INSIGHTSIAS

SIMPLIFYING IAS EXAM PREPARATION

HAMPI'S VIRUPAKSHA TEMPLE
A portion of Hampi's Virupaksha temple collapsed due to heavy rains.

20 MAY - 26 MAY 2024

WEEKLY CURRENT AFFAIRS

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GENERAL STUDIES – 2

Topics: Government policies and interventions for development in various sectors and issues arising out of their design and implementation.

1. HIGHER EDUCATION IN INDIA: STATUS, CHALLENGES AND SOLUTIONS

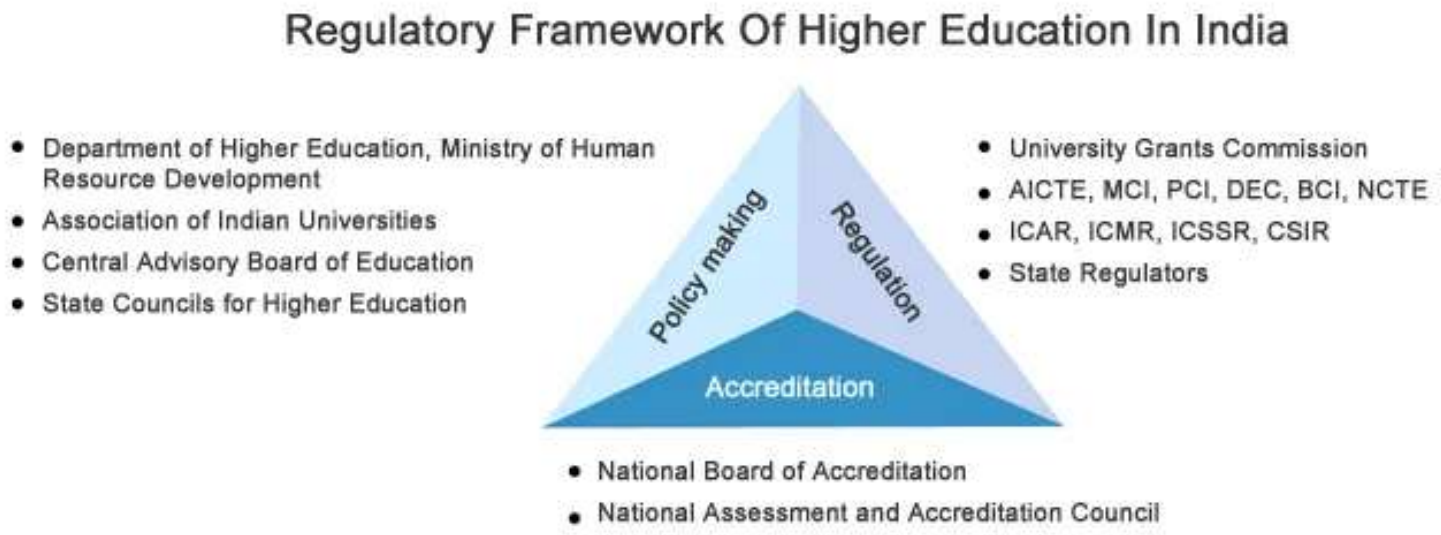
Context:

Indian higher education is experiencing heightened politicization, posing a serious threat to academic institutions and intellectual freedom.

India boasts one of the world's largest higher education systems, including prestigious institutions like IITs and IIMs. Despite its vastness, **challenges such as quality and relevance persist**. Additionally, **increasing politicization** poses a threat to academic freedom and intellectual discourse.

Status of Higher Education in India:

Aspect	Status
Student Enrolment	Over 4 crore students enrolled in higher education institutes in 2021-22.
	A significant increase from about **3.42** crore in 2014-15.
	Women enrolment: Over 2 crore in 2021-22, up by 32% from **1.5** crore in 2014-15.
	The highest proportion of women enrolment at the postgraduate level (over 55%).
Gross Enrolment Ratio (GER)	Estimated GER for age group 18-23 years: **28.4%.**
The primacy of Government Institutions	**About 73.7% of students** attend government universities, comprising **58.6%** of all universities.
	State public universities have the largest share of enrollment (around 31%) among government-owned universities.



Primary Challenges **in the Indian Higher Education System:**

1. **Politicization of higher education**: Concerns rise over politicization in higher education, impacting autonomy in faculty recruitment, curriculum design, and resource allocation.
    a. E.g., Controversies around the appointments of Governors as Chancellors and Vice Chancellors, undermining institutional independence.
2. **Limited Funding:** Interim Budget 2024-25 slashes education allocation by 7%, with UGC funding cut by 61%.

3. **Low R&D investment**: It remains low at 0.64% of GDP, compared to **China (2.4%), Germany (3.1%), South Korea (4.8%), and the US (3.5%).**
4. **Uneven Regional Development**: Higher education institutions are unevenly distributed, with states like Delhi, Tamil Nadu, and Maharashtra having higher concentrations of reputed institutions.
5. **Quality of Education**: The quality of education in many institutions falls short compared to other developing nations.
    a. **E.g.** A study by the **National Employability Report** highlighted the industry's perception of **the outdated curriculum** in many Indian universities.
6. **Faculty Shortage**: There is a significant shortage of qualified faculty across institutions.
    a. **E.g. AISHE data** indicates a faculty shortage in many institutions, with **a high student-to-faculty ratio.**
7. **Lack of Research and Innovation**: Indian institutions often lack a strong focus on research and innovation. **For instance,** India **ranks lower in global innovation indices**, indicating a need for increased emphasis on research and development.
8. **Affordability:** Higher education is often unaffordable for many students.
    a. For **example, AISHE reports** show disparities in enrolment rates among **different social groups.**
9. **Equity and Access**: A report titled **"Gender and Higher Education in India: Negotiating Equity with Access"** attempts to outline the multiple dimensions of gender asymmetries and discrimination that occur in higher education institution
10. **Inadequate Infrastructure:** Many institutions lack the necessary infrastructure.
    a. **E.g.** According to the **All India Survey on Higher Education (AISHE) 2019-20,** many colleges lack basic amenities, affecting the quality of education.
11. **Job Market Alignment:** There is often a mismatch between the skills students acquire and what the job market requires. A report titled **"EMPLOYABILITY AND ENTREPRENEURSHIP IN INDIAN UNIVERSITIES"** shows that **employability in the country is only 47%.**

Impact on Quality:

1. **Skill Gap:** The gap between the curriculum and industry needs results in a workforce lacking in essential skills.
2. **Inadequacy in Research:** The lack of focus on research and innovation limits the country's capacity to contribute to global knowledge and technological advancements.

Government Initiatives:

Initiative	Description
National Education Policy (NEP) 2020	Aims to overhaul the education system, and promote multidisciplinary learning, skill development, and research. Targets 50% Gross Enrolment Ratio by 2035.
Institutions of Eminence (IoE) Scheme	Launched in 2018, grants 20 institutions complete autonomy.
National Credit Framework	Integrates training and skill development into education, and stores student credits digitally.
Revamped Accreditation and Ranking Systems	NIRF ranks institutions, and NAAC ensures quality standards.
Digital Initiatives	SWAYAM offers online courses, National Digital Library provides educational resources.
Study in India Program	Attracts international students with scholarships and streamlined admission process.
Foreign Institutions in India	Regulations allow the top 500 foreign universities to establish branch campuses.
SHE under INSPIRE	Scholarship to attract students to study basic sciences and pursue research careers.

Measures to Address Challenges:

1. **Infrastructural, Academic and Faculty Reforms:** Improving infrastructure and implementing academic and faculty reforms can **enhance the quality of education.** For instance, the **Rashtriya Uchchatar Shiksha Abhiyan (RUSA)** aims to upgrade infrastructure in higher educational institutions
2. **Increase Representation of States in UGC:** Increasing the representation of states in the University Grants Commission (UGC) can help address regulatory challenges.
3. **Availability of Quality Textbooks in Local Language:** Providing quality textbooks in local languages can improve access to education. **The National Council of Educational Research and Training (NCERT)** has been publishing quality textbooks in various local languages.
4. **Government Financial Support:** Government financial support can make higher education more affordable.
    a. Schemes like the **Pradhan Mantri Vidya Lakshmi Karyakram** provide educational loans to students.
5. **Implementation of New Education Policy:** The implementation of The NEP 2020 aims to overhaul the education system by introducing a **new curriculum structure, promoting multilin-**

gualism, and focusing on skill development.

6. **Strengthening Quality Assurance Institutions:** Strengthening **institutions like the National Assessment and Accreditation Council (NAAC)** can ensure quality assurance.
7. **Digital Education**: The Government of India has launched several **initiatives like SWAYAM**, an online education platform, to promote digital education.
8. **Public-Private Partnerships (PPP)**: PPP models have been successful in improving the education system. For example, the **Delhi Public School Society** operates schools in collaboration with private entities.

Other measures needed:

1. **Shift focus to practical skill development** through project-based learning, internships, and industry collaborations.
2. Encourage universities to engage in **social development projects** to promote civic engagement.
3. **Enhance the National Digital Library** and promote open educational resources.
4. **Establish entrepreneurship and innovation centres** within universities.
5. **Promote transnational education partnerships** with international universities.
6. **Implement dual study programs** combining theoretical learning with practical training.
7. **Adopt a competency-based credentialing system** with blockchain certificates.

Conclusion

A **revitalized higher education system** will not only contribute to the intellectual growth of the nation but also position India as a competitive force on the global educational stage. It is an investment in the nation's intellectual capital, fostering innovation, critical thinking, and socio-economic development.

Insta Links:

- An ambitious push for values, and ethics in higher education

Mains Link:

Q1. How have digital initiatives in India contributed to the functioning of the education system in the country? Elaborate on your answer. (USPC 2020)

Q2. Discuss the main objectives of Population Education and point out the measures to achieve them in India in detail. (USPC 2021)

Prelims Link:

Q. Which of the following provisions of the Constitution does India have a bearing on Education? (UPSC 2012)

1. Directive Principles of State Policy
2. Rural and Urban Local Bodies
3. Fifth Schedule
4. Sixth Schedule
5. Seventh Schedule

Select the correct answer using the codes given below:

(a) 1 and 2 only
(b) 3, 4 and 5 only
(c) 1, 2 and 5 only
(d) 1, 2, 3, 4 and 5

Ans- D

Topics: Bilateral, regional and global groupings and agreements involving India and/or affecting India's interests.

2. IRANIAN PRESIDENT'DEATH AND ITS IMPACT ON GEOPOLITICS

Context:

Iranian President Ebrahim Raisi's death in a helicopter crash raises questions on middle east geopolitics.

About Ebrahim Raisi:

Born December 14, 1960, he rose from a **clerical family in Mashhad, Iran**, to hold prominent positions in the government, including Tehran's prosecutor and Iran's judiciary chief. He ran for presidency in 2017 and won in 2021.

Notably, **he strengthened ties with Russia and China** while resuming diplomatic relations with Saudi Arabia. His support for **Palestine and alleged involvement in human rights violations** drew international attention. As president, he faced **criticism for crackdowns on protests and escalated conflicts** with Israel and the West.

Iranian Internal Politics:

In Iran, politics has long been defined by a **struggle between conservatives (to which Raisi belonged) and reformists** since the 1979 Islamic Revolution. Conservatives advocate **strict adherence to Shi'ite Islam's** principles and view the Revolution as anti-Western imperialism, enjoying support from poorer sectors.

Reformists, while loyal to the Revolution, seek greater flexibility domestically and internationally, advocating for women's rights, civil society, free elections, and improved relations with the West. Despite economic challenges from sanctions, conservatives have largely retained power, even amidst protests.

Impact of his death:

1. **Iran's Political Structure:** The President op-

erates under the Supreme Leader's authority, with upcoming elections within 50 days. Since Iran has a robust public institution, smooth transition is anticipated. Constitutional provisions dictate Mohammad Mokhber, Iran's First Vice President, assumes the acting presidency.

2. **Global Implications**: Iran's policies towards South Asia and Arab states are expected to persist. Gold prices surged post-Raisi's death, reflecting global market concerns.
3. **Impact on India**: Chabahar Port development might slow, affecting global oil markets due to Iran's significant production. Increased oil prices could impact India's economy. Potential tensions in West Asia could further influence India, depending on developments.

Different aspects of India-Iran Relations:

Aspect	Details
Historical Relations	Millennia-long interactions, dating back to ancient times. Trade between southern Iran and India through Persian Gulf and Arabian Sea
Political Relations	**Friendship treaty signed in 1950**; Tehran Declaration (2001) and New Delhi Declaration (2003) set strategic vision; Trilateral Agreement on Trade, Transport, and Transit
Connectivity	MoU signed in 2015 for Shahid Beheshti Port development at Chabahar; Strategic cooperation for Chabahar Port as regional and international hub
Trade Relations	**Bilateral trade reached US$2.5 billion** in 2022; India among Iran's top trade partners; Major Indian exports: rice, tea, sugar, pharmaceuticals, electrical machinery, artificial jewelry; Major imports: dry fruits, chemicals, glassware
Cultural Cooperation	Civilizational links foster robust people-to-people ties; Indian Cultural Centre renamed Swami Vivekananda Cultural Centre (SVCC); Farsi included in New Education Policy as classical language
Energy Security	Iran ranks 2nd globally in gas **reserves**; Iran presents opportunity for fuel diversification, decarbonization, and gas share in India's energy mix
Strategic Importance (For India)	Strategic location between Persian Gulf and Caspian Sea; Provides alternative connectivity to Afghanistan and Central Asian republics; Access to crude oil and natural gas reserves
Strategic Importance (For Iran)	Access to large market for oil sales; Improving trade ties and investment opportunities in India; India can be leveraged for its ties with West as India enjoys good relations with most of the countries.
Areas of Convergence	**Engagement with Afghanistan**: Potential for common policy with open channels to Taliban; **Rebalancing in West Asia**: Opportunity to strengthen ties amid regional dynamics

For: Israel-Iran Conflicts: Challenges and Solutions: Click Here

Challenges:

Indo-Iranian ties have faced challenges, including **India's halt of oil imports from Iran** due to U.S. sanctions post the Iran nuclear deal revocation in May 2019, impacting India's energy security. Moreover, **India's close relations with Israel** contrast with Iran's ties with China, underlined by a 25-year strategic partnership agreement. Additionally, **Iran-backed Houthis** in Yemen have targeted Saudi Arabia and UAE, both key partners of India. **Iran's criticism of India's abrogation of Article 370**, granting special status to Kashmir, further strained relations.

Way forward:

1. **Unlocking Bilateral Potential:** Strengthening India-Iran ties could unlock vast potential for regional and global cooperation, benefiting both nations.
2. **Cheaper Crude Oil:** Resuming oil imports from Iran could lower crude oil prices globally, benefiting multiple countries and encouraging market stability.
3. **Connectivity with Eurasia:** Enhancing cooperation on the International North-South Transport Corridor (INSTC) could significantly reduce transit times for goods between India, Iran, Afghanistan, Russia, Central Asia, and Europe, boosting trade.
4. **Energy Security**: Advancing projects like the Iran-Oman-India gas pipeline (IOI) could enhance ener-

gy security for India

Conclusion:

Ebrahim Raisi's tragic death in a helicopter crash is not expected to significantly impact domestic markets unless it triggers geopolitical tensions.

India-Iran should focus on **areas of mutual interest and convergence**, working together to achieve common goals. **India's assertive diplomacy**, emphasizing cooperation with neighbors and friends, presents an opportunity for renewed engagement with Iran and unlocking vast cooperation potential. A reset in relations is timely and promising.

Insta Link:

Gaza conflict: India-Israel Relations

Prelims Link:

Q) What is the importance of developing Chabahar Port by India? (UPSC 2017)

(a) India's trade with African countries will enormously increase.
(b) India's relations with oil-producing Arab countries will be strengthened.
(c) India will not depend on Pakistan for access to Afghanistan and Central Asia.
(d) Pakistan will facilitate and protect the installation of a gas pipeline between Iraq and India.

Ans: C

GENERAL STUDIES – 3

Topics: Indian Economy and issues relating to planning, mobilization of resources, growth, development and employment.

1. ECONOMIC CAPITAL FRAMEWORK (ECF) OF RBI AND ITS IMPLICATIONS

Context:

The Reserve Bank of India (RBI) approved a record **transfer of ₹2,10,874 crore** to the Union government for 2023-24, more than **double the ₹87,416 crore** transferred last year. The RBI also increased the **Contingent Risk Buffer (CRB) to 6.50% from 6%**. This surplus is based on the **Economic Capital Framework (ECF) adopted in 2019**.

What is Economic capital?

Economic capital is the amount of capital that a firm (in this case RBI), usually in financial services, needs to ensure that it **stays solvent given its risk profile**. It includes **both realized and unrealized reserves**.

Economic Capital Framework Objective: The framework aims to balance the RBI's autonomy with the Government's development goals.

Reserve Bank of India's Sources of Income:

Source of Income	Interest from Government Securities Open Market Operations (OMOs) Foreign Exchange Operations Interest on Loans and Advances Income from LAF
Expenditure	Operating Expenses Interest Paid on Deposits and Borrowings Currency Issue Expenses Provisioning for Contingencies and Reserves
Surplus	Net income is derived from the total income (sources of income) minus total expenditure (expenses). Reserve funds and contingency provisions for financial stability and emergencies.

About Economic Capital Framework (ECF)

The ECF provides a **method for determining risk provisions and profit distribution** under **Section 47 of the RBI Act, 1934**, requiring the central bank to pay profits to the government after provisions for **debts, asset depreciation, and staff contributions**. It was recommended by the **Expert Committee (headed by Bimal Jalan)** to Review the Extant Economic Capital Framework of the RBI.

The Bimal Jalan-led panel recommended:

1. **The total economic capital** should be maintained between **20.8% to 25.4%** of the RBI's balance sheet.
2. **Risk Capital Frameworks**: Assess the adequacy of RBI reserves.
3. **Contingency Risk Buffer (CRB):** Maintain within **5.5%-6.5%** of the RBI's balance sheet.
    a. **The CRB is the country's savings** for a financial stability crisis, which has been consciously maintained with the RBI in view of its role as Lender of Last Resort.
4. **Review Frequency:** Review ECF every five years, or sooner if risks change significantly.
5. **Accounting Year Alignment**: Sync RBI's fiscal year (April-March) with the government's from 2020-21 for better policy cohesiveness.
6. **Interim Dividend**: Remove the interim payout structure, restricting it to extraordinary circumstances.

All recommendations were accepted by the RBI.

Reasons for Higher Dividend Transfers to the Government:

1. **Increased RBI Revenue**: Boosted by variable repo rate (VRR) auctions for bank funding amid tight liquidity.
2. **Revaluation Gains**: Higher revaluation gains on forex reserves.
3. **Interest Rates**: Increased interest rates on domestic and foreign securities.
4. **Foreign Exchange Sales**: Higher gross sales of foreign exchange.
5. **Rupee Depreciation**: Surplus transfer aided by the rupee's depreciation against the dollar.

Implications of Surplus Transfer:

1. **Fiscal Relief**: Eases government fiscal management and boosts capex expenditure
2. **Revenue Compensation:** Helps offset lower tax buoyancy and other revenue gaps.
3. **Budget Support**: Provides a buffer to meet budget targets.
4. **Offsetting Losses**: Mitigates potential losses from lower disinvestment, telecom payouts, or tax revenues.
5. **Fiscal Management:** Enhances the government's ability to manage fiscal deficits.

Reasons Against RBI Surplus Transfer to Government:

1. **Autonomy**: Preserves RBI's independence from government influence.
2. **Financial Stability**: Ensures sufficient reserves for managing financial crises.
3. **Risk Buffer**: Maintains a contingency risk buffer for unforeseen economic shocks.
4. **Monetary Policy:** Supports effective monetary policy implementation without fiscal pressure.
5. **Long-term Stability**: Prioritizes long-term economic stability over short-term fiscal gains.

Conclusion:

Transferring the RBI surplus to the government provides immediate fiscal relief and supports budgetary goals, but maintaining sufficient reserves is crucial for the RBI's autonomy and long-term financial stability. A balanced approach is essential for sustainable economic health.

Insta links:

RBI Panel on Economic Capital Framework

Prelims Link:

Q. Which of the following statements is/are correct regarding the Monetary Policy Committee (MPC)? (UPSC 2017)

1. It decides the RBI's benchmark interest rates.
2. It is a 12-member body including the Governor of RBI and is reconstituted every year.
3. It functions under the chairmanship of the Union Finance Minister.

Select the correct answer using the code given below:
(a) 1 only
(b) 1 and 2 only
(c) 3 only
(d) 2 and 3 only
Ans: A

Q. If the RBI decides to adopt an expansionist monetary policy, which of the following would it not do? (UPSC 2020)

1. Cut and optimize the Statutory Liquidity Ratio
2. Increase the Marginal Standing Facility Rate
3. Cut the Bank Rate and Repo Rate

Select the correct answer using the code given below:
(a) 1 and 2 only
(b) 2 only
(c) 1 and 3 only
(d) 1, 2 and 3
Ans: B

Topics: Infrastructure: Energy, Ports, Roads, Airports, Railways etc.

2. GREEN BIOHYDROGEN PRODUCTION IN INDIA

Context:

The Principal Scientific Adviser to the Government of India, Professor Ajay Kumar Sood, chaired a meeting to discuss biomass cultivation on degraded land for green biohydrogen production.

The key difference between biohydrogen and green hydrogen is in their sources of production:

- **Biohydrogen:** Derived from biological sources such as biogas, and often considered a form of renewable hydrogen due to its environmentally friendly conversion process.
    - Biohydrogen is hydrogen produced from **biological sources, typically through biogas reforming**. It converts **biogas (CH4 and CO2) into hydrogen**, often referred to as syngas or bio-hydrogen
- **Green Hydrogen:** Produced through the electrolysis of water using renewable energy sources like solar or wind power, and is considered the purest form of clean hydrogen.

What is Green Bio-hydrogen?

Green biohydrogen refers to **hydrogen gas produced**

through the process of biomass cultivation, typically on degraded or barren land. This method involves utilizing organic materials such as **seaweed, algae, molasses, sugarcane, and other plant-based resources** to generate hydrogen through biological processes.

For: Opportunities and Challenges of Green Hydrogen in India: Click Here

Prospects of Biomass:

A recent MNRE study estimated a surplus biomass availability of approximately 230 million metric tonnes annually (2017-18) and a biomass power potential of **around 28 GW**. India's **tropical climate and vast agricultural potential** make it conducive for biomass production. With an annual production of about **460 million tonnes of agricultural waste**, biomass can **substitute coal by around 260 million tonnes**, potentially saving Rs 250 billion per year.

Benefits of Bioenergy crops cultivation:

1. **Soil Restoration and Erosion Prevention**: Cultivation of energy crops rebuilds degraded soil, enhancing quality, fertility, and structure. Prevents soil erosion and fosters native plant species' habitat. Improves biodiversity and acts as a carbon sinks, combating climate change.
2. **Carbon Sequestration:** Biomass plants absorb carbon dioxide, aiding climate change mitigation.
3. **Sustainable Biohydrogen Production**: Biomass serves as feedstock for green biohydrogen production via thermochemical or biochemical conversion. Green biohydrogen is a clean fuel emitting only water vapour.
4. **Bioenergy Generation:** Specific bioenergy crops grown on degraded land are used for biomass energy production. Fast-growing trees, grasses, and high-energy plants can be converted into biofuels, biogas, or solid biomass.
5. **Enhancing Food Security**: Biomass cultivation on degraded land preserves fertile agricultural areas for food crops. Prevents diversion of food grains, improving food security and supporting agri-export.

Government Initiatives for Bio and Green Hydrogen:

Initiative	Key Points
Global Biofuel Alliance	Leading efforts to establish global standards for hydrogen from biomass.
National Hydrogen Mission	Targeting a production increase to 5 million metric tonnes (MMT) by 2030, meeting 40% of domestic requirements.
Production Linked Incentive (PLI) Scheme	Proposing a Rs 15,000-crore PLI scheme for electrolysers.
Green Hydrogen Mission	Development of Green Hydrogen Production Capacity of at least 5 MMT (Million Metric Tonne) per annum; Renewable energy capacity addition of about 125 GW in the country by 2030
	Strategic Interventions for Green Hydrogen Transition (SIGHT): Funding domestic electrolyser manufacturing and green hydrogen production.
	Green Hydrogen Hubs: Identifying and developing states/regions for large-scale hydrogen production/utilization.
	Strategic Hydrogen Innovation Partnership (SHIP): Under this Public-private partnership framework R&D will be facilitated under the mission.
International Collaboration	Actively partnering with other countries, research institutions, and private entities for expertise and technology development.
Renewable Energy Integration	Integrating green hydrogen production with India's expanding renewable energy capacity for improved efficiency and sustainability.
National Biomass Atlas of India	It offers **state-wise and crop-wise data on residues per crop**, along with images illustrating different crops and their residue ratios.

Challenges:

1. **Soil Quality**: Rehabilitating degraded soil lacking essential nutrients is crucial.

2. **Species Selection**: Identifying biomass crops resilient to harsh conditions is challenging.
3. **Water Availability**: Developing efficient irrigation methods is essential due to water scarcity.
4. **Economic Viability**: High initial investments and aligning crops with market demand pose challenges.
5. **Biodiversity**: Introducing biomass crops may disrupt local ecosystems and biodiversity.
6. **Cultivation Methods**: Implementing practices to minimize ecological impact is essential.

Way forward:

To improve **degraded soil fertility, strategies like incorporating organic matter** such as compost and biochar, or employing techniques like **bio flocculation**, which leverages microbial processes, can be implemented. Additionally, by **adopting agroforestry methods**, integrating fast-growing tree species like **Pongamia pinnata** with native grasses and legumes, not only enhances soil fertility through nitrogen fixation but also facilitates biofuel production while promoting biodiversity. **Drones equipped with multispectral sensors** can be utilized for quick assessment of degraded land, mapping soil composition, and identifying potential biomass cultivation areas, aiding in land diagnostics. Furthermore, **developing markets for biomass and its by-products** is essential for ensuring economic viability and creating a value chain that supports rural livelihoods. Additionally, **seaweed cultivation** holds immense potential for bioenergy production and fostering a marine biomanufacturing start-up ecosystem.

Conclusion

Bio-hydrogen will be a critical industrial fuel of the 21st century. India is well-positioned to show leadership, which is in India's and the planet's collective interest.

Insta Links:

India's green hydrogen challenge

Prelims Links:

Q. With reference to the usefulness of the by-products of the sugar industry, which of the following statements is/are correct? (UPSC 2013)

1. Bagasse can be used as biomass fuel for the generation of energy.
2. Molasses can be used as one of the feedstocks for the production of synthetic chemical fertilizers.
3. Molasses can be used for the production of ethanol.

Select the correct answer using the codes given below:

(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: C

Topics: Science and Technology- developments and their applications and effects in everyday life Achievements of Indians in science & technology; indigenization of technology and developing new technology.

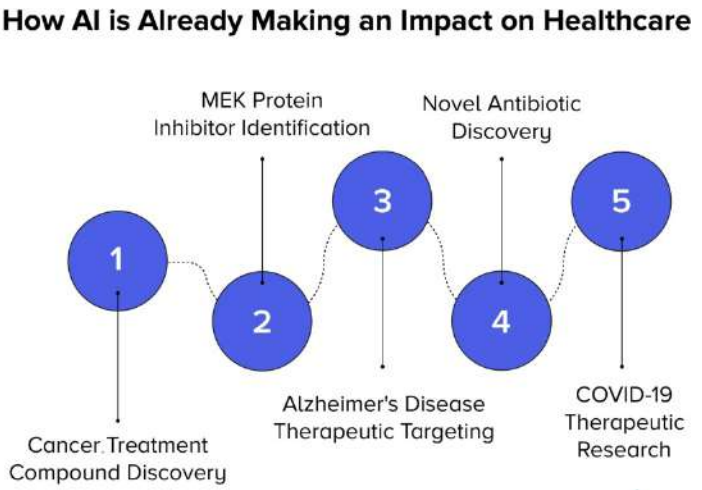
3. USE OF AI FOR DRUG DISCOVERY AND DEVELOPMENT

Context:

AI is **transforming drug development by accelerating target discovery** and predicting drug-target interactions.

Examples of New Drugs Formulated through AI:

1. **DSP-1181:** For obsessive-compulsive disorder.
2. **Halicin:** For antibiotic resistance
3. **BMS-986195**: A potential treatment for fibrosis.



Role of AI in Drug Development and Discovery:

Aspect	Role
Enhanced Target Discovery	AI, particularly through advanced tools like **AlphaFold and RoseTTAFold**, revolutionizes target discovery by accurately predicting the three-dimensional structures of proteins, DNA, and RNA. It allows for a **more precise understanding of how drugs** can interact with these biological targets.
Improved Efficiency	AI models **drastically reduce the time required for drug-target interaction studies** and increase the accuracy of these predictions E.g., AlphaFold 3 predicted drug-target interactions with a **76% accuracy rate,** a substantial improvement over previous methods.

Cost Reduction	By leveraging **deep neural networks and generative diffusion**-based architectures, AI minimizes the need for expensive and time-consuming laboratory experiments, thus reducing drug development costs.
Versatility in Predictions	Predict interactions involving any combination of protein, DNA, RNA, small molecules, and ions, broadening the scope of drug development research.
Improved Drug Design	AI algorithms predict how a molecule will interact with a target protein, allowing for more targeted drug design with better efficacy and fewer side effects.

Limitations of AI in Drug Development

1. **Limited Prediction Accuracy**: AI tools achieve up to 80% accuracy, but drop significantly for complex interactions like protein-RNA.
2. **Restricted Application:** AI enhances early phases like target discovery but doesn't affect pre-clinical and clinical trials.
3. **Model Hallucinations:** Diffusion-based AI models can generate incorrect predictions due to inadequate training data.
4. **Restricted Tool Access**: Advanced tools like AlphaFold 3 are not publicly available, limiting verification and broader use.
5. **Lack of Computing Infrastructure**: India lacks extensive computing resources like high-speed GPUs, hindering AI-driven drug development.
6. **Shortage of Skilled Professionals**: There's a significant gap in skilled AI scientists compared to countries like the U.S. and China, limiting innovation within India.
7. **Data Quality and Quantity:** The diverse and often scarce nature of drug discovery data poses challenges for accurate analysis and modelling by AI systems.
8. **Cost and Technical Expertise**: Implementing AI in drug discovery requires substantial investments in infrastructure and skilled personnel
9. **Lack of Standardization**: The absence of standardized data formats, collection methods, and analysis techniques in drug discovery hinders the effective comparison of studies and datasets

What should be done:

1. **Data Privacy and Regulatory Compliance**: Strict adherence to data protection regulations like HIPAA and GDPR is essential in AI-driven drug discovery to address ethical and legal concerns regarding patient data privacy.
2. **Investment in R&D**: India can boost AI-driven research projects in pharmaceuticals by increasing funding and support. Public-private partnerships can expedite innovation and commercialization.
3. **Regulatory Framework:** Establishing supportive regulations balancing innovation and safety is crucial. Investment in infrastructure like high-performance computing facilities is necessary for AI-driven research.
4. **Public-Private Partnerships:** Collaboration among academia, government, and pharmaceutical firms accelerates AI adoption in the industry.

Case Study:
iOncology AI Project: To develop an AI-powered platform (iOncology AI) to help oncologists select the most effective treatment for cancer patients based on their genetic makeup.

The government programme for the promotion of AI in Healthcare:

- Ayushman Bharat Digital India Mission
- IndiGen Programme (for genome sequencing of Indians)
- Human Genome Project
- Health Stack
- **ICMR guideline of use of AI in Healthcare**
- AIRAWAT (AI Research, Analytics and Knowledge Assimilation platform): India's first AI-specific cloud computing infrastructure

Conclusion:

The AI market has witnessed significant growth, from $200 million in 2015 to $700 million in 2018, with projections indicating a surge to $5 billion by 2024. The integration of AI in drug discovery has the potential to **revolutionize the pharmaceutical industry** and healthcare sector in India and further support India's position as the '**Pharmacy of the World**'.

Insta Links:

Use of Artificial Intelligence in Medicine

Prelims Links

Q. With reference to agriculture in India, how can the technique of 'genome sequencing', often seen in the news, be used in the immediate future?

1. Genome sequencing can be used to identify genetic markers for disease resistance and drought tolerance in various crop plants.
2. This technique helps in reducing the time required to develop new varieties of crop plants.
3. It can be used to decipher the host-pathogen relationships in crops

Select the correct answer using the code given below:
(a) 1 only

(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3
Answer: D

Topics: Conservation related issues, environmental pollution and degradation, environmental impact assessment.

4. THE VITAL ROLE PLAYED BY TRIBAL COMMUNITIES IN PRESERVING FORESTS

Context:
Droupadi Murmu (in this article) emphasized the vital role of preserving forests and advocated for listening to tribal communities, whose collective wisdom can guide ecological sustainability.

About Scheduled Tribes in India:

Aspects	Description
The Constitution of India does not define the term **'tribe'**. **Article 342 (i)** empowers the President to specify Scheduled Tribes. **Fifth Schedule** establishes Tribes' Advisory Councils. STs constitute **8.6%** of the Population (census 2011). **Draft National Tribal Policy, 2006** records **698 STs** in India. **Bhil** is the largest tribal group (38%) followed by Gonds. **Madhya Pradesh** has the highest tribal Population in India. Santhal are the oldest Tribes in India.	
According to Lokur Committee (1965):	1. Indication of Primitive Traits
	2. Distinctive Culture
	3. Shyness of Contact with the Community at Large
	4. Geographical Isolation
	5. Backwardness
Educational & Cultural Safeguards	**Article 15(4):** Special provisions for advancement of STs.
	Article 29: Protection of Interests of Minorities (includes STs).
	Article 46: Promotion of educational and economic interests.
	Article 350: Right to conserve distinct Language, Script or Culture.
Political Safeguards	**Article 330:** Reservation of seats for STs in Lok Sabha.
	Article 332: Reservation of seats for STs in State Legislatures
	Article 243: Reservation of seats in Panchayats.
Administrative Safeguard	**Article 275:** Grant of special funds for welfare and administration.

Roles Tribal Population Play in Forest Conservation:

Roles	Examples
Eco-tourism Initiatives	Khonoma village in Nagaland, managed by the Angami tribe, **promotes community-based eco-tourism** while preserving forests and traditional practices.
Tribal Forest Guardians Program	Implementation of a **"Tribal Forest Guardians" program**, training tribal members as forest guards or eco-guides, leveraging their local ecological knowledge.
Tribal Knowledge Banks	**Documenting traditional ecological knowledge**, like the rice-fish cultivation system of **the Apatani tribe in Arunachal Pradesh**, and integrating it into conservation strategies.
Forest Product Value Addition and Marketing	Establishing **processing units for forest products** and creating market linkages, exemplified by the **Hakki Pikki tribe's Adiwasi Herbal Hair Oil.**
Preservation of Sacred Groves	**Garasia tribes in** Sirohi district, Rajasthan preserve forests as sacred groves, protecting threatened species.

Rotational Farming and Grazing	**Gond, Pradhan, and Baiga tribes** of Madhya Pradesh practice **Utera farming and Badi cropping system**.
Sustainable Fishing Practices	**Wancho and Nocte tribes of Tirap district**, Arunachal Pradesh employ bamboo and stone obstructions for fishing.
Wildlife Protection through Beliefs and Totems	**Adi tribes of Arunachal Pradesh** do not hunt animals like tigers, sparrows, and pangolins due to cultural beliefs.
Community-based Conservation Efforts	Idu Mishmis declare forest areas as **"Community Conserved Areas"; Bishnoi Tiger Force** combats poaching in Rajasthan.

Key Challenges Encountered by Tribals in India:

1. **Land Alienation and Displacement**: Tribes face displacement due to development projects like mining and dams, disrupting their traditional lands.
2. **Lack of Implementation of Forest Rights** Act: Slow implementation of the Act has led to delays and harassment, with many facing illegal evictions.
3. **Threats to Traditional Livelihood Practices**: Conservation policies and restrictions have endangered traditional practices like shifting cultivation and hunting.
4. **Loss of Traditional Knowledge and Cultural Erosion**: Migration to urban areas risks the loss of traditional knowledge and cultural practices.
5. **Impact of Climate Change:** Tribes, reliant on natural resources, are vulnerable to climate change impacts, affecting agriculture and livelihoods.
6. **Lack of Education**: Inadequate infrastructure and language barriers hinder tribal education, leading to a preference for immediate employment over schooling.
7. **Health and Nutrition Issues**: Economic backwardness results in health problems and malnutrition among tribal populations.
8. **Gender Issues**: Environmental degradation and commercialization affect gender roles and create societal challenges.
9. **Erosion of Identity:** Modern institutions conflict with traditional tribal laws, leading to concerns about preserving cultural identity and language extinction.

Solutions for Tribal Forest Conservation:

1. **Listen to Tribal Communities**: Incorporate tribal wisdom for ecologically sustainable practices.
2. **Amend Curriculum:** Adapt forest service training to address climate change and conservation challenges.
3. **Learn and Propagate**: Engage with tribal communities, learn from their practices, and propagate their sustainable methods.
4. **Balance Tradition and Modernity**: Acknowledge and integrate traditional knowledge with modern conservation approaches.
5. **Participatory Forest Management**: Strengthening participatory forest management models like Joint Forest Management (JFM) by ensuring tribal communities' active involvement in decision-making processes.

Insta Links:

- Indigenous Knowledge – Konda Reddi tribe
- The 'Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Rights Act)'

Prelims Link:

Q.1 Consider the following pairs: (UPSC 2013)

	Tribe	State
1.	Limboo (Limbu)	Sikkim
2.	Karbi	Himachal Pradesh
3.	Dongaria Kondh	Odisha
4.	Bonda	Tamil Nadu

Which of the above pairs are correctly matched?
(a) 1 and 3 only
(b) 2 and 4 only
(c) 1, 3 and 4 only
(d) 1, 2, 3 and 4
Ans: A

Q.2 Consider the following statements about Particularly Vulnerable Tribal Groups (PVTGs) in India: (UPSC 2019)

1. PVTGs reside in 18 States and one Union Territory.
2. A stagnant or declining population is one of the criteria for determining PVTG status.
3. There are 95 PVTGs officially notified in the country so far.
4. Irular and Konda Reddi tribes are included in the list of PVTGs.

Which of the statements given above are correct?
(a) 1, 2 and 3
(b) 2, 3 and 4
(c) 1, 2 and 4
(d) 1, 3 and 4
Ans: C

Q. 3 Under the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, who shall be the authority to initiate the process for determining the nature and extent of individual or community forest rights or both? (UPSC 2013)
(a) State Forest Department
(b) District Collector/Deputy Commissioner
(c) Tahsildar/Block Development Officer/Mandal Revenue Officer
(d) Gram Sabha
Ans: D

Q. At the national level, which ministry is the nodal agency to ensure effective implementation of the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006?
(a) Ministry of Environment, Forest and Climate Change
(b) Ministry of Panchayati Raj
(c) Ministry of Rural Development
(d) Ministry of Tribal Affairs
Ans: D

5. ECONOMIC COST OF CLIMATE CHANGE

Context:
The economic toll of climate change is staggering, with recent UN studies revealing that **global GDP could have been 37% higher** without warming since 1960.

What is Climate Change?
Climate change refers to **long-term alterations in temperatures and weather patterns**. While natural factors like **solar activity and volcanic eruptions** can contribute, human activities, especially the burning of fossil fuels, have been the primary driver since the 1800s. From 1970 to 2021, nearly 12,000 climate change-induced disasters occurred, causing over 2 million deaths and **$4.3 trillion** in economic losses.

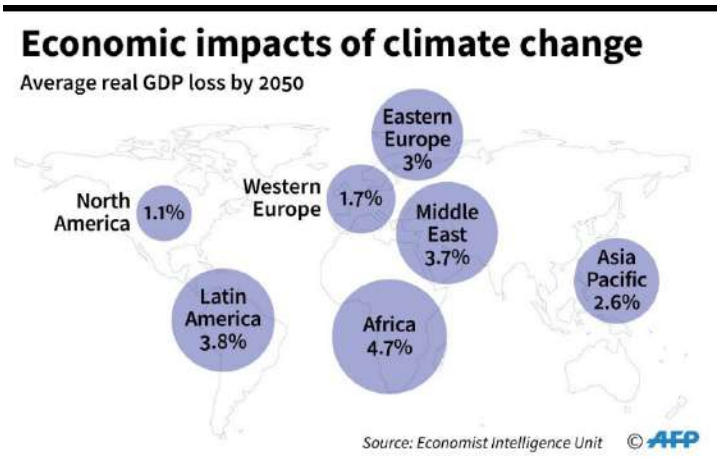
India ranked 7th in the Global Climate Risk Index 2021, indicating high exposure and vulnerability to climate risk events. Its diverse climate faces various temperatures, precipitation patterns, and extreme weather events, impacting the economy spatially and temporally.

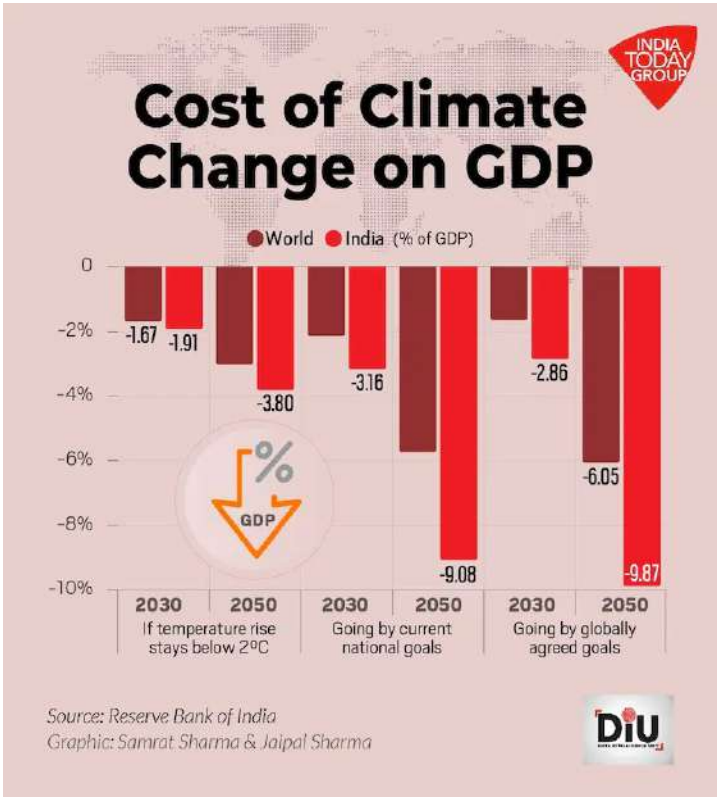
Impact of Climate Change on the Economy:

Impacts	Description
Reduced Agricultural Productivity and Yield	Climate change can **disrupt crop cycles and lower agricultural** yield
	The **southwest monsoon has also become unpredictable**. The annual average rainfall in India has gradually declined while intense wet spells as well as dry spells have increased in India.
Setback to Industrial and Service Sector	Increased operational costs, reduced profits, and infrastructure damage can occur due to **climate-related regulations, investment shifts, and extreme weather events**, affecting industrial and service sectors.
Infrastructure Damage	Extreme weather events like **floods and heatwaves** induced by climate change can cause significant damage to infrastructure, leading to economic losses.
Labor Market Impacts	Climate-induced **health hazards** may reduce productivity and prompt migration from climate-vulnerable areas; Global job losses from heat stress by 2030.
	In 2020, the **World Bank said that India could account for 34 million of the projected** 80 million global job losses from heat stress-associated productivity declineby2030.
Risks for Banks and Financial Institutions	Physical and transition risks from climate change can affect banks and financial institutions directly and indirectly, impacting their credit, market, liquidity, operational, and reputational risks.

Impacts on High-Emission Industries	Industries contributing to **high greenhouse gas emissions face challenges in transitioning to cleaner technologies**, affecting electricity production, transportation, and other sectors.
Resource Scarcity	Climate **change worsens water scarcity**, leading to conflicts over shared water resources, and impacting agriculture, hydropower, and economic activities.
Erupted Arctic Economic Opportunities	Melting Arctic sea ice opens economic opportunities but also raises **concerns over resource exploitation and territorial disputes** among nations with interests in the region.
Climate-induced Conflicts	Climate change exacerbates **existing tensions and conflicts over resources,** particularly in regions facing political instability and economic challenges, such as the Syrian conflict influenced by prolonged drought.
Climate-related Supply Chain Disruptions	Extreme weather events disrupt global supply chains, causing **economic losses and shortages of critical goods**, exemplified by the 2011 floods in Thailand impacting electronics and automotive manufacturing.
Climate Gentrification	Climate change susceptibility prompts **wealthier individuals and businesses to relocate**, potentially leading to economic displacement and further marginalization of vulnerable communities in safer areas.

Risk Emanating from climate change:





What should be done:

1. **Industrial Symbiosis**: Revolutionize circular economy, incentivize waste reduction, and promote industrial symbiosis.
2. **Public-Private Partnerships**: Encourage collaborations for green innovation, and establish dedicated funds for startups.
3. **Climate-Conscious Urban Planning**: Prioritize sustainability in city planning, and integrate climate measures into Smart Cities Mission.
4. **Climate-Resilient Special Economic Zones (SEZs):** Create zones with sustainable practices, and attract green businesses and industries.
5. **National Green Taxonomy**: Establish a classification system for sustainable activities, and guide investments and policies.
6. **Green Bond Financing**: Issue sovereign green bonds to fund climate-resilient infrastructure projects.

Conclusion:

India, the third-largest emitter of greenhouse gases in 2020, is projected to peak emissions between 2040-2045, posing challenges for its energy transition plans. A forward-thinking approach is crucial for navigating this trajectory effectively.

Mains Link:

Q.1 Describe the major outcomes of the 26th session of the Conference of the Parties (COP) to the United Nations Framework Convention on Climate Change (UNFCCC). What are the commitments made by India in this conference? (UPSC 2021)

Q.2 'Climate Change' is a global problem. How will India be affected by climate change? How Himalayan and coastal states of India be affected by climate change? (USPC 2017)

Prelims Link

Q.1 In the context of India's preparation for Climate-Smart Agriculture, consider the following statements: (UPSC 2021)

1. The 'Climate-Smart Village' approach in India is a part of a project led by the Climate Change, Agriculture and Food Security (CCAFS), an international research programme.
2. The project of CCAFS is carried out under Consultative Group on International Agricultural Research (CGIAR) headquartered in France.
3. The International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in India is one of the CGIAR's research centres.

Which of the statements given above are correct?
(a) 1 and 2 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3
Ans: (d)

Q.2 Which of the following best describes/describe the aim of 'Green India Mission' of the Government of India? (UPSC 2016)

1. Incorporating environmental benefits and costs into the Union and State Budgets thereby implementing the 'green accounting'.
2. Launching the second green revolution to enhance agricultural output so as to ensure food security to one and all in the future.
3. Restoring and enhancing forest cover and responding to climate change by a combination of adaptation and mitigation measures.

Select the correct answer using the code given below.
(a) 1 only
(b) 2 and 3 only
(c) 3 only

(d) 1, 2 and 3
Ans: (c)

Q.3 With reference to 'Global Climate Change Alliance', which of the following statements is/are correct? (USPC 2017)
1. It is an initiative of the European Union.
2. It provides technical and financial support to targeted developing countries to integrate climate change into their development policies and budgets.
3. It is coordinated by World Resources Institute (WRI) and World Business Council for Sustainable Development (WBCSD).

Select the correct answer using the code given below:
(a) 1 and 2 only
(b) 3 only
(c) 2 and 3 only
(d) 1, 2 and 3
Ans: (a)

GENERAL STUDIES – 4

1. FROM KAUTILYA TO IMMANUEL KANT: LESSONS FOR A WORLD AT WAR

Context:
Kant's rationality and ethics remain relevant in today's world, fraught with geopolitical interests and fake news.

Who was Immanuel Kant?
Immanuel Kant (1724-1804) was a German philosopher from Königsberg, Prussia. He is best known for his works in epistemology, ethics, and metaphysics, particularly the "**Critique of Pure Reason."** Kant's philosophy emphasized reason, rationality, and autonomy, and he argued for perpetual peace, open trade, and the idea of a world citizen. His ideas continue to influence contemporary thought in various fields, including ethics, politics, and international relations.

Key Ideas	Description
Rejection of Imperialism and Colonialism	Kant opposed imperialism, colonialism, and slavery, advocating for the autonomy of nations and individuals.
Support for Open Trade and Immigration	He believed in the benefits of open trade and supported the right to refuge and free movement of people.
Concept of a World Citizen	Kant introduced the idea of a "world citizen" who could travel freely across borders, promoting global unity.
Emphasis on Reason, Rationality, and Morality	Kant stressed that political actions should be guided by reason, rationality, and ethical principles.

Relevant to his ideas in today's world:
1. **Crisis in Multilateral Order**: Kant's ideas are being reassessed due to dysfunctionality in the multilateral order, as seen with the UN's struggles.
2. **Global Citizenship**: His concept of a **"world citizen"** resonates in today's globalized world, advocating for free movement and open trade.
3. **Ethics and Rationality**: Kant's emphasis on reason, rationality, and morality remains crucial in addressing issues like terrorism and aggression by nations.
4. **Global Non-Self-Governing Territories**: Kant's rejection of imperialism and colonialism is relevant as 17 territories still seek self-government, reflecting ongoing colonial legacies.
5. **Modern Challenges**: Kant's vision of **"perpetual peace"** contrasts with today's realities of global terrorism, multinational corporations, and AI-driven warfare.

India's perspective emphasizes its **ancient strategic culture**, which draws wisdom from texts like the **Ramayana, Mahabharata, Arthashastra, and Tirukkural**, assessing statecraft through the lens of ethics. During its G20 Presi-

dency, India promoted the motto "**One Earth, One Family, One Future**," inspired by **Vasudhaiva Kutumbakam**, reflecting its commitment to global unity. Rooted in its cultural heritage, India values serving humanity. It aims to blend Kant's ideas with its own ancient teachings, offering a new moral compass for international relations.

CONTENT FOR MAINS ENRICHMENT

CONTEXT	USAGE IN ANSWERS
1. MANTHAN (FILM)	Context: In the mid-1970s, **half a million dairy farmers in Gujarat contributed two rupees each to fund "Manthan," India's first crowd-funded film**, directed by Shyam Benegal. This 1976 film depicts the rise of a **dairy cooperative movement inspired by Verghese Kurien,** transforming India into the world's top milk producer. Restored after 50 years, it premiered at Cannes recently. **Values shown by this film:** "Manthan" portrays values such as community cooperation, social justice, empowerment of marginalized groups, and the **transformative power of collective action**. It highlights the significance of grassroots movements in driving social and economic change. **About Dr. Verghese Kurien (1921-2012):** Also known as the 'Father of the White Revolution in India,' he spearheaded **'Operation Flood,'** the world's largest agricultural program. He established 30 farmer-run institutions and played a key role in the success of the **Amul brand**, leading India to become the world's largest milk producer in 1998. His efforts extended to managing the **Delhi Milk Scheme** and making India **self-sufficient in edible oils**. Honoured with the **Ramon Magsaysay Award, Krishi Ratna, World Food Prize**, and India's highest civilian awards (Padma Shri, Padma Bhushan, and Padma Vibhushan), **National Milk Day on November 26** commemorates his birth anniversary.
2. INDIA'S 'ALL WE IMAGINE AS LIGHT' WINS GRAND PRIX	**Context:** Indian director **Payal Kapadia's debut film "All We Imagine As Light"** won the Grand Prix prize. **All We Imagine As Light is an Indo-French production** about a nurse, Prabha, and her friend, Anu, who embark on a transformative road trip. Kapadia's previous documentary, **A Night of Knowing Nothing**, won the Golden Eye award at Cannes. **What is the Cannes Film Festival?** The Cannes Film Festival is a **prestigious annual event held in Cannes, France**, showcasing international films and attracting global attention for its film premieres, red-carpet events, and exclusive industry gatherings. It **began in 1946** and is renowned for awarding **the prestigious Palme d'Or** to outstanding films. **Festival Highlights** 1. **Features film premieres**, screenings, and exclusive industry events. 2. **Red carpet events** attract global media attention. 3. **Notable for awarding the prestigious Palme d'Or**, with films like "Taxi Driver," "Pulp Fiction," and "Parasite" among winners. 4. The only Indian film to win the Palme d'Or was **"Neecha Nagar" in 1946.**

FACTS FOR PRELIMS

GS-1

Art & Culture

1. 2024 INTERNATIONAL BOOKER PRIZE

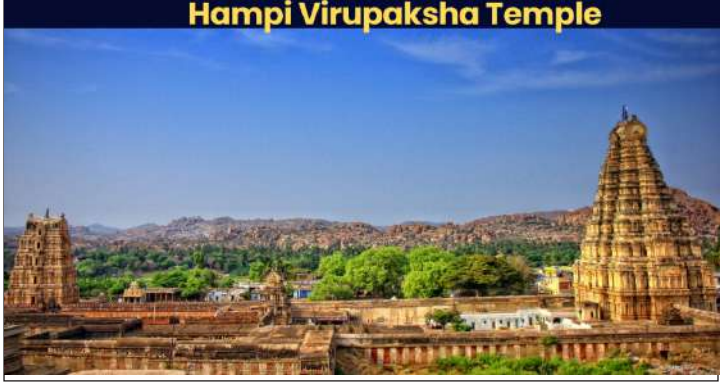
Context:
Jenny Erpenbeck's **novel "Kairos" wins the 2024 International Booker Prize**, depicting a **complex love story amidst East Germany's final years**.
Set against the backdrop of the **Berlin Wall's fall**, it explores personal and national transformations.
About the International Booker Prize (formerly known as the Man Booker International Prize):

It is awarded annually to recognize the **finest translated work of fiction worldwide**. **Established in 2005**, it encourages reading diverse fiction and has impacted reading habits in the UK. Eligible works must be **long-form fiction originally written in any language** but translated into English. The £50,000 prize is equally split between the author and translator, with shortlisted candidates receiving £2,500 each.

2. HAMPI'S VIRUPAKSHA TEMPLE

Context:
A portion of **Hampi's Virupaksha temple collapsed** due to heavy rains.

About the Temple:
The **Virupaksha Temple in Hampi**, dedicated to **Lord Virupaksha (a form of Shiva),** is a **UNESCO World Heritage Site** in Karnataka. Constructed by **Lakkan Dandesha** under **Prauda Deva Raya** of the Vijayanagara Empire, it's one of India's oldest temples, dating back to the **7th century**. The temple features **intricate Dravidian architecture** with a nine-tiered entrance gate and mathematical patterns. It has survived through the **Chalukyan and Hoysala periods**, despite damage during Mughal rule. Notable festivals include the marriage of Virupaksha and Pampa in December and the chariot festival in February.



History

3. WAS THE STONE AGE ACTUALLY THE AGE OF WOOD?

Context:
New research suggests that the **Stone Age, known for stone tools,** might also be termed the **"Wood Age"** due to advanced woodworking.

A study of **300,000-400,000-year-old wooden artefacts** from Schöningen, Germany, reveals that these tools required significant skill and precision. The study identified 187 wooden artifacts showing varied woodworking techniques.

The Stone Age, lasting from 3.4 million years ago to around 6,000-4,000 years BP, is traditionally divided into the **Palaeolithic, Mesolithic, and Neolithic periods**, characterized by stone **tool use and a hunter-gatherer lifestyle** transitioning to settled agriculture.

Period	Time Frame	Characteristics
Paleolithic Age	500,000 – 10,000 BCE	Divided into three phases:
		Early/Lower Palaeolithic (500,000 B.C. – 50,000 B.C.): Hand-axes, cleavers, choppers.
		Middle Palaeolithic (50,000 B.C. – 40,000 B.C.): Flakes, points, scrapers.
		Upper Palaeolithic (40,000 B.C. – 10,000 B.C.): Blades, borers, advanced tools.
Mesolithic Age	10,000 – 6000 BCE	Transitional phase between Paleolithic and Neolithic; hunting, fishing, food gathering, and early domestication of animals.
Neolithic Age	6000 – 1000 BCE	Polished stone tools, stone axes; development of early agriculture and animal domestication.

Society

4. MURIA TRIBE

Context:
Muria tribal farmer practices the **traditional 'deda' seed preservation method**, handed down by his ancestors. This eco-friendly technique involves **storing seeds in leaves, packed nearly airtight to resemble boulders**, providing multi-layer protection from pests and worms. Each 'deda' **supports up to 5kg of seeds and can preserve them for up to five years**. The method, used for pulses like green gram and red gram, ensures food security for Muria families settled in the Godavari valley, who migrated from Chhattisgarh due to conflict.

About the Murias Tribe:
They are a sub-group of the Gond tribe, primarily residing in **Chhattisgarh, India**. They are known for their involvement in the **Muria Rebellion of Bastar in 1876**, which was a revolt against **Gopinath Kapardas, the diwan of Bastar**. The Murias have unique customs, including the practice of **burying the dead in structures called "Gudi,"** where a stone is placed 6 to 7 feet high. Additionally, they have a social institution **known as "Ghotul,"** where young boys and girls have the freedom to choose their own life partners.

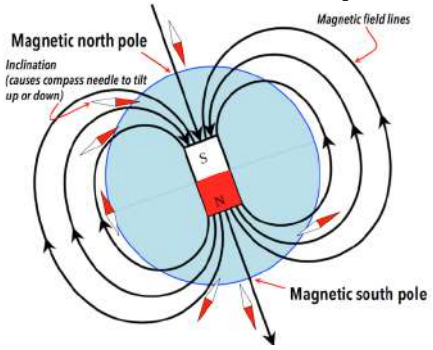
Geography

5. EARTH'S MAGNETIC FIELD

Context:
About 600 million years ago, Earth's magnetic field weakened significantly, allowing more solar radiation to reach the planet.

Impact:
The weakening magnetic field **exposed the atmosphere to solar radiation**, releasing free oxygen atoms that facilitated the emergence of early life forms. It coincided with the **Ediacaran Period** (about 635 million to 541 million years ago), during which **multicellular organisms evolved due to increased oxygen levels** in the atmosphere and oceans. This research challenges previous theories about the origin of oxygen and suggests that multiple factors contributed to its accumulation.

About Earth's Magnetic Field:

Earth's Magnetic Field	Description
About	Earth's magnetic field (or geomagnetic field) is generated in the planet's interior and extends into space, creating a region called the **magnetosphere and interacting with the solar wind**. The magnetic field is generated by **convection currents of molten iron and nickel** in the Earth's core (also called the **geodynamo process)**, which carry charged particles and generate magnetic fields. Earth's magnetic field is **generated by the outer core**.
	Not only Earth, but **Jupiter, Saturn, Uranus, and Neptune** also have strong magnetic fields, which are not fully understood. **Mars lacks the inner heat and liquid interior** needed for a magnetic field, while **Venus has a liquid core but spins too slowly** to generate one. 

Magnetic Poles	Earth has two sets of poles: the **geographic poles and the magnetic poles.** The geographic North and South poles are the locations where the lines of longitude converge, with the Geographic North Pole situated in the middle of the Arctic Ocean and the Geographic South Pole located in Antarctica. In contrast, the **magnetic poles are the locations where the magnetic field lines enter and exit the Earth's surface**. The Magnetic North Pole, also known as the **North Dip Pole**, is currently found on **Ellesmere Island in northern Canada**.
Magnetic Pole reversal	The forces that generate Earth's magnetic field are constantly changing, causing changes in the strength of the magnetic field. This causes the **location of Earth's magnetic north and south poles to gradually shift**, and to even completely flip locations around **every 300,000 years**. During a pole reversal, the magnetic field weakens but doesn't completely disappear.
Magnetic Field's Lifetime	Previous studies suggested a magnetic field on Earth at **least 3.5 billion years** old, but a recent study has extended its lifetime by another 200 million years. **Using uranium-to-lead ratio analysis**, researchers estimated that some of the magnetised minerals in the rocks were approximately **3.7 billion years old**.
Potential Role in Earth's Habitability	The early magnetic field may have played a **critical role in making the planet habitable**. It likely helped retain a life-sustaining atmosphere and shielded the planet from damaging solar radiation.

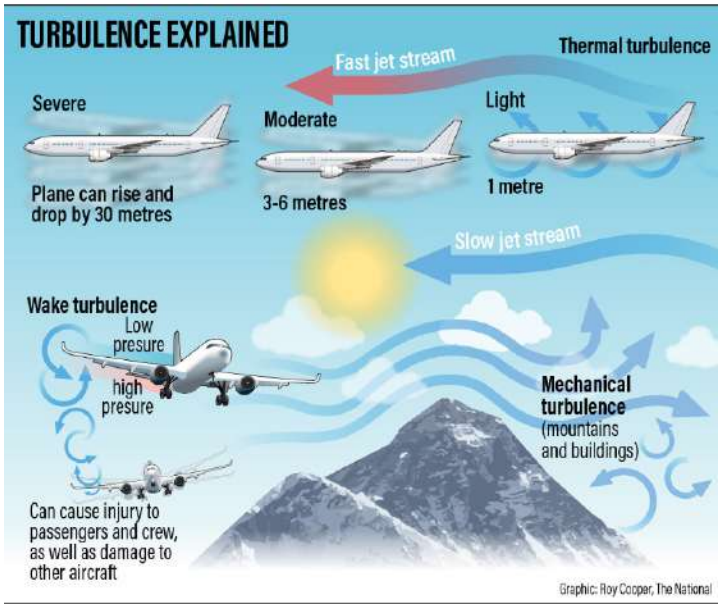
6. TURBULENCE

Context:

A recent Singapore Airlines flight encountered severe mid-air turbulence, a type called **Clear-air turbulence**, caused by wind shear.

What is Wind shear?

It is the change in wind speed or direction over a distance, occurring horizontally or vertically at various altitudes. It's commonly associated with weather phenomena like jet streams, mountain waves, or thunderstorms.



What is Turbulence?

Turbulence is the **irregular motion of air** that can occur during flight. It manifests as sudden, unpredictable changes in airflow, causing the aircraft to experience shaking or bouncing movements.

Turbulence occurs in aircraft due to various factors, including:

1. **Atmospheric Conditions:** Turbulence can be caused by disturbances in the atmosphere, such as wind shear, jet streams, thermal convection, or mountain waves.
2. **Weather Systems:** Thunderstorms, frontal boundaries, and other weather systems can create turbulent conditions as aircraft encounter changes in air pressure, temperature, and moisture.
3. **Terrain Effects**: Near mountains or large land masses, aircraft may experience turbulence caused by the interaction of air masses with terrain features.
4. **Wake Turbulence**: Aircraft generate wake turbulence, or vortices, as they move through the air. Following aircraft can encounter these vortices, leading to turbulence.
5. **Clear-Air Turbulence**: This type of turbulence occurs in clear air and is often associated with changes in wind speed and direction at high altitudes, such as jet streams.

7. HEAT INDEX

Context:
The mercury in Delhi **reached 41°C recently**, but with high humidity, the heat index soared to a blistering 50°C.

IMD now **measures the heat index, factoring in both temperature and humidity**, providing a more accurate sense of discomfort. Expectations are for the index to hit 54-56°C in the next 48 hours.

Heat Index (HI):
Launched by the India Meteorological Department (IMD) on an **experimental basis**. Also known as **Apparent Temperature**, it reflects what the temperature feels like to the human body when relative humidity is combined with the air temperature. It provides information **about the impact of humidity on high temperatures** and serves as an indicator of human discomfort.

Color codes used for HI:
1. **Green**: HI less than 35°C
2. **Yellow**: HI between 36-45°C
3. **Orange**: HI between 46-55°C
4. **Red**: HI greater than 55°C

GS-2

Salient features of Indian Constitution & Functioning

1. USE OF STATE-FUNDED MEDIA DURING POLLS

Context:
Recent incidents involving Sitaram Yechury and G Devarajan, where changes were made to their speeches aired on Doordarshan and AIR, have sparked controversy

About the use of state-funded media during polls:

Aspect	Descriptions
ECI's Allocation of Time	Since 1998**, recognised political parties** have been allowed to freely use state-owned television and radio during polls.
	The **ECI determines the time allotted** to each recognised national and state party before the election campaign begins.
	National Parties:
	- 10 hours of telecasting time on Doordarshan's national channel
	- At least 15 hours on its regional channels
	- 15 hours of airing on regional AIR stations
	- 10 hours on the national AIR
	State Parties:
	- At least 30 hours of telecasting time on the appropriate regional Doordarshan channel
	- AIR radio station
	Time Allotted for 2024 Elections:
	- For national parties: **4.5 hours** (45 minutes each) on Doordarshan and AIR
	- Remaining **5.5 hours** allocated based on vote share in 2019 Lok Sabha elections
	- Similar formulae followed for state parties

ECI's Guidelines on Speech Contents	Parties and speakers are **expected to submit transcripts of speeches three to four days** before recording.
	Transcripts must be approved by concerned authorities in respective AIR and Doordarshan stations.
	Forbidden Speech Content:
	Criticism of other countries; Attack on religions or communities; Obscenity or defamation; Incitement of violence; Contempt of court; Attacks against the integrity of the President and judiciary; Statements affecting the unity, sovereignty, and integrity of the nation; Criticism of individuals by name
Concerns Raised by Opposition Leaders	According to Sitaram Yechury, censorship applied to his text is a patent denial of the **right to dissent in a democracy**.

2. SPECIAL CATEGORIES OF VOTERS

Type of Voting	Description	Eligible Voters
In-Person Voting	Voters cast their ballots at designated polling stations on the specified election day using EVMs.	All registered voters.
Postal Ballots	Allows remote voting outside the polling station, without EVMs, before the designated poll date.	Special voters, Essential service workers (railways, telecom, health, media, etc.)., voters on election duty, detainees, and certain absentee voters.
	Postal Voting Centers (PVC): Centers where essential service absentee voters can obtain and cast their postal ballots before the election day.	
Electronically Transmitted Postal Ballot System (ETPBS)	Encrypted ballots are sent electronically to service voters, who return completed ballots by post.	Service voters (armed forces, paramilitary, government employees abroad).
Home Voting	Election teams visit homes of **85+ aged voters, PwD, and COVID-19**-affected voters to facilitate postal voting.	Voters aged 85+, persons with disabilities, COVID-19 affected voters.
Election Duty Certificate (EDC)	Allows election duty personnel to vote at their duty polling station within the same constituency.	Election duty personnel.
Proxy Voting	Service voters appoint a proxy to vote on their behalf at their designated polling station.	Armed and paramilitary forces (Classified Service Voters).
Assisted Voting	Allows a companion to assist a blind or disabled voter in casting their vote.	Voters with blindness or other disabilities.

Constitutional and Non- Constitutional Bodies

3. NCBC RECOMMENDS INCREASING THE RESERVATION QUOTA FOR OBCS

Context:
The National Commission for Backward Classes (NCBC) has recommended **increasing the reservation quota for Other Backward Classes (OBCs)** in public employment in Punjab and West Bengal.

Currently, **Punjab allocates 25% of public employment** positions to Scheduled Castes and 12% to OBCs, totalling

37% reservation. The NCBC has proposed enhancing the OBC quota by an **additional 13%**, bringing the total OBC reservation in public employment to 25%, adhering to the **Supreme Court's ceiling of up to 50% reservation for socially and educationally backward classes** (in the **Indra Sawhney case**).

In West Bengal, the reservation quota for Scheduled Castes, Scheduled Tribes, and Other Backward Classes is **22%, 6%, and 17%, respectively**, in government-run or aided establishments. The NCBC suggests increasing the OBC reservation to reach the **50% ceiling set by the Supreme Court.**

About the National Commission for Backward Classes (NCBC):
It was established as a statutory body under the **NCBC Act, 1993**, and was granted Constitutional Status through the **102nd Constitution Amendment Act, 2018**, with the insertion of **Article 338B**. The commission consists of a Chairperson, Vice-Chairperson, and three other Members in the rank and pay of **Secretary to the Government of India**. Its mandate includes investigating and monitoring all matters related to the safeguards provided for **socially and educationally backward classes**. Additionally, the NCBC advises the Central Government on **OBC inclusion/exclusion requests** from state or central governments. The commission **presents its report to the President annually** and at other times as it deems fit. If the Government disagrees with its recommendations, **it must record its reasons.**

4. FORM 17C

Context:
A **dispute has arisen over the Election Commission's (EC)** handling of voter turnout data, **particularly related to Form 17C**.

- Form **17C records** detailed **polling data, including the number of votes cast and rejected at each booth.**
- The Commission maintained **there is no legal mandate for it to make public the total number of votes cast in each polling station**. It says copies of Form 17C are shared with the polling agents present **immediately upon the close of polling.**

About Form 17C:
The **Conduct of Election Rules, 1961** require the EC to maintain two forms- **Forms 17A and 17C.** Form **17A records the details of every voter** who enters a polling booth and casts their vote. **Form 17C contains the total number of votes cast.**

5. INSTITUTE OF CHARTERED ACCOUNTANTS OF INDIA (ICAI)

Context:
The Supreme Court upheld a **regulation by the Institute of Chartered Accountants of India (ICAI),** limiting chartered accountants to accepting a maximum number of tax audit assignments per financial year.

What is ICAI?
The Institute of **Chartered Accountants of India (ICAI) is a statutory body** established under the Chartered Accountants Act, 1949, by the Indian Parliament to regulate the **chartered accountancy profession** in the country. It operates under the **Ministry of Corporate Affairs, Government of India**, with its headquarters in New Delhi. As the world's **second-largest professional body** of chartered accountants, ICAI is governed by a **Council comprising elected and nominated members**. Its functions include regulating the profession, conducting examinations and education, providing continuing professional education, formulating accounting standards, ensuring ethical standards, and exercising disciplinary jurisdiction. Additionally, ICAI contributes input on policy matters to the government.

About National Financial Regulatory Authority (NFRA):
It is an Indian body established under the **Companies Act 2013** to enforce accounting and auditing standards, oversee auditor work, and recommend standards. It has the authority to investigate professional misconduct by chartered accountants or CA firms, impose penalties, and bar them **for up to 10 years**.

International Relations

6. ANTARCTIC PARLIAMENT MEETS IN KOCHI

Conext:
India has hosted the **46th Antarctic Treaty Consultative Meeting (ATCM 46)** in **Kochi**, organized by the National Centre for Polar and Ocean Research through the Ministry of Earth Sciences.

What is ATCM (also called Antarctic Parliament)
The Antarctic Treaty Consultative Meeting (ATCM) is an annual gathering of the parties to the **1959 Antarctic Treaty**, including the original twelve signatories and other nations conducting significant research in Antarctica.

At this year's ATCM, **India will introduce a new working group focused on formulating regulations to monitor tourism** and protect the continent's fragile ecosystem. Representatives from the **56 member countries of the Antarctic Treaty** will attend. This is the first time India is hosting the meeting since 2007.

Key Agenda at ATCM 46

1. Promoting peaceful governance in Antarctica.
2. Introducing a new working group to regulate tourism and mitigate its impact on the fragile ecosystem.
3. Discussing sustainable management of resources, biodiversity, research collaboration, and climate change impacts.
4. Presenting India's plan for the construction of Maitri II.

About Antarctic Treaty

The Antarctic Treaty**, signed on December 1, 1959**, and in force since June 23, 1961, is an **international agreement governing activities in Antarctica**. It designates the continent as a **scientific preserve,** ensuring it remains exclusively for peaceful purposes. Initially signed by 12 countries, the treaty now **includes 56 signatories, with India joining in 1983**. Key provisions prohibit military activities, promote scientific cooperation, and ban nuclear explosions and radioactive waste disposal.

India in Antarctica

Since 1983, India has been a **consultative party to the Antarctic Treaty**, participating in governance decisions. India operates three research stations: **Dakshin Gangotri (1983-1990), Maitri (since 1989), and Bharati (since 2012).** India plans to establish a new station, Maitri II, by 2029. In 2022, **India enacted the Antarctic Act** to reaffirm its commitment to the treaty's principles.

7. ICC ISSUES ARREST WARRANT AGAINST ISREAL'S PM AND HAMAS LEADER

Context:

The Prosecutor of the International Criminal Court (ICC) requested arrest warrants against leaders of Hamas and Prime Minister Benjamin Netanyahu of Israel about the October 7, 2023 attacks and the war in Palestine.

What is the International Criminal Court?

The International Criminal Court (ICC) is a permanent international court headquartered in **The Hague, Netherlands. Established by the Rome Statute in 1998 (entered into force on July 1, 2002)**, it investigates, prosecutes, and tries individuals accused of genocide, crimes against humanity, war crimes, and the crime of aggression. With 124 countries as States Parties to the Rome Statute, **India, US, China are notably not a member**. The ICC comprises **18 judges serving non-renewable 9-year terms** and operates alongside, rather than replacing, national criminal justice systems, complementing their efforts. Palestine became the 123rd member of the Rome Treaty on April 1, 2015. **Israel is not a Party to the Rome Statute.**

Are ICC decisions binding? What happens next?

The ICC's decisions are binding. However, it relies on the cooperation of States for support, particularly for making arrests and transferring the arrested individuals to the ICC detention centre, for freezing assets, and enforcing sentences.

Previously, ICC issued **an arrest warrant for war crimes for President Vladimir Putin** (**first time that the ICC has issued an arrest warrant against one of the five permanent members** of the United Nation Security Council)

ICJ vs. ICC

	International Court of Justice (ICJ) La Cour Internationale de Justice (CIJ)	International Criminal Court (ICC) La Cour pénale internationale (CPI)
Year Court Established	1946	2002
UN-Relationship	Official court of the U.N., commonly referred to as the "World Court."	Independent. May receive case referrals from the UN Security Council.
Location	The Hague, The Netherlands	The Hague, The Netherlands
Types of Cases	Contentious between parties & Advisory opinions	Criminal prosecution of individuals
Subject Matter	Sovereignty, boundary, & maritime disputes, trade, natural resources, human rights, treaty violations, treaty interpretation, and more.	Genocide, crimes against humanity, war crimes, crimes of aggression
Funding	UN-funded.	Assessed contribution from state parties to the Rome Statute; voluntary contributions from the U.N.; voluntary contributions from governments, international organizations, individuals, corporations and other entities.

8. ARAB LEAGUE SUMMIT

Context:

UN Secretary-General António Guterres, speaking at the **Arab League Summit** in Bahrain, called for a **humanitarian ceasefire in Gaza, the release of all hostages, and unimpeded aid access.**

About the Arab League:

- The **Arab League, formally known as the League of Arab States**, is a **regional organization** of **Arab countries in and around North Africa and the Middle East.**
- It was founded on **March 22, 1945, in Cairo** with the signing of the **Pact of the League of Arab**

States also known as the Alexandria Protocol, by Egypt, Iraq, Transjordan (now Jordan), Lebanon, Saudi Arabia, and Syria.
- The League has since **expanded to include 22 member states** (India has observer status)

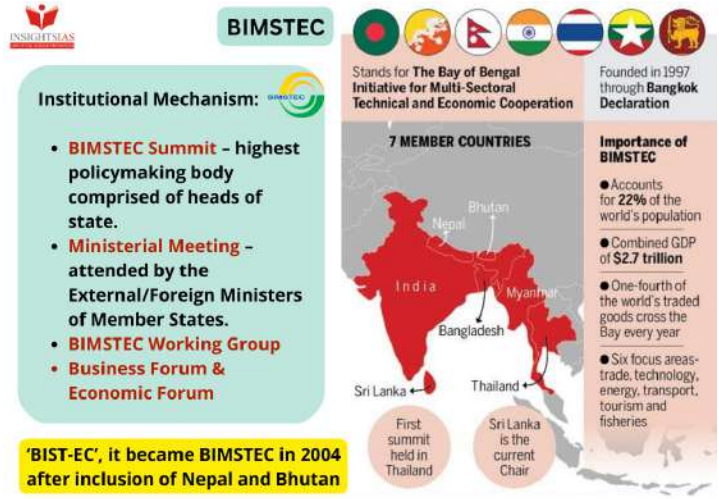
9. BIMSTEC

Context:
The BIMSTEC Charter, which came into force on May 20, 2024, grants the organization a **'legal personality,' enabling it to welcome new members and observers**.

This milestone **allows BIMSTEC to engage in structured diplomatic dialogue** with other countries and groupings. The charter reaffirms India's dedication to fostering a prosperous, peaceful, and sustainable neighbourhood, emphasizing shared history, culture, and mutual respect among member states.

What is Legal Personality?

Legal personality refers to the **recognition of an entity**, such as an organization or corporation, as having rights and obligations similar to those of a natural person.



SAARC	BIMSTEC
1. Only a regional organisation (South Asia)	1. Interregional organisation (South Asia+ South East Asia)
2. Established in 1985 with the signing of the SAARC Charter in Dhaka.	2. Established in 1997, with Bangkok declaration
3. Issues: Mistrust and suspicion, plagued by regional politics and asymmetric power balance	3. Members maintain reasonably friendly relations and Intra-regional trade has increase by around 6% in a decade.

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10. RECOGNITION OF PALESTINE

Context:
Ireland, Norway, and Spain plan to formally recognize the state of Palestine, highlighting a shift in international opinion. Recently, **143 countries, including India**, called for UN recognition of Palestine. The **International Criminal Court** has sought arrest warrants for Israeli leaders and Hamas for war crimes.

- These recognitions are **symbolic acts aimed at influencing Israel's actions in Gaza and supporting moderate Palestinian** forces. The international community is urging Israel to reconsider its stance on the two-state solution.

About Palestine:
Palestine, officially the State of Palestine, is **located in the southern Levant region of West Asia**. It comprises the **West Bank and Gaza Strip**, bordering Israel, Jordan, and Egypt. The capital is **Jerusalem**, with **Ramallah** as the administrative centre. Historically, the region has seen various rulers and holds religious significance for **Judaism, Christianity, and Islam**. After the Ottoman Empire's fall, the **British controlled Palestine** until the establishment of Israel in 1948, which led to the displacement of many Palestinians. The **Oslo Accords** in the 1990s led to the **creation of the Palestinian Authority**. Currently, the West Bank is partly governed by the Palestinian Authority, while Hamas controls the Gaza Strip.

Major challenges include the Israeli occupation, settlement expansions, and the status of Jerusalem and refugees. Despite these issues, Palestine has a highly educated population, an emerging economy, and significant tourism. As of May 2024, it is a **non-member observer state at the UN since 2012**.

GS-3

Indian Economy

1. ASSET RECONSTRUCTION COMPANIES (ARCS)

Context:
The Reserve Bank of India (RBI) has raised supervisory concerns regarding the functioning of asset reconstruction companies (ARCs).

What are ARCs?

Asset Reconstruction Companies (ARCs) are **financial**

institutions that acquire and manage stressed assets from banks and financial institutions. Registered under Section 3 of the **SARFAESI Act, 2002, ARCs** face several challenges, including issues like back-door entry of defaulting promoters, lengthy settlement processes, and non-transparent practices.

Previously, in April RBI issued a master direction for ARCs**:**

1. The direction stipulates that **ARCs must maintain a minimum capital requirement of Rs 300** crore, with existing ARCs given until March 31, 2026, to meet this threshold.
2. **Non-compliant ARCs** will face supervisory action, including the prohibition on incremental business until compliance is achieved.
3. **ARCs with a minimum Net Owned Fund (NOF) of Rs 1000 crore** can act as resolution applicants and are permitted to invest in specified instruments, subject to certain conditions and caps on investment.

2. MATERIOVIGILANCE PROGRAMME OF INDIA (MVPI) PLATFORM

Context:

The Drugs Controller General of India (DCGI), through a circular, has directed all device license holders and manufacturers to report any adverse events on the **Materiovigilance Programme of India (MvPI) platform** to mitigate risks and ensure public health safety.

About MvPI:

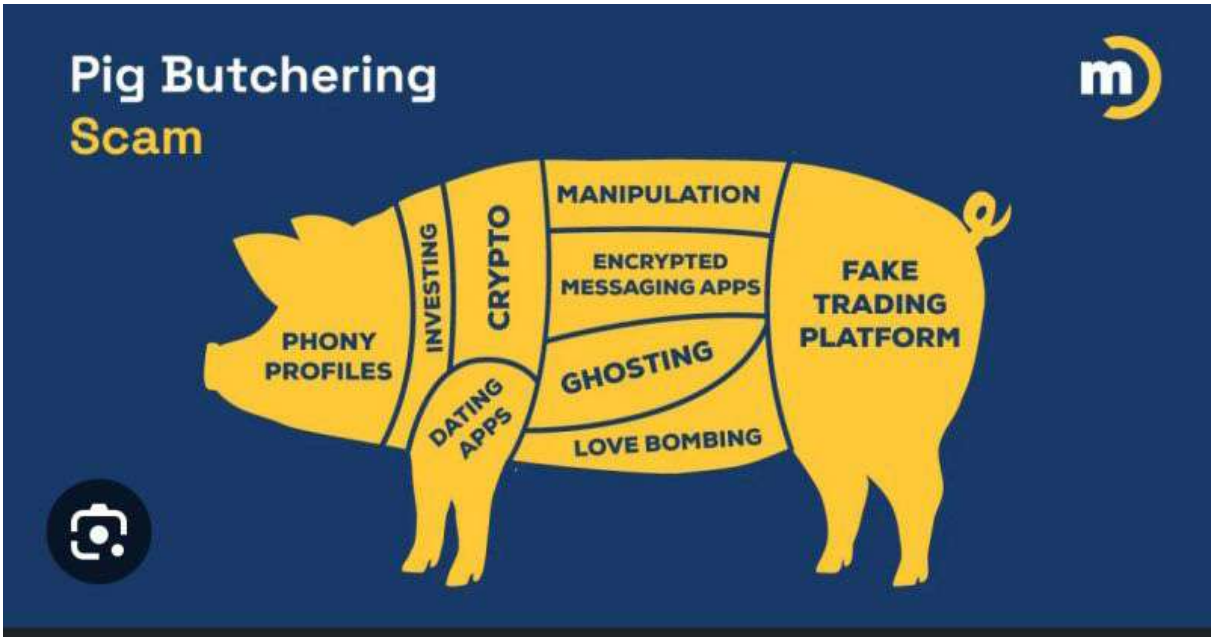
It was launched in 2015, and is overseen by the **Indian Pharmacopoeia Commission since 2018**. It serves as the National Coordination Centre, focusing on monitoring **Medical Device-associated Adverse Events (MDAE)** and raising awareness among healthcare professionals. MDAE reports can be submitted by various stakeholders, including clinical specialists, biomedical engineers, nurses, pharmacists, and patients.

About DCGI:

The Drugs Controller General of India (DCGI) heads the Central Drugs Standard Control Organization, overseeing the approval of licenses for specified drug categories in India, including blood products, vaccines, and IV fluids. **DCGI operates under the Ministry of Health & Family Welfare** and establishes standards for drug manufacturing, sales, import, and distribution in the country.

3. PIG BUTCHERING SCAM

Pig Butchering Scams, also known as "sha zhu pan" scams, involve building trust with victims over time before tricking them into investing in fraudulent schemes. It is a type of **long-term scam and investment fraud**. For instance, scammers may offer attractive job opportunities or investment plans, creating emotional connections to lower victims' guard.



4. COMPETITION COMMISSION OF INDIA

Context:

At the **15th Foundation Day event of the Competition Commission of India (CCI)**, the Attorney General of India highlighted the **challenges digital markets pose for global competition regulators.**

About the Competition Commission of India:

- The **Competition Commission of India (CCI)** is a **regulatory body** established by the **Government of India to enforce the Competition Act, 2002.**
- Its **primary objective is to promote and sustain competition in markets**, **protect the interests of consumers, and ensure freedom of trade.**

5. REPORTS IN NEWS

Reports	Description
Travel & Tourism Development Index (TTDI) 2024	The **World Economic Forum (WEF) released the TTDI 2024**
	TTDI assesses **factors and policies for sustainable and resilient Travel and Tourism** development. This second edition evolved from the Travel & Tourism Competitiveness Index (TTCI), WEF's flagship index since 2007.
	India's rank improved to **39 in 2024** from 54 in 2021
Global Land Outlook Thematic Report on Rangelands and Pastoralists	Released by the UN Convention to Combat Desertification (UNCCD)
	The report examines the **relationship between rangelands and their human communities**, particularly pastoralists, to identify protection strategies.
	Rangelands, comprising ecosystems like grasslands, savannahs, and deserts, cover over 54% of the Earth's surface, with 78% in drylands.
	Up to 50% of rangelands are degraded due to factors like land use changes, excessive grazing, and urban expansion.
	In India, **rangelands cover about 121 million hectares**, with 100 million hectares underutilized.
	The United Nations Convention to Combat Desertification (UNCCD), **adopted in 1994**, is the **sole legally binding international agreement** linking environment and development to sustainable land management. India has ratified it.
ILO's Financing gap for universal social protection	The report estimates the **financing gap to achieve Universal Social Protection (USP)** in 133 Low and Middle-Income Countries (LMICs)
	India needs over US$135 billion for USP, with a financing gap of **3.3% of GDP** and **11.8%** of government expenditure.
World Bank's Water For Shared Prosperity	The World Bank report, **released at the 10th World Water Forum in Bali, Indonesia,** defines shared prosperity as boosting prosperity for the poorest to achieve equitable societies.
	Four building blocks of prosperity: Health and Education, Jobs and Income, Peace and Social Cohesion, and Environment.
	Population growth, urbanization, and climate change increase global water access disparity.
	In 2022, 197 million people in the world lacked safe drinking water, and 211 million lacked basic sanitation.
	World Water Forum: Held every three years, co-hosted by the World Water Council and a host country. **Aims to raise water issues** on the political agenda and support international water issue resolutions.

6. THE PRE-PACKAGED INSOLVENCY RESOLUTION PROCESS (PPIRP)

Context:

The **Pre-packaged Insolvency Resolution Process (PPIRP)** has successfully facilitated the **full settlement of operational creditors' claims for five companies**.

About The Pre-packaged Insolvency Resolution Process (PPIRP):

- The Pre-Packaged Insolvency Resolution Process (PPIRP) is a **mechanism for resolving corporate insolvency** that was added to the **Insolvency and Bankruptcy Code (IBC) in 2016**.
- It's designed to be **faster and more efficient than other processes** and **to minimize disruption to businesses.**

The PPIRP process involves:

- Preparing and negotiating a resolution plan before insolvency proceedings begin
- Implementing the plan immediately when insolvency proceedings start
- Completing the **entire process within 120 days**

7. TOP STARTUP CITIES

Context:

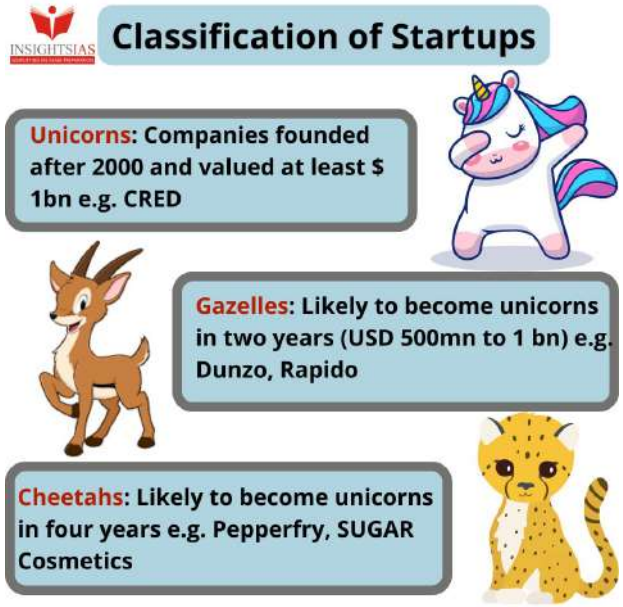
PitchBook recently released its **2024 global Venture Capital ecosystem rankings**, spotlighting the top 50 startup cities worldwide.

Mumbai secured the 32nd spot, Bengaluru ranked 34th, and Gurugram made it to 48th place. The report highlights a **surge in innovation and growth** in the global startup landscape, attracting significant investments and fostering multi-billion-dollar valuations.

The top five cities were:

1. San Francisco Bay Area, USA
2. New York City, USA
3. Beijing, China
4. Shanghai, China
5. Los Angeles, USA

India has emerged as the **3rd largest ecosystem** for startups globally as of 31st May 2023. **India ranks 2nd in innovation quality** with top positions in the quality of scientific publications and the quality of its universities among middle-income economies.



Government initiatives:

1. **National Initiative for Developing and Harnessing Innovations (NIDHI)**
2. **Startup India Action Plan (SIAP)**
3. **Ranking of States on Support to Startup Ecosystems (RSSSE)**
4. **Startup India Seed Fund Scheme (SISFS):** Provides financial aid to startups for various stages like proof of concept, prototype development, and market entry.
5. **National Startup Awards**: Recognizes exceptional startups and ecosystem enablers for their contributions to innovation and economic growth.
6. **SCO Startup Forum**: Launched to enhance startup ecosystems collectively among SCO countries.
7. **Prarambh Summit**: Provides a platform for startups and young innovators worldwide to showcase ideas and inventions.

PitchBook, renowned for its comprehensive financial data and insights, serves as a vital resource in the capital markets, with offices in London, New York, San Francisco, and Seattle.

Science & Technology

8. 50 YEARS SINCE INDIA'S FIRST NUCLEAR TEST

Context:

Fifty years ago (1974), India conducted its **first nuclear test, Operation Smiling Buddha**, in Pokhran, marking its entry into the nuclear club.

Led by **Dr H.N. Sethna and Dr R. Ramanna, the test yielded successful results in the 10-15 kiloton range**. This made India the first nation, apart from the five permanent members of the UN Security Council, to conduct such a test. In 1998, India conducted a series of nuclear tests, code-named **Operation Shakti**, again in Pokhran, expanding its nuclear capabilities. These tests enabled India to build nuclear weapons with **yields up to around 200 kilotons**.

India's nuclear doctrine emphasizes building a credible minimum deterrent, adhering to a **"No First Use" policy**, and maintaining civilian political control over nuclear retaliation.

9. NASA'S PREFIRE MISSION

Context:

Polar Radiant Energy in the Far-InfraRed Experiment (PREFIRE) polar mission is set to unlock the **mys-**

teries of Earth's poles by capturing new data on heat emissions.

Consisting of a **pair of CubeSats, PREFIRE will measure far-infrared radiation**, shedding light on how different polar properties contribute to heat dissipation.

10. GIANT VIRUSES

Context:

Giant viruses, dating back 1.5 billion years, discovered in Yellowstone's geothermal springs shed light on Earth's early conditions.

A giant virus, also known as a "**girus,**" is notably large, with some exceeding typical bacteria in size. They are classified within the phylum ***Nucleocytoviricota***.

These viruses, **with unusually large genomes, offer insights into the environment during the emergence of life**. Thriving in extreme conditions, they don't infect humans but may have influenced the **evolution of single-cell organisms**. The study reveals ancient connections between these viruses and hot springs, suggesting their role in ecosystem stability.

Yellowstone, the oldest US national park, is renowned for its hot springs and holds UNESCO Biosphere Reserve and World Heritage site status.

11. BACTERIAL PATHOGENS PRIORITY LIST (BPPL)

Context:

The World Health Organization (WHO) updated its **Bacterial Pathogens Priority List (BPPL), highlighting critical priority pathogens** that pose significant global health threats due to their resistance to treatment and ability to spread resistance.

About BPPL:

The Bacterial Pathogens Priority List (BPPL) is **a crucial tool in combating antimicrobial resistance**. Introduced by the **WHO in 2017**, it initially listed 13 bacterial pathogens to guide research and development efforts for new antibacterials.

The 2024 list categorizes **15 families of antibiotic-resistant bacteria** into critical, high, and medium-priority groups to aid in prioritizing responses. Some high-priority pathogens, like **Salmonella and Shigella,** burden low- and middle-income countries, posing challenges in healthcare settings.

Antibiotic resistance**, driven by misuse and overuse of antimicrobials**, makes infections harder to treat and increases the risk of severe illness and death.

The WHO Bacterial Priority Pathogens List serves as a vital tool in combating antimicrobial resistance, updating rankings to address evolving threats.

12. SPECULOOS- 3 B

Context:

Astronomers at the University of Liège in Belgium discovered an **Earth-sized exoplanet, SPECULOOS-3 b,** orbiting an **ultra-cool red dwarf, 55 light-years away**.

- **Exoplanets:** Planets beyond our solar system, either orbiting other stars or free-floating.
- **Red dwarfs are the smallest main sequence stars**, much smaller than the Sun

The star, roughly the **size of Jupiter and twice as cold as the Sun**, bombards the planet with intense radiation, likely stripping away any atmosphere, and making it uninhabitable. The SPECULOOS project, aimed at studying ultra-cool dwarf stars, previously discovered the **TRAPPIST-1 system**. The newly found exoplanet orbits its star every **17 hours and is tidally locked, with perpetual day and night sides.**

13. DOPPLER RADAR SPEED GUNS

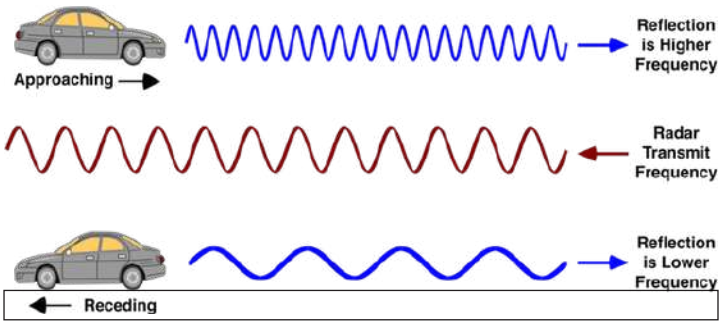
Context:

The Consumer Affairs Ministry has **proposed new rules for radar speed guns** used to measure vehicle speeds on roads.

According to the draft rules, **radar equipment installed after the finalization of the rules must be verified and stamped within one yea**r. Existing equipment should also undergo verification whenever re-verification is due. Conditions are outlined for the use of speed measurement results in legal proceedings.

About Doppler radar:

It utilizes the **Doppler effect to collect velocity data**. The Doppler effect, proposed by **Johann Christian Doppler in 1842,** describes the change in **wave frequency** when there's relative motion between a wave source and its observer. This phenomenon is observed in **sound waves and electromagnetic waves.** Doppler radar finds applications in astrophysics and vehicle speed monitoring by law enforcement.



14. VENUS

Conext:

A new study suggests that **Venus is losing water much faster than previously thought**, with researchers identifying a mechanism in the **Venusian ionosphere responsible** for this accelerated water loss.

Venus may have **once had oceans, but now only 0.002%** of its atmosphere is water vapor. The process of non-thermal hydrogen escape, where solar radiation splits water molecules and hydrogen escapes into space, is a key factor.

About Venus:

Venus, the **second planet from the Sun and the closest to Earth**, is renowned as the **brightest planet** in the night sky. It lacks a satellite and its atmosphere is primarily composed of **carbon dioxide,** with clouds of sulfuric acid droplets. Notably, **Venus rotates in the opposite direction to most planets**, from east to west. Alongside Mercury, Earth, and Mars, Venus is classified as a **terrestrial planet**.

15. PSYCHEDELIC DRUGS IN INDIA

Context:

Driven by the need for better mental health treatments and the low success rate of current medications, researchers are calling for clinical trials of psychedelic drugs in India. P

About Psychedelics

Psychedelics are a **class of drugs that alter perception, behaviour, consciousness, and thought**, often intensifying sensory awareness. These drugs, a subset of psychotropic substances, are known for causing vivid hallucinations and drastically changing an individual's thoughts and perceptions.

Categories of Psychedelics:

- **Classical Psychedelics**: Primarily cause hallucinations by activating the serotonin 5-HT receptor, found throughout the body. Examples include LSD, psilocybin, and DMT.
- **Non-Classical Psychedelics**: Interact with various receptors. Notable examples are ketamine and MDMA.

How do They work?

Psychedelics typically **enhance serotonin, a mood-stabilizing hormone**, by binding to serotonin receptors on cell surfaces, triggering specific biochemical reactions.

Research and Clinical Use: Five psychedelics—psilocybin, LSD, MDMA, ketamine, and DMT—are being extensively studied for treating mental health issues.

Regulation: The 1971 UN Convention on Psychotropic Substances regulates about 200 psychotropic substances, categorizing them into four schedules based on abuse potential, with Schedule I being the most restrictive. The convention does not specify the exact number or types classified as psychedelics.

16. PRE-ECLAMPSIA

Pre-eclampsia is a hypertensive disorder of pregnancy that leads to multiorgan dysfunction in the mother. It typically **manifests after 20 weeks of pregnancy**, characterized by **high blood pressure**. Other symptoms include **swelling in the face, hands, and feet, severe headaches**, vision changes, upper abdominal pain, and trouble breathing. Studies show that **pre-eclampsia significantly raises the risk of heart failure**, coronary heart disease, stroke, and cardiovascular death in mothers.

India's Adverse Pregnancy Outcomes:

1. India accounts for nearly a quarter of the **world's adverse pregnancy outcomes**.
2. **NFHS-5 statistics** show perinatal mortality at 32 per 1,000 pregnancies and neonatal mortality at 25 per 1,000 live births.
3. **Hypertensive disorders** in pregnancy are a leading cause of maternal death.

17. ARTIFICIAL INTELLIGENCE (AI) ACT

Context:

The **European Union** has finalized the **world's first comprehensive law** regulating **artificial intelligence, known as the AI Act.**

- This legislation **sets strict rules for AI applications**, categorizing them based **on the risks they pose to society.**
- High-risk AI systems, such as autonomous vehi-

cles and medical devices, face stringent evaluations, while **AI applications deemed "unacceptable" like social scoring systems**, **predictive policing, and emotional recognition are prohibited.**

- Companies violating the AI Act could **face fines of up to 35 million euros or 7% of their annual global revenues.**

The law, aimed at **ensuring trust, transparency, and accountability**, includes provisions for generative AI systems to respect copyright laws and undergo routine testing.

18. COPERNICUS-EMS PROGRAMME

Context:

The **Copernicus Emergency Management Service (EMS)** rapid response mapping was **activated by the EU** to assist in **locating a helicopter carrying the Iranian President**, which crashed near the Iran-Azerbaijan border.

About Copernicus programme:

- The **Copernicus programme** is an EU initiative that **utilizes satellite and ground-based data** to address **climate change, disaster management, and other global challenges**.
- The **Copernicus Emergency Management Service (EMS)** is a component of the **broader Copernicus program**, an **initiative by the European Union (EU)** aimed at **providing comprehensive Earth observation and monitoring services.**

The Copernicus EMS specifically focuses on **delivering timely and accurate geospatial information to support emergency response** efforts during **natural disasters, humanitarian crises, and other emergencies.**

19. NAEGLERIA FOWLERI

Context:

A girl from Kerala, has died from **amoebic meningoencephalitis**, a **rare brain infection** caused by **Naegleria fowleri**, known as the **'brain-eating amoeba.'**

Naegleria fowleri is a type of **amoeba**, a unicellular organism found in soil, warm freshwater lakes, rivers, and hot springs.

If this amoeba **enters the nose and reaches the brain**, it can **cause a severe infection known as Primary Amoebic Meningoencephalitis (PAM).**

Due to its ability to infect and destroy brain tissue, **Naegleria fowleri is often referred to as the "brain-eating amoeba."**

While infections caused by this organism are rare, they **are almost always fatal.**

20. FERROPTOSIS

Context:

A recent study by researchers **has identified ferroptosis**, an **unusual form of cell death**, as a significant **contributor to lung damage in COVID-19 patients.**

- Ferroptosis occurs when the **outer fat layers of cells collapse, leading to cell death**.
- This **differs** from the more common type of cell death, **where cells break down their internal molecules.**
- The **study analysed human tissues and autopsies of COVID-19 victims**, along with samples from hamsters, revealing that **ferroptosis was a primary mechanism behind the lung damage observed.**

Ferroptosis is a **form of regulated cell death** characterized by the **iron-dependent accumulation of lipid peroxides to lethal levels**.

Unlike **other forms of cell death such as apoptosis or necrosis**, ferroptosis specifically involves the **oxidative damage of lipids within cell membranes**, leading to **cell membrane destabilization and ultimately cell death.**

21. MALARIA VACCINE 'R21/MATRIX-M'

Context:

The **Serum Institute of India (SII)** has begun exporting **the 'R21/Matrix-M' malaria vaccine** to **Africa**, targeting children in **malaria-endemic regions.**

- Developed in **collaboration with the University of Oxford and Novavax's Matrix-M adjuvant**.
- It is the **second malaria vaccine** recommended by **WHO in 2023, after RTS, S/AS01 vaccine.**

About Malaria:

- Malaria is a **life-threatening disease** caused by **parasites** that are **transmitted to people through the bites of infected female Anopheles mosquitoes**.
- It is **preventable and curable**, but it remains a **major public health problem**, particularly in **tropical and subtropical regions.**

22. GRAPHITE

Context:

India is discussing with **Sri Lanka to acquire graphite mines, aiming** to meet the rising demand for graphite, crucial for battery anodes, especially lithium-ion batteries.

- China is the **world's largest producer of natural graphite**, accounting for **two-thirds of global supply**.
- While **Mozambique, Madagascar, and Brazil are significant non-Chinese producers, China also refines over 90% of the world's graphite for use in EV battery** anodes.
- It is **among 30 critical minerals** declared by India.

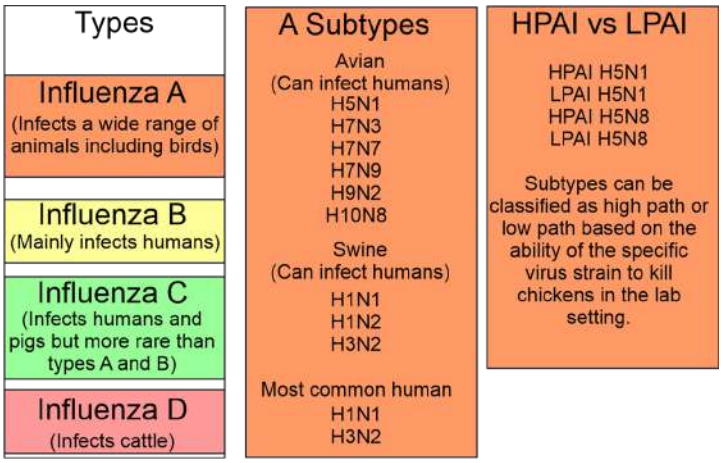
About Graphite**:**
Graphite is a **naturally occurring crystalline** form of **carbon**. It's made up of **stacked layers of graphene.** Graphite is the most stable form of **carbon under standard conditions.**
Graphite is a **mineral that's found in metamorphic and igneous rocks**. It's extremely **soft, cleaves with very light pressure, and has a very low specific gravity.**
Graphite is a **good conductor of electricity** and heat. It's also lighter than diamond, smooth and slippery to the touch.
Graphite, a **key component in electric vehicle (EV) batteries**, has seen a surge in demand due to the **growth of the EV industry**. The battery end-use market for graphite **has grown by 250% globally since 2018**

23. AVIAN INFLUENZA

Context:
Australia's first human case of bird flu has been confirmed in a child who **contracted the H5N1 virus** while in India. The child returned from India in March and fell ill with the flu virus.

Although **avian influenza rarely infects humans**, it can cause severe illness and has a high mortality rate.

About Avian influenza**:**
It is commonly known as bird flu, is a highly contagious viral infection that primarily affects birds, including wild and domestic poultry. The **H5N1 strain**, first identified in 1996, has a mortality rate of about 60% in humans. Symptoms range from mild flu-like symptoms to severe respiratory issues and neurological problems. In India, outbreaks of avian influenza have occurred since 2006, with millions of birds culled to control its spread. India's strategy involves detecting and culling infected birds. Antiviral treatments are available for human cases.



Global efforts to combat avian influenza include the **Global Influenza Surveillance and Response System (GISRS),** a WHO-led initiative that monitors circulating virus strains and advises on treatment and control measures. Additionally, the **World Organisation for Animal Health (WOAH) collaborates** internationally to enhance animal health. In India, the **National Action Plan for Prevention, Control, and Containment of Avian Influenza** outlines steps to manage outbreaks. India's self-declaration of freedom from **Highly Pathogenic Avian Influenza (HPAI)** in certain poultry compartments was approved by WOAH in 2023.

24. EVTOL (ELECTRIC VERTICAL TAKE-OFF AND LANDING) AIRCRAFT

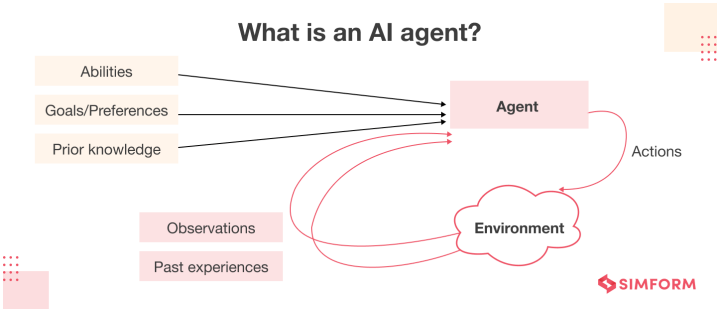
Context:
IIT Madras-incubated ePlane Company is set to launch eVTOL (electric Vertical Take-Off and Landing) aircraft in Bengaluru.

What are eVTOLs **(electric Vertical Take-Off and Landing aircraft)?**
These are vehicles that can take off and land vertically using **electric propulsion**. They use electric motors to drive rotors or propellers, with energy stored in batteries, typically lithium-ion. eVTOLs are designed to operate in urban areas, reducing traffic congestion, and air pollution, and improving connectivity and emergency services.

25. AI AGENTS

Context:
GPT-4o by **OpenAI and Project Astra** by Google represent a new breed of AI known as AI agents.

Unlike conventional voice assistants like **Alexa and Siri**, AI agents can engage in **real-time, multi-modal interactions** with humans, processing various inputs including text, images, and voice. They perceive their environment through sensors, process information using algorithms, and take action. Unlike large language models (LLMs) such as GPT-3 and GPT-4, AI agents offer **more natural and immersive interactions**, understanding context and providing personalized responses. They have potential applications in customer service, **education, healthcare, and more**, but also raise concerns about privacy, security, and bias.



26. RADIATION PROCESSING

Context:
The government plans to expand the **radiation processing of onions** to create a buffer stock of 100,000 tonnes this year, aiming to prevent shortages and price rises.

With output expected to drop by 16%, radiation technology will be used to increase shelf life, reducing hoarding and price volatility.

Radiation Processing:

1. **Uses ionizing radiations** like gamma rays, accelerated electrons, and X-rays.
2. **Delayed ripening** extends shelf life by eliminating spoilage microbes.
3. **Cannot eliminate microbial toxins** and pathogen viruses.
4. Causes minimal chemical changes.
5. **Least impact on nutritional value** compared to other methods.

Regulation:

1. Radiation Processing is mandated by the **Prevention of Food Adulteration (Fifth Amendment) Rules, 1994.**
2. **Requires packages of irradiated foods** to display the green irradiation logo endorsed by Codex Alimentarius Commission and the phrase **'Processed by Irradiation method**.

About Onions:
The onion, an herb in the lily family, is globally grown for culinary and medicinal purposes. India is the **world's second-largest producer**, with major states including **Maharashtra, Karnataka,** and others. **Maharashtra leads in production** (42%), followed by Madhya Pradesh (15%) in 2021-22.

Key export destinations include Bangladesh, Malaysia, UAE, Sri Lanka, and Nepal. Onion **farmers lack government MSP-based support** and depend solely on market forces.

Environment & Ecology

27. WORLD BEES DAY

Context:
The UN designated **20 May as World Bee Day** to raise awareness and protect pollinators. The 2024 theme, "***Bee Engaged with Youth***," emphasizes involving young people in conservation.

Honey bees, with three pairs of legs, four wings, and five eyes, perform a **"waggle dance"** to communicate food source locations. They **produce propolis**, a resinous substance that seals hive cracks, protects against invaders, and prevents bacterial and fungal buildup.

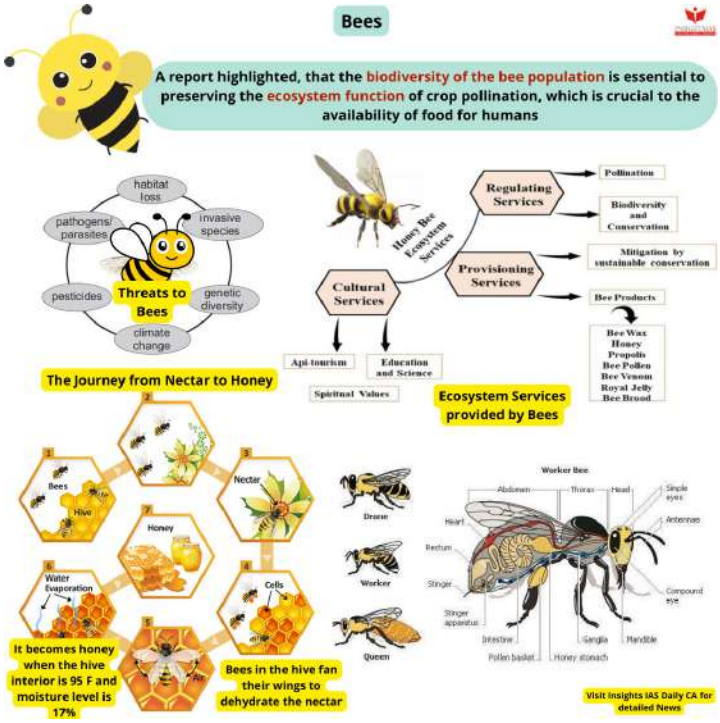
The Importance of Bees and Pollinators

1. Bees, butterflies, bats, and hummingbirds are crucial for pollination.
2. **90% of wild flowering plants,** 75% of food crops, and 35% of agricultural land rely on animal pollination.
3. **Pollinators are vital for food security** and biodiversity conservation.
4. **Threats to Pollinators**: Human activities like habitat destruction, pesticides, and climate change threaten pollinators.
5. **Actions to Protect Pollinators**: Plant diverse native plants, avoid pesticides, and buy local honey. Governments should involve local communities, enforce protective measures, and encourage sustainable practices.

Initiatives:

1. The **International Pollinator Initiative** promotes sustainable pollinator use.
2. FAO provides technical assistance for sustainable beekeeping and honey production.

Previous news:



28. PURNIMA DEVI BARMAN WINS THE 2024 WHITLEY GOLD AWARD

Context:

Dr Purnima Devi Barman from India has been awarded **the 2024 Whitley Gold Award (dubbed 'Green Oscar') by the UK charity Whitley Fund for Nature (WFN)** for her efforts to save the **Greater Adjutant Stork (Hargila).**

Conservation Efforts:

Barman's campaign has increased the **stork population in Assam from 450 to over 1,800.** She has mobilized **10,000 rural women, known as "stork sisters,"** to protect nesting sites and rebrand the stork from a bad omen to a cultural symbol. The project has planted 45,000 saplings and rescued over 500 chicks. The global population of the stork has increased to approximately 3,180 birds.

About Greater Adjutant Stork

1. **Distribution**: Known as 'Hargila,' primarily found in Assam (80%) and Bihar, India, and Cambodia.
2. **Habitat**: Wetlands, nests in tall trees with closed canopies and bamboo clumps.
3. **Threats**: Hunting, habitat destruction, felling of nest trees, and wetland degradation.
4. **Conservation Status**: IUCN: Nearly Threatened (NT).
5. **Significance**: The Greater Adjutant Stork plays a vital role in nutrient recycling and maintaining ecosystem health.

29. MANIPURI PONY

Context:

Manipur has taken decisive steps to safeguard its iconic Manipuri Pony, known as Meitei Sagol, from extinction.

About Meitei Sagol:

It is one of India's seven recognized horse and pony breeds, and is known for its short stature yet remarkable attributes **like stamina, agility, and intelligence**. Originating from Manipur, they are esteemed as the **original polo pony**, tracing back to the traditional Sagol Kangjei sport.

However, their population faces threats such as **habitat shrinkage and the lack of polo grounds.** To address these challenges, the Manipur government declared them an **Endangered Breed in 2013** and introduced the **Manipuri Pony Conservation and Development Policy in 2016.** Recent resolutions aim to safeguard the breed, including immediate actions for pony protection, forming a task force, and conducting a comprehensive census.

30. SHALLOW AQUIFER MANAGEMENT (SAM)

Context:

Telangana is implementing **Shallow Aquifer Management (SAM) pilot** models in Habsiguda and Sainikpuri to address groundwater depletion and flooding.

What is an Aquifer?

An aquifer is an underground layer of permeable rock, soil, or sand that holds water and allows it to flow freely. It acts as a natural reservoir, storing groundwater that can be accessed through wells for various purposes like drinking water supply, irrigation, and industrial use.

What is SAM?

SAM is a sustainable urban water management technique under the **AMRUT scheme**. It drills shallow borewells to pump out water, recharging aquifers during rainfall and raising water tables.

31. INTERNATIONAL SOLAR ALLIANCE

Context:

Spain has become **the 99th member of the International Solar Alliance (ISA).** Spain handed over the ISA Instrument of Ratification during a meeting between Spain's Ambassador to India

Previous News about ISA:

ISTAR-C and ISA

Context: India is considering expanding its solar STAR-C initiative to several Pacific Island nations

ISA Solar Technology and Application Resource Centre (ISTAR C) is one of the intiative of International Solar Alliance (ISA) with the aim to build a network of technical training, entrepreneurship, sharing best practices and establishing research centers to promote knowledge dissemination and capacity-building for solar technology.	
Other such initiatives of ISA	Indian Technical and Economic Cooperation (ITEC) Scheme (for training to master trainer in solar technology); One Sun One World One Grid (OSOWOG)
About ISA	The International Solar Alliance (ISA) (founded in 2015 at London; HQ: Gurugram, Haryana) is an alliance of more than 120 signatory countries, which lie either completely or partly between the Tropic of Cancer and the Tropic of Capricorn.
Nature	The alliance is a treaty-based inter-governmental organization.
Objective	The primary objective of the alliance is to work for efficient consumption of solar energy to reduce dependence on fossil fuels.
Founders	India and France
Vision	"Let us together make the sun brighter."
Mission	Facilitate energy access, ensure energy security, and drive energy transition in member countries.
Administration	ISA is headed by the Director General. The Director General leads the operations and carries out the functions of the ISA Secretariat. He is responsible to the ISA Assembly. He has a term of four years and is eligible for re-election.
Eligibility	All member states of the United Nations are eligible to join the ISA. Countries that do not fall within the Tropics can join the alliance and enjoy all benefits as other members, with the exception of voting rights
Observer Status	At the United Nations General Assembly (UNGA)

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32. CENSUS TO ESTIMATE BLUE SHEEP AND HIMALAYAN IBEX

Context:

The census to estimate blue sheep and Himalayan ibex populations has begun in **Himachal Pradesh's Lahaul & Spiti district**. Wildlife authorities are using the double observer survey technique to conduct the survey in the challenging terrain

About Blue Sheep:

The Bharal, or blue sheep, is a Himalayan caprine species with the scientific name Pseudois nayaur, the sole member of its genus. Found in the **high Himalayas**, it inhabits regions across **India, Bhutan, China, Myanmar, Nepal, and Pakistan**. Bharal are medium-sized, with males slightly larger than females, and sport a slate grey coat with white underparts and black markings. Their **distinctive horns curve** upwards and then backwards. **Bharal are diurnal and active throughout** the day, grazing and resting on mountain slopes. They are classified as **Least Concern on the IUCN Red List** and are protected under the Wildlife Protection Act of 1972 in India.

About Himalayan Ibex:

The Himalayan ibex, a subspecies of the Siberian ibex, is native to the Himalayan region spanning India, Pakistan, Tibet, and Nepal. Scientifically known as **Capra sibirica** hemalayanus, it thrives in **high-altitude areas between 3,000 and 5,800 meters**. In India, it's primarily found in **Jammu and Kashmir, Himachal Pradesh, and Uttarakhand**. These sturdy wild goats **weigh about 90 kg**, stand 40 inches tall, and sport large curved horns with notches. Their coat ranges from **light brown to reddish-brown,** with a woolly texture in winter. Typically found in small herds, they can reach **speeds of up to 50 km/h**. The Himalayan ibex is classified as **Near Threatened on the IUCN Red List**.

33. SYMPATRIC SPECIATION

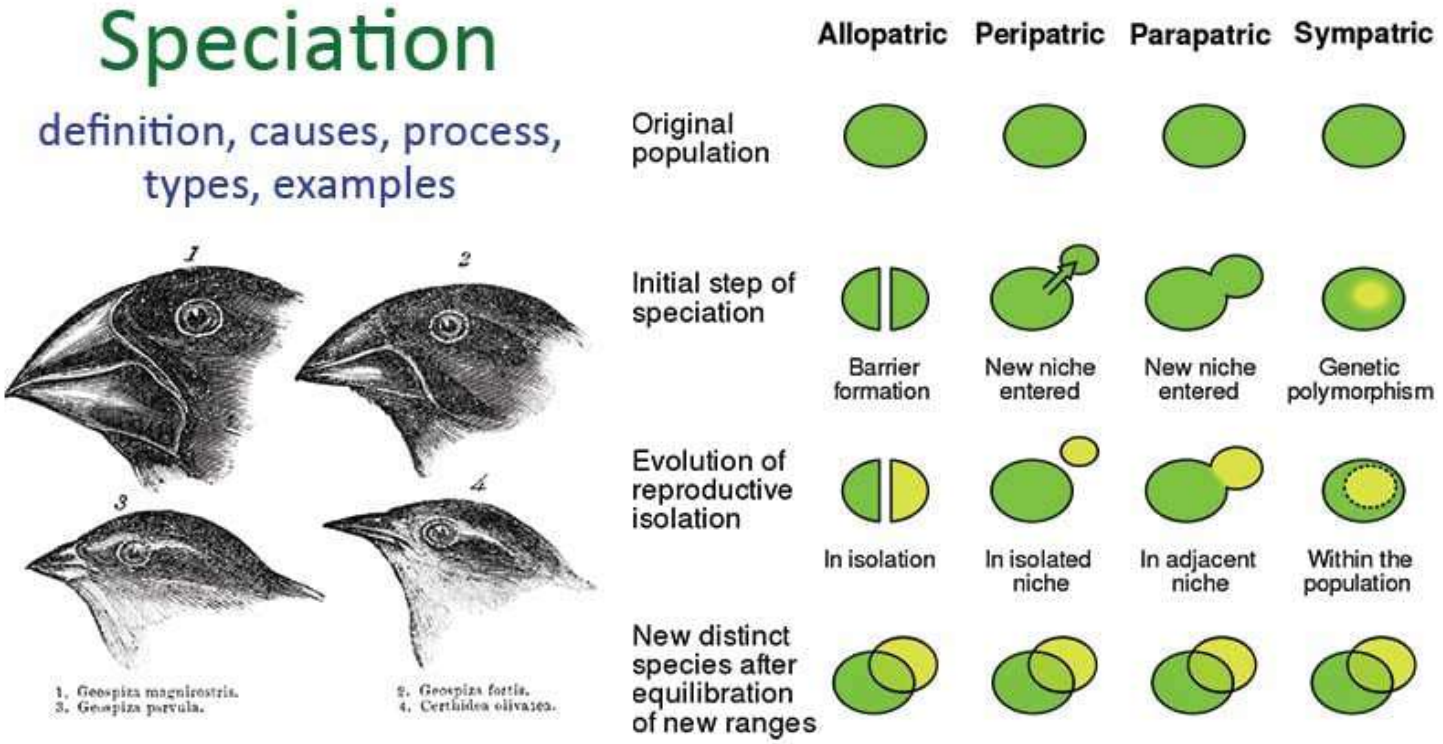
Context:

A study by **researchers at IIT Bombay**, challenged the **traditional view that new species can only develop in geographically isolated areas** (allopatric speciation).

- Instead, it demonstrates that **new species can evolve in the same area without geographic barriers**, a process **known as sympatric speciation.**
- The study used a **genetic-based model focusing on birds** to investigate **how environmental resources, genetic factors, and mating preferences contribute to sympatric speciation**.

Key findings include:

- **Disruptive Selection**: Variations in **environmental resources** lead to **different traits being favoured, such as birds developing different beak sizes to utilize specific food resources**. This helps maintain distinct groups within the same population.
- **Sexual Selection**: Contrary to previous beliefs, **mating preferences based on advantageous traits** (like beak size) rather than arbitrary traits (like feather colour) drive sympatric speciation.
- **Genetic Architecture:** The genetic control of traits significantly **impacts the likelihood of new species forming**. Genetic flexibility in traits like **beak size facilitates speciation even with minimal disruptive selection.**



34. ZERO DEBRIS CHARTER

Context:

Recently, **twelve nations** signed the **Zero Debris Charter** at the **ESA/EU Space Council,** committing to making space activities debris-neutral by 2030.

The signatories include **Austria, Belgium, Cyprus, Estonia, Germany, Lithuania, Poland, Portugal, Romania, Slovakia, Sweden, and the United Kingdom**, alongside the European Space Agency (ESA) as an International Organisation. This initiative, first introduced at the **ESA Space Summit in November 2023**, aims to lead global efforts in space debris mitigation and remediation.

What is the Zero Debris Charter?

The **Zero Debris Charter aims** to achieve debris-neutrality in space by 2030. The Charter is part of ESA's comprehensive **Zero Debris approach**, which involves significant internal reforms and the development of debris mitigation technologies under its Space Safety Programme. ESA estimates **over one million pieces of space debris** larger than one-centimetre orbit Earth, posing severe risks to satellites and astronauts.

Space debris, comprising non-functional objects in Earth orbit, poses threats to infrastructure and increases collision risks. India's initiatives **include Debris Free Space Missions (DFSM) by 2030** and **Project NETRA** for space situational awareness. Globally, efforts like the **Inter-Agency Space Debris Coordination Committee** and **Space Debris Mitigation Guidelines** are crucial for addressing this issue.

35. COMBATING OIL SPILLS AT SEA

Context:

The Indian Coast Guard (ICG) organised a 'Pollution Response Seminar and Mock Drill ' recently.

Topic	Details
What is an Oil Spill?	The release of **liquid petroleum hydrocarbons into the environment, especially marine areas**, from tankers, platforms, rigs, or wells.
Substances	Refined products like gasoline, diesel, bunker fuel, or oily refuse.
Examples of Incidents	**International**: El Palito refinery (Venezuela, 2020), MV Wakashio (Mauritius, 2020), Norilsk diesel spill (Russia, 2020), Deepwater Horizon (Gulf of Mexico, 2010)
	India: Chennai (2023 and 2017), Sundarban (2014), ONGC Uran (2013), Mumbai (2010)
Damage	**Environmental**: Harm to fish, birds, and mammals; habitat contamination; **Fisheries**: Reduced fish populations, damaged fishing gear; **Tourism**: Decline due to polluted beaches; **Health**: Toxic exposure causing respiratory problems, and skin irritation.
International Efforts for Oil Spill Management	**MARPOL** (1973): International Maritime Organisation's convention to prevent pollution from ships (India is a signatory); **Oil Pollution Preparedness, Response and Cooperation Convention (1990)**: Framework for international cooperation and mutual assistance in oil spill response (India is a signatory)
Indian Efforts for Oil Spill Management	**National Oil Spill Disaster Contingency Plan** (NOS-DCP): Managed by the Indian Coast Guard, it ensures effective spillage reporting, prompt response, public health protection, and use of science and technology; **Merchant Shipping Act, 1958**: Grants the government authority to enforce compliance with shipping regulations to prevent oil spills.
Control Measures for Oil Spills	**Bioremediation**: Using microorganisms to remove toxins (e.g., TERI's Oil Zapper bacteria). **Oil Booms**: Floating barriers to contain spills. **Dispersants**: Chemicals sprayed to aid natural oil breakdown.

36. MANGROVE ECOSYSTEM

Context:

The first **global mangrove assessment by the International Union for Conservation of Nature (IUCN),** warns of the imminent collapse of South India's mangrove ecosystems due to pollution, deforestation, and coastal development.

- Unlike the ecosystems in **western and eastern India**, those in the south are highly vulnerable to collapse, threatened further by rising sea levels and severe storms linked to climate change.

The IUCN Red List of Ecosystems (RLE) has assessed mangrove ecosystems globally for the first time, revealing alarming findings.

1. **Half of the assessed global mangrove ecosystems** are at risk of collapse, with nearly 20% classified as high risk.
2. **Major threats include** climate change, deforestation, development, pollution, and dam construction.
3. **Climate change** alone jeopardizes **one-third of assessed mangrove** ecosystems.
4. **Sea-level rise** is predicted to submerge 25% of global mangrove area in the next 50 years.
5. **Without significant intervention, by 2050,** climate change and sea-level rise could lead to the **loss of 1.8 billion tonnes of stored carbon and expose 2.1 million lives** to coastal flooding.
6. **Indian mangroves vary in status**: Andaman and Bay of Bengal are classified as Least Concern, while South India is Critically Endangered, and West India is Vulnerable.

Mangroves play a crucial role in disaster risk reduction, carbon sequestration, and supporting biodiversity and fisheries.

Initiatives for Mangroves:

Global:

1. **Mangrove Breakthrough**: Introduced at UNFCCC COP27 by UN High-Level Climate Champions and Global Mangrove Alliance (GMA).
2. Global Mangrove Alliance (GMA) was established at the World Ocean Summit in 2018.
3. **Mangrove Alliance for Climate**: Led by UAE in collaboration with Indonesia.

India:

1. **Mangrove Initiative for Shoreline Habitats & Tangible Incomes (MISHTI)**.
2. **Conservation and Management of Mangroves and Coral Reefs** under National Coastal Mission Programme.

37. CLIMATE LITIGATION

Context:

Environmental activists have sued Norway, challenging its proposal for seabed mineral exploration, claiming inadequate impact assessment. Norway's parliament approved the plan in January, citing minimal impact from the study.

Deep-Sea Mining Explained

1. Involves extracting minerals from the ocean floor.
2. **Types**: Polymetallic nodules, seafloor sulphide deposits, cobalt crusts.
3. **Materials**: Nickel, cobalt, rare earth elements, essential for renewable energy and technology.
4. **Environmental concerns**: Ecosystem damage, pollution, sediment plumes affecting marine life.

Climate Litigation Overview

1. **Definition**: Legal action to hold countries and companies accountable for climate efforts and contributions.
2. **Rising trend**: 2,180 cases in 65 jurisdictions by December 2022 (up from 884 in 2017).
3. **Key Cases:**
    a. **2,000 Swiss women** sued their government over climate inaction.
    b. **Young plaintiffs in Montana** won against the state for neglecting climate change.
    c. **A 9-year-old girl in India** filed a case for greater climate action, later rejected.

Defence

38. F-16 FIGHTER JET PILOTED BY AI

Context:
In a groundbreaking development at Edwards Air Force Base, an experimental F-16 fighter jet was recently piloted by artificial intelligence (AI) rather than a human.

What is F-16 Fighting Falcon?
It has been developed by **Lockheed Martin, is a multirole fighter jet** renowned for its agility and versatility. It has been widely used by various air forces around the world since its introduction in the 1970s.
In India, the equivalent to the F-16 is the HAL Tejas. Developed by Hindustan Aeronautics Limited (HAL), the Tejas is a **lightweight, multirole fighter aircraft** designed for the Indian Air Force.

AI adoption in the Indian military:
In 2019, the **Defence AI Project Agency (DAIPA) and the Defence AI Council (DAIC)** were established to oversee AI initiatives. In 2022, the government identified **75 priority projects** aimed at leveraging AI for defense purposes. The Defence Research and Development Organisation (DRDO) has established specialized laboratories, such as the **Centre for Artificial Intelligence and Robotics (CAIR)** in Bengaluru, dedicated to conducting application-oriented research in AI for military applications.

MAPPING

INTERNATIONAL

Places	Description
1. NEW CALEDONIA	**A state of emergency** has been declared by France in New Caledonia, including curfews and bans on gatherings and alcohol sales.
	New Caledonia is a **French overseas territory in the South West Pacific Ocean**. Its maritime neighbours include Australia, Fiji, New Zealand, Papua New Guinea, and Vanuatu. Though it is one of the **European Union's Overseas Countries and Territories (OCTs),** New Caledonia is **not part of the EU, Euro, or Schengen zones**. The Lagoons of New Caledonia and associated coral reef ecosystem are a **UNESCO World Heritage site.**
	

2. NILE RIVER

Satellite imagery, geophysical surveys, and sediment cores revealed that the pyramids of Egypt were built near a **now-buried 64km branch of the Nile River, named Ahramat**, which facilitated the transport of massive stone blocks and materials.

The Nile River, the **longest river in the world** (though this has been contested by research suggesting that the **Amazon River is slightly longer**), flows from south to north through Eastern Africa. Originating from **rivers that feed Lake Victoria**, it travels northward through northeastern Africa before draining into the Mediterranean Sea. The Nile runs through or along the borders of 11 African countries, including Egypt, Burundi, Tanzania, Rwanda, the Democratic Republic of the Congo, Kenya, Uganda, Sudan, Ethiopia, Eritrea, and South Sudan. Its major tributaries are the White Nile, Blue Nile, and Atbara.

3. PORT OF CALL (SPAIN'S CARTEGENA)

Spain has refused permission for an **Israel-bound ship carrying arms to call at the south-eastern port of Cartagena**. The Marianne Danica, carrying nearly 27 tons of explosive material from India's Madras

What is a Port of Call?: A port of call is a **designated stop where a ship docks during its journey**. It serves as a temporary destination where passengers and cargo can embark or disembark, and where the ship can refuel, take on supplies, or undergo maintenance if necessary.

Cartagena is a **port city and naval base** in the Murcia region of southeast Spain.

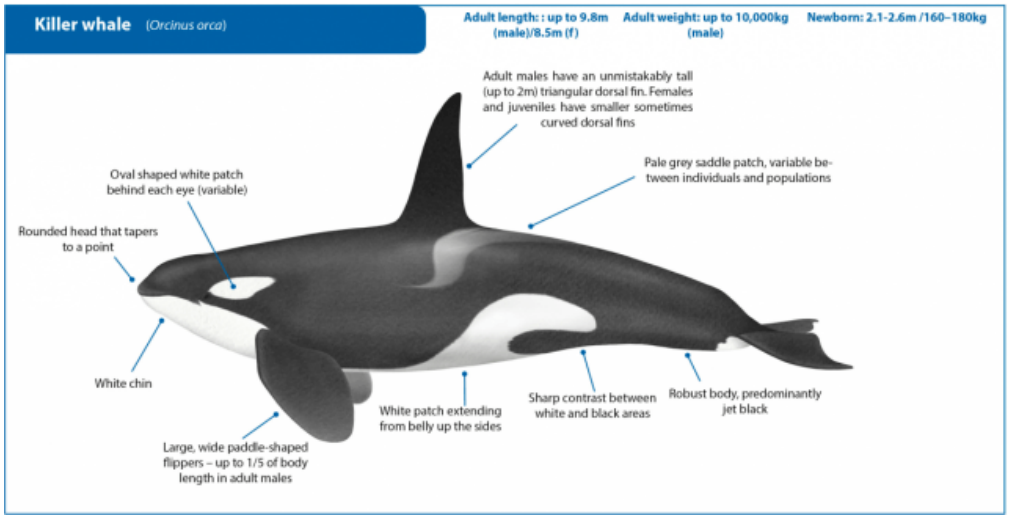
4. STRAIT OF GIBRALTAR

Context: A sailing yacht sank in Moroccan waters near the Strait of Gibraltar after being rammed by orcas.

About Orcas, also known as killer whales:

They are the **largest dolphins, recognized by their black-and-white colouring**, reaching up to 8 meters in length and weighing up to 6 tonnes. Highly intelligent and social, they use **echolocation for communication and hunting**.

While powerful predators, they are **not aggressive towards humans in the wild**. Pods, or maternally related groups, have distinct communication patterns. Orcas are listed as **Data Deficient on the IUCN Red List and under CITES Appendix II**.



About the Strait of Gibraltar:

It is a **vital shipping route connecting the Mediterranean Sea to the Atlantic Ocean** and has been the site of recent orca attacks on vessels. It acts as a natural chokepoint between Europe and Africa.

5. ROTTERDAM, NETHERLANDS

World Hydrogen Summit 2024 held in Rotterdam, Netherlands

The summit featured **India's Ministry of New & Renewable Energy** showcasing advancements in green hydrogen technology at its pavilion.

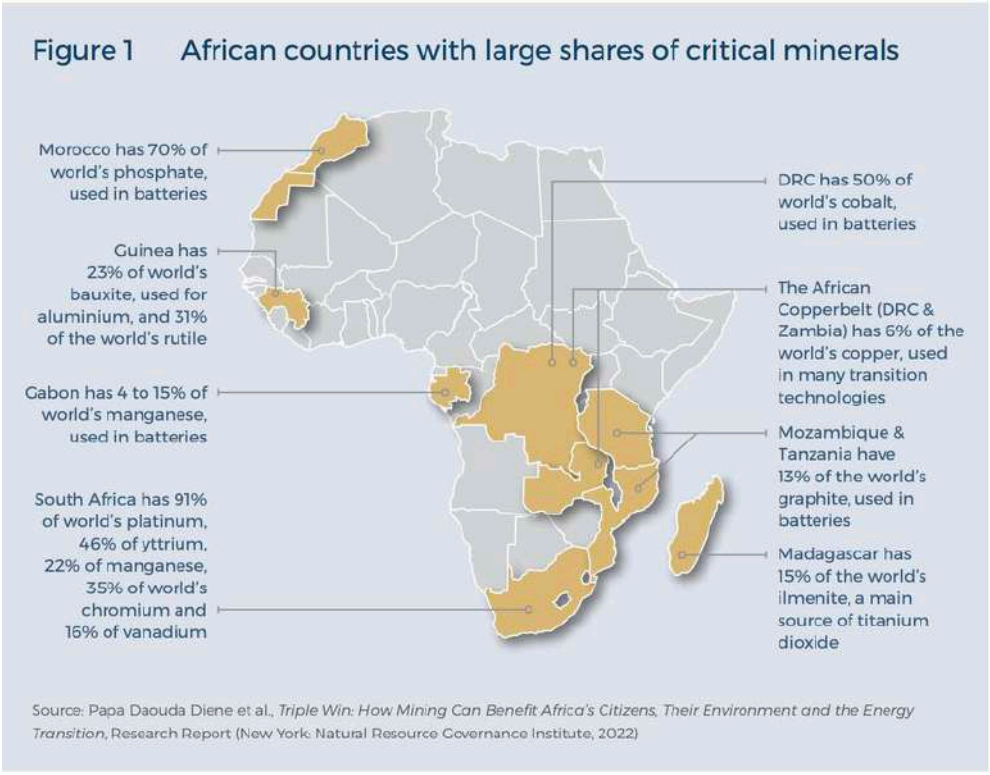
India's initiatives: National Green Hydrogen Mission (NGHM) in 2023; Strategic Interventions for Green Hydrogen Transition Programme (SIGHT); Hydrogen Valley Innovation Clusters

Hydrogen, a colourless, odourless, tasteless, and flammable gas, is the most abundant element in the universe and the third most abundant on Earth's surface, resembling alkali metals and halogens.

6. AFRICA: CRITICAL MINERAL ACQUISITION PLAN BY INDIA

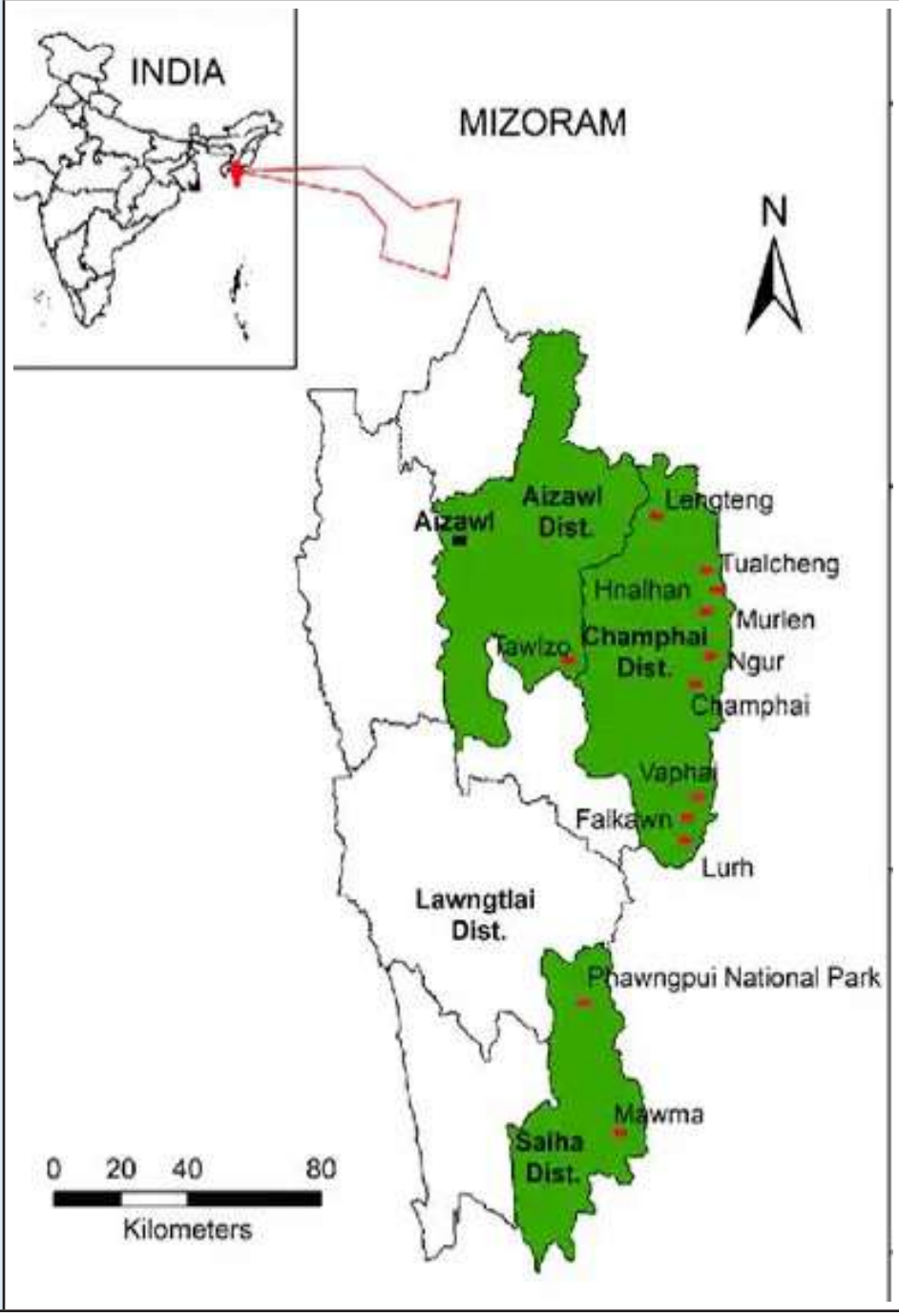
Context: India aims to **bolster its access to critical minerals in Africa** to enhance resource security and challenge China's dominance in the region.

- With a list of 30 crucial minerals, including lithium and cobalt, India seeks partnerships in countries like Tanzania, Zimbabwe, Congo, and Zambia.



Khanij Bidesh India Limited (KABIL) was established in 2019 as a joint venture of **NALCO, HCL, and MECL** to secure strategic minerals like lithium and cobalt from overseas. **KABIL** handles the identification, acquisition, exploration, and processing of these minerals to meet India's commercial needs.

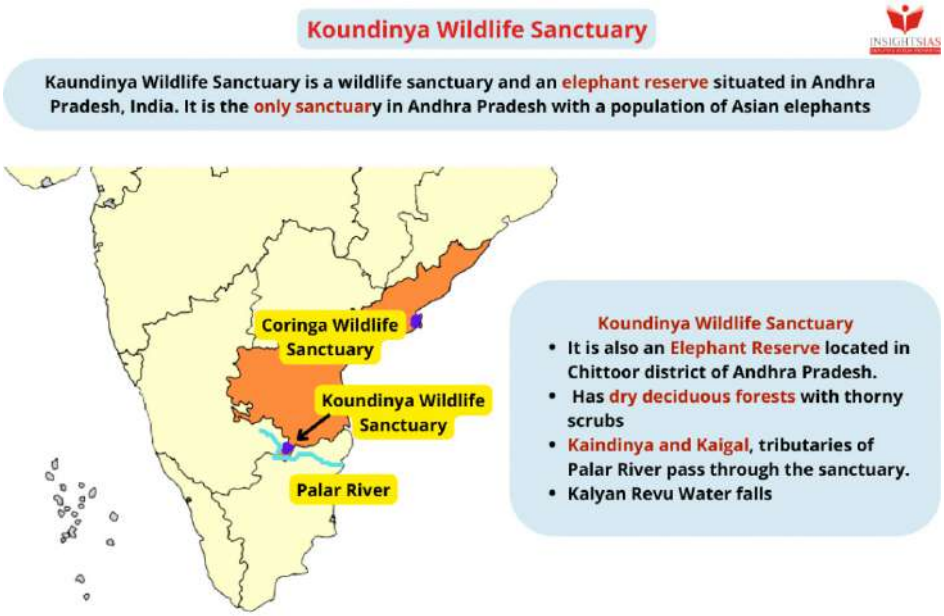
The Mineral Security Partnership (MSP) is a US-led coalition of 14 countries, including **India**, focusing on ensuring stable supply chains for critical minerals like **Cobalt, Nickel, Lithium, and rare earth minerals**. Its mandate includes diversifying and stabilizing global supply chains, promoting investment, upholding environmental and social standards, and increasing mineral recycling.

Places	Description
7. PHAWNGPUI NATIONAL PARK OF MIZORAM	A rare **hemi-parasitic terrestrial plant (Phtheirospermum lushaiorum)** has been found in Phawngpui National Park of Mizoram. Lushaiorum is named after **"Lushai" tribe of Mizoram.**
	Phawngpui National Park, also known as Phawngpui Blue Mountain National Park, is one of two national parks in Mizoram, India, the other being the larger **Murlen National Park.** Located about 300 km from Aizawl in the Lawngtlai district near Burma, it encompasses Phawngpui, Mizoram's highest peak at 2,157 meters, along with the surrounding reserve forest.
	The **Lushai tribe, part of the Kuki-Chin group,** is commonly known as Mizos and is of Mongoloid origin. Their main occupations are Jhum and orange cultivation, and they are historically known as a headhunter community. The **popular Bamboo Dance (Cheraw-dance)** is a cultural highlight. Lushai society is organized as a patrilocal joint family with patrilineal descent and inheritance rules.
	

8. KOUNDINYA WILDLIFE SANCTUARY (ANDHRA PRADESH)

The **Sri Lankan golden-backed frog** has been rediscovered in India after 200 years at Koundinya Wildlife Sanctuary.

Located in the Kuppam and Palmaner Ranges of Chittoor district, Andhra Pradesh, it is the only sanctuary in the state known for **Asian elephants.** The Kaundinya and Kaigal tributaries of the **Palar River flow through it**.



9. UJANI DAM

Context: Six people, including two children, drowned after their boat capsized in the Ujani dam backwaters in Maharashtra's Pune district due to **strong winds and rains.**

About Ujani Dam:

Ujani Dam is on the **Bhima River near Ujjani village** in Solapur district, Maharashtra. The dam generates 12 MW of hydroelectric power.

About Bhima River:

It is also known as the **Chandrabagha River, it is a major tributary of the Krishna River**. Originates in the **Bhimashankar hills** near Karjat, Pune District, Maharashtra. Flows southeast through Maharashtra, Karnataka, and Telangana, merging into the Krishna River at Kadlur, Karnataka. **Pandharpur**, an important pilgrimage centre, is situated on its right bank.