liberties is necessary. This allows for continuous improvement and adaptation of the law in line with evolving security challenges while safeguarding individual rights and freedoms.

Conclusion

- A balanced approach to reforms to the Unlawful Activities (Prevention) Act (UAPA) is essential for maintaining national security and preventing misuse. Key areas include clear definitions, safeguards against misuse, protection of rights, transparency and accountability, and compliance with international human rights standards. This ensures security without compromising individual freedoms.

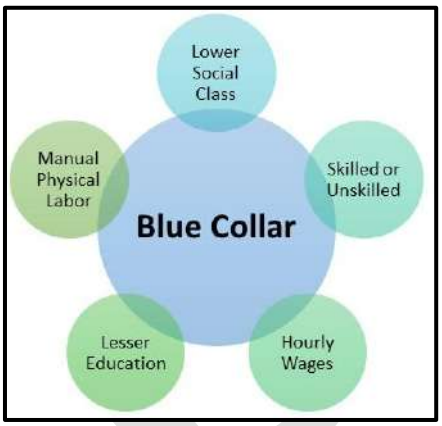
1.2 SHORT ARTICLES

eMIGRATE

Context

- The Memorandum of Understanding (MoU) signed between the Ministry of External Affairs (MEA), Ministry of Electronics and Information Technology (MeitY), and CSC eGovernance Services India Limited aims to streamline and digitize the emigration process for blue-collar workers through the eMigrate project.

About eMigrate



- **Assistance to Blue-Collar Workers:** The eMigrate project primarily assists blue-collar workers intending to work in Emigration Check Required (ECR) countries. These workers typically engage in manual labor or skilled trades in various sectors such as manufacturing, construction, mining, etc.
- **Digitization of Emigration Process:** The project aims to digitize the emigration process, bringing various stakeholders like foreign employers, registered recruitment agents, and insurance companies onto a common platform. This digitization helps in streamlining the process and making it more accessible and transparent.
- **Promotion of Safe and Legal Migration:** One of the core objectives of the eMigrate initiative is to promote safe and legal migration practices. By providing a centralized platform for emigration services, it facilitates compliance with regulations and ensures the protection of migrant workers' rights.

Components of the MoU

- **Integration of Portals:** The MoU includes the integration of the eMigrate Portal of the Ministry of External Affairs (MEA) with the portal of Common Service Centres (CSCs). This integration aims to provide seamless access to eMigrate services for citizens through CSCs, which are widespread across rural and urban areas in India.
- **Access to Services:** Through CSCs, citizens will have access to various eMigrate services, including applicant registration, document processing, and assistance in booking essential services required by migrant workers, such as medical examinations.
- **Awareness Campaign:** CSCs will also play a crucial role in creating awareness about eMigrate services among citizens across India. This awareness campaign aims to educate potential migrant workers about the benefits and procedures involved in utilizing eMigrate services, thereby promoting informed decision-making.

About Common Service Centers (CSCs)

- **Initiative of MeitY:** Common Service Centers (CSCs) are an initiative of the Ministry of Electronics and Information Technology (MeitY). They aim to provide electronic services to villages in rural India, bridging the digital divide and empowering citizens with access to various government and private services.
- **Promotion of Rural Entrepreneurship:** CSCs not only serve as service delivery points but also promote rural entrepreneurship by enabling individuals to set up and operate CSCs, thereby creating livelihood opportunities in rural areas.
- **CSC SPV:** The CSC e-Governance Services India Limited functions as a Special Purpose Vehicle (CSC SPV) responsible for monitoring the implementation of the CSC scheme and ensuring the effective

functioning of CSCs across the country.

- **Vision Areas:** CSCs enable three vision areas, namely digital infrastructure as a utility to every citizen, governance and services on demand, and digital empowerment of citizens. They play an Important role in realizing these visions by providing access to essential electronic services and empowering citizens through digital literacy initiatives.
- **Expansion Under CSC 2.0 Scheme:** It aims to expand the self-sustaining CSC network to 2.5 lakh Gram Panchayats for the delivery of various electronic services. This includes strengthening and integrating existing CSCs and making operational additional CSCs in Gram Panchayats, thereby extending the reach of electronic services to rural areas.

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON:
RIGHT TO PRIVATE PROPERTY	18th May, 2024
RULES FOR POLITICAL PARTIES TO USE STATE-FUNDED MEDIA	20th May, 2024
DIGITAL COMPETITION BILL	22nd May, 2024
FOREIGNER TRIBUNAL	24th May, 2024
SC/ST Act	24th May, 2024
ADVERTISING STANDARDS COUNCIL OF INDIA (ASCI)	25th May 2024
SPECIAL CATEGORIES OF VOTERS, THEIR VOTING METHODS	27 May 2024

1.3 SNIPPETS

Commission of Crime Prevention and Criminal Justice

APTI PLUS

- The recent session of the Commission on Crime Prevention and Criminal Justice (CCPCJ) in Vienna (Austria) aimed at strengthening crime prevention, criminal justice responses, and global cooperation.
- The CCPCJ serves as the primary policy-making body within the UN for crime prevention and criminal justice, providing policy guidance, and overseeing the implementation of UN crime programs.
- It acts as the governing body of the United Nations Office on Drugs and Crime (UNODC), coordinating activities related to crime prevention, mobilizing support among member states, and organizing UN Congresses on Crime Prevention and Criminal Justice.

Remand Hearings

APTI PLUS

- India's Constitution mandates that arrested individuals must be produced before the nearest magistrate within 24 hours of arrest, as per Article 22(2) of the Constitution.
- Section 57 of the Code of Criminal Procedure, 1973 prohibits police officers from detaining an arrested person for more than 24 hours without the magistrate's authority. This period excludes the time for transporting the accused from the place of arrest to the court of the magistrate.
- A Remand Hearing is a crucial stage in the process, where the magistrate can authorize further detention in police or judicial custody. The magistrate's role in remand hearings is to ensure the accused's constitutional and statutory protections.

'Samlat Deh' Land Rights

APTI PLUS

- Shamlat deh is village common land in India, created by multiple landowners for communal purposes like grazing pastures and playgrounds, often divided into various chunks.
- Landowner rights traditionally held in shamlat deh land were proportionate to the size of their individual land holdings. The 2022 Supreme Court judgment raised questions about these rights.
- In Bhagat Ram v/s State of Punjab (1967), this recognized the aforementioned landowner rights. The 2022 Supreme Court judgment upholding the 1992 amendment to the Punjab Village Common Lands (Regulation) Act, 1961 vested control in gram panchayats.
- However, the ongoing review petition highlights potential conflicts with the Bhagat Ram case and Article 31A (protection against land acquisition without compensation).

Lis Pendens Doctrine

APTI PLUS

- Lis Pendens, meaning "pending lawsuit", is a legal doctrine enshrined in Section 52 of the Transfer of Property Act, 1882 (TOPA). It safeguards the rights of individuals involved in ongoing court disputes concerning immovable property (land and buildings).
- Applicability:
  - The doctrine comes into play when a lawsuit regarding ownership or rights to a specific immovable property is underway in a court of competent jurisdiction.
  - If the property owner transfers the property while the lawsuit is ongoing, the transferee (buyer) is bound by the court's final decision in the dispute.
- Non-Applicability:
  - Lis Pendens doesn't apply to transfers of movable property such as vehicles or furniture. Whether the transferee was aware of the pending lawsuit is irrelevant. They are bound by the court's outcome regardless.
  - The doctrine itself doesn't automatically invalidate transfers made during litigation. However, if the court rules against the transferor's ownership, the transferee might lose the property.

Personality Rights

APTI PLUS

- Personality rights, also known as publicity rights, are legal protections granted to individuals to control the commercial use of their name, image, likeness, voice, signature, and other identifiable features that contribute to their public persona.
- In India, courts recognize and protect personality rights under the broader framework of privacy rights, property rights, and intellectual property laws.
- Unauthorized use of a celebrity's likeness or identity for commercial purposes without their consent may constitute a violation of their personality rights.

Section 436A of The Code of Criminal Procedure

APTI PLUS

- The Supreme Court has confirmed that Section 436A of the Code of Criminal Procedure (CrPC) applies to those accused of money laundering.
- Section 436A states that an undertrial detainee who has spent half of the maximum period of imprisonment specified for the alleged offence under investigation, inquiry, or trial, shall be released on bail by the Court. This applies to offences under the CrPC or any other law.
- The provisions under Section 436A focus on time-bound trials to prevent excessively long pre-trial detention and are not an automatic right. It does not apply to offences punishable with death or where the Court believes continued detention is necessary.

Radical Democracy

- The concept was developed by Indian freedom fighter and humanist philosopher Manabendra Nath Roy, combining freedom and justice in a reorganized society.
- It emphasizes "new humanism," a philosophical foundation based on rational thought and human intelligence.
- It advocates for a radical approach to democracy and elections, focusing on independent candidates and a humanist economy.
- It also includes comprehensive social programs, such as unemployment insurance and pensions.
- It rejects traditional liberal democracy for failing to address economic inequality and social justice under capitalism and opposes authoritarianism for suppressing individual freedom.

Article 329(b)

- Article 329(b) of the Indian Constitution is a legal framework that restricts judicial intervention in the electoral process.
- It states that no election to either the House of Parliament or the Legislature of a State can be challenged except through an election petition, as per the procedure provided by law.
- This clause effectively prohibits challenges to elections through any other legal avenue, emphasizing the exclusive jurisdiction of election petitions in addressing electoral disputes.
- The Supreme Court in the K. Venkatachalam case, clarified that Article 329(b) does not apply to matters related to disqualifications and penalties under Articles 191 and 193, which deal with parliamentary and legislative assembly membership.

Pragati-2024

- The Central Council for Research in Ayurvedic Sciences (CCRAS), an autonomous body under the Union Ministry of Ayush, has launched "PRAGATI-2024" or Pharma Research in AyurGyan And Techno Innovation.
- The objective is to explore research opportunities and foster collaboration with the Ayurveda drug industry.
- CCRAS, headquartered in New Delhi, is responsible for advancing knowledge and practices in Ayurveda, including medicinal plant research, drug standardization, pharmacological research, clinical trials, literary research, and tribal health care research.
- The council is responsible for formulating, coordinating, developing, and promoting research on scientific lines in Ayurveda and the Sowa-Rigpa system of medicine, including developing research policies, guidelines, and initiatives to advance the field.

DigiLocker

- DigiLocker is a digital platform launched by the Indian government in 2015 to provide a secure online space for users to store, access, and share digital copies of documents issued by various government agencies and departments.
- It aims to eliminate the need for physical documents by providing a convenient and paperless alternative for document management.
- DigiLocker is a flagship initiative of the Ministry of Electronics & IT (MeitY) under the Digital India programme.
- DigiLocker is integrated with several government departments and agencies, enabling seamless document verification and authentication.

What are the Rules on Contesting Seats?

- The Representation of the People Act (RPA), 1951, allows a candidate to contest an election from up to two constituencies, but they can only hold one seat at a time if elected from both.
- A sub-section, 33 (7), of the RPA was introduced through an amendment in 1996, allowing a candidate to contest from two seats. However, Section 70 of the same Act states that a candidate can hold only one seat at a time, regardless of whether they have been elected from more than one seat.
- The minimum age for a person to contest Lok Sabha and Assembly polls is 25 years, and 30 years for the Rajya Sabha or the State Legislative Council.
- There is no minimum educational qualification needed to contest general elections in India. Candidates must be citizens of India, registered in some constituency of the country as valid voters, and must not have been convicted of any offence punishable by more than two years.

Process Of Declaring Voters Turnouts

APTI PLUS

- The Election Commission of India (ECI) uses the ENCORE system to manage and monitor voter turnout data during elections.
- Returning Officers (ROs) or Assistant Returning Officers (AROs) enter estimated poll percentages into the ENCORE Portal on polling day, allowing election officers at various levels to monitor and aggregate the data in real-time.
- After polling, detailed turnout reports are entered, distinguishing between male, female, and third-gender voters against the total number of electors.
- Form 17C, the official record of turnout data, holds legal significance as it serves as the basis for election petitions and result verification.

History Sheets

APTI PLUS

- A history sheet is a comprehensive record maintained by Indian law enforcement for individuals suspected of posing a threat to public safety due to their past criminal activity.
- It serves as a centralized record for tracking known offenders and monitoring their movements.
- The process of creating a history sheet varies slightly based on individual state police rules but generally involves identifying a person with a significant criminal history or suspected involvement in ongoing criminal activities.
- The term "history sheet" first appeared in the Punjab Police Rules of 1934.
- Types of history sheets include KD (Known Depredators), rowdy sheets, suspect sheets, and other categories based on the perceived threat level and type of criminal activity.

2. INTERNATIONAL RELATIONS

2.1 INDIA INDONESIA RELATIONS

Context

- The 7th India-Indonesia Joint Defence Cooperation Committee (JDCC) meeting was held in New Delhi.

Details

- Both sides expressed satisfaction at the expanding scope of defense cooperation between the two countries.
- The progress made on various bilateral defense cooperation initiatives was deliberated in meetings.
- Dignitaries identified means to enhance existing areas of collaboration, especially in the field of defense industry ties, maritime security, and multilateral cooperation.

India-Indonesia Relations

Historical and Cultural Ties

- **Ancient Connections:** India and Indonesia share over 2009 years of cultural and commercial ties.
- **Religious Influence:** Hinduism, Buddhism, and later Islam traveled from India to Indonesia.
- **Cultural Influence:** Indonesian folk arts and dramas are inspired by Indian epics like the Ramayana and Mahabharata. Wayang, Wayang wong, etc.
- **Active Cultural Exchange:**
  - Jawaharlal Nehru Indian Cultural Centre offers classes in Indian arts, music, dance, yoga, and languages.
  - Sahabat India Festival (2015): Festival of India in Indonesia, featuring 35 events across 16 cities.

Political Relations

- **Independence Struggles**: Leaders like Jawaharlal Nehru and President Sukarno collaborated during their respective independence movements.
- **Bandung Conference 1955**: Foundation of Afro-Asian and Non-Aligned Movements was laid here.
- **Look East Policy:** Since 1991, India's Look East Policy has enhanced bilateral ties in multiple sectors.
- **Act East Policy:** The current government aims to deepen ties with East Asia through the Act East Policy.

Economic and Commercial Relations

- **Trade Growth:** In 2022-2023, India's bilateral trade with Indonesia was valued at US\$38.84 billion, making Indonesia India's second-largest trading partner in ASEA.
- **Key Imports/Exports:**
  - India imports crude palm oil, coal, minerals, rubber, and hydrocarbons from Indonesia.
  - India exports refined petroleum, maize, vehicles, telecom equipment, pharmaceuticals, and more.

Indian Community in Indonesia

- Around 100,000 Indonesians of Indian origin, primarily in Jakarta, Medan, Surabaya, and Bandung. About 10,000 Indian nationals live in Indonesia as traders, engineers, consultants, accountants, bankers, and other professionals.

Challenges in India-Indonesia Relations

- **Trade Imbalance:** Persistent trade imbalance exists between two countries. India is the largest buyer of Indonesian crude palm oil, but exports to Indonesia are primarily limited to refined petroleum, maize, and pharmaceuticals, leading to a trade deficit.
- **Bureaucratic Hurdles:** Lengthy approval processes and regulatory compliance issues often delay projects, such as the high-level task force's efforts to monitor and facilitate investments.

- **Maritime Security Concerns:** While India focuses on the broader Indo-Pacific strategy, Indonesia emphasizes ASEAN centrality, causing strategic alignment challenges.
- **Religious intolerance:** Both India and Indonesia are ethnically diverse democracies with India's majority religion as Hinduism, followed by Muslims, Christians, Sikhs, and Buddhists, and in Indonesia, the majority religion is Islam, followed by Christians, Hindus, and Buddhists. Indonesia on many occasions has criticized India on the issue of minorities.
- **Cultural Misunderstandings**: Despite historical ties, cultural differences in business practices can lead to misunderstandings. For example, Indonesia's preference for consensus decision-making contrasts with India's more hierarchical approach.

Way Ahead for India-Indonesia Relations

- **Enhancing Trade and Investment:** The Comprehensive Economic Cooperation Agreement (CECA) signed in 2005 should be upgraded Bilateral Comprehensive Economic Cooperation Agreement (BCECA) can help balance trade and promote investment.
- **Streamlining Bureaucratic Processes:** Simplifying regulatory frameworks and improving ease of doing business can attract more investments.
- **Strengthening Maritime Cooperation:** Joint maritime exercises and enhanced cooperation in the Indo-Pacific region can address shared security concerns. Ex. IND-INDO CORPAT.
- **Diversifying Economic Engagement:** Focusing on new sectors such as renewable energy, technology, and pharmaceuticals can diversify economic ties. India's strong pharmaceutical industry can help meet Indonesia's healthcare needs.
- **Promoting Cultural and People-to-People Exchanges:** Increasing cultural exchanges and educational collaborations can strengthen bilateral ties. Expanding educational programs like the establishment of an Ayurveda Chair in Bali can further cultural and academic connections.

Conclusion

- India-Indonesia relations epitomize a strategic partnership grounded in mutual respect, economic cooperation, and shared regional interests, fostering stability and prosperity in the Indo-Pacific region through diplomatic collaboration and cultural exchanges.

2.2 COMMISSION ON POPULATION AND DEVELOPMENT

Context

- The event, titled "Localizing the SDGs: Women in Local Governance in India Lead the Way," was organized during the 57th Session of the Commission on Population and Development (CPD57).

Details of the event

- Organizer: Permanent Mission of India to the United Nations and the Ministry of Panchayati Raj, in collaboration with the United Nations Population Fund (UNFPA).
- Aim: **To highlight the role of Indian women in grassroots political leadership and their contributions to sustainable development at the local level.**
- India's representation: **Elected Women Representatives (EWRs) from rural local self-governments in India.**

Commission on Population and Development

- Established by the **United Nations Economic and Social Council (ECOSOC) in 1946.**
- It serves as the primary UN body responsible for monitoring, reviewing, and assessing global population trends, issues, and policies.
- The CPD hold**s annual sessions at the United Nations Headquarters in New York.**

India's Elected Women Representatives (EWRs) and how they help in SDG Localization

India has 1.4 million women serving as elected members of PRIs, constituting 46% of total representatives.

- **Community-Centered Approach:** In rural areas, women representatives may advocate for **clean water and sanitation facilities (SDG 6)** by taking initiatives for constructing community water wells or organizing sanitation drives.
- **Empowerment Through Education:** **EWRs promote education (SDG 4),** especially for girls, as a means of empowerment. Ex. Campaign for building schools in marginalized areas, advocacy for scholarships or free textbooks for girls in her constituency.
- **Healthcare Accessibility:** Ensuring **healthcare access (SDG 3),** particularly for women and children like establishment of health centers, maternity clinics, or vaccination drives in underserved areas.
- **Economic Empowerment:** Economic **empowerment (SDG 1 and 8)** by supporting initiatives like microfinance programs, skill development training, and women's cooperatives. Formation of self-help groups for women to start small businesses or crafts enterprises can be encouraged.
- **Environmental Conservation:** **Environmental sustainability (SDG 13, 14, and 15)** by promoting eco-friendly practices and conservation efforts like advocating for waste management programs, tree plantation drives, etc.
- **Social Inclusion and Gender Equality:** Promoting **social inclusion (SDG 5 and 10) and gender equality to** address issues like gender-based violence, discrimination, and unequal opportunities.

Case studies

Chhavi Rajawat:

Chhavi Rajawat is known for her remarkable work in women's empowerment at the grassroots level. She gained prominence as the Sarpanch (village head) of Soda village in Rajasthan. Chhavi**, an MBA graduate, left her corporate job to serve her ancestral village. Under her leadership, Soda witnessed a transformation with improved infrastructure, access to clean water, and better educational facilities. Chhavi initiated several women-centric programs aimed at empowering them economically and socially. She encouraged the formation of self-help groups (SHGs) to promote entrepreneurship among women, provided vocational training, and organized awareness campaigns on health and education.** Chhavi's efforts not only empowered women in Soda but also inspired similar initiatives across the country, showcasing the potential of women leaders in local self-government.

Case studies

Tulsi Prajapati:

Tulsi Prajapati, from the state of Madhya Pradesh, is another inspiring example of women's empowerment in local self-government**. She became the Sarpanch of Barkheda Panth village at the age of 24, making her one of the youngest women leaders in rural India.** Despite facing opposition and skepticism due to her gender and age, Tulsi proved her leadership abilities through her dedication and innovative approach to governance**. Tulsi focused on addressing critical issues affecting women in her village, including access to education, healthcare, and sanitation. She implemented various development projects, such as building schools, toilets, and healthcare centers, to improve the quality of life for women and their families. Tulsi also encouraged women's participation in decision-making processes, empowering them to voice their concerns and advocate for their rights.** Tulsi's leadership and commitment to women's empowerment have made a significant impact in Barkheda Panth and served as a model for inclusive and effective governance in rural areas of India. Her story demonstrates the transformative power of women leaders in local self-government in driving positive change and advancing gender equality.

Conclusion

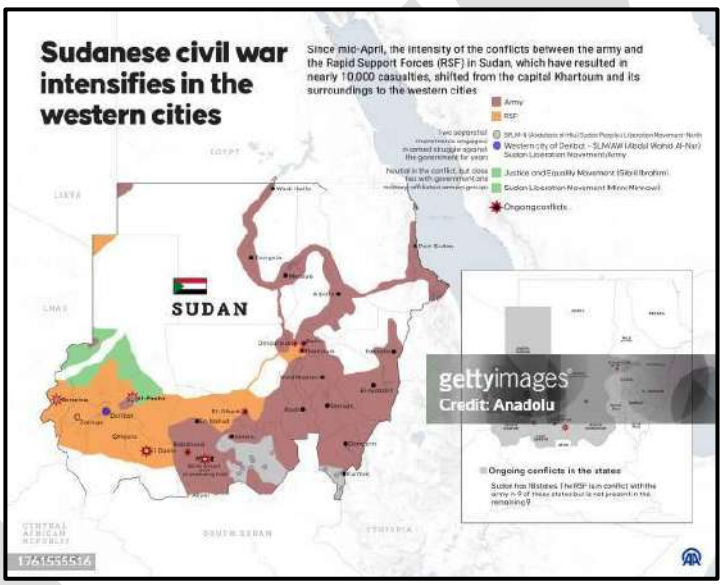
- India's Elected Women Representatives (EWRs) play a pivotal role in localizing Sustainable Development Goals (SDGs) by championing grassroots initiatives, advocating for gender equality, and prioritizing community development, thereby driving sustainable progress at the grassroots level.

2.3 SUDAN'S CIVIL WAR

Context

- Sudan is facing persistent civil war due to identity crisis and ethnic conflicts.

Historical Context of Sudan's war



- **1899-1956: S**udan was under joint British-Egyptian rule from 1899 until independence in 1956. The north (predominantly Arab and Muslim) and the south (largely African and animist/Christian) were administered separately.
- **1956:** After independence, the central government was dominated by northern elites, marginalizing the southern regions leading to a rise in demands for autonomy.
- **First Civil War (1955-1972):** continued until the Addis Ababa Agreement in 1972 provided autonomy for the southern region.
- Second Civil War (1983-2005): reignited in 1983 when President Jaafar Nimeiri imposed Sharia law nationwide and revoked southern autonomy.
- **Independence of South Sudan (2011):** The 2011 referendum as per the Comprehensive Peace Agreement (CPA) 2005 resulted in South Sudan becoming an independent nation on July 9, 2011.
- **2023:** A civil war between two rival factions of the military government of Sudan, the Sudanese Armed Forces (SAF), and the paramilitary Rapid Support Forces (RSF), both supported different leaders began.

Major causes of the Sudan War

1. **Ethnic and Regional Marginalization:** *Sudan has a diverse population with 19 major ethnic groups and over 597 sub-groups, with Sudanese Arabs comprising about 70%.* Historical marginalization of ethnic and regional groups by centralized governments has led to resentment and conflict.

2. **Religious and Political Identity Crisis:** Sudan's struggle to reconcile its diverse religious and political identities, particularly the imposition of an Arab-Islamic identity by past governments, has led to resistance and conflict among non-Arab populations and marginalized communities.
3. **Unequal Distribution of Resources:** The concentration of political and economic power in Khartoum has resulted in the unfair distribution of wealth and resources, leading to disparities between the centre and periphery regions.
4. **External Factors and Interference:** *RSF emerged as a counterbalance to the traditional armed forces, gaining significant power and influence. Russia reinforced RSF's autonomy and control over resources.*
5. **Failure of Governance and Political Institutions:** Persistent governance failures, corruption, and lack of effective institutions have eroded public trust and contributed to the conflict.

Conclusion

- Achieving peace requires addressing marginalization in conflict zones like Darfur, South Kordofan, and the Nuba Mountains. Fundamental issues include marginalization, religion-state relations, governance, resource sharing, land disputes, and social justice.

2.4 CHABAHAR PORT OPERATION

Context

- Eight years after concluding the general framework of cooperation on the Cha-bahar port, India and Iran signed a 10-year contract for its operation.

Details

- The long-term agreement was signed between Indian Ports Global Ltd. (IPGL) and the Port and Maritime Organisation (PMO) of Iran.
- The agreement will enable the operation of the Shahid-Behesti terminal.
- **IPGL will invest approximately $120 million in equipping the port.**
- **India has also offered a credit window of $250 million for mutually identified projects aimed at improving Chabahar-related infrastructure.**

May 2015	• A memorandum of understanding for the development of the Chabahar port by India was signed.
May 23, 2016	• The contract was executed during the visit of the Prime Minister to Iran. • A trilateral agreement to establish the International Transport and Transit Corridor (Chabahar Agreement) was signed by India, Iran, and Afghanistan.
May 2024	• India and Iran signed a 10-year contract for its operation.

About Chabahar Port

- It is a deep water port located in the Sis-tan-Baluchistan province of Iran.
- Chabahar Port is located in southeastern Iran, on the Gulf of Oman.
- **It serves as Iran's only oceanic port and consists of two separate ports named Shahid Kalantari and Shahid Beheshti, each of which has five berths.**
- It is only about 170 kilometers west of the Pakistani port of Gwadar.

Significance of the framework agreement

- It is **closest to India and is located in the open sea, providing easy and secure access for large cargo ships.**

- Chabahar is of strategic importance to both Iran and India. It can potentially help Tehran avoid the effect of Western sanctions and offer New Delhi an **alternative route that bypasses Pakistan, which does not allow India land access for trade with Afghanistan and Central Asia.**
- It served as a vital trade artery **connecting India with Afghanistan and Central Asian Countries.**
- India will use the port for humanitarian aid shipments, reaffirming its commitment to support regional development beyond commercial interests.
- This port's operation and India's effort **showcase India's commitment to fostering goodwill and stability in the region.**

Conclusion

- The agreement is important for a new age of trade, marine cooperation, and transshipment and boosts trilateral trade between India, Iran, and Afghanistan. As India continues to invest in Chabahar port, its efficiency and capacity will be further enhanced, solidifying India's commitment to the region's economic development.

2.5 UK DEPORTING MIGRANTS TO RWANDA

Context

- British authorities deported an asylum seeker to Rwanda under a voluntary returns scheme.

Safety of Rwanda (Asylum and Immigration) Bill

- The law allows *the removal of asylum seekers who made "unauthorized journeys" since January 1, 2022, to Rwanda for processing of asylum claims.*
- The deportation under the law is facilitated *under the Voluntary Returns Scheme (VRS), which* offers financial assistance to migrants and failed asylum seekers who choose to depart to a "safe third country" like Rwanda.
- Eligibility for deportation includes being in the UK illegally, overstaying a visa, withdrawing an asylum application, or being a victim of modern slavery.

U.K.-Rwanda Deal on Refugees

As per this deal following has been offered by UK:

- The UK government provides development funding to Rwanda as part of the asylum plan.
- The UK to fund processing and integration costs for relocated individuals.

Safety Concerns in Rwanda after Deportation

- Rwanda is *one of the most densely populated countries in the world with a population of over 13 million people and* it *continues to feature among the least developed nations in the world.*
- Despite economic progress, concerns persist regarding human rights abuses, including arbitrary detention, ill-treatment, and torture.
- The government has been accused of preventing dissent, controlling media and opposition, and pressuring refugees.

- Rwanda hosts a significant refugee population, with around 90% living in camps and 80% relying on humanitarian assistance.
- The UNHCR reports high vulnerability among refugees in Rwanda, with limited access to basic needs and services.

Way ahead

- **Comprehensive Immigration Reform:** Develop and implement comprehensive immigration reform that addresses various aspects of the immigration system, including pathways to legal status for undocumented immigrants, improvements to the legal immigration process, border security measures, and addressing the root causes of migration from countries of origin.
- **Promoting Legal Pathways for Immigration:** Simplify and streamline legal immigration processes to provide more opportunities for individuals to migrate to the country through legal channels. This could involve expanding visa programs for skilled workers, increasing family reunification quotas, and creating temporary worker programs to meet labor market demands.
- **Addressing Root Causes of Migration:** Address the underlying factors driving migration, such as poverty, violence, political instability, and lack of economic opportunities in countries of origin. This could involve diplomatic efforts, foreign aid programs, and partnerships with other countries to promote stability, economic development, and good governance.
- **Enhancing Integration and Assimilation:** Develop policies and programs to support the integration and assimilation of immigrants into society, including language training, access to education and healthcare, and employment opportunities.
- **Global Refugee Education Fund:** UNESCO may create a dedicated fund to support education initiatives in refugee camps and host countries.

Conclusion

- By implementing a balanced strategy that considers humanitarian concerns, national security, and economic factors, societies can navigate the complexities of immigration while maximizing the benefits and minimizing the challenges associated with migration.

2.6 DEEPENING RUSSIA-CHINA TIES AND IMPACT ON INDIA

Context

- President Vladimir Putin and Xi Jinping recently met at the historic Great Hall of the People in china.

Main takeaways from the visit

- **Sino-Russian Relationship Dynamics:**
  - The meeting points to the deepening ties between Russia and China, characterised by mutual respect and strategic cooperation.
  - Russia's emphasis on the **non-opportunistic and non-directed nature of its relationship** aims to reassure global observers about the stability and intentions of the alliance.
  - China characterised the friendship as "everlasting" and poised it as a model for international relations. This signals China's commitment to the partnership.
- **International Context:**
  - The timing of the visit amid Russia's control over Ukrainian territory highlights Russia's assertiveness in foreign policy and its ability to shape geopolitical dynamics.
  - The Chinese president's recent European tour and meetings with leaders like countries from France **demonstrate China's broader diplomatic engagements beyond its alliance with Russia, indicating its multi-faceted approach to global affairs.**

- **Concerns over China's Role in Ukraine War:**
  - There might be China's role in providing military support to Russia through the supply of dual-use items.
  - Increased imports of machinery and equipment from China to Russia, particularly those with military applications, raise concerns about China's indirect involvement in the conflict.

Sino-Russian Historical Context:

- **During the Cold War, China and the USSR were rivals,** competing for control of the global communist movement. Tensions between the countries rose dangerously in the early 1960s, and they fought a brief border war in 1969.
- The relationship **began to improve after the death of Mao in 1976** but remained still right until the collapse of the Soviet Union in 1991.
- **In the post Cold War-era, economic relations formed the "new strategic basis" for Sino-Russian relations.** China became Russia's biggest trading partner and the largest Asian investor in Russia. China views Russia as a powerhouse of raw materials and a valuable market for its consumer goods.

Implications for India

- **Strategic Alignment:** Closer ties between Russia and China could lead to shifts in the balance of power and influence in Asia, impacting India's geopolitical positioning.
- **India's reliance on defence: According to the SIPRI, Russia was the largest supplier of arms to India in both 2013–17 and 2018–22, but its share of total Indian arms imports fell from 64% to 45%.** The prospect of Russia becoming a "junior partner" to China is concerning and India may need to reassess its defence procurement strategies and diplomatic engagements.
- **Decreased reliability of Russia:** The Soviet Union's position during the 1962 war was not particularly supportive of India. However, Moscow did extend its support during the 1971 war. But current Sino-Russia dynamics show that Russia may not be completely relied upon in the future.
- **Economic Implications:** Deeper economic cooperation between Russia and China may lead to increased competition in accessing markets and

resources, as well as potential disruptions in existing economic partnerships.

- **Regional Dynamics:** The growing partnership may influence regional dynamics in South Asia, Central Asia, and beyond impacting India's interests and maintain regional stability.

Way ahead

- **Strategic Autonomy**: India must continue to maintain its strategic autonomy, balancing its relations with both Russia and China while strengthening ties with other major powers like the US and the EU.
- **Diplomatic Engagement**: Enhance diplomatic engagements with both Russia and China to ensure that India's interests are safeguarded and to promote regional stability.
- **Economic Diversification**: Diversify economic relations by expanding trade partnerships with other countries to reduce over-reliance on any single nation, including Russia and China.
- **Regional Cooperation**: Strengthen regional cooperation through forums like BRICS, SCO, and RIC (Russia-India-China) to foster dialogue and mutual understanding.
- **Defense Partnerships**: Continue defense collaborations with Russia, given the historical ties and ongoing projects, while also exploring new defense partnerships globally.

Conclusion

- India, situated in the midst of this evolving geopolitical landscape, faces complex strategic calculations concerning its defence posture, diplomatic relations, and regional security dynamics.

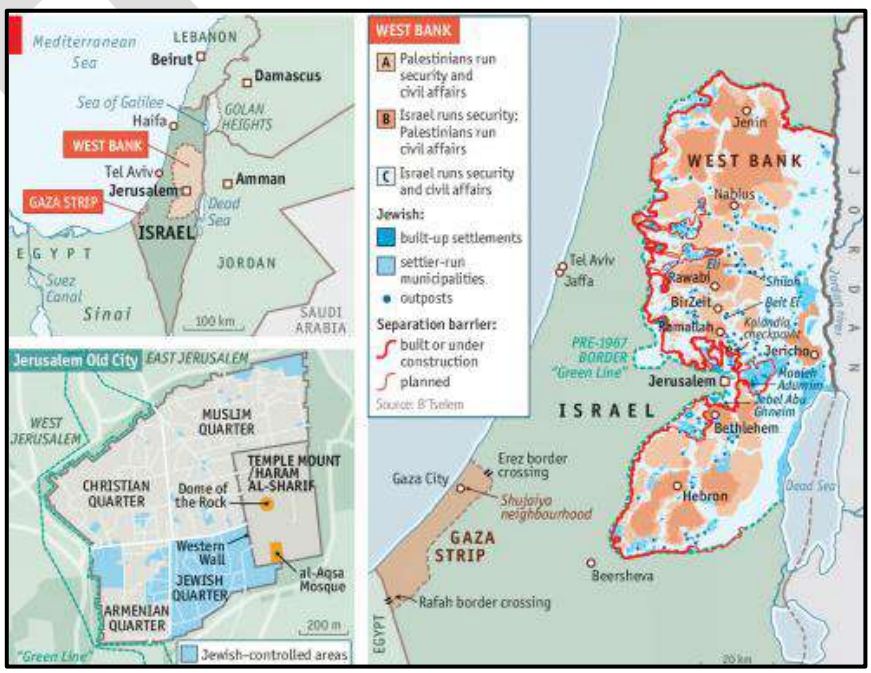
2.7 STATEHOOD OF PALESTINE

Context

- Ireland, Norway, and Spain have announced to formally recognise a Palestinian state from 28 May.

Palestinian statehood status

- **Recognition Status:** As of 2024, over 130 of the 193 United Nations member states have recognized Palestine as a state. However, notable countries like the United States, Canada, and some European nations have not formally recognized it.
- **UN Status:** Non-member observer state status Palestine at the United Nations since 2012 allows it to participate in UN debates and join certain international treaties and organizations.



Basis statehood

- The Palestinian Authority (PA) seeks statehood based on the borders **established before the Six-Day War in 1967, with East Jerusalem as its capital. This territory includes the West Bank, Gaza Strip, and East Jerusalem.**

Major issues in statehood

- **Israeli Occupation:** Ongoing Israeli occupation of the West Bank and Gaza Strip, which Palestinians see as their future state is the main cause of conflict.
- **Peace Process failure: The progress of Oslo Accords in the 1990s aimed to establish a framework for resolving the Israeli-Palestinian conflict and achieving Palestinian statehood through negotiations has been slow, and the peace process has faced numerous setbacks.**
- **Expansion of Israeli Settlements:** The expansion of Israeli settlements in the West Bank are considered illegal under international law and have been a major point of contention in peace negotiations.
- **Other challenges and obstacles:** Other significant challenges, including security concerns, disputes over borders and sovereignty, the status of Palestinian refugees, and the status of Jerusalem, which is claimed by both Israelis and Palestinians as their capital.

Way forward for Palestinian Issue

- **Negotiations:** Direct talks, facilitated by international mediators or through bilateral channels, should aim to address key issues such as borders, settlements, Jerusalem, refugees, and security.
- **Two-State Solution:** The international community widely supports the **idea of a two-state solution, with Israel and Palestine living side by side in peace and security. Both parties need to commit to this vision and work towards its realization.**
- **End to Occupation**: Israel should end its occupation, dismantle illegal settlements, and lift restrictions on movement and access for Palestinians.
- **Security:** Demilitarisation of a future Palestinian state, as well as security guarantees for Israel and measures to address Palestinian security concerns should be done.
- **Reconciliation:** Reconciliation efforts between Fatah and Hamas should continue, for Palestinian unity to form a unified Palestinian government that can represent all Palestinians in negotiations and governance.
- **International Support: T**he international community, including regional actors, should continue to support Palestinian statehood efforts diplomatically, financially, and politically. This support can help create momentum for negotiations and provide assistance for Palestinian state-building efforts.
- **Regional Dynamics:** Regional dynamics, including the **normalisation of relations between Israel and Arab states, can either facilitate or hinder progress towards Palestinian statehood.** Regional actors should use their influence to support a just and lasting resolution to the Israeli-Palestinian conflict.

Conclusion

- The path to Palestinian statehood remains uncertain, with factors such as shifts in regional geopolitics, changes in Israeli and Palestinian leadership, and the willingness of the international community to push for a resolution all playing crucial roles in determining the outcome.

2.8 BIMSTEC

Context

- BIMSTEC's Charter comes into force after Nepal's ratification.

Details

- The Parliament of Nepal endorsed the charter in the early weeks of April 2024, which allowed the document to come into force this month.

About the charter

- The seven members of BIMSTEC — Bangladesh, Bhutan, India, Myanmar, Nepal, Sri Lanka and Thailand — first signed the charter on 30 March 2022 at the fifth BIMSTEC summit held virtually in Colombo, Sri Lanka.
- It came into effect today after Nepal ratified it in April 2024.

Main provisions

- The charter establishes a legal and institutional framework for cooperation among the seven countries surrounding the Bay of Bengal.
- It highlights the long-term vision and priorities of the member countries.
- The document gives the organisation a legal personality.
- **Establishes a mechanism for admitting new members and observers, and the criteria of geographical contiguity or "primary" dependence on the Bay of Bengal for trade and transport purposes has been added for admission of new members.**
- It enables negotiations and agreements with countries and other regional and international groupings.
- All decisions will be taken by consensus among current members.
- Charter also empowers the BIMSTEC ministerial meeting to set up any further criteria as required.
- The charter also highlights that the leaders' summit will be held every two years and indicates the procedure for the rotational chairmanship of the organisation.

Challenges

- **Coordination and Implementation:** Bureaucratic delays and differing national priorities have slowed progress on key infrastructure projects like the BIMSTEC Transport Connectivity Master Plan.
- **Geopolitical Tensions:** Bilateral tensions between India and Nepal have affected regional cooperation within BIMSTEC. Nepal wants to prioritise SAARC over BIMSTEC. Issues such as cross-border terrorism and territorial disputes have strained relations of countries in south asia , impacting the organisation's ability to foster cohesive regional integration.
- **Infrastructure and Connectivity Gaps:** The lack of adequate transport infrastructure between BIMSTEC countries hampers trade and connectivity. For instance, inadequate road and rail links between India and Myanmar limit the efficient movement of goods and people, hindering economic integration.
- **Security Concerns:** Despite the region's vulnerability to natural disasters, limited information sharing and coordination among member states have hampered joint efforts in disaster management. **This was evident during the response to major disasters like the 2004 Indian Ocean tsunami and Cyclone Nargis in Myanmar in 2008.**
- **Institutional Capacity and Resource Constraints:** BIMSTEC's Secretariat operates with limited resources and staffing. As a result, the Secretariat's ability to effectively coordinate and implement BIMSTEC initiatives, such as promoting tourism or facilitating trade, may be constrained by resource limitations.

Conclusion

- As member countries continue to collaborate and leverage their collective strengths, BIMSTEC can play a pivotal role in addressing shared challenges and unlocking new opportunities for socio-economic advancement in the years to come.

2.9 US-SAUDI CIVIL NUCLEAR DEAL

Context

- White House National Security Adviser will visit Saudi Arabia this weekend for talks expected to touch on a civil nuclear cooperation agreement.

Civil Nuclear Cooperation Agreement

- **Signed under Section 123 of the U.S. Atomic Energy Act of 1954, it is commonly referred to as "123 Agreements."**
- In conjunction with the **Non-Proliferation of Nuclear Weapons (NPT), 123 Agreements help to advance U.S. nonproliferation principles.**
- The U.S. can negotiate agreements for significant civil nuclear cooperation with other nations under this act and Congressional review is required for such agreements.
- Nine nonproliferation criteria are **outlined to prevent the misuse of nuclear technology for weapons development or sensitive material transfer.**
- As of December 6, 2022, the United States has 23 such agreements in force that govern peaceful nuclear cooperation with 47 countries, the International Atomic Energy Agency, and the governing authorities on Taiwan.

Saudi Arabia's Interest in a Civil Nuclear Deal

- Despite being a major oil exporter, **Saudi Arabia aims to diversify its energy sources and reduce emissions under Vision 2030. Nuclear energy is seen as a potential component of this plan.**

Potential Benefits for the United States

- Could contribute to broader goals such as normalising relations between Saudi Arabia and Israel.
- Could **enhance Israel's security, strengthen the coalition against Iran, and enhance U.S. ties with Saudi Arabia amid growing Chinese influence in the Gulf.**
- Commercially, U.S. companies could secure contracts to build nuclear power plants in Saudi Arabia, competing with other global players like Russia and China.

Key Issues in a Saudi-U.S. Nuclear Deal:

- The potential establishment of a uranium enrichment facility on Saudi territory **raises concerns about proliferation risks and control over the facility.**
- Critics express concerns that Saudi Arabia might seek nuclear expertise for nuclearisation of the country.

Way Ahead

- **Transparency and Accountability:** Any nuclear deal should include stringent transparency and accountability measures to ensure that nuclear technology is used exclusively for peaceful purposes and subject to international monitoring.
- **Regional Security Dialogue:** Engaging in a broader regional security dialogue involving key stakeholders, including Saudi Arabia, Iran, and other Gulf states, could help address underlying security concerns and promote confidence-building measures.
- **Renewable Energy Investment:** Encouraging Saudi Arabia to invest in renewable energy sources as an alternative to nuclear power could mitigate proliferation risks and contribute to global efforts to combat climate change.
- **Human Rights Conditionality:** Incorporating human rights conditionality into the nuclear deal could help address concerns about Saudi Arabia's governance practices and demonstrate a commitment to upholding universal values and principles.
- **International Cooperation:** Working closely with international partners, including the International Atomic Energy Agency (IAEA) and other relevant stakeholders, to ensure effective nuclear safeguards and promote responsible nuclear stewardship in the region.

Conclusion

- Safeguards are essential to prevent Saudi Arabia from using enrichment facilities for weapons development.

2.10 MANAMA DECLARATION AND ARAB LEAGUE

Content

- The "Manama Declaration" issued by the Arab League or a similar regional organisation, contains several key points regarding the Israeli-Palestinian conflict.

Details about declaration

- **International Protection and Peacekeeping Forces:** **The declaration calls for the deployment of international protection and peacekeeping forces by the United Nations in the occupied Palestinian territories. This is aimed at ensuring the safety and security of Palestinians until a two-state solution is implemented.**
- **Immediate Ceasefire in Gaza:** Emphasises the need for an "immediate" ceasefire in Gaza, highlighting the urgency of ending hostilities and violence in the region.
- **End to Forced Displacement:** Declaration advocates for an end to forced displacement in the Palestinian territory, addressing the humanitarian crisis and protection of Palestinian communities.
- **Support for Two-State Solution:** Supports establishment of an independent Palestinian state alongside Israel, based on pre-1967 borders, as a long-term resolution to the conflict.

Arab League

- Formed on March 22, 1945, in Cairo, Egypt, with the goal of promoting economic, cultural, political, and military cooperation among Arab countries.

Membership:

- The League comprises 22 member states, including countries such as Egypt, Saudi Arabia, Iraq, Jordan, Lebanon, Libya, Morocco, Tunisia, and others.
- Each member state has equal representation in the League's decision-making processes.

Objectives:

- **Foster Cooperation:** Aims to promote cooperation and solidarity among Arab nations in various domains, including economic, social, and cultural spheres.
- **Protect Sovereignty:** Works to safeguard the sovereignty, independence, and territorial integrity of Arab states.
- **Resolve Disputes:** Seeks to mediate and resolve disputes or conflicts among member states through diplomatic means.
- **Coordinate Policies:** Coordinates political and diplomatic policies on regional and international issues affecting Arab interests.
- **Promote Arab Identity:** Promotes Arab identity, heritage, language, and cultural exchange among member states.

Key Initiatives and Resolutions:

- **Arab Peace Initiative:** In **2002, the League proposed the Arab Peace Initiative,** which calls for normalizing relations between Arab countries and Israel in exchange for Israeli withdrawal from occupied territories and a just solution to the Palestinian refugee issue.
- **Economic Cooperation:** The League promotes economic integration and cooperation among member states through initiatives such as the Arab Free Trade Area (AFTA) and investment partnerships.
- **Humanitarian Assistance:** It provides humanitarian aid and support to member states during crises, natural disasters, and humanitarian emergencies.

Conclusion

- The declaration reflects ongoing efforts within the Arab League or the 22-member bloc to engage in diplomatic initiatives and

international advocacy for a peaceful resolution to the Israeli-Palestinian conflict. By addressing issues such as international protection, ceasefire, and displacement, the declaration underscores the humanitarian dimensions of the conflict and the need for immediate actions to alleviate suffering and promote stability.

2.11 WIPO TREATY ON GENETIC RESOURCES & TRADITIONAL KNOWLEDGE

Content

- WIPO Treaty on Intellectual Property, Genetic Resources, and Associated Traditional Knowledge was adopted recently.

WIPO Treaty on Intellectual Property, Genetic Resources, and Associated Traditional Knowledge.

About

- Held under the aegis of WIPO at its headquarters in Geneva.
- **The treaty's proposal was first introduced by Colombia in 1999.**
- Conducted from May 13 to May 24, 2024.
- This is the **27th treaty adopted under the World Intellectual Property Organization (WIPO).**
- It is the first new treaty in a decade, highlighting its significance and the long gap since the last treaty.
- **Negotiations officially began in 2021 and culminated in this diplomatic conference.**

Mandatory Disclosure

- Patent applicants **must disclose the country of origin or the source of the genetic resources** when the claimed invention is based on these resources.
- **Applicants must also disclose the Indigenous Peoples or local community who provided the traditional knowledge if the patent is based on such knowledge.**

Entry into Force

- The treaty will come into force once it is ratified by 15 parties.
- Signing the treaty indicates intent to comply with its provisions but does not legally bind a country to it.

Significance

- It is the **first treaty to specifically address genetic resources (GRs) and traditional knowledge (TK) held by Indigenous Peoples and local communities.**
- **The treaty aims to make the IP system more inclusive, catering to the needs of diverse countries and communities.**
- **India possesses 7-8% of the world's biodiversity. The country has a rich repository of knowledge based on these genetic resources.** The treaty is particularly significant for India due to its vast biodiversity and tradition.

The Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilisation

- **Adoption:** Adopted on October 29, 2010, in Nagoya, Japan, under the Convention on Biological Diversity (CBD).
- **Entry into Force:** Came into force on October 12, 2014.
- **Objectives:**
  - **Fair and Equitable Sharing:** Ensure the fair and equitable sharing of benefits arising from the utilization of genetic resources, thereby contributing to the conservation and sustainable use of biodiversity.
  - **Access to Genetic Resources:** Establish a transparent legal framework to facilitate access to genetic resources and associated traditional knowledge.
- **Provisions:**
- **Prior Informed Consent (PIC):** Requires users to obtain prior informed consent from the provider country before accessing genetic resources.
- **Mutually Agreed Terms (MAT):** Stipulates that access to genetic resources should be

based on mutually agreed terms between the provider and the user.

- **Benefit-Sharing:** Mandates the sharing of benefits (monetary or non-monetary) arising from the use of genetic resources with the provider country and indigenous communities.
- **Implementation Mechanisms:**
- **Compliance Measures:** Obligates parties to ensure compliance with domestic regulations on access and benefit-sharing (ABS) and to support compliance with MAT.
    - **National Focal Points (NFPs):** Each party must establish a national focal point to facilitate access and provide information on ABS procedures.
    - **Competent National Authorities (CNAs):** Countries designate competent national authorities to grant access and oversee the implementation of PIC and MAT.

Conclusion

- The WIPO Treaty on Intellectual Property, Genetic Resources, and Associated Traditional Knowledge represents a milestone in the protection of traditional knowledge and genetic resources. For India and other countries of the global South, this treaty is a significant step towards a more inclusive and equitable IP system.

2.12 SHORT ARTICLES

MATES Scheme

Context:

- The Australian Federal Budget Document announced the start date for the Mobility Arrangement for Talented Early-professionals Scheme (MATES) for Indian Nationals.

About

- Established under the Australia-India Migration and Mobility Partnership Arrangement, co-signed by both nations on 23 May 2023.
- Commence as a pilot with 3,000 places for primary applicants per program year.
- Under the scheme, **Indian graduates and early career professionals (aged 18 to 30) with knowledge and skills in specific fields of study will be offered a new temporary mobility pathway to live and work in Australia for up to two years.**
- Eligible fields will include renewable energy, mining, engineering, information and communication technology, artificial intelligence, financial technology, and agricultural technology.

Benefits

- MATES participants will be able to live and work in Australia for up to 2 years. **Participants may extend their period of stay in Australia by applying for another visa permitting temporary or permanent residence, provided they meet all eligibility requirements for the visa.**
- Participants will be able to apply to bring dependents (spouses and dependent children). Dependants will have work rights in Australia, and will not count towards the annual cap.
- **It will give Indian university graduates and early career professionals the opportunity to live and work in Australia for up to two years, and to gain employment and valuable experience in their areas of expertise.**
- The scheme will also benefit Australian industry sectors and businesses by enhancing their access to some of India's most talented graduates with in-demand knowledge and skills.

Travel & Tourism Development Index

Context:

- The World Economic Forum released the Travel & Tourism Development Index 2024.

About the index

- The index is prepared in collaboration with the University of Surrey.

- The biennial index analysed the travel and tourism sectors of 119 countries, assessing a range of factors and policies.

India ranking

- India's rank - 39th, highest in South Asia and among lower-middle-income economies.
- In the 2021 index, India was ranked 54th.
- Key drivers: India's strong Natural (6th), Cultural (9th), and Non-Leisure (9th) Resources.
- Global inflationary trends have affected travel and tourism conditions in India, with price competitiveness declining and air transport and tourist services infrastructure yet to recover to 2019 levels.
- Consequently, India's overall TTDI (Travel and Tourism Development Index) score is 2.1 percent below its 2019 level.

World ranking

- The US topped the list.
- Following the US, the top five countries in the 2024 list are Spain, Japan, France, and Australia.
- Germany ranked 6th, followed by the UK, China, Italy, and Switzerland in the top ten.

A Stronger Position in the world

- High-income economies in Europe and Asia-Pacific continue to lead the index.
- International tourist arrivals and the travel and tourism sector's contribution to global GDP are expected to return to pre-pandemic levels this year, driven by the lifting of COVID-19 travel restrictions and strong demand.
- The Middle East had the highest recovery rates in international tourist arrivals, exceeding 2019 levels by 20 per cent, while Europe, Africa, and the Americas showed a strong recovery of around 90 per cent in 2023.

KAZA Summit

Context:

- More than 400 delegates gathered in Livingstone, Zambia, for the inaugural Kavango-Zambezi (KAZA) Trans-Frontier Conservation Area (TFCA) Summit.

Summit Objectives

- Assess the progress made since the establishment of the KAZA-TFCA.
- Review the implementation of the 2016 Memorandum of Understanding and the 2011 KAZA Treaty.
- Seek renewed commitment from current leaders for regional cooperation and further development.

Theme and Issues

- **The summit's theme: "Leveraging KAZA's natural capital and cultural heritage resources as catalysts for inclusive socio-economic development of the eco-region."**
- Emphasis on managing wildlife resources to benefit local communities.
- Ensuring KAZA becomes and remains the best-managed conservation area globally.

KAZA TFCA

- It is enormous, larger than Germany and Austria combined and nearly twice as large as the United Kingdom.
- It lies in the Kavango and Zambezi river basins where Angola, Botswana, Namibia, Zambia and Zimbabwe converge.
- Protected areas like Okavango Delta, the world's largest inland delta, and the Victoria Falls, a World Heritage Site are located here.

U.N. Counter-Terrorism Trust Fund

Context:

- India has contributed $500,000 to the U.N. Counter-Terrorism Trust Fund, which shows

India's commitment to support multilateral efforts in the global fight against terrorism.

Details of the funding

- India's contribution would support UNOCT's global programs —**mainly Countering Financing of Terrorism (CFT) and Countering Terrorist Travel Programme (CTTP).**
- They are aimed at building capacities of the member states of eastern and southern Africa to combat the critical issues of financing of terrorism and prevent the movement and travel of terrorists.
- With its current contribution, India's total financial support to the trust fund now stands at $2.55 million.

United Nations Office of Counter-Terrorism (UNOCT)

- **Establishment:** The UNOCT was established in 2017 as a result of a **merger between the Counter-Terrorism Implementation Task Force Office (CTITF) and the UN Counter-Terrorism Centre (UNCCT).**
- **Mandate:** It serves as the focal point within the United Nations system for counter-terrorism efforts, providing leadership in strengthening the coordination and coherence of the global counter-terrorism response.
- **Functions:** UNOCT coordinates the implementation of the Global Counter-Terrorism Strategy, facilitates counter-terrorism capacity-building assistance to member states, and promotes international cooperation and partnerships in countering terrorism.
- **Strategic Priorities**: Its strategic priorities include addressing the evolving threat of terrorism, preventing violent extremism, strengthening international cooperation, and ensuring respect for human rights and the rule of law in counter-terrorism efforts.

United Nations Counter-Terrorism Trust Fund (UNCTF)

- The UNCTF was **established in 2005 to support the implementation of the United Nations Global Counter-Terrorism Strategy, providing resources for projects and initiatives aimed at countering terrorism.**
- **Funding:** It relies on voluntary contributions from member states, international organizations, and private sector entities to finance counter-terrorism activities and capacity-building projects.
- **Focus Areas:** The UNCTF focuses on areas such as preventing and countering violent extremism, enhancing border security and law enforcement capacities, supporting victims of terrorism, and strengthening legal frameworks to combat terrorism.

India's dependence on Chinese imports

Context:

- China surpasses the US to become India's top trading partner with $118.4 billion in business.

The table lists commodities imported by India, **where China accounts for the largest share in total imports**

	Commodity	China's share in imports
1	Electronics/ telecom/ electrical products	43.9%
2	Machinery	39.7%
3	Textile and clothing	38.2%
4	Chemicals and pharmaceuticals	26.8%
5	Automobiles	26%

Source: GTRI
Data as of 2022

Details:

- China has reclaimed its position as India's largest trading partner, surpassing the United States after two years, according to the latest figures released by the Global Trade Research Initiative (GTRI).
- **In the fiscal year 2024, India's bilateral trade with China totaled $118.4 billion, with imports rising by 3.24% to $101.7 billion and exports increasing by 8.7% to $16.67 billion.**
- **Trade between India and the US experienced a decline. Two-way trade was $118.3 billion in FY24, with Indian exports dropping by 1.32% to $77.5 billion and imports decreasing by 20% to $40.8 billion.**
- The report also compared other trading relationships with countries like Russia and Saudi Arabia. **Russia's trade figures have seen a dramatic increase, with exports growing by**

78.3% and imports soaring by 952%, leading to a widened trade deficit.

- Trade with Saudi Arabia showed a more balanced growth, with exports more than doubling and imports rising at a slower pace.

Chinese dependence statistics

- The GTRI report highlighted significant dependence and noted that **"India imported $4.2 billion worth of telecom and smartphone parts, accounting for 44 percent of total imports in this category.**
- **Laptops and PC imports from China totaled $3.8 billion, making up 77.7 percent of India's imports in this sector.**
- **India's import of lithium-ion batteries for electric vehicles, primarily from China, was valued at $2.2 billion, representing 75% of such imports,**

Status of Indian Students Abroad

Context

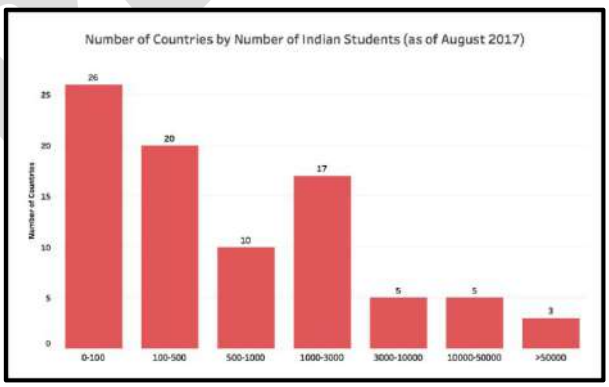
- Indian students have overtaken the Chinese to become Germany's largest international student community.

Details:

- *A record 43,000 Indian students are presently enrolled in various German colleges and universities, marking a 100% increase over the last five years.*
- *After India and China, Syria (15,563), Austria (14,762), and Turkey (14,732) boast of the largest international student populations in Germany.*
- As of records from the 2022-2023 academic year, Germany hosts 4,58,210 international students — roughly 20 percent of Germany's total student population.
- Engineering programs is most sought-after in Germany by Indians accounting for 60% of all Indian students in Germany. But there is also a huge interest in streams such as law, management and social sciences (20%), and mathematics (15 %)

Reasons for high student turnouts in Germany:

- **Low costs:** Compared to other Western countries, the cost of education in Germany is low as higher education is mostly public-funded. This means that students only have to take care of their living expenses.
- **Courses taught in English:** Germany is not an English-speaking country unlike the US, the UK, Canada, and Australia, Indian students' top choices. *But now Germany is offering courses in English as well. Currently, over 2000 degree courses are taught in English, mostly at Masters level. PhD courses, both structured and individual programs, take this number even higher.*
- **Skilled Immigration Act**
  - Germany's new Skilled Immigration Act will also offer Indian students a smoother pathway into the German labor market. The German government now **allows international students from outside the European Union to work up to 20 hours per week, overriding the previous limit of 10 hours.**



Indian students abroad

- Apart from Germany, *Indian students are also the largest group of international students in the US, with nearly 267,000 Indians enrolled in US universities in 2022-23, more than a quarter of the 1 million international students in the US.* The US issued record-high numbers of student visas during June-August 2023.
- Until August 2023, Canada stood among the top foreign study destinations for Indian students. However, between October to December 2023, an 86% decline was observed in the issuance of study permits to Indian students.
- Diplomatic issues between India and Canada have affected visa processing and a two-year Canadian cap on international student

permits will reduce the number of Indians obtaining student visas to attend Canadian universities in the short term.

G7 Ministers Meet

Context:

- G7 energy ministers discussed a possible time frame for phasing out coal-fired power plants.

About G7 ministers meet

- It was held in Turin.
- It was the first two-day talks of Energy and ecological transition ministers from the G7.

Agenda

- To discuss the issue of committing to a common target and possible timeframe for shutting down coal-fired power plants.

Outcome

- The latest G7 draft commits to "phase out existing coal power generation during the first half of 2030s or in a timeline consistent with keeping a limit of 1.5°C temperature rise in line with countries' net zero pathways".

Criticisms of G7 countries:

- **Missed targets:** A new report by a global climate institute says that while the "**G7 economies need to slash their own emissions by 58% by 2030 compared to 2019 levels to do their part to limit warming to 1.5°C, the current collective 2030 ambition level of the G7 stands at an insufficient 40-42% but existing policies suggest that the G7 will likely only achieve a 19-33% reduction by the end of this decade.**
- **Huge emissions:** Together the G7 makes up around 10% of the global population and 38 percent of the global economy and was responsible for 21 percent of total greenhouse gas emissions in 2021, according to the Climate Analytics Policy Institute.
- **Dependence on fossil fuels:** The G7 countries largely depend on fossil fuels, and provide significant public finance for fossil fuels, surpassing investments in clean energy.
- **Inadequate Financing**: They have been slow and insufficient in providing climate finance to developing nations agreed under the Paris Agreement targets**. Oxfam reports that only 20% of climate finance from rich countries in 2019 was allocated for adaptation, with very less reaching least developed countries.**
- **Failure to update NDC:** Most of the G7 member countries fail to update nationally determined contributions (NDCs) and Paris Agreement targets.

Way ahead for G7 countries:

- G7 countries should adopt "significantly more ambitious plans to cut emissions".
- G7 needs to discuss "innovative" financing models amid calls for more accessible finance for vulnerable countries.
- "' Challenging budget conditions' should not be an excuse for failing to deliver substantial new public climate finance pledges.
- The recently concluded World Bank (WB) and International Monetary Fund (IMF) meetings show a marginal increase of $11bn in finance but the gap is still too large. G7 countries must increase climate finance.
- The highly industrialized countries should use their political clout, wealth, and technologies to end fossil fuel use.

Conclusion:

- Climate finance is essential for tackling the rising issue of climate change and G7 countries must ensure adequate climate financing as the principle of common but differentiated responsibilities.

Antarctica Treaty

Context

- India to host the 46th Antarctic Treaty Consultative Meeting and 26th Meeting of the Committee for Environmental Protection in 2024.

About the meetings

- The Ministry of Earth Sciences (MoES), Government of India, through the **National Centre for Polar and Ocean Research (NCPOR)**, will host the **46th Antarctic Treaty Consultative Meeting (ATCM 46) and the 26th Meeting** of the Committee for **Environmental Protection (CEP 26)** in Kochi, Kerala.

- **Both meetings are Convened annually under the Antarctic Treaty System**

Agenda

- 46th ATCM agenda: Include strategic planning for sustainable management of Antarctica and its resources; policy, legal, and institutional operations; biodiversity prospecting; inspections and exchange of information and data; research, collaboration, capacity building, and cooperation.
- The 26th CEP agenda: Focuses on Antarctic environment evaluation, impact assessment, management, and reporting; climate change response; area protection and management plans including marine spatial protection; and conservation of Antarctic biodiversity.

Antarctic Treaty

- **Signed in 1959 and entered into force in 1961.**
- Established to use Antarctica as a region dedicated to peaceful purposes, scientific cooperation, and environmental protection.
- **56 countries are currently party to it.**
- **Established in 2004,** the ATS(Antarctic Treaty Secretariat) coordinates the ATCM and CEP meetings. It also monitors compliance with Antarctic Treaty provisions.

Committee for Environmental Protection

- The CEP was established under the Protocol on Environmental Protection to the Antarctic Treaty (the Madrid Protocol) in 1991.
- The CEP advises the ATCM on environmental protection and conservation in Antarctica.

India's association with the treaty

- India has been a Consultative Party to the Antarctic Treaty since 1983.
- It participates in the decision-making process along with the other 28 Consultative Parties to the Antarctic Treaty to date.

India's Antarctic research efforts

- India's first Antarctic research station, **Dakshin Gangotri,** was established in 1983.
- At present, India operates two year-round research stations: **Maitri (1989) and Bharati (2012).**
- The permanent research stations facilitate Indian Scientific Expeditions to Antarctica, which have been ongoing annually since 1981.
- In 2022, India enacted the Antarctic Act, reaffirming its commitment to the Antarctic Treaty.
- India's scientific and strategic endeavors in the polar regions (the Arctic and Antarctic), the Himalayas, and the Southern Ocean are under the **National Centre for Polar and Ocean Research (NCPOR) in Goa.**
- NCPOR is an autonomous institution under **MoES, Government of India. MoES has set up a Host Country Secretariat at MoES HQ** to successfully coordinate and organize the event.

2.13 SNIPPETS

African Union

APTI PLUS

- African Union 'firmly condemns' Israeli incursion into Rafah.
- The African Union (AU) is a continental union of 55 member states located on the continent of Africa.
- The bloc was founded on 26 May 2001 in Addis Ababa, Ethiopia and launched on 9 July 2002 in Durban, South Africa.
- AU was formed to replace the Organization of African Unity(OAU), established on 25 May 1963 in Addis Ababa by 32 signatory governments; the OAU was disbanded on 9 July 2002.
- The most important decisions of the AU are made by the Assembly of the African Union, a semi-annual meeting of the heads of state and government of its member states.
- At a G20 (Group of 20) meeting held in Delhi, India in 2023, the African Union was admitted as a member to the G20 like the European Union.

Military Gender Advocate of the Year Award

APTI PLUS

- Indian Army officer Major Radhika Sen was awarded the UN Military Gender Advocate of the Year award by the UN Secretary General.
- The Award is observed as the International Day of UN Peacekeepers.
- The award recognises the efforts of a military peacekeeper in promoting the principles of the 2000 Security Council resolution that calls for protecting women and girls from conflict-related sexual violence and sets gender-related responsibilities for the UN.
- Ms Sen is the second Indian peacekeeper to receive the honour after Major Suman Gawani, who served with the UN Mission in South Sudan and received the award in 2019.

International Day of UN Peacekeepers

- May 29, Theme for 2024: "Fit for the future, building better together"
- The United Nations General Assembly officially established the day in 2002.
- The day honors the professionalism, dedication, and courage of all men and women who have served in UN peacekeeping operations.

International Booker Prize

APTI PLUS

- Jenny Erpenbeck's 'Kairos' wins the International Booker Prize 2024.
- It is an international literary award hosted in the United Kingdom.
- Awarded for: Best work of fiction translated into English and published in the UK or Ireland.
- Awarded by: Booker Prize Foundation
- Prize is awarded every year.
- Inaugurated in 2005 as an extension of the Man Booker Prize for Fiction, to a single work of fiction or collection of short stories, translated into English and published in the United Kingdom or Ireland.
- Cash Prize: £50,000 prize for the winning title, shared equally between author and translator.

3. ECONOMY

3.1 CHANGES INTRODUCED BY IRDAI FOR HEALTH INSURANCE POLICIES

Context

- The Insurance Regulatory and Development Authority of India (IRDAI) has introduced significant changes to health insurance regulations.

Major Changes Introduced by IRDAI for Health Insurance Policies

- **Quick Authorization**: Insurers must grant the final authorization within three hours of receiving the discharge request from the hospital.
- **Immediate Discharge**: Policyholders shall not be made to wait for discharge from the hospital.
- **Penalty for Delay**: If there is any delay **beyond three hours**, the insurer will bear any additional charges incurred by the hospital from the shareholder's fund.
- **Immediate Processing**: In the event of the **policyholder's death during treatment**, the insurer must immediately process the claim settlement request.
- **Mortal Remains**: Insurer must ensure the immediate release of the mortal remains from the hospital.
- **Goal**: Insurers are urged **to achieve 100% cashless claim settlements in a time-bound manner.**
- **Emergency**: In emergencies, insurers should decide on cashless authorization requests **within one hour.**
- **Help Desks**: Insurers may arrange for dedicated help desks at hospitals to assist with cashless requests.

Other Changes Introduced by IRDAI

- **Diverse Products**: Insurers are encouraged to offer a wider range of products, add-ons, and riders to cater to all ages, regions, occupational categories, medical conditions/treatments, and all types of hospitals and health care providers.
- **Choice of Policy**: Policyholders with multiple health insurance policies can choose under which policy they want to claim the admissible amount.
- **Mandatory CIS**: Insurers must provide a **Customer Information Sheet (CIS) along** with every policy document to ensure transparency and clarity.
- **Rewards**: Insurers may reward policyholders **with a No Claim Bonus, either by increasing the sum insured or discounting the premium amount,** for not making any claims during the policy period.
- **Cancellation Refund**: Policyholders can receive a refund of the premium or a proportionate premium for the unexpired policy period if they choose to cancel their policy at any time during the policy term.

Policyholders and Health Insurance: Survey Findings

A survey by Local Circles found significant issues with health insurance claims processing:

- **Claim Processing Difficulties**: 43% of insurance policyholders experienced difficulties processing their health insurance claims over the past three years.
- **Time-Consuming Process**: The claims process is extremely time-consuming, often causing policyholders to spend the last day of hospital admission running around to get their claim processed.
- **Extended Discharge Times**: In many cases, it **took 10-12 hours after the patient was ready for discharge** to complete the claims process, causing delays and additional costs.
- **Pre-Approval Issues**: Even when the insurance company had provided pre-approval to the hospital's TPA desk before admission, policyholders still faced significant delays.

Conclusion

- The new changes introduced by IRDAI aim to address and mitigate these issues, **providing policyholders with more choices, flexibility, and improved service standards.**
- These measures are expected to **enhance the overall experience for health insurance policyholders, ensuring faster, more efficient, and hassle-free claims processing.**

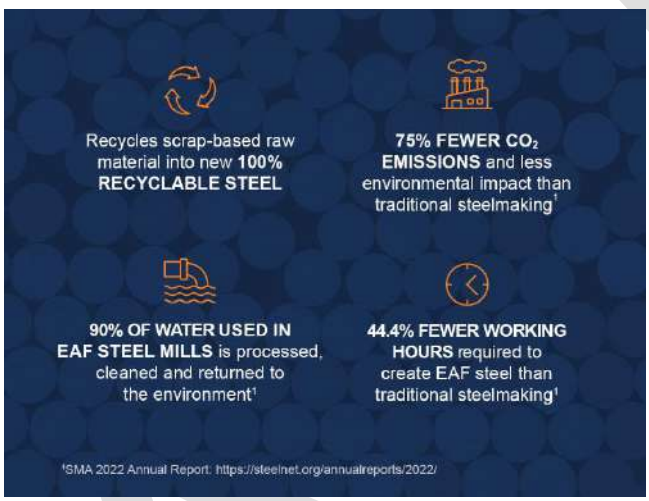
3.2 ELECTRIC ARC FURNACE (EAF) STEELMAKING

Context

- The global share of steelmaking through electric arc **furnaces had been around 25 per cent until 2012 for almost a decade, after which it started to increase further.**

Steel Production Method	Raw Materials	Process Description	Energy Efficiency	Sustainability
BF-BOF	Iron ore, coal, recycled steel	Blows oxygen into a furnace to melt raw materials	Lower	High energy consumption, relies on raw materials, limited sustainability progress
EAF	Recycled steel, electricity	Uses electrical currents to melt scrap steel and other metals	Higher	Promotes circular economy, less landfill waste, lower energy use, fewer emissions

EAF Benefits



Growth of Electric Arc Furnace (EAF) Steelmaking

- **Stable Share Pre-2012:** EAF steelmaking held a steady global share of around 25%, dominated by BF-BOF methods.
- **Post-2012 Increase:**
  - 2017: EAF saw 7.5% growth.
  - 2018: Growth accelerated to 12.3%, raising EAF's global share to 29% (404 million tonnes out of 1.8 billion).
- **2021 Statistics:** EAF **accounted for 30% of global steel output** (560 million tonnes), using 60 million tonnes of hot metal, 120 million tonnes of DRI, and 450 million tonnes of steel scrap.
- **Revised Capacity Planning (March 2023):** Planned EAF **capacity rose to 43%,** indicating a shift towards EAF technology due to its environmental benefits and efficiency.

International Energy Agency (IEA) Study and Predictions

- **Required EAF Adoption: 53% of steelmaking capacity** needs to use EAF technology.
- **Hydrogen-based DRI:** 42% of primary steelmaking should use EAFs with hydrogen-based direct reduced iron.
- **Current Shortfall:** Projected **EAF capacity by 2050 is only 32%,** indicating a significant gap.
- **Conclusion:** Accelerated adoption and investment in EAF technology needed to meet IEA's net-zero targets.

EAF Adoption in China and India

Steel Capacity Trends in Asia:

- Asia leads with **three-quarters of upcoming global steel capacity**, with China and India as major contributors.
- **99% of new BF-BOF developments are in Asia**, led by China and India.

China's Initiatives:

- China holds 49% of global BF-BOF capacity but is surpassed by India in upcoming capacity share (India 40%, China 39%).
- China aims to increase **EAF steel production from <10% in 2022 to 15% by 2025, targeting 20% by 2030.**

EAF Development in India:

- Currently, **28% of steel in India is produced via EAF, mainly using coal-based sponge iron and steel scrap.**
- Companies like JSW Steel, Jindal Steel and Power, and AM/NS are establishing EAF and conarc furnaces.
- Challenges include **rising natural gas prices for DRI.**

Closing Remarks

- **India's National Steel Policy 2017 targets 35-40% EAF/induction furnace production by 2030,** despite challenges in transitioning to gas/green hydrogen-based DRI and steel scrap.
- To combat challenges, China and India should increase scrap usage, **adopt green hydrogen, improve EAF technology, and ensure policy support.** Investing in **carbon capture, enhancing natural gas availability, and fostering international collaboration are also crucial.**

3.3 PRE-PACKAGED INSOLVENCY RESOLUTION PROCESS (PPIRP)

Context

- The Pre-packaged Insolvency Resolution Process (PPIRP) has achieved notable success in five cases.

What is Insolvency?

- Insolvency **is a state in which a business or an individual is unable to pay debts on time.**
- It often leads to a bankruptcy filing, marking a legal declaration of one's inability to repay outstanding debts.

Insolvency and Bankruptcy Code (IBC), 2016

- The 2016 Insolvency and Bankruptcy Code (IBC) regulate insolvency and bankruptcy proceedings for companies, partnership firms, and individuals.
- It amalgamates several laws including **provisions from the Companies Act 2013,** providing a unified framework for dealing with insolvency.
- The main goal to **resolve corporate debtor insolvency and maximize asset value for all stakeholders**.

- It involves **appointing an insolvency professional to manage the company and devise a resolution plan approved by creditors and the National Company Law Tribunal (NCLT).**
- The IBC **has resolved over 2,000 cases, marking a significant reform in handling financial distress.**

Pre-packaged Insolvency Resolution Process (PPIRP)

- **Introduced in 2021,** PPIRP offers a quicker **resolution mechanism for MSMEs in financial distress.**
- PPIRP allows an **informal agreement between creditors and debtors** before formal insolvency begins. Upon **approval by 66% of creditors**, the process starts with the approval of NCLT.

Criteria	CIRP Process	PPIRP Process
Eligibility	All companies and LLP	Companies classified as MSME
Minimum amount of Default	1 Crore Rupees	10 Lakhs Rupees
Application for Initiation	Financial Creditor, Operational Creditor and Corporate Debtor himself	Corporate Debtor, authorized person of CD, Person in control of financial affairs of the CD
Timeline	180 Days + 90 Days + 60 Days	120 Days (No Extension)
Interim Resolution Professional	IRP will get appointed on the Insolvency Commencement Date (ICD)	No Such Concept under this Process
Resolution Professional	RP will get appointed on the 1st COC meeting held on 30th day of ICD	RP will get appointed on the Pre-Packaged Insolvency Commencement Date (PICD)
Base Resolution Plan (Sec 5(2A))	No Such Concept under this Process	It will be submitted by the Corporate Debtor to financial creditors before PICD
Constitution of Committee of Creditors	23rd Day from the Insolvency Commencement Date (ICD)	7th Day from the Pre-Packaged Insolvency Commencement Date (PICD)
First Meeting of Committee of Creditors	To be held within 7 days of Constitution of COC	To be held within 7 days of Constitution of COC
Preliminary Information Memorandum (Sec 5(23A))	No Such Concept under this Process	It will be submitted by Corporate Debtor within two days of PICD to RP
Management of the Corporate Debtor	Vested with the IRP on ICD and subsequently transmitted to RP (Sec 17)	Vested with the old management and RP shall monitor it (Sec 54F(2)(d))
Initiation of CIRP (Sec 54O)	Not Applicable	COC at any time may decide upon for initiation of CIRP with voting not less than 66%
Resolution Plan	Equal Opportunity to All	First Opportunity to Promoters
Termination	Results in Liquidation	Only in case of 54J order – Liquidation Other case – Management continues CD

3.4 INDIA'S AGRICULTURAL EXPORT DECLINE

Context

- India's agricultural exports dropped by 8.2% in the fiscal year ending on March 31, 2024, due to restrictive shipment measures on cereals, sugar, and onions.

Statistical Data

- Total agricultural exports were valued at $48.82 billion in 2023-24, down from the record high of $53.15 billion in the previous fiscal year.

Historical Context

- Agricultural **exports fell from $43.25 billion in 2013-14 to $35.60 billion in 2019-20**, coinciding with a simultaneous increase in imports.

Global Commodity Market Dynamics

- A **crash in global agri-commodity prices** contributed to India's decline in agricultural exports.
- The UN FAO food price index dropped **from an average of 119.1 to 96.5 points between 2013-14 and 2019-20.**
- Global price recovery post-**Covid-19 pandemic** and **Russia's invasion of Ukraine** saw a surge in the FAO index to 140.8 in 2022-23.
- Despite this, exports dropped in the fiscal year just concluded, reflecting the volatile nature of global agricultural markets.

Drivers of Exports

Sugar and Non-Basmati Rice:

- Decline **primarily led by sugar and non-basmati rice exports**.

Sugar Export Restrictions:

- Government-imposed restrictions **prevented sugar exports during the current production year starting from October 2023.**
- Consequently, **sugar exports were valued at only $2.82 billion in 2023-24, significantly lower than previous fiscal years**.

Non-Basmati Rice Export Restrictions:

- **Ban on exports of all white non-basmati rice** since July 2023 due to concerns over domestic availability and food inflation.
- Only parboiled grain shipments within the non-basmati segment are permitted, **subject to a 20% duty,** leading to a decrease in overall non-basmati exports.

Wheat and Onion Export Restrictions:

- Export restrictions on wheat resulted in a **drastic decline in value to $56.74 million in 2023-24.**
- Lifting of the ban on onion exports on May 4, 2023, with imposed floor price and duty, resulted in reduced exports.

Other Export Items:

- Most major agricultural export items, excluding marine products, **castor oil, and other cereals, showed growth.**
- **Basmati rice exports reached $5.84 billion**, surpassing previous highs.
- **Spices exports exceeded $4 billion** for the first time.
- Exports of buffalo meat, oil meals, and raw cotton increased but remained below historical peaks.

Drivers of Imports

Edible Oils:

- **7.9% decline in overall agricultural imports** driven by a significant reduction in imports of edible oils.
- **Decrease in import bill for vegetable oils** to below $15 billion during the last fiscal year due to lower global prices.

Pulses:

- Despite reduced spending on cooking oil imports, the **import of pulses nearly doubled to $3.75 billion in 2023-24**, marking the highest level since fiscal years 2015-16 and 2016-17.

Policy Takeaways

Stability and Predictability:

- Farmers and traders prioritize **stable and predictable policies for smooth operations**.
- **Sudden export bans or restrictions**, even on products like de-oiled rice bran, often benefit consumers over producers.
- Overnight implementation of such actions, like with wheat exports, **can cause significant damage as establishing export markets requires time.**
- Economists suggest **a more predictable, rules-based policy framework, favoring temporary tariffs over outright bans or quantitative restrictions.**

Import Policies:

- The Government has **reduced or eliminated import duties on pulses and edible oils**.
- However, these actions **contradict the goal of promoting crop diversification away from water-intensive crops like rice, wheat, and sugarcane.**

Future Directions:

- Post-election, a **rationalized export-import policy is essential.**
- The policy **should balance producer and consumer interests while aligning with short-term and long-term agricultural sector goals.**

3.5 SOLAR POWER IN INDIA

Context

- Global solar generation surged in 2023, with India experiencing remarkable growth, surpassing Japan to become the **world's third-highest producer of solar power.**

Global solar energy surge

- Solar generation worldwide in 2023 increased over sixfold since 2015, signaling substantial growth in renewable energy adoption.
- India experienced **a remarkable 17-fold increase in solar generation compared to 2015**, reflecting significant progress in solar power production.

India's Solar Power Achievement

- In 2023, **India generated 113 billion units (BU) of solar power**, surpassing Japan's production of 110 BU and becoming the world's third-highest producer.
- This propelled India to the third position in global solar power production, overtaking Japan.

Installed Power Capacity Rankings

- **India ranks fifth globally in installed power capacity with 73 gigawatts (GW)**, encompassing both renewable and non-renewable sources.
- Japan holds the third position with 83 GW in installed power capacity.

Discrepancy between Installed Capacity and Actual Generation

- Installed power capacity reflects potential power production capability, including solar energy, but actual generation can vary due to demand fluctuations and local circumstances.
- This highlights the need to address challenges in effectively harnessing solar energy.

Discrepancy in India's Solar Power Utilization

- Despite solar power **accounting for 18% of India's installed electricity capacity,** its contribution to actual power generation is relatively low at 6.66%.
- Bridging this gap underscores the importance of addressing operational and infrastructural challenges.

Continuing Growth of Solar Power and Renewable Energy

- Factors contributing to India's overtaking of Japan in solar power production include **Japan's 2% decrease in power demand in 2023, allowing India to surpass it.**
- **China remains the global leader in solar power generation**, with renewables

accounting for 30% of global electricity production in 2023.

Acceleration of Solar Power Adoption

- Global solar generation in 2023 **increased significantly, indicating an acceleration in solar power adoption globally and in India**.
- **India's share of solar generation rose from 0.5% in 2015 to 5.8% in 2023**, highlighting the rapid growth in solar energy adoption.

Importance of Clean Electricity

- Increasing clean electricity not only reduces carbon emissions but also meets rising electricity demand, essential for addressing climate change.
- Transitioning to renewable energy sources is crucial for decoupling economic growth from emissions.

Conclusion

- The growth of solar power and renewable energy **signifies a global shift towards sustainable energy production**.
- India's rise in solar power production reflects its commitment to renewable energy adoption but sustained efforts are needed to accelerate this transition and mitigate climate change impacts.

3.6 RBI'S GOLD LOAN NORMS TO CONTROL NBFCS

Context

- The Reserve Bank of India (RBI) emphasized the adherence to regulatory norms by gold loan lenders.

RBI's Gold Loan Norms

- **Loan Amount Limit:** Lenders **restricted to offering up to 75% of the gold's value as a loan**, ensuring adequate collateral to cover potential losses.
- ***Note:*** During the pandemic, RBI **temporarily allowed loans up to 90%,** aiding borrowers and enabling aggressive lending by NBFCs, but this expired in March 2021.
- **Disbursement Restrictions:** **Cash disbursement limited to ₹20,000**; the remaining amount must be deposited into the borrower's bank account to comply with income tax rules.
- **Auction Process:** Mandates fair and transparent auctioning of gold in case of default, accessible to borrowers.

Reasons for Reinforcement

- **RBI observed violations by some NBFCs, exemplified by IIFL Finance's disciplinary actions for:**
  - Exceeding loan amount limits.
  - Inaccurate gold evaluation.
  - Improper loan disbursal.
  - Irregularities in auction processes.
- NBFCs **may overestimate gold collateral**, expanding loan portfolios aggressively.
- Reliance on internal assayers by NBFCs instead of external ones, **potentially leading to overvaluation**.
- Significant growth in NBFCs' gold loan portfolios since the pandemic, raising concerns about systemic risks amidst industry expansion.

LTV (Loan-to-Value) Ratio for Gold Loans

- LTV represents the **ratio of the loan amount sanctioned to the value of the gold deposited as collateral.**
- Gold's collateral value is determined solely by its actual weight, **excluding making charges and the value of any precious or semi-precious stones in the jewellery.**
- **Current Market Rate:**
  - The loan amount calculation relies on the current market rate of gold.
  - Some lenders may use an average rate from recent days or weeks.
- **Variations by Lender:** Specific rates and calculation methods can vary among lenders.

Calculation and Impact

- **Calculation Formula:** LTV = Loan amount / Market value of the collateral.

- **Interest Rate Impact:** Higher LTV ratios lead to higher interest rates, indicating a riskier investment for lenders.

Recent RBI Rule and Restrictions

- **New RBI Rule:** RBI increased the gold loan limit under the bullet repayment scheme for urban co-operative banks (UCBs) meeting Priority Sector Lending targets. The **limit rose from ₹2 lakhs to ₹4 lakhs on March 31, 2023.**
- **Loan Restrictions:** RBI **mandates banks to lend only up to 75% of the value of gold jewellery** pledged as collateral, ensuring protection for both borrowers and lenders.

Additional Information

- **Minimum Loan Value:** Varies among banks and NBFCs, **typically ranging from ₹3,000 to ₹20,000.**

3.7 GENERALISED SYSTEM OF PREFERENCES (GSP)

Context

- In international trade, the **"Generalised System of Preferences,"** or GSP, holds a unique position.

GSP

- GSP stands for the **Generalised System of Preferences.**
- The Generalized System of Preference (GSP) is **a unilateral scheme wherein custom duty preferences or concessions are granted by developed countries** to export of specified products from developing countries.
- The preferences are in the form of **either elimination or reduction in customs duty when the list of eligible products from the beneficiary developing country (BDC) are exported to the developed country.**
- The **major countries that grant GSP preferences to developing countries include** Armenia, Australia, Azerbaijan, Belarus, Canada, the European Union (EU), Japan, Kazakhstan, the Kyrgyz Republic, New Zealand, Norway, the Russian Federation, Switzerland, Tajikistan, Turkmenistan, Turkey, the United Kingdom (UK), the United States (US), and Uzbekistan.
- Each developed country tailors its own GSP programme.
- It is **enshrined within the World Trade Organization (WTO) framework**.
- Since, the GSP is a **unilateral customs duty preference scheme**, meaning India or other beneficiary developing countries do not need to provide reciprocal customs duty preferences to the developed country.
- **Note:** Approximately 40% of India's exports to the EU utilize the EU GSP, and before the US GSP withdrawal, around 10% of India's total exports to the US were under the GSP.

Historical Evolution of GSP

- The concept of GSP **evolved in the United Nations Conference on Trade and Development (UNCTAD)** and **was adopted during the UNCTAD II Conference in New Delhi in 1968.**
- The objective of the GSP is outlined in Resolution 21 (ii), adopted at the UNCTAD II Conference.
- The three objectives for beneficiary developing countries (BDCs) stated in the Resolution are:
  - To increase their export earnings.
  - To promote their industrialization.
  - To accelerate their rates of economic growth.
- The **legal provision for the grant of GSP was negotiated during the General Agreement on Tariffs and Trade (GATT).**
- This provision **was adopted on November 28, 1978, and is known as the "Enabling Clause".**

- In legal terms, the Enabling Clause is called the ***"Differential and More Favorable Treatment Reciprocity and Fuller Participation of Developing Countries".***

Benefit of GSP for Exporters

- GSP **provides customs duty reductions for exports made by beneficiary developing countries**, such as India, to GSP-granting developed countries like the European Union (EU) and the UK.
- The GSP customs duty **is lower than the normal customs duty (Most Favored Nation or MFN duty) of the developed country.**
- For exports to the EU under the GSP, **the duty could be either zero (for non-sensitive products) or reduced (for sensitive products).**
- Exporters **under the GSP must fulfill the rules of origin stipulated in the GSP scheme.**
- The rules of origin ensure that the product exported originates from the country of export and is not diverted from another country.
- **Criteria for determining origin vary by product and commonly include:**
  - Whether the product or its inputs are wholly originating from the exporting country.
  - Whether there is a change in tariff classification between the imported input and the final product.
  - The quantum of value addition that has occurred in the beneficiary country.
  - The key objective of these rules is **to ensure substantial processing and transformation in the exporting country, confirming that the product genuinely originates from there.**

Generalized System of Preferences (GSP) Withdrawal: Implications for India

- The United States' decision to withdraw the Generalized System of Preferences (GSP) benefits, effective from June 5, 2019, has significant repercussions for India's export sector.
- **Established in 1976 under the Trade Act of 1974**, the US has been a key proponent of GSP, providing tariff benefits to nearly 120 designated beneficiary countries and territories.
- **India, along with Brazil**, has been a major beneficiary of GSP, enjoying preferential tariff treatment for various export products.

- Under GSP, the US government **annually reviews eligible countries and products**, offering them lower-than-normal tariffs compared to other WTO members.
- Covered products include **agricultural goods, handicrafts, and specialized items that are typically the strengths of developing countries.**
- GSP **provides exemptions to the Most Favored Nation (MFN) clause of the WTO**, allowing developed countries to offer preferential treatment to developing partners.

GSP Withdrawal

- USA's decision **to withdraw GSP benefits for 94 products** from all beneficiary countries reflects a broader policy shift.
- The move, effective since November 1, 2018, primarily affects agricultural and handicraft exports.

Impact on India

- **India, exporting nearly 50 of the affected products, stands to bear a substantial impact**, given its reliance on GSP benefits.
- The removal of GSP benefits **threatens exports worth approximately $5.6 billion, a significant portion of India's total exports to the US.**

Conclusion

- The withdrawal of GSP benefits by the US underscores a toughening stance on trade, particularly with countries like India that have benefited significantly from the program.
- GSP renewal **offers an opportunity for comprehensive U.S.-India trade negotiations**, potentially elevating bilateral trade beyond its current $200 billion mark.
- Negotiations on India's GSP benefits, **could cover various aspects, including trade in goods and services**, labour rights, environmental enforcement, and regulatory practices.
- While GSP alone may not suffice, **it signifies a mutual commitment to advancing bilateral trade cooperation.**

3.8 RBI'S SURPLUS TRANSFER TO THE GOVERNMENT

Context

- The Reserve Bank of India's (RBI) Central Board of Directors **has agreed to transfer of Rs 2.11 lakh crores as surplus to the government for the financial year 2023-24.**

Background

- Every year, the RBI transfers a certain amount to the central government **through the surplus income it generates from investments, fluctuations in the valuation of its dollar reserves, and revenue earned from currency printing fees**.
- Last fiscal year, the central bank had given Rs 87,416 crore to the Centre as surplus.
- But this year's amount is somewhat the biggest and 141% more than FY23.

How does the RBI, as India's central banking institution, generate profit?

- The RBI, serving as India's central banking pillar, boasts a multifaceted framework for profit generation.
- Central to its earnings are:
  - **Borrowing management** for both central and state governments.
  - **Regulation of banks** and non-banking financial bodies.
  - **Profits derived from foreign currency assets** like bonds, treasury bills, and central bank deposits.
  - **Earnings from local, rupee-based government securities** and short-term bank lending.

- **Commission from overseeing government transactions** and specific underwriting endeavours.

RBI's Expenditures

- Substantial expenditures, including **currency printing, staff remunerations, transaction commissions for banks, and dealer compensations**, need to be addressed.
- Before marking its profit, the RBI makes rigorous provisions for potential financial pitfalls such as bad loans, asset wear and tear, staff benefits, and other statutory obligations.
- The **profit, distilled from this process, is then transferred to the central government**.
- Factors like **investments, dollar holding valuation dynamics, currency printing fees, and rupee depreciation** influence the RBI's surplus income.

How do the transfer mechanics work?

- The RBI's inception in 1935 saw it **as a private entity with shareholders and a modest Rs. 5 crore in capital.**
- A **transformational shift in 1949 led to its nationalisation,** making the government its principal stakeholder.
- This structural change means that instead of typical dividends, the RBI channels its net income to the government, rooted in **Section 47 of the Reserve Bank of India Act, 1934.**
- This surplus transfer is **essentially the residue post various financial provisions.**
- Guidelines suggest that the **RBI should maintain a Contingent Risk Buffer, primarily sourced from the Contingency Fund (CF), amounting to 5.5-6.5 percent of its balance sheet.**
- Amounts exceeding this threshold are viewed as surplus, eligible for government transfer.
- On the front of the RBI's economic capital levels — which is essentially the Currency and Gold Revaluation Account (CGRA), **the committee recommended keeping them in the range of 20-24.5 percent with the surplus channelled to the Centre.**

What is the global perspective?

- Surplus transfers aren't unique to India. However, the approach varies.
- While **countries like the UK and the US have the central bank and government jointly decide the surplus distribution**, in Japan, the **government takes the lead.** On average, these **transfers hover around 0.5 percent of the GDP.**

Impact of RBI's Surplus Transfer to the Government

- The higher-than-budgeted RBI surplus transfer **would help to boost the government's resource envelope in FY2025**, allowing for enhanced expenditures or a sharper fiscal consolidation than what was pencilled into the interim budget for FY2025.
- The government **can reduce its dependence on market borrowings, which are currently budgeted at a gross Rs 14.13 lakh crore and help lower borrowing costs**
- If the government borrowings are lower, **it will soften yields, bringing in respite in the bond market.**
- The government **can also choose to deploy the additional resources for higher spending, preferably for capital expenditure.**
- In short, **it will provide a boost to the government's effort towards fiscal consolidation.**

Conclusion

- In essence, the RBI's surplus transfer isn't just a financial transaction. It's a **testament to the institution's role in economic stability and a window into the dynamic relationship between the central bank and the government.**

3.9 SHORT ARTICLES

Ambaji White Marble (AWM)

Context:

- Marble mined in Gujarat's **Ambaji** has been awarded the **Geographical Indication (GI) tag** by the Central Government.

Details

- The marble mined in Gujarat's Banaskantha district, known as **Ambaji White Marble (AWM)**, has earned a **GI tag**. This marble is notable for its exceptional **whiteness**, ranging from **95.8% to 96.3%**, and its **uniform, finely packed grains**.
- **AWM** is highly **resilient to heat**, **translucent**, and can be **polished to a high gloss**, making it a preferred material in India's **temple architecture** since the early medieval period.
- It has been used in significant structures such as the **Ambaji Temple** and the newly developed **Parliament of India**.
- The **GI tag** not only protects the **heritage and livelihoods of local artisans** but also promotes the **economic prosperity** of the region, ensuring the continued legacy of Ambaji's marble craftsmanship.

Transformation of Apple Cultivation in Spiti

Context:

- Over the past few decades, a **gradual warming of temperatures** has been observed, making **apple cultivation** viable in the lower regions of Spiti.

Details

- Spiti's harsh climate initially made **apple cultivation** difficult, but warming temperatures have changed this. Early attempts were minimal, but now farmers have shifted from **traditional crops** like barley and potatoes to apples, significantly increasing income.
- Post-1975 earthquake, resettled villagers began successful **small-scale apple cultivation**.
- Today, apple farming yields up to **Rs 12 lakh** per 10 bighas, enhancing **socio-economic conditions**.
- With **scientific methods** and promotion of **natural farming**, apple farming spans over 660 hectares, producing **196,000 boxes** valued at **Rs 34 crore** in 2023-24.
- **Spiti apples** are sold in major Indian markets and exported internationally.

SBI Trading-Cum-Clearing (TCM) Member

Context

- State Bank of India (SBI) becomes the first bank to be a Trading-Cum-Clearing (TCM) Member of India International Bullion Exchange (IIBX) at GIFT City, Gujarat.

Detail

- SBI's **IFSC Banking unit (IBU)** at GIFT City can now trade and settle on the **IIBX platform** for its clients.
- **RBI guidelines** permit Indian Bank branches in GIFT IFSC to act as TCM of IIBX and allow **special category clients (SCC)** to import gold through IIBX.

Significance

- SBI's entry as a **TCM** is expected to boost trading volumes at IIBX, bringing transparency, efficiency, and accessibility to India's bullion market, and showing SBI's commitment to financial innovation.

What is bullion?

- **Bullion** refers to physical gold and silver of high purity, typically in bars, ingots, or coins, often held as reserves by central banks or institutional investors.

IIBX

- The **India International Bullion Exchange** is India's first bullion exchange, launched in 2022 at GIFT-IFSC, and the third of its kind globally.

Prior to IIBX

- India's bullion market, one of the largest globally, was previously unorganized and

regulated tightly, with only approved banks and agencies allowed to import gold.

Transition to IIBX

- IIBX allows qualified jewellers to import bullion directly, facilitating a more organized market.
- It trades **995 purity 1 kilo gold** and **999 purity 100 gram gold mini**. Regulated by the **International Financial Services Centres Authority (IFSCA)**.

Membership Categories

- **Trading Member (TM):** Executes trades, cleared by a clearing member.
- **Trading Cum Self Clearing Member (TSM):** Executes and clears own trades and clients' trades.
- **Trading Cum Clearing Member (TCM):** Executes and clears trades for self and others.
- **Professional Clearing Member (PCM):** Clears trades for trading members.

RBI's New Digital Initiatives

Context

- RBI has rolled out major digital initiatives: PRAVAAH portal, Retail Direct Mobile App, and FinTech Repository.

Details

- These innovations aim to **streamline regulatory processes, facilitate retail investments in government securities, and deepen understanding of the FinTech sector in India.**

PRAVAAH Portal:

- A secure web-based platform simplifying regulatory approvals.
- Features include **online submissions, status tracking, query responses, and timely decisions.**

Retail Direct Mobile App:

- Facilitates retail investors to trade in government securities conveniently.
- Enables buying **in primary auctions and trading in the secondary market.**

FinTech Repository:

- Comprehensive database capturing information on FinTech entities and technologies.
- **Managed by the Reserve Bank Innovation Hub (RBIH)** for trend analysis and policy formulation.
- Encourages contributions **from both regulated and unregulated FinTechs**.

India's Trade Trends

Context

- India recorded a trade deficit, indicating a difference between imports and exports.

Details

- In the fiscal year 2023-24, India saw **a trade deficit with nine out of its top 10 trading partners, including China, Russia, Singapore, and Korea.**
- While deficits **widened** with some countries like China and Russia, they narrowed with others such as the UAE and Saudi Arabia.
- **China emerged as India's largest trading partner, overtaking the U.S.**, with bilateral trade reaching $118.4 billion. India maintained a trade surplus of $36.74 billion with the U.S. in 2023-24, along with other countries like the U.K., Belgium, Italy, France, and Bangladesh. India maintained **a trade surplus with the U.S.**.
- India's total trade deficit **narrowed to $238.3 billion in the fiscal year 2023-24,** compared to $264.9 billion in the previous fiscal year.
- Trade experts note that deficits aren't always negative, but they **can strain domestic currency and signal economic instability, necessitating measures to boost exports and manage imports effectively.**

Note: *A trade deficit means that the country is importing more goods and services than it is exporting; a trade surplus means the opposite.*

Green Hydrogen

Context

- GAIL (India) Ltd., has inaugurated its **first 10 MW Green Hydrogen Plant in Vijaipur, Madhya Pradesh**, aligning with India's National Green Hydrogen Mission.

What is Green Hydrogen?

- Green hydrogen, is a **colorless, odorless, tasteless, non-toxic, and highly combustible gas**.
- **Produced via electrolysis** powered by renewable energy sources like **solar, wind, or hydropower**, green hydrogen is gaining traction as a **versatile fuel for transportation, power generation, and industrial activities**, offering a **sustainable alternative to fossil fuels.**

Current Status and Challenges

- **Less than 1% of hydrogen produced is green hydrogen** - IRENA's **World Energy Transitions Outlook.**
- The production of green hydrogen faces challenges such as **a shortage of large electrolyzers and the cost of renewable electricity**.
- **Storage and transportation complexities, alongside high costs** and **efficiency losses in the production process,** present additional hurdles.

India's Pursuit of Green Hydrogen

- India's commitment to reducing greenhouse gas emissions **under the Paris Agreement and transitioning to a net-zero economy by 2070** underscores the importance of green hydrogen.

Note: *Under Paris Agreement India is committed to reducing its greenhouse gas emissions by 33-35% from the 2005 levels.*

- The **National Hydrogen Mission, launched in 2021**, aims to slash carbon emissions and boost the utilization of renewable energy sources.

Advantages and Strategies for Building a Global-scale Green Hydrogen Industry

- India can accelerate the development of a global-scale green hydrogen industry by setting ambitious targets, **incentivizing electrolyzer production, and optimizing distribution networks to decarbonize the gas grid.**

Closing Remarks

- India's $100+ billion annual energy import bill and surging fossil fuel usage drive its significant **CO2 emissions, comprising nearly 7% of the global burden.**
- To achieve **energy independence by 2047,** India eyes green hydrogen as a key alternative fuel, aiming to establish itself as a premier global hydrogen hub and exporter.

'Foot Rot' Disease

Context

- Punjab Agricultural University (PAU), Ludhiana, has devised ***Trichoderma asperellum*** (2% WP), a **biocontrol agent** aimed at tackling the perilous 'foot rot' disease afflicting Basmati rice crops.

Foot Rot:

- **Fungal disease** affecting Basmati rice seedlings.
- Caused by ***Fusarium verticillioides.***

Symptoms and Spread:

- Seedling yellowing, elongation, drying, and eventual death.
- Spread via **root invasion, compromising plant health.**

Current Management Practices:

- Early seedling treatment with ***Trichoderma harzianum.***Seed treatment with Sprint 75 WS(a fungicide).
- Emphasis on **disease-free seeds and prompt removal of infected seedlings.**
- **Timely nursery management** to avoid peak infection periods.

Issues with Current Management Practices

- Using ***Trichoderma harzianum and Sprint 75 WS*** focuses primarily on early stages, **potentially neglecting later stages of growth where the disease can still impact.**
- Overreliance on fungicides like Sprint 75 WS **can lead to chemical resistance in pathogens and soil and environmental harm.**
- These methods **may not address all disease vectors or environmental conditions conducive to foot rot, necessitating a more integrated management approach.**

Significance of the New Solution: *Trichoderma asperellum:*

- ***Trichoderma asperellum***is **eco-friendly**.
- It shows efficacy **leaving no harmful residues.**

- **It shows promising** experimental results, reducing foot rot incidence and yield losses.
- Foot rot is a common disease of basmati rice that can cause significant losses in yield and quality. Hence, the new solution ***Trichoderma asperellum*** safeguards quality and quantity of Basmati rice exports.
- **It reduces reliance** on harmful chemical treatments.
- **It promotes soil health** and environmental sustainability.

Fear Index

Context:

- On May 6, the India VIX, also known as the Fear Index, **surged significantly, reaching up to 16.58%**.
- This surge raised caution among experts, especially regarding large leveraged positions.

India VIX:

- VIX stands for **Volatility Index, indicating the expected volatility in the** Indian market.
- It represents the rate and magnitude of price changes expected in either direction.
- **Calculated using NIFTY Index Option prices**, it forecasts the annualized change in the Nifty 50 for the next 30 days.
- Historically, **VIX and Nifty move inversely, notably during events like the Covid-19 pandemic, where VIX reached 83.63 on March 24, 2020.**
- However, VIX only indicates potential market moves, regardless of direction. Higher VIX implies higher risk for retail investors.

Importance of India VIX Index:

- The India VIX **reflects investor sentiment and risk perception.**
- A high **VIX indicates expectations of significant market shifts,**signaling a volatile period, while a low VIX suggests stability.
- It helps investors make informed decisions based on expected market turbulence.

Using India VIX for Trading:

- **Equity traders use it as a risk indicator,** adjusting strategies based on market volatility.
- It **aids in managing stop losses** during volatility spikes and serves as a risk management signal for long-term investors.
- Institutional investors adjust hedges based on VIX trends, and options traders leverage VIX insights for decision-making.
- Additionally, VIX can be a tool for trading volatility directly and guides portfolio managers in adjusting stock exposures.

India's First Nifty Non-Cyclical Consumer Index Fund

Context:

- Grow Mutual Fund introduces India's first Nifty Non-Cyclical Consumer Index Fund, a significant milestone in the country's investment landscape.

What Are Non-Cyclical Stocks:

- Non-cyclical stocks are **companies from which people will continue to consume their products even during an economic downturn. These often include consumer staple goods, food, gasoline, utilities, and pharmaceuticals/healthcare.**
- Non-Cyclical stocks, **also known as defensive stocks, remain resilient despite economic fluctuations, exemplified by utility companies and essential services.**

Understanding the Difference between Cyclical Stocks vs. Non-Cyclical Stocks:

Cyclical Stocks:

- Directly impacted by economic changes and **dependent on business cycle fluctuations.**
- **Season-specific demand influences stock prices**, offering opportunities for profit maximization.

Examples of Cyclical Stocks

- Cyclical stocks **tend to be for expensive durable goods, luxury, or leisure**. Therefore, stocks in the automotive industry, consumer durables, airlines, luxury goods makers, and hospitality stocks would be prime examples.

Non-Cyclical Stocks:

- Products in continuous demand, **irrespective of economic cycles, such as food and water.**
- **Less affected by economic instability**, providing stability and consistent returns.

Objective and Strategy:

- The fund **mirrors the performance of the Non-Cyclical Consumer Index–TRI**, aiming for long-term capital growth by investing in securities of the Nifty Non-Cyclical Consumer Index.

Investment Options:

- Investors **can initiate a Systematic Investment Plan (SIP) with a minimum investment of Rs 100 or opt for lump sum investments with a minimum of Rs 500.**

Index Composition and Rationale:

- The index **consists of leading stocks from consumer sectors like Fast-Moving Consumer Goods and textiles**, prioritizing companies with substantial market capitalization and established consumer brands.

Suitability for Investors:

- Ideal for investors seeking consistent wealth accumulation **by tapping into the growth potential of renowned consumer brands, offering stability and resilience amid economic fluctuations.**

Asset Allocation:

- **Predominantly allocates 95-100% of assets in equities** and equity-related securities of companies involved in or benefiting from consumption activities, with a minor portion in debt instruments.

Exit Load:

- **An exit load of 1% applies to units redeemed or switched within 30 days** from the date of allotment, with no exit load thereafter.

Drip Pricing

Context:

- The Centre recently warned about "drip pricing," cautioning consumers about hidden charges and advising them to seek assistance if encountering unexpected increases in charges on a product's MRP.

What is 'Drip Pricing'?

- Drip pricing is **a strategy where only a portion of an item's cost is initially displayed, with the full amount revealed later during the purchase process.**
- This tactic often **involves withholding essential fees or omitting necessary add-ons, leading to discrepancies between the advertised price and the final cost to the consumer.**
- Companies present a lower initial price to attract customers but **later disclose mandatory fees, complicating comparison shopping and disadvantaging sellers with transparent pricing structures.**

How does it work?

- Drip pricing **relies on the notion that once customers are invested in the purchasing process, they may proceed with the transaction even after discovering additional fees.**
- Businesses use **this tactic to attract customers into initiating the purchase process, betting on the likelihood that customers may be less inclined to restart their search upon discovering additional costs.**

Impact of Drip Pricing

For Consumers:

- **Misleading Pricing**: Conceals true costs, making informed decisions difficult and causing dissatisfaction.
- **Comparison Challenges**: Hinders price comparisons, reducing competition and leading to overpayment.
- **Customer Frustration**: Unexpected fees at checkout frustrate and disappoint consumers.

For Businesses:

- **Reputation Risk**: Short-term gains from lower advertised prices can harm long-term trust and loyalty.
- **Competitive Disadvantage**: Transparent pricing may seem less appealing compared to drip pricing, impacting market competitiveness.

Swing Trading

Context:

- Amidst recent market volatility, swing trading has emerged as a prominent trend, offering opportunities for traders to profit from

fluctuating stock movements during the ongoing Lok Sabha elections.

Trend of Swing Trading:

- Swing trading involves **capitalizing on the fluctuating movements of different stocks, presenting opportunities for traders to profit from short- to medium-term market dynamics.**
- Swing trading is a style of trading **that attempts to capture short- to medium-term gains in a stock (or any financial instrument) over a period of a few days to several weeks. Swing traders primarily use technical analysis to look for trading opportunities.**

Understanding Swing Trading:

What is Swing Trading?

- Swing trading entails **holding positions for longer than a single day, typically spanning several days or weeks.**
- It **aims to capture gains as stock prices fluctuate, with traders utilizing various strategies focusing on momentum and potential reversal points.**

How Does it Work?

- Traders seek stocks with **high volume and volatility, employing fundamental and technical analysis.**
- Entry involves setting stop-loss and target prices based on support and resistance levels, with traders buying at support and selling at resistance levels.

Objective of Swing Trading:

- The primary goal is to profit **from short- to medium-term fluctuations in stock prices,** capitalizing on both upward and downward movements in the market.

Advantages and Disadvantages:

Advantages:

- **Versatility:** Allows traders to remain active **despite time constraints, offering flexibility in setting entry and exit prices.**
- **Opportunity Identification**: Enables traders to identify new market opportunities and minimize risk exposure.
- **Lower Losses**: Stop losses **typically result in lower losses compared to long-term trades, enhancing risk management.**
- **Enhanced Trade Understanding**: Relies on technical analysis to anticipate stock performance, enabling traders to limit potential losses.

Disadvantages:

- **Unpredictable Changes**: Overnight market fluctuations can lead to **unexpected outcomes, increasing risk exposure.**
- **Expert Knowledge Requirement**: Proficiency in technical analysis is essential, demanding time and effort to acquire necessary skills.
- **Psychological Challenges:** Requires quick decision-making and confidence **in trade decisions, posing psychological challenges to traders.**

Bullish and Bearish Swing Tactics:

- Bullish traders identify upward **trends followed by counter-trends, entering trades when the original upward trend resumes.**
- Bearish **traders recognize downward trends**, entering trades as stocks resume their downward trajectory, often utilizing sell-stop limit orders.

Closing Thoughts:

- Swing trading offers opportunities to **navigate market volatility, requiring vigilance, market knowledge, and a strategic approach to maximize profits while managing risks effectively.**

Business Responsibility and Sustainability Reporting (BRSR)

Context

- Delhi-based think tank CSE praised SEBI's Business Responsibility and Sustainability Reporting (BRSR) initiative for enhancing corporate transparency.

Details

- BRSR mandates the **top 1000 listed companies** by market capitalization to disclose **their Environmental, Social, and Governance (ESG) performance in a standardized format from FY 2022–23** onwards, following a voluntary phase in FY 2021–22.
- The framework **aligns with nine principles of the "National Guidelines on Responsible**

Business Conduct" issued by the Ministry of Corporate Affairs (MCA) in 2019, with required reporting on essential indicators and voluntary reporting on leadership indicators.

- The MCA proposed two formats: **BRSR Comprehensive, mandatory for obligated entities, and BRSR Lite, encouraged for non-obligated entities.** Both formats include sections on general disclosures, management and process disclosures, and principle-wise performance disclosures.

> ESG, which stands for Environmental, Social, and Governance, evaluates **how a company performs in areas like environmental sustainability, social responsibility, and corporate governance**. It's a key consideration for investors aiming to align their investments with ethical and sustainable practices. In essence, ESG reflects a **company's commitment to making positive contributions to society and the environment** alongside financial performance.

Bond Buybacks

Context

- The RBI repurchased only Rs 2,069 crore of government bonds from a notified amount of Rs 60,000 crore as banks were unwilling to sell the securities at a loss.

Details

Bonds

- Bonds are financial instruments **where investors lend money to entities like corporations or governments** for a specific period with fixed or variable interest rates, play crucial roles in various contexts.
- They fund projects for companies, municipalities, states, and governments, with bondholders acting as creditors, earning interest and receiving their principal back at maturity.

Bond buybacks

- Bond buybacks, **such as when central and state governments repurchase their own bonds before maturity, serve multiple purposes.**
- They aid **liability management by mitigating risks associated with refinancing and liquidity** in government securities markets, enabling early debt settlement through cash payments.
- **Objectives like cost reduction** through repurchasing high-interest bonds, **improving market liquidity** by buying back less traded securities, and **injecting additional liquidity** into the financial system underscore the significance of bond buyback operations in financial management.

Reasons behind Bond Buyback

- One primary motive is **debt reduction**, as companies or governments buy back bonds **to lower their overall debt levels**, thereby **improving their balance sheet and financial stability**.
- Additionally, issuers may seek to **reduce interest expenses by buying back high-interest bonds and potentially reissuing debt at lower rates**. This process can also lead to **an improved credit rating**, resulting in lower future borrowing costs.

Impact of Bond Buybacks

- **For the issuer,** buybacks **improve financial ratios such as debt-to-equity,** making the entity appear financially healthier, though they require a cash outflow that can temporarily reduce liquidity.
- If the buyback price is lower than the bonds' carrying value, it can boost earnings through an accounting gain, and future interest savings will improve profitability.
- Successful **debt reduction might also lead to credit rating upgrades, lowering future borrowing costs.**
- **For bondholders**, buybacks often provide a premium payment above market price, offering **immediate financial benefit but introducing reinvestment risk** if the proceeds need to be invested in a lower interest rate environment.
- Large-scale buybacks **can increase the price of remaining bonds by reducing supply.** In the broader market, **buybacks can stabilize or increase bond prices**, signal financial health, and lower yields due to reduced supply, potentially impacting the interest rate environment and enhancing investor confidence in the issuer.

OTHER ARTICLES TO BE READ FROM IASGYAN WEBSITE
Institute of Chartered Accountants of India
Small Industries Development Bank of India (SIDBI)
Economic Capital Framework
sweet sorghum
Market Economy Status
Surety Bonds
Economic Capital Framework
National Savings Certificate (NSC) Scheme

3.10 SNIPPETS

Golden Rice

- The Philippines Court of Appeals revoked biosafety permits for commercial propagation of Genetically Modified (GM) Golden Rice.
- Golden rice is a genetically engineered variety of rice (Oryza sativa) designed to biosynthesize beta-carotene, a precursor of vitamin A, in its edible parts, aiming to address vitamin A deficiencies in regions where this nutrient is lacking in the diet.
- Nobel laureates endorsed the use of genetically modified golden rice in 2016, highlighting its potential to produce up to 23 times more beta-carotene than the original version, thus enhancing its nutritional benefits.

ZiG

- The Reserve Bank of Zimbabwe (RBZ) has launched a new currency called the ZiG, short for Zimbabwe Gold.
- ZiG is a gold-backed currency, ensuring value stability through government-held gold reserves.
- It offers notes and coins in denominations ranging from 1ZiG to 200ZiG.

Cost Inflation Index

- The Income Tax Department has released the Cost Inflation Index for the fiscal year beginning April 2024.
- Cost Inflation Index or CII updated annually by the Central Board of Direct Taxes (CBDT) is a tool used in the calculation of an estimated yearly increase in an asset's price as a result of inflation.
- Defined under Section 48 of the Income Tax Act, 1961 CII table is used to calculate the long term capital gains from a transfer or sale of capital assets. Capital gain refers to the profit acquired from the sale/transfer of any capital assets, including land, property, stocks, shares, trademarks, patents, etc.
- The CII, taxpayers can ascertain the inflation-adjusted purchase price of assets, ensuring precise computation of taxable long-term capital gains (LTCG).

Onion Irradiation

- The Union government plans to increase onion irradiation this year to extend its shelf life in the buffer stock.
- Irradiation prevents sprouting without health risks.
- Irradiation helps tackle post-harvest losses, regulated under Atomic Energy rules with costs ranging from ₹0.5 to ₹1.0 per kg.

Paradox of Thrift

- Keynesian economists argue that a rise in individuals' savings, by reducing the amount of money that is spent on final goods and services, can in effect cause a significant fall in overall savings and investment
- The paradox of thrift challenges the notion that higher individual savings necessarily lead to overall economic growth.
- According to Keynesian economists, increased personal savings can paradoxically dampen consumer spending and investment, potentially exacerbating economic downturns.

Pig Butchering

- A 32-year-old woman lost Rs 25 lakh to Pig Butchering.
- Pig Butchering is a deceptive investment fraud originating in China, which gained global traction during the pandemic. It preys on victims emotionally, exploiting their trust and greed.
- The scam starts with either an investment pitch or a romantic relationship, gradually convincing victims of the investment's legitimacy and profitability.
- Social media platforms, messaging apps, and dating apps play a crucial role in perpetrating this scam, allowing scammers to build trust and craft convincing narratives, making detection difficult.

Dal Imports: Key Statistics

- In April 2024, the consumer price index for cereals was 8.63% higher than in April 2023.
- Pulses inflation soared to 16.84%, almost double that of cereals, and since pulses are not widely distributed through the Public Distribution System (PDS), consumers faced higher market prices.
- The rise in dal prices was driven by an El Niño-induced patchy monsoon and insufficient winter rains, leading to reduced domestic production.
- States like Karnataka, Maharashtra, Andhra Pradesh, and Telangana were notably affected.
- Consequently, India saw record high pulses imports in FY 2023-24, reversing the self-sufficiency achieved between 2015-16 and 2021-22

Trivia

- India imports pulses from countries from Canada, Myanmar, Australia, Mozambique and Tanzania.
- Rajasthan, Madhya Pradesh, Maharashtra, Uttar Pradesh, and Karnataka are India's top states for pulse production.
- Gram dominates with 40% of total pulses, followed by Arhar (15-20%), Urad, and Moong (8-10% each) in total production.

4. DEFENCE & SECURITY

4.1 I4C

Context

- The Indian Cyber Crime Coordination Centre (I4C), in collaboration with Microsoft, has blocked more than 1,000 Skype IDs involved in blackmail, extortion, and "digital arrests" by cybercriminals posing as police and law enforcement authorities.

Indian Cyber Crime Coordination Centre (I4C)

- Indian Cyber Crime Coordination Centre scheme was approved on **05th October 2018.**
- **The I4C was formally established on 10th January 2020 by Hon'ble Home Minister.**
- I4C focuses on tackling all the issues related to **Cybercrime for the citizens, which includes improving coordination between various Law Enforcement Agencies and the stakeholders.**

Objectives of I4C

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

Components of the Scheme

- **National Cybercrime Threat Analytics Unit (TAU):** Provides a platform for law enforcement personnel, persons from private sector, academia and research organisations to work collaboratively in order to analyse all pieces of the puzzle of cybercrimes.
- **National Cybercrime Reporting:** It will work with already established investigation units at state and central levels as well as experts from different spheres to create expert investigation teams.
- **Platform for Joint Cybercrime Investigation Team:** Its objective is to drive intelligence-led, coordinated action against key cybercrime threats and targets. This will facilitate the joint identification, prioritization, preparation and initiation of multi-jurisdictional measures against cybercrimes.
- **National Cybercrime Forensic Laboratory (NCFL) Ecosystem:** Forensic analysis and investigation of cybercrime as a result of new digital technology and techniques.
- **National Cybercrime Training Centre (NCTC):** It will focus on standardization of course curriculum focused on cybercrimes, impact containment and investigations, imparting practical cybercrime detection, containment and reporting training on simulated cyber environments.
- **Cybercrime Ecosystem Management Unit:** Develop ecosystems that bring together academia, industry and government to operate, investigate a cybercrime basis, establish standard operating procedures, contain the impact of cybercrimes and respond to cybercrimes.
- **National Cyber Research and Innovation Centre:** Track emerging technological developments, proactively predict potential vulnerabilities, which can be exploited by cybercriminals.

Initiatives taken up

- **National Cybercrime Reporting Portal (NCRP) :** Launched in 2019, the portal facilitates victims/complainants to report cybercrime complaints online.
- **Crime and Criminal Tracking Network & Systems (CCTNS) :** CCTNS aims at creating a

comprehensive and integrated system for enhancing the efficiency and effective policing at all levels and especially at the Police Station level through adoption of principles of e-Governance.

- **National Automated Finger-Print Identification System (NAFIS)** of National Crime Records Bureau (NCRB) does the work of tracing the involvement of interstate criminals in crimes with greater ease, accuracy and efficiency across the country.
- **National Cybercrime Helpline number 1930,** is helping the common citizen in registering online financial frauds. All States/UTs have been boarded and more than 263 banks, e-commerce companies and others have been integrated.
- **The Indian Cyber Crime Coordination Centre (I4C) and Joint Cybercrime Coordination Teams (JCCT) Jamtara,** Jharkhand has launched the **'Pratibimb' platform which not only aggregates data but also employs geospatial mapping to pinpoint the physical locations of mobile numbers associated with cybercrimes.**

Conclusion

- Adopting a holistic approach, including proactive measures, robust encryption, and ongoing vigilance, is crucial to effectively combating cyber threats. Embracing the principles of the **"4C's" - Collaboration, Connectivity, Complexity, and Convergence -** can enhance cyber resilience and ensure a safer digital environment for individuals, businesses, and governments alike.

4.2 CYBERCRIMES IN SE ASIA

Context

- A significant number of Indians are victims of financial fraud over the Internet. Criminals are allegedly based in Myanmar, Laos, and Cambodia.

Details

- Indian Cyber Crime Coordination Centre (I4C) found that **46% of reported frauds from January to April originated from these three countries.**
- Victims lost an estimated Rs 1,776 crore during this period.
- National Cybercrime Reporting Portal (NCRP) recorded 7.4 lakh complaints from January 1 to April 30, 2024.
- 15.56 lakh complaints were received in all of 2023.
- **Complaints in previous years:** 9.66 lakh (2022), 4.52 lakh (2021), 2.57 lakh (2020), and 26,049 (2019).

Types of Cybercrime which happened in SE Asia

- **Trading Scam:**
  - Fraudsters used social media ads with fake news and stock market expert images.
  - Victims joined WhatsApp or Telegram groups for trading tips.
  - Directed to install unregistered trading apps and deposit money for buying shares.
  - Shown fake profits and encouraged to invest more, sometimes paying "taxes" on profits.
  - Total loss: Rs 1420.48 crore.
- **Digital Arrest:**
  - Victims received calls claiming involvement in illegal activities.
  - Contacted via Skype or other video platforms by fake law enforcement officials.
  - Demanded money for compromise and case closure.
  - Victims were "digitally arrested" until demands were met.
  - Total loss: Rs 120.30 crore.

- **Investment Scam (Task-Based):**
  - Received WhatsApp messages offering large sums of money for home-based tasks.
  - Tasks involved boosting social media ratings for a fee.
  - Initially received small payments, followed by requests for larger deposits for higher returns.
  - Victims asked to complete more tasks to improve their "performance score."
  - Total loss: Rs 222.58 crore.
- **Romance/Dating Scam:**
  - Victims lured by fake profiles of foreign women on dating/social media sites.
  - Scammers proposed relationships or marriage and planned in-person meetings.
  - Victims asked for money to help "detained" women at the airport.
  - Total loss: Rs 13.23 crore.

Way ahead to tackle cybercrime in SE Asia

- **Regional Cooperation:** Enhance collaboration among Southeast Asian countries through platforms like ASEAN to share intelligence, best practices, and resources. Example: ASEAN Cybersecurity Cooperation Strategy promotes information sharing and joint cyber defense exercises among member states.
- **Strengthening Legal Frameworks:** Harmonize cyber crime laws across the region to ensure consistency and facilitate cross-border investigations and prosecutions. Example: **Singapore's Cybersecurity Act 2018 sets a strong legal precedent for other Southeast Asian countries to develop comprehensive cybersecurity laws.**
- **Capacity Building:** Invest in training law enforcement agencies, judiciary, and other stakeholders to equip them with the necessary skills and knowledge to combat cyber crimes effectively.
- **Public-Private Partnerships:** Foster partnerships between governments and private sector companies to improve cybersecurity infrastructure and share threat information.
- **Awareness and Education:** Launch public awareness campaigns to educate citizens about cyber threats and promote safe online practices.
- **Technological Advancements:** Invest in advanced cybersecurity technologies and tools to detect, prevent, and respond to cyber threats more

effectively. **Example: Indonesia's national cyber agency (BSSN) invests in advanced threat detection systems and cybersecurity infrastructure.**

- **Incident Response Teams:** Establish and strengthen Computer Emergency Response Teams (CERTs) in each country to provide a coordinated response to cyber incidents.

Conclusion

- By adopting a holistic approach that combines technical solutions, policy frameworks, and proactive engagement, Southeast Asia can effectively mitigate the impact of cybercrime and safeguard its digital future.

4.3 SHORT ARTICLES

RudraM-II Air-to-Surface Missile

Context:

- RudraM-II air-to-surface missile successfully flight-tested by DRDO from Su-30 MK-I off the Odisha coast.

The Rudram

- It is a series of supersonic and hypersonic air-to-surface ground attack and anti-radiation missiles in development by the Defence Research and Development Organisation of India.
- It can be launched from a range of altitudes with a large standoff distance for destroying enemy surveillance radars, communication stations and bunkers.

Variants:

- Rudram-1, Rudram-2 and Rudram-3

Differences between Rudram 1, Rudram 2, and Rudram 3 missile variants

Features	Rudram 1	Rudram 2	Rudram 3
Type	Anti-Radiation Missile	Anti-Radiation Missile	Anti-Radiation Missile
Primary Target	Enemy radar systems	Enhanced range and capability over Rudram 1	Enhanced range and capability over Rudram 2
Range	100-250 km	250-500 km	500-700 km
Guidance System	Passive homing head	Advanced passive homing head	Advanced passive homing head with improved accuracy
Warhead Type	High-explosive pre-fragmented	High-explosive pre-fragmented	High-explosive pre-fragmented
Launch Platform	Sukhoi Su-30MKI, Mirage 2000	Sukhoi Su-30MKI, Mirage 2000	Sukhoi Su-30MKI, Mirage 2000
Operational Status	Inducted, operational	Under development/testing	Planned/early development
Development Agency	DRDO	DRDO	DRDO
Key Features	Suppresses enemy air defenses, versatile targeting	Extended range, improved homing accuracy	Further extended range, superior targeting and accuracy

INS Delhi, Shakti, and Kiltan

Context:

- Indian Naval Ships Delhi, Shakti, and Kiltan arrived at Singapore on 06 May 24

Details

- The visit is part of the Operational Deployment of the Indian Navy's Eastern Fleet to the South China Sea.
- This visit will further strengthen the longstanding friendship and cooperation between the two maritime nations through a series of engagements and activities.
- During the ships' stay in harbor, interactions with the High Commission of India, professional interactions with the Republic of Singapore Navy as well as academia and community outreach amongst other activities, was done, reflecting the shared values of both navies.

INS Delhi (Destroyer)

- It was built at the Mazagon Dock Limited in Mumbai and commissioned on 15 November 1997.
- This class is among the largest warships to be designed and built in India.
- It is a guided-missile destroyer of the Indian Navy.
- It is one of the Delhi-class destroyers, which are the largest in the Indian Navy.
- The ship is equipped with advanced weaponry and sensors for multi-role operations, including anti-aircraft, anti-submarine, and anti-surface warfare capabilities.
- Delhi-class destroyers are designed to operate as part of carrier battle groups or independently for various naval missions.

INS Shakti (Replenishment Tanker)

- INS Shakti is a Deepak-class, fleet tanker and replenishment ship of the Indian Navy.
- She was built by Fincantieri, an Italian shipbuilding company based in Trieste. She is the second and final ship of her class.
- Shakti, along with her predecessor Deepak, is one of the largest ships of the Indian Navy.
- It serves as a vital logistics support vessel, capable of replenishing other naval ships at sea with fuel, ammunition, and provisions.
- The ship plays a crucial role in extending the operational range and endurance of the Indian Navy's fleet by providing underway replenishment capabilities.
- INS Shakti enhances the Navy's ability to sustain prolonged maritime operations by ensuring continuous logistical support to deployed ships.

INS Kiltan (Corvette)

- INS Kiltan is a Kamorta-class anti-submarine warfare corvette of the Indian Navy.
- It is designed for detecting, tracking, and neutralizing enemy submarines, as well as performing anti-surface and anti-aircraft operations.
- The corvette is equipped with advanced sensors, weapons systems, and stealth features to enhance its survivability and effectiveness in modern naval warfare scenarios.
- INS Kiltan represents India's indigenous shipbuilding capabilities, being constructed at Garden Reach Shipbuilders & Engineers (GRSE) in Kolkata, India.

ASMPA Supersonic Nuclear Missile

Context:

- France Conducts Successful Test of ASMPA Supersonic Nuclear Missile as a part of Durandal military exercises.

About the test

- This test occurs amid heightened global nuclear tensions, particularly with Russia's military activities and escalating rhetoric.
- Test was conducted using a Rafale fighter jet and the test was part of the Durandal military exercises, focusing on military readiness and reliability.

ASMPA

- The ASMPA, an air-launched cruise missile, is a key component of France's nuclear deterrence strategy.

- The ASMPA evolved from the ASMP missile, which entered service in 1986, with upgrades in 1997 (ASMP-A) and 2016 (ASMPA-R).
- ASMPA (Air-Sol Moyenne Portée Amélioré) is an improved version of the French ASMP (Air-Sol Moyenne Portée) missile.

Key points about the ASMPA missile:

- Type: Air-launched cruise missile.
- Origin: Developed and deployed by France.
- Service Entry: Entered service in 2009.
- Purpose: Designed for delivering nuclear warheads.
- Range: Approximately 500 kilometers.
- Speed: Supersonic, capable of reaching speeds of Mach 3.
- Platform: Primarily deployed from the Dassault Rafale fighter jets.
- Guidance System: Inertial navigation system with GPS updates.
- Warhead: Can carry a thermonuclear warhead.
- Upgrades: Enhanced performance and reliability compared to its predecessor, ASMP.

Durandal military exercise

- It is a military exercise that involves the French Armed Forces and is often conducted to enhance operational readiness and interoperability among participating units.
- Objective: To test and improve the capabilities of the French Armed Forces in various combat scenarios.
- Participants: Involves various branches of the French military, including the Army, Navy, and Air Force.
- Frequency: Conducted periodically, often annually or biennially.
- Strategic Importance: Aims to maintain a high level of readiness and adaptability in the French Armed Forces.

Digital arrest

Context:

- Following increasing reports of "digital arrests" by cybercriminals posing as law enforcement officers, the central government has collaborated with Microsoft to block more than 1,000 Skype IDs used for online intimidation, blackmail, and extortion.

What is 'Digital Arrest'?

- 'Digital arrest' is a new and innovative tactic employed by cybercriminals to defraud victims and extort money.

Modus Operandi

- In this cybercrime, method is that **fraudsters pose as law enforcement officials such as the police, Enforcement Directorate, and CBI, among others, and manipulate them into believing that they have committed some serious crime.**
- The cyber fraudsters deceive the victim into believing that he or she has been put under 'digital arrest' and will be prosecuted if they do not pay the scamsters a huge amount of money.
- The cyber criminals often force the naive victims to self-arrest or self-quarantine themselves, by tricking them into believing that they have been put under 'digital arrest' and cannot leave their house unless they pay up.

Measures to protect oneself from digital arrest

- **Cyber Hygiene:** This includes maintaining cyber hygiene by regularly updating passwords, and software and also enabling two-factor authentications to reduce the chances of unauthorized access.
- **Phishing Attempts:** These can be evaded by refraining from clicking on dubious links or downloading attachments from unknown sources and also authenticating the legitimacy of emails and messages before sharing any personal information.
- **Secured devices:** By installing reputable antivirus and anti-malware solutions and keeping operating systems and applications up to date with the latest security protocols.
- **Virtual Private Networks (VPNs):** VPNs can be employed to encrypt internet connections thus enhancing privacy and security. However one must be cautious of free VPN services and OTP only for trustworthy providers.
- **Monitor online services:** A regular review of online accounts for any unauthorized or unlawful activities and setting up alerts for

any changes to account settings or login attempts may help in the early detection of cybercrime and coping with it.

- **Secure communication channels:** Using secure communication techniques such as encryption can be done for the protection of sensitive information. Sharing of passwords and other information must be cautiously done especially in public forums.
- **Awareness:** The increasing prevalence of cybercrime known as "digital arrest" underscores the **need for preventive measures and increased public awareness. Educational initiatives that draw attention to prevalent cyber threats—especially those that include law enforcement impersonation—can enable people to identify and fend off scams of this kind.** The collaboration of law enforcement agencies and telecommunication companies can effectively limit the access points used by fraudsters by identifying and blocking susceptible calls.

72 Division

Context:

- The Army is considering raising the 72 Division, a new Army division for possible deployment in eastern Ladakh.

72 Division

- The Army is considering raising the 72 Division, a new Army division for possible deployment in eastern Ladakh.
- This division was originally intended to **function under the 17 Mountain Strike Corps (MSC).**
- The division would be based in Panagarh, West Bengal, which is the headquarters of the 17 MSC.
- Its primary purpose would be **to enhance India's military presence and capabilities in Eastern Ladakh.**
- The division would be tasked with possible deployment in Eastern Ladakh under the Northern Command.
- It would consist of infantry brigades and support elements.

Need for 72nd Division

- The decision to establish this division comes amid ongoing tensions with China along the Line of Actual Control (LAC).
- The creation of this new division signifies a significant development in India's military strategy and readiness in response to the evolving security situation in Eastern Ladakh.

Strike Corps

- A strike corps is responsible for offensive trans-border action.
- Currently, the Army has four strike corps — the Mathura-based 1 Corps, Ambala-based 2 Corps, Bhopal-based 21 Corps, and 17 MSC in Panagarh.
- **However, till 2021, only the 17 MSC — which was partially raised then — was focused on China. The other three were focused on Pakistan.**
- The newly created 72-division would completely focus on China.

Hangor Class Submarine

Context

- The first Hangor class submarine, built by China for Pakistan, was launched on April 26 at a Wuhan shipyard.
- The Hangor-class is an export variant of the Chinese Type 039A Yuan class.
- The recently launched submarine was the f**irst of eight submarines of this class that the Pakistan Navy is set to induct into its fleet by 2028.**
- It is a diesel-electric attack submarine, named after the now-decommissioned **PNS Hangor, which famously sank the Indian frigate INS Khukri during the 1971 war.**
- It has four diesel engines.
- It is also equipped with a**n air-independent propulsion (AIP) system,** which significantly increases the submarines' endurance underwater.
- **It has six 21-inch torpedo tubes and capabilities to launch anti-ship missiles**, as well as the Babur-3 subsonic cruise missile, which has a range of 450 km.

- **"Diesel-electric"** refers to the mode of propulsion where diesel engines power the submarine when surfaced (as they need air to operate), while a battery, charged by the diesel engine, allows the vessel to operate while submerged.
- Conventional diesel-electric submarines **need to surface to recharge their batteries after a few days (2-5, depending on the battery used), making them detectable to enemy radar and exhaust fumes sensors.**
- **An AIP system** can increase submarines' underwater endurance manifold (upwards of 15-20 days). The Indian Navy is currently in the process of installing an indigenously developed AIP system to its Kalavari class submarines.

Difference

Size

- The Hangor class is significantly bigger than the Kalavari class and displaces more water than the latter.

Maneuverability

- Indian Kalavari class submarines are better at moving around and navigating in shallow areas.

Armament

- Kalavari class **carries German-made torpedoes, and missile systems such as French Exocet anti-ship missiles, and MICA anti-air missiles.** This is likely superior, and more battle-tested than Hangor's armament.

Underwater endurance

- Kalvari classes do not come with built-in AIP. This means that in terms of underwater endurance, the Hangor class potentially has an edge over the Kalavari class.

Similarities

Speed

- The Pakistani submarine has a reported top speed of 20 knots (37 kmph), the same as its Indian counterpart

Engine

- Both run on diesel-electric propulsion.

Launch system

- Both submarines do not have vertical launch systems (like the ones in India's nuclear Arihant class), which would allow it to carry bigger cruise missiles like the Brahmos-NG.

Sensors

- Both submarine classes carry state-of-the-art sensor suites.

4.4 SNIPPETS

Bulava ICBM

APTI PLUS

- Russian President Vladimir Putin ordered a new nuclear-capable missile known as the Bulava into the Russian military arsenal.
- The RSM-56 Bulava is a submarine-launched ballistic missile (SLBM) developed for the Russian Navy.
- It was deployed in 2019 on the new Borei class of ballistic missile nuclear submarines.
- It is intended to serve as a crucial component of Russia's nuclear triad.
- The weapon takes its name from bulava, a Russian word for mace.
- Engine: Three-stage solid and liquid head stage
- Payload capacity: 1150 kg
- Propellant : Solid propellant and liquid fuel
- Operational range: 8,300 km
- Guidance system : Inertial guidance
- Launch platform : Borei-class submarines

Project Udbhav

APTI PLUS

- Project Ufhbhab aligns with the Prime Minister' vision to modernise the armed forces by incorporating indigenous knowledge and practices.
- It was launched by the Indian Army and it aims to integrate ancient Indian strategic knowledge with modern military practices.
- Objective: To rediscover and apply ancient Indian texts such as the Vedas, Puranas, Mahabharata, and Arthashastra to contemporary military strategies.
- Collaboration: The project is a joint initiative between the Indian Army and the United Service Institution of India (USI).
- Focus Areas: It explores statecraft, warcraft, diplomacy, and grand strategy from historical texts.
- Purpose: Enhance the Indian Army's strategic outlook and address modern security challenges by leveraging India's rich military heritage.

Tarkash

APTI PLUS

- The India-U.S joint exercise in conducting coordinated operations in urban counter terrorism contingencies concluded in Kolkata.
- The word "Tarkash" translates to "Quiver" in English, symbolizing the readiness of the Indian Army to respond swiftly and effectively to any security threats.
- It is held between the elite National Security Guard (NSG) and the U.S. Special Operations Forces (SOF).
- It was the seventh edition of the Indo-U.S. joint counter terrorism exercise "Tarkash".
- To enhance the operational preparedness and combat capabilities of the Indian Army.
- It also aims to improve coordination, interoperability, and communication among different units of the Indian Army.

Vishing

APTI PLUS

- The government released a circular warning its employees of a sophisticated cybercrime— vishing.
- It is a short for voice+phishing.
- It's a technique wherein a threat actor calls the victim over the phone and tries to trick her into clicking on malicious files or emails, which can then take one to a legitimate-looking website asking her to share personal information.
- In other cases, the attacker can ask for sensitive information from the victim.
- The caller might appear as the manager or colleague of the victim, asking her to share sensitive information, at times using urgency as the tactic.
- Artificial intelligence aids the attacker to imitate the voice and mannerisms to such an extent, making it easier to trick the victim.

LockBit ransomware

APTI PLUS

- U.S. announces $10 million bounty for alleged LockBit ransomware creator.
- It is a cybercriminal group proposing ransomware as a service (RaaS).
- Software developed by the group enables malicious actors who are willing to pay for using it to carry out attacks in two tactics where they not only encrypt the victim's data and demand payment of a ransom but also threaten to leak it publicly if their demands are not met.
- Formerly known as "ABCD" ransomware.
- It is a subclass of ransomware known as a 'crypto virus' due to forming its ransom requests around financial payment in exchange for decryption.
- It focuses mostly on enterprises and government organizations rather than individuals.
- It was estimated in early 2023 to be responsible for 44% of all ransomware incidents globally.

FWB-200B

APTI PLUS

- First indigenous bomber UAV unveiled in Bengaluru.
- It is India's first indigenous bomber UAV aircraft- FWD-200B developed by Flying Wedge Defence, one of the pioneers in India's defense and aerospace technology sector.
- It has a payload capacity of 100 kg
- It is classified as a MALE Unmanned Combat Aerial Vehicle (medium-altitude, long-endurance).
- The Unmanned Aerial System (UAS) consists of optical surveillance payloads and is integrated with missile-like weapons for precision air strikes.
- Max speed: 200 kts/370 kmph.
- Significance: While the US Predator costs Rs 250 crores, the indigenous FWD-200B, built with state-of-the-art technology and manufactured in India, costs a mere Rs 25 crores.

HIMARS

APTI PLUS

- Russia's government has published footage to show the targeting of Ukrainian High Mobility Artillery Rocket Systems (HIMARS).
- It is a highly mobile, multiple-launch rocket system developed by Lockheed Martin for the United States Army and Marine Corps.
- Design and Configuration: Mounted on a wheeled chassis, providing high mobility and rapid deployment capabilities. It is based on the chassis of the Family of Medium Tactical Vehicles (FMTV), which enables it to operate in various terrain conditions.
- Launch Platform: Carries six Guided Multiple Launch Rocket System (GMLRS) rockets or one MGM-140 Army Tactical Missile System (ATACMS) missile on its launcher.
- Range and Payload: The rockets have a range of up to 70 kilometers (approximately 43 miles) and can carry various warhead options, including high-explosive, unitary, and cluster munitions.
- Precision Guidance: Equipped with GPS-guided navigation systems and inertial measurement units, providing effective engagement of both fixed and moving targets with minimal collateral damage.
- Operational Deployment: Previously deployed in various combat theaters, including Iraq and Afghanistan, where it has proven to be a valuable asset for providing fire support to ground forces and conducting precision strikes against enemy targets.

5. ENVIRONMENT & ECOLOGY

5.1 RECIPE FOR A LIVABLE PLANET

Context

- World Bank Report titled *"Recipe for a Livable Planet: Achieving Net Zero Emissions in the Agrifood System"* outlines actions for countries to enhance food security, and climate resilience, and protect vulnerable populations during the transition to net-zero emissions.

Findings of the report

Impact of Solar Pump Adoption in India

- *Replacing a quarter of India's 8.8 million diesel irrigation pumps with solar pumps could lead to a reduction in agrifood emissions by 11.5 million tonnes annually.*
- This reduction surpasses the combined global emissions prevented by electric vehicles and solar panels in 2020, as per a new World Bank report on agri food system emissions reduction.

Global Agrifood Emissions

- The world's agrifood system emits about 16 gigatonnes of greenhouse gases annually, around one-third of global emissions, with projections indicating further growth.

India's Emission Profile

- *In India, 60% of agrifood emissions originate from the farm gate, with enteric fermentation being a major contributor due to livestock inefficiency.*
- Despite low emission intensity in rice production, India's global rank as the second-largest rice producer contributes considerable emissions (4%).

Renewable Energy Adoption in India

- India has already deployed over 272,000 solar-powered irrigation systems by December 2020, indicating the potential for significant emissions reduction in the agri-food sector.
- 80% of agrifood emission mitigation potential in India could be achieved through cost-saving measures.

Top Agrifood Emitters

- The top ten agrifood emitters include China, Brazil, India, the United States, Indonesia, the Democratic Republic of Congo, the Russian Federation, Canada, Pakistan, and Argentina.
- Of these, two (Canada and US) are high-income countries (HIC), one (Democratic Republic of Congo) is low-income country (LIC) and the rest are middle-income countries.

Per Capita Emissions

- While populous countries like China and India rank high in total emissions, their per capita emissions are relatively lower compared to high-income countries.
- HICs exhibit the highest per capita emissions due to resource-intensive development models, with the US being a significant historical emitter.

Way ahead

- **Investments in agrifood systems:** *Investments are crucial to halve agrifood emissions and meet Net Zero goals. Annual investments will need to increase to $260 billion a year to cut in half agrifood emissions by 2030 and reach Net Zero emissions by 2050. Investments in emissions reduction would yield over $4 trillion in benefits,* including improved human health, food security, job creation, and carbon retention in forests and soils.
- **Financing:** The report emphasizes the need to redirect agricultural subsidies towards emissions reduction initiatives and increase financing for Net Zero targets.
- **High-income countries** can support low- and middle-income countries to adopt low-emission farming methods and technologies and shift subsidies away from high-emission food sources.
- **Middle-income countries** have a crucial role in reducing emissions through greener practices like livestock and rice emission

reduction, soil health improvement, and efficient land use.

- **Low-income countries** can pursue climate-smart opportunities for greener economies, including forest preservation and restoration to mitigate agrifood emissions.

Conclusion

- Achieving net zero emissions in the agrifood system requires holistic approaches that prioritize sustainable practices, innovation, and collaboration across the entire supply chain. it necessitates transformative actions to mitigate greenhouse gas emissions while ensuring food security, biodiversity conservation, and equitable socio-economic outcomes.

5.2 CLIMATE CHANGE AND MENTAL HEALTH

Context

- The study in British Columbia highlighted that individuals with mental health conditions, particularly schizophrenia, faced a higher risk of heat-related deaths during an extreme heat event in 2021 compared to those with kidney and heart diseases.

Research details

- During the eight-day extreme heat event in 2021, the province of British Columbia experienced temperatures as high as 40 degrees C when the average temperatures have been around 20 degrees C. The region recorded around 740 excess deaths during this heat wave.
- To understand who was affected the most during this event, the researchers compared 1,614 deaths recorded over a month in 2021 with 6,524 deaths recorded in the same time period nine years ago.
- *They analysed the data based on 26 medical conditions, including heart disease, schizophrenia, chronic kidney disease, dementia, depression, Parkinson's disease, and osteoporosis.*
- They reported that *8% of the people surveyed in 2021 were previously diagnosed with schizophrenia as opposed to 2.7% of the people surveyed nine years ago. This was a 200% increase from a summer in which heat waves weren't recorded.*
- 280 people whose deaths were confirmed to be related to heat, 37 people had schizophrenia.
- This led the to conclusion that *while people with schizophrenia were found to be at greater risk of heat-related distress than those with kidney and heart diseases, the latter weren't immune: they were at risk as well, just less so.*

Impact on hypothalamus

- Individuals with schizophrenia were found to be more vulnerable to heat-related distress, potentially due to dysfunction of the hypothalamus in the brain.
- The main function of the hypothalamus is to maintain the homeostasis of the body, i.e. to keep the body in a stable condition that ensures it can carry out its normal function. This means it controls the body's temperature, heart rate, hunger, thirst, mood, libido, sleep, and the regulation of hormones.
- Antipsychotic medications prescribed to individuals with schizophrenia may also contribute to heat-related complications by affecting the hypothalamus and raising body temperature.
- The study highlights marginalization, lower economic status, and a propensity for loneliness are risk factors for people with schizophrenia, and the same factors for heat-related illnesses.

Way ahead

- **Risk Mitigation Strategies:** Scientists emphasize the importance of providing extra protection and support to individuals with schizophrenia during heat waves. While discontinuing antipsychotic medications is not recommended, interventions such as counseling and addressing social isolation can help mitigate heat-related risks.
- **Community Awareness and Support:** Community organizations and caregivers play a crucial role in educating individuals with schizophrenia and their families about the increased risk of heat-related illness. Awareness campaigns and emergency cooling measures can help ensure the safety of vulnerable populations during heatwaves.
- **Climate Change Implications:** Addressing climate change and its effects on public health requires multidisciplinary approaches and community interventions.

Schizophrenia

- It is a *chronic brain disorder.* While there is no cure for schizophrenia, research is leading to innovative and safer treatments
- Individuals with schizophrenia often *experience psychotic symptoms, such as hallucinations and delusions, and may have difficulty recognizing illness (anosognosia).*
- Comorbidities like diabetes and hypertension, coupled with socioeconomic factors and social isolation, further exacerbate their vulnerability to heat-related illnesses.

Conclusion

- Climate change poses significant mental health challenges, affecting individuals through increased stress, anxiety, and trauma from extreme weather events and environmental disruptions. Addressing these impacts demands comprehensive support systems, resilience-building strategies, and proactive mental health interventions to safeguard well-being in the face of environmental change.

5.3 ENSURING SAFETY AND HEALTH AT WORK IN A CHANGING CLIMATE

Context

- The International Labour Organization's latest report titled 'Ensuring safety and Health at Work in a Changing Climate' points to the need to ensure that labor becomes climate-proofed.

The report and its findings

- **Exposure to heat:** The report states that well over a third of the world's population is exposed to excessive heat annually, leading to almost 23 million work-related injuries.
- **Impacts of climate change:** The report highlights six key impacts of climate change: excessive heat, solar ultraviolet radiation, extreme weather events, workplace air pollution, vector-borne diseases, and agrochemicals. These could lead to a range of health issues such as stress, stroke, and exhaustion.
- **Emerging hazards:** Due Global rise in gig employment they are highly heat-susceptible. **Gig workers constitute about 1.5% of India's total workforce, which is projected to grow to about 4.5% by 2030, according to a Nasscom study.** In the Indian context, about **80% of the country's 2023 workforce of 600 million is susceptible to heat-related hazards.**

Which sectors are affected?

- **Agriculture is by far the most heat-susceptible sector globally,** particularly so in the developing world, where informal farm laborers work with little to no weather protection. The NSSO data of July 2018-June 2019 reveal that almost 90% of Indian farmers own less than two hectares of land, and earn an average monthly income of a little over ₹10,000 with farmers in the bottom three States of Jharkhand, Odisha, and West

Bengal earning as low as ₹4,895, ₹5,112, and ₹6,762.

- **Agriculture is followed by India's sprawling Micro, Small, and Medium Enterprises (MSME)** sector which employs about 21% of the country's workforce, or more than 123 million workers.
- **This sector is followed by the building and construction segment** which constitutes about 70 million workers, almost 12% of India's workforce.

Issues in Laws Addressing Workplace Safety

- India has more than 13 central laws regulating working conditions across various sectors, consolidated under the Occupational Safety, Health and Working Conditions Code, 2020. However, concerns persist regarding the enforcement of safety standards, especially for the majority of MSMEs not registered under these laws.
- **The Indian Factories Act defines a factory as an enterprise with "10 or more" workers, but those registered under this law are less than a quarter of a million based on the latest available data.**
- The Labour Bureau in its 2020 report observed **"an increase of 2.48% in the number of total registered factories that is, from 2,22,012 at the beginning of the year to 2,27,510 at the end of the year 2020."** This means the overwhelming majority of India's 64 million MSMEs are not registered under this law and are therefore outside the purview of governmental inspections.

Issues of occupational safety and health in India

- **Outdated Regulations:** The Factories Act provides broad guidelines on ventilation and temperature, but regulations were established decades ago, lacking consideration for modern cooling technologies like air conditioning.
- **Lack of Specificity:** Regulations lack specificity regarding thermal comfort levels based on the intensity of work, failing to address the needs of workers engaged in different levels of activity.
- **Need for Modernization:** There's a pressing need to update regulations to incorporate technological advancements for ensuring thermal comfort in workplaces.
- **Global Comparisons:** Comparisons with countries like Brazil, which mandate specific temperature limits based on the intensity of work, highlight the need for more precise regulations tailored to different working conditions.
- **Worker Concerns and Corporate Response**: Instances of worker demands for hydration amenities highlight the disconnect between worker needs and management perception, with concerns often dismissed as insignificant. Unions face pressure from both management and government bureaucracy, impacting their ability to advocate for worker welfare.

Conclusion

- The link between labor productivity, human health, and climate change requires greater attention, with an urgent need for a universally accepted regulatory framework to protect workers from climate-related hazards. It's essential to ensure the future of labor is climate-proofed to safeguard worker safety and well-being in an evolving climate.

5.4 IMPACT OF CLIMATE CHANGE-LINKED HAZARD ON WOMEN, CHILDREN

Context

- As per the **internal study commissioned by the Ministry of Women and Child Development**, Women and children in Bihar, Gujarat, Uttar Pradesh, Maharashtra, Madhya Pradesh, Andhra Pradesh, West Bengal and Telangana are particularly vulnerable to climate change related disasters.

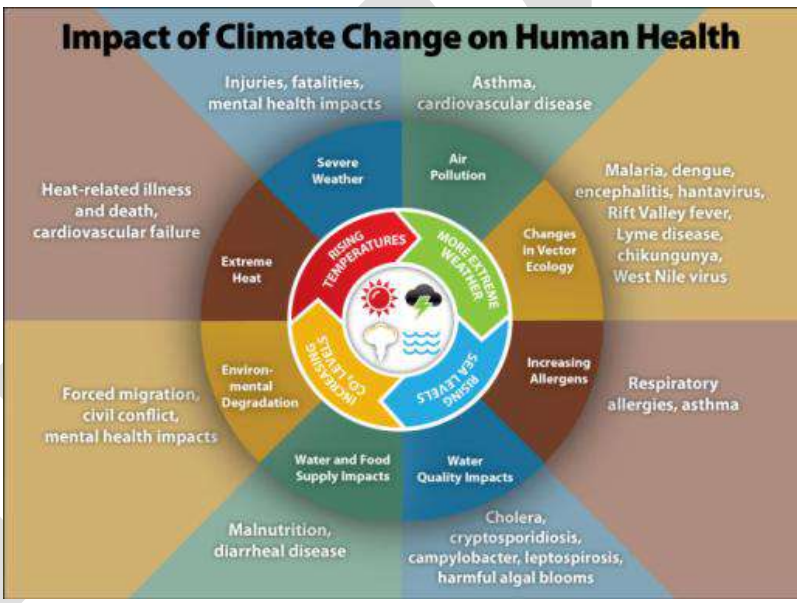
Details and findings of the study

Identifying Climate Change Hotspots:

- **Spatial Analysis of Floods, Cyclones, and Droughts:** The study identified certain spatial hotspots where high exposure to climate change hazards such as floods, cyclones and droughts coexists with a higher prevalence of poor health variables such as underweight women and child marriage.
- **District-level Vulnerability Scores by CEEW:** The climate change hotspots have been identified by spatio-temporal analysis encompassing 50 years of data on frequency and intensity of floods, cyclones and droughts and by using district-level climate vulnerability exposure scores published in 2021 by the Council on Energy, Environment and Water (CEEW).
- **Health Indicators Mapping using NFHS-5 Data:** For health indicators of women and children, mapping and statistical analysis had been conducted by using the fifth National Family Health Survey (NFHS-5) which cites data of 2019-21.

Vulnerability to Hydro-meteorological Disasters

- **Districts Vulnerable to Cyclones and Floods:** Overall, 183 districts were vulnerable to hydro-meteorological disasters such cyclones and floods, while 349 districts witnessed drought.
- **Districts Facing Drought Challenges:** In northern areas of Bihar and Gujarat, the geospatial maps show hotspots drought, flood, and cyclone coexist with stunting and underweight children. **Up to 70% of Indian districts are at very high risk of floods, droughts, and cyclones.**



- **Regional Hotspots and Health Impacts:** Northern plains, including parts of Uttar Pradesh, have hotspots for stunting, while parts of north Maharashtra and south Madhya Pradesh are hotspots for underweight children.
- **Impact on Children:** **Children are 6% more likely to be stunted, 24% more likely to be underweight, experience 35% reduction in minimum diet diversity, and there is a 12% increase in likelihood of deaths if they are under five years of age and exposed to drought.**
- **Women and Children's Health Impacts:** Women and children's undernutrition, teenage pregnancy and domestic violence are also indications that the impact of climate change is immense. **Exposure to drought events increases the likelihood of prevalence of underweight women by 35%, child marriage by 37%, teenage pregnancy by 17% and intimate partner violence by up to 50%," the study states.**

Way ahead

- Excess deaths due to heat are not recognized and **every State and city should make a heat action plan to tackle the effects of heatwaves.**
- There should be **accountability for who is responsible for coordination,** who will finance, and how will messages be disseminated in case of heat stroke. It is a multi-sectoral effort. **For instance, the labor department should enforce laws to give a break to construction labor from 12 p.m. to 4 p.m.**

- There is also a **need for national-level data on climate vulnerability** considering all hazards.
- There is a **need to study the extent of exposure of women and children** at the individual, household, and community levels to seven types of hazards - floods, cyclones, droughts, rainfall variability, heatwaves, air pollution, and cold waves.
- **To identify statistically significant hotspots highlighting the prevalence of heatwaves or prolonged heat and poor health variables**, there is a need to generate detailed district-wise monthly temperature data that is currently lacking.

Conclusion

- Climate change-linked hazards disproportionately affect women and children, exacerbating vulnerabilities and widening existing socio-economic disparities. Urgent action is imperative to address their specific needs and ensure equitable adaptation and resilience strategies.

5.5 THE EVOLUTION AND ESSENTIALS OF INDIA'S CLIMATE POLICY

Context

- Climate policy of India reflects India's commitment to climate change policy.

Evolution and Essentials of India's Climate Policy

Early Initiatives (1980s-1990s)

- 1980s: India started participating in global environmental discussions, such as the United Nations Conference on Environment and Development (UNCED).
- 1988: Establishment of the Ministry of Environment and Forests (MoEF).

The 1990s

- 1992: India participated in the Rio Earth Summit and ratified the United Nations Framework Convention on Climate Change (UNFCCC).
- 1993: Creation of the National Conservation Strategy and Policy Statement on Environment and Development.

Early 2000s

- 2001: India's First National Communication (NATCOM) to the UNFCCC, detailing national greenhouse gas (GHG) inventories and climate mitigation efforts.
- 2002: Introduction of the Energy Conservation Act, promoting energy efficiency and conservation.

Mid-2000s

- 2008: Launch of the National Action Plan on Climate Change (NAPCC), outlining eight missions focused on climate change mitigation and adaptation, including the National Solar Mission and the National Mission for Enhanced Energy Efficiency.

Late 2000s to Early 2010s

- 2009: India's Copenhagen Pledge to reduce emissions intensity of GDP by 20-25% from 2005 levels by 2020.
- 2010: Establishment of the National Clean Energy Fund (NCEF) to support clean energy initiatives.

2010s

- 2015: Submission of India's **Intended Nationally Determined Contribution (INDC) under the Paris Agreement, aiming to reduce emissions intensity of GDP by 33-35% by 2030 from 2005 levels, increase renewable energy capacity to 175 GW by 2022, and create a carbon sink of 2.5 to 3 billion tonnes of CO2 equivalent through additional forest and tree cover.**
- 2016: Ratification of the Paris Agreement.

Recent Developments (2020s)

- 2021: Announcement of the National Hydrogen Mission to promote hydrogen as a clean energy source.

- 2022: Commitment to achieve net-zero carbon emissions by 2070, increase non-fossil energy capacity to 500 GW by 2030, and meet 50% of energy requirements from renewable sources by 2030.
- 2023: Updates and progress reports on various NAPCC missions, such as advancements in solar energy, energy efficiency, and sustainable agriculture practices.

Five Major Determinants of India's Climate Policy

Geography

- **Land and Biodiversity:** India covers 2.4% of the world's land area, is a mega-biodiverse country with 17 biodiversity hotspots, and experiences six seasons.
- **Climate Disruption:** Climate change has led to unpredictable seasonal patterns affecting nature and society.

Population

- **Human to Land Ratio:** India's dense population demands integrated land and water management.

Impacts

- **Vulnerability:** India ranked as the fifth most affected country by extreme weather events (Global Climate Risk Index 2020).
- **Economic Impact:** Climate change could reduce India's GDP by 2.8% and depress living standards by 2050 (World Bank report).

Worldview

- **Cultural Ethos:** Influenced by principles of living in harmony with nature, inspired by ancient texts and Gandhi's ideals.
- **Ministry's Focus:** Emphasis on the principle "Nature Protects if She is Protected."

Actions

- **International Leadership:** India has contributed to creating the International Solar Alliance and adheres to the CBDR-RC principle.
- **Domestic Initiatives:** Implementation of the National Action Plan on Climate Change (NAPCC) and state-level action plans (SAPCCs).
- **Emissions Reduction**: Reduced emission intensity by 33% from 2005 to 2019, decoupling economic growth from GHG emissions.

Conclusion

- India Advocates for the ethos of **'Vasudhaiva Kutumbakam' (One Earth, One World, One Future)** as essential for global sustainability. India's model should inspire other developing nations to counter narratives from developed countries and focus on science-based policy-making.

5.6 BIOCOVERS

Context

- Biocovers are important areas of applications.

About

- Biocovers, also known as bioplastic covers or bio-covers, refer to a type of covering or material used in various applications that are biodegradable or derived from renewable resources.

Characteristics

- **Biodegradability:** Biocovers are **designed to decompose naturally over time, usually through microbial action, into harmless substances like water, carbon dioxide, and biomass.** This contrasts with conventional plastic covers that can persist in the environment for centuries.
- **Renewable Resources:** Many biocovers are made from renewable resources such as plant-based materials (e.g., corn starch,

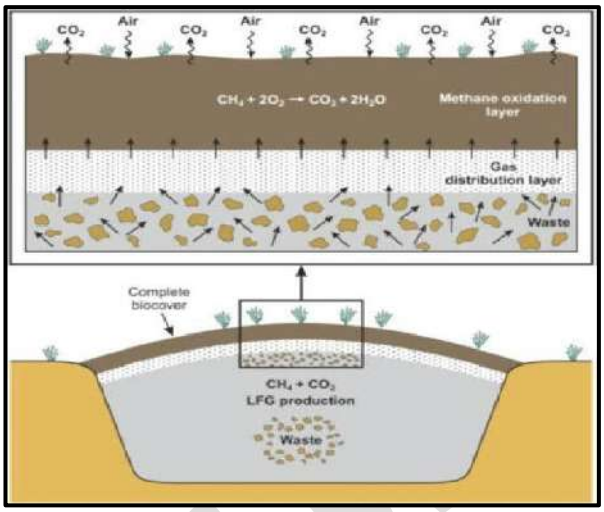
sugarcane) or biodegradable polymers derived from microbial fermentation.

Applications

- **Agriculture:** Biocovers are used as mulches or protective covers for crops. They help retain moisture, control weeds, and enhance soil health while being environmentally friendly.
- **Packaging:** Biodegradable packaging materials, including wraps, bags, and containers, are made using biocovers to reduce plastic waste.
- **Landfills:** Biocovers can be used as temporary covers for landfill sites to reduce odor, control pests, and minimize environmental impact during waste disposal.

Benefits

- **Environmental Sustainability:** Biocovers contribute to reducing plastic pollution and dependence on fossil fuels by utilizing renewable resources.
- **Soil Health:** In agriculture, biocovers improve soil structure, moisture retention, and nutrient cycling compared to traditional plastic covers.
- **Waste Management:** Biodegradable biocovers in packaging and landfill applications promote sustainable waste management practices.



Challenges

- **Cost:** Biocovers may be more expensive than conventional plastic covers due to production costs and limited economies of scale.
- **Performance:** The performance and durability of biocovers may vary depending on the specific materials used and application conditions.
- **Regulation:** Standards and regulations regarding biodegradability and compostability of biocovers vary globally, leading to challenges in certification and market acceptance.

Conclusion

- Biocovers offer a promising solution to reduce plastic pollution and promote sustainable practices in agriculture, packaging, and waste management.

5.7 SHORT ARTICLES

German Cockroach

Context:

- Human activities, including trade, war, and urban development, have inadvertently helped the German cockroach spread and thrive.

German cockroach

- **Scientific name: Blattella germanica**
- It is one of the most pervasive pests worldwide, and its success can be attributed to several factors, including its origin, adaptability, and the inadvertent assistance of human activities.
- known as the **croton bug, is a species of small cockroach, typically about 1.1 to 1.6 cm long.**
- In color it varies from tan to almost black, and it has two dark, roughly parallel, streaks on the pronotum running anteroposteriorly from behind the head to the base of the wings.

Origins and Evolution

- **Genetic Ancestry:** The German cockroach likely originated in the Bay of Bengal region, specifically around east India and Bangladesh.
- Genetic studies have shown that **it shares a close lineage with the cockroach species Blattella asahinai, indicating a divergence roughly 2,100 years ago.**

Spread and Global Domination

- **The first wave of migration from the Bay of Bengal occurred about 1,200 years ago, facilitated by the movement of traders and armies during the expansion of the Islamic Umayyad and Abbasid Caliphates.**
- **A second wave, about 390 years ago**, saw them spread eastwards into Indonesia and other parts of Southeast Asia, likely carried by European trading companies like the British and Dutch East India Companies.
- The German cockroach was **first noted in Europe around the mid-18th century, particularly during the Seven Years' War (1756-63).** It then spread globally over the next century, aided by international trade and improved shipping methods.

Biological and Behavioral Adaptations

- **Survival Traits:** They are nocturnal and have developed a preference for avoiding open spaces, which helps them stay hidden from predators and human attempts at extermination. They thrive in human dwellings due to access to food, water, and warm environments
- **Resistance to Control Methods:** They have a remarkable ability to develop resistance to insecticides. The rapid evolution of resistance makes pest control challenging. Initially effective baits became less so as the cockroaches evolved to avoid the sugar-based lures used in these traps.

Differences among catadromous, anadromous, and diadromous fish

Context:

- A study, published in the British Ecological Society's Journal of Applied Ecology, found that MPAs designated to protect diadromous fish species did not align with their core habitats.

Differences among catadromous, anadromous, and diadromous fish:

Feature	Diadromous Fish	Anadromous Fish	Catadromous Fish
Definition	Fish that migrate between freshwater and marine environments.	Fish that live in the ocean and breed in freshwater.	Fish that live in freshwater and breed in the ocean.
Examples	European eel, bull shark	Salmon, striped bass, sea lamprey	European eel, American eel
Migration Direction	Both directions: freshwater to marine and marine to freshwater	Marine to freshwater only	Freshwater to marine only
Purpose of Migration	Feeding, breeding, and escaping harsh conditions	Primarily for breeding	Primarily for breeding
Life Cycle Stages	Utilize both freshwater and marine stages	Marine juvenile stage, migrate to freshwater to spawn	Freshwater juvenile stage, migrate to marine to spawn
Adaptation	Adapt to both saltwater and freshwater environments	Adapt specifically for spawning in freshwater	Adapt specifically for spawning in marine

Habitat Usage	Utilize different habitats throughout their life cycle	Spend most of life in marine habitats, migrate to freshwater for spawning	Spend most of life in freshwater habitats, migrate to marine for spawning

Similarities:

- Both diadromous types (anadromous and catadromous) migrate between freshwater and marine environments.
- Adapted to living in both types of water.
- Important for maintaining ecological balance in their respective ecosystems.

GSAP Skills

Context:

- The International Union for Conservation of Nature (IUCN) has launched the Global Species Action Plan (GSAP) skills.

Global Species Action Plan (GSAP) skills

- It includes an online knowledge platform aimed at enhancing conservation efforts for threatened species worldwide.

Purpose

- The primary goal is to equip conservation practitioners, policymakers, and stakeholders with the necessary skills and knowledge to implement effective species conservation actions.

Features

- **Training Modules:** The platform offers training modules covering various aspects of species conservation, including planning, monitoring, and management strategies.
- **Interactive Learning:** It provides interactive learning experiences, possibly through simulations, case studies, and practical exercises.
- **Multi-Stakeholder Engagement:** The platform facilitates collaboration and knowledge-sharing among diverse stakeholders involved in species conservation.
- **Target Audience:** Conservation practitioners, researchers, government agencies, NGOs, and other stakeholders engaged in species conservation efforts globally.
- **Technological Integration:** The use of modern technologies like interactive modules, multimedia resources, and possibly AI-driven learning tools to enhance user engagement and learning outcomes.

Benefits

- **Enhanced Capacity Building:** The platform aims to enhance the capacity of conservationists and organizations to address species extinction threats effectively.
- **Improved Conservation Practices:** By providing access to up-to-date information and best practices, the platform can contribute to more informed and impactful conservation actions.
- **Global Collaboration:** It fosters global collaboration and knowledge exchange, promoting a collective effort towards biodiversity conservation.

Phtheirospermum lushaiorum

Context:

- A rare hemi-parasitic terrestrial plant has been found in Phawngpui National Park of Mizoram.

Phtheirospermum lushaiorum

- A research scholar from the Botanical Survey of India has found a new and very rare terrestrial hemi-parasitic plant.
- **Scientific Name:** Phtheirospermum lushaiorum
- **Place:** Phawngpui national park peak in Lawngtlai district of Mizoram.
- They **lack a fully developed root system and form connections with another plant,** from which it obtains some or all of its water and minerals.
- They have ch**lorophyll and produce their own food by photosynthesis, and in some cases are capable of limited growth in the absence of the host plant.**

- They tap into the sap-conducting tissue of the host by means of specialized structures called haustoria.
- They flower only during July to September and fruits are produced during August to October.
- **"The specific epithet "lushaiorum" is named after the "Lushai" tribe of Mizoram.**

Phawngpui National Park

- Phawngpui National Park or Phawngpui Blue Mountain National Park is one of the two national parks of India in Mizoram, **the other and the larger being Murlen National Park.**
- **It is about 300 km from the main city Aizawl.**
- It bears the name of the mountain Phawngpui, often called the Blue Mountain of Mizoram, which is the highest mountain peak in the state.
- **Fauna:** Park provides habitat for a range of birds including the rare Blyth's tragopan, falcon, sunbirds, dark-rumped swift, and **Mrs. Hume's pheasant, which is the Mizoram state bird, and also rare animals like the mountain goat, slow loris, tiger, leopard, leopard cat, serow, goral, Asiatic black bear, stump-tailed macaque and capped langur.**
- **Flora:** Orchids and rhododendrons, with areas of bamboo.

Ligdus Garvale

Context:

- A team of naturalists has documented a new spider species from Garvale, a village in the Somwarpet taluk of the Kodagu district.

Ligdus Garvale

- It was found in Garvale village of the Kodagu district, Karnataka,
- This marks only the second recorded instance of the Ligdus genus in 129 years.
- The first, Ligdus Chelifer, was reported from Myanmar by Thorell in 1895.
- Ligdus Garvale was discovered under the leaf of a torch ginger plant and bears a resemblance to Pseudoscorpions.
- It is a jumping spider.
- Due to its nature as a high canopy jumper, it often goes unnoticed and constructs a double-layered web for retreat.

Jumping Spiders

- They are a group of spiders that constitute the family Salticidae.
- **As of 2019, this family contained over 600 described genera and over 6,000 described species,making it the largest family of spiders at 13% of all species.**
- They have some of the best vision among arthropods and use it in courtship, hunting, and navigation.
- Jumping spiders are generally recognized by their eye pattern. All jumping spiders have four pairs of eyes, with the anterior median pair being particularly large.
- **Class:** Arachnida
- **Order:** Araneae
- **Family:** Salticidae

Sperm whales

Context:

- MIT scientists decode basic elements of the communication system and how they talk among sperm whales.

Details of the study

- In a study published in the journal Nature Communications, researchers analyzed more than 8,700 snippets of sperm whale clicks, known as codas.
- **Research has found four basic components they think make up this phonetic alphabet.**
- **This alphabet could then be used by the whales in an unlimited number of combinations.**
- **They do not have a fixed set of codas and this gives the whales access to a much larger communication system.**

Significance

- Sperm whales seem to have sophisticated social ties and deciphering their communication systems could reveal parallels with human language and society.
- **The knowledge of the communication system of sperm whales could be used for conservation purposes, like minimizing their**

risk of being hit by ships or reducing ocean noise levels.

How Whales communicate

- Like many whales and dolphins, sperm whales are highly social mammals and communicate **by squeezing air through their respiratory systems to make strings of rapid clicks that can sound like an extremely loud zipper underwater.**
- **The clicks are also used as a form of echolocation to help them track their prey.**
- **Scientists have been trying for decades to understand what those clicks might mean, with only minimal progress.**

About Sperm whales

- It is the **largest of the toothed whales and the largest toothed predator.**
- It is the **only living member of the genus Physeter** and one of three extant species in the sperm whale family, **along with the pygmy sperm whale and dwarf sperm whale of the genus Kogia**
- They **have the biggest brains of any animal on the planet at up to 20 pounds,** as much as six times the size of an average human brain.
- **They live in matriarchal groups of about 10 and sometimes meet up with hundreds or thousands of other whales.**
- Sperm whales can **grow up to 60 feet (18 meters) long and dive to nearly 3,280 feet (1,000 meters) to hunt for squid.**
- They sleep vertically, in groups.
- **International Union for Conservation of Nature :**"vulnerable"
- **Scientific name:** Physeter macrocephalus

World Migratory Bird Day

Context:

- In 2024, World Migratory Bird Day will be celebrated on two days, 11 May and 12 October, aligning with the cyclic nature of bird migration in different hemispheres.

Details

- The World Migratory Bird Day campaign in 2024 will stress the need for proactive conservation measures.
- **The annual campaign will take place under the theme "Protect Insects, Protect Birds".**
- **For the first time ever, the upcoming World Migratory Bird Day campaign in 2024 will focus on the importance of insects for migratory birds, and highlight concerns related to decreasing populations of insects.**

Importance of insects

- Insects are essential sources of energy for many migratory bird species.
- Along their migration routes, birds look out for insects in fields, forests, wetlands, and various habitats during stopovers.
- T**he timing of bird migration often coincides with peak insect abundance at stopover locations, supplying nourishment for birds to replenish their energy reserves before continuing their journeys.**
- The loss and disturbance of insect populations at breeding sites and along avian migration routes threaten bird survival and well-being.

Significance of birds

- Birds play crucial roles in pollination and pest control, and a lack of insects disrupts these ecosystem functions. Overpopulation of certain insects, without natural predators from birds, can also cause outbreaks that damage plant health and agriculture.

Orangatuan

Context

- For the first time, an orangutan was seen using the medicinal leaves to treat wounds.

About Orangatuans

Taxonomy and Classification

- Orangutans are great apes belonging to the family **Hominidae and genus Pongo.**
- They are classified into two species: **the Bornean orangutan (Pongo pygmaeus) and the Sumatran orangutan (Pongo abelii).**
- **Bornean Orangutan (Pongo pygmaeus):**
  - Bornean orangutans are native to the island of Borneo in Southeast Asia.
  - They have a **broader distribution compared to Sumatran orangutans,**

inhabiting both lowland and swamp forests as well as mountainous regions.
    - Bornean orangutans exhibit greater dietary flexibility, consuming a wider variety of foods, including fruits, leaves, bark, insects, and sometimes small vertebrates.
    - Adult males typically develop larger cheek pads or flanges compared to Sumatran orangutans.
- **Sumatran Orangutan (Pongo abelii):**
    - Sumatran orangutans are found on the Indonesian island of Sumatra.
    - They primarily inhabit lowland tropical rainforests, with some populations also occurring in montane forests at higher elevations.
    - Sumatran orangutans have a more restricted distribution compared to Bornean orangutans, and they are considered to be more critically endangered.
    - They tend to have longer faces and lighter hair compared to Bornean orangutans.
    - Sumatran orangutans **have a slower reproductive rate compared to their Bornean counterparts.**

Physical Characteristics
- Orangutans are characterized by their shaggy red fur, long arms, and a bulky body.
- Adult males develop large cheek pads known as flanges, which are fully developed in dominant males.

Habitat and Distribution
- Orangutans are native to the rainforests of Borneo and Sumatra in Southeast Asia. They inhabit lowland and swamp forests as well as mountainous regions.

Behavior and Social Structure
- Orangutans are primarily solitary animals, with adult males being largely solitary while females may occasionally interact with other individuals.
- They are arboreal, spending most of their time in trees, and are well adapted for swinging and climbing.

Diet and Feeding Habits
- Orangutans are primarily frugivorous, with fruits making up the majority of their diet.
- They also consume leaves, bark, insects, and occasionally small vertebrates.

Reproduction and Life Cycle
- Female orangutans give birth to a single offspring after a gestation period of approximately 8.5 months.
- Offspring stay with their mothers for several years, learning essential skills for survival before becoming independent.

Conservation Status
- Orangutans are listed as **critically endangered by the International Union for Conservation of Nature (IUCN).**

Threats
- Habitat loss due to deforestation, illegal logging, and palm oil plantations pose significant threats to their survival. Hunting and poaching also contribute to their declining population.

Magpies

Context:
- Blue magpie species are frequently observed from Kashmir to Myanmar.

About
- Magpies belong to the Corvidae family of birds which includes crows, jays, and ravens.

Common species
- Eurasian magpie (Pica pica) and the Black-billed magpie (Pica hudsonia).

Cultural significance
- Birds of this family are generally considered to be noisy, inquisitive birds that in folklore from around the world have often been associated with omens, good or bad.
- In some European cultures, they accompany witches.

Habitat
- They are found in the Himalayas.
- The gold-billed magpie, Urocissa flavirostris, also called the yellow-billed blue magpie, occupies the high altitude zone between 2000 and 3000 meters above sea level.

- Red-billed magpie species: Below 2000 kilometres.
- Blue magpie: Found at lower altitudes where humans live in larger numbers.

Intelligence

- Considered one of the most intelligent birds, displaying problem-solving abilities and tool use. They have been observed using tools to obtain food and have a remarkable memory.

Threats

- While magpies are not considered globally threatened, habitat loss is increasing.

Methane Emission

Context

- Research in the Institute for Global Change in Japan has found various aspects of methane emission and subsequent global warming.

Details and findings

- During 2019-2020, these researchers examined the c**oncentration of methane in the atmosphere and how it changed with time.**
- **Until the 1990s, the concentration increased, then stabilized for a bit, and then started to increase again around 2007**. According to recent estimates, the atmospheric concentration of methane today is three times what it was 300 years ago.
- The models prepared by them said m**ethane emissions from fossil fuels declined between 1990 and the 2000s and that they've been stable since.**
- The study reported that **microbes have been the biggest sources of methane in the atmosphere, not the burning of fossils.**

The reason cited by them for an increase in methane

- Increase in cattle-rearing in Latin America and more emissions from waste in South and Southeast Asia, Latin America, and Africa.
- They added that the number of wetlands worldwide had increased as well.

The sources of methane

- There are two categories of sources: biogenic and thermogenic.

Thermogenic source

- When fossil fuels such as natural gas or oil are extracted from deep within the earth's crust, thermogenic methane is released.

Biogenic source

- Biogenic methane comes from microbial action.
- The microbes that produce methane are archaea - single-celled microorganisms distinct from bacteria and eukaryotes - and are called methanogens. They thrive in oxygen-deficient environments, such as the digestive tracts of animals, wetlands, rice paddies, landfills, and the sediments of lakes and oceans.
- Methanogens convert organic matter into methane and human activities like agriculture, dairy farming, and fossil fuel production have further increased methane emissions.

Identifying the source as per the study

- If there are fewer carbon-13 atoms than a certain level in a group of 1,000 methane molecules, the methane is from a biological source.
- If the methane is from thermogenic sources, such as trapped fossil fuels or geological activities, there will be more carbon 13 atoms in 1,000 molecules.

Warming potential

- Methane is the second most abundant anthropogenic greenhouse gas after carbon dioxide (CO_2) but it warms the planet more.
- Over a century, methane has a global warming potential 28 times greater than CO_2, and even higher over shorter periods like two decades.

Shallow Aquifer Management (SAM) Model in Hyderabad

Context

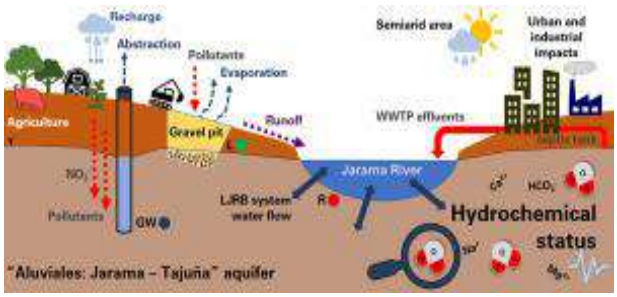
- Greater Hyderabad Municipal Corporation (GHMC) in a latest intervention has taken up Shallow Aquifer Management (SAM) model on a pilot basis in the city.

Objective

- **Sustainable Urban Water Management:** The primary goal of the SAM model is to ensure

the sustainable management of urban water resources in Hyderabad.

- **Address Groundwater Issues:** It aims to tackle persistent problems such as groundwater depletion and drying up of borewells.
- **Prevent Urban Flooding:** The project also seeks to mitigate the quick flooding of city streets during heavy rains.



Implementation Framework

- **Pilot Project:** The initiative is being implemented on a pilot basis under the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) scheme.
- **Selection of Sites**: Five municipal parks have been identified for the pilot. The initial focus is on two parks in the LB Nagar zone: Kakatiya Park at Habsiguda and E-sector park at Sainikpuri.

Nodal Agency

- **National Institute of Urban Affairs (NIUA):** NIUA is the nodal agency responsible for overseeing the implementation of the SAM model.

Technical Approach

- **Shallow Water Injection Borewells:** The project involves drilling borewells to a depth of 100-120 feet to inject water into the shallow aquifers.
- **Recharge Pits:** Water collected from the surrounding watershed is channelled through recharge pits to facilitate the recharging of underground water layers.
- **Rainfall Utilization:** The system ensures that rainfall is effectively used to recharge groundwater, thereby raising the water table.

Expected Outcomes

- **Groundwater Recharge:** The recharging of shallow aquifers will help in increasing the groundwater levels in the targeted areas.
- **Technical Benefits:** The project is expected to recharge groundwater aquifers in the surrounding areas and soon see an improvement in groundwater levels.
- **Sustainable Water Management:** The initiative aims to create a sustainable framework for urban water management that can be replicated in other regions.
- **Flood Mitigation:** By efficiently managing rainwater, the project will help in reducing urban flooding.
- **Scalability:** If successful, the SAM model could be scaled up and implemented in other parts of Hyderabad and potentially in other cities facing similar water management issues.
- **Policy Integration:** The project aligns with broader urban development and sustainability goals under the AMRUT scheme and other national policies.

5.8 SNIPPETS

Sea anemone

APTI PLUS

- Scientists at the ICAR-National Bureau of Fish Genetic Resources (NBFGR) have found mass anemone bleaching off the Agatti island in Lakshadweep.
- Invertebrate predatory aquatic animal of order Actiniaria marked by soft bodies and an ability to sting.
- Named after the Anemone, a terrestrial flowering plant.
- As cnidarians, sea anemones are related to corals, jellyfish, tube-dwelling anemones, and Hydra.
- Unlike jellyfish, sea anemones do not have a medusa stage in their life cycle.
- A typical sea anemone is a single polyp attached to a hard surface by its base, but some species live in soft sediment, and a few float near the surface of the water.
- Known to form symbiotic relationships with other animals, mostly with clownfish.
- They use nematocysts, which are specialized cells containing venomous organelles called cnidocysts, to capture prey and defend themselves against predators.

Leopard Cat

- Leopard cat sighted in Maharashtra's Pench Tiger Reserve for first time.
- It is a species of forest-dwelling cat, of family Felidae, noted for its leopard-like colouring.
- Most widespread species after the jungle cat in India due to its "adaptive flexibility"
- Scientific name : Prionailurus bengalensis.
- Distribution: It is restricted to North East India, northern Himalayan states, West Bengal, Odisha, and pockets of Western Ghats. It was believed to be absent in central India.
- Habitat: Live in tropical evergreen rainforests and plantations at sea level, in subtropical deciduous and coniferous forests in the foothills of the Himalayas at altitudes above 1000 m.
- Features: Colouration ranges from pale tawny, to yellow, red, or grey above, with the underparts white, and spotted.

Pench TR:

- Located in Madhya pradesh, gets its name from the Pench river is spread over 740 sq km.
- The flora is predominantly dominated by teak trees.

Peucetia chhaparajnirvin

- Daryapur-based arachnologist Atul Bodkhe has identified the green lynx spider, which was never discovered earlier.
- Newly identified species of green lynx spider found in the Tal Chhapar Wildlife Sanctuary, located in the Churu district of Rajasthan, India.
- Resides on the green leaves of the Vachellia nilotica (babul) tree within this sanctuary.
- Named after its place of discovery, the Tal Chhapar area in Rajasthan.
- Physical Characteristics: Have elongated legs, facilitating swift movement, which is advantageous for ambushing prey.
- Nocturnal Behavior: Primarily active during the night, exhibiting nocturnal behavior patterns.
- Feeding Habits: Captures its prey through pouncing rather than constructing webs.
- Taxonomic Classification: Belong to the family Oxyopidae within the order Araneida.
- Distinctive Features: Characterized by their hexagonally arranged eyes and pointed abdomens.

Dice snake

- A study published in the journal Biology Letters found that dice snakes go to extreme lengths to save themselves from predators, including faking their own deaths.
- Scientific name: Natrix tessellata.
- They are non-venomous, semi-aquatic snakes found in parts of Europe and Asia.
- Appearance: They are relatively small, typically ranging from 50 to 80 centimeters in length. They have a slender body with a distinctive pattern of dark spots or squares along their back, resembling dice markings hence the name "dice snake."
- Habitat: Preferably freshwater habitats such as rivers, streams, ponds, and marshes.
- Behavior: Primarily diurnal, meaning they are active during the day. They also hunt for fish, amphibians, and invertebrates.
- Reproduction: Oviparous, meaning they lay eggs.
- Threats: habitat loss, pollution, and human activities impacting their freshwater habitats.
- Ecological Importance: They play a role in controlling populations of small aquatic animals like fish and frogs, contributing to the balance of ecosystems they inhabit.
- IUCN Red list: Least Concern

Oleander flower

- Two Kerala temple boards have banned use of oleander flowers in temple offerings after a 24-year old woman died after accidentally chewing some oleander leaves.
- Nerium oleander, commonly known as oleander or rosebay, is a plant cultivated worldwide in tropical, subtropical, and temperate regions.
- In Kerala, the plant is known by the names of arali and kanaveeram.
- Only species currently classified in the genus Nerium, belonging to family Apocynaceae.
- It is known for its drought tolerance and is often used for ornamental and landscaping purposes.
- It is grown along highways and beaches as a natural, green fencing.
- IUCN status: Least Concern

United Nations Forum on Forests

APTI PLUS

- 19th Session of the United Nations Forum on Forests (UNFF), held at the UN Headquarters in New York made a declaration to take urgent and accelerated actions to halt deforestation and forest degradation and to prevent land degradation.
- The United Nations Forum on Forests It is a high-level intergovernmental policy forum which includes all United Nations member states and permanent observers, the UNFF Secretariat, the Collaborative Partnership on Forests, Regional Organizations and Processes, and Major Groups.
- Founded: 18 October 2000
- Headquarters: New York, USA
- Parent organization: United Nations Economic and Social Council

Principal functions:

- To facilitate the implementation of forest-related agreements and foster a common understanding of sustainable forest management;
- To provide for continued policy development and dialogue among Governments, and international organizations to address forest issues and emerging areas of concern in a holistic, comprehensive, and integrated manner,
- To enhance cooperation as well as policy and program coordination on forest-related issues.

Batillipes chandrayaani

APTI PLUS

- A new species of marine tardigrade discovered from the southeast coast of Tamil Nadu has been named Batillipes chandrayaani after the Chandrayaan-3 moon mission by researchers at the Cochin University of Science and Technology (Cusat).
- Belongs to the phylum Tardigrada and the family Batillipedidae.
- It is the third marine tardigrade species identified in Indian waters, and the second found along the East Coast.
- Size: Measures about 0.15 millimeters in length and 0.04 millimeters in width, similar in size to its counterparts.
- Shape: It features a distinct trapezoid-shaped head and four pairs of legs adorned with sharp-tipped sensory spines. Both male and female specimens exhibit comparable morphology and size.
- It marks the 39th species documented under the Batillipes genus.
- Prior discoveries include Stygarctus keralensis from the southwest coast in 2021 and Batillipes kalami from the southeast coast in 2023.

Glyptothorax punyabratai

APTI PLUS

- New Catfish Species was Discovered in Arunachal Pradesh by ICAR-NBFGR.
- The discovery was made in Tung Stream, a tributary of the Tissa River, in the Brahmaputra River drainage system.
- The species is named Glyptothorax punyabratai.
- The newly discovered species has been named after the renowned founder director of ICAR-NBFGR, Dr. Punyabarata Das, in honor of his groundbreaking contributions to fisheries research.
- They are now registered at the National Fish Museum-cum-Repository of ICAR-NBFGR in Lucknow.
- ICAR-National Bureau of Fish Genetic Resources (ICAR-NBFGR)
- ICAR-National Bureau of Fish Genetic Resources (ICAR-NBFGR) was established in December 1983 in Allahabad under the aegis of the Indian Council of Agricultural Research to undertake research related to the conservation of fish germplasm resources of the country.
- The Bureau's permanent infrastructure was developed at Canal Ring Road, Telibagh, Lucknow, U.P in 1999.

Iberian lynx

APTI PLUS

- As per the Spanish government, the number of endangered Iberian lynx in the wild in Spain and Portugal has nearly doubled since 2020 to surpass 2,000 last year.
- It is one of the four extant species within the medium-sized wild cat genus Lynx.
- It is endemic to the Iberian Peninsula in southwestern Europe.
- The Iberian lynx has a short bright yellowish to tawny coloured spotted fur. The spots vary in shape and size from small round to elongated.
- They prefer open grassland mixed with dense shrubs such as strawberry trees, mastic, and juniper, and trees such as holm oak and cork oak. It is now largely restricted to mountainous areas.
- Scientific name: Lynx pardinus
- Class: Mammalia
- Domain: Eukaryota
- Family: Felidae
- Threats: Decreasing food base, Habitat loss and degradation, Illegal Hunting.
- IUCN Red List: Endangered

Snow Leopard in Kishtwar NP

APTI PLUS

- Scientists from the University of Kashmir, Srinagar and the National Development Foundation, Jammu have captured four snow leopards on camera in Kishtwar High Altitude National Park of the Union territory (UT) of Jammu and Kashmir's Chenab Valley region.
- It is a Felidae (mammals in the order Carnivora) in the genus Panthera.
- It is an apex predator and flagship species of High Mountain Asia.

Location and Habitat:

- Snow leopards inhabit high-altitude mountainous regions, including the Himalayas, and are well adapted to survive in harsh environments with extreme cold and sparse vegetation.
- Global distribution: snow leopards are found in 12 countries with the largest share in the Tibetan plateau of China, followed by Mongolia and India. Other countries include Russia, Afghanistan, Pakistan, Nepal, Bhutan, Kazakhstan, Tajikistan and Uzbekistan.
- India: Largely found in the high altitude cold, arid and rugged terrains of Jammu & Kashmir, Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh.

Challenges and Threats:

- Snow leopards face various threats in the wild, including habitat loss, poaching, human-wildlife conflict, and climate change impacts such as shrinking habitats and reduced prey availability.
- Vulnerable on the IUCN Red List.
- India is home to two per cent of the global range of the snow leopard.
- Country has 718 snow leopards, most of whom live in areas that are not under legal protection.

Sri Lankan golden-backed frog

APTI PLUS

- Researchers from the Zoological Survey of India, in partnership with the Andhra Pradesh Biodiversity Board, rediscovered the Sri Lankan golden-backed frog (Hylarana gracilis) after two centuries in the Koundinya wildlife sanctuary in Eastern Ghats in Andhra Pradesh.
- Scientific name: Hylarana gracilis.
- It is a species of frog in the family Ranidae.
- They are considered endemic to Sri Lanka and this new record from the Eastern Ghats.
- Body shape: Body slender and head small.
- Appearance: Iris is reddish brown with golden specks and dark patches. Flanks light yellowish-gray. Light brown limbs with grayish cross-bands. Throat and limbs are light grey.
- IUCN status: Vulnerable.
- With this finding, the number of freshwater frog species in India rises to 20.

Dhole

APTI PLUS

- A study has reported the presence of dholes or Asiatic wild dogs (Cuon alpinus) in the high mountains of Central Asia nearly 30 years.
- Habitat and Distribution: Dholes, also known as Asiatic wild dogs, inhabit forests, grasslands, and mountainous regions across South and Southeast Asia.
- Physical Characteristics: They have a reddish coat, bushy tail, and large ears, resembling a mix between a fox and a wolf.
- Social Structure: Dholes are highly social animals, living and hunting in packs that can range from 5 to 12 individuals, but sometimes up to 30.
- Diet and Hunting: They primarily prey on medium-sized ungulates such as deer and wild boar, employing cooperative hunting techniques.
- Communication: Communicate through a range of vocalizations including whistles, clicks, and growls, which are used for coordinating hunts and social bonding.
- Reproduction: Breeding season varies with geography, and females give birth to litters of 4-6 pups after a gestation period of about 60-63 days.

Conservation Status:

- The IUCN Red List : Endangered due to habitat loss, depletion of prey, and human-wildlife conflict.

Oedocladium sahyadricum

APTI PLUS

- A group of psychologists from the Department of Botany at Catholicate College in Pathanamthitta has discovered a new algal species in the Western Ghats.
- It was discovered in the natural forests of Kumbhavurutty region in Kollam.
- This is the first time a species in the Oedocladium category has been recorded in Kerala.
- The name 'sahyadricum' refers to the Western Ghats, also known as Sahyadri, which is rich in plant diversity and provides ideal conditions for the growth of terrestrial microalgae.
- This discovery has been published in Taiwania, an International Journal of Biodiversity.
- The species, which looks like moss protonema, is velvety green but turns yellowish-green as it matures.

Application:

- In medicine, agriculture, and in the production of a natural pigment, astaxanthin which is well-documented for its unique biological activities and health benefits.

Mrugavani National Park

APTI PLUS

- The Mrugavani National Park at Chilkur in Moinabad mandal has reduced in area by 80 hectares
- It is a national park located in Hyderabad, Telangana State, India.
- It covers an area of 3.6 square kilometres or 1211 acres.
- It is home to a 600 different types of plant life.
- The Park is home to around 350 spotted deer.
- Flora: Teak, Bamboo, Sandal, Picus, Palas, Rela etc.
- Vegetation: They are dry deciduous forest in the Southern tropical. The undulating topography shows the rocky side of the formation of the Deccan trap.

Fauna

- Mammals – Panther, Cheetal, Sambar, Wild boar, Jungle Cat, Civet Cat, Mongoose, Jackals, Porcupines, fox, Black naped Hare etc.
- Reptiles – Snakes, Rat Snakes, Monitor Lizard, Russell Viper, Cobra etc.
- Birds – Quails, Peacocks, Warblers, Partridges, Flower Peckers, Ducks, Curlews, Lapwings, Babbler, Koel etc.
- The animals include: indian hare, forest cat, civet, Indian rat snake, Russell's viper, chital and the flower pecker.

Emblica chakrabartyi

APTI PLUS

- Scientists from SNM College Maliankara, Ernakulam, National Botanical Research Institute, Lucknow, and King Fahd University, UAE, have reported the discovery of a new plant species Emblica chakrabartyi from Adichilthotti within the Edamalayar forest range of Kerala.
- The species belongs to the gooseberry (Phyllanthaceae) family.
- It has been named after Tapas Chakrabarty, former scientist at the Botanical Survey of India, for his contribution to the study on Phyllanthaceae.

Features

- Tree height: approximately 2 metres. Leaves: large with a shiny elongated oval shape of up to 13 cm.
- The flowering and fruiting occur during December to June. Male flowers are found in inflorescence whereas females ones are in single, on the leaf axils.
- Each flower bears yellowish green coloured six petals. The fruits are brown to black when they ripen and the seeds are black about 8-9 mm diameter.
- Generally grown as shrubs in tropical rainforests.
- 55 species of the genus Emblica have been recorded all around the world.
- The new plant is the eleventh from India.

Orcas

APTI PLUS

- Two people were rescued after a group of orcas, also known as killer whales, sank their 15-meter-long sailing yacht in the Strait of Gibraltar.
- Scientific name: Orcinus orca
- The orca, or killer whale, is a toothed whale that is the largest member of the oceanic dolphin family.
- It is the only extant species in the genus Orcinus.
- They are recognizable by their black-and-white patterned body.
- Distribution: They are found in diverse marine environments, from Arctic to Antarctic regions to tropical seas.
- Socialisation: They are highly social; some populations are composed of highly stable matrilineal family groups (pods).
- International Union for Conservation of Nature conservation status: Data deficient.
- Threats: habitat loss, pollution (by PCBs), capture for marine mammal parks, and conflicts with human fisheries.

Sailfin Catfish

APTI PLUS

- CSIR-Centre for Cellular and Molecular Biology (CCMB) scientists have found out that the invasive armoured sailfin catfish has spread to 60% in the water bodies of Eastern Ghats, damaging the fishing nets and the ecosystem also.

Armoured Sailfin Catfish (ASC)

- It is also known as Rakashi or devil fish.
- It was brought to India due to its distinctive appearance and algae-cleaning abilities but it has since multiplied to become invasive in some areas.
- They are Native to South America and belong to the largest catfish family.
- Named for its sail-like dorsal fin, the part of its scientific name multiradiatus means "many-rayed" and refers to the rays of the dorsal fin.
- Habitat: Most common in sluggish streams, floodplain lakes, and marshes. They are known from the Orinoco, Amazon, Magdalena, Maracaibo, Paraná, Parnaíba and São Francisco systems.
- Scientific name: Pterygoplichthys multiradiatus
- Family: Loricariidae
- Genus: Pterygoplichthys
- Order: Siluriformes

Sariska Tiger Reserve

APTI PLUS

- Even 46 years after it was notified as a Tiger Reserve,almost 60.5% of the total STR land has not yet been transferred to the forest department.

Sariska Tiger Reserve

- It is a tiger reserve in Alwar district, Rajasthan, India and it is nestled in Aravali hills.
- This area was a hunting preserve of the Alwar state and was declared a wildlife sanctuary in 1958.
- Vegetation: It comprises scrub-thorn arid forests, dry deciduous forests, grasslands, and rocky hills.
- Area: 883 km^2
- Declared National Park: 1979
- Fauna: Jungle cats, rhesus macaque, sambhar, chital, wild boar, etc.
- Flora: 90% of the area in the sanctuary is covered with dhok trees. Other species found include salar, kadaya, gol, ber, Banyan, gugal, bamboo, kair, adusta, etc.
- Kankarwadi fort: It is located in the centre of the Reserve and it is said that Mughal emperor Aurangzeb had imprisoned his brother Dara Shikoh at this fort in struggle for succession to the throne.

Madagascar's Baobab Trees

APTI PLUS

- According to DNA studies, the iconic trees first arose in Madagascar 21 million years ago. Their seeds were later carried on ocean currents to Australia and also to mainland Africa, evolving into distinct species.

Baobab Trees

- The trees have trunks with large circumferences and thin, spindly branches.
- Their height extends up to 50 meters.
- They have exceptionally long lifespans going up to 2,000 years.
- Scientific name: Adansonia
- Family: Malvaceae
- Uses: Fruits and seeds are edible, the seed oil is used for cooking, and the bark fiber for clothing.
- Distribution: They are native to Madagascar, mainland Africa, and Australia. The trees have also been introduced to other regions such as Asia.
- Ecological significance: It is a keystone species. It provides"essential resources, such as food or shelter, for a guild of animals in return for which the guild of animals provides an essential service, or mobile links, such as pollination or diaspore dispersal.
- India: It is found in a few areas including one near the Golconda Fort in Andhra Pradesh that is believed to be more than 400 years old.
- IUCN Red List of Threatened Species:
- Three Madagascar species of baobab trees are threatened with extinction.
- The remaining three are listed under the Least Concern category.

6. SOCIAL ISSUES

6.1 MENSTRUAL HYGIENE IN INDIAN PRISONS

Context

- **NFHS 2019-2020 Findings:** 80% of young women (15-24 years) use safe menstrual hygiene products.
- **Urban and Demographic Gains:** Significant improvements in urban areas and specific demographics.

Findings from the National Family Health Survey (NFHS 2019-2020)

Women in Indian Prisons:

- **Neglected Group:** Female prisoners' menstrual hygiene **needs are often overlooked.**
- **Systemic Oversight:** Lack of attention to basic needs, including menstrual hygiene.

Societal Attitudes and Biases:

- **Fundamental Rights:** Female prisoners are **often denied fundamental rights.**
- **Female Purity Standard:** Societal biases against women prisoners exacerbate neglect.

Current Status in Prisons:

- **Population:** 23,772 women, **with 77% in reproductive age.**
- **Sanitary Napkins:** Inconsistent availability and poor quality.
- **Facilities:** Inadequate water and washroom facilities, overcrowding, and poor sanitation.
- **Health Issues:** Poor hygiene leads to higher **instances of urinary infections.**

Policy Interventions

- **Menstrual Hygiene Scheme:** Distribution of free or subsidized sanitary napkins.
- **Suraksha Suvidha Napkins:** Affordable napkins **sold at ₹1 eachat Jan AushadhiKendras.**
- **National Menstrual Hygiene Policy (2023):** Aims for equitable and dignified menstrual hygiene management, including for prisoners.

Necessary Actions

1. **Adhere to Model Prison Manual 2016:** Standardize and monitor compliance.
2. **Public Health Perspective:** Address menstrual hygiene in prisons as a public health issue.
3. **Develop a Comprehensive Strategy:**
   - Ensure consistent supply of high-quality products.
   - Upgrade facilities.
   - Prioritize health and dignity.
4. **Conduct Empirical Research:** Assess current conditions and inform policy-making.

Conclusion

- **Enforcement of guidelines, addressing menstrual hygiene as a public health issue, comprehensive strategies, and empirical research** are crucial to uphold the health and dignity of incarcerated women and combat period poverty in prisons.

6.2 SHARE OF RELIGIOUS MINORITIES: AN ANALYSIS

Context

- Media and politicians have sensationalized findings from ***the "Share of Religious Minorities: A Cross-Country Analysis (1950-2015)" working paper by the Economic Advisory Council*** to the Prime Minister (EAC-PM).

Details

Misinterpretation:

- Misleading reports suggest **alarming growth of the Muslim population in India.**
- **Falsely** implies a threat to the Hindu population.

Consequences of Misinterpretation:

- **Divisive Narratives:** Sensationalism fuels **divisive political narratives.**
- **Misinformed Public:** Public is left with inaccurate views on population issues.

Clarifying Population Growth Dynamics:

- **Balanced Growth:** EAC-PM report data does not support claims of rapid Muslim population growth.
- **Demographic Trends:** Trends are **consistent with global patterns** and **do not threaten the Hindu population.**

Need for Accurate Reporting:

- **Responsible Media:** Media should **strive for accuracy and avoid sensationalism.**
- **Educating the Public:** Clear, factual communication is essential.

Share of religious minorities: A cross-country analysis (1950-2015) paper findings

Limitations of the Paper: *The working paper states that changes in religious demography are due to complex, multivariate factors, and pinpointing the exact causes is beyond its scope.*

Importance of Socio-Economic Context:

- **Socio-Economic Factors:** Education and economic conditions **influence family size more than religion.**
- **Impact of Development:** Better access to education, health care, and economic opportunities leads to lower fertility rates.

Understanding Fertility Rates:

- **Education:** Higher education levels, especially for women, **correlate with lower fertility rates.**
- **Economic Conditions:** Improved economic conditions reduce family size.
- **Health Care Access:** Access to health care, including family planning, influences fertility rates.

High Population Growth Rate and Human Development:

- **Indicator of Development Issues:** High growth often **indicates lack of education, health care, and economic opportunities.**
- **Muslim Population Growth:** Reflects lag in human development indicators.

Low Growth Rate and Socio-Economic Factors:

- **Improved Conditions:** Lower growth rate can reflect better socio-economic conditions.
- **Higher Emigration Rates:** Can indicate migration for better opportunities.

Cross-Country Analysis by EAC-PM:

- **Dataset Details:** RCS-DEM database used for analysis of 167 countries from 1950 to 2015.

Explaining Population Changes (Between 1950-2015):

Absolute Increase in Population:

- **Hindu Growth:** Hindu population grew by 701 million.

- **Muslim Growth:** Muslim population increased by 146 million.

Proportional Changes:

- **Hindu Proportion:** Fell by 6.64 percentage points.
- **Muslim Proportion:** Increased by 4.25 percentage points.

Rate of Change:

- **Hindu Share:** Declined by 7.8%.
- **Muslim Share:** Increased by 43.2%.

Contextualizing Rate of Change:

- **Statistical Expectation:** With Hindus making up 84.7% and Muslims 9.8% in 1950, the Muslim growth rate seems more significant due to their smaller initial proportion.

Comparison with Other Religious Groups:

- **Buddhists:** Increase of 1519.6%.
- **Sikhs:** Increase of 49.2%.
- **Parsis:** Decline of 86.7%.

Misinterpretation of Figures

- **Misleading Statistics:** Significant percentage changes can mislead without context; **large increases in Buddhists or Sikhs don't imply demographic shifts or conspiracies.**
- **Parsis' Decline:** Doesn't indicate targeted persecution.

Conclusion

- **Nuanced Understanding Needed:** Population changes must be understood in context.
- **Sensationalism Leads to Misinterpretation:** Accurate reporting and understanding demographic data are crucial for balanced public discourse.

6.3 FEMICIDE

Context

- In 1782, an English judge allowed violence against wives if the tool used wasn't thicker than the husband's thumb, **giving rise to the term "rule of thumb."**
- Despite societal progress, thousands of women globally are still killed annually due to their gender.

Femicide

- Originated in England in 1801, **"femicide" denotes "the killing of a woman."**
- It **refers to the hate crime of systematically killing females because of their sex.**
- **Coined by feminist Diana E. H. Russell,** it's defined as "the killing of females by males because they are female."
- Popularized in the 1970s feminist movements, femicide remains underresearched in scientific literature.

Femicide Laws

- Since 2013, countries have enacted femicide laws to **combat gender related killings.**
- **Cyprus, Malta, and Croatia** have implemented severe penalties for offenders.
- In Latin America, 18 countries classify femicide as a hate crime, showing a regional commitment to address systemic violence against women.

Costa Rica's Initiative

- **Passed a landmark law in 2007** punishing femicide with 2035 years in prison.
- Targets not only romantic partners but also those in positions of trust, recognizing diverse dynamics of gender based violence.

Report on Femicide

- UN Office on Drugs and Crime and UN Women have joined forces to produce the second joint edition of a report on gender-related killings of women and girls.

Victims and Perpetrators

Victims

- **Most Likely Perpetrators:** Women and girls are most likely to be killed by those closest to them, such as intimate partners and family members.
- **Statistics (2022):**
  - **Number of Victims:** Approximately 48,800 women and girls were killed worldwide by intimate partners or other family members.
  - **Daily Average:** More than 133 women or girls killed every day by someone in their own family.
- **Common Perpetrators:**
  - Current and former intimate partners
  - Family members (fathers, mothers, uncles, brothers)
- **Percentage:** Intimate partners account for about 55% of all intimate partner and family-related killings.

Alarming Trends

Increase in Female Homicides

- **Record High:** This year recorded the highest number of total intentional female homicides.
- **Implications:** Indicates a global failure to prevent preventable deaths.

Prevention Measures

- **Early Intervention:** Importance of identifying risks and intervening early.
- **Gender-Responsive Policing and Justice:** Implementation of policing and justice systems sensitive to gender issues.
- **Survivor-Centred Support and Protection:** Providing access to support and protection tailored to the needs of survivors.

Global Impact of Femicide

Universality of the Issue

- **Universal Problem:** Femicide, like all forms of gender-based violence against women and girls, is prevalent in every country and territory worldwide.

Regional Statistics (2022)

- **Africa**: 2.8 women and girls per 100,000 were killed by an intimate partner or family member.
- **Asia:** 0.8 women and girls per 100,000.
- **Americas**: 1.5 women and girls per 100,000.
- **Europe**: 0.6 women and girls per 100,000.
- **Oceania:** 1.1 women and girls per 100,000.

Implications

- **Disparity:** Significant variation in femicide rates across regions.
- **Need for Action:** Urgent need for targeted interventions and global cooperation to address this widespread issue.

Violence against women in India

- Violence against women in India encompasses physical or sexual violence perpetrated by men against women, including domestic abuse, sexual assault, and murder. Common forms include murder (such as dowry deaths and honor killings), female infanticide, sexual crimes (rape, trafficking, forced prostitution), and acid attacks.

Key Statistics:

- According to the **National Crime Records Bureau of India,** reported incidents of crime against women increased by 15.3% in 2021 compared to the year 2020. According to the National Crime Records Bureau, in 2011, **there were more than 228,650 reported incidents of crime against women, while in 2021**, there were 428,278 reported incidents, **an 87% increase**. Of the women living in India, 7.5% live in West Bengal - where 12.7% of the total reported crime against women occurs. Andhra Pradesh is home to 7.3% of India's female population and accounts for 11.5% of the total reported crimes against women. **65% of Indian men believe women should tolerate violence in order to keep the family together**, and women sometimes deserve to be beaten. In January 2011, the International Men and Gender Equality Survey (IMAGES) Questionnaire reported that **24% of Indian men had committed sexual violence at some point during their lives.**
- India's Gender Gap Index rating was 0.629 in 2022, placing it in 135th place out of 146 countries.

Challenges in Combatting Femicide

- Persisting femicide rates **due to misclassification and underreporting.**
- Extends beyond intimate partner violence to include hate crimes and harmful practices.

Universal Lessons

- Addressing femicide **requires legal measures and societal shifts in attitudes towards gender and violence**.
- **"Feminicide" highlights governmental inaction**, holding them accountable for responses to genderbased violence.

Tackling Femicide

- **Vital to challenge toxic masculinity** and promote gender equality.
- Advocacy and community involvement crucial for sustainable solutions.

Conclusion

- Femicide **necessitates legislative action and societal change.**
- Implementation of femicide laws and challenging societal norms are **critical for achieving justice and preventing further violence against women and girls.**

6.4 REGISTRATION OF MARRIAGES

Context

- The Supreme Court ruled that despite an official marriage certificate, **a Hindu couple before the Court had "never acquired the status of husband and wife."**
- The reason: the couple's marriage was **registered under the Hindu Marriage Act, 1955 (HMA)** even before they performed the wedding rituals. The SC ruled that the couple who had filed divorce cases need not get a divorce because they were never married in the first place.
- The apex court's observations in the ruling bring to focus various issues on registration and solemnization of a marriage, and its necessity.

What is a solemnized marriage?

- Solemnizing a marriage simply refers to the **performance of an official marriage ceremony, with appropriate rituals.**
- Marriage in India is largely governed through a gamut of personal laws, and the **Special Marriage Act, 1954 (SMA**). Though codified through statute, these personal laws are essentially practices ordained by religion, with each religion having its own set of 'requirements' for a marriage — **a marriage is 'valid' when these requirements are met**.
- For instance, for **Hindus (and Christians), marriage is a sacrament,** i.e. it is a religious bond.
- **Rituals such as *kanyadaan*, *panigrahana* and *saptapadi*,** or other local customs solemnize a Hindu marriage.
- Section 7 of the HMA **codifies these requirements, and names *saptapadi* as an essential ritual.**
- For Christians, **a ceremony in the Church based on local customs is regarded as a valid marriage**. For example, for some Tamil Christians, this involves tying of a *thaali* — a chain with a cross on the pendant in Church.
- Under Muslim law, however, marriage is **essentially a contractual obligation**. A valid marriage requires the consent of both parties, in writing, and in the presence of witnesses. In practice, this includes both parties giving vocal consent, and signing a *nikahnama* (Islamic marriage contract) in the presence of witnesses and a Qazi.

What are registered marriages?

- Registration of a marriage **after it is solemnized** as per rituals is different from a registered marriage.
- Commonly used terms **like 'court marriage' or 'registered marriage'** refer to **a nonreligious or civil marriage under the SMA**, a secular law.
- A marriage 'performed' under this law is **essentially a solemnization in 'court' (a registrar's office) without any rituals.** However, marriages under personal laws (such as HMA) become 'valid' **only after the performance of rituals prescribed by religion.**
- A marriage without any rituals is only valid under the SMA.
- **Section 8 of the HMA** gives powers to the state to register marriages solemnized as per the requirements of Section 7. Similarly, **the Indian Christian Marriage Act 1872** provides the procedure for solemnization of Christian marriages and their registration.
- For Muslims, a *nikahnama* issued by a Qazi outlines the terms of the marriage. Although not a public registration under a statute, this registration form is widely adopted. Separately, several states including Assam, and Jammu & Kashmir have their own laws for registration of Muslim marriages and divorce, although their application is scarce.

What if a marriage is not registered?

- Entry 5 of the Concurrent List in the **Constitution's Seventh Schedule** deals with marriage and divorce, and **Entry 30** deals with vital statistics including registration of births and deaths. Both these subjects **jointly or separately deal with the registration of marriages**.
- Although there is a central legislation on the subject — **the Births, Deaths and Marriages Registration Act, 1886** — it does not have a robust application to marriage, unlike the effort to record births and deaths.
- States have their own laws, and in **some states like Karnataka and Delhi, registration of a marriage is mandatory.**
- A certificate of a marriage registration is useful for various official purposes where either spouses need to declare that they are married. For instance, applying for a spousal visa or joint medical insurance. However, **not registering a marriage cannot be the sole ground to declare it invalid** — since registering a marriage itself does not make it valid, so not registering also cannot in itself make it invalid.
- When the validity of a marriage is contested, then a marriage certificate alone is not enough to prove the marriage. An exception

to this is a certificate **under the SMA which is "conclusive" proof of marriage**.

- **Section 13(2) of the SMA** states that "on a certificate being entered in the Marriage Certificate Book by the Marriage Officer, the Certificate shall be deemed to be conclusive evidence of the fact that a marriage under this Act has been solemnized and that all formalities respecting the signatures of witnesses have been complied with."
- In Muslim and Christian marriages too, **registration takes place almost immediately after solemnization with witnesses present which makes it more reliable as evidence.** This is unlike in a Hindu wedding where the priest performing the ceremony does not routinely certify the marriage.
- However, in law, there exists a general presumption of marriage when a man and woman have cohabited continuously even if there is no direct evidence of marriage.
- **Section 114 of the Indian Evidence Act** states that "the Court may presume the existence of any fact which it thinks likely to have happened, regard being had to the common course of natural events, human conduct and public and private business, in their relation to the facts of the particular case."
- A 'valid' marriage as per rituals might be key in determining who is a rightful spouse when there are claims by multiple cohabiting partners. These aspects become crucial in bigamy trials, inheritance suits.
- In a bigamy case, a man has to prove that one of his marriages is not valid to not be charged for marrying twice. In an inheritance case, the validity of a marriage is questioned to disinherit a spouse.
- Proof of performing a valid marriage as per rituals (through photos, witnesses etc.); proof of long cohabitation as spouses through acceptance by family, friends or even children is evidence of a valid marriage.
- A marriage certificate has corroborative value in these cases but cannot be counted as evidence in itself.

Recent Ruling of the Supreme Court

- **Marriage as Sacred Institution:** Emphasizes marriage as a sacred union under the Hindu Marriage Act, highlighting its lifelong, dignified, and consensual nature.
- **Commercialization of Marriage:** Criticizes the commodification of marriage, stating it should not be reduced to a transactional event involving dowry or extravagant ceremonies.
- **Legal Consequences:** Declares that registration alone, without adherence to Section 7 of the Act, holds no legal weight.
- **Spiritual Significance:** Acknowledges the spiritual significance of marriage ceremonies, considering them purifying and transformative experiences.

Arguments in Favor of the Supreme Court's Position

- **Preservation of Cultural Heritage:** Upholds traditional practices, safeguarding cultural heritage associated with Hindu marriages.
- **Clarity in Legal Recognition:** Ensures clarity in determining the validity of marriages, avoiding ambiguity or disputes.
- **Respect for Religious Sentiments:** Recognizes and respects religious sentiments, aligning with India's secular ethos.
- **Prevention of Abuse:** Deters exploitation of legal loopholes for practical purposes, ensuring marriages are solemnized with reverence.

Arguments Against the Supreme Court's Position

- **Modernization and Adaptation:** Insistence on traditional ceremonies may impede individuals' rights to choose alternative forms of union.
- **Legal Formalism vs. Substance:** Overlooks substantive aspects of marriage, potentially disregarding valid unions based on mutual consent.
- **Access to Legal Rights:** Strict adherence may hinder marginalized communities' access to legal rights, perpetuating social inequalities.

Conclusion

- Reaffirms marriage's sacred nature, emphasizing traditional ceremonies' importance.
- Raises questions on individual autonomy and access to legal rights.
- Advocates for a balance between tradition and modernity, ensuring inclusivity and equity in marital relationships.

6.5 DOMESTIC VIOLENCE COMPENSATION

Context

- Supreme Court deliberation on Domestic Violence Compensation.

Case Background

- The petitioner contests orders from the Bombay High Court and a trial court, **challenging a Rs 3 crore compensation ruling under Section 22 of the Protection of Women from Domestic Violence Act 2005.**

Understanding the DV Act

- **Expanding on Domestic Violence Definitions:** The DV Act explicitly includes actions coercing the aggrieved person to meet unlawful dowry demands or surrender property, broadening the scope beyond physical harm to encompass financial coercion.
- **Defining the Aggrieved Person:** Defined as any woman in a domestic relationship with the respondent, highlighting the Act's gender-specific focus on protecting women from domestic violence.
- **Implications for Legal Interpretation:** The DV Act provides a robust framework for legal interpretation and enforcement by **defining domestic violence comprehensively** and specifying the aggrieved person's identity. This clarity streamlines legal proceedings and ensures consistent application of the law.

Compensation and Relief under the Domestic Violence Act

- **Section 22 - Compensation Orders:** Section 22 of the Domestic Violence Act **empowers Magistrates to adjudicate compensation** and damages for injuries inflicted due to acts of domestic violence. Unlike other provisions in the Act, this section **offers an avenue for additional relief beyond the standard remedies.**
- **Scope of Compensation:** Compensation, as defined within the Act, **extends beyond mere physical injuries to encompass the broader spectrum of harm inflicted**, including **mental anguish and emotional distress endured by the aggrieved person**. This recognition underscores the holistic impact of domestic violence on victims' well-being, aiming to redress both visible and invisible forms of harm.
- **Section 12 - Application for Relief:** Section 12 grants the aggrieved person or their **legal representative the right to seek various reliefs under the Act, including compensation.** Importantly, it ensures that **the aggrieved person retains the option to pursue compensation through civil suits independently of the Act's provisions, preserving their legal autonomy.**
- **Petitioner's Argument in recent case:** The petitioner raises valid concerns regarding the proportionality of the Rs 3 crore compensation, questioning its alignment with principles of justice and equity.
- **Interpreting Compensation Criteria:** The petitioner's counsel argues that **compensation should primarily reflect the damages and injuries caused by the spouse's actions, with a specific focus on mental anguish and emotional distress**. This argument emphasizes a departure from assessing compensation based on the parties' standard of living, which may be more applicable in maintenance cases under Section 20.
- **Section 20 - Monetary Reliefs:** Under Section 20, **Magistrates are empowered to order monetary relief to meet expenses and losses**

suffered by the aggrieved person and any children, aligning with their accustomed standard of living. The magistrate may opt for lump sum payments or monthly maintenance based on the nature and circumstances of the case.

- **Precedents and Legal Interpretations:** Legal precedents, **such as the Delhi High Court's ruling in Chaturbhuj vs. Sita Bai,** underscore the importance of preventing destitution in maintenance proceedings rather than solely punishing neglectful spouses. Similarly, rulings from the Supreme Court, **like Kalyan Dey Chowdhury vs. Rita Dey Chowdhury Nee Nandy and Dr. Kulbhushan Kumar vs. Raj Kumari**, provide guidelines for determining maintenance amounts based on the parties' status and capacity to pay.
- **Legal Challenges and Discretionary Powers:** The court possesses discretionary powers in computing damages, taking into account both the suffering endured by the victim and the financial circumstances of the parties involved. However, the **absence of clear precedents in calculating damages often necessitates borrowing legal principles from maintenance cases to address complexities in domestic violence scenarios.**

Conclusion

- The ongoing debate surrounding compensation criteria underscores the **nuanced balancing act required in addressing the needs of victims while ensuring fairness in legal proceedings**.
- As courts navigate the complexities of domestic violence cases, **they must consider not only the specific injuries suffered by victims but also the broader financial implications for all parties involved, thus ensuring justice is served comprehensively.**

7. SCIENCE & TECHNOLOGY AND HEALTH

7.1 BACTERIAL PATHOGENS PRIORITY LIST

Context

- The World Health Organization (WHO) has **updated its Bacterial Pathogens Priority List (BPPL) for the first time since 2017.**
- This list is crucial for guiding research and development (R&D) efforts, antimicrobial resistance (AMR) surveillance, and infection prevention strategies.

Details

Categories and Criteria

- The updated BPPL categorizes 24 pathogens and 15 "drug-bug" combinations into critical, high, and medium priority groups. These categories are based on eight criteria:
  1. Mortality
  2. Incidence
  3. Non-fatal health burden
  4. Trend of resistance
  5. Transmissibility
  6. Preventability in healthcare and community settings
  7. Treatability
  8. Number of antibiotics in the pipeline

Critical Priority Pathogens

Characteristics

- **High Threat:** Limited treatment options, high morbidity and mortality, and ability to share resistance mechanisms.
- **Focus:** Primarily gram-negative bacterial pathogens found in hospitals.

Key Pathogens

- **Gram-Negative Bacteria:**
  - Resistant to carbapenems and third-generation cephalosporins.
  - Examples: **Acinetobacter baumannii**, **Pseudomonas aeruginosa**, **Enterobacteriaceae** (including Klebsiella pneumoniae, Escherichia coli).
  - **Third-Generation Cephalosporin-Resistant Enterobacterales (3GCRE):** Notable for high rates of treatment failure, especially in neonatal sepsis.
- **Mycobacterium tuberculosis:**
  - Resistant to Rifampicin, a key antibiotic for tuberculosis treatment.
  - **Rifampicin-Resistant Tuberculosis (RR-TB):** Newly added due to diagnostic and treatment challenges.

High Priority Pathogens

Characteristics

- **Substantial Burden:** Difficult to treat, cause significant disease burden, particularly in low- and middle-income countries, and increasing resistance.
- **Community Pathogens:** More emphasis on pathogens causing community-acquired infections.
- **Healthcare Challenges:** Pose major issues in hospital and healthcare settings.

Key Pathogens

- **Methicillin-Resistant Staphylococcus aureus (MRSA)**
- **Vancomycin-Resistant Enterococcus faecium**
- **Fluoroquinolone-Resistant Shigella**: Moved from medium to high priority due to increasing resistance.
- **Fluoroquinolone-Resistant Salmonella Typhi**: Leading cause of typhoid fever with significant global health impact.
- **Fluoroquinolone-Resistant Non-Typhoidal Salmonella**: Leading cause of foodborne illness with growing resistance concerns.
- **Third-Generation Cephalosporin-Resistant and/or Fluoroquinolone-Resistant Neisseria gonorrheae**
- **Pseudomonas aeruginosa:** Also listed under critical for some strains.

Medium Priority Pathogens

Characteristics

- **Increasing Resistance:** Pose significant challenges in vulnerable populations and low- and middle-income countries (LMICs).

Key Pathogens

- Macrolide-Resistant Group A Streptococci
- Penicillin-Resistant Group B Streptococci
- Macrolide-Resistant Streptococcus pneumoniae
- Ampicillin-Resistant Haemophilus influenzae
- Neisseria gonorrhoeae

Notable Changes and New Additions

New Additions

- Macrolide-Resistant Group A Streptococci
- Penicillin-Resistant Group B Streptococci
- Macrolide-Resistant Streptococcus pneumoniae

Notable Removals

- Clarithromycin-Resistant Helicobacter pylori
- Fluoroquinolone-Resistant Campylobacter spp
- Penicillin-Non-Susceptible Streptococcus pneumoniae
- Third-Generation Cephalosporin-Resistant Providencia spp
- Vancomycin-Intermediate and -Resistant Staphylococcus aureus.

7.2 DIETARY GUIDELINES FOR INDIA 2024

Context

- The comprehensive guidelines issued by the National Institute of Nutrition (NIN) in India address the growing concerns related to noncommunicable diseases (NCDs) and malnutrition among vulnerable groups.

Details

Background

- About **56.4% of India's total disease burden is attributed to unhealthy diets**, emphasizing the need for dietary improvements.
- A **healthy diet and physical activity can prevent 80% of Type 2 diabetes** cases and significantly reduce the burden of heart disease and high blood pressure.

Dual nutrition challenge faced by India

Micronutrient Deficiencies:

- Incidence of micronutrient deficiencies, including zinc, iron, and vitamins, is prevalent among children aged 1 to 19, with rates ranging from 13% to 30%.
- Anaemia remains a significant concern, with prevalence rates of 40.6%, 23.5%, and 28.4% in children under age 5, ages 5-9, and 10-19, respectively.

Persistence of Undernutrition and Emergence of Overnutrition:

- While **severe forms of undernutrition like marasmus and kwashiorkor have decreased, anaemia persists, indicating ongoing nutritional challenges.**
- Despite the prevalence of undernutrition, there has been a **significant increase in obesity over the last 30 years,** highlighting the emergence of overnutrition-related issues.

Dietary Guidelines

General dietary principles:

Diverse Food Groups:

- Aim to obtain essential nutrients from at least eight food groups, including:
  - Vegetables
  - Leafy vegetables
  - Roots and tubers
  - Dairy products
  - Nuts
  - Oils

Restriction of Cereals:

- Limit the consumption of cereals, which are a staple in Indian meals, to contribute only 45% of the total energy intake. This is lower than the current range of 50-70%.
- Instead, increase the intake of proteins from sources such as:
  - Pulses
  - Meat

  - Poultry
  - Fish
- Proteins should make up 14% of the total daily energy intake, higher than the current range of 6-9%.

Essential Fatty Acids and B12:

- Vegetarians may face challenges in obtaining adequate levels of essential polyunsaturated fatty acids (PUFA) and vitamin B12.
- Recommendations include consuming sources rich in PUFA such as flax seeds, chia seeds, walnuts, vegetables, and greens.

Salt Restriction:

- Limit salt consumption to 5g per day to reduce the risk of hypertension and other related health issues.

Avoidance of Highly Processed Foods:

- Strongly discourage the consumption of highly processed foods that are high in fats, salt, and sugar. These foods contribute to various health problems, including obesity, cardiovascular diseases, and diabetes.

Specific dietary recommendations:

Pregnant Women:

- Consume small, frequent meals to alleviate nausea and vomiting.
- Increase consumption of fruits and vegetables, particularly those rich in iron and folate, to support maternal and fetal health.
- Iron and folate are essential for preventing anemia and supporting fetal development.

Infants and Children:

- Exclusively breastfeed infants for the first six months, without giving honey, glucose, or diluted milk.
- Avoid giving water, even during hot months, as breast milk provides adequate hydration.
- Introduce complementary foods after six months of age to meet growing nutritional needs.
- Breast milk provides essential nutrients and immune protection for infants, while complementary foods should be introduced gradually to ensure a balanced diet.

Elderly:

- Consume foods rich in proteins, calcium, micronutrients, and fiber to support overall health and well-being.
- Include a variety of foods such as pulses, cereals (with at least one-third as whole grains), low-fat milk or milk products, nuts and oilseeds, and ample servings of vegetables and fruits.
- Protein helps maintain muscle mass and strength, while calcium supports bone health.
- Micronutrients and fiber are essential for overall health and digestive function.
- Regular physical activity is crucial for maintaining bone density and muscle mass, promoting mobility and independence in older adults.

7.3 PRIVATE PLAYERS IN INDIAN SPACE SECTOR

Context

- New Space India Limited (NSIL) — the **commercial arm of the department of space — has called on private players to manufacture its largest launch vehicle LVM3.**
- This is the launch vehicle that propelled Chandrayaan-2 and Chandrayaan-3 to the Moon.
- A human-rated version of the same vehicle will be used for the Gaganyaan mission as well.

Details

- Initially designed for missions requiring spacecraft to escape Earth's orbit or be placed in large geosynchronous orbits, **LVM3 has demonstrated commercial viability by deploying multiple satellites in low Earth orbit (LEO).**
- In 2022 and 2023, it launched two batches of 36 satellites each commercially for internet provider OneWeb, showcasing its capability to deploy multiple satellites in different orbits during missions.

Background

1992: Establishment of Antrix Corporation Ltd.

- In 1992, the Department of Space (DoS) established Antrix Corporation Ltd., a wholly government-owned company under ISRO's administrative control.
- Antrix's primary mandate was to promote, market, and deliver commercial products of ISRO to international companies.
- It serves as the intermediary between ISRO and its private industry partners, facilitating technology transfer, assessing financial and commercial viability of joint ventures, and developing the industrial capabilities of the Indian space sector.

1999: Launch of Foreign Satellites

- On May 26, 1999, ISRO's Polar Satellite Launch Vehicle (PSLV) C-2 launched its first foreign satellites - German DLR-TUBSAT and Korean KITSAT-3, alongside ISRO's own satellite OCEANSAT.
- This marked the beginning of ISRO's commercial satellite launch services for foreign customers.

2016: Milestone Achieved

- In September 2016, ISRO achieved a major milestone when the PSLV C-37 successfully injected 104 satellites into orbit in a single launch, setting a record for the highest number of satellites launched in a single mission.
- This success further boosted ISRO's reputation in the commercial satellite launch market.

2019: Establishment of New Space India Limited (NSIL)

- In 2019, the Centre established New Space India Limited (NSIL), a public sector undertaking under the DoS.
- NSIL aims to boost indigenous production of various ISRO space products by the industry consortium, focusing on the domestic space industry.
- Similar to Antrix, NSIL serves as a commercial arm of ISRO, offering launch services, building satellites and subsystems, remote sensing services, technology transfer, and producing small and polar satellite launch vehicles in collaboration with Indian space/defence companies.

Involvement of private players in India's space sector

Established Aerospace Companies:

- **Hindustan Aeronautics Ltd (HAL):** Provides structural parts for various space components such as heat shield assembly, nose cone assembly, fuel propellant tanks, and cryogenic engines for launch vehicles.
- **Godrej Aerospace:** Manufactures liquid propulsion engines and complex fabricated assemblies for antennas, pods, satellite thrusters, actuators, valves, and pumps.
- **Ananth Technologies and Data Patterns:** Core manufacturers of ISRO's ground stations, nanosatellites, automated test equipment, and printed circuit boards (PCB) for various controllers and subsystems of satellites and launch vehicles.

New Space Start-ups:

- **Dhruva Space Private Limited (Established 2012):** One of the first space start-ups in India, involved in satellite manufacturing and related services.
- **Bellatrix Aerospace (Established 2015):** Engaged in the development of satellite propulsion systems and related technologies.
- **Aadyah Aerospace (Established 2016):** Focuses on designing and manufacturing satellites, launch vehicles, and propulsion systems.
- **Agnikul Cosmos (Established 2017):** Developing a small satellite launch vehicle tailored for the needs of small satellite operators.
- **Manastu Space (Established 2017):** Specializes in green technology for space, offering alternative fuel for boosters,

refueling stations in space, and deorbiting solutions for expired satellites.

- **Skyroot Aerospace (Established 2018):** Developing their own satellite launch vehicles and associated technologies.
- **Satellize (Established 2018):** Engaged in satellite communication and related services.
- **Pixxel (Established 2019):** Focused on building a constellation of Earth observation satellites for various applications.

Indian regulatory framework for private space companies

IN-SPACe (Indian National Space Promotion and Authorization Center):

- Created as a single-window, independent nodal agency announced on May 16, 2020, under the 'AatmaNirbhar Bharat Abhiyan' stimulus package.
- IN-SPACe authorizes, promotes, and supervises space activities of private non-governmental entities (NGEs) in India.
- **Functions:**
  - Authorizing and supervising NGEs' activities such as building launch vehicles, satellites, and sharing infrastructure under ISRO/DoS control.
  - Evaluating and issuing authorizations for space activities including launches and test firings.
  - Providing technical incubation for start-ups and promoting space tourism.
- **Partnerships:** Since its establishment, IN-SPACe has signed 45 Memoranda of Understanding (MoUs) with NGEs to support their space activities.

National Geospatial Policy:

- The National Geospatial Policy was unveiled on December 28, 2022, building on the guidelines issued in February 2021.
- **Objectives:**
  - Framework for the development of a geospatial ecosystem.
  - Democratization of geospatial data and strengthened integrated interface for all digital data with location.
  - Promoting private sector participation in the collection of geospatial data.
- **Key Features:**
  - Allows private companies to acquire geospatial data and maps from government agencies without licenses.
  - Simplifies permissions and clearances for the collection, use, and dissemination of geospatial data.
  - Promotes Survey of India to maintain high-resolution/high spatial accuracy orthoimagery.

Liberalization of Geo-Spatial Data:

- **As part of the 'AatmaNirbhar Bharat Abhiyan' in May 2020**, Finance Minister Nirmala Sitharaman announced the liberalization of geo-spatial data policies, opening up planetary exploration and outer space travel to private companies.
- **Geo-Spatial Data Policy:** Guidelines issued in February 2021 allowed private companies to access government geospatial data and maps without licenses for most categories.

Indian Space Policy (2023):

- **Permissible Activities for Non-Governmental Entities (NGEs):**
  - NGEs are permitted to offer communication, internet services, remote sensing, and navigation services through self-owned, procured, or leased satellites.
  - They can operate ground facilities for space operations such as telemetry, tracking, and command (TT&C).
  - Utilization of Indian or non-Indian orbital resources is allowed to establish communication satellites.
  - NGEs can manufacture and operate space transportation systems, including launch vehicles and shuttles, including reusable, recoverable, and reconfigurable versions of these transports.
  - Commercial recovery of an asteroid or space resource is also permitted under this policy.
- **Transition for ISRO:**

- The policy facilitates ISRO's transition from manufacturing operational space systems to focusing on research and development in advanced technologies.

Amended Foreign Direct Investment (FDI) Policy (2024):

- Up to 74% FDI is permitted for satellite manufacturing and operation.
- Up to 49% FDI is allowed for launch vehicles, spaceports, and associated systems.
- 100% FDI is allowed to manufacture components and systems/sub-systems for satellites, ground, and user segments.
- Investments beyond the mentioned limits in these segments can be made via the government route.

Must read articles:

LVM 3

7.4 FIRST HUMAN RECIPIENT OF PIG KIDNEY TRANSPLANT DIES

Context

- The first recipient of a modified pig kidney transplant passed away, around two months after the surgery was carried out.
- The family members and the Massachusetts General Hospital, where the procedure was performed, did not link the transplant operation to his death.

Details

- Xenotransplantation, or heterologous transplant, involves transplanting live cells, tissues, or organs from nonhuman animal sources into human recipients.
- Such cells, tissues or organs are called xenografts or xenotransplants.
- It aims to address the shortage of human organs available for transplantation, providing potential solutions for patients awaiting life-saving procedures.

History and Development

- Xenotransplantation, particularly involving hearts, was **first attempted in humans during the 1980s**.
- The **demand for organ transplants far exceeds the availability of donor organs**, leading to lengthy waiting lists and thousands of deaths annually.
- Besides organ transplantation, xenotransplantation **shows promise in treating neurodegenerative disorders, diabetes, and other medical conditions using animal cells and tissues.**

Challenges

- **Immunological Barriers:** The risk of rejection remains a significant challenge, as the human immune system may recognize and attack foreign animal tissues or organs.
- **Infection Risks:** Xenotransplantation raises concerns about potential transmission of infectious diseases or zoonotic infections from animals to humans.
- **Long-Term Outcomes:** Limited data on the long-term effects and success rates of xenotransplantation procedures underscore the need for further research and clinical trials.
- **Animal Welfare:** Ethical concerns surround the use of animals as organ donors and the potential impact on their welfare.

Xenotransplantation Process

Preparing the Organ:

- **Genetic Modification:** The selected animal organ undergoes genetic modifications to reduce the risk of rejection by the human immune system.
- **CRISPR-Cas9 Technology:** CRISPR-Cas9 is utilized to remove pig genes that produce antibodies and incorporate human genes to enhance compatibility.
- **Enhancing Compatibility:** Specific genetic edits aim to make the organ more compatible with human physiology and immune response.

Surgical Procedure:

- **Transplantation Surgery:** The modified pig organ is surgically implanted into the recipient's body, similar to a standard organ transplant procedure.
- **Immune-Suppressing Drugs:** Post-surgery, recipients receive immune-suppressing medications to prevent rejection and allow for successful integration of the transplanted organ.

Monitoring and Follow-Up:

- **Continuous Monitoring:** Close monitoring of the recipient's immune response and organ function is essential post-transplantation.
- **Response Evaluation:** Regular assessments are conducted to evaluate the body's response to the transplanted organ and ensure its continued viability.

Why Pigs for Xenotransplantation?

- **Anatomical and Physiological Similarity:** Pigs share anatomical and physiological similarities with humans, making them suitable candidates for xenotransplantation.
- **Cost-Effectiveness:** Pigs are widely farmed, and breeding them for organ transplantation is cost-effective compared to other animal species.
- **Variety of Breeds:** The availability of various pig breeds allows for matching organ sizes with recipient needs, increasing compatibility.

Addressing Immune Rejection:

- **Thymus Gland Embedding:** Embedding the pig's thymus gland beneath the organ's outer layer helps educate the recipient's immune system, reducing immune responses.
- **Immunosuppression Management:** Proper management of immune-suppressing medications is crucial to prevent rejection and ensure long-term organ function.

Types of Xenotransplants

- **Solid Organ Transplants:** Involves transplanting whole organs, such as hearts, kidneys, livers, or lungs, from animals to humans.
- **Cellular Xenotransplants:** Involves transplanting specific cells or tissues, such as pancreatic islet cells for diabetes treatment or neuronal cells for neurodegenerative diseases.
- **Genetically Engineered Xenotransplants:** Animals may be genetically modified to reduce the risk of rejection by the recipient's immune system or to enhance compatibility.

7.5 NEURAL PROCESSING UNIT

Context

- M4 chip's 16-core Neural Engine represents a significant advancement in Apple's hardware lineup, particularly in terms of AI-related tasks.

Details

What is NPU (Neural Processing Unit)?

- An NPU, or Neural Processing Unit, is a **specialized hardware component designed specifically for accelerating neural network processes.**
- Neural networks, **inspired by the human brain, are the backbone of many AI-related tasks**. NPUs excel at executing the complex computations involved in neural network operations.
- NPUs are **optimized for tasks such as speech recognition, natural language processing, image and video processing (e.g., object detection, image segmentation), recommendation systems**, and more.

Key Features of NPUs:

- **Parallel Processing**: NPUs leverage parallel processing to execute multiple neural network operations concurrently, accelerating computation.
- **Low Precision Arithmetic**: Many NPUs support low-precision arithmetic operations (e.g., 8-bit or even lower) to reduce computational complexity and energy consumption.

- **High Bandwidth Memory**: NPUs are often equipped with high-bandwidth memory to efficiently handle large neural network models and datasets.
- **Hardware Acceleration**: NPUs employ hardware acceleration techniques, such as systolic array architecture or tensor processing units, to expedite neural network computations.

NPU Applications:

- **Image Recognition**: NPUs excel in tasks like object detection, classification, and segmentation in images and videos.
- **Natural Language Processing (NLP)**: NPUs are used for tasks such as language translation, sentiment analysis, and text summarization.
- **Autonomous Vehicles**: NPUs play a crucial role in enabling real-time perception and decision-making capabilities in autonomous vehicles.
- **Medical Imaging**: NPUs accelerate medical image analysis tasks, aiding in diagnosis, prognosis, and treatment planning.
- **IoT and Edge Computing**: NPUs are deployed in edge devices and IoT applications to perform inference tasks locally, reducing latency and bandwidth requirements.

Distinctions between NPUs, CPUs, and GPUs

CPU (Central Processing Unit):

- **Sequential Computing**: CPUs execute instructions sequentially, processing one task at a time.
- **Versatility**: CPUs are designed for general-purpose computing tasks, suitable for a wide range of applications and workloads.
- **Complex Tasks**: While CPUs can handle complex computations, their sequential processing nature may not be optimal for highly parallelizable tasks like deep learning inference.

GPU (Graphics Processing Unit):

- **Parallel Computing**: GPUs excel at parallel computing, featuring thousands of cores optimized for simultaneous execution of tasks.
- **Graphics Rendering**: Initially developed for rendering graphics in video games and multimedia applications, GPUs are highly efficient at parallel processing but are not specifically designed for AI workloads.
- **AI Workloads**: While GPUs can handle AI workloads, they may not be as power-efficient or optimized for machine learning tasks compared to dedicated NPUs.

NPU (Neural Processing Unit):

- **Dedicated for AI**: NPUs are purpose-built for accelerating neural network computations, leveraging parallel processing specifically tailored for machine learning operations.
- **Efficiency**: NPUs are optimized for power efficiency and performance in AI workloads, offering faster processing and lower energy consumption compared to CPUs and GPUs.
- **Specialized Circuits**: NPUs incorporate specialized circuits and architectures designed to execute neural network operations efficiently, making them well-suited for tasks like image recognition, natural language processing, and more.

7.6 ARTIFICIAL GENERAL INTELLIGENCE

Context

- In a recent interview, Sam Altman, **CEO of OpenAI, expressed his commitment to invest billions of dollars towards the development of Artificial General Intelligence (AGI)**.
- But even as Altman continues to champion what is considered to be the pinnacle of AI development, **many in the global tech community are very apprehensive.**

Details

What is Artificial General Intelligence (AGI)?

- Artificial General Intelligence (AGI) refers to a **type of artificial intelligence that possesses the ability to perform any intellectual task that a human can do.**
- This includes a wide range of cognitive abilities such as reasoning, common sense, abstract thinking, background knowledge, transfer learning, and the ability to differentiate between cause and effect.

Harnessing the Potential

- AGI can **revolutionize diagnostics, treatment planning, and personalized medicine** by analyzing vast datasets.
- Integration of AGI in healthcare systems can lead to more accurate predictions, early detection of diseases, and tailored treatment plans.
- AGI-powered automation can **streamline processes and improve decision-making in finance and business sectors.**
- Real-time analytics and market predictions provided by AGI can enhance financial trading strategies and optimize business operations.
- AGI has the **potential to revolutionize education through adaptive learning systems tailored to individual student needs.**
- Democratization of personalized education worldwide can be achieved through AGI-driven educational platforms.

Why are People Worried about AGI?

- **Existential Threat:** Some people view AGI as an existential threat to humanity. They fear that once AGI reaches a certain level of intelligence, it could surpass human intelligence and potentially pose a risk to human existence.
- **Unpredictable Behavior:** AGI systems may exhibit unpredictable behavior, especially if they are not programmed with ethical guidelines or fail-safes. This unpredictability could lead to unintended consequences or even dangerous outcomes.
- **Job Displacement:** The widespread adoption of AGI could lead to significant job displacement across various industries. As AGI systems become capable of performing tasks traditionally done by humans, there is concern about the potential impact on employment and livelihoods.
- **Ethical Concerns:** AGI raises ethical concerns related to privacy, security, and autonomy. There are questions about how AGI systems will be used, who will control them, and how they will impact society as a whole.
- **Inequality:** There is a risk that AGI technology could exacerbate existing inequalities, with access to advanced AI systems primarily available to wealthy individuals or corporations. This could widen the gap between the haves and the have-nots.
- **Lack of Regulation:** There are currently no comprehensive regulations in place to govern the development and deployment of AGI. This lack of regulation raises concerns about accountability, transparency, and oversight.

Artificial General Intelligence (AGI) vs. Narrow AI

	Narrow AI:	AGI:
Historical Context:	• Has been in development since the mid-20th century, with applications in various domains such as natural language processing, computer vision, and robotics. • Continuously evolving with advancements in machine learning, deep	• Originated as a concept in the 20th century, notably introduced by Alan Turing in his paper on machine intelligence. • Represents the ultimate goal of AI research—to create machines with human-like intelligence capable of performing any intellectual task.

	learning, and other AI techniques. • Predominantly focused on solving specific problems rather than achieving general intelligence.	• Current efforts in AGI development involve interdisciplinary research spanning neuroscience, cognitive science, computer science, and engineering.
Capabilities and Adaptability:	• Specialized in performing specific tasks with high efficiency and accuracy. • Limited to the tasks it was designed for and cannot generalize its knowledge to new domains. • Requires significant human input and supervision to function effectively.	• Possesses a broad spectrum of cognitive abilities similar to humans. • Can learn from diverse sources, adapt to new situations, and apply knowledge across different domains. • Has the potential for autonomous decision-making and problem-solving in various real-world scenarios.
Implications:	• Offers practical solutions for specific problems in fields such as healthcare, finance, and manufacturing. • Raises concerns about job displacement, algorithmic bias, and ethical implications related to privacy and security.	• Holds the potential for transformative impacts on society, economy, and human life. • Raises profound ethical, societal, and existential questions regarding the control, safety, and implications of highly intelligent machines. • Requires careful consideration of risks, regulations, and ethical frameworks to ensure responsible development and deployment.

7.7 SHORT ARTICLES

Polar Craters on the Moon

Context

- A recent study conducted by Indian space scientists, in collaboration with various research institutions, has revealed compelling evidence regarding the enhanced possibility of water ice occurrence in the polar craters of the Moon.

Details

About Moon craters

Formation:

- **Impact Events:** Most Moon craters are formed by the impact of meteoroids, asteroids, and comets colliding with the lunar surface.
- **Size Variability**: Craters on the Moon range in size from microscopic pits to vast basins hundreds of kilometers in diameter.
- **High Velocity Impact**: When an object strikes the Moon's surface at high velocity, it excavates material, creating a depression known as a crater.

Types:

- **Simple Craters:** These are relatively small, bowl-shaped depressions with a central peak or a flat floor. They are typically less than 20 kilometers in diameter.
- **Complex Craters:** Larger impact events create complex craters with features such as terraced walls, central peaks, and sometimes, multiple rings. These can range from 20 to hundreds of kilometers in diameter.
- **Impact Basins:** The largest lunar craters are impact basins, such as the South Pole-Aitken Basin and the Imbrium Basin. These are enormous features often hundreds to thousands of kilometers across, with multiple rings and extensive ejecta blankets.

Notable Moon Craters:

- **Tycho:** One of the youngest and most prominent lunar craters, with a diameter of

approximately 85 kilometers. It has a distinctive ray system visible from Earth.

- **Copernicus:** Another prominent crater, about 93 kilometers in diameter, with a central peak complex and terraced walls.
- **Aristarchus:** Known for its high albedo and volcanic activity, Aristarchus is a relatively young crater with a diameter of around 40 kilometers.

Polar Craters:

- Polar craters are located near the lunar poles, specifically within regions that experience permanent shadow.
- These regions are of particular interest due to the presence of permanently shadowed areas (PSAs), where temperatures remain extremely low, and volatile compounds, such as water ice, may be preserved.
- **Notable Polar Craters:**
  - **Shackleton Crater:** Located near the lunar south pole, Shackleton Crater is one of the largest and deepest PSAs on the Moon. It has been a focal point of scientific interest due to its potential for harboring water ice.
  - **Cabeus Crater:** Cabeus Crater gained attention during NASA's LCROSS mission, which intentionally impacted a spacecraft into the crater's floor to analyze the composition of materials ejected from the impact.

Must read articles: Moon

Quarks

Context

- One recent finding reported that three-quark clumps are more likely to form than two-quark clumps when a particular type of quark is more densely surrounded by some other particles.
- Another study reported observing clumps composed entirely of the heavier quarks.
- Understanding these heavy-quark clusters is crucial for completing our understanding of all quarks and their impact on phenomena like nuclear fusion and stellar evolution.

Details

Neutron Stars

- **Formation:** When massive stars undergo supernova explosions, their cores collapse under gravity's immense pressure. This collapse fuses protons and electrons into neutrons, forming incredibly dense objects known as neutron stars.
- **Composition:** Neutron stars are composed primarily of neutrons, packed into a sphere with immense density. The pressure within neutron stars is so extreme that it could potentially force neutrons into a new state of matter.

Quark Stars

- The concept of quark stars arises from the possibility that there could be stars too massive to form neutron stars but not massive enough to form black holes.
- These hypothetical stars, if they exist, would be composed of quark matter instead of neutrons.
- Studies have suggested that the interiors of massive neutron stars may have a high probability of being composed of quark matter, potentially ranging from 80-90%.
- However, due to limited observational data, more research is needed to confirm the existence and properties of quark stars.

What are Quarks?

- Quarks are elementary particles and one of the basic building blocks of matter. They are believed to be point-like entities with no internal structure.
- **Electric Charge:** Quarks carry fractional electric charges. They are the only known particles to exhibit this property.
- **Spin:** Quarks have a half-integer spin, specifically 1221 in natural units (h-bar).
- **Color Charge:** Quarks carry a property called color charge, which is related to the strong nuclear force.

Types of Quarks:

- Quarks come in six known types, or flavors:

1. **Up Quark (u):** Symbolized as "u", it has a charge of +23e+32*e* (where "e" is the elementary charge) and is the lightest quark.

2. **Down Quark (d):** Symbolized as "d", it has a charge of −13e−31*e* and is also relatively light.
3. **Charm Quark (c):** Symbolized as "c", it has a charge of +23e+32*e* and is heavier than up and down quarks.
4. **Strange Quark (s):** Symbolized as "s", it has a charge of −13e−31*e* and is heavier than up and down quarks.
5. **Top Quark (t):** Symbolized as "t", it has a charge of +23e+32*e* and is the heaviest known quark.
6. **Bottom Quark (b):** Symbolized as "b", it has a charge of −13e−31*e* and is heavier than up and down quarks.

Must read articles: Elementary Particles

Oxytocin

Context

- A recent submission in the Delhi High Court flagged the "rampant use of Oxytocin" in such colonies.

Details

- Oxytocin, a hormone **known as the "love hormone," is banned in India since April 2018 due to its misuse in increasing milk yield in dairy cattle.**
- The Delhi High Court has called for action against the spurious use of oxytocin in dairy colonies, citing it as animal cruelty.
- The Court directed the Department of Drugs Control to conduct weekly inspections and register cases under relevant laws.
- Offences related to oxytocin usage will be investigated by jurisdictional police stations, and the Intelligence Department of Delhi Police will identify sources of spurious oxytocin production.

Legal Framework Regarding Oxytocin Use

- Administering oxytocin is **deemed animal cruelty and a cognizable offense under Section 12 of the Prevention of Cruelty to Animals Act, 1960.**
- The Delhi High Court directed the Department of Drugs Control, GNCTD, to conduct weekly inspections.
- Cases of spurious oxytocin usage or possession must be registered under **Section 12 of the Prevention of Cruelty to Animals Act, 1960, and Section 18(a) of the Drugs and Cosmetics Act, 1940.**
- The Centre decided that **Karnataka Antibiotics and Pharmaceuticals Limited (KAPL) would be the sole public sector undertaking permitted to produce oxytocin for the entire country**.

About Oxytocin

- Oxytocin is a **neuropeptide hormone** produced in the hypothalamus and released by the pituitary gland.
- Often referred to as the "love hormone" or "**bonding hormone**" due to its role in social bonding, trust, and intimacy.

Biological Functions of Oxytocin:

- **Labor and Childbirth:** Oxytocin stimulates uterine contractions during labor and facilitates childbirth.
- **Breastfeeding:** It promotes milk ejection (letdown reflex) during breastfeeding by contracting the cells around the milk-producing glands.
- **Social Bonding:** Oxytocin plays a crucial role in forming social bonds, trust, empathy, and maternal behavior.
- **Sexual Activity:** It is involved in sexual arousal and orgasm in both men and women.
- **Stress Reduction:** Oxytocin has anti-stress effects by reducing cortisol levels and promoting relaxation.
- **Regulation of Cardiovascular System:** It helps regulate blood pressure and heart rate.

3-D Printing of PS4 Engine

Context

- On May 9, 2024, ISRO successfully tested a liquid rocket engine, PS4, for the fourth stage of the Polar Satellite Launch Vehicle (PSLV), manufactured using additive manufacturing technology, commonly known as 3D printing.
- This advancement showcases ISRO's commitment to innovation and efficiency in space technology.

Details

- 3D printing is an **additive manufacturing process that constructs three-dimensional objects layer by layer using computer-created designs.**
- Designers **create a 3D model of the object using Computer-Aided Design (CAD) software, which is then sent to a 3D printer.** The printer builds the object layer by layer, stacking materials such as plastic, composites, or bio-materials to form the final product.
- Unlike subtractive manufacturing, where material is removed from a solid block to create an object (e.g., sculpting), 3D printing adds material layer by layer to form the desired shape.

Advantages of 3D Printing

- **Complexity:** 3D printing enables the creation of intricate and complex shapes that would be challenging or impossible to achieve with traditional manufacturing methods.
- **Efficiency:** By eliminating the need for multiple parts and weld joints, 3D printing reduces material waste and production time.
- **Customization:** It allows for customized designs and adaptations, catering to specific requirements with minimal adjustments.
- **Cost-Effectiveness:** Despite initial setup costs, 3D printing can be cost-effective for small to medium-scale production runs, especially when considering savings in material and labor.

Application in ISRO's PS4 Engine

- **Redesign:** ISRO redesigned the PS4 engine for production using 3D printing technology.
- **Simplification:** By leveraging 3D printing, ISRO reduced the number of parts in the engine from 14 to a single piece, eliminating 19 weld joints.
- **Material Savings:** The use of 3D printing saved 97% of raw material compared to traditional manufacturing methods.
- **Time Efficiency:** Overall production time was reduced by 60%, showcasing the efficiency gains achieved through additive manufacturing.

CRISPR-CAS9 and Inherited Blindness

Context

- Scientists have said they used a human gene editing tool, CRISPR-Cas9, to restore vision in people with a rare form of inherited or congenital blindness.

Details

- Leber congenital amaurosis (LCA), a **rare form of inherited blindness affecting about one in 40,000 people**, results in severe vision loss at an early age.
- LCA is **caused by a mutation in the CEP290 gene**, which affects the function of the protein CEP290 critical for sight.
- The trial was named **"BRILLIANCE."** Participants received a single dose of a CRISPR gene therapy called **EDIT-101.**
    - **EDIT-101:** This therapy targets the mutation in the CEP290 gene, removing the faulty DNA sequence and inserting a healthy strand, restoring normal function of the CEP290 protein.
    - **Improved Vision:** 11 out of 14 participants experienced improved vision after receiving the treatment.

Inherited Blindness

- Inherited blindness refers to **vision loss or blindness that is caused by genetic mutations passed down from parents to their offspring.**
- Inherited blindness can manifest in various forms, including congenital blindness (present at birth) or progressive vision loss over time.
- Inherited blindness **can be inherited through different genetic patterns**, including autosomal recessive, autosomal dominant, X-linked recessive, and mitochondrial inheritance.
- Numerous genes have been implicated in inherited blindness, affecting various aspects of ocular development, function, and maintenance.

CRISPR-Cas9

- CRISPR-Cas9 is a revolutionary **genome editing technology that allows precise modification of DNA sequences within cells.**

- **CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) and Cas (CRISPR-associated) proteins** were initially discovered as a bacterial immune system against viruses.
- CRISPR-Cas9 has widespread applications in genetic research, biotechnology, agriculture, and medicine.

West Nile Fever in Kerala

Context

- The Kerala government has reported West Nile fever cases in several districts.
- The health department ordered all districts to be vigilant and issued directives to take mosquito control measures by stepping up pre-monsoon cleaning drives and surveillance activities.

Details

- West Nile fever (WNF) is a **viral infection caused by the West Nile virus** (WNV), primarily **transmitted to humans through the bite of infected mosquitoes.**
- WNF occurs primarily in regions where the virus is endemic, with periodic outbreaks reported in various parts of the world, including Africa, Europe, the Middle East, North America, and Asia.
- **Mosquito species of the genus Culex are the primary vectors** responsible for transmitting WNV to humans and other vertebrate hosts.

Etiology

- WNV **belongs to the family Flaviviridae, genus Flavivirus,** and is classified into various lineages or strains based on genetic differences.
- The virus primarily circulates between birds and mosquitoes, with humans and other mammals serving as incidental hosts.
- WNV can cause a spectrum of clinical manifestations, ranging from asymptomatic infection to severe neurological disease.

Transmission

- **Mosquito-Borne Transmission:** WNV is primarily transmitted to humans through the bite of infected mosquitoes, primarily Culex species, which acquire the virus by feeding on infected birds.
- **Blood Transfusion and Organ Transplantation:** Transmission can also occur through blood transfusion, organ transplantation, and perinatal transmission from mother to fetus.
- **Rare Modes of Transmission:** Rare cases of WNV transmission have been reported through breastfeeding, and laboratory exposure.

Clinical Presentation

- The **majority of WNV infections (~80%) are asymptomatic**, with individuals showing no clinical signs or symptoms.
- **Mild Disease (West Nile Fever):** Symptomatic infection may present as a self-limited febrile illness, with symptoms such as fever, headache, body aches, fatigue, rash, and occasionally gastrointestinal symptoms.
- **Severe Disease (Neuroinvasive Disease):** In a small proportion of cases (<1%), WNV infection can progress to severe neurological disease, including meningitis, encephalitis, acute flaccid paralysis, and rarely, death.

Diagnosis

- Laboratory diagnosis of WNV infection involves **detecting viral nucleic acid (RNA) or specific antibodies (IgM and IgG) in serum, cerebrospinal fluid (CSF), or other clinical specimens** using molecular and serological assays.
- **Cross-reactivity with other flaviviruses, such as dengue virus and Zika virus, can complicate serological diagnosis** and require confirmatory testing.

Treatment

- There is **no specific antiviral treatment for WNV infection**, and management primarily involves **supportive care to alleviate symptoms and complications.**
- Hospitalization may be necessary for patients with severe neurological disease or complications such as dehydration, respiratory failure, or secondary bacterial infections.

- **Vector control measures,** including larval habitat reduction, insecticide spraying, and mosquito repellents, play a crucial role in preventing WNV transmission.

Kawasaki Disease

Context

- Two baby girls diagnosed with kawasaki disease, a condition causing inflammation of blood vessels, were successfully treated at Coimbatore Medical College and Hospital (CMCH) very recently.

Details

- Kawasaki disease, **also known as mucocutaneous lymph node syndrome**, is an autoimmune condition characterized by inflammation of blood vessels.
- It involves **inflammation of the blood vessels throughout the body**, commonly affecting the coronary arteries, which supply blood to the heart muscle.
- It **predominantly affects children**, with the majority of cases occurring in those under the age of 5. It is more common in boys than girls and is most prevalent in East Asian populations.
- The **exact cause of Kawasaki disease remains unknown**, but it is believed to involve a combination of genetic predisposition and environmental triggers, such as infections.

Symptoms

- Persistent high fever, typically lasting for at least five days, is a hallmark symptom of Kawasaki disease.
- **Mucocutaneous Symptoms:** These include redness and swelling of the hands and feet (often referred to as "strawberry tongue"), rash, redness of the eyes (conjunctivitis), and swollen lymph nodes.
- Kawasaki disease can lead to **inflammation of the coronary arteries**, which may result in coronary artery aneurysms and increase the risk of heart complications such as myocarditis and arrhythmias.
- Children with Kawasaki disease may also experience irritability, joint pain, abdominal pain, diarrhea, and vomiting.

Treatment and Management

- **Intravenous Immunoglobulin (IVIG):** The primary treatment for Kawasaki disease is **high-dose IVIG,** which helps reduce inflammation and decrease the risk of coronary artery complications.
- **Aspirin Therapy:** High-dose aspirin is often administered along with IVIG to reduce fever and inflammation. After the acute phase, aspirin is typically continued in lower doses to prevent blood clot formation.
- **Monitoring:** Regular follow-up visits and cardiac evaluations, including echocardiograms, are essential to monitor for coronary artery abnormalities and other complications.
- Since the exact cause of Kawasaki disease is unknown, there are no specific preventive measures. However, early recognition and treatment can help reduce the risk of complications.

Materiovigilance Programme

Context

- The DCGI has issued a circular urging all medical device licence holders and manufacturers to report adverse events on the MvPI platform, highlighting the importance of post-market surveillance (PMS) in ensuring device safety and performance.

Details

- **Dependence on Imports:** India relies on imports for approximately 80% of its medical devices.
- **Regulations:** Medical devices in India are regulated under the Drugs and Cosmetics Act, 1940, and Medical Devices Rules, 2017.

Materiovigilance Programme of India (MvPI)

- The Materiovigilance Programme of India (MvPI) was **launched on July 6, 2015, to monitor the safety of medical devices across the country**.
- This initiative aims to systematically collect data on adverse events related to medical devices and perform scientific analysis to inform regulatory decisions, ultimately improving the safe use of medical devices.

Objectives:

The primary objectives of the MvPI are:

- **Monitoring and Recording:** To monitor, record, and analyze the root causes of adverse events or risks associated with the use of medical devices, including in-vitro diagnostics, by healthcare professionals or patients/users.
- **Regulatory Recommendations:** To provide regulatory bodies with data-driven recommendations for appropriate actions to enhance patient safety.
- **Patient Safety Improvement:** To ensure the safety and performance of medical devices, thereby improving patient safety.

Organizational Structure:

The MvPI operates under the following structure:

- **National Coordination Centre (NCC):** The Indian Pharmacopoeia Commission (IPC) has been functioning as the NCC since 2018.
- **Central Regulatory Body:** The Central Drugs Standards Control Organization (CDSCO) regulates the program.
- **Adverse Events Monitoring Centres (AMCs):** Various healthcare institutions across India act as AMCs to collect and report adverse event data.
- **Technical Support Unit (TSU):** Based at the National Health Systems Resource Centre (NHSRC), providing technical and operational support.

Prefire Mission

Context

- NASA's upcoming mission, **PREFIRE (Polar Radiant Energy in the Far-InfraRed Experiment)**, aims to fill critical gaps in understanding **how the Earth's polar regions, the Arctic and Antarctic, radiate heat into space and influence global climate.**
- The mission **will use twin CubeSats,** small shoebox-sized satellites, to study these phenomena, with the first satellite set to launch on May 22, 2024, from New Zealand.

Details

- **Second Satellite Launch:** Two weeks after the first.
- **Launch Vehicle:** Electron launch vehicle.
- **Instruments:** Equipped with thermal infrared spectrometers, each weighing less than 6 pounds (3 kilograms).
- **Orbits:** Asynchronous near-polar orbits, overlapping every few hours near the poles for maximum coverage.
- The CubeSat platform costs less than a full-size satellite while providing critical climate data.

Heat Distribution

- **Energy Absorption:** Earth absorbs energy from the Sun at the tropics, which is then moved toward the poles by air and water currents.
- **Far-Infrared Wavelengths:** About 60% of the heat energy that flows out to space in far-infrared wavelengths has never been systematically measured.

Objectives

- **Climate Model Accuracy:**
  - **Heat Loss Measurement:** Reveal the full spectrum of heat loss from Earth's polar regions.
  - **Improve Predictions:** Data will improve climate models and predictions of climate change and sea level rise.
- **Scientific Achievements:**
  - **New Information:** Provide new data on how the atmosphere and ice influence heat radiation from the polar regions.
  - **Arctic Warming:** Help understand why the Arctic has warmed more than 2.5 times faster than the global average since the 1970s.
  - **Heat Emission Efficiency:** Better knowledge of how efficiently far-infrared heat is emitted by snow, sea ice, and the influence of clouds.
  - **Future Predictions:** Enhance predictions of heat exchange changes and their effects on ice sheet melting, atmospheric temperatures, and global weather.

Genetic Drift

Context

- Recent research conducted by scientists from Purdue University and other institutions has revealed that **genetic drift, rather than natural selection, is the primary force behind the speciation of the endangered White Sands pupfish** in New Mexico.
- This discovery challenges the traditional view that natural selection is the predominant driver of speciation, particularly in such unique ecological settings.

Details

Key Findings

- Genetic drift, the **random fluctuation of allele frequencies**, was identified as the main evolutionary force driving the speciation.
- This process was significantly influenced by population bottlenecks and geographic isolation, particularly over the last 5,000 years.
- Contrary to expectations, **no genes linked to environmental adaptations (e.g., salt tolerance) were identified, supporting the conclusion that genetic drift, not selection, was responsible for the divergence**.
- The Carrizozo lava flow, occurring about 5,000 years ago, acted as a physical barrier, contributing to the separation and isolation of pupfish populations.
- Both the Malpais Spring and Salt Creek populations experienced significant reductions in size approximately 2,500 years ago.
- These bottlenecks enhanced the effects of genetic drift due to the smaller population sizes.

Implications for Conservation

- The discovery necessitates a **revision of the pupfish classification, potentially designating two species rather than one.**
- The researchers propose naming the new species "the enchanted pupfish," reflecting New Mexico's moniker, "the Land of Enchantment."
- Enhanced conservation efforts are recommended for both populations to protect their distinct genetic identities and ensure their survival.
- This case highlights the potential for genetic drift to play a significant role in speciation, particularly in isolated and small populations.

About Genetic Drift

- Genetic drift is a fundamental mechanism of evolution, contributing to the changes in allele frequencies within a population.
- Unlike natural selection, which favors traits that increase fitness, genetic drift occurs due to random sampling effects, especially in small populations.
- This randomness can lead to significant genetic changes over generations.

Mechanisms of Genetic Drift

- **Random Sampling of Alleles**:
  - Allele frequencies change due to the random sampling of gametes.
  - Over time, this can lead to the fixation or loss of alleles.
- **Fixation**:
  - An allele reaches a frequency of 1 (100%) in the population.
  - This means the allele is present in all individuals.
- **Loss**:
  - An allele reaches a frequency of 0 in the population.
  - This means the allele is completely lost from the gene pool.

Consequences of Genetic Drift

- Drift tends to reduce genetic variation within a population. This can make the population more susceptible to diseases and environmental changes.
- Populations that are geographically isolated can become genetically different over time. This can eventually lead to speciation.
- Genetic drift supports the neutral theory of molecular evolution, which states that most evolutionary changes are the result of random drift of neutral mutations.

Calcium Carbide

Context

- The Food Safety and Standards Authority of India (FSSAI) has **issued a directive emphasizing strict compliance with the prohibition on the use of calcium carbide for artificial ripening of fruits**.
- This advisory is particularly pertinent during the mango season.
- FSSAI has also instructed the Food Safety Departments of States and Union Territories to be vigilant and take stringent actions against violators.

Details

Key Points

- **Health Risks of Calcium Carbide:**
  - **Harmful Substances:** Calcium carbide releases acetylene gas containing harmful traces of arsenic and phosphorus.
  - **Health Issues:** Exposure can cause dizziness, frequent thirst, irritation, weakness, difficulty in swallowing, vomiting, and skin ulcers.
  - **Hazardous Handling:** Acetylene gas is dangerous for those handling it, with the risk of direct contact leaving toxic residues on fruits.
- **Regulatory Framework:**
  - **Prohibition:** Regulation 2.3.5 of the Food Safety and Standards (Prohibition and Restrictions on Sales) Regulations, 2011, bans the sale of fruits ripened with acetylene gas.
  - **Legal Compliance:** Traders and food business operators are required to ensure their practices comply with these regulations to avoid legal repercussions.
- **Approved Alternatives:**
  - **Ethylene Gas:** FSSAI endorses ethylene gas as a safer alternative for ripening fruits, permissible up to 100 ppm concentration.
  - **Natural Ripening Process:** Ethylene is a naturally occurring hormone that regulates and initiates the ripening process, ensuring safety and uniformity.
  - **Ethephon 39% SL:** Approved by the Central Insecticides Board and Registration Committee for the uniform ripening of mangoes and other fruits.

Plunging Region around Black Holes

Context

- A recent study led by Oxford University researchers provided the first observational proof of plunging regions around black holes, affirming Einstein's theory of gravity.
- Published in the *Monthly Notices of the Royal Astronomical Society*, the study used X-ray data from NASA's NuSTAR and NICER telescopes to analyze smaller black holes close to Earth.
- It confirmed the existence of plunging regions, where the strongest gravitational forces in the galaxy are exerted.

Details

- Plunging regions around black holes represent a **key area where matter and radiation exhibit extreme behaviors due to the black hole's intense gravitational pull.**
- These regions exist just outside the event horizon, marking the transition where material spirals inward and eventually crosses into the black hole, becoming irretrievable.

Key Concepts

- **Event Horizon:**
  - **Definition:** The boundary around a black hole beyond which no information or matter can escape.
  - **Characteristics:** Defines the Schwarzschild radius for non-rotating black holes and the Kerr radius for rotating ones.
- **Innermost Stable Circular Orbit (ISCO):**
  - **Definition:** The closest orbit around a black hole where a particle can maintain a stable circular path.
  - **Significance:** Inside the ISCO, orbits become unstable, causing material to spiral inward rapidly toward the event horizon.
- **Accretion Disk:**

- **Definition:** A disk of gas and dust that forms around a black hole as material falls inward.
- **Inner Edge:** Typically located near the ISCO.
- **Emission:** Heats up due to gravitational energy release, emitting radiation, especially in the X-ray spectrum.

- **Plunging Region:**
  - **Location:** The area between the ISCO and the event horizon.
  - **Dynamics:** Material loses stable orbits and spirals rapidly into the black hole, influenced by extreme gravitational forces and relativistic effects.

Venus Water Mystery

Context

- Venus, the second planet from the Sun, presents a significant anomaly with its extreme dryness compared to Earth.
- While scientists have accounted for much of Venus's water loss over billions of years, some of it remains unaccounted for.
- A recent discovery involving a chemical reaction might bridge this gap and offer insights into the planet's past water content and its implications for planetary habitability.

Details

Historical Water Content

- More than four billion years ago, Venus had enough water to form an ocean 3 kilometers deep.
- Today, this volume has diminished to just 3 centimeters, signifying a drastic reduction in water content over time.

Reasons for Water Loss

- **Atmospheric Conditions**
  - **Greenhouse Effect:** Venus's carbon dioxide-rich atmosphere creates a severe greenhouse effect, raising surface temperatures to 450°C (842°F), above water's boiling point.
  - **Vaporization:** Water can only exist as vapor in Venus's atmosphere under these conditions.
- **Solar Proximity**
  - **UV Radiation:** The Sun's ultraviolet radiation breaks water molecules into hydrogen and oxygen atoms in Venus's ionosphere.

Mechanisms of Water Loss

Two primary processes contribute to the water loss:

- **Thermal Process (Hydrodynamic Escape):** In the planet's early history, the Sun heated Venus's outer atmosphere, causing it to expand and allowing hydrogen to escape into space. This process likely ceased around 2.5 billion years ago as the atmosphere cooled.
- **Non-Thermal Process (Hydrogen Escape):** Dr. Eryn Cangi and her colleagues focused on current water loss via hydrogen escape. This non-thermal process, previously underestimated, involves a chemical reaction that significantly accelerates water decline.

Key Findings

- **Formyl Cation (HCO+):** This molecule, identified in Mars's atmosphere as facilitating hydrogen escape, is now believed to play a similar role on Venus.
- **HCO+ Dissociative Recombination Reaction (DR):** This reaction, occurring at about 125 km altitude, involves HCO+ breaking down into carbon monoxide and a hydrogen atom. The energetic hydrogen atoms then escape into space.
- **Doubling of Water Loss Rate:** Modeling this reaction suggests it could double the rate of hydrogen escape, implying Venus lost water faster and could have maintained oceans longer than previously thought.
- **Remaining Water:** Despite these processes, some water persists on Venus, possibly replenished by comet impacts.

X Chromosome

Context

- Scientists have found a molecular link between altered X-chromosome inactivation and autoimmune diseases

Details

Recent Research and Clinical Implications

Altered X-Chromosome Inactivation and Autoimmune Diseases

- **X-Inactivation Process**: Involves epigenetic changes that silence most genes on one X chromosome to prevent overexpression of X-linked genes in females.
- **Research Findings**: Studies have linked altered X-chromosome inactivation (XCI) to autoimmune diseases. For example, a study showed that perturbing the expression of Xist in female mice reactivated previously inactive genes on the X chromosome, leading to lupus-like symptoms.

Alzheimer's Disease and the X Chromosome

- **Gene USP11**: Research suggested that the gene ubiquitin specific peptidase 11 (USP11) on the X chromosome, which escapes X-inactivation, contributes to the accumulation of tau protein in the brain, potentially explaining the higher prevalence of Alzheimer's in women.

About the X Chromosome

- The X chromosome is one of the two sex chromosomes (the other being the Y chromosome) in humans and many other organisms.
- It plays a crucial role in determining sex, as well as in numerous genetic functions and diseases.

Disorders Associated with the X Chromosome

- **X-Linked Recessive Disorders**
  - Hemophilia: A disorder affecting blood clotting due to mutations in the F8 or F9 genes.
  - Duchenne Muscular Dystrophy: A severe muscle-wasting disease caused by mutations in the DMD gene.
- **X-Linked Dominant Disorders**
  - Rett Syndrome: A neurological disorder caused by mutations in the MECP2 gene, primarily affecting females.
- **X-Chromosome Aneuploidies**
  - Turner Syndrome (45,X): A condition in which a female has only one X chromosome, leading to short stature, infertility, and other health issues.
  - Klinefelter Syndrome (47,XXY): A condition in males with an extra X chromosome, leading to infertility, reduced testosterone levels, and other physical traits.

Zero Debris Charter

Context

- Twelve nations have signed the Zero Debris Charter at the ESA/EU Space Council, solidifying their commitment to the long-term sustainability of human activities in Earth orbit.
- In addition to the 12 countries, the European Space Agency also signed the Zero Debris Charter as an International Organisation (IGO).

Details

- The Zero Debris Charter is a significant initiative aimed at mitigating space debris to ensure the long-term sustainability of space activities.
- It was **formally introduced at the ESA Space Summit in Seville in November 2023.**

Key Objectives

- **Debris Neutrality by 2030:** The Charter commits signatories to achieve a state of zero debris, meaning no new space debris will be created, and efforts will be made to remove existing debris.
- **International Collaboration:** The initiative promotes global cooperation among space-faring nations and organizations to collectively address the issue of space debris.

Signatories

- **Countries:** Austria, Belgium, Cyprus, Estonia, Germany, Lithuania, Poland, Portugal, Romania, Slovakia, Sweden, and the United Kingdom.
- **Organizations:** Over 100 organizations, including national space agencies, satellite manufacturers, space startups, and astronomical societies, have pledged to support the Charter.

Importance of the Charter

- **Leadership in Space Sustainability:** Positions Europe as a leader in space sustainability efforts.
- **Mitigation and Remediation:** Encourages the development and implementation of technologies to prevent the creation of new debris and to remove existing debris.
- **Risk Reduction:** Aims to reduce the hazards posed by space debris to operational satellites and astronauts.

Challenges Addressed

- **Exponential Growth of Debris:** ESA estimates over one million pieces of debris larger than one cm are in Earth orbit, each capable of causing significant damage.
- **Potential Hazards:** Without intervention, the increasing debris population could make some orbits unusable.

ESA's Role

- **Space Safety Programme:** ESA's internal initiative focuses on revising space debris mitigation requirements.
- **Facilitation and Coordination:** ESA's 'Protection of Space Assets' Accelerator played a crucial role in developing the Charter.

Must Read Articles: ***Space Debris***

Astronomical Transients

Context

- Shrinivas Kulkarni, a prominent Indian-American astronomer, was recently honored with the 2024 Shaw Prize for Astronomy for his pioneering work on the physics of these transients.

Details

- Astronomical transients are objects or events in the sky that change in brightness, position, or both, over relatively short timescales, ranging from milliseconds to years.

Astronomical Transients

- Astronomical transients are classified based on their duration, luminosity, and underlying physical mechanisms.
- They provide valuable information about extreme astrophysical processes and are often associated with high-energy phenomena such as supernovae, gamma-ray bursts, and neutron star mergers.
- **Supernovae:** Supernovae are explosive events marking the end of a star's life cycle, resulting in a significant increase in brightness.
- **Gamma-Ray Bursts (GRBs):** GRBs are intense bursts of gamma radiation originating from distant galaxies.
- **Fast Radio Bursts (FRBs):** FRBs are brief, intense bursts of radio waves, lasting milliseconds.
- **Tidal Disruption Events (TDEs):** TDEs occur when a star gets too close to a supermassive black hole and is torn apart by tidal forces.
- **Novae:** Novae are eruptions on the surface of a white dwarf in a binary system, caused by accretion of hydrogen from a companion star.

Magellan Mission

Context

- Recent studies have uncovered **new evidence of volcanic activity on Venus**, suggesting the planet was volcanically active between 1990 and 1992.
- These findings are based on data from NASA's Magellan mission, which orbited Venus from 1990 to 1994.
- Researchers in Italy have identified new lava flows, confirming ongoing volcanic activity on the planet.

Details

Key Discoveries

- Analysis of Magellan data reveals new **lava flows on the western flank of Sif Mons and the western part of Niobe Planitia.**
- Earlier studies had observed changes in the shape and size of a volcanic vent, reinforcing the evidence of active volcanism.
- The findings suggest that **Venus has a level of volcanic activity comparable to Earth.**
- Understanding Venus's volcanic activity **helps scientists learn more about the planet's interior and its geological evolution.**

Future Missions

- In 2031, NASA plans to launch the **VERITAS mission (Venus Emissivity, Radio Science, InSAR, Topography, and Spectroscopy),**

aimed at providing more detailed observations of Venus's surface and interior.

- This mission will help scientists understand why Venus evolved differently from Earth despite their similar sizes and compositions.

About Magellan Mission

- The Magellan mission, managed by NASA's Jet Propulsion Laboratory (JPL), was an ambitious and successful endeavor**to map the surface of Venus**.
- **Launched on May 4, 1989, and ending its mission on October 12, 1994**, Magellan significantly advanced our **understanding of Venusian geology and topography through radar imaging**.
- **Venus Arrival**: August 10, 1990.

Objectives

- **Primary Objective**: To map the surface of Venus using synthetic aperture radar (SAR) to penetrate the dense cloud cover and obtain high-resolution images.
- **Secondary Objectives**:
  - Measure the planet's gravitational field.
  - Gather data on surface properties and radar reflectivity.
  - Study atmospheric and surface interactions.

Must read article: Venus

ADDITIONAL TOPICS TO BE READ FROM IASGYAN WEBSITE (DAILY NEWS ANALYSIS)	
Expanded Program on Immunization	2nd May 2024
P VS NP Problem	3rd May 2024
Domestic Manufacturing of Electrolysers	4th May 2024
Dengue Surge in Latin America	4th May 2024
Endosymbiotic Theory	6th May 2024
Goldene	7th May 2024
Carboxysomes	13th May 2024
Pandemic Response Rules	27th May 2024
Copper	29th May 2024
Tobacco Epidemic in India	31st May 2024

7.8 SNIPPETS

Gliese 12 B

APTI PLUS

- Astronomers have identified a potentially habitable exoplanet, Gliese 12 b, situated approximately 40 light-years from Earth.
- Initial Identification: NASA's Transiting Exoplanet Survey Satellite (TESS) identified Gliese 12 b as a potential planet candidate.
- Validation: The European Space Agency's Characterising ExoPlanet Satellite (CHEOPS) confirmed its status as an exoplanet.

Preeclampsia

- World Preeclampsia Day, observed annually on May 22nd, aims to raise crucial awareness about preeclampsia, a potentially life-threatening pregnancy complication.
- Preeclampsia is a pregnancy-related disorder characterized by high blood pressure and often a significant amount of protein in the urine.
- It usually occurs after the 20th week of pregnancy and can also develop postpartum.
- Preeclampsia can have severe complications for both the mother and the baby if not managed properly.

Ferroptosis

- Research shows that ferroptosis, a form of cell death, occurs in severe COVID-19 patient lungs.
- Ferroptosis is a distinct form of regulated cell death characterized by iron-dependent lipid peroxidation, leading to oxidative damage and cell death.
- Unlike apoptosis, necrosis, or autophagy, ferroptosis involves unique biochemical pathways and morphological changes.
- It has significant implications in various diseases, including cancer, neurodegeneration, and ischemia-reperfusion injury.

Thyroid Day

- World Thyroid Day is observed on May 25th every year.
- The theme for World Thyroid Day 2024 is Non-Communicable Diseases (NCDs).
- 2007: The Thyroid Federation International (TFI) established May 25th as World Thyroid Day. This date was selected to coincide with the anniversary of the European Thyroid Association.
- The thyroid gland is a vital endocrine organ located in the neck.
- It plays a crucial role in regulating metabolism, growth, and development through the secretion of thyroid hormones.

Nancy Grace Roman Telescope

- NASA's upcoming Nancy Grace Roman Space Telescope is set to embark on a groundbreaking mission: hunting for primordial black holes, which date back billions of years to the Big Bang.
- The mission is scheduled to launch in late 2026, with the aim of challenging our understanding of the universe's early epochs.

Synchrotron

- On May 14, 2024, China inaugurated the High Energy Photon Source (HEPS), the first fourth-generation synchrotron light source in Asia.
- This state-of-the-art facility, located in Huairou, approximately 50 kilometers from Beijing, is set to revolutionize scientific research with the world's brightest synchrotron X-rays.
- A synchrotron is a type of particle accelerator that produces intense beams of X-rays and other forms of electromagnetic radiation.
- These beams are used for a variety of applications in scientific research, medical treatments, and industrial processes.

Dyson Sphere

- A collaborative effort by international researchers from Sweden, India, the US, and the UK to search for technosignatures of Dyson spheres.
- A Dyson Sphere is a hypothetical megastructure proposed by physicist Freeman Dyson in 1960.
- It's essentially a massive, spherical structure constructed around a star to harness its energy output.
- The primary purpose of a Dyson Sphere is to capture and utilize the energy emitted by a star. This energy can be used for various purposes, including powering advanced civilizations, interstellar travel, or even terraforming planets.

Sub-orbital Trips

- Gopi Thotakura, an India-born aviator and commercial pilot based in the United States, recently became the first space tourist from India.
- He was among six space tourists on a sub-orbital flight conducted by Blue Origin, a private space company.
- Sub-orbital trips involve spacecraft that cross the Karman line, which is generally considered the boundary between Earth's atmosphere and outer space at about 100 km altitude, but do not enter orbit around Earth.

eVTOL

- eVTOL (Electric Vertical Takeoff and Landing) aircraft have the potential to revolutionize urban transportation, emergency services, and short-haul travel.
- However, like any emerging technology, its impact can be both positive and negative, depending on how it is implemented and utilized.
- eVTOL (Electric Vertical Takeoff and Landing) aircraft represent a transformative development in aviation technology, offering the potential for quiet, efficient, and sustainable air transportation.
- These aircraft are designed to take off, hover, and land vertically using electric power, which makes them well-suited for urban air mobility and short-haul flights.

China Launches CHANG'E-6

- China launched its second mission to the far side of the Moon. If successful, it will be the world's first mission to bring back samples from the part of the Moon that the Earth never gets to see.
- The mission, known as Chang'e-6, lifted off from the Wenchang Space Launch Center.
- The Chang'e-6 mission is planned to last for 53 days, encompassing various phases of lunar exploration and sample collection.
- Upon reaching the Moon's orbit, the mission's orbiter will begin circling the natural satellite, conducting observations and mapping of the lunar surface.
- The lander component of the mission will descend to the lunar surface, targeting the vast South Pole-Aitken basin, which is approximately 2,500 kilometers wide.

Boeing Crewed Space Test

- Atlas V rocket launch was called off.
- It was set to lift off with a team of two veteran astronauts — Barry Wilmore and Sunita Williams — sitting inside a spacecraft called Starliner, built by Boeing, on the capsule's third test flight and the first with astronauts on board.
- If the mission succeeds, the U.S. will for the first time in its history have two spacecraft to launch astronauts to space.

Eta Aquariids

- The Eta Aquariids peaked on May 5 and 6.
- Countries in the Southern Hemisphere, such as Indonesia and Australia, offer the best views due to their favorable position.
- The Eta Aquariid meteor shower is an annual celestial event known for its dazzling display of shooting stars.
- Eta Aquariid meteors move at speeds of around 66 km per second and are composed of burning space debris.
- The shower appears to originate from the Aquarius constellation, hence the name "Eta Aquariids."
- In the Northern Hemisphere, the radiant is lower, leading to Earthgrazer meteors, while in the Southern Hemisphere, they are higher in the sky.

Antares

- Indian Institute of Astrophysics releases video of moon occulting Antares.
- Antares, also known as Alpha Scorpii, is the alpha, or brightest, star in the constellation Scorpius, and the 15th-brightest star in the whole night sky.
- Antares, often referred to as "the heart of the scorpion," holds a significant place in both astronomy and mythology.
- Scorpius, also known as Scorpio in astrology, holds a prominent place as the eighth sign of the zodiac.
- Red supergiant stars are massive, evolved stars in the late stages of their life cycle.
- They are characterized by their large size and reddish hue, owing to their low surface temperatures.
- The Indian Institute of Astrophysics (IIA), headquartered in Bengaluru, stands as an autonomous research institution funded by the Department of Science and Technology, Government of India.

Fusobacterium Nucleatum

- Fusobacterium nucleatum, typically residing in the human mouth, has emerged as a significant player in colorectal cancer (CRC) pathogenesis.
- Researchers at the Fred Hutchinson Cancer Center identified a distinct subtype of Fusobacterium nucleatum significantly associated with CRC tumours.
- They revealed Fusobacterium nucleatumanimalis (Fna) as the predominant subtype linked to CRC, suggesting genetic factors influencing its association with cancerous tissues.
- Fusobacterium nucleatum is a gram-negative anaerobic bacterium found in the oral cavity, gastrointestinal tract, and other mucosal surfaces of humans.
- Initially identified as a common oral commensal, its role as a pathogen has gained significant attention due to its association with various oral and systemic diseases.

Thrombosis with Thrombocytopenia Syndrome (TTS)

- AstraZeneca, the producer of the AZD1222 vaccine, known as Covishield in India, has acknowledged a potential link between its vaccine and TTS.
- Covishield, manufactured by the Serum Institute of India (SII), has been widely used in India, with over 175 crore doses administered.
- While denying a generic link between the vaccine and TTS, AstraZeneca admitted the possibility of TTS occurring in "very rare cases."
- TTS is a rare but serious condition characterized by abnormal blood clotting (thrombosis) and low platelet counts (thrombocytopenia).

Marijuana Reclassification

- Currently, marijuana is classified as a Schedule I drug in the United States, alongside substances like heroin and cocaine.
- However, there's a proposal to reclassify marijuana to Schedule III.
- Moving marijuana to Schedule III would result in it being subject to less stringent regulations compared to Schedule I drugs. This shift acknowledges the potential medical benefits of marijuana.

Chloropicrin

- The U.S. State Department accused Russia of having used a chemical weapon against Ukrainian forces in violation of the Chemical Weapons Convention, while also announcing fresh sanctions against Moscow.
- It was first utilized as a poison gas during World War I by both Allied and Central Powers.
- Chemical Name: Trichloronitromethane
- Chemical Formula: CCl3NO2
- Other Names:Nitrochloroform, Nitromethane trichloride
- Appearance:Colorless to pale yellow liquid with a pungent odor resembling tear gas.

Spektr-RG

- Astronomers report the discovery of a new pulsar using the Spektr-RG space observatory.
- The newfound object, designated SRGA J144459.2−604207 (or SRGA J1444 for short), turns out to be a bursting accreting millisecond X-ray pulsar.
- The concept for the Spektr-RG X-ray observatory was proposed in the 1980s by Rashid Sunyaev of the Space Research Institute of the USSR Academy of Sciences.
- The project was resurrected in 2003 with a scaled-down design, leading to the development of the Spektr-RG mission.
- Launch Date: July 13, 2019.
- Mission Objective: To conduct a seven-year X-ray survey using two primary instruments: eROSITA and ART-XC.

National Technology Day

- National Technology Day, observed annually on May 11, commemorates India's successful nuclear tests conducted on May 11, 1998, in Pokhran, Rajasthan.
- The tests included the launch of the Shakti-I nuclear missile at the Pokhran test range in Rajasthan, marking a significant milestone in India's defense capabilities.
- In addition to the nuclear tests, India also achieved milestones in aerospace technology, with the successful testing of the indigenous aircraft 'Hansa-3' in Bengaluru.
- The Defence Research and Development Organisation (DRDO) also test-fired the Trishul missile on the same day, showcasing advancements in missile technology.
- Since 1999, the Technology Development Board (TDB) has been recognizing technological innovations contributing to national growth.

55 Cancri E

- Astronomers have located a rocky exoplanet with an atmosphere, marking a significant discovery in the search for habitable worlds beyond our solar system.
- This rocky planet, known as 55 Cancri e or Janssen, orbits a star in the constellation Cancer, approximately 41 light-years away from Earth.
- Classified as a "super-Earth," 55 Cancri e is larger than Earth but smaller than Neptune.
- 55 Cancri e is likely tidally locked, meaning one side of the planet always faces its host star.
- With scorching surface temperatures and inhospitable conditions, 55 Cancri e is one of the hottest rocky exoplanets known.

Caenorhabditis Elegans

- Researchers from Princeton University discovered that C. elegans worms, after consuming a disease-causing strain of bacteria, passed on the knowledge of avoiding the same bacteria to their progeny for up to four generations.
- Published in PLoS Genetics, the study revealed that the worms learned to avoid feeding on the disease-causing bacteria through a small RNA molecule produced by the bacteria, which altered the worms' feeding behavior.

International Thalassemia Day

- Theme: "Empowering Lives, Embracing Progress: Equitable and Accessible Thalassaemia Treatment for All."
- World Thalassemia Day was first celebrated on May 8, 1994, by the Thalassaemia International Federation (TIF).
- TIF, a non-profit organization founded in 1986, initiated this day in memory of TIF President PanosEnglezos' son, George, who battled thalassemia.

FLiRT

- The emergence of new COVID-19 variants like KP.2 and KP1.1, collectively referred to as the FLiRT variants, has reignited concerns about the ongoing pandemic.
- Origins: KP.2 and KP1.1 are descendants of the Omicron JN.1 variant, which gained global attention during the winter last year.
- Spread: These variants have been detected in various countries, including the U.S., U.K., South Korea, New Zealand, and India.

Maillard Reaction

- The browning of food, such as meat, cakes, bread, and vegetables, occurs primarily due to a chemical process called the Maillard reaction.
- Named after French scientist Louis-Camille Maillard, the Maillard reaction occurs when amino acids (building blocks of proteins) and sugars are heated together.
- It's a non-enzymatic browning process, meaning it happens without the involvement of enzymes.

Naegleria Fowleri

- Naegleria fowleri, commonly known as the "brain-eating amoeba," is a free-living amoeba that causes primary amebic meningoencephalitis (PAM), a rare and often fatal brain infection.
- This organism thrives in warm freshwater environments and has recently been responsible for the death of a young girl in Kerala.

R21/matrix-m Malaria Vaccine

- The Serum Institute of India (SII) has begun exporting the R21/Matrix-M malaria vaccine to Africa.
- This vaccine was developed in collaboration with the University of Oxford and Novavax's Matrix-M adjuvant.
- Malaria is a life-threatening disease caused by parasites that are transmitted to people through the bites of infected female Anopheles mosquitoes.
- Despite significant progress in reducing malaria incidence and mortality, it remains a major public health challenge, particularly in tropical and subtropical regions.

Snca Proteins

- Parkinson's disease, a debilitating neurodegenerative disorder, is currently managed through symptomatic treatments that either boost dopamine levels or involve neuron grafting.
- However, a potential solution focusing on the SNCA (synuclein alpha) protein could offer a more sustainable treatment method.
- SNCA is prevalent in neurons, particularly dopaminergic neurons, which are critical for dopamine neurotransmission.
- Misfolded SNCA forms Lewy bodies, contributing to the loss of neuronal function and eventual cell death.
- Its aggregates are also found in other neurodegenerative diseases, though most notably in Parkinson's.

SOrTed Mission

- Agnikul Cosmos, a Chennai-based space start-up, has achieved a significant milestone by successfully launching the SOrTeD mission.
- This mission utilized the Agnibaan rocket, powered by the world's first single-piece 3D-printed semi-cryogenic rocket engine, Agnilet.
- The SOrTeD (Agnibaan SubOrbital Technological Demonstrator) mission is a single-stage launch vehicle demonstration.

8. CULTURE & HISTORY

8.1 SHORT ARTICLES

Wood Age

Context:

- Recent research suggests that the traditional **concept of the Stone Age, primarily characterized by stone tools, should be reconsidered to include the significant use of wood, leading to the proposition of the 'Wood Age'.**
- A study of wooden artifacts from **Schöningen, Germany**, indicates these were not merely simple tools but **technologically advanced instruments requiring substantial skill and precision.**

Periodising Human Prehistory:

- In the 19th century, Danish archaeologist Christian Jürgensen Thomsen introduced a systematic classification of prehistory into the **Stone Age, Bronze Age, and Iron Age based on technological progress.**
- The Stone Age **began around 3.4 million years ago and is divided into three periods: Palaeolithic, Mesolithic, and Neolithic.**

What Schöningen reveals according to the new study

- Schöningen stands out for its number and variety of wooden tools.
- A study co-authored by several researchers identified **a minimum of 20 hunting weapons and 35 tools made on split woods, likely used in domestic activities.**
- The **damp, oxygen-less soil** prevented the decomposition of wood and other organic matter.
- This resulted in the **most well-preserved assemblage of prehistoric wooden artifacts in the world.**

Significance of Wood in Prehistoric Times:

- It highlights the **crucial role of wood as a material in prehistoric technology.**
- It further showcases the **advanced woodworking skills of pre-modern humans, providing a more comprehensive understanding of their technological capabilities.**

Nile's Role in Ancient Egypt

Context:

- Recent research reveals the **Nile River's** pivotal role in ancient Egyptian civilization, particularly in the construction of the iconic pyramids.

The Mighty Nile:

Course

- The Nile River delta was **ideal for growing papyrus, which ancient Egyptians used to make cloth, boxes, and rope.**
- Originating from the **Great Lakes region of Africa**, it flowed through Sudan and South Sudan, **merging with the Blue Nile from Ethiopia before reaching Egypt** and eventually emptying into the Mediterranean Sea.
- The annual floods of the Nile brought water and silt downstream, sustaining agriculture and settlement in the desert.

Agriculture

- The Nile served as a crucial **lifeline**, providing water and fertile soil for agriculture.
- To get the most out of the Nile's waters, ancient Egyptian farmers developed a system called **basin irrigation.**
- **Beans, cotton, wheat, and flax** were abundant crops that were easily stored and traded.

Insights into Pyramid Building

- **Constructed over about 1,000 years**, the pyramids were **strategically located close to the Nile River**, which facilitated access to water and transportation during their construction.
- Recent discoveries led by Professor Eman Ghoneim have uncovered evidence of **a previously unknown branch of the Nile, named "Ahramat," near the pyramid sites**.

- This newly identified branch likely **played a crucial role in aiding transportation and providing water, further supporting the construction of these monumental structures.**

Changes in the Environment:

- Natural factors like earthquakes and land shifts likely led to the **disappearance of the Ahramat branch, affecting settlement and construction activities near the river.**

UNESCO's Memory of the World Asia-Pacific Regional Register

Context:

- The Ramcharitmanas, Panchatantra, and Sahṛdayāloka-Locana have been included in UNESCO's Memory of the World Asia-Pacific Regional Register.

Significance of the Literary Works:

Ramcharitmanas

- Authored by Goswami Tulsidas.
- Revered epic in **Indian literature**.
- Significant influence on the **cultural** and **moral fabric** of the nation.
- Source of **inspiration** for centuries.

Panchatantra

- Penned by Pt. Vishnu Sharma.
- Collection of ancient Indian **fables**.
- Imparts **moral lessons** and **practical wisdom**.
- Lasting impact on readers **worldwide**.

Sahṛdayāloka-Locana

- Written by Acharya Anandvardhan.
- Influential work in **Indian literary criticism** and **artistic expression**.
- Inclusion highlights its enduring significance in the **literary world**.

UNESCO's Memory of the World Register:

- Established in **1997**.
- Aims to promote the exchange of information among experts and raise resources for the preservation, digitization, and dissemination of **documentary materials**.
- 429 main documentary heritages have been inscribed in the Register, with 116 from **Asia** and the **Pacific**.
- The Memory of the World Committee for Asia and the Pacific (**MOWCAP**) oversees the regional list.

Booker Prize

Context:

- The Booker Prize, a hallmark in the literary realm, faces scrutiny due to its historical ties to slavery through its original sponsor, Booker Group.

The Booker Prize:

- **Establishment and Evolution: Founded in 1969, initially for Commonwealth writers**, it later expanded globally. It celebrates the best single work of sustained fiction in English, published in the UK or Ireland.
- **Founders and Sponsorship: Co-founded by Tom Maschler and Graham C Greene**, it was sponsored by Booker Group Ltd until 2001, later taken over by British investment firm Man Group.
- **Selection Process:** Each year, panels of authors, publishers, journalists, and notable figures select winners.
- **International Booker Prize:** Recognizes translated works of fiction published in the UK or Ireland.
- **Eligibility:** Short story collections are eligible, with £50,000 prize money shared between the author and translator.
- **Trophy Design:** The original trophy, **designed by Jan Pieńkowski, was reinstated for the 2023 prize.**

Patachitra

Context:

- The first generation women patachitra artists of Bengal sell their work online & are recognized worldwide, encouraging future generations to stay in the profession.

Patachitra:

- **Etymology:** The term "Patachitra" **originates from the Sanskrit words "patta" meaning "cloth" and "chitra" meaning "picture"**, reflecting the art form's basis in cloth-based scroll paintings.

- **Odisha Pattachitra:** Pattachitra is a **traditional painting style primarily inspired by Hindu mythology and the Vaishnava sect.** It features rich colors, intricate motifs, and depictions of mythological themes.
- **Origin:** Pattachitra, with roots dating back over a thousand years, evolved from mural traditions around religious centers like Puri, Konark, and Bhubaneswar in Odisha.
- **Features:** Pattachitra is known for its **intricate detailing, meticulous brushwork, and solid black outlines defining vibrant colors**. Themes are primarily religious, **featuring Hindu gods like Lord Jagannatha, Sri Krishna, and Ganesha.**
- **Themes and Style:** Pattachitra **predominantly depicts Hindu deities, with bold lines, sharp angles, and decorative borders** blending folk and classical elements. Common themes include **scenes from the Ramayana, Mahabharata, and depictions of Lord Jagannath.**
- **Technique:** Traditionally **executed on cotton cloth with a mixture of chalk and gum**, Pattachitra artists **use natural colors from vegetables and minerals without preliminary sketches. A lacquer coating enhances durability and glossiness.**
- **GI Tag**: Patachitra's geographical indication differs by state due to distinct styles and motifs: Odisha's version is registered as Orissa Pattachitra, while West Bengal's is Bengal Patachitra.
- **The difference between Odisha and Bengal Pattachitra:** Odisha's Pattachitra often **depicts religious subjects, while Bengal's focuses on social narratives, folklore, and culture**. Unlike Odisha, **Bengal Pattachitra is more exaggerated and stylized, emphasizing emotion, narration, and drama, often accompanied by songs narrating the story.**
- **Conclusion:** Patachitra remains a cherished art form preserving cultural heritage with vibrant colors, intricate designs, and timeless narratives, serving as a testament to Indian folk art's enduring legacy.

8.2 SNIPPETS

Vivekananda Memorial

APTI PLUS

- Prime Minister Narendra Modi visited the Vivekananda Rock Memorial in Kanyakumari.
- Situated on one of two rocks off the coast of Vavathurai, Kanyakumari, this monument was erected in 1970 to honor Swami Vivekananda, who is believed to have attained enlightenment there.
- At the southernmost tip of the Indian peninsula where the Arabian Sea, the Indian Ocean and the Bay of Bengal meet lies the Vivekananda Memorial.
- Geologists refer to it as 'the Gondwana Junction' due to its historical significance where India, Madagascar, Sri Lanka, East Antarctica, and Australia were once connected.
- Over millions of years, India's movement northwards resulted in the formation of the Himalayas and the Tibetan Plateau when it collided with Eurasia.
- The island itself is composed of Charnockite rock, named after Job Charnock, the founder of Calcutta, whose tombstone was made from this rock. It is basically a Metamorphic Rock.

Virupaksha Temple: A Sacred Monument in Hampi

APTI PLUS

- A portion of the Virupaksha Temple in Karnataka collapsed due to torrential rains.
- Located in Hampi, Vijayanagara district, Karnataka.
- Part of the Group of Monuments at Hampi, a UNESCO World Heritage Site.
- Dedicated to Sri Virupaksha.
- Built by LakkanDandesha under Krishna Deva Raya II of the Vijayanagara Empire.
- Dates back to the 7th century CE, predating Vijayanagara's establishment.
- Features delicately carved pillars, intricate designs, a sanctum, ante chambers, pillared halls, and open pillared halls. Notable structures include a 50-meter nine-tiered eastern gateway and the Kanakagiri gopura.
- Utilizes mathematical concepts with repeating patterns reminiscent of fractals.
- Krishna Devaraya, contributed ornate structures such as the central pillared hall and the eastern gopuram.

Great Pyramid of Giza

APTI PLUS

- A recent discovery near the iconic Great Pyramid of Giza has sparked excitement
- The Great Pyramid of Giza, the largest Egyptian pyramid, serves as the final resting place of Pharaoh Khufu, who reigned during the Fourth Dynasty of the Old Kingdom.
- Built around 2600 BC, this architectural marvel has stood the test of time, retaining its position as the oldest of the Seven Wonders of the Ancient World.
- Initially standing at 146.6 meters (481 feet), the Great Pyramid held the title of the world's tallest human-made structure for over 3,800 years.
- Over time, erosion and removal of the smooth white limestone casing reduced its height to the current 138.5 meters (454.4 ft), revealing the underlying core structure.
- Constructed using an estimated 2.3 million large blocks, weighing a total of 6 million tonnes, the pyramid's stones are primarily sourced from local limestone on the Giza Plateau.
- Additional materials, such as white limestone from Tura for casing and granite blocks from Aswan, were transported via the Nile.

Nakba Day

APTI PLUS

- On May 15, every year, Palestinians mark the Nakba Day.
- Nakba Day is the day of commemoration for the Nakba, also known as the Palestinian Catastrophe, which comprised the destruction of Palestinian society and homeland in 1948, and the permanent displacement of a majority of the Palestinian people.
- Since 1949, a year after Israel's establishment, May 15 witnessed demonstrations, strikes, and flag raisings in West Bank cities (under Jordanian rule). By the late 1950s, May 15 became Palestine Day, symbolizing international solidarity with Palestine across Arab and Muslim nations.

9. GEOGRAPHY AND DISASTER MANAGEMENT

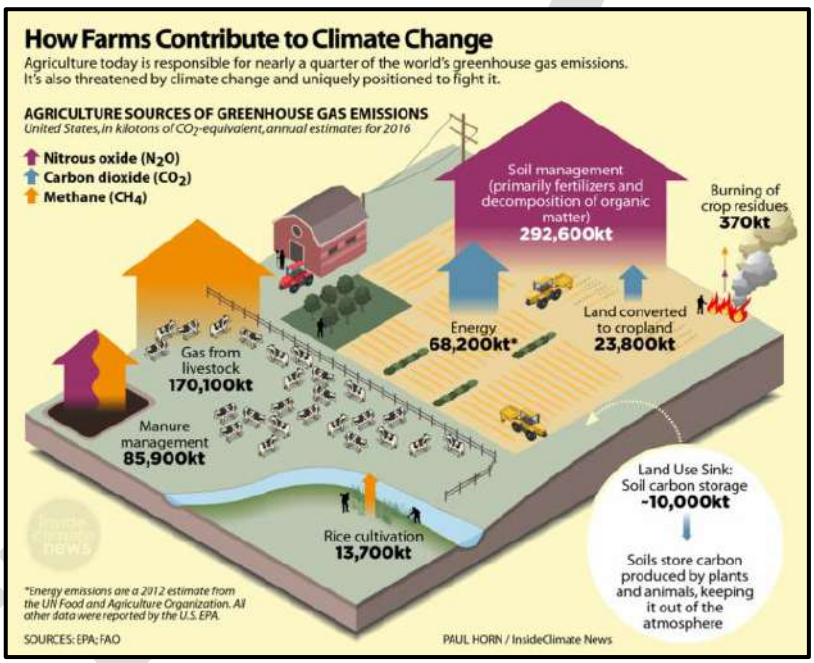
9.1 CARBON FARMING

Context

- Carbon farming tackles climate change by utilizing techniques to increase carbon storage in soil and vegetation.

About Carbon farming

- Carbon farming is an innovative approach to agriculture **aimed at mitigating climate change through practices that enhance carbon sequestration in soils and vegetation while reducing greenhouse gas emissions.**
- This method focuses on regenerative agricultural techniques that improve soil health, promote biodiversity, and support sustainable land management.



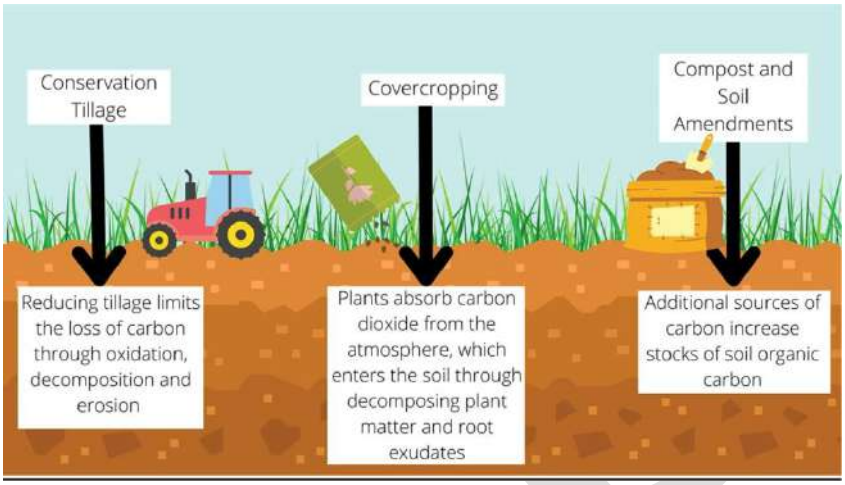
Techniques in Carbon Farming

- **Rotational Grazing:** Involves moving livestock to fresh pastures regularly, allowing grazed areas to recover, which reduces erosion and promotes healthy regrowth, enhancing carbon sequestration through vegetation.
- **Agroforestry:** Integrates trees and shrubs into crop fields, which act as carbon sinks, regulate soil temperature and moisture, and provide habitats for beneficial insects and pollinators.
- **Conservation Agriculture:** Uses no-till farming and other methods to reduce soil disturbance, improve soil structure, encourage beneficial bacteria growth, and increase organic matter content, crucial for carbon storage.
- **Integrated Nutrient Management:** Focuses on using organic fertilisers and compost instead of synthetic ones, promoting slow nutrient release, reducing nutrient leaching, and enhancing soil organic matter content.
- **Agro-ecological Practices:** Includes crop diversification and intercropping to mimic natural ecosystems, reduce pest outbreaks, improve soil health, and increase carbon sequestration.
- **Improved Livestock Management:** Enhances feed quality to reduce methane emissions from enteric fermentation and manages animal waste to prevent methane emissions from manure decomposition.

Significance of Carbon Farming

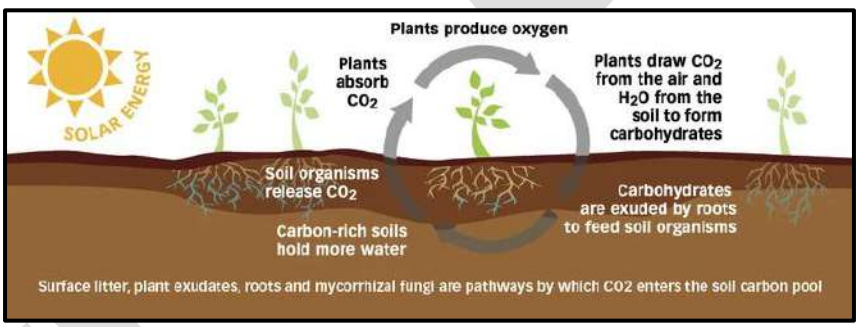
- **Mitigating Climate Change:** By storing carbon in the soil and reducing greenhouse gas emissions, carbon farming significantly contributes to combating climate change.
- **Improving Soil Health:** Healthy soils enhance water retention, reduce erosion, and increase nutrient availability, leading to improved crop yields and overall agricultural productivity.

- **Enhancing Biodiversity:** Promote biodiversity by creating complex ecosystems within agricultural landscapes, attracting beneficial insects and pollinators, and reducing pesticide reliance.
- **Creating Economic Opportunities:** Carbon farming can generate new income streams for farmers through carbon credit markets and potentially higher yields from healthier soil.



Challenges in Implementing Carbon Farming in Developing Countries like India

- **Location Dependence:** Effectiveness varies with geographical location, soil type, climate, and water availability.
- **Water Scarcity:** Practices like cover cropping can increase water demand, posing a challenge in water-scarce regions.



- **Financial Constraints:** Initial costs for new methods can be a barrier for small-scale farmers with limited resources.
- **Policy and Awareness:** Lack of supportive government policies and limited farmer education can hinder widespread adoption.

Opportunities for Carbon Farming in India

- **Climate Resilience:** Adaptation strategies in regions like the Indo-Gangetic plains and the Deccan Plateau can benefit climate-resilient agricultural practices.
- **Economic Benefits:** Agro-ecological practices could generate significant economic value for farmers through sustainable agriculture.
- **Policy and Awareness:** Increased policy support, technological advancements, and farmer education are crucial for scaling up carbon farming in India.

Global Initiatives in Carbon Farming

- **Voluntary carbon markets in countries like the U.S., Australia, New Zealand, and Canada** offer farmers additional income for verified carbon sequestration activities.
- **Initiatives like the '4 per 1000' initiative, Kenya's Agricultural Carbon Project**, and the Carbon Farming Initiative in Australia promote carbon farming globally.

Way Forward

- **Develop location-specific carbon farming techniques** optimized for different agro-climatic conditions.
- **Provide financial support** to help farmers overcome initial costs.
- Incentivize carbon farming practices and reward farmers for carbon sequestration.
- **Educate farmers** about the benefits and methods of carbon farming for widespread adoption.

- Increased consumer awareness of the environmental impact of food production could drive demand for products grown using carbon farming methods.
- Utilize precision agriculture and soil monitoring technologies to enhance carbon farming practices.
- **Foster cooperation among farmers, researchers, policymakers, and consumers** to develop and implement successful carbon farming initiatives.

Conclusion

- Carbon farming offers immense potential as a climate change mitigation strategy, providing multiple co-benefits such as improved soil health, biodiversity conservation, and economic opportunities for farmers. Comprehensive support from governments, international organizations, and research institutions is essential to overcome challenges and promote the widespread adoption of sustainable agricultural practices.

9.2 CONSTRUCTED WETLANDS

Context

- Constructed wetlands serve as nature-inspired solutions for wastewater treatment, harnessing natural processes to effectively remove contaminants and foster environmental sustainability.

Constructed wetlands

- Constructed wetlands are engineered systems designed to replicate natural wetland processes for treating wastewater.

Types of Constructed Wetlands

- **Subsurface Flow (SSF):** Wastewater flows horizontally through a bed of gravel or sand planted with wetland vegetation. Microbes living within the media break down pollutants as the water travels through them.
- **Surface Flow (SF):** Water flows across shallow ponds or channels with emergent plants. Contaminants are removed through physical, chemical, and biological processes as water interacts with plants and microbes.

Components and Processes

Vegetation

- **Provide habitat for beneficial bacteria:** The root systems of wetland plants provide surfaces for beneficial bacteria to colonize and grow. These bacteria are crucial for breaking down organic matter present in the wastewater.
- **Absorb nutrients:** Wetland plants act as natural filters by absorbing excess nutrients, such as nitrogen and phosphorus, from the wastewater. This helps to prevent algal blooms and nutrient pollution in the treated water.
- **Oxygenate the water:** Through root respiration, wetland plants release oxygen into the water column. This oxygen is vital for the survival and activity of aerobic microorganisms, which play a major role in biodegradation processes.
- **Stabilize the substrate:** The root network of wetland plants helps to stabilize the soil or media within the wetland system, preventing erosion and maintaining the integrity of the treatment bed.

Microorganisms

- **Biodegrade pollutants:** Microorganisms break down complex organic pollutants present in the wastewater into simpler, harmless compounds. This biodegradation process significantly reduces the organic load in the treated water.
- **Ammonia conversion:** Microorganisms convert harmful ammonia, a common component of wastewater, into nitrate, a less harmful form of nitrogen. This helps to protect aquatic life from the toxic effects of ammonia.

- **Phosphorus stabilization:** Microorganisms can transform and stabilize phosphorus compounds in the wastewater, preventing them from causing algal blooms.
- **Organic matter decomposition:** Microorganisms contribute to the overall decomposition of organic matter in the wetland system, further purifying the water.

Substrate

- **Physical support for plants:** The substrate provides a medium for plant roots to anchor and grow, ensuring the proper establishment and functioning of the wetland vegetation.
- **Microbial habitat**: The substrate offers a living space for microbial communities to thrive. The pore spaces within the substrate provide an essential habitat for these microorganisms to grow and carry out biodegradation processes.
- **Water flow influence:** The type and arrangement of the substrate material influence the flow of water and wastewater through the constructed wetland system. This flow pattern is crucial for optimizing treatment efficiency.
- **Substrate selection:** The choice of substrate material (gravel, sand, or soil) depends on the specific type of wastewater being treated. Different substrates offer varying properties that may be better suited for certain contaminants.

Benefits of Constructed Wetlands

- **Water Purification:** Constructed wetlands act as natural filters, removing pollutants like nitrogen, phosphorus, and organic matter from wastewater or stormwater. The plants, microbes, and soil work together to break down and absorb these contaminants.
- **Habitat Creation:** These wetlands provide a haven for various plant and animal species. They offer breeding grounds, food sources, and shelter for a diverse range of wildlife, contributing to biodiversity conservation.
- **Flood Control:** Constructed wetlands can help regulate water flow and mitigate flooding. By storing and slowly releasing excess water, they can reduce the peak flow during heavy rain events, lessening the risk of flooding downstream.
- **Cost-Effectiveness:** Compared to traditional wastewater treatment plants, constructed wetlands are generally less expensive to construct, operate, and maintain. They rely on natural processes for purification, reducing the need for energy-intensive machinery.

Significance of Constructed Wetlands

- **Sustainable Wastewater Treatment:** Constructed wetlands are a sustainable approach to wastewater treatment. They utilize natural processes like microbial breakdown and plant uptake to purify water, requiring less energy and chemicals compared to conventional treatment plants.
- **Habitat Creation and Biodiversity Enhancement:** These wetlands function as havens for various wildlife species. They provide breeding grounds, food sources, and shelter for a diverse range of plants and animals, contributing to biodiversity conservation efforts.
- **Cost-Effectiveness:** Compared to traditional wastewater treatment plants, constructed wetlands are generally less expensive to build, operate, and maintain. Their reliance on natural processes reduces the need for energy-intensive machinery and complex infrastructure.
- **Water Reuse Potential:** The treated water from constructed wetlands can often be reused for irrigation or other non-potable purposes, reducing the demand for freshwater resources.
- **Climate Change Mitigation:** Constructed wetlands can play a role in mitigating climate change by sequestering carbon dioxide in their soils and plants. They act as carbon sinks, helping to reduce atmospheric greenhouse gas concentrations.

India's Success Stories with Constructed Wetlands

- **Asola Bhatti Wildlife Sanctuary (Delhi):** This sanctuary utilizes a constructed wetland system to treat sewage from nearby settlements, showcasing the potential for habitat creation alongside wastewater treatment.
- **Perungudi and Kodungaiyur (Chennai):** Decentralized wastewater treatment using constructed wetlands has been implemented in these regions, effectively reducing pollution levels.
- **Kolkata East Wetlands (West Bengal):** This Ramsar site (a wetland designated for its international importance) features a network of natural and constructed wetlands treating wastewater from Kolkata and surrounding areas.
- **Palla Village (Haryana):** Constructed wetlands here treat wastewater from Delhi, improving water quality in the Yamuna River, a vital waterway in India.
- **Auroville (Tamil Nadu):** This international township exemplifies sustainable practices, including using decentralized wastewater treatment systems with constructed wetlands.

Challenges of Constructed Wetlands

- **Land Availability:** One of the main limitations is the land area required to construct wetlands, especially for large-scale wastewater treatment applications. Finding suitable locations can be challenging in densely populated areas.
- **Treatment Efficiency:** While effective, constructed wetlands may not always achieve the same level of purification as conventional treatment plants, particularly for highly polluted wastewater. Optimizing design and operation is crucial to ensure efficient treatment.
- **Public Perception:** Misconceptions about constructed wetlands, such as concerns about mosquito breeding, can sometimes hinder public acceptance. Educational efforts are needed to address these concerns and promote the benefits of these systems.
- **Long-Term Maintenance:** Regular maintenance is necessary to ensure proper functioning and prevent clogging or mosquito breeding. Developing efficient maintenance strategies is important for the long-term success of these systems.

Conclusion

- Constructed wetlands present a promising, nature-based solution for wastewater treatment in India, leveraging natural processes to remove contaminants and promote environmental sustainability. With supportive policies, capacity-building efforts, and community involvement, constructed wetlands can

play a significant role in achieving sustainable industrial progress and preserving water resources for future generations.

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON:
HYDROPOWER	3rd May, 2024
WATER POLLUTION IN RIVERS	7th May 2024
SPONGE CITIES	9th May, 2024
LAND SQUEEZE	15th May, 2024
RAT HOLE MINING	15th May, 2024
LAND SUBSIDENCE	20th May, 2024
ILLEGAL MINING	27th May, 2024
ONSET OF MONSOON	31st May, 2024
FIRE SAFETY REGULATIONS IN INDIA	30th May, 2024
LANDSLIDES	31st May, 2024

9.3 SNIPPETS

Wind Shear

- Wind shear refers to the change in wind speed, direction, or both over a certain distance in the atmosphere, which can significantly affect weather patterns and the development of severe storms, including hurricanes.
- Vertical wind shear, often observed near weather fronts and mountainous terrain, plays a critical role in determining the strength and structure of hurricanes. Climate patterns, such as El Niño and La Niña, can influence vertical wind shear patterns.
- Wind shear can also impact aviation, aviation safety, and weather forecasting, as it influences the development and intensity of various weather phenomena.

Scarborough Shoal

- Scarborough Shoal is a disputed territory between the Philippines and China, in the South China Sea.
- The shoal is a collection of rocks and small islands, with the largest island featuring a lagoon within its perimeter. The highest point, South Rock, barely reaches 1.8 meters above sea level at high tide.

Speculoos-3 b

- SPECULOOS-3 b is an Earth-sized exoplanet orbiting an ultra-cool red dwarf star.
- It completes one orbit around its host star in 17 hours, indicating its proximity to the star.
- The host star is more than twice as cold as our sun, less massive, and emits far less light.
- The days and nights on SPECULOOS-3 b are likely to be endless due to tidal locking.
- The discovery was made by the SPECULOOS project, which uses a network of robotic telescopes worldwide.

Muria Tribes

APTI PLUS

- Muria tribe, an indigenous Adivasi community in the Bastar district of Chhattisgarh, is deeply rooted in their cultural traditions and social structure.
- Many Muria tribes migrated to the Godavari Valley in Andhra Pradesh due to conflicts between left-wing extremists and central forces.
- Muria youths participate in mixed-sex dormitories called "ghotul".
- They follow traditional folk practices, worshiping nature and village deities, akin to Sarnaism.
- Muria families engage in small-scale farming, primarily for food security, cultivating pulses and maize.
- They practice the traditional seed preservation method called "deda," which involves preserving seeds in leaves and packaging them almost airtight. It ensures protection from pests and worms, allowing stored seeds to remain viable for up to five years.

Nyishi Tribe

APTI PLUS

- The Nyishi community is the largest ethnic group in Arunachal Pradesh.
- Polygyny is prevalent among the Nyishi, symbolizing social status and economic stability.
- They are geographically concentrated around the Dafla Hill range and practice jhum, a form of shifting cultivation.
- Their attire includes traditional hair plaited with thread, cane rings, and a cane helmet with a hornbill beak.
- They wear sleeveless shirts, pomo, and mantles, with beads and animal furs for decoration. They carry a machete, chighi, and a bow and arrows.
- Religion is based on the Donyi Polo, which believes everything in nature has an owner. Many Nyishi people have become Christian, Hinduism, or still follow the ancient indigenous Donyi-Polo.

Indian Ocean Dipole (IOD)

APTI PLUS

- It is a climatic phenomenon characterized by variations in sea surface temperatures (SST) between the western and eastern parts of the Indian Ocean.
- It is triggered by ocean surface heating variations and atmospheric interaction, which influences ocean water movement.
- The Indian Ocean Current (IOD) has two phases:
  - Positive IOD is characterized by warmer-than-average SSTs in the western Indian Ocean and cooler-than-average SSTs in the eastern Indian Ocean, leading to increased precipitation and droughts in Indonesia and Australia.
  - Negative IOD, characterized by cooler-than-average SSTs and warmer-than-average SSTs, affects regional rainfall distribution and monsoon dynamics.
- Climate change is expected to increase the frequency and intensity of positive IOD events, further impacting regional weather patterns and climate variability.

Sharavathi River

APTI PLUS

- The Sharavati River, originating in the Western Ghats, flows through Karnataka and joins the Arabian Sea at Honnavar.
- It forms Jog Falls from a 253 m height and its flow is controlled by the Linganamakki dam.
- The river basin is primarily composed of pre-Cambrian rocks, including the Dharwar system and peninsular gneiss. The soils are lateritic, acidic, and reddish-brown.
- The basin receives heavy rainfall, with most rainfall occurring during the southwest monsoon from June to September.
- The basin hosts a rich biodiversity, many endemic to the Western Ghats, and notable species like the lion-tailed macaque, tiger, leopard, wild dog, deer, reptiles, and avian species.

Cloud Seeding

APTI PLUS

- Cloud seeding is a process of artificially modifying clouds to increase precipitation by introducing seeding agents. Common seeding agents include silver iodide, solid carbon dioxide (dry ice), and salt crystals.
- Methods of cloud seeding include aircraft seeding, ground-based seeding, and rocket or cannon seeding.
- There are two main types of cloud seeding:
  - Hygroscopic seeding: Uses materials that attract water vapour, like table salt or calcium chloride, to increase cloud condensation nuclei. This can increase rainfall.
  - Glaciogenic seeding: Introduces substances acting as ice nuclei, like silver iodide or dry ice, to freeze supercooled water droplets. This can lead to the formation of ice crystals, which can grow and fall as snow or rain. Glaciogenic seeding is most effective in winter storms with supercooled water droplets.
- The effectiveness of cloud seeding can vary based on factors such as cloud type, atmospheric conditions, and seeding agents.

Sahyadri Tiger Reserve

APTI PLUS

- The Sahyadri Tiger Reserve is located in the Sahyadri Ranges of the Western Ghats in Maharashtra, bordering Maharashtra, Karnataka, and Goa.
- It spans over two protected areas, Koyna Wildlife Sanctuary (KWLS) and Chandoli National Park (CNP).
- The reserve consists of woodlands, grasslands, and plateaus, supporting various vegetation types such as fodder species and fruit-bearing species.
- It is home to a diverse range of wildlife, including top carnivores like Tiger, Wild Dog, and Leopard, herbivores like Gaur, Sambar, Four Horned and Giant Squirrel, bird species like Hornbills and Indian River Tern.

Tadoba Andhari Tiger Reserve

APTI PLUS

- The Tadoba Andhari Tiger Reserve, located in the Chandrapur district of Maharashtra, is a diverse landscape including Tadoba National Park and Andhari Wildlife Sanctuary.
- The reserve is named after the local god worshiped by the tribes, and the Andhari River flows through the forest.
- The reserve features diverse landscapes including forested hills, meadows, valleys, and wetlands like Tadoba Lake and Kolsa Lake.
- The main attraction is Bengal tigers; other wildlife species include Indian leopards, sloth bears, gaur, nilgai, dhole, small Indian civet, jungle cats, sambar, chital, marsh crocodiles, Indian python, Indian monitor, terrapins, Indian star tortoise, Indian cobra, Russel's vipers, and various bird species.

Venus

APTI PLUS

- Venus is the second planet from the Sun and has extreme conditions, including the densest atmosphere among terrestrial planets, the hottest planet with a surface temperature average of around 464°C, and an atmospheric pressure about 92 times that of Earth's at sea level.
- Its thick atmosphere rich in greenhouse gases traps heat, and its surface is shaped by active volcanism.
- Venus is unique among the planets in our solar system due to its clockwise rotation, which is opposite to most other planets, including Earth.
- A Venusian day lasts longer than its year, and its orbit around the Sun takes about 224.7 Earth days.
- Conditions potentially suitable for life have been identified in Venus's cloud layers, but the surface is inhospitable due to extreme temperatures and atmospheric composition.

Catatumbo Lightning

APTI PLUS

- Catatumbo Lightning is a unique natural phenomenon that occurs in Venezuela, where the Catatumbo River joins Lake Maracaibo (the largest lake in Venezuela).
- The Catatumbo Lightning is caused by unique atmospheric conditions in the region, where warm, moist air from the Caribbean Sea combines with cooler air descending from the Andes Mountains.
- As two opposing air masses collide over Lake Maracaibo, they provide ideal conditions for the creation of electrical charges in the atmosphere.
- Catatumbo Lightning, also known as Relámpago del Catatumbo, occurs over and around Lake Maracaibo for approximately 140 to 160 nights per year, lightning occurring at a rate ranging from 16 to 40 times per minute.
- Thunderstorms develop when warm, moist air rises rapidly in an unstable atmosphere, triggered by various factors such as daytime heating, frontal boundaries, orographic lifting, or convergence of air masses.

Cyclone in May 2024

APTI PLUS

- Cyclone Remal: Cyclone Remal landfall in West Bengal and Bangladesh. 'Remal', which means 'sand' in Arabic, has been named by Oman as the first tropical cyclone to make landfall in the region during the 2024 pre-monsoon season.
- Cyclone Hidaya: Tropical Cyclone Hidaya made landfall on Mafia Island, Tanzania, in May 2024.
- A tropical cyclone is a powerful, circular storm originating over warm tropical oceans.
- These storms derive their energy from warm ocean waters, typically with sea surface temperatures of at least 26.5°C, releasing latent heat that intensifies the low-pressure system.
- At the centre of the cyclone is the eye, a region of calm weather characterized by clear skies, warm temperatures, and very low atmospheric pressure.
- The eyewall surrounds the eye and contains the storm's most intense winds and rainfall.
- Spiral rainbands extend outward from the centre of the cyclone and bring bands of heavy rainfall and thunderstorms.
- The winds in a tropical cyclone rotate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere due to the Coriolis Effect.

Swell Surge Forecast System

APTI PLUS

- Swell waves are formed when strong winds over large ocean expanses transfer energy to the water surface, resulting in large and powerful waves known as swells.
- They can travel long distances, maintaining their energy and size, and often travel for days before reaching coastal regions.
- Swell waves are different from locally generated wind waves, which have shorter wavelengths and are affected by local wind conditions. When they reach coastal areas, they can cause significant impacts, including coastal erosion, flooding, and damage to infrastructure.
- The Swell Surge Forecast System is developed by the Indian National Centre for Ocean Information Services (INCOIS) to predict the occurrence of swell waves and issue warnings to coastal populations and authorities about potential high sea waves and associated risks.

Paliyar Tribes

APTI PLUS

- The Paliyan tribe is a Dravidian tribal group residing in the South Western Ghats montane rain forests of South India, primarily in Tamil Nadu and Kerala.
- They have traditionally relied on hunting, gathering, and foraging for sustenance, with yams being a major food source. Over time, many Paliyans have transitioned to trading forest products, cultivating food, and beekeeping, as well as working as wage labourers on plantations.
- They practise shifting cultivation, where they cultivate small plots of land for a few seasons before moving on to new areas to regenerate the land.
- They speak a Dravidian language closely related to Tamil, emphasising their cultural heritage and regional ties.
- They worship nature spirits and deities, offering prayers to Vanadevadai and Karuppan, and have customary burial practices.

Taam Ja'

APTI PLUS

- Taam Ja', a massive sinkhole off the coast of the Yucatan Peninsula in Mexico, has sparked scientific interest due to its unique origin and environment.
- Its geomorphology includes a nearly circular shape at the surface, steep sides, and biofilms, sediments, limestone, and gypsum ledges.
- Extensive studies of Taam Ja' were conducted using echo-sounding, thermohaline profiling, chemical analysis of water samples, and scuba diving.
- Physicochemical variations in Taam Ja' were observed, with surface salinity reflecting estuarine conditions and deeper layers indicating seawater influence.

Kadar Tribe

APTI PLUS

- The Kadar tribe is indigenous in Tamil Nadu, Karnataka, and Kerala, known for their traditional hunting and gathering methods.
- They specialize in collecting honey, wax, cardamom, ginger, and umbrella sticks for trade with plains merchants.
- The Paraiyar Community claims the Kadars are part of Paraiyar, who care for forests and forest life.
- In the early 20th century, they worked with forest officials to guide royal hunting parties in Cochin. Currently, many members have moved to areas closer to the plains and urban areas.

Soil Nailing

APTI PLUS

- Soil nailing is a geotechnical engineering technique used to reinforce and stabilize slopes at risk of landslides or erosion.
- Engineers assess slope conditions, considering factors like soil type, slope angle, groundwater levels, and potential failure mechanisms. Holes are drilled into the unstable slope at specified intervals and depths.
- Steel reinforcing bars or rods are inserted into the holes, with a cementitious grout or resin. These elements provide additional structural support, preventing movement and failure, and increasing soil stability.
- After installation, the exposed slope face may be covered with shotcrete or other materials to provide immediate stabilization and protection against erosion.

Geomagnetic Storms

APTI PLUS

- A geomagnetic storm is a temporary disturbance of Earth's magnetosphere caused by a shock wave from the solar wind.
- Effects of geomagnetic storms include Solar Energetic Particle (SEP) Events, Geomagnetically Induced Currents (GICs), Ionospheric Storms, and aurora displays.
- The Dst Index measures changes in the Earth's magnetic field, a key metric for understanding geomagnetic storms.
- Impacts on technology and infrastructure include damage to transformers and power grids, disruption of radio and satellite communications, and corrosion of pipelines.
- Radiation hazards pose health risks to astronauts and high-altitude flight crews, and some studies suggest that geomagnetic storms may impact animal navigation.

Indian Ocean Basin-wide Index

APTI PLUS

- A study published in the journal Science has found a possible connection between sea-surface temperature anomalies in the Indian Ocean and the severity of dengue epidemics worldwide.
- The team analyzed global climate patterns, focusing on the Indian Ocean basin-wide index (IOBW), which represents average sea-surface temperature variations across the tropical Indian Ocean.
- The index has a more strong impact on temperatures in tropical regions, such as Brazil.
- The Northern Hemisphere experiences a peak dengue epidemic period between July and October, while the Southern Hemisphere experiences it in February and April. The amplitude of dengue incidence is high when the index is positive and low when negative.

Semal Tree

APTI PLUS

- The semal tree, also known as the silk cotton tree, is a vital part of Rajasthan's forest ecosystem.
- Its unique features, such as spiked trunks and fluffy seed pods, contribute to its ecological significance.
- The tree grows tall and straight, reaching heights of up to 20 meters on average.
- The fruit is a capsule that reaches about 13 centimetres in length, initially light-green when immature and turning brown when mature.
- The seeds inside are numerous, long, and packed in white cotton-like fibres.
- The fibres are used in thread and textiles in Nepal and India, as well as in traditional dishes in Thailand.

Aurora Lights in India

APTI PLUS

- The recent visibility of auroras in Ladakh has been linked to increased solar activity and unique space weather events.
- Auroras, also known as the Northern Lights or Southern Lights, are natural light displays in the sky, predominantly seen at high latitudes near the Earth's poles.
- Auroras occur due to interactions between charged particles from the Sun and Earth's magnetic field. Solar processes involved include solar wind, which emits charged particles from the Sun, and Earth's magnetosphere, which forms the magnetosphere.

Uniyala Multibracteata

APTI PLUS

- Researchers have rediscovered the rare tree species Uniyala multibracteata, also known as Kattupoovamkurunnila, in the Wagamon hills of the Western Ghats after 140 years.
- The species, first discovered in 1880, was not observed or collected for 140 years, leading to speculation about its extinction.
- The species, which grows in evergreen forests and rocky grasslands at elevations of 1,200 meters above sea level, is described as a small tree or large shrub, reaching heights of 2 to 5 meters.

Batagay

APTI PLUS

- The Batagay Crater, also known as the "gateway to the underworld," is an enormous crater in Siberia, Russia, that is rapidly expanding due to permafrost thaw, a process that melts permanently frozen ground in polar and high-mountain regions.
- Despite variations in climate and environmental conditions, the rate of melting at Batagay has remained relatively consistent over the past decade.
- Impact craters, formed by the high-velocity impact of a smaller body, have raised rims and lower floors compared to the surrounding terrain.
- Volcanic craters, formed by volcanic activity, are bowl-shaped depressions above a volcano's vent. Calderas are larger volcanic craters formed by the collapse of a volcano's magma chamber.

Hindon

APTI PLUS

- The Hindon River, originating from the Shakumbhari Devi Range in Uttar Pradesh, flows through various districts before joining the Yamuna River at Noida.
- The Kali River, a major tributary, merges with the Hindon near Sardhana. Near Sardhana, an ancient Mahadev Temple, believed to date back to the Mahabharata period, is located at the confluence of the Hindon and Kali rivers.
- The river is also home to the Indus Valley Civilization Site Alamgirpur, which offers insights into ancient settlements and cultures.
- The river was a site of significant battles during the Rebellion of 1857.

10. PLACES IN NEWS

10.1 IN INDIA

KUMAON HIMALAYAS

Details

- It is a western-central section of the Himalayas in northern India, extending 200 miles from the Sutlej River east to the Kali River.
- It is largely within Uttarakhand and rises to 25,646 feet at Nanda Devi and 25,446 feet at Kamet.
- Kumoun has popular hill stations: Nainital, Ranikhet, Almora, and the famous Jim Corbett Wildlife National Park.
- Yamunotri, Gangotri, Kedarnath and Badrinath known as CHAR DHAM (four sacred shrines) of Hindus are located in the Garhwal Himalaya, western part of Kumaon Himalaya.

Culture of Kumaon Region:

- Traditional attire, Pichaura, is worn by women during religious ceremonies and festivals.
- Aipan, an intricate art form, is practised in Kumaon.

GARO HILLS

Details

- The Geological Survey of India (GSI) discovered ancient fossils in Tolegre, South Garo Hills, Meghalaya. The fossils are believed to belong to extinct species such as Rhodocetus and Amulocetus, considered ancestors of modern whales.
- The Garo Hills form the western edge of the Shillong Plateau, reaching elevations of about 4,600 feet. The region is characterized by its dense forests, high rainfall, and lush vegetation.
- Agriculture is a key economic activity in Garo Hills, with rice cultivation being predominant. Other important products include cotton, bamboo, and lac, which contribute to the local economy.
- The region has significant mineral resources like coal, limestone, and petroleum, which play a role in its economic development.
- The Garo Hills region is predominantly inhabited by the Garo people, who have a unique matrilineal social system.
- Nokrek National Park, located in the western part of Garo Hills, was designated a biosphere reserve by UNESCO in 2009.

UJANI DAM

Details

- The Ujjani Dam is built along the Bhima River in Maharashtra.
- The Bhima River originates in the Western Ghats (Sahyadri hills). The River basin has several tributaries, including Kundali, Kumandala, and Ghod.
- Bhima River is the tributary of the Krishna River.

KODAGU

Details

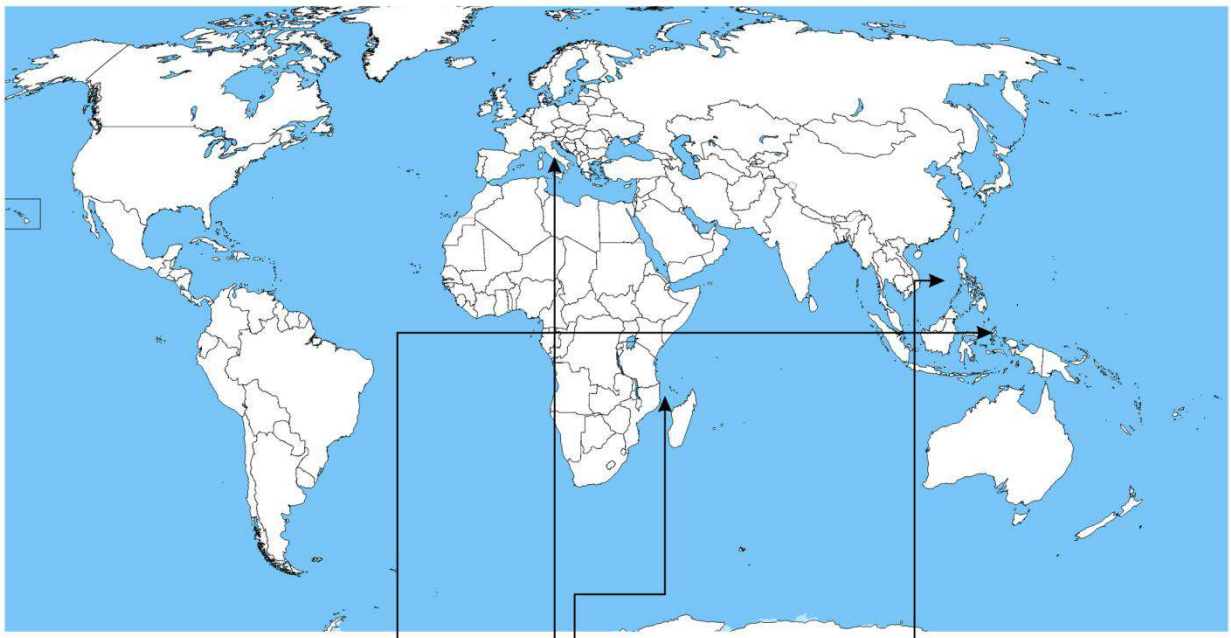
- Kodagu district is located on the eastern slopes of the Western Ghats in Karnataka.

Kodagu has three wildlife sanctuaries:

- Pushpagiri Wildlife Sanctuary: Part of the UNESCO World Heritage Site of the Western Ghats.
- Talakaveri Wildlife Sanctuary: Surrounding the origin of the river Kaveri.
- Brahmagiri Wildlife Sanctuary: In the Brahmagiri Hills

- Nagarahole National Park: Bordering Kodagu district, this prominent wildlife reserve, also known as Rajiv Gandhi National Park, is famed for its tiger, elephant, and other wildlife populations.
- SAI (Save Animals Initiative) Sanctuary: India's only private wildlife sanctuary.
- The district is famous for its coffee estates, contributing significantly to Karnataka's coffee production, accounting for 33% of the state's share.
- Kodagu is a major producer of black pepper, contributing roughly one-quarter of India's total production.

10.2 IN WORLD



MOUNT IBU

Details

- Mount Ibu, an active stratovolcano located on Halmahera Island in Indonesia, is a part of the Pacific "Ring of Fire" with 127 active volcanoes.
- Stratovolcanoes, also known as composite volcanoes, are characterized by a conical shape formed by layers of volcanic material deposited during successive eruptions.
- These volcanoes slope gently at the base but rise quickly near the summit to form tall mountain peaks.
- They are found above subduction zones and are part of large volcanically active regions like the Ring of Fire.

CAMPI FLEGREI

Details

- A recent earthquake with a magnitude of 4.4 has struck the Campi Flegrei supervolcano region near Naples, Italy.
- The region is known for its complex volcanic system, including several centres within a large caldera, which was formed around 39,000 years ago after a massive eruption emptied the magma chamber, leading to the collapse of the volcano's structure.
- The eruption is believed to have contributed to the decline of the Neanderthal population.
- About one-third of the caldera lies beneath the Tyrrhenian Sea.
- The most recent significant eruption occurred in 1538, resulting in the formation of Monte Nuovo, a new volcanic mountain.

PHILIPPINES

Details

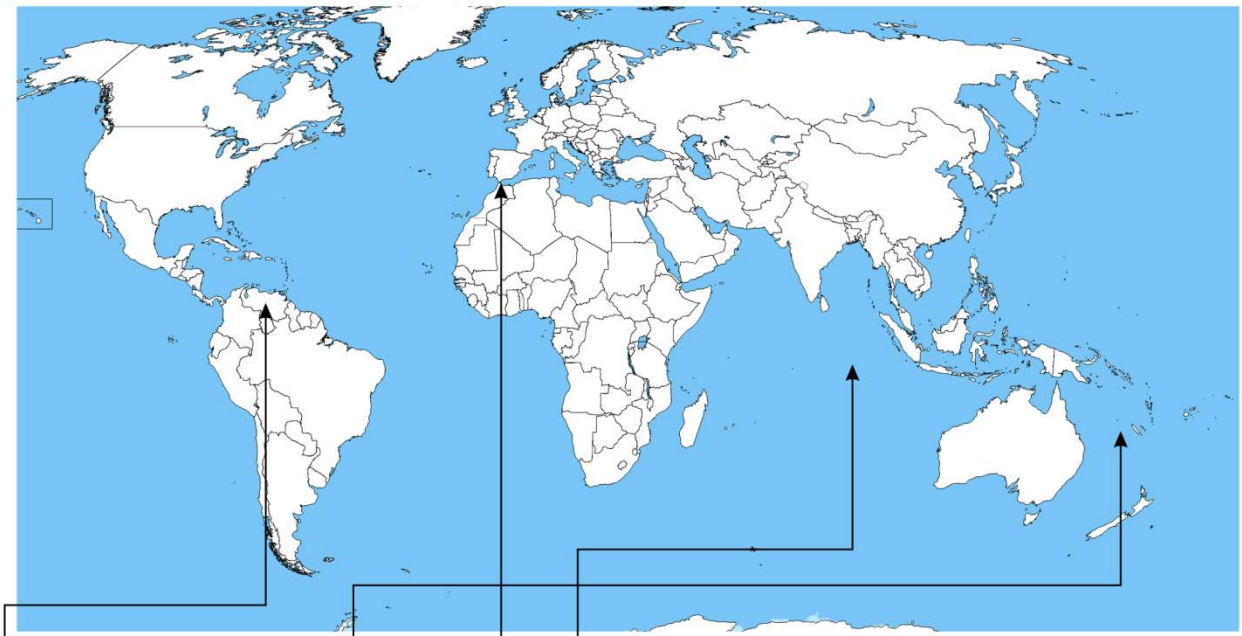
- The Philippines, a Southeast Asian archipelagic country with 7,641 islands, has passed a bill to legalize divorce.
- The Philippines is located on the Pacific Ring of Fire and is prone to natural disasters like earthquakes and typhoons.
- The country's highest mountain is Mount Apo in Mindanao, at 2,954 meters above sea level.
- It is a megadiverse country with high rates of discovery and endemism (67%), with an estimated 13,500 plant species, 3,500 of which are endemic.

SEYCHELLES

Details

- Seychelles is an island country and archipelagic state in the Indian Ocean, consisting of 115 islands.
- It is situated north of Madagascar and 1,500 kilometres east of mainland Africa.
- It is the smallest and least populated sovereign African country.
- Since declaring independence in 1976, the country has developed from an agricultural society to a market-based economy characterized by service, public sector, and tourism activities.
- Seychelles has the highest nominal per capita GDP and the highest Human Development Index in Africa.

10.2 IN WORLD



NEW CALEDONIA

Details

- New Caledonia is a French territory in the southwestern Pacific Ocean, east of Australia.
- Its largest landmass is Grande Terre, with its elongated shape giving it a cigar-like appearance.
- The island's central region is dominated by rugged mountain ranges, with Mount Panié being the highest peak.
- The island's unique red soils, rich in valuable minerals like nickel, chrome, and cobalt, have significant economic importance.
- The Diahot River is the longest in New Caledonia.

SAHUL

Details

- Archaeologists have discovered Sahul, a supercontinent that played a significant role in human migration from Asia to Australia around 70,000 years ago.
- Sahul was exposed during the last ice age, when extensive glaciation caused sea levels to drop, exposing landmasses now submerged.
- It connected Australia to Papua New Guinea in the north and Tasmania in the south, facilitating ancient human migration across continents.
- Sahul was about 30% larger than the collective area of present-day Australia, Tasmania, and New Guinea.
- Sahul was located at the same latitude as present-day Australia and New Guinea.

HUMBOLDT GLACIER

Details

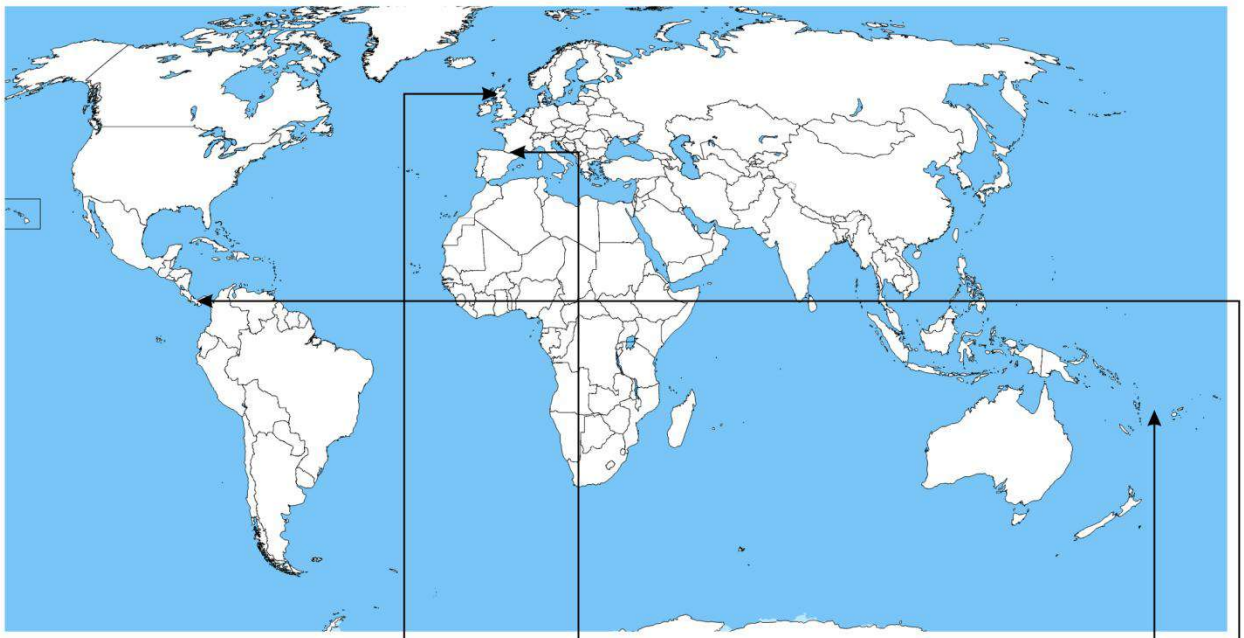
- The Humboldt Glacier, Venezuela's last remaining glacier, has been reclassified as an ice field due to its size reduction.
- It is also known as Sermersuaq Glacier and borders the Kane Basin, an Arctic waterway lying between Greenland and Canada.
- The glacier, located in the Andes Mountains, is a critical ecosystem and water source for the region.
- The glacier's rapid melting is accelerated by global climate change, the El Niño Phenomenon, and Venezuela's political and economic turmoil.

STRAIT OF GIBRALTAR

Details

- The Strait of Gibraltar is a narrow waterway that connects the Atlantic Ocean to the Mediterranean Sea, separating Europe from Africa.
- It is located within the territorial waters of Spain, Morocco, and the British overseas territory of Gibraltar.
- The Mediterranean waters are saltier than the Atlantic waters, forming a layer of bottom water that constantly flows into the Atlantic.
- Although part of the strait falls within British territorial waters, international laws allow for freedom of navigation and overflight.
- The strait is an important bird area, serving as a migratory route for hundreds of thousands of seabirds annually.

10.2 IN WORLD



SCOTLAND

Details

- Scotland, a country in the United Kingdom, occupies nearly one-third of the UK's land area and is surrounded by the Atlantic Ocean, North Sea, and Irish Sea.
- The country's climate is temperate and oceanic, influenced by the Gulf Stream. The west is warmer than the east due to Atlantic Ocean currents.
- Its flora includes deciduous and coniferous woodlands, moorland, and tundra species.

PYRENEES

Details

- The Pyrenees mountain range stands as a natural border between France and Spain.
- The base of the Pyrenees is formed by a variety of ancient rocks, including sedimentary rocks, slates, schists, and even marble. Granites, igneous rocks formed from cooled magma, are also prominent.
- It spans between the Mediterranean Sea and the Bay of Biscay.
- The northern slopes experience the cooling influence of the Atlantic Ocean, resulting in lower temperatures and higher rainfall. In contrast, the southern slopes experience a Mediterranean climate, characterized by hot, dry summers and milder winters.
- Broad-leaved deciduous forests thrive at lower altitudes, while coniferous forests and alpine meadows dominate the higher slopes.

COOK ISLANDS

Details

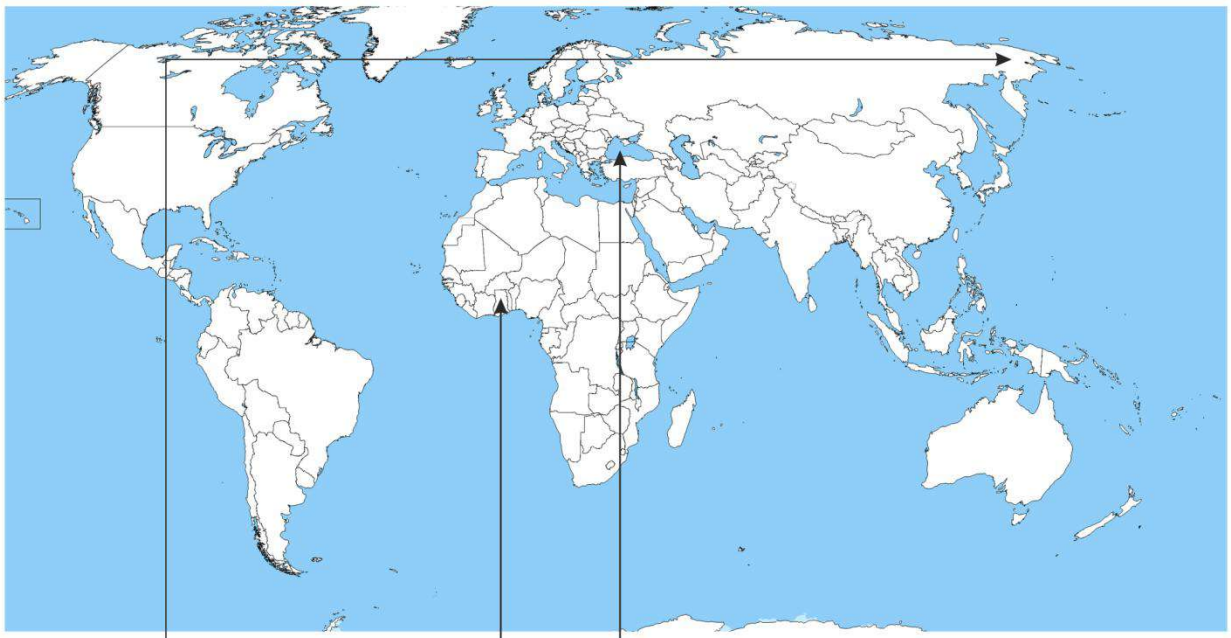
- The Cook Islands, consisting of 15 islands, are located in the South Pacific Ocean.
- The islands are divided into Southern and Northern Cook Islands.
- Tourism is the primary industry, with offshore banking, pearl farming, and marine and fruit exports also significant.
- The islands host unique marine species, including the rare Peppermint angelfish.
- The Cook Islands operates under self-governance but is in free association with New Zealand.

PANAMA

Details

- Panama is a Central American country located at the southern end of the continent, bordering South America.
- It is bordered by the Caribbean Sea to the north and the Pacific Ocean to the south.
- The Darién Gap, an impenetrable forest, serves as a natural barrier between Panama and Colombia.
- Panama has a rich biodiversity, with 40% of its land covered by evergreen forests.
- The Panama Canal, completed in 1914, connects the Atlantic and Caribbean Seas to the Pacific Ocean, contributing significantly to Panama's economy.

10.2 IN WORLD



SIBERIA

Details

- Declaration of emergency due to widespread forest fires in the Irkutsk region, Jewish Autonomous Oblast, and Khabarovsk Krai region of Siberia, Russia.
- Lake Baikal in Siberia is the deepest and oldest freshwater lake in the world.
- It experiences an extreme continental climate with long, bitterly cold winters and short summers. Minimum temperatures recorded in northern regions like Sakha (Yakutia), where temperatures as low as −68 °C have been recorded.
- The northernmost parts of Siberia are covered by tundra, characterized by low-lying vegetation, permafrost (permanently frozen ground), and harsh conditions that limit plant growth.
- The predominant vegetation zone in Siberia is the taiga, which consists of dense coniferous forests interspersed with swamps and wetlands. This biome supports a diverse range of wildlife adapted to cold climates.
- Siberia is rich in natural resources, including vast deposits of coal, petroleum, natural gas, diamonds, iron ore, and gold.

BLACK SEA

Details

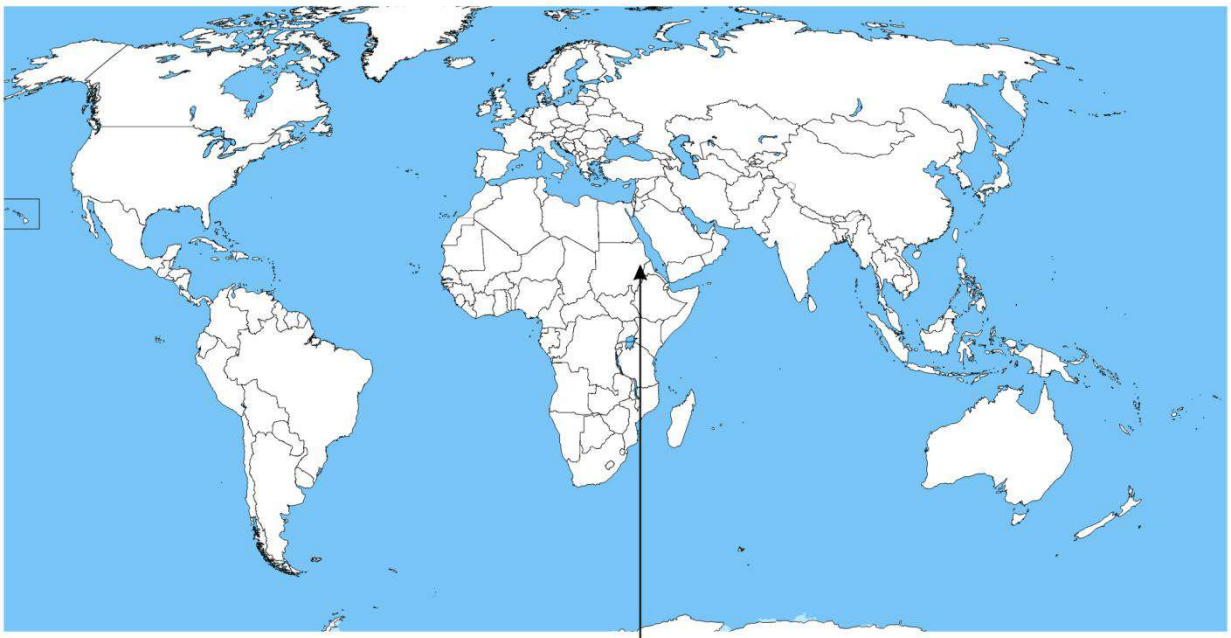
- The Black Sea, also known as the Euxine Sea, is a large inland sea located at the southeastern extremity of Europe.
- The countries bordering the Black Sea include Ukraine, Russia, Georgia, Turkey, Bulgaria, and Romania. The mnemonic "BURGeR-T" (Bulgaria, Ukraine, Russia, Georgia, Romania, and Turkey) can help remember these countries.
- Russia has the longest coastline on the Black Sea, followed by Turkey, and Ukraine.
- It is connected to the Aegean Sea (an arm of the Mediterranean Sea) through the Bosporus Strait, the Sea of Marmara, and the Dardanelles Strait. It also connects to the Sea of Azov via the Kerch Strait.
- It is the largest meromictic basin in the world, meaning there is very little mixing between its lower and upper water layers.
- It is one of the world's largest anoxic basins, characterized by areas with extremely low levels of dissolved oxygen, rendering the lower layers almost biologically dead.
- It receives significant freshwater inflows from numerous rivers, including the Danube, Southern Bug, Dnieper, Rioni, and Dniester.

GHANA

Details

- Ghana, situated on the coast of the Gulf of Guinea in West Africa, lies to the north of the Equator.
- It shares its borders with Ivory Coast to the west, Burkina Faso to the north, and Togo to the east. To the south, it is bordered by the Gulf of Guinea and the Atlantic Ocean.
- The Akan ethnic group constitutes the largest portion of the population.
- The southwestern and south-central regions of Ghana are characterized by forested plateau terrain, including areas such as the Ashanti uplands and the Kwahu Plateau.
- It is intersected by major rivers such as the White Volta and Black Volta, which flow southwards and converge to form Lake Volta, the world's third-largest reservoir by volume.
- The Greenwich Meridian, which marks the prime meridian and passes through London, also traverses the eastern part of Ghana, notably at Tema.

10.2 IN WORLD



GREAT RIFT VALLEY

Details

- The Great Rift Valley stretches northward through the eastern part of Africa, passing countries like Uganda, Kenya, Tanzania, and Mozambique.
- The valley is formed along the East African Rift, a divergent plate boundary where the African Plate is splitting into two new plates, the Nubian Plate and the Somali Plate. This geological process has resulted in the formation of rifts and faults, creating the distinctive landscape of the Great Rift Valley.
- Regional Variations:
- In Asia: The Rift includes the Dead Sea Transform, the Jordan Rift Valley, the Red Sea Rift, and the East African Rift, encompassing features like the Jordan River and the Dead Sea.
- In Africa: The East African Rift Valley follows the Red Sea before turning inland into the Ethiopian highlands and running along two main branches: the Western Rift Valley (or Albertine Rift) and the Eastern Rift Valley.
- The Rift Valley lakes, such as Lake Tanganyika and Lake Victoria, were formed as a result of the rift and are renowned for their biodiversity.
- The unique geography and climate of the Great Rift Valley have led to the formation of mineral-rich lakes like Lake Magadi and Lake Nakuru.

11. GOVERNMENT SCHEMES

11.1 SHORT ARTICLES

Vibrant Village Program

Context

- The Union Government recently sanctioned road projects under the Vibrant Village Programme (VVP) to enhance connectivity along the China border.

About Vibrant Village Programme (VVP)

- It is a **centrally sponsored scheme announced in the Union Budget 2022-23**. It is a **four-year program, running from the financial year 2022-23 to 2025-26.**
- It is the **initiative of the Union Home Minister**, aimed at comprehensive **development in select villages along the northern border of India, particularly in regions adjacent to China.**

Objectives

- **Reduced Migration:** Reverse the trend of people leaving border villages, which weakens India's presence and hinders intelligence gathering. It aims to make border villages more attractive by improving living standards and infrastructure.
- **Enhanced Security:** A populated border with residents acting as eyes and ears strengthens national security. People living near the border can provide valuable insights into activities on the Chinese side.
- **Improved Quality of Life:** It goes beyond security by focusing on creating a positive change for border residents. This includes better infrastructure, especially improved roads, leading to easier access to essential services, markets, and education.

Focus Areas

Livelihood Generation

- The program promotes activities like tourism, cultural heritage preservation, skill development, and entrepreneurship to create sustainable economic opportunities.
- The development of cooperative societies for agriculture, horticulture, and cultivation of medicinal plants is another key focus area, aiming to boost the rural economy.

Infrastructure Development

- Providing road connectivity to currently unconnected villages is a top priority. This will enhance accessibility and integration with the broader economy.
- Developing housing and essential village infrastructure will improve living conditions and attract residents to stay.
- Ensuring access to reliable energy, including renewable sources like solar power, is crucial for overall development.
- Improving television and telecom connectivity will bridge the digital divide and connect border villages to the rest of the country.

Border Area Development Programme (BADP) under the Ministry of Home Affairs

- In addition to the VVP, essential **infrastructure projects have been approved under the BADP in all census villages/towns within 0-10 kilometres from the International Boundary (IB).**
- It was **launched in 1993-94** to address the developmental needs and well-being of people living in remote and inaccessible areas near the International Border (IB).
- Key components of BADP include infrastructure development, livelihood generation, financial inclusion, and education and health.
- The program is a **Centrally Sponsored Scheme (CSS),** with state governments playing a crucial role in planning, executing, and monitoring projects.
- The program encourages convergence with other central, state, and local government schemes to maximize the impact of development efforts in border areas.

Incentivizing Village Residence

- The VVP recognizes the need to create incentives to encourage people to stay in border villages. This could involve financial assistance, improved job opportunities, or better educational facilities for their children.

Conclusion

- The effective implementation of the VVP is crucial for its success in achieving its goals of reducing migration, strengthening border security, and improving the lives of residents in border villages. If executed well, this program can significantly contribute to India's overall security posture along its border with China.

TOPIC NAME	UPLOADED ON IAS GYAN WEBSITE ON
PM WANI	23rd May, 2024

10.2 SNIPPETS

Target Olympic Podium Scheme (TOPS)

APTI PLUS

- Launched in 2014 by the Ministry of Youth Affairs and Sports (MYAS) to support India's elite athletes in winning medals at the Olympics and Paralympics.
- Revamped in 2018 to establish a technical support team for managing TOPS athletes.
- The primary objective is to identify and support elite athletes capable of achieving podium finishes at major international events.
- The selection process involves a committee identifying elite athletes with the potential to win medals.
- Financial assistance includes a monthly stipend of Rs. 50,000.
- Customized training programs are approved by the Mission Olympic Cell (MOC), under the Chairmanship of the Director General, of the Sports Authority of India (SAI).