INSIGHTSIAS

SIMPLIFYING IAS EXAM PREPARATION

ELEPHANT

The elephant population in Kerala has declined from 1,920 in 2023 to 1,793, as revealed by a recent synchronized population estimation across southern Indian states.

22 JULY - 27 JULY 2024

WEEKLY CURRENT AFFAIRS

WWW.INSIGHTSONINDIA.COM

INSIDE

GENERAL STUDIES – 2

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

1. Supreme Court Verdict on States' Right to Tax Mineral-Rich Lands 4

Topics: Issues relating to development and management of Social Sector/Services relating to Health, Education, Human Resources.

2. Economic Survey 2024 Shines Light on Mental Health 6

GENERAL STUDIES – 3

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

3. Economic Survey 2024: Here are the key takeaways 8

Topics: Government Budgeting.

4. Union Budget 2024-25: Key Takeaways and Game-Changers 11

5. Urban Transformation Strategies in Union Budget 2024-25: 17

6. Union Budget 2024-25: 12 New Plug-and-Play Industrial Parks 18

7. Budget 2024-25: Bharat Small Reactors (BSRs)21

Topics: Major crops cropping patterns in various parts of the country, different types of irrigation and irrigation systems storage, transport and marketing of agricultural produce and issues and related constraints; e-technology in the aid of farmers.

8. Economic Survey 2023-24: Celebrating the Triumph of Indian Agriculture 23

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

9. Issues with India's Forest Conservation 25

10. Economic Survey and Budget: Global Approach to Climate Change and India's Perspective 27

Topics: Disaster and management.

11. Government Unveils National Landslide Forecasting Centre 29

GENERAL STUDIES – 4

1. Gender Equality in Sports 32

2. Ethics of Philanthropy 32

CONTENT FOR MAINS ENRICHMENT

1. How Chess is helping fight alcoholism 33

2. Bioplastics from cassava 33

3. Initiatives by Minal Karanwal (IAS) 34

FACTS FOR PRELIMS

GS-1

Art & Culture

1. Vishnupad and Mahabodhi temples 34

2. Kalarippayattu 34

3. Sangameshwara temple 35

4. Charaideo Moidams 35

5. NATIONAL MISSION FOR MANUSCRIPTS 35

Geography

6. Rogue waves 35
7. Olympic Order 36

GS-2

Salient features of Indian Constitution

8. Right to be forgotten 36

Functioning of Parliament and State Legislatures

9. Immunity to governors 36
10. Unlawful Activities Prevention Act (UAPA) 36

Governance

11. U-WIN 37
12. CULTURAL MAPPING OF VILLAGES 37
13. DIGIPIN (Digital Postal Index Number) 37
14. PM Janjatiya Unnat Gram Abhiyaan 38

International Relations

15. Carbon crediting mechanism 38

GS-3

Indian Economy

16. Global Capability Centres (GCCs) 38
17. Greenium 38

Science & Technology

18. Uranium 39
19. Apophis asteroid 39
20. PC emulator 39
21. Curiosity rover 39
22. NovA - 'NuMI Off-axis νe Appearance' 40
23. Lactic acid bacterium 40
24. Dark oxygen 40
25. Ketamine 41
26. Listeria 41
27. Tinzaparin 41

Environment & Ecology

28. Elephant 41
29. Phlogacanthus Sudhansusekharii 42
30. Zebra mussel 42
31. Project Cheetah 42
32. Artificial reefs 43
33. 'White category' sectors 43
34. Climate Finance Action Fund (CFAF) 44

Internal Security

35. The Indian Cyber Crime Coordination Centre (I4C) 44

Defence

36. Pralay Missiles 44
37. Triput class frigates 45

Reports in news

1. World's Forests 2024 Report 46
2. Report "The strategic role of data centers in empowering India's digital revolution" Released 46

MAPPING

INDIAN

1. Lithium in Mandya and Yadgiri districts (Karnataka) 47

GENERAL STUDIES – 2

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

1. SUPREME COURT VERDICT ON STATES' RIGHT TO TAX MINERAL-RICH LANDS

Context:

The Supreme Court ruled that States have the **unlimited right to tax mining lands and quarries**, independent of the **Parliament's Mines and Minerals (Development and Regulation) Act of 1957.**

1. **The 8:1 judgment, led by Chief Justice D.Y. Chandrachud**, affirmed that State Legislatures' power to tax is derived from the Constitution and is essential for their revenue generation.

Background of the Case

In 1989, a seven-judge Bench ruled that the Centre holds primary authority over mining regulation under the **Mines and Minerals (Development and Regulation) Act, 1957**, and **Entry 54 of the Union List**. States could only **collect royalties, not impose additional taxes, as royalties were classified as taxes**.
In 2004, a five-judge Bench suggested there might have been a **typographical error in the 1989 ruling, indicating that royalties were not a tax**. This discrepancy led to the current nine-judge review.

What did SC decide now?

1. **State Taxation Authority**: The power to tax mineral rights is enumerated in Entry 50 of List II (State List), and **Parliament cannot use its residuary power** with respect to this subject matter.
    i. While **Parliament can impose limitations on states' mineral taxation** via laws, the MMDRA has no specific provision imposing such limitations.
2. **Regulatory Power**: Entry 54 of List I (Union List) pertain to the Union's power over minerals and is regulatory, not inclusive of taxing authority.
3. **Definition of "Land"**: The term "land" in Entry 49 of List II includes mineral-bearing lands, granting states the competence to tax such lands.
4. **Overruling 1989 Judgment**: The court overruled its 1989 judgment and held **that royalty is not within the nature of a tax** and does not come under the MMDRA.
5. **Clarification on Taxing Authority**: The ruling clarifies that the power to impose taxes on mineral rights resides solely with the states, while Parliament may only impose limitations to prevent hindrances to mineral development.
6. **Ensuring Non-Obstruction**: Parliament can set constraints on how states levy taxes on mineral rights to ensure mineral development is not obstructed, but cannot impose taxes directly.

What was the dissenting opinion of one of the judges?

Dissenting Opinion: One of the 9 bench judges, warned that allowing states to levy taxes on mineral rights might lead to attempts to impose taxes on lands and buildings under Entry 49 of List II, potentially **disrupting the federal system and uniformity in mineral pricing and development**.

2. **Economic Consequences:** States levying taxes on minerals could lead to legal uncertainty and adverse economic consequences, impacting metal development in India.

Difference between Royalty and a Tax:

Aspect	Royalty	Tax
Origin	Originates from an agreement between parties.	Imposed under a statutory power without reference to any special benefit conferred on the payer.
Nature	Compensation is paid for the rights and privileges enjoyed by the grantee.	Enforced by law and does not require the taxpayer's consent.
Relationship	Direct relationship with the benefit or privilege conferred upon the grantee.	Imposed for public purposes without any specific benefit to the payer.

Specificity	Specific to the agreement and often linked to the exploitation of resources or usage of a privilege.	Part of the common burden is borne by all citizens, not linked to any specific privilege or benefit.
Quid Pro Quo	Involves a quid pro quo arrangement.	Does not involve a quid pro quo arrangement.
Mandatory Nature	Payment is linked to a specific benefit or privilege, and the arrangement is contractual.	Payment is mandatory and not linked to any specific privilege or benefit.
Precedents	**Hingir-Rampur Coal Co. Ltd. vs. State of Orissa (1961),** State of West Bengal vs. Kesoram Industries Ltd. (2004)	State of Himachal Pradesh vs. Gujarat Ambuja Cement Ltd. (2005), Jindal Stainless Ltd. vs. the State of Haryana (2017)

About the MMDRA Act:

Aspect	Details
What is MMDRA, 1957?	It is pivotal legislation in India **governing the mining sector, undergoing multiple amendments** for alignment with national economic and security interests.
Primary Objectives	**Develop the mining industry, ensure mineral conservation, and bring transparency** and efficiency to mineral exploitation.
2015 Amendment	Introduced key reforms such as the **auction method, DMF, NMET, and penalties** for illegal mining activities.
	Auction Method: Mandated auctioning of mineral concessions to enhance transparency in allocation.
	District Mineral Foundation (DMF): Established to benefit areas and people affected by mining.
	National Mineral Exploration Trust (NMET): Created to boost mineral exploration activities.
	Penalties for Illegal Mining: Implemented stringent penalties to curb illegal mining activities.
2021 Amendment	Removed the distinction between **captive and merchant mines**; ensured all private-sector mineral concessions were granted through auctions.
	Captive Mines: Operated by companies to produce minerals exclusively for their own use, with the ability to sell up to 50% of their annual mineral production in the open market.
	Merchant Mines: Operated to produce minerals for sale in the open market.
2023 Amendment	Aimed to **strengthen exploration and extraction of critical minerals** essential for India's economic development and national security.
	Key Amendments of 2023: Removed 6 minerals from the list of 12 atomic minerals limited to exploration by State agencies, empowered the government to exclusively auction mineral concessions for critical minerals.
	Exploration Licenses: Introduced to **attract foreign direct investment** and engage junior mining companies in exploring deep-seated and critical minerals.
	Focus: Reducing dependence on imports and encouraging private sector involvement to expedite exploration and mining of critical minerals.
	Importance of Certain Minerals: Recognized the importance of minerals like lithium, graphite, cobalt, titanium, and rare earth elements for future technologies and India's commitment to energy transition and net-zero emissions by 2070.
	Central Government's Role: Empowered to exclusively auction mining leases and composite licences for certain critical minerals.
	State Governments' Role: Granted the mining lease or composite licence after auctions conducted by the Central government.
	Removal of Certain Minerals: Removed certain minerals from the list of atomic minerals such as lithium, beryllium, titanium, etc.

Insta Links:

3. Amendment to Mines and Minerals (Development and Regulation) Act
4. Offshore Areas Mineral (Development and Regulation) Amendment Bill, 2023

Mains Links:

Q. Despite India being one of the countries of Gondwanaland, its mining industry contributes much less to its Gross Domestic Product (GDP) in percentage. Discuss. (UPSC 2021)
Q. "In spite of adverse environmental impact, coal mining is still inevitable for development". Discuss (UPSC 2021)

Topics: Issues relating to development and management of Social Sector/Services relating to Health, Education, Human Resources.

2. ECONOMIC SURVEY 2024 SHINES LIGHT ON MENTAL HEALTH

Context:

Economic Survey 2024 **Addresses Mental Health at the Economic Level for the First Time Ever.**

National Prevalence of Mental Health

1. **Mental Disorders**: **10.6%** of Indian adults suffer from mental disorders (NMHS 2015-16).
2. **Treatment Gap**: Ranges from 70% to 92% for different disorders.
3. **Urban vs. Rural:** Higher mental morbidity in urban metro regions (**13.5%**) compared to rural (**6.9%)** and urban non-metro areas **(4.3%).**
4. **Adolescent Mental Health**: Increased poor mental health among adolescents, with 11% feeling anxious, 14% experiencing extreme emotions, and 43% having mood swings (NCERT Survey), exacerbated by COVID-19.

The Economic Survey highlights the significant impact of mental health disorders on the economy:

1. **Productivity Losses:** Absenteeism, decreased productivity, and disability.
2. **Increased Healthcare Costs**: Higher expenditures for treatment and care.
3. **Poverty and Mental Health**: Stressful living conditions, financial instability, and limited opportunities increase psychological distress.

Government Initiatives:

Initiative/Policy	Details
National Mental Health Programme	Upgraded over **1.73 lakh Sub Health Centres**, Primary Health Centres, Urban PHCs, and Urban Health and Wellness Centres to Ayushman Arogya Mandirs providing mental health services.
National Tele Mental Health Programme	Established 53 **Tele MANAS** cells in 34 states/UTs with over 1600 trained counsellors in 20 languages, handling more than **8.07 lakh calls since Oct 2022 (as of 31 March 2024).**
Increasing Mental Health Personnel	**Sanctioned 25 Centres of Excellence** to increase PG students' intake, strengthened 47 PG Departments in 19 Government medical colleges/institutions, provided mental health services to 22 AIIMS, and set up three Digital Academies for online training.
Rashtriya Kishor Swasthya Karyakram	Conducted **Adolescent Friendly Health Clinics (AFHC)** and Peer education programmes across the country.
NIMHANS and iGOT-Diksha Collaboration	NIMHANS (Bengaluru) provides **psychosocial support and training via iGOT-Diksha platform**. Conducts online training for health workers.
WHO	On World Mental Health Day 2023 (October 10), WHO underscored the theme that **"Mental health is a universal human right."**
Paro Declaration	Adoption of the **Paro Declaration**, which aims to provide universal access to **People-centred Mental Health Care and Services.**

Recommendations of Economic Survey:

Policy Recommendation	Details
Increase Number of Psychiatrists	Raise from **0.75 psychiatrists** per lakh population (2021) to WHO norm of 3 per lakh.
Comprehensive Guidelines	Develop for **excellence centres' services** alongside mental healthcare professionals and users.
Programme Effectiveness	**Gather feedback from users**, professionals, and stakeholders to assess and improve programmes.
Peer Support Networks	**Nurture networks, self-help groups,** and community-based rehabilitation to de-stigmatize mental disorders.
NGO Partnerships	**Scale up efforts, share knowledge, and leverage resources** to enhance policies and identify areas of improvement.
Involve Individuals with Experience	**Engage those with personal experience** in decision-making, service planning, and advocacy.
Early Identification	**Sensitize mental health** at preschool, Anganwadi level for early disorder identification.
Standardized Guidelines	**Standardize mental health services** across government and private sectors.
School Integration	**Develop age-appropriate mental health curriculum**, encourage early intervention, and promote community-level interactions.
Community Approach	**Adopt a bottom-up, whole-of-community approach** to address mental health and break the stigma.
Acknowledge Reluctance	**Public health officials should tackle mental health** by addressing fundamental personal reluctance.

GENERAL STUDIES – 3

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

3. ECONOMIC SURVEY 2024: HERE ARE THE KEY TAKEAWAYS

Context:

Economic Survey 2023-24 was tabled in Parliament by Union Minister for Finance and Corporate Affairs, Smt. Nirmala Sitharaman.

What is the Economic Survey?

It provides a **detailed report of the state of the national economy (from agriculture to unemployment to infrastructure)** for the year that is coming to a close (2023-24) with forecasts of the upcoming financial year (2024-25). It is **prepared by the Economic Division of the Department of Economic Affairs (DEA),** Ministry of Finance, under the **guidance of the chief economic adviser (CEA).**

Once prepared, the **Survey is approved by the Finance Minister** and the comments or policy solutions contained in the Survey are **not binding on the government**. The first Economic Survey was **presented for 1950-51 and until 1964**, it was presented along with the budget.

The main highlights of the Economic Survey are as follows:

Chapter	Highlights
State of the Economy – Steady as She Goes	Projected real GDP growth of **6.5–7%**. Real GDP grew by **8.2%** in FY24. Retail inflation reduced from **6.7% to 5.4%.** CAD at **0.7%** of GDP. Real GDP 20% higher than FY20 level. 55% of tax from direct Tax, 45% from indirect Tax. Free food grains to **81.4** crore people.
Monetary Management and Financial Intermediation- Stability is the Watchword	RBI maintained a steady policy rate at **6.5%.** Credit disbursal grew by **20.2%.** Double-digit bank credit growth. Gross and net NPAs at multi-year lows. Industrial credit growth at **8.5%.** Primary capital markets facilitated **₹10.9 lakh crore.**
	• Bank credit has experienced a double-digit growth, with both gross and net non-performing assets at multiyear lows. • Target-based approach followed for Financial Inclusion with emphasis on promoting Indio's Digital Public Infrastructure
Prices and Inflation- Under Control	Retail inflation at **5.4%, lowest** since pandemic. Price cuts for LPG, petrol, and diesel. LPG inflation deflationary. Food inflation increased to **7.5%.** Government interventions mitigated food inflation. RBI projects inflation to **4.5%** in FY25.
	• Most States & I-ITS witnessed decreased inflation rates in FY24 compared to FY23. With 29 out of 36 recording rotes below 6% in FY24.
External Sector - Stability Amid Plenty	• India's rank in **World Bank's Logistics Performance** Index improved to **38th**. CAD narrowed to **0.7%.** Services exports grew by **4.9% to USD 341.1 billion**. • India top remittance recipient at USD 120 billion, followed by Mexico, China, Philippines and Pakistan. • External debt to GDP ratio at **18.7%.**
Medium-Term Outlook – A Growth Strategy for New India	• Deliberate focus on boosting private investment • Growth & expansion of India's Mittelstand (MSMEs) • Agriculture as an engine of future growth • To secure financing of green transition in India • Bridging education-employment gap • Focused building of state capacity.

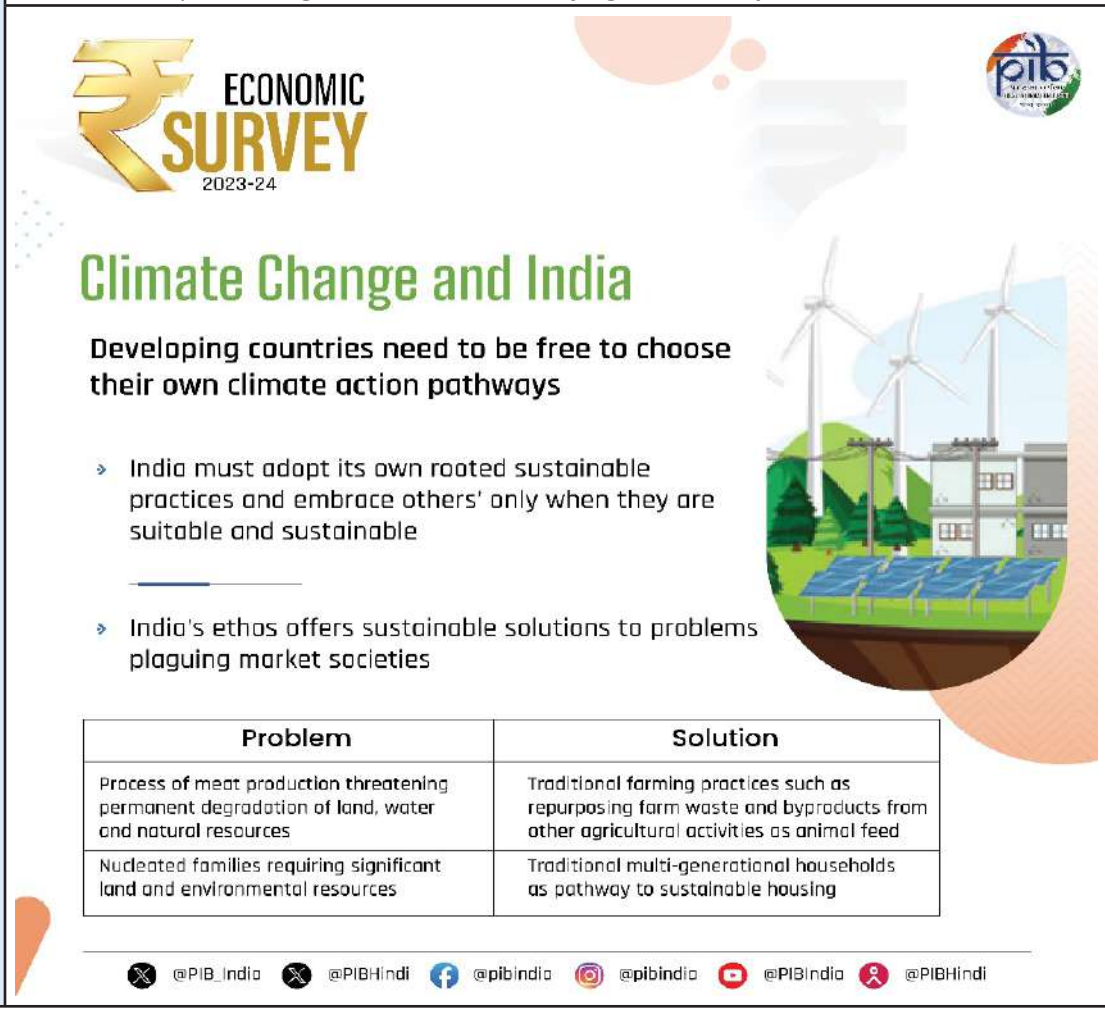
Climate Change and Energy Transition: Dealing with Trade-Offs	**India only G20 nation aligned with 2°C warming.** Renewable energy capacity increased. Non-fossil sources **45.4%** of installed capacity. Emission intensity reduced by 33%. Sovereign green bonds worth 216,000 Cr issued in Jan-Feb 9023 followed 220,000 cr in oct-Dec 2023. Carbon Sink (tree and forest cover) Of 1.97 Bn tonnes Of C02 equivalent been created between 2005 and 2019. Addition of 30 GW of solar capacity through rooftop solar under PM-Surya Ghar Yojana.
Social Sector - Benefits that Empower	Welfare expenditure grew at **12.8% CAGR**. Ayushman Bharat generated **34.7 crore cards**. **'Poshan Bhi Padhai Bhi'** for preschool education. Rise in higher education enrolment driven by SC, ST, OBC. Ayushman Bharat swing lives; saves more than 1.25 lakh crore of out-of-pocket expenditure for poor and deprived families. DAY-NRLM programme covers over 89 Mn women through 83 lakh Self Help Groups; empirically associated with women's empowerment.
Employment and Skill Development: Towards Quality	Unemployment rate declined **to 3.2%**. Youth unemployment reduced to 10%. Female labour force participation rate rising. EPFO membership grew by **8.4%** CAGR. Gig workforce expected to expand. Rising youth and female participation in the workforce on opportunity to tap the demographic and gender dividend. Indian economy needs to generate **an average of 78.5 lakh jobs in non-form sector annually until 2030.**
Agriculture and Food Management – Plenty of Upside Left If We Get It Right	Agriculture sector grew at **4.18%.** Credit disbursed to agriculture **₹22.84 lakh crore**. 90 lakh hectares under micro irrigation. Investment in agricultural research yields high payoff. Share of non-institutional credit has reduced from in 1950 to 23.40% in 2021-22. Need to encourage production patterns and practices consistent with their agro-climatic characteristics.
Industry - Small and Medium Matters	Industrial growth rate of **9.5%.** Manufacturing sector growth driven by chemicals, pharmaceuticals, machinery. PLI schemes attracted **₹1.28 lakh crore** investment. India's electronics manufacturing **3.7%** of global market share. **Steel sector** achieved its highest levels of production in FY24. **91.76 Lakh guarantees for MSME sector** approved under **Credit Guarantee Fund Trust for Micro and Small Enterprises (CGTMSE)** scheme.
Services - Fuelling Growth Opportunities	Services sector GVA at 55%. India's services exports **4.4%** of global. Aviation sector grew 15%. Real estate sales highest since 2013. Internet density at **68.2%.** E-commerce expected to cross USD 350 billion by 2030.
	India: Pharmacy of the World: • World's 3rd largest market by volume • India's pharmaceutical market valued at USD 50 Bn currently. • 8 Of the top 20 global generic companies based in India. • More than 12,500 Janaushadhi Kendras opened, covering all districts.
Infrastructure – Lifting Potential Growth	NH construction **pace tripled to 34 km/day**. Railways capital expenditure increased by 77%. New terminal buildings at 21 airports operationalized. Clean energy sector investment of **₹8.5 lakh crore**. Construction of on index thot tracks utilization rates of infrastructure facilities would shed light on sub-sectors where there is oversupply or shortfall.

Climate Change and India: Why We Must Look at the Problem Through Our Lens

Global strategies flawed; focus on overconsumption. India's ethos of nature harmony. Emphasis on sustainable housing through traditional households. **"Mission LiFE"** for mindful consumption.

Global strategies for climate change are flawed:

- Western approach does not seek to address the root of the problem, i.e., **overconsumption**
- Global pursuit of **energy-guzzling technologies** such as AI and large-scale mining has contributed to higher fossil fuel consumption.
- Their practices **ignore humans' underlying relationship with Nature.**



Mains Links:

Q. Do you agree with the view that steady GDP growth and low inflation have left the Indian economy in good shape? Give reasons in support of your arguments. (UPSC 2019)

Prelims Links: UPSC 2015

With reference to the Indian economy, consider the following statements:

1. The rate of growth of the Real Gross Domestic Product has steadily increased in the last decade.
2. The Gross Domestic Product at market prices (in rupees) has steadily increased in the last decade.

Which of the statements given above is/are correct?

1. 1 only
2. 2 only
3. Both 1 and 2
4. Neither 1 nor 2

Ans: 1

Topics: Government Budgeting.

4. UNION BUDGET 2024-25: KEY TAKEAWAYS AND GAME-CHANGERS

What is Budget?

The Union Budget is the **annual financial statement of the Indian government**, presented by the Finance Minister on February 1st. It consists of the **Revenue Budget and Capital Budget,** covering expected income and expenditures. The budget includes *macroeconomic details in Part A* and **taxation proposals in Part B**, presented as a **Money Bill** defined in **Article 110** of the Constitution. After independence, **India's first Budget** was presented in 1947 by **Finance Minister RK Shanmukham Chetty**.

Article 112 of the Indian Constitution mandates the Union Budget as the government's estimated receipts and expenditures.

Key Budget documents include:

1. Annual Financial Statement (Article 112)
2. Demands for Grants (Article 113)
3. Finance Bill (Article 110)
4. Fiscal Policy Statements mandated under the FRBM Act, 2003, including
5. The Macro-Economic Framework Statement and
6. The Medium-Term Fiscal Policy cum Fiscal Policy Strategy Statement.

Objectives of budget:

The Union Budget focuses on objectives such as stimulating economic growth, promoting social justice and equality, ensuring effective resource allocation, and maintaining fiscal stability.

Stages of Budget presentation:

Stage	Description
President's Address	Joint address by the President of India to both Houses of Parliament, outlining government policy priorities, achievements, and legislative agenda.
Economic Survey Presentation	Prepared by the Economics Division of the Department of Economic Affairs under the Chief Economic Advisor's guidance. Tabled in Lok Sabha a day before the Union Budget presentation.
Railway Budget (Till 2016)	Presented separately until 2016, merged with the General Budget in 2017.
Union Budget Presentation	Presented by the Finance Minister on February 1st.
General Budget Discussion	After the Budget presentation, discussed in both Houses of Parliament. Allows critique and debate on the Budget.
Voting on Demands for Grants	Parliament approves Demand for Grants for ministries and departments, authorizing proposed expenditures.
The passing of Finance Bill	Finance Bill, containing taxation proposals, passed by both Houses of Parliament and enacted. The budget comes into effect after Presidential assent.

Union Budget **2024-25 Highlights**

Aspect	Details
Economic Growth	India's economic growth remains strong despite global uncertainties.
Focus	Focus is on 4 major castes, namely **'Garib' (Poor), 'Mahilayen' (Women), 'Yuva' (Youth) and 'Annadata' (Farmer) (similar to Interim Budget)**
Budget Theme	The budget focuses on **employment, skilling, MSMEs, and the middle class**.

Budget Estimates 2024-25	**Total receipts other than borrowings**: **32.07 lakh crore**
	Total expenditure: **48.21** lakh crore
	Net tax receipt: 25.83 lakh crore
	Fiscal deficit: **4.9 per** cent of GDP
	Government aims to reach a **deficit below 4.5 per** cent next year
	Inflation is low and stable, moving towards the 4% target; core inflation is **at 3.1%.**

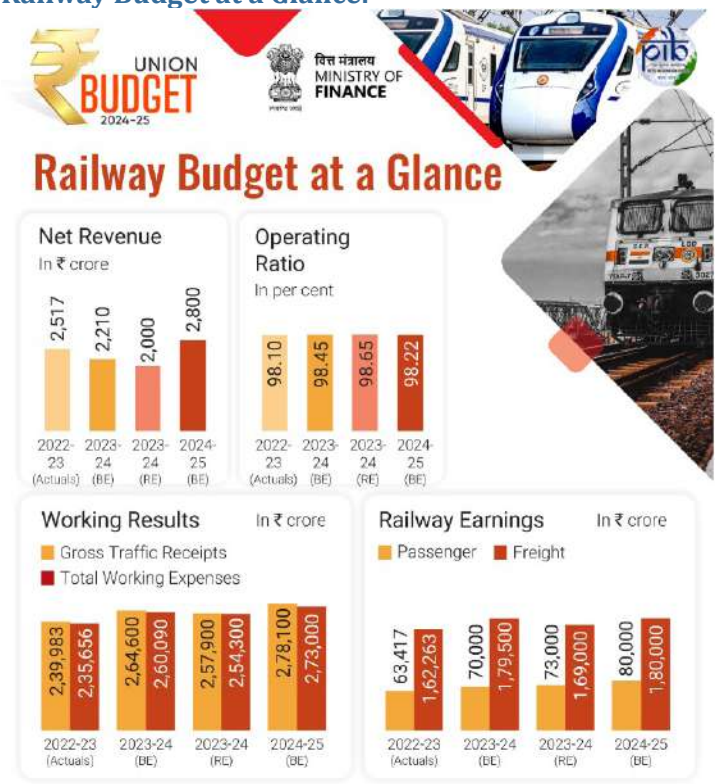
Nine Budget Priorities in pursuit of 'Viksit Bharat'

Priority 1: Productivity and resilience in Agriculture	**An allocation** of **₹1.52 lakh crore** has been made for agriculture and allied sectors. This includes the release of **109 new high-yielding and climate-resilient varieties of 32 field and horticulture crops** for cultivation by farmers.
	Natural Farming: In the next two years, **1 crore farmers across the country will be initiated into natural farming** with certification and branding.
	Bio-input Centres: **10,000 need-based bio-input resource centres will be established** to support natural farming.
	Digital Public Infrastructure: To further enhance agricultural efficiency, **Digital Public Infrastructure (DPI) for Agriculture** will be implemented, covering farmers and their lands within three years. **New 109 high-yielding & climate-resilient varieties** of 32 field & horticulture crops to be released for cultivation by farmers. A strong push to 1 crore farmers across the country towards natural farming supported through certification & branding.

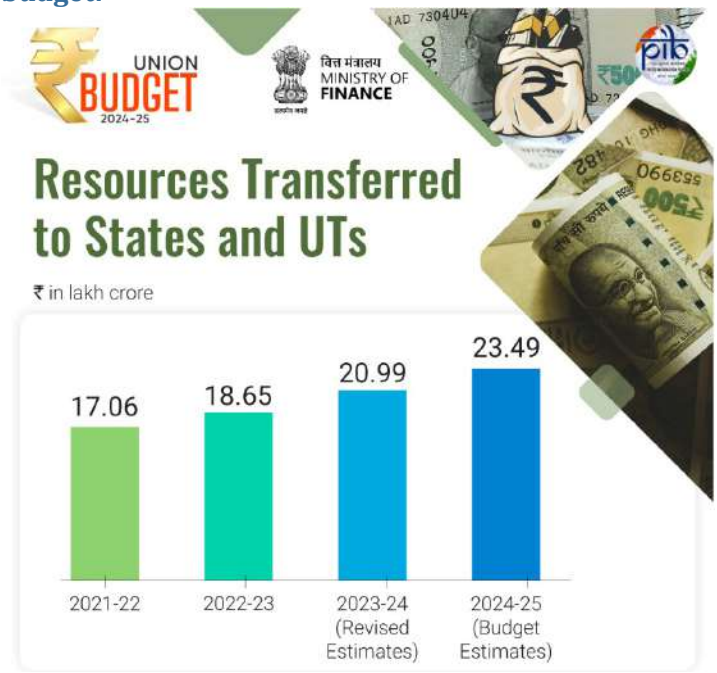
Priority 2: Employment & Skilling	**Package of PM's five schemes for Employment and Skilling**
	Prime Minister's Package of **5 Schemes and Initiatives for employment, skilling and other opportunities** for **4.1 crore youth** over a 5-year period. This year, **₹1.48 lakh crore** is allocated for education, employment, and skilling.
	Scheme A - First Timers: One-month salary of up to `15,000 to be provided in 3 installments to first-time employees, as registered in the EPFO
	Scheme B - Job Creation in manufacturing: Incentive to be provided at specified scale directly, both employee and employer, with respect to their EPFO contribution in the first 4 years of employment
	Scheme C - Support to employers: Government to reimburse up to `3,000 per month for 2 years towards EPFO contribution of employers, for each additional employee
	New centrally sponsored scheme for Skilling: 20 lakh youth to be skilled over a 5-year period.; **1,000 Industrial Training Institutes** to be upgraded in hub and spoke arrangements.
	New Scheme for Internship in 500 Top Companies to 1 crore youth in 5 years
	To facilitate **higher participation of women in the workforce, working women hostels and crèches** will be established in collaboration with industry.
	Women-specific skilling programmes will be organized, and market access for women Self-Help Group (SHG) enterprises will be promoted
Priority 3: Inclusive Human Resource Development and Social Justice	Purvodaya Initiative: Develop **a plan for the eastern region**, including **Bihar, Jharkhand, West Bengal, Odisha, and Andhra Pradesh**, focusing on human resource development, infrastructure, and economic opportunities to drive Viksit Bharat.
	Develop industrial node at Gaya along the **Amritsar-Kolkata Industrial Corridor**. Launch power projects, including a **2400 MW power plant at Pirpainti (Bhagalpur, Bihar), with** a total investment of ₹21,400 crore
	Andhra Pradesh Reorganization Act: Special financial support of ₹15,000 crore through multilateral development agencies
	Develop industrial nodes at Kopparthy along the **Vishakhapatnam-Chennai Industrial Corridor** and at **Orvakal along the Hyderabad-Bengaluru Industrial Corridor**
	Pradhan Mantri Janjatiya Unnat Gram Abhiyan: Improve socio-economic conditions of **tribal families in 63,000 villages**, benefiting 5 crore people
	Bank Branches in North-Eastern Region: Establish 100 branches of India Post Payment Bank
Priority 4: Manufacturing & Services	**Credit Guarantee Scheme for MSMEs in the Manufacturing Sector**: A scheme providing collateral-free credit guarantees for term loans to MSMEs for machinery and equipment purchases.
	Credit Support to MSMEs during Stress Period: A new mechanism to ensure continued bank credit support to MSMEs during periods of financial stress.
	Mudra Loans: Increase the limit of Mudra loans under the 'Tarun' category to ₹20 lakh from ₹10 lakh for those with successful repayment histories.
	Enhanced Scope for Mandatory Onboarding in TReDS: Reduce the turnover threshold for mandatory onboarding on the TReDS platform from ₹500 crore to ₹250 crore.
	MSME Units for Food Irradiation, Quality & Safety Testing: Provide financial support to establish 50 multi-product food irradiation units in the MSME sector.
	E-Commerce Export Hubs: Set up E-Commerce Export Hubs through public-private partnerships to help MSMEs and traditional artisans sell products internationally.
	Digital Public Infrastructure (DPI) Applications: Develop DPI applications for credit, e-commerce, education, health, law and justice, logistics, MSME, service delivery, and urban governance.

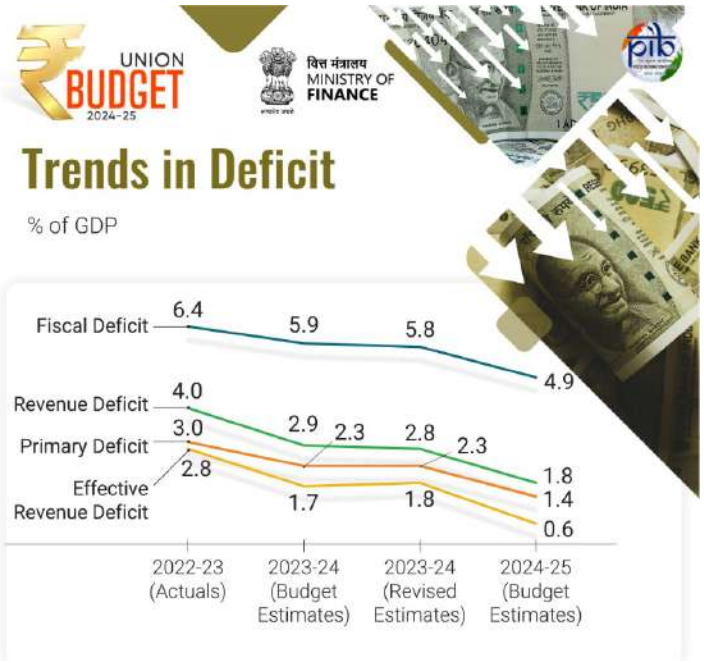
Priority 5: Urban Development	**Transit Oriented Development**: Develop and finance Transit Oriented Development plans for 14 large cities with populations over 30 lakh.
	Urban Housing: Invest ₹10 lakh crore, **including central assistance of ₹2.2 lakh crore over the next 5 years**, under **PM Awas Yojana Urban 2.0** to address housing needs of 1 crore urban poor and middle-class families.
	Street Markets: Launch a new scheme to support the **development of 100 weekly 'haats' or street food hubs** annually for the next 5 years in select cities. (building on the **success of PM SVANidhi Scheme** in transforming the lives of street vendors)
Priority 6: Energy Security	Energy Transition: Introduce a policy document on '**Energy Transition Pathways'** to balance employment, growth, and environmental sustainability.
	Pumped Storage Policy: Develop a policy to promote pumped storage projects for electricity storage.
	Research and Development of Small and Modular Nuclear Reactors: Partner with the private sector to research and develop Bharat Small Modular Reactors and newer nuclear technologies
	Advanced Ultra Super Critical Thermal Power Plants: Propose a joint venture between NTPC and BHEL to establish an 800 MW commercial plant using Advanced Ultra Super Critical (AUSC) technology
	Roadmap for 'Hard to Abate' Industries: Implement regulations to transition 'hard to abate' industries from the 'Perform, Achieve and Trade' mode to the 'Indian Carbon Market' mode
	PM Surya Ghar Muft Bijli Yojana has been launched to install rooftop solar plants to enable 1 crore households obtain free electricity up to 300 units every month. The scheme has generated **remarkable response with more than 1.28 crore registrations and 14 lakh applications**
Priority 7: Infrastructure	**Central Government Infrastructure Investment**: Allocate ₹11,11,111 crore (**3.4% of GDP**) for capital expenditure.
	State Governments Infrastructure Investment: Provide **₹1.5 lakh crore** in long-term interest-free loans for state infrastructure projects.
	Pradhan Mantri Gram Sadak Yojana (PMGSY): Launch Phase IV to ensure all-weather connectivity for 25,000 rural habitations.
	Irrigation and Flood Mitigation: Offer ₹11,500 crore for projects like the **Kosi-Mechi intra-state link** and assist states like Assam, Himachal Pradesh, Uttarakhand, and Sikkim with flood and landslide management.
	Tourism: Develop V**ishnupad Temple Corridor, Mahabodhi Temple Corridor, Rajgir**, and assist in enhancing temples, monuments, wildlife sanctuaries, natural landscapes, and beaches in Odisha.
Priority 8: Innovation, Research & Development	**Anusandhan National Research Fund**: Operationalize fund for basic research and prototype development.
	Financing Pool: Establish a ₹1 lakh crore pool to support private sector-driven research and innovation at a commercial scale.
	Space Economy: Create a ₹1,000 crore venture capital fund to expand the space economy fivefold over the next 10 years.
Priority 9: Next Generation Reforms	Rural Land Related Actions: Implement Unique Land Parcel Identification Number (ULPIN) or Bhu-Aadhaar for all lands; **Digitize cadastral maps** and survey map sub-divisions based on current ownership; Establish a **land registry** and link it to the farmers registry.
	Urban Land Related Actions: Digitize land records in urban areas using GIS mapping.
	Services to Labour: Integrate the **e-shram portal** with other platforms for a one-stop solution; **Develop open architecture databases** to keep up with labour market changes and skill requirements.
	NPS Vatsalya: Introduce NPS-Vatsalya for contributions by parents and guardians for minors.

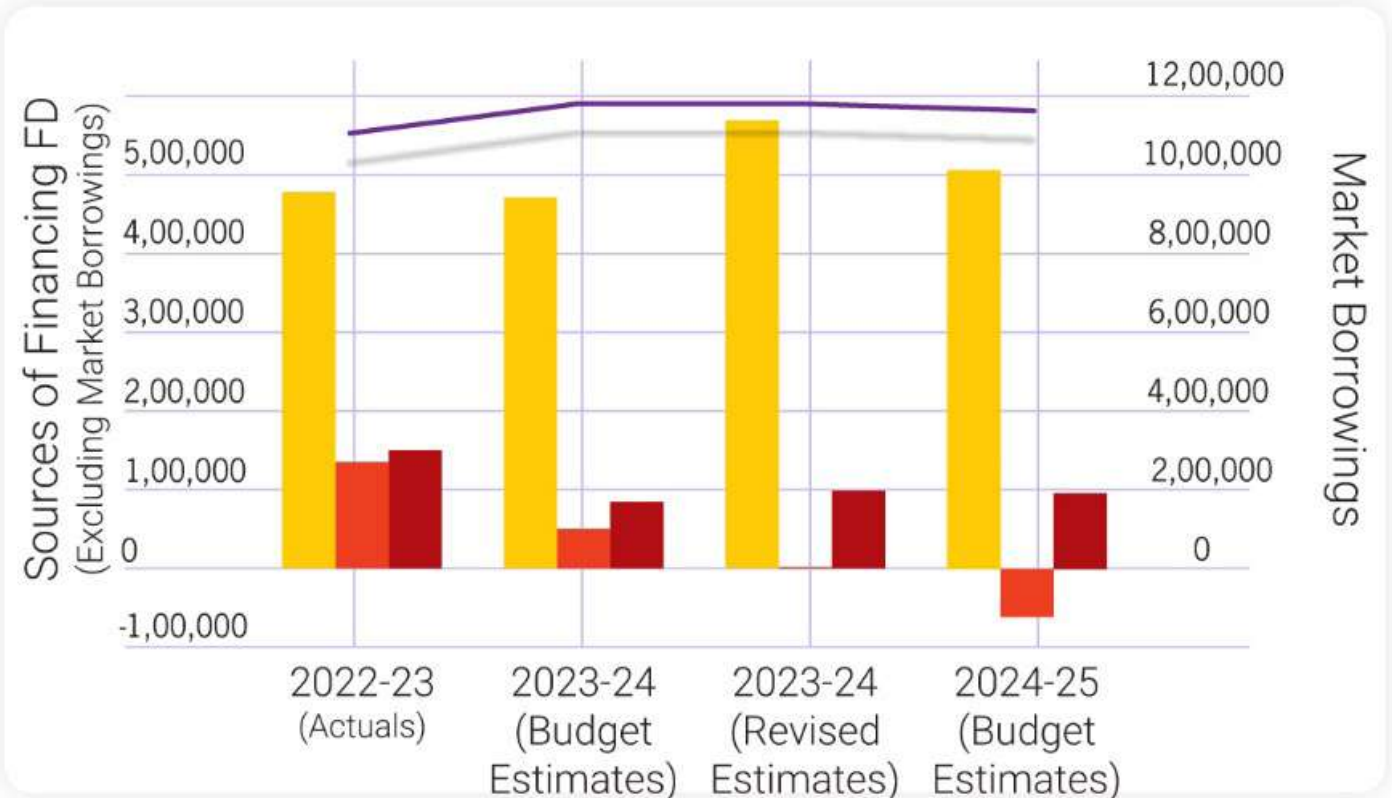
Railway Budget at a Glance:



Other Important Infographics about Trends in this budget:







Indirect taxes:

- Customs duty on three more medicines to be fully removed, to provide relief to cancer patients. Basic customs duty on mobile phone, mobile PCBA and mobile charger to be reduced to 15%.
- 25 critical minerals to be exempted from customs duties & basic customs duty on two Of them to be reduced.
- List of exempted capital goods for use in the manufacture of solar cells & panels in the country to be expanded.
- Customs duty proposed to be removed on oxygen free copper for manufacture of resistors & certain parts for manufacture of connectors to be exempted.

5. URBAN TRANSFORMATION STRATEGIES IN UNION BUDGET 2024-25:

Strategies in Union Budget 2024-25	Details
PM Awas Yojana (PMAY)	**Expansion and Investment**: Allocation for 3 crore additional houses, including **PM Awas Yojana Urban 2.0** for 1 crore urban poor and middle-class families with ₹10 lakh crore investment. Central assistance of **₹2.2 lakh crore** over five years and interest subsidies for affordable loans.
	
	Vision and Commitment: Focus on pucca houses with essential amenities (toilets, LPG, electricity, tap connections). Female head of the family mandated as owner/co-owner, promoting women's empowerment among EWS and LIG.
Rental Housing	**Dormitory-type accommodation** for industrial workers through PPP mode, supported by **Viability Gap Funding (VGF)** and anchor industries. Policies for efficient and transparent rental housing markets.
Cities as Growth Hubs	**Development of cities as growth hubs through economic and transit planning**, orderly peri-urban area development, and creative brownfield redevelopment. **Transit Oriented Development plans for 14 large cities with populations above 30 lakh.**
Water Supply and Sanitation	Partnership with state governments and multilateral development banks to **promote water supply, sewage treatment, and solid waste management projects in 100 large cities**. Utilization of treated water for irrigation and tank filling.
Weekly 'Haats'	Support for developing **100 weekly 'haats' or street food hubs each year for five years**, building on the success of the **PM SVANidhi Scheme for street vendors.**
Stamp Duty	**Encouragement for states to moderate high stamp duty** rates and lower duties for properties purchased by women, as part of urban development reforms.

'Cities as Growth Hubs'

- Orderly development of peri-urban areas through economic and transit planning
- Framework for creative brownfield redevelopment of existing cities
- Water supply, sewage treatment and solid waste management projects and services for 100 large cities
- 14 large cities with a population above 30 lakh will have Transit Oriented Development Plans
- 1 cr urban poor and middle-class families to be covered under the PM Awas Yojana Urban 2.0
- 100 weekly 'haats' or street food hubs in select cities
- Rental housing for industrial workers to be facilitated in PPP mode

Other Initiatives:

Initiative	Description

AMRUT (Atal Mission for Rejuvenation and Urban Transformation) Scheme	Aims to provide basic services like water supply, sewerage, and urban transport to households, ensuring improved urban infrastructure.
Climate Smart Cities Assessment Framework 2.0	Evaluates and guides cities in integrating climate resilience into their urban planning and development strategies.
TULIP - The Urban Learning Internship Program	Offers internships to young graduates in urban local bodies and smart cities to enhance their understanding of urban governance and planning.
Smart Cities Mission (SCM)	Focuses on promoting sustainable and inclusive cities that provide core infrastructure, a clean and sustainable environment, and quality of life to citizens.
National Mission for Clean Ganga (NMCG)	Aims to rejuvenate the Ganga River by implementing projects for pollution abatement, river surface cleaning, and biodiversity conservation.
River Cities Alliance (RCA)	A collaborative platform for river cities to share knowledge and best practices on river management and sustainable urban development.
National Water Policy, 2012	Advocates for rainwater harvesting and desalination in urban and industrial areas to increase the availability of utilizable water, promoting sustainable water management.

Need for Urban Transformation Strategy

1. **Increasing Urban Population:** Currently, urban areas constitute ~35% of India's population; Expected to grow to 53% by 2047.
2. **Economic Contribution:** Urban centres contribute ~**66% to the national GDP**; Expected to reach 80% by 2050.
3. **Key Issues:**
   i. Infrastructure deficit.
   ii. Rapidly deteriorating environment, including air pollution.
   iii. Sub-optimal planning and governance.

Mains Link:

Q. With a brief background of quality of urban life in India, introduce the objectives and strategy of the 'Smart City Programme.' (UPSC 2016)

Prelims Link:

Q. With reference to Ayushman Bharat Digital Mission, consider the following statements: (UPSC 2022)

1. Private and public hospitals must adopt it.
2. As it aims to achieve universal, health coverage, every citizen of India should be part of it ultimately.
3. It has seamless portability across the country.

Which of the statements given above is/are correct?

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

Q. Consider the following statements: (UPSC 2011)
In India, a Metropolitan Planning Committee

1. is constituted under the provisions of the Constitution of India.
2. prepares the draft development plans for metropolitan area.
3. has the sole responsibility for implementing Government sponsored schemes in the metropolitan area.

Which of the statements given above is/are correct?

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

6. UNION BUDGET 2024-25: 12 NEW PLUG-AND-PLAY INDUSTRIAL PARKS

Context:

TWELVE INVESTMENT-READY **"PLUG AND PLAY" INDUSTRIAL PARKS** TO BE CREATED UNDER **NATIONAL INDUSTRIAL CORRIDOR DEVELOPMENT PROGRAMME: UNION BUDGET 2024-25**

What are Industrial Parks?

Industrial Parks are designated areas specifically developed to accommodate clusters of industrial activities. They offer specialized infrastructure and facilities to support manufacturing and business operations

Examples from India:

- **Sri City, Andhra Pradesh**: A large Special Economic Zone (SEZ) providing world-class infrastructure to attract global investments in various industries.
- **Gautam Budh Nagar, Uttar Pradesh**: An industrial park focusing on sectors like electronics, IT, and textiles, enhancing regional economic growth.

Examples from the World:

- **Shenzhen Special Economic Zone, China**: An industrial park that transformed Shenzhen into a major global manufacturing hub, boosting economic development and innovation.
- **Silicon Valley, USA**: A renowned industrial park for technology and innovation, housing numerous tech companies and startups, driving significant advancements in the tech industry.

Currently, the **Government of India has approved the development of 11 industrial corridors**, comprising 32 projects organized into four phases. The current list of industrial corridors includes:

1. Delhi Mumbai Industrial Corridor (DMIC)
2. Chennai Bengaluru Industrial Corridor (CBIC)
3. Extension of CBIC to Kochi via Coimbatore
4. Amritsar Kolkata Industrial Corridor (AKIC)
5. Hyderabad Nagpur Industrial Corridor (HNIC)
6. Hyderabad Warangal Industrial Corridor (HWIC)
7. Hyderabad Bengaluru Industrial Corridor (HBIC)
8. Bengaluru Mumbai Industrial Corridor (BMIC)
9. East Coast Economic Corridor (ECEC) with Vizag Chennai Industrial Corridor (VCIC) as Phase-1
10. Odisha Economic Corridor (OEC)
11. Delhi Nagpur Industrial Corridor (DNIC)

The National Industrial Corridor Development and Implementation Trust (NICDIT) oversees these projects, aiming for systematic, multi-modal connectivity across economic zones to enhance logistics and economic activities.

Despite decades of development, these clusters have not propelled India to replicate **China's manufacturing success.**

Reasons behind India not becoming a manufacturing hub like China:

1. **Poor Infrastructure:** China has invested heavily in its infrastructure, including roads, ports, and power supply, facilitating efficient manufacturing and logistics.
    a. India's infrastructure, though improving, still suffers from **frequent power outages, inadequate transportation facilities, and congested ports, increasing production costs and causing delays.**
    b. E.g., China's Spent $8 trillion on infrastructure development between 2011 to 2021 while India plans only $1.4 trillion for the National Infrastructure Pipeline from 2019 to 2025.
2. **Logistical Inefficiencies**: China boasts **world-class logistics and supply chain management**, ensuring smooth production and distribution.
    a. While inefficient logistics in India **hinder productivity and competitiveness**, impacting the overall efficiency of the manufacturing sector.
    b. E.g. **India is currently ranked 38th in the LPI 2023 while china was ranked 14th.**
3. **Regulatory and Bureaucratic Hurdles**: India's cumbersome regulatory framework involves **multiple approvals, unclear regulations, and red tape,** discouraging investors and delaying projects.
4. **High Cost of capital**: Lower interest rates and better access to affordable credit in China facilitate manufacturing investments.
    a. While high-interest rates and limited affordable credit in India increase business costs, hindering expansion and technological upgrades.
    b. E.g., **India's average lending rate was 8.6 % in 2022, significantly higher than China's 4.3%.**
5. **Taxation issues**: China's tax policies are more conducive to manufacturing, encouraging foreign and domestic investments.
    a. Although **GST reforms** are positive, India's tax structure remains **complex, adding to operational costs**.
6. **Skill Gap and workforce issues:** China has invested in **vocational training and education**, creating a skilled labour pool for manufacturing, while a significant portion of India's workforce lacks advanced manufacturing skills, affecting **productivity and quality.**
    a. E.g., according to **India Skills report, only 49% of Indian youth is employable.**
7. **Limited technological adoption:** Slow adoption of advanced technologies in India results in higher production costs and lower efficiency.
    a. E.g., **Indian textile sector still relies on outdated technologies**.
8. **R&D Investment:** Significant investment in R&D in China drives innovation and advanced manufacturing capabilities. While limited R&D investment in India hampers innovation and development of new manufacturing processes.
    a. E.g., **India spends only 0.64 percentage of it GDP on R&D while China spends 2.64 % of its GDP.**

Way forward:

1. **Investment in Infrastructure:** India should prioritize infrastructure projects such as the **Dedicated Freight Corridor (DFC)** and the **Bharatmala project** to improve logistics and connectivity across the country.
2. **Smart Industrial Zones:** Establishing Special Economic Zones (SEZs) with integrated infrastructure (power, water, transport) to attract manufacturing clusters.
    a. For instance, the **Gujarat International Finance Tec-City (GIFT)** is a successful example of an SEZ attracting global financial institutions.
3. **Expanding initiatives like the Skill India Mission** to train and certify workers in manufacturing skills, modelled on successful vocational training programs in countries like Germany.
4. **Adoption of Industry 4.0 Technologies:** Incen-

tivizing the adoption of automation, IoT, and digital manufacturing technologies through schemes like the **Production Linked Incentive (PLI) for electronics manufacturing.**

5. **Green Manufacturing Initiatives:** encouraging sustainable practices through incentives for eco-friendly technologies and compliance with **global environmental standards**, similar to **Sweden's carbon-neutral manufacturing goals**.

Conclusion

By focusing on these strategic areas and learning from successful international examples, India can overcome its challenges and position itself as a competitive manufacturing hub. These initiatives not only enhance industrial capabilities but also contribute to economic growth, job creation, and sustainable development.

About PM Gati-Shakti National Master Plan:

PM Gati Shakti Master Plan (2021), is a **Rs. 100 lakh-crore project** for developing '**holistic infrastructure**'. It aims to ensure the speed (Gati) and Power (Shakti) of **infrastructure projects** in the **next four years**, with a focus on expediting works on the ground, saving costs and creating jobs, and bringing down the logistics cost.

Gati Shakti scheme will give the necessary push to infrastructure development:

- **Boost to infrastructure:** A **plug-and-play model** for industrial parks. It will subsume National Infrastructure Pipeline launched in 2019
- **Helps solve logistical issues:** India's logistics cost **burden is 13-14% of GDP**, compared to **6-8%** in more competitive economies.
- **Curbs red-tapism:** g., the Railways has started a '**Common Drawing Approval System**' on an online platform, so all the approvals can be accessed on one portal.
- **Increased coordination**: Gati Shakti will **bring together 16 infrastructure-related Ministries**.
- **Incorporation of various projects from different ministries**: Gati Shakti will incorporate the **infrastructure schemes of various Union ministries and state governments:** Bharatmala, Sagarmala, UDAN, inland waterways, dry/land ports, etc.

Six Pillars of Gati Shakti Plan

1.Comprehensiveness (tech led holistic planning)
2. Prioritization of work (no haphazard decisions)
3. Optimization (laying the groundwork before the project is started)
4. Synchronization
5.Analytical 6. Dynamic

About NICDP:

The **National Industrial Corridor Development Programme (NICDP)** aims to develop futuristic industrial cities that can compete globally in manufacturing and investment. It **includes 11 industrial corridors with 32 projects in four phases**. The first corridor, the **Delhi Mumbai Industrial Corridor**, was approved in 2007. The implementation is managed by the **National Industrial Corridor Development and Implementation Trust (NICDIT)** and the **National Industrial Corridor Development Corporation Limited (NICDC),** with oversight by an Apex Monitoring Authority chaired by the Finance Minister.

Insta Links

PM GatiShakti — National Master Plan

Mains Links

Q. Gati Shakti will ensure integrated planning and implementation of infrastructure projects in the coming years, with a focus on expediting works on the ground, saving costs and creating jobs. Discuss. (250 Words) (UPSC Mains 2022)

7. BUDGET 2024-25: BHARAT SMALL REACTORS (BSRS)

Context:

The 2024-25 Union Budget emphasizes the importance of nuclear energy in India's energy mix, particularly through **Small Modular Reactors (SMRs)**. The government will partner with the private sector to develop **Bharat Small Reactors (BSRs)**.

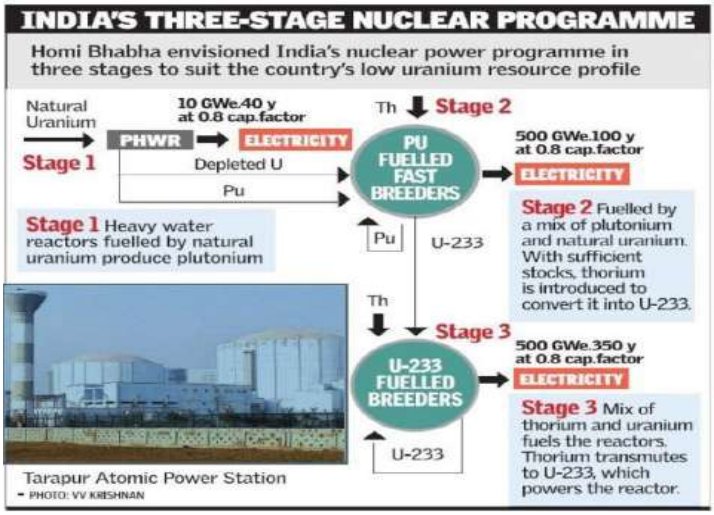
What are Bharat Small Reactors (BSRs)?

Bharat Small Reactors (BSRs) are **compact, factory-built nuclear reactors designed for India's energy needs, offering a safe, cost-effective, and low-carbon energy source**, which involves collaboration between the Indian government and private sector.

This marks a historic shift in India's nuclear policy, as the Atomic Energy Act of 1962 previously barred private sector participation. **Bharat Small Reactors (BSRs)**, aligned with **global trends in Small Modular Reactors (SMRs),** are based on India's **existing Pressurized Heavy Water Reactor technology**. They aim to enhance nuclear energy's contribution, currently at **1.6%,** to India's energy mix.

India's Three stage Nuclear Programme:

In 1954, India established the Department of Atomic Energy (DAE) to harness nuclear resources for peaceful purposes, following Dr. Bhabha's vision of self-reliance in nuclear energy.



Present status: With **500 MW Prototype Fast Breeder Reactor (PFBR)** at Kalakand, India is finally ready to **start the second stage.** However, experts estimate that it would take India at least another four decades before it has built up a sufficient fissile material inventory to launch the third stage.

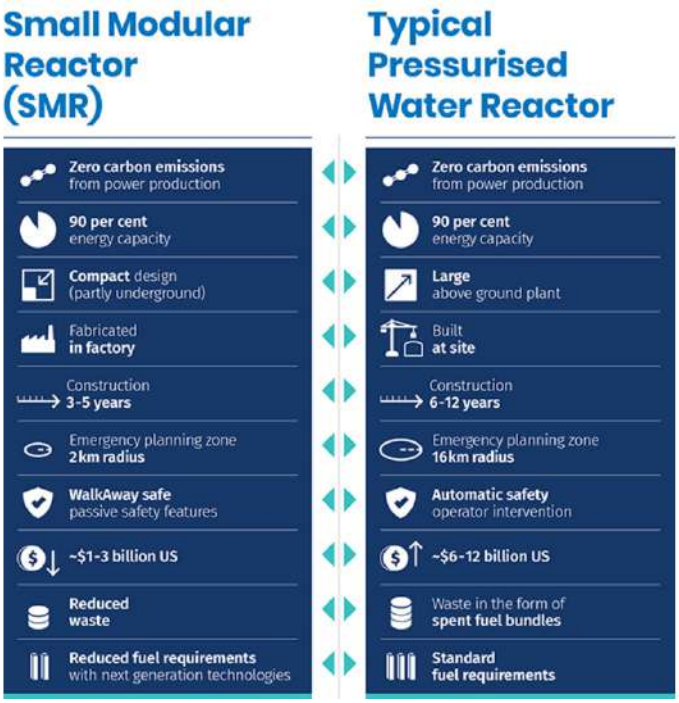
- Globally, countries like **Russia, Argentina, Canada, China, South Korea, and the US** are already developing or licensing SMRs.

Use of nuclear power: electricity generation with over 20 reactors in operation, Scientific studies at BARC, Nuclear medicine, crop improvement, and food preservation are practical applications, while strategic deterrence is maintained for national security.

Challenges: India's nuclear program has been subject to international sanctions and restrictions due to its status as a nuclear-armed nation outside the Nuclear Non-Proliferation Treaty (NPT). Technological dependence on imported technology and equipment.

Small modular reactors and its advantages: The term refers to a class of modern reactors that are essentially "small", and each unit can be manufactured in a factory and transported to a location for installation. They are envisaged for markets such as remote applications or for remote locations with limited grid capacity.

Reactor	Power Capacity
Large, Conventional Reactor	700+ MW(e)
Small Modular Reactor	Up to 300 MW(e)
Micro Reactor	Up to ~10 MW(e)



More about Small Modular Reactors (SMRs):

Small Modular Reactors (SMRs)	
SMRs are	**Small** – physically a fraction of the size of a conventional nuclear power reactor.
	Modular – making it possible for systems and components to be **factory-assembled and transported** as a unit to a location for installation.
	Reactors – harnessing **nuclear fission** to generate heat for electricity production or direct application.
Capacity	Ranging from **less than 30 MWe to 300+ MWe.**
Classification	Land-based water-cooled SMRs, Marine based water cooled SMRs, High-temperature gas-cooled SMRs (HTGRs), Liquid metal-cooled fast neutron spectrum SMRs (LMFRs), etc
Status of development (globally)	At present, nearly **80 SMR** designs are in the development and licensing stages, and a few of them are in the deployment and operational stages.
Advantages	**Manufactured off-site:** This can significantly save construction time, unlike the conventional nuclear reactors that are built on-site.
	Low running costs (lesser fuel, fewer staff) and **increased efficiency.**
	Better control/flexibility: Generating less electricity when demand is down and are particularly useful for **remote locations –** have variable power generation requirements.
	Safety features: Don't need a power supply and can handle accidents without the assistance of a person or a computer.
	SMRs and SDGs: SMRs can play a key role in the **clean energy transition**, while also helping countries achieve **SDG 7** (universal access to energy).
Challenges	**Lack of development:** SMR industry is yet to realise a fully developed operational fabrication facility for large-scale serial manufacturing of SMR components.
	Economic benefits depend on the large-scale production of SMRs.
	A large number of technologies: For deployment of the SMRs at the same time, could not only create **regulatory challenges** for the nuclear industry but also take away some **degree of cost optimisation.**
	Mobilising finance: For technology development, licensing and construction of prototype plants.
Way ahead	**Standardisation of designs** of components and modules, **strategic partnerships**, and **harmonisation** of regulatory and licensing processes will facilitate the adoption of SMRs at a large scale.
	The existing safety assessment methodology should be updated.
	Availability of low-cost finance, inclusion in green taxonomy and utilisation of innovative financing instruments such as green bonds, etc.
	Availability of required skilled personnel across the value chain of engineering, design, testing, inspection, construction, etc.

Conclusion:

Nuclear science and technology in India has been marked by significant achievements, embracing Small Modular Reactors can pave the way for more sustainable and efficient nuclear power generation

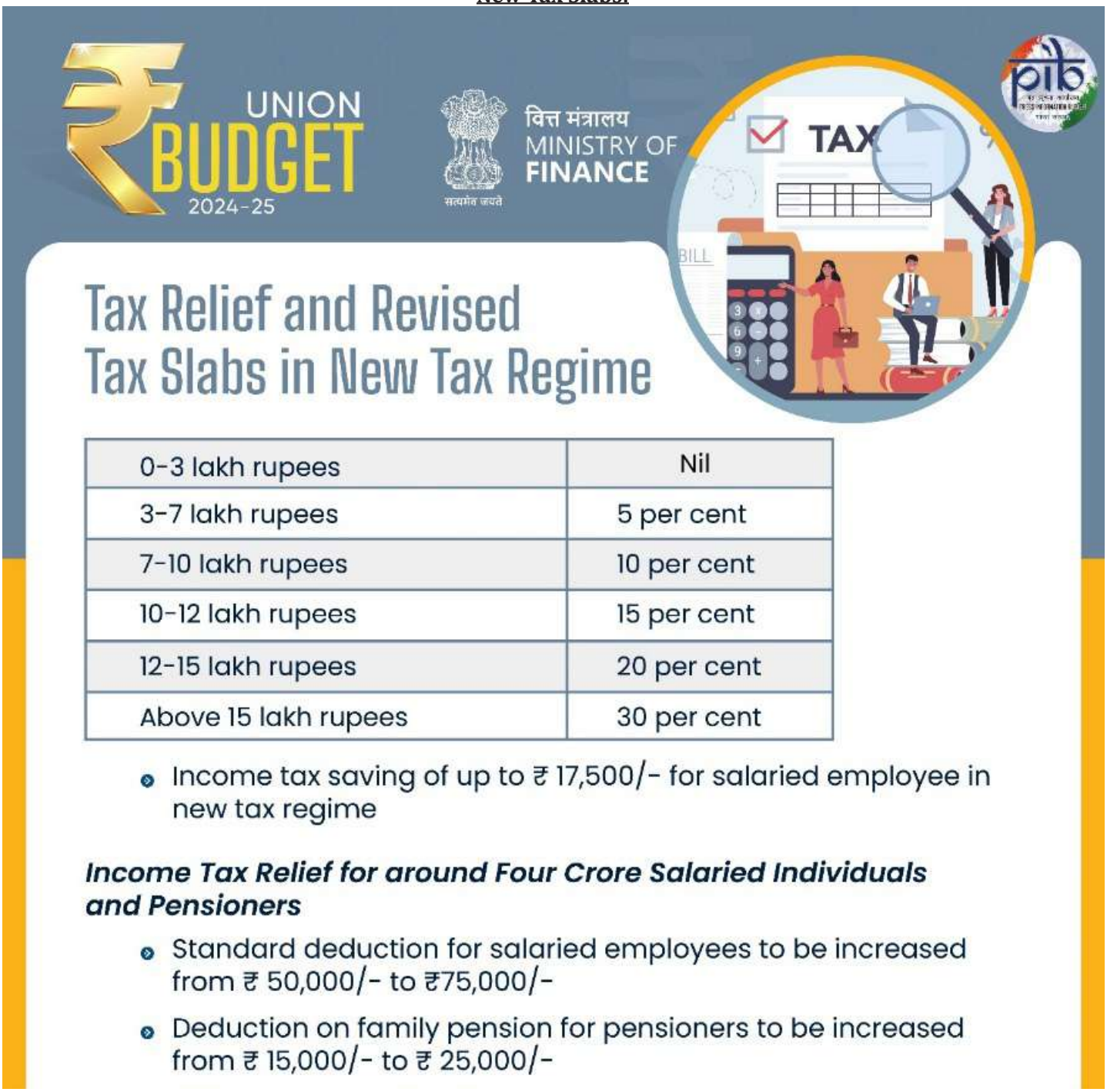
Insta Links:

The Future of Nuclear Power in India

Mains Links:

Give an account of the growth and development of nuclear science and technology in India. What is the advantage of a fast breeder reactor programme in India? (UPSC 2019)

New Tax Slabs:



Topics: Major crops cropping patterns in various parts of the country, different types of irrigation and irrigation systems storage, transport and marketing of agricultural produce and issues and related constraints; e-technology in the aid of farmers.

8. ECONOMIC SURVEY 2023-24: CELEBRATING THE TRIUMPH OF INDIAN AGRICULTURE

Key Highlights of Agriculture and Allied sector from the Economic Survey:

Category	Highlights
Success Story of Indian Agriculture	From food deficit and importing country in the 1960s **to net exporter of agricultural products.**

Growth Rate and Employment	Agriculture sector **registered an average annual growth rate of 4.18% over the last five years**; supports **42.3%** of the population and contributes **18.2% to GDP**.
Investment in Agriculture Research	Investment yields high returns; for every rupee invested, **there is a payoff of ₹13.85.**
Foodgrain and Oilseed Production	Record production of **329.7 million tonnes** in 2022-23; oilseeds area increased by **17.5%** from 2014-15 to 2023-24.
e-NAM Scheme and FPOs	e-NAM portal registered over **1.77 c**rore farmers; 8,195 FPOs registered, with significant financial support provided.
Agricultural Price Support	MSP increased for all crops since 2018-19 with a margin of at least 50% over production costs.
Social Security for Farmers	PMKMY provides monthly pensions to farmers; **23.41 lakh** farmers enrolled as of July 2024.
Crop Insurance	PMFBY offers comprehensive risk cover for crops; insured area reached 610 lakh ha in 2023-24.
Allied Sectors Growth	Livestock and fisheries sectors show significant growth, contributing to farm incomes and economic stability.
Food Processing Sector	GVA increased from **₹1.30 lakh** crore in 2013-14 to **₹1.92 lakh crore i**n 2022-23; sector accounts for significant share in India's exports.
Three Great Challenges	Agriculture must address food and nutritional security, climate change adaptation/mitigation, and sustainable use of water, energy, and land.
Transition to Nutritional Security	Need to shift from basic food security to nutritional security; demand for pulses, millets, fruits, vegetables, milk, and meat is growing.
	1. **Invoke export bans** only in exceptional cases; allow farmers to benefit from higher international prices.
	2. **Re-examine inflation-targeting framework** to exclude food prices; address hardships for low-income consumers via direct benefit transfers or coupons.
	3. **Increase Total Net Irrigated Area;** promote efficient water utilization technologies like drip irrigation and fertigation.
	4. **Promote crop-neutral incentive** structures to address climate considerations.
Private Sector Investment	Vital for technological advancement, improved production methods, marketing infrastructure, and reduction in post-harvest losses.
Structural Transformation Needed	Requires transformation due to water scarcity and climate change; reverse migration during COVID and extreme weather conditions in 2024 highlight the need for policy re-evaluation.
Sustainable Farming Initiatives	**PM-PRANAM initiative** promotes reduced use of chemical fertilizers and adoption of sustainable practices.

Key points from the Economic Survey for Allied Sectors:

Sector/Area	Details
Overall Growth	Allied sectors in agriculture are emerging as robust growth centers for improving farm incomes.
Livestock Sector	CAGR: **7.38%** (2014-15 to 2022-23)
	Contribution to total GVA: Increased from **24.32% to 30.38%**
	Total GVA contribution: **4.66%** (2022-23)
Fisheries Sector	CAGR: **8.9%** (2014-15 to 2022-23)
	Contribution to agricultural GVA: **6.72%**
	Record fish production: **17.54 million tons (2022-23),** ranking third globally

Government Initiatives	**AHIDF**: Supports investments in dairy/meat processing, animal feed, and breed improvement
	408 projects sanctioned **(₹13.861 crore)**
	Creates 40,000 jobs, benefits 42 lakh farmers
	PMMSY: Enhances fish production and infrastructure
	FIDF allocated **₹5.59** thousand crore for 121 projects
Food Processing Sector	GVA: Increased from ₹**1.30 lakh crore** (2013-14) to **₹1.92 lakh** crore (2022-23)
	Contribution to manufacturing GVA: **7.66%** (2022-23)
	Processed food exports: Increased from **14.9%** (2017-18) to **23.4%** (2022-23), totalling USD **46.44 billion**

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

9. ISSUES WITH INDIA'S FOREST CONSERVATION

Context:

The article discusses that the **exploitation of forest resources** due to uncontrolled and unsustainable practices has **degraded forest landscapes**.

The **UN's Decade of Ecosystem Restoration (2021-2030)** has sparked global tree-planting initiatives, but they face criticism for limited community involvement, poor post-planting care, forest encroachment, and reduced carbon sequestration and biodiversity.

Status of Forests in India:

Definition of Forest: 1996 **Godavarman Judgement** defines "forest" as any land recorded as such in government records or meeting the dictionary definition, which describes a forest as **"a large area covered with trees and undergrowth"** according to the Oxford Dictionary.

As per, the India State of Forest Report 2021**:**

1. **India's forest and tree cover constitutes 24.62%** of its geographical area, with forests covering **21.71%** and tree cover **2.91%**.
2. **Madhya Pradesh has the largest forest cover** by area, followed by Arunachal Pradesh, Chhattisgarh, Odisha, and Maharashtra.
3. **Mizoram, Arunachal Pradesh, Meghalaya, Manipur, and Nagaland** have the highest forest cover as a percentage of the total geographical area.
4. **States like Andhra Pradesh, Telangana, Odisha, Karnataka, and Jharkhand** have shown a positive change in forest cover, while others like Arunachal Pradesh, Manipur, Nagaland, Mizoram, and Meghalaya have experienced a decline.
5. **India ranks third globally for net gain in average annual forest area** between 2010 and 2020, with more than half of the world's forests located in Russia, Brazil, Canada, the United States, and China.

Significance of Trees:

Significance	Data/Example
Biodiversity Conservation	47,000 plant species and 81,000 animal species (**7% and 6.5%** of global flora and fauna)
Climate Change Mitigation	Forests absorb 15% of India's CO2 emissions (2016). Pledge to create an additional carbon sink of **2.5-3 billion tonnes CO2** equivalent by 2030. **Green India Mission** aims to increase forest cover by 5 million hectares.
Livelihood Support	Over 250 million people, including tribal communities, depend on forests. **Forest Rights Act and Van Dhan Yojana** enhance forest-based livelihoods. E.g., **Madhya Pradesh's Tendu Patta** collection benefits tribal people.
Ecosystem Services	Provides air purification, soil conservation, and pollination worth trillions of rupees. **Economics of Ecosystems and Biodiversity (TEEB) Initiative influences policies.**

Cultural and Spiritual Significance	Supports traditional knowledge and practices. Sacred groves recognized under **Biological Diversity Act.** Documentation of traditional ecological knowledge in the **Nilgiris Biosphere Reserve**.

Major Challenges Faced by Forests in India:

Challenge	Details
Deforestation & Degradation	Loss due to development, mining, and agriculture. **Forest Survey of India (2021)** reported a 1,582 sq km decrease in moderately dense forests.
Human-Wildlife Conflict	Shrinking habitats lead to conflicts, with 500+ people and 100+ elephants dying annually.
Plantation vs. Conservation	**Monoculture plantations** harm biodiversity and ecosystem health, often lacking post-planting care and monitoring.
Legislative Loopholes	Amendments to the **Forest Conservation Act, 1980**, potentially open vast areas to deforestation.
Climate Change	Forests face **altered precipitation patterns**, fires, and pest outbreaks, e.g., 2024 Uttarakhand fires.
Invasive Species	Species like **Lantana camara** in Western Ghats and **Senna spectabilis** in Mudumalai Tiger Reserve threaten native biodiversity.
Funding Issues	**CAMPA funds** for afforestation face underutilization and misallocation.
Shrinking Corridors	Wildlife corridors like **Kaziranga-Karbi Anglong and Kanha-Pench** are disappearing, affecting animal movement and genetic diversity.
Low Community Participation	Local community involvement ensures long-term sustainability.
Other India-Specific Challenges	Nearly **10 million hectares of India's forests** are affected by encroachment.
	Approximately 275 million people rely on forests for their basic needs and livelihood.
	Since independence, **about 5.7 million hectares** of forest land have been **repurposed for non-forestry uses**.
	India faces the daunting task of restoring **26 million hectares of degraded forests by 2030.**

What is the Initiative Taken for the Ecosystem Restoration?

1. **Decade of Ecosystem Restoration (2021-2030):** The UN aims to restore 350 million hectares of degraded land to enhance ecosystem services and sequester 13-26 gigatons of greenhouse gases.
2. **Van Mahotsava in India:** Launched in 1950 by K.M. Munshi, this annual tree-planting festival occurs in the first week of July, promoting forest growth and engaging public participation.
3. **Global Tree Planting Initiatives:** The "One Trillion Trees Initiative" by the World Economic Forum aims to massively increase global tree cover.
4. **The "Great Green Wall"** of China, aimed at reducing desertification.
5. **The "Bonn Challenge",** which has a target of restoring 150 million hectares by 2020 and 350 million hectares by 2030.

Way Forward for Forest Conservation in India

1. **Diverse Plantations**: Limit monoculture; diversify native species.
2. **Urban Greening**: Improve air quality, reduce heat islands in cities.
3. **Long-Term Commitment**: Ensure long-term nurturing and care of saplings.
4. **Integrated Landscape Management**: Holistic conservation beyond protected areas.
5. **Technological Integration:** Use advanced tech for forest monitoring.
6. **Community-Centric Models**: Scale up successful community forest management.
7. **Green Finance**: Innovative financing for conservation.
8. **Urban Forestry**: Comprehensive urban biodiversity and green infrastructure.
9. **Strengthening Governance**: Modernize forest departments and build capacity.
10. **Sustainable Livelihoods**: Promote eco-friendly forest-based livelihoods.
11. **Restoration of Degraded Forests**: Nationwide ecological restoration program.

12. **Indigenous Seed Banks**: Preserve local biodiversity for restoration.
13. **Drone-Seeding**: Use drones for reforestation in difficult terrains.
14. **Combating Forest Fires**: Preventative measures, early detection, and rapid response

Insta Links:

- **Forest Conservation Amendment Act 2023: Impact on Indigenous Communities**

Mains Links:

Q. "The most significant achievement of modern law in India is the constitutionalization of environmental problems by the Supreme Court." Discuss this statement with the help of relevant case laws. (UPSC 2022)
Q. "Policy contradictions among various competing sectors and stakeholders have resulted in inadequate 'protection and prevention of degradation' to the environment." Comment with relevant illustrations. (UPSC 2018)

Prelims Links:

Consider the following statements: (UPSC 2019)

1. As per recent amendment to the Indian Forest Act, 1927, forest dwellers have the right to fell the bamboos grown on forest areas.
2. As per the Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006, bamboo is a minor forest produce.
3. The Scheduled Tribes and Other Traditional Forest Dwellers (Recognition of Forest Rights) Act, 2006 allows ownership of minor forest produce to forest dwellers.

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

10. ECONOMIC SURVEY AND BUDGET: GLOBAL APPROACH TO CLIMATE CHANGE AND INDIA'S PERSPECTIVE

Context:

The **Economic Survey 2023-24** highlights the flaws in the current global approach to climate change, **emphasizing the need for developing countries to adopt a localized perspective in their climate strategies**.

Definition and Historical Instances

The current global approach to climate change predominantly **focuses on reducing carbon emissions through renewable energy adoption**, energy efficiency, and cutting methane emissions. Historically, this approach has been **shaped by developed nations**, often neglecting the **socio-economic and geographical challenges** faced by developing countries like India.

How the global approach to climate change is flawed:

Aspect	Issue
Inadequate Funding	**Only USD 100 billion** was pledged by developed countries till 2020, far short of the approximately **USD 6 trillion** which developing countries need by 2030 to **meet half of their climate targets.**
Ignoring Per Capita Emissions	Developing countries like India, **despite having low per capita emissions and a minimal cumulative historical contribution** to global emissions (4% from 1850-2019), are urged to take **greater responsibility** for emissions reduction.
Overestimating Risks	The global approach often **overestimates the risks associated with nuclear energy**, which is one of the cleanest and safest options. Public fear, fueled by rare accidents like Chernobyl and Fukushima, hinders its broader adoption.
High-Energy Technologies	Developed countries are **increasing their energy infrastructure to support energy-intensive technologies** such as artificial intelligence, which exacerbates energy demand and emissions.
Overconsumption	Developed nations focus on **substituting means to achieve high consumption rather than addressing the root cause of overconsumption**, leading to higher fossil fuel usage despite climate change mitigation goals.
Example of Overconsumption	**Meat Production:** Developed countries' practices threaten food security and degrade resources by creating **'food-feed competition.'** Traditional farming in developing nations reduces costs and balances the natural cycle, freeing arable land to combat global hunger.
Resource-Intensive Renewables	Transitioning to renewable energy involves **significant environmental costs due to the extraction of rare earth metals required for solar panels and wind turbines**. This process is often destructive and energy-intensive, contradicting the objectives of clean energy.

Intermittent Renewable Sources	Renewable energy sources like **solar and wind are intermittent, requiring substantial storage capacities** to ensure a stable power supply. This necessitates additional resource extraction for battery production, further impacting the environment.
Financial Burden on Developing Countries	Developing countries face a **significant financial burden in transitioning to cleaner energy sources**. The limited financial support from developed nations makes it challenging for countries like India to invest in the necessary clean energy infrastructure and technology.
Lack of Holistic Approach	The current global strategy **primarily focuses on technological solutions without addressing lifestyle** changes and reduced consumption in developed countries, which are essential for sustainable climate action.
Housing	**Western nucleated families lead** to urban sprawl and high environmental costs. Vs **India**: Traditional multi-generational households in India promote sustainable living with local materials, natural ventilation, and lower resource use, benefiting the elderly and reducing energy consumption.

India's Climate Action Progress

1. **Carbon Sink:** India has created a carbon sink of approximately **1.97 billion tonnes** of CO2 equivalent between 2005 and 2019, with plans to add an additional **2.5 to 3.0** billion tonnes by 2030 through enhanced forest and tree cover.
2. **Emissions Intensity Reduction**: India aims to reduce the emissions intensity of its GDP by 45% by 2030 from the 2005 level.
3. **Mission LiFE**: Focuses on behavioral changes among individuals to combat climate change, promoting mindful consumption over overconsumption.

Benefits and Drawbacks of India's Climate Actions

Benefits:

1. **Sustainable Development**: Integrating traditional farming practices and multi-generational households promotes sustainable living and reduces environmental costs.
2. **Economic Growth:** Investing in renewable energy and energy efficiency projects can drive economic growth while reducing emissions.

Drawbacks:

1. **Financial Burden**: The transition to cleaner energy sources requires significant investment, which is challenging given the current financial support from developed nations.
2. **Technological Challenges**: Renewable energy sources like solar and wind are intermittent and require substantial storage capacities, which are resource-intensive.

Suggested Actions

1. **Develop a Climate Finance Taxonomy**: As announced in the Union Budget 2024-25, this system will classify sustainable investments, guiding investors and banks to direct capital towards impactful climate adaptation and mitigation projects.
2. **Promote Small-Scale Renewable Projects**: Focus on small-scale solar and wind projects suited to India's unique context, improving energy efficiency in industries, and promoting sustainable agricultural practices.
3. **Advocate for Equitable Climate Policies**: Push for more equitable climate policies that hold developed nations accountable for their historical emissions and current consumption patterns.

About Climate Finance Taxonomy (presented in Union Budget for 2024-25)

Definition:

A classification system identifying which parts of the economy can be marketed as sustainable investments, guiding investors and banks to direct funds toward impactful climate change solutions.

Purpose: Taxonomies set standards for **classifying climate-related financial instruments** (e.g., green bonds) and serve other uses like climate risk management, net-zero transition planning, and climate disclosure.

Global Adoption: Countries such as South Africa, Colombia, South Korea, Thailand, Singapore, Canada, Mexico, and the European Union have developed taxonomies.

Significance:

1. **Aids countries in transitioning to a net-zero economy** by ensuring economic activities align with science-based transition pathways.
2. **Promotes climate capital deployment** and reduces greenwashing risks.
3. **Enhances capital availability** for climate adaptation and mitigation, helping countries like India achieve climate commitments and green transitions.

Way Forward:

The **Economic Survey 2023-24 and the Union Budget 2024-25** emphasize that:

1. **India's climate strategy must balance developmental goals with meaningful climate action**.
2. India's strategy should focus on **sustainable development practices, individual responsibility, and equitable climate policies**.
3. India needs to **advocate for climate justice**, ensuring that global strategies are accommodative of its unique socio-economic context.

About Mission LiFE:

Topic	Details
Mission LiFE (Lifestyle for Environment) (launched in Oct 2022) is a global movement initiated by India to promote an environmentally conscious lifestyle.	LiFE Lifestyle For Environment
Need	Addressing environmental degradation and climate change at the individual and community level
Aim	It aims to replace mindless consumption with mindful utilization and encourages individuals and communities to undertake climate-friendly actions in their daily lives.
Approach	Focus on individual behaviours, co-create globally, leverage local cultures
Objectives	Promote environmentally conscious lifestyle, nudge individuals to undertake climate-friendly actions, create a global network of Pro-Planet People (P3)
Example	Promoting Sustainable Transportation: Encouraging individuals to use public transport, carpooling, cycling, or walking instead of private vehicles to reduce carbon emissions and promote a greener commute.
Other related initiatives	Glasgow Climate Meet (Cop26), Panchamrit strategy, International Solar Alliance, National Action Plan on Climate Change, National Clean Air Programme (NCAP), National Biofuel Policy

Conclusion:

By promoting sustainable consumption and leveraging its position in the Global South, India can push for a more equitable and effective global climate strategy.

Mains Links:

Q. Write a note on Life mission and how it will help reduce global carbon emissions.

Topics: Disaster and management.

11. GOVERNMENT UNVEILS NATIONAL LANDSLIDE FORECASTING CENTRE

Context:

Union Minister G Kishan Reddy Inaugurates **National Landslide Forecasting Centre and Launches Bhusanket Web Portal & Bhooskhalan Mobile App.**

What is National Landslide Forecasting Centre (NLFC)?

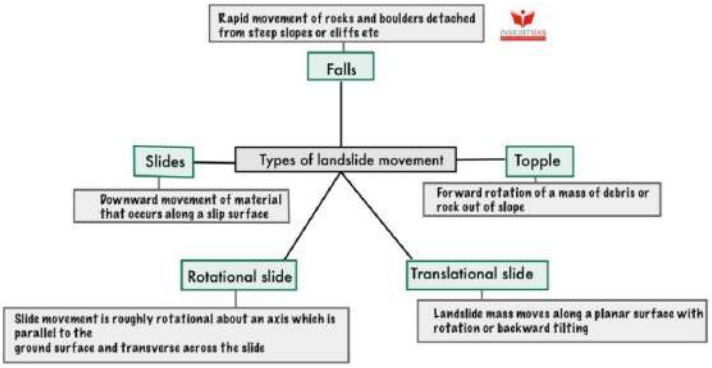
The **National Landslide Forecasting Centre (NLFC) aims to mitigate landslide hazards** in India. It provides **early warning bulletins for landslide-prone states** and plans to operationalize a nationwide **Landslide Early Warning System (LEWS) by 2030**

Other Initiatives:

1. **Bhusanket Web Portal:** Facilitates dissemination of information on landslide hazards and initiates short- and medium-range forecasting.
2. **Bhooskhalan Mobile App:** Provides quick daily landslide forecasts.
3. **Previously, IIT Delhi's HydroSense Lab** has created **India's first high-resolution landslide susceptibility map**

About Landslide:

A landslide is "**a movement of a mass of rock, earth or debris down a slope".**



Types of flows

1. **Debris flows**: rapid mass movements of loose soil, rock, organic matter, and slurry, often triggered by intense precipitation or snowmelt.
2. **Earth flow**: It is a **down-slope viscous flow of fine-grained material** saturated with water.
3. **Mudflow:**A mudflow is a **wet or viscous fluid mass** of fine and coarse-grained material that flows rapidly along drainage channels.
4. **Creep:**Creep is the **slow, steady, downward movement of material** under gravity that occurs in a large area

India's Vulnerability to Landslides (as per ISRO's Landslide Atlas of India)

1. **Global Ranking:** India ranks among the **top five countries** globally prone to landslides, witnessing **at least one death per 100 sq km annually** due to such events.
2. **Primary Cause:** Rainfall variability, particularly in the **Himalayas and Western Ghats, s**tands as the predominant cause of landslides in India.
3. **Geographical Vulnerability:** Excluding snow-covered areas, **over 12%** of the country's geographical land area is susceptible to landslides.
4. **Regional Breakdown:**
    1. **Over 66% of landslides** occur in the **North-western Himalayas**.

1. **Rudraprayag and Tehri Garhwal districts** of Uttarakhand have the **highest landslide density and landslide risk** exposure in the country.
2. About 19% are reported in the **North-eastern Himalayas**.
3. The Western Ghats contribute to **over 14% of landslide events**.

5. **Impact in the Western Ghats:** Despite fewer occurrences, landslides in the Western Ghats pose significant risks, **especially in Kerala**, making inhabitants vulnerable to fatalities.

Causes of Landslides:

Causes of Landslides	Details
Heavy Rainfall	Excessive rainfall saturates the soil, increasing its weight and reducing cohesion. This weakens slopes, particularly during heavy rain, making them more susceptible to landslides.
Steep Slopes	Areas with steep terrain face greater landslide risk as gravitational forces act more intensely on sloping surfaces, especially during heavy rainfall or seismic activity.
Earthquakes	Seismic activity can disrupt slope balance, triggering landslides. Volcanic eruptions, such as pyroclastic flows, displacing soil and rock, also contribute to landslide occurrences.
Human Activities	Deforestation, mining, construction, and excavation alter landscapes, remove vegetation, and disturb slope balance. These activities weaken terrain stability, escalating the risk of landslides.
Underlying Geology	The type of rock and soil beneath an area influences landslide susceptibility. Loose, unconsolidated soil is more prone to landslides, while stable bedrock, typical in the Himalayan landscape, is less likely to experience such events.

Effects of landslides:

- **Loss of Life:** According to the **International Disaster Database (EM-DAT),** over 50,000 fatalities worldwide due to landslides between 2000 and 2020, with Kedarnath disaster in Uttarakhand causing 6000 deaths.
- **Environmental Impact:** Soil erosion from landslides can **affect water quality and aquatic life**, as seen in Oso, Washington in 2014.
- **Infrastructure Disruption**: Landslides can block critical transportation routes, as seen in **the Chamoli disaster (2021) that** led to the blockage of the Rishi Ganga River and the destruction of various infrastructure in the region.
- **Property Damage**: The cost of repairing or rebuilding homes, infrastructure, and farmlands can be substantial.
- **Displacement**: The United Nations Office for Disaster Risk Reduction (**UNDRR**) reports that landslides triggered by **heavy rainfall in Nepal in 2020 displaced more than 9,000 households**, leaving many families without shelter.

Recent examples of landslide disasters in the past year:

- **Joshimath Sinking** in Uttarakhand
- **June 2023:** A landslide in the **Noney** district of **Manipur**, India, killed at least 58 people.
- **May 2023:** A landslide in **Rio de Janeiro**, **Brazil**, killed at least 232 people.
- **March 2023:** A landslide in **Putumayo, Colombia**, killed at least 323 people.

Government Measures for Landslide Impact Mitigation:

- **The National Landslide Susceptibility Mapping (NLSM) Programme** (initiated by the Geological Survey of India in 2014) aims to aims to map landslide-prone areas across India
- Establish a nationwide repository on **GIS-based Landslide Inventory**
- The goal is to enhance **understanding, assessment, and management** of landslide-prone regions in the country through comprehensive mapping and geospatial analysis.
- **National Remote Sensing Centre (NRSC)** under the Indian Space Research Organisation (ISRO) has released the **Landslide Atlas of India**, a detailed guide identifying Landslide Hotspots in the country.

NDMA Guidelines:

National Disaster Management Guideline on Management of Landslides and Snow Avalanches

1. **Hazard, Vulnerability & Risk Assessment**: Identify areas prone to landslide hazards and assess resources at risk
2. **Early Warning Systems**: Continuous monitoring of movements, stress development, and timely data transmission
3. **Investigations for Risk Assessment**: Multi-disciplinary investigations for comprehensive risk

assessment leading to the formulation of standards to effectively mitigate the impact of landslides

Way Forward for Landslide Management in India:

Way Forward	Details
Landslide Monitoring	Involves deploying sensors, satellite imagery, and ground-based instruments for detecting ground movement and potential landslide precursors.
NHAI's Landslip Detection System	The National Highways Authority of India (NHAI) plans to install a landslip detection system on the Kochi-Dhanushkodi National Highway in Munnar. The system, developed by IIT-Mandi, the Indian Army, and DRDO, aims to provide early warnings about landslips.
Landslide Hazard Maps	Generation of reliable landslide hazard maps using advanced tools like UAVs, Terrestrial Laser Scanners, and high-resolution Earth Observation (EO) data.
International Best Practices	Learning from Brazil's SNAKE System, a Landslide Early Warning System (LEWS), to incorporate digital monitoring, forecasting, and alert mechanisms.
Special Purpose Vehicle (SPV) for Landslide Management	Formation of an expert professional group at the national level to study and decide on risk mitigation strategies to recommend permanent fixes for identified landslide hotspots.
Awareness Programmes	Initiatives aimed at creating a culture of awareness, alertness and preparedness among the public.
Monitoring Construction and Development	Implementing strict monitoring of construction and developmental activities, such as roads and dams, in landslide-prone areas.
Limiting Agriculture and Settlements	Restricting agriculture to valleys and areas with moderate slopes, controlling large settlements in high vulnerability zones.
Afforestation and Water Flow Control	Promoting large-scale afforestation programs and constructing bunds to reduce water flow.
Encouraging Terrace Farming	Encouraging terrace farming, especially in northeastern hill states where Jhumming (Slash and Burn/ Shifting Cultivation) is prevalent.

Conclusion:

Understanding the causes and effects of landslides is essential for disaster preparedness and mitigation efforts. **Implementing early warning systems, land-use planning, and sustainable land management practices** can help reduce the vulnerability of communities to landslide hazards. Moreover, international cooperation and sharing of knowledge and best practices are crucial in addressing the challenges posed.

About GSI:

The Geological Survey of India (GSI), established in 1851 under the Ministry of Mines, is a key scientific agency conducting geological surveys and studies. **Headquartered in Kolkata, GSI has six regional offices** and state units nationwide. Originally focused on **coal deposits for railways**, it now provides comprehensive geoscientific information, maps rock types, geological structures, and explores critical minerals, utilizing advanced techniques and collaborating with various stakeholders.

Insta Links:

- Landslide Atlas of India

Mains Link:

Q. Disaster preparedness is the first step in any disaster management process. Explain how hazard zonation mapping will help disaster mitigation in the case of landslides UPSC 2019

Q. Differentiate the causes of landslides in the Himalayan region and Western Ghats (UPSC 2021)

GENERAL STUDIES – 4

1. GENDER EQUALITY IN SPORTS

Context:
With the **Paris 2024 Olympic and Paralympic Games,** history will be made as an **equal number of men and women compete**, marking the largest gender-equal sporting event.
As per recently released, UNESCO's Sport and Gender Equality Game Plan

Key Observations:

1. **Sexual Abuse:** 21% of women athletes and 11% of men reported childhood sexual abuse in sports.
2. **High Dropout:** 49% of girls drop out of sports during adolescence, 6 times higher than boys, due to lack of role models, safety concerns, lack of confidence, and negative body image.
3. **Inequality:** No women in the top **50 highest-paid athletes**.
4. **Leadership:** Only **30% of major sports federations** were chaired by women in 2023.

Suggested Actions:

1. **Use sports media to change attitudes** and address gender inequalities.
2. **Promote gender equality** in sports leadership and decision-making.
3. **Develop gender-responsive infrastructure** and budgeting.
4. **End all forms of gender-based violence** in sports.

Ethical Values from Gender Equality in Sports:

1. **Fairness:** Ensuring equal opportunities for all genders in sports participation and competition.
2. **Inclusivity:** Promoting a diverse and welcoming environment for athletes of all genders.
3. **Respect:** Valuing and recognizing the contributions of athletes regardless of gender.
4. **Empowerment:** Encouraging and supporting female athletes to reach their full potential.
5. **Integrity**: Upholding honesty and transparency in sports governance and decision-making.
6. **Safety**: Creating a secure and harassment-free environment for all athletes.
7. **Equity**: Addressing and reducing disparities in resources, pay, and representation.

2. ETHICS OF PHILANTHROPY

Context:
The article highlights the growth and potential of Indian philanthropy

"We must consider the time and the place, and the character of the receiver, which is the weights in the scale, which cause our gifts to be well or ill received." – Seneca

Definition:
Philanthropy can be defined as an act or gift done or made for humanitarian purposes.

Philanthropy in India:
In pre-independent India, **Mahatma Gandhi encouraged businessmen to contribute their wealth for the betterment of society**. Industrialists like **Jamnalal Bajaj and G.D. Birla** supported Mahatma Gandhi's initiatives during the freedom movement while pursuing their own philanthropic interests.

Philanthropy in the West:
America: Carnegie-Rockefeller era of philanthropy.
Andrew Carnegie built impressive institutions (like Carnegie Library and Carnegie Mellon University), but also inspired (and instigated) the rich; the last line of his book reads: ***"The man who dies rich, dies disgraced."***
The Rockefeller Foundation also **developed a vaccine to eradicate yellow fever**. Both Carnegie and Rockefeller became role models, inspiring generations (including myself) to give away their wealth to improve society.

Issues with Philanthropy:

1. **The parochial nature of giving**, which risks some of the poorest regions being ignored
2. **Programmatic giving doesn't add up** (for example: a number of foundations and NGOs work on school education, yet learning outcomes have not improved).
3. **A recipient may violate the donor's intent** in spirit or in law.
4. **A donor's activities may be considered incompatible** with those of the institution's mission.
5. **Recipient may be perceived as complicit with or oblivious to a donor's unethical practices**, thus tainting its own good name, especially when an institution grants naming rights.
6. A donor may receive a **quid pro quo for all or part of a donation**.

The way forward for philanthropy in India:

1. **Build institutions**: Donors can fund think tanks and build area-specific (say, on energy transition) or geography-specific (such as eastern Uttar

Pradesh) institutions.

   a. **For e.g.: The Tata family built the Indian Institute of Science** in Bengaluru, The Energy and Resources Institute (TERI), the Tata Memorial Hospital, etc.

2. **Fund risky R&D for the government:**
   a. For example, **Nandan Nilekani** built an innovation ecosystem such as Aadhaar, UPI and eKYC.
3. **Support governments to improve delivery**: Partnering with the government as a philanthropic entity is the most effective way to make a scalable and sustainable impact.
   a. **For example, The Piramal Foundation** is supporting the Aspirational Districts collective
4. **Veddis Foundation** is funding initiatives to improve the evidence base and outcome orientation of governments.

CONTENT FOR MAINS ENRICHMENT

Topic in News	Usage in Answers
1. HOW CHESS IS HELPING FIGHT ALCOHOLISM	**Context:** In Marottichal, a village in Kerala, **chess has become a powerful tool against alcoholism and gambling.** • **Inspired by chess legend Bobby Fischer**, local tea **shop owner Unnikrishnan began teaching the game in the 1970s**, successfully **diverting attention from alcohol to chess.** • **Over 80% of the village's 4,000 residents now play chess**, making it a generational hobby. • The village **aims to become India's first 100% chess-literate community**, with plans to integrate chess into school curricula and support budding professional players. **Ethical Values which can be learnt:** • Chess Initiative: A Community Building Tool • **Strengthens community bonds** by combating alcoholism and gambling. • **Reflects social responsibility** by addressing a pressing social issue. • **Promotes education and intellectual growth** through chess. • **Promotes inclusivity**, involving people of all ages and backgrounds. • **Encourages a healthier lifestyle** by diverting attention from alcohol to a mentally stimulating game. • **Highlights innovation** in addressing social problems through creative solutions.
2. BIOPLASTICS FROM CASSAVA	**Context:** In **Nagaland** smallholder farmers are producing **compostable bioplastic bags from cassava starch**, setting an example in **reducing plastic use.** • This initiative, supported by **the North East Centre for Technology Application and Reach (NECTAR),** and led by Eco starch, a **local MSME, aims to replace single-use plastics with biodegradable alternatives.** • This **initiative promotes the concept of 'cassava village' to boost the local economy, provide alternative livelihoods, and generate employment**, especially for local youth and women's self-help groups. • Eco starch plans to **expand its operations to include biodegradable films and bags for food packaging, further enhancing local employment opportunities.** **Lessons that can be learnt:** • **Sustainable Alternatives**: Using locally available resources, **such as cassava, for bioplastic production** showcases the potential for **sustainable alternatives to single-use plastics**. • **Community Involvement:** Empowering women's **self-help groups (SHGs)** and local youth enhances community engagement and fosters inclusive growth. • **Economic Empowerment:** Developing **'cassava villages' boosts the local economy** by providing **alternative livelihoods and generating employment.** • **Scalability and Expansion:** Expanding product lines can **create more jobs and cater to a broader market, further enhancing local economic benefits.**

3. INITIATIVES BY MINAL KARANWAL (IAS)

Context: Nanded (Maharastra) ZP CEO Minal Karanwal has launched several innovative features

Initiative	Description	Ethical Values
Stationery Donation Drive	Campaign to donate stationery instead of bouquets for distribution to ZP school children	Altruism, Community Support, Fairness
Balika Panchayat	Organizes young girls in villages to address social issues like alcoholism and child marriage	Empowerment, Gender Equality, Leadership
MGNREGA Helpline	Dedicated helpline to assist unskilled workers in securing employment	Responsibility, Inclusivity, Equity

These initiatives promote ethical values such as **altruism, community support, fairness, empowerment, gender equality, leadership, responsibility, inclusivity, and equity**.

FACTS FOR PRELIMS

GS-1

Art & Culture

1. VISHNUPAD AND MAHABODHI TEMPLES

Context:

Finance Minister announced **during the Union Budget speech** that corridor projects will be built for the **Vishnupad Temple in Gaya and the Mahabodhi Temple in Bodh Gaya, Bihar**.

- These projects aim to **transform the temples into world-class pilgrim and tourist destinations**, **similar to the Kashi Vishwanath Temple Corridor.**

Vishnupad Temple:

- Dedicated to **Lord Vishnu**, this temple features a **40cm-long footprint believed to be Lord Vishnu's**.
- Built in **1787 by Queen Ahilyabai Holkar**, it stands **about 100 feet tall with 44 pillars and is located on the banks of the Falgu River**.
- It is **significant during pitra paksh, a period for rituals to remember ancestors.**

Mahabodhi Temple:

- A **UNESCO World Heritage Site**, this temple marks the **location where Gautam Buddha attained enlightenment under the Mahabodhi Tree.**
- Originally built by **Emperor Ashoka** in the **3rd century B.C.,** the present structure **dates back to the 5th-6th centuries** and is one of the **earliest brick Buddhist temples.**

2. KALARIPPAYATTU

Context:

The Ministry of Youth Affairs & Sports has recognized the **Kalarippayattu Federation of India** for its efforts in **promoting the traditional martial art of Kalarippayattu within the country**.

About Kalarippayattu:

- **Kalaripayattu, meaning "Battleground" (Kalari) and "Method" or "Art" (Payatt),** is an ancient Indian martial art that **originated in Kerala between the 3rd century BC and the 2nd century AD.**
- **Practiced in Kerala and parts of Tamil Nadu**, it is one of the **oldest and most scientific martial arts** in the

world, with a **history of over 3,000 years.**

- Kalaripayattu includes **personal combat training exercises designed to develop sharp reflexes** for unarmed combat and skilled fighting **using various weapons such as sticks, daggers, knives, spears, swords, and shields.**

3. SANGAMESHWARA TEMPLE

Context:

The **ancient Sangameshwara temple in Kurnool district, Andhra Pradesh**, is once again submerged due to recent heavy rains and rising water levels in the Srisailam project.

About Sangameshwara temple:

- The Sangameshwara Temple, **dedicated to Lord Shiva**, has recently been submerged in the **backwaters of the Srisailam project in Nandyal district due to heavy inflow from the Krishna River.**
- The temple was originally built in **740 AD by Chalukya ruler Pulakesin II on the Krishna River bank.**
- It was originally situated where the **Tungabhadra and Krishna Rivers merge, 10 km from its current location.**
- To prevent submersion from the Srisailam Dam's construction, the **temple was dismantled and rebuilt at its current site in 1979, maintaining its historical and religious significance.**

4. CHARAIDEO MOIDAMS

Context:

Assam's Charaideo Moidams, now a **UNESCO World Heritage Site**, are **royal burial sites of the Ahom dynasty, which ruled Assam from 1228 to 1826 AD.**

- A moidam is a **mound of earth over a grave**, typically **containing one or more chambers with an earthen mound** covered in grass and a pavilion on top.
- Unlike Hindus who cremate their dead, **the Ahoms, originating from the Tai people, practiced burial.**
- **Charaideo, the first capital established by King Sukaphaa in 1253 AD**, remained a symbolic and ritual center of power for the Ahoms.
- The burial sites **contain items for the afterlife and are reminiscent of ancient Egyptian rites**, earning the nickname **"Pyramids of Assam."**

5. NATIONAL MISSION FOR MANUSCRIPTS

Context:

The **National Mission for Manuscripts in India** aims to **document, conserve, digitize, and disseminate the country's manuscript heritage**.

- To achieve this, **over 100 Manuscripts Resource Centres and Manuscripts Conservation Centres** have been established nationwide.

Key achievements of the mission include:

- Documenting **approximately 5.2 million manuscripts.**
- Conserving **90 million folios of manuscripts.**
- **Digitizing 350,000 manuscripts, comprising 35 million pages**.
- Conducting over **100 conservation workshops**.
- Uploading around **140,000 manuscripts on its web portal, with 75,000 available for free public access.**
- Publishing **over 100 books since its inception.**

Establishment of the **National Mission of Manuscripts (NMM)** was aimed at **safeguarding India's extensive repository of manuscripts**. The NMM an **autonomous body was established in 2003 by the Ministry of Culture, Government of India.**

Geography

6. ROGUE WAVES

Context:

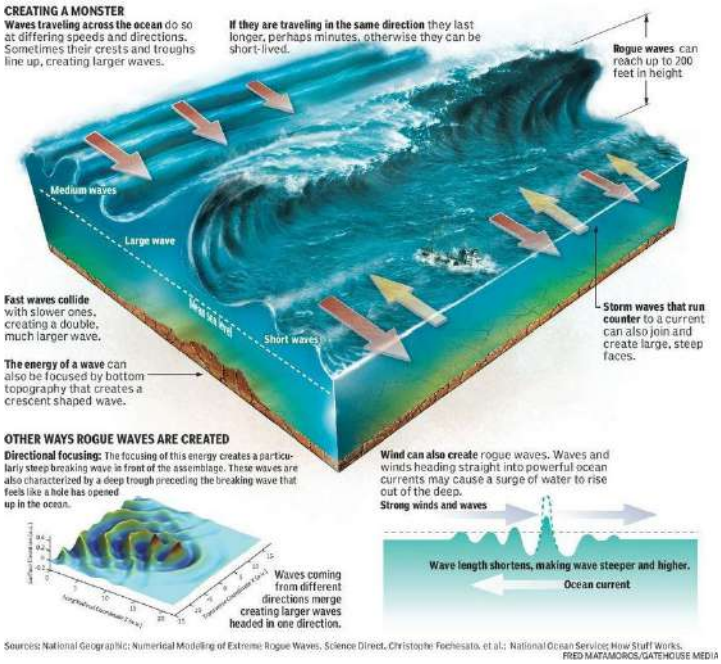
Researchers have **developed an AI program** that **predicts rogue waves by analysing data** from **172 ocean buoys.**

- **Rogue waves**, defined as **waves twice the size of**

surrounding waves, pose significant threats to ships, coastal infrastructure, and human lives.

- Traditionally unpredictable, these waves form when swells from distant weather systems converge or when ocean currents compress swells.
- The AI, trained on 20-minute wave pattern samples, can predict rogue waves up to five minutes in advance with around 73-75% accuracy.

Future advancements in AI and data collection may further improve prediction accuracy, potentially leading to near-perfect forecasts.



7. OLYMPIC ORDER

Context:

Abhinav Bindra, India's first individual Olympic gold medallist, has been awarded the prestigious Olympic Order by the International Olympic Committee (IOC) for his significant **contributions to the Olympic Movement**.

- The award will be **presented during the 142nd IOC Session in Paris.**
- Bindra, who won the men's 10-meter air rifle event at the 2008 Beijing Games, is the first Indian to receive this highest IOC honour.

GS-2

Salient features of Indian Constitution

8. RIGHT TO BE FORGOTTEN

Context:

The Supreme Court of India has agreed to examine the issue of the "right to be forgotten," a concept related to digital privacy and the control of personal data.

- This right allows individuals to have their personal data, such as names and photos, removed from public records and online platforms.

Status of Right to be forgotten in India:

- In India, the "right to be forgotten" is considered part of the broader right to privacy under Article 21 of the Constitution, but specific legal provisions for this right are lacking.
- The Digital Personal Data Protection Act, 2023, which includes penalties for data misuse, does not explicitly cover this right.
- The Information Technology (Intermediary Guidelines and Digital Media Ethics Code) Rules, 2021, offer a complaint process for unauthorized personal data exposure, but do not address the right comprehensively.

Functioning of Parliament and State Legislatures

9. IMMUNITY TO GOVERNORS

Context:

The Supreme Court agreed to examine Article 361 of the Constitution, which grants immunity to governors from criminal prosecution.

- The plea calls for judicial scrutiny of the immunity provided under Article 361.
- Article 361 exempts the president and governors from court accountability for their official actions, making it an exception to Article 14 (right to equality).

10. UNLAWFUL ACTIVITIES PREVENTION ACT (UAPA)

Context:

The Supreme Court of India granted bail to a Nepali citizen detained for over nine years under the Unlawful Activities Prevention Act (UAPA), citing his right to a speedy trial.

- The bench emphasized that statutory restrictions should not override the constitutional right to life and personal liberty if the trial is significantly delayed.
- This ruling follows a precedent set in the 2021 Union of India v. K A Najeeb case and continues a trend where the SC has granted bail despite UAPA's strict provisions due to prolonged incarcerations.

What is UAPA?

The Unlawful Activities Prevention Act, 1967 is a Parliamentary law that gives powers to the central government to deal with activities directed against the integrity and sovereignty of India.

Provisions of the Act:

- UAPA is applicable to both Indians and well as foreigners.
- It can be applied to offences committed either in India or outside.
- The law provides for death penalty and life imprisonment as the highest form of sentences.
- A maximum time of 180 days is given to the investigating agency to file report, which can also be extended.

Amendments in 2019:

- NIA officers of the rank of Inspector or above can investigate a case in addition to DSP or ACP ranked officer in a state.
- The **law empowers the government to designate individuals as terrorists.**
- The approval of Director General of Police is **required to attach properties connected with terrorism.**

Concerns:

- It gives absolute and sweeping powers to the central government to arrest individuals indulging in an activity it considers as unlawful.
- The courts are bound to give stringent punishment under the UAPA even if offence is not serious.

Governance

11. U-WIN

Context:

The Indian government is **rolling out U-WIN**, an **online vaccine management portal** for **childhood immunization**, similar to **the CoWIN platform used during the COVID-19 pandemic**.

- U-WIN aims to **create digitized and individualized immunization records** for children **up to six years old and pregnant mothers.**
- The platform will **track all vaccinations, send reminders to parents, and provide a downloadable digital vaccine certificate.**
- U-WIN will also **help health workers by generating lists of due vaccinations and allow the government to study immunization trends.**
- U-WIN will be **linked to the existing eWIN platform** for inventory management, ensuring efficient vaccine distribution and tracking.

The platform is **expected to improve vaccination compliance** through reminders, **ensure portability of vaccination records, reduce errors, and provide detailed data** on individual immunization, helping to reach unvaccinated children and improve overall public health outcomes.

Digital Impetus - Activities porposed

- Digitisation of routine immunisation micro-plan through U-WIN registration module.
- After registration, targeted beneficiaries will receive a message from U-WIN for their upcoming vaccination dose as per Universal Immunisation Programme.
- Beneficiaries are verified on U-WI N through their Aadhaar before vaccination. Ayushman Bharat Health Account unique ID is created for all registered beneficiaries.
- Acknowledgement will be sent to beneficiaries after every dose. Vaccination certificate can be downloaded from U-WIN portal.
- Engaging private sector in the future as of beneficiaries are utilising private health facilities for delivery services and vaccination.

12. CULTURAL MAPPING OF VILLAGES

Context:

The Government of India, **under the Ministry of Culture, has launched the National Mission on Cultural Mapping (NMCM).**

The project aims to:

- **Raise awareness about cultural heritage** and its role in development and identity.
- **Map 6.5 lakh villages**, including their geographical, demographic profiles, and cultural assets.
- **Create National Registers of Artists and Art practices**.
- **Develop a web portal and mobile app** to serve as a **National Cultural Work Place (NCWP).**
- The project targets **all inhabited villages listed in the 2011 Census, including those in Bihar.**
- The data is accessible on **the Mera Gaon Meri Dharohar Web Portal** (https://mgmd.gov.in/) and can be utilized by **various ministries and government organizations to protect and promote village cultures, traditions, and art forms.**

13. DIGIPIN (DIGITAL POSTAL INDEX NUMBER)

Context:

The **Department of Post** has released a **beta version of the National Addressing Grid, DIGIPIN (Digital Postal Index Number),** for public feedback.

- Developed with **IIT Hyderabad, DIGIPIN aims to provide a permanent digital infrastructure** for addressing that remains **unaffected by changes in state, city, or locality names, or road net-**

works.

- The system divides the country into 4m x 4m units, each assigned a unique 10-digit alpha-numeric code based on geographical coordinates.
- This code serves as an offline addressing reference, useful for locating addresses, emergency operations, and logistics.
- No private address data is stored, ensuring privacy.

14. PM JANJATIYA UNNAT GRAM ABHIYAAN

Context:

Finance Minister announced the launch of the PM Janjatiya Unnat Gram Abhiyaan, aimed at providing basic facilities to five crore Scheduled Tribe families across 63,000 villages in tribal-majority and aspirational districts.

- This scheme is designed after PM-JANMAN for Particularly Vulnerable Tribal Groups.
- The 2024-25 budget allocated ₹13,000 crore for the Ministry of Tribal Affairs, with a significant portion going to Eklavya Model Residential Schools.

International Relations

15. CARBON CREDITING MECHANISM

Context:

India and Japan are planning to establish a Joint Crediting Mechanism (JCM) for carbon trading and credit adjustment, formalized through a Memorandum of Cooperation.

- Under this mechanism, carbon credits will be allocated through a structured process and tracked via a registry.
- These credits will contribute to each country's Nationally Determined Contributions under the Paris Agreement.
- The proposal aims to attract investments in low-carbon technologies, fostering job creation and technological diffusion.
- The JCM will be governed by relevant domestic laws and regulations, with a joint committee developing the necessary rules and guidelines.
- The mechanism ensures that credits can be shared between both countries while avoiding double counting.

GS-3

Indian Economy

16. GLOBAL CAPABILITY CENTRES (GCCS)

Context:

Global Capability Centres (GCCs) have become a crucial component of India's economic landscape, contributing over 1% to the nation's GDP and significantly boosting services exports.

- In FY24, 'other business services' provided by GCCs accounted for 26% of services exports, second only to IT services at 48%.
- These centres employ around 3.2 million professionals, including engineers and scientists, with significant contributions in engineering, research, and development (ER&D), business process management (BPM), and IT services.
- GCCs are increasingly establishing operations in tier-II cities due to cost advantages and fresh talent pools.

Government initiatives like 'Digital India' and supportive state policies in Karnataka, Telangana, and Tamil Nadu have facilitated the establishment and expansion of GCCs, particularly in sectors like automotive, electric vehicles, electronics, pharmaceuticals, and life sciences.

Major GCC Players in India

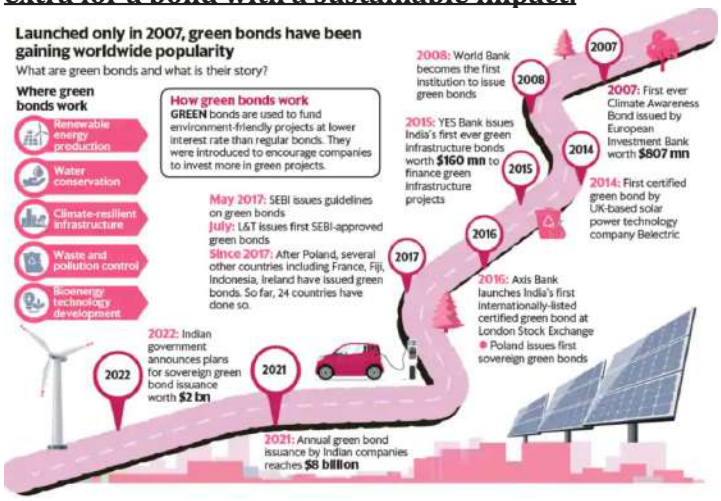
17. GREENIUM

Context:

India's sovereign green bonds, have not received significant green premiums from private investors, affecting the financing of green transition projects, according to the Economic Survey.

- Despite India's green bond framework being well-rated, there is more capital potential than actual capital flow for energy transition in emerging markets.
- The Survey highlights the need for developed countries to provide more accessible, affordable financial resources in line with UNFCCC and Paris Agreement objectives.

Greenium is defined as the **difference in yield between thematic bonds and ordinary bonds** of a **similar maturity**, based on the logic that investors are **willing to pay extra for a bond with a sustainable impact.**



Science & Technology

18. URANIUM

Context:

A new study by the **Bhabha Atomic Research Centre (BARC)** concludes that up to **60 µg/l of uranium in drinking water is safe**, challenging the **Bureau of Indian Standards' (BIS) 2021 limit of 30 µg/l.**

- The **BIS standard aligns with WHO recommendations** but the BARC study argues it may be **counterproductive, adding unnecessary purification costs without health benefits**.
- BARC researchers cite medical research indicating that **small uranium concentrations do not pose health risks, including cancer.**
- The **study compares India's standards to those of other countries**, noting higher acceptable limits in nations with **significant uranium consumption like Finland and Slovakia.**
- The BARC study criticizes BIS for not conducting health impact studies **before setting the 30 µg/l limit,** unlike agencies such as the **US Environmental Protection Agency**.

The study suggests **retaining the Atomic Energy Regulatory Board's limit of 60 µg/l**, emphasizing the need for country-specific standards based on local conditions and economic factors.

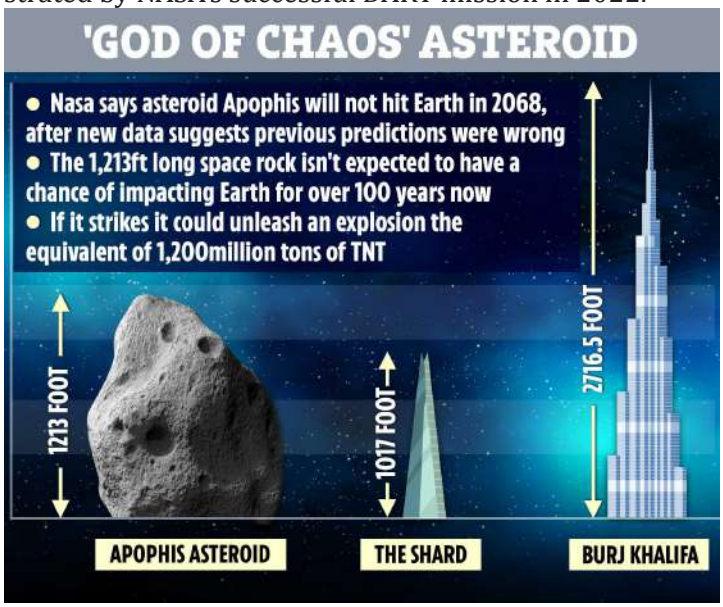
19. APOPHIS ASTEROID

Context:

The **European Space Agency (ESA)** has announced the **Rapid Apophis Mission for Space Safety (Ramses)** to study the **Apophis asteroid when it passes within 32,000 km of Earth in 2029.**

- This close approach, happening only once every 5,000 to 10,000 years, **presents a unique opportunity for in-depth asteroid research.**
- **ESA's Ramses spacecraft** will accompany the **375-meter-wide asteroid**, conducting extensive studies on its **physical and orbital characteristics before and after the flyby.**
- This mission follows NASA's commitment to a **similar mission with its OSIRIX-APEX spacecraft**.
- The data gathered will **enhance planetary defense strategies** and **provide insights into the Solar System's formation.**

This initiative **underscores the growing focus on asteroid research**, crucial for **developing measures to protect Earth from potential asteroid collisions**, as demonstrated by NASA's successful DART mission in 2022.



20. PC EMULATOR

Context:

Apple recently approved a PC emulator for iOS, allowing users to run classic software, particularly games, on iOS, iPadOS, and visionOS.

- An **emulator is software that enables one device to mimic another**, allowing software designed for one **system to run on another without redesigning.**
- Emulators are **generally legal as they do not use proprietary code**. However**, running or distributing copyrighted ROMs without ownership is illegal.**
- **Emulators can pose security risks if downloaded from unofficial sources**, potentially containing malware.
- They may **also impact device performance due to their resource-intensive nature.**

21. CURIOSITY ROVER

Context:

The NASA Curiosity rover made a remarkable discovery

on Mars by accidentally cracking open a rock and **revealing yellowish-green crystals of pure sulphur**, a first on the red planet.

- The **discovery of pure sulphur, typically formed through volcanic processes or hydrothermal vents** on Earth, has puzzled scientists.
- The sulphur rocks, revealed through the rover's fortuitous crushing of a rock**, exhibited a crystalline texture and colour, a stark contrast to Mars' usual orange landscape.**
- This discovery echoes a similar **find by NASA's Spirit rover, which unearthed pure silica in 2007, hinting at past hot springs on Mars.**

About Sulphur:

Appearance	**Yellow crystalline solid at room temperature**
Natural Occurrence	Found in **minerals, ores, and as part of various biological compounds**; occurs naturally in volcanic regions
Biological Role	**Essential for amino acids (cysteine and methionine**), vitamins, and coenzymes; vital for cellular processes
Industrial Uses	Used in the production of **sulfuric acid, fertilizers, petroleum refining, and as a fungicide**
Compounds	Forms various compounds such **as sulphur dioxide (SO_2), sulphur trioxide (SO_3), and hydrogen sulphide (H_2S)**
Physical Properties	**Insoluble in water, soluble in carbon disulfide, and has a melting point of 115.21°C**
Health Impact	Can be toxic in high concentrations; **sulphur compounds can cause respiratory issues and irritation**

22. NOVA - 'NUMI OFF-AXIS νE APPEARANCE'

Context:

New data from the NOvA experiment, which studies neutrinos, has **deepened the mystery surrounding these subatomic particles' mass.**

- Neutrinos, abundant yet difficult to study due to **their rare interactions with matter, have puzzled scientists for decades.**
- **Initially thought to be massless, it was later discovered in the 1990s that neutrinos do have mass**, challenging the existing Standard Model of particle physics.
- The **NOvA experiment aims to determine the mass hierarchy of neutrinos**, which could reveal key **insights into the universe's evolution.**

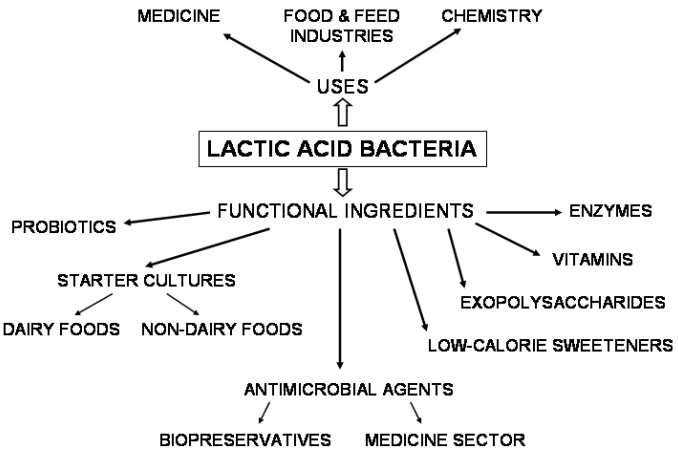
This research is part of a **global effort to understand neutrinos better, involving numerous international experiments.**

23. LACTIC ACID BACTERIUM

Context:

Scientists have discovered a **new strain of lactic acid bacterium**, **MCC0200**, with significant potential as a **probiotic beyond the dairy industry.**

- Genetic analysis of MCC0200 revealed its **ability to survive gastrointestinal conditions, adhere to intestinal surfaces, and promote gut health.**
- The strain shows **resilience against gastric juices and bile acids and possesses genes aiding acid tolerance and bile resistance.**
- **MCC0200 can adhere to mucosal surfaces, auto-aggregate, and co-aggregate** with pathogenic bacteria, enhancing gut colonization and immune function.
- It also demonstrates **antioxidative properties and can produce essential vitamins like folate.**
- **MCC0200 has cholesterol-lowering capabilities**, which could **benefit cardiovascular health.**
- This strain's diverse **probiotic attributes and safety profile make it a promising candidate for food and pharmaceutical applications.**



24. DARK OXYGEN

Context:

Scientists have **discovered "dark oxygen"** being produced in the deep ocean by **metallic nodules on the seafloor**, challenging the belief that oxygen production requires sunlight.

What is "Dark Oxygen"?

"Dark oxygen" is oxygen produced in the deep ocean, independent of sunlight, by metallic nodules on the seafloor.

How is it being produced?

These naturally occurring metallic nodules **act like batteries**, generating electric currents that split seawater (H_2O) into hydrogen and oxygen.

Applications:

1. **Support for Deep-Sea Life**: Provides oxygen for marine organisms in deep-sea environments.
2. **Potential Extraterrestrial Insights**: Suggests similar oxygen production could occur on other planets and moons, possibly supporting life.

Concerns:

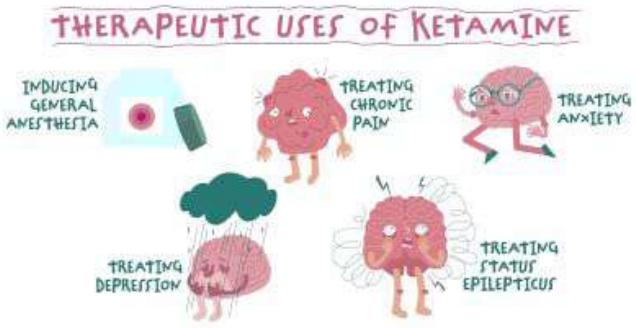
1. **Environmental Impact**: Deep-sea mining for these nodules could disrupt oxygen production and harm marine life.
2. **Ecosystem Destruction**: Mining activities may destroy unknown and poorly understood deep-sea ecosystems.
3. **Regulatory Oversight**: Ensuring environmentally friendly mining practices is crucial to mitigate damage.

25. KETAMINE

Context:

A **new slow-release ketamine tablet** offers hope for **treatment-resistant depression with fewer side effects** compared to traditional intravenous or intranasal administration.

- **Ketamine, originally an anesthetic**, has **rapid antidepressant effects** and is **often used when other antidepressants fail.**
- **The slow-release formulation reduces common side effects** like headaches and nausea, making it **suitable for at-home use.**

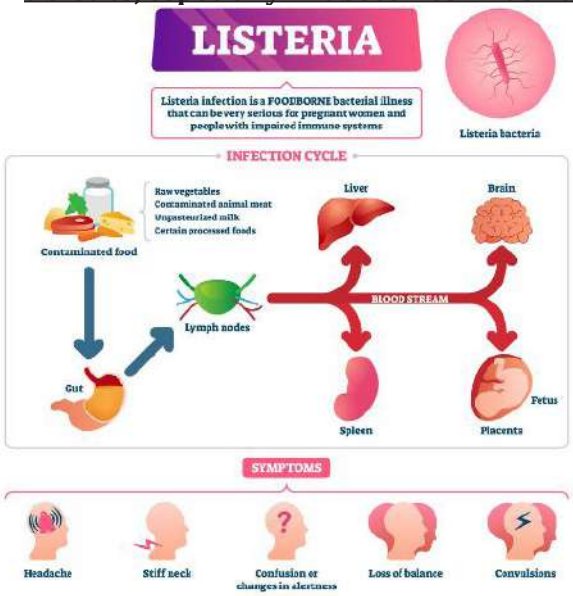


26. LISTERIA

Context:

Recent listeria outbreaks in the US and Canada have resulted in **four deaths and numerous hospitalizations.**

- **Listeria monocytogenes**, a bacteria **found in soil and contaminated food**, **causes listeriosis**, an infection that can be **severe for the elderly, immunocompromised individuals, and pregnant women**.
- Symptoms of listeriosis **include vomiting, nausea, cramps, severe headache, constipation, and fever.** The infection can be **treated with antibiotics, especially if it becomes invasive.**



27. TINZAPARIN

Context:

Researchers have discovered that tinzaparin, a drug used to **prevent blood clots, can significantly reduce the damage caused by spitting cobra venom to human cells**.

- The venom of **the red spitting cobra, native to Tanzania, can cause severe pain and permanent damage or death to its victims.**
- Current antivenom treatments**, derived from animal antibodies, are costly, difficult to produce, and can have severe side effects.**
- They found that many of these genes are involved in the **synthesis of heparan sulphate, a compound regulating blood vessels and clot formation.**
- **Tinzaparin mimics heparan sulphate, causing the body to shut down the synthesis pathway**, thus blocking the venom's effects.
- Experiments showed that **tinzaparin protected human cells and reduced skin damage in mice exposed to cobra venom.**

Environment & Ecology

28. ELEPHANT

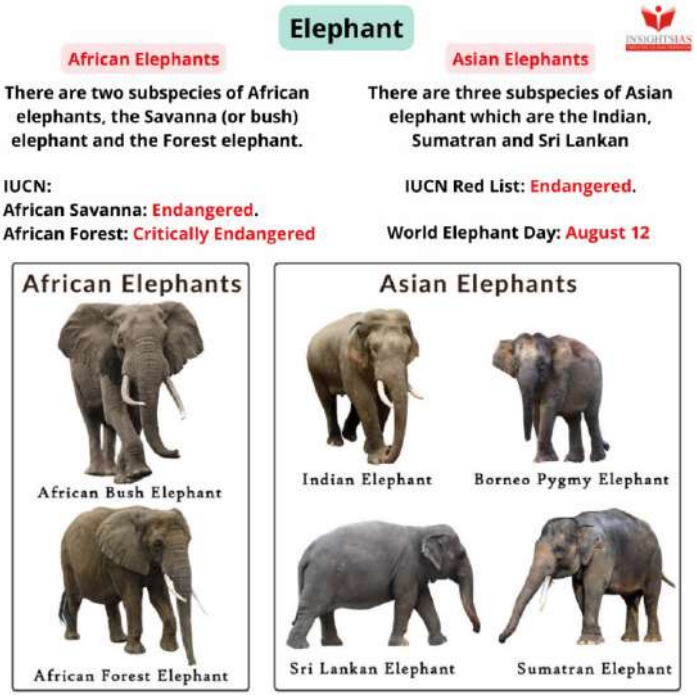
Context:

The **elephant population in Kerala has declined from 1,920 in 2023 to 1,793**, as revealed by a recent **synchronized population estimation across southern Indian states.**

- This reduction, is attributed to **climatic varia-**

tions that prompted elephant migration to neighbouring states.

- The report emphasizes the **need for conservation and management of elephant populations**, noting that **habitat fragmentation and developmental pressures increase human-elephant conflicts.**



29. PHLOGACANTHUS SUDHANSUSEKHARII

Context:

Researchers from the **Botanical Survey of India (BSI)** have **discovered a new plant species, 'Phlogacanthus Sudhansusekharii'**, in Arunachal Pradesh.

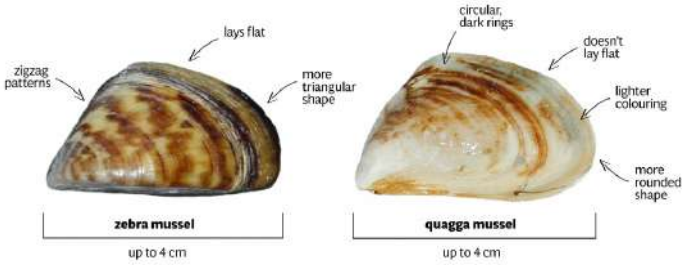
- This species, **belonging to the Acanthaceae family and Phlogacanthus genus**, has been named in **honor of Dr. Sudhansu Sekhar Dash** for his significant **contributions to plant and ecological research in the Indian Himalayan region.**

30. ZEBRA MUSSEL

Context:

Zebra mussel larvae, an invasive species, have been **discovered in the Colorado River near Grand Junction, Colorado.**

- This poses a **severe threat to the river's ecosystem and infrastructure**.
- **Zebra mussels are difficult to remove once established** and can **rapidly spread, disrupting ecosystems by eliminating essential food sources** and attaching to hard surfaces, **leading to clogged pipes and damaged equipment.**

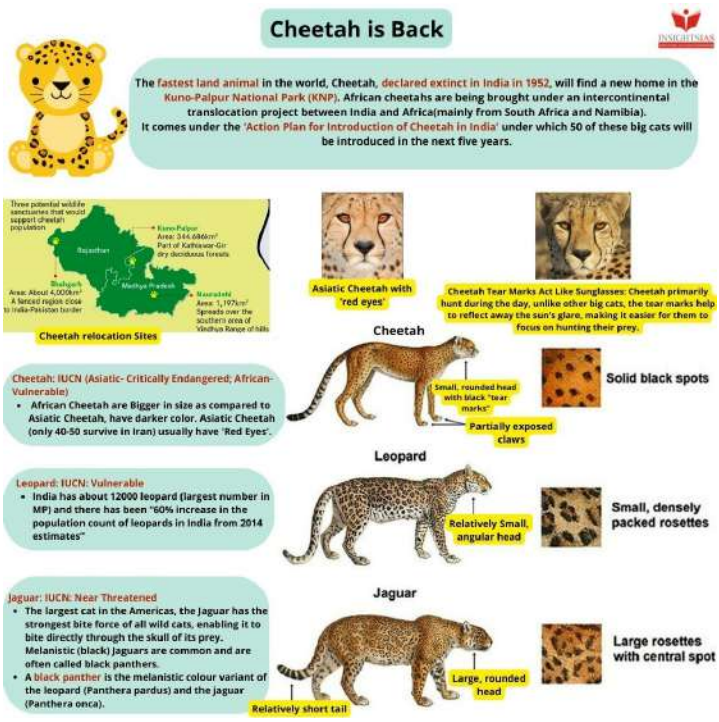


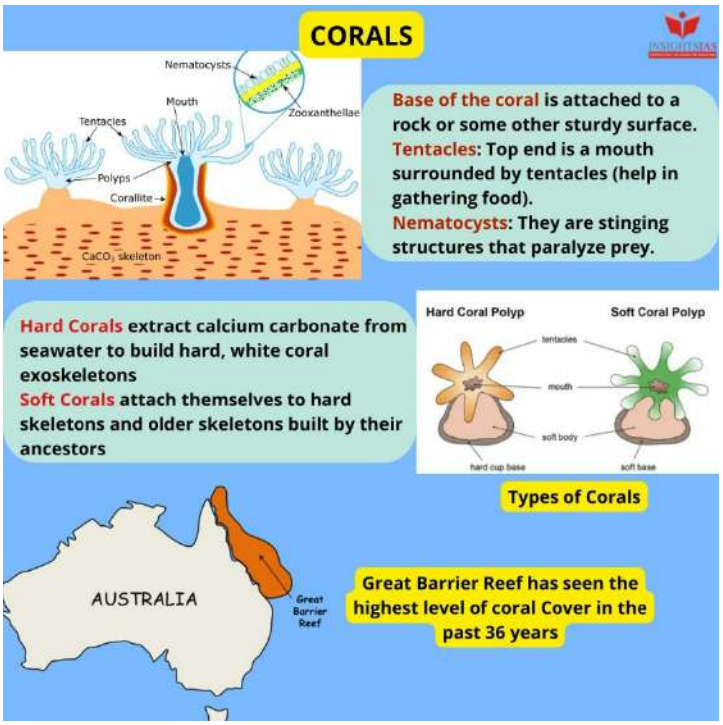
31. PROJECT CHEETAH

Context:

Banni, a vast grassland in the southern part of Kutch, Gujarat, is being readied to **host cheetahs from Africa** as part of the **next phase of Project Cheetah.**

- However, **Banni lacks sufficient prey for a viable cheetah population**, necessitating the introduction of **species like chital to sustain the big cats.**
- Banni offers the **advantage of having no leopards,** making it a potential long-term site for a **larger cheetah population once sufficient prey is established.**





32. ARTIFICIAL REEFS

Context:

Recently **300 artificial reef modules were deployed in various shapes off the coast of Rameshwaram, Tamil Nadu**, to enhance **marine fisheries resources and coastal biodiversity**.

- **These reefs, located 3 nautical miles offshore at a depth of 6 meters,** benefit fishermen from eight fishing villages.

About Artificial reefs:

- **Artificial reefs are human-made structures** placed on the **seabed using biorock technology**.
- This technology **involves passing a low electrical current through water via electrodes** near a steel structure, **attracting dissolved minerals to form a calcium carbonate layer akin to natural coral reefs.**
- **These reefs provide hard surfaces for algae, barnacles, corals, and oysters** to attach to, creating habitats for **fish, absorbing carbon dioxide, and benefiting local fishing communities**.

33. 'WHITE CATEGORY' SECTORS

Context:

Industries classified under the **'white category' by the Central Pollution Control Board (CPCB),** considered non-polluting, **will no longer need prior permissions ('consent to establish' (CTE) and 'consent to operate' (CTO)) from state pollution control boards** to operate **under the Air Act, 1981, and Water Act, 1974,** according to draft notifications from the Environment Ministry.

- White category industries, **such as wind and solar power projects and air cooler assembly**, must **now inform state boards of their operations via self-declarations**.

Categorizing Industrial Sectors:

The Ministry of Environment, Forest and Climate Change (MoEFCC) **categorizes industrial sectors based on their Pollution Index (PI),** which reflects the **level of emissions, effluents, hazardous waste, and resource consumption**.

The **Pollution Index ranges from 0 to 100,** with higher values indicating greater pollution. The criteria for categorization are as follows:

- **Red category: PI score of 60 and above**
- **Orange category: PI score of 41 to 59**
- **Green category: PI score of 21 to 40**
- **White category: PI score up to 20**

This categorization is based on references from the **Water (Prevention and Control of Pollution) Cess (Amendment) Act, 2003, Environment (Protection) Act, 1986 standards, and the Doon Valley Notification, 1989.**

34. CLIMATE FINANCE ACTION FUND (CFAF)

Context:

Azerbaijan, hosting this year's COP29 UN climate talks, replaced a planned fossil fuel production levy with the **launch of the "Climate Finance Action Fund" (CFAF).**

- The **fund aims to raise $1 billion annually** from **fossil fuel-producing countries** and companies to **support climate projects in developing nations**.
- Key focuses include **clean energy, energy efficiency, climate resilience, and new technologies**.

Half of the CFAF's capital will go to these projects, while the remaining half will help countries meet their Nationally Determined Contributions (NDCs) **to maintain the 1.5-degree Celsius target**.

Additionally, **20% of the funds will support immediate disaster response in vulnerable regions.**

Internal Security

35. THE INDIAN CYBER CRIME COORDINATION CENTRE (I4C)

Context:

The Indian Cyber Crime Coordination Centre (I4C) has been upgraded to an "**attached office" of the Ministry of Home Affairs (MHA)**.

- This change **provides I4C with greater operational independence and resources to address cybercrime.**

About The Indian Cyber Crime Coordination Centre (I4C):

- The Indian Cyber Crime Coordination Centre (I4C) was initially established as a scheme under the **Ministry of Home Affairs' Cyber and Information Security (C&IS) division in 2018.**
- Its **objective is to act as a central point to curb cybercrime**, serve as an **early warning system for cybercrime prevention and detection, and facilitate easy complaint filing.**
- I4C operates through various verticals, **including the National Cybercrime Reporting Portal, the National Cybercrime Threat Analytics Unit, and the National Cybercrime Research & Innovation Centre.**

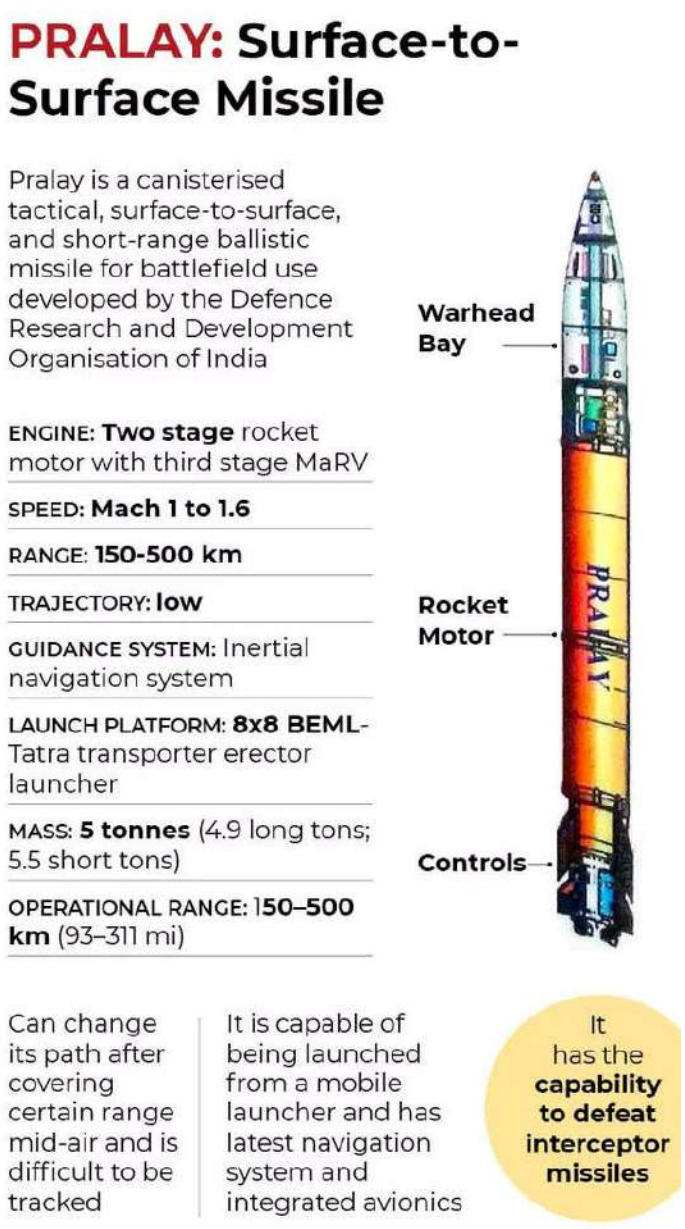
Defence

36. PRALAY MISSILES

Context:

Armenia is interested in acquiring **India's Pralay missile** to **counter Azerbaijan's Israeli-origin LORA missiles.**

- This potential deal would **enhance India's reputation as a missile exporter, following the success of the Brahmos missile export.**
- **The Pralay, developed by DRDO**, has a **higher percentage of indigenous content compared** to the **Brahmos, making it more profitable for India.**
- The Pralay is a **mobile, canister-based short-range ballistic missile (SRBM)** with a range of 150-500 km, **utilizing inertial guidance and a DSMAC seeker for terminal guidance.**
- It **features a quasi-ballistic trajectory and terminal manoeuvring capabilities**, making it difficult to intercept.
- The missile can **carry various warheads and is designed to have a low radar signature.**

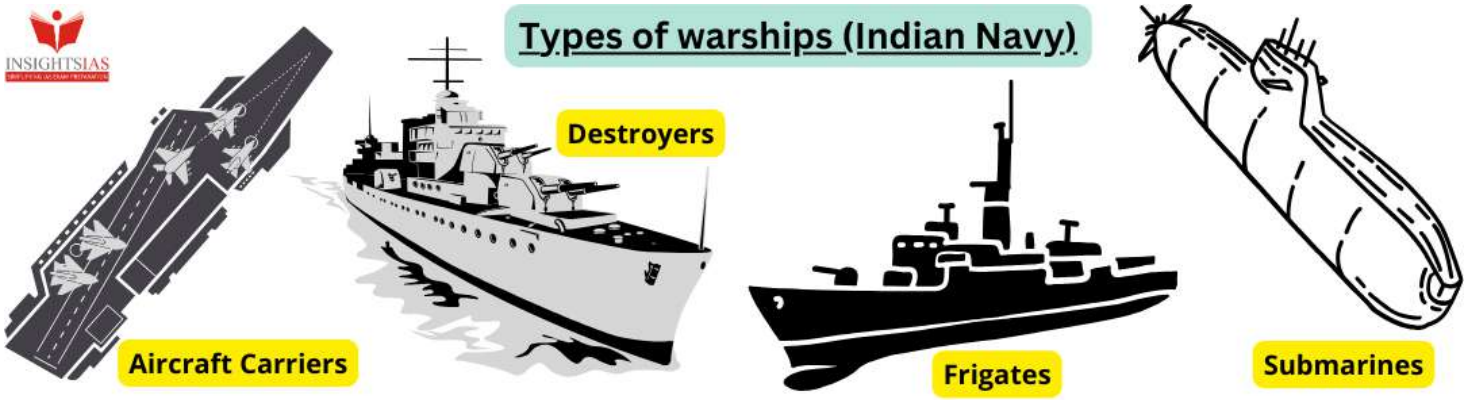


37. TRIPUT CLASS FRIGATES

Context:

Goa Shipyard Limited (GSL) launched the **first of two indigenous Advanced P1135.6 stealth frigates**, **named 'Triput**,' for the Indian Navy, with **technology transferred from Russia.**

- **India contracted four frigates from Russia in 2016**, with two built in Russia and two at GSL. The first **Russian-built frigate, Tushil, is set to be delivered in September 2024, and the second, Tamal, by February 2025.**



Type of Warship	Description	Examples
Aircraft Carriers	Large ships capable of carrying and launching aircraft.	INS Vikramaditya, INS Vikrant (under construction)
Destroyers	Versatile warships with anti-air, anti-ship, and anti-submarine capabilities.	INS Kolkata, INS Visakhapatnam, INS Imphal
Frigates	Smaller than destroyers, with multi-role capabilities.	INS Shivalik, INS Nilgiri
Corvettes	Compact warships designed for coastal defense and patrol duties.	INS Kamorta, INS Kiltan
Submarines	Submersible vessels used for stealthy underwater operations.	INS Kalvari, INS Arihant
Patrol Vessels	Smaller craft used for patrolling, search and rescue, and other coastal missions.	INS Saryu, INS Sunayna
Mine Countermeasures Vessels	Designed for mine-clearing operations.	INS Nireekshak, INS Karwar
Landing Platform Docks	Amphibious assault ships for launching troops and equipment ashore.	INS Jalashwa, INS Shardul
Offshore Patrol Vessels	Used for patrolling and surveillance in offshore waters.	INS Vikram, INS Vajra
Research Vessels	Ships dedicated to scientific research and oceanographic studies.	INS Sagardhwani, INS Sindhughosh (research variant)
Training Ships	Used for training purposes and instruction of naval cadets.	INS Tarangini, INS Sudarshini

Reports in news

Reports	Description
1. WORLD'S FORESTS 2024 REPORT	**By Food and Agriculture Organization (FAO)**
	The theme for this year is "**Accelerating forest solutions through innovation**." Key highlights include a decrease in the deforestation rate to **10.2 million hectares per year** in 2015-2020 from **15.8 million hectares** per year in 1990-2000, with **India ranking 3rd** for average annual net gain in forest area from 2010-2020.
	Non-timber forest products support the livelihoods of about **275 million** people in India.
	There is a **pressing need for innovation in the forest sector to address climate change stress** through resilient forest and land management strategies against wildfires and pests.
	Innovations Enhancing Forest Potential:
	Technological: Remote sensing and cloud computing improve forest management by generating high-quality data (e.g., NASA and ESA's Landsat and Copernicus programs).
	Social, Policy, and Institutional: Engaging women, youth, and Indigenous People through dynamic innovations (e.g., **India's Joint Forest Management Programme mandates 1/3rd female representation** on committees).
	Financial: Innovations to enhance the value of standing forests and boost restoration efforts (e.g., **SCRIPT – Soft Commodity Risk Platform**).
2. REPORT "THE STRATEGIC ROLE OF DATA CENTERS IN EMPOWERING INDIA'S DIGITAL REVOLUTION" RELEASED	A joint report by **ASSOCHAM and PwC** highlights the role of data centres in advancing India's digital landscape.
	Data centres are secure spaces housing computing and networking equipment for **data collection, storage, processing, and distribution.** Data centres facilitate data localisation by enhancing storage capabilities.
	Indians are projected to consume the **most data globally by 2028**
	Recommendations include improving regulatory compliance, increasing R&D investments to reduce power consumption, and creating data centre ecosystems in Tier 2 cities.

MAPPING

INDIAN

Place	Why in News?
1. LITHIUM IN MANDYA AND YADGIRI DISTRICTS (KARNATAKA)	**Context:** The **Atomic Minerals Directorate for Exploration and Research (AMD)** found lithium in Mandya and Yadgiri districts, Karnataka. Preliminary surveys have identified **1,600 tonnes of lithium in Mandya**. India has several states with significant lithium reserves, including **Karnataka, Rajasthan, Jharkhand, and Andhra Pradesh**. Lithium was **first discovered in Jammu and Kashmir in 1999**, and other active lithium blocks in India Katghora in Chhattisgarh. **Mandya and Yadgiri Districts** 1. **Mandya:** Located in Karnataka, known for its sugarcane farming and rich cultural heritage. 2. **Yadgiri**: Also in Karnataka, primarily an agricultural district.