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— Disclaimer —

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

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

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Section A [MAINS]

INTERSECTIONALITY: GENDER AND CASTE DYNAMICS IN INDIA'S LABOUR MARKET

Context: India is a booming market, but often the details of it reveal certain trends in terms of how the societal dynamics play a role. This gets further complex w.r.t the Women and the caste realities and how they relate to the Labour Market.

Background:

- Over the last two decades, a noticeable decline in female **Labour Force Participation (LFP)** has paralleled the overall reduction in workforce engagement.
- Structural constraints within India's manufacturing and service sectors, **combined with gender bias and caste discrimination,** contribute to women finding themselves at the bottom of the labour pyramid.
- This **limits their employment choices,** primarily directing them towards the agricultural or informal sector.

Need for Exploration:

- While previous discussions have attempted to trace the decline in female LFP through the lens of caste, **conflicting results have emerged.**
- Education's role in **facilitating employment opportunities for women** from higher castes contrasts with the reservation-driven choices of public sector jobs for women from lower castes.

Points of Analysis:

- Utilizing data from the Socio-Economic and Caste Census (SECC) 2011, analysis of labour force participation at the tehsil level.
- The focus is on Bihar, Haryana, Maharashtra, Punjab, Madhya Pradesh, Rajasthan, and Uttar Pradesh.
- Women's involvement in rural informal sectors changes based on caste positions, emphasizing the influence of economic conditions and female-headed households.

Caste and Gender Bias:

- Gender-related barriers hinder **women's contribution to economic activities**, with societal expectations often prioritizing housework.
- Legal and economic constraints, such as **restrictions on night shifts,** further impede women's pursuit of employment.
- However, in the non-farm, informal sector, women in **female-headed households find opportunities, driven by economic necessities**.
- Caste-based biases, rooted in historical expectations, explain the **higher female LFP in lower-caste households, particularly in the informal sector**.

Education's Role:

- The caste pattern in women's employment reveals **lower work participation rates among upper-caste women**.
- Education plays a pivotal role, as limited o**pportunities confine lower-caste women to informal sector jobs.**
- Education **beyond school allows entry into the formal economy,** particularly through state-driven affirmative action policies.
- Conversely, educated women from higher castes, challenging societal norms, **find greater prospects in the formal sector**.

Socio-Economic Impact:

- Despite obstacles rooted in caste and gender bias, **women's participation in the workforce has a positive socio-economic impact.**
- The ability to **generate revenue enhances decision-making capacities for women** and their families.
- **Education and employment correlate with delayed marriage and childbirth**, increased child schooling, reduced domestic violence, and enhanced mobility for women.

The intersectionality of gender and caste in women's participation in the labour force emerges as a critical aspect that demands attention for shaping a progressive socio-economic landscape.

WASTE FOR WEALTH: YEAR-END REVIEW OF THE GOBARDHAN INITIATIVE

Context: The Galvanising Organic Bio-Agro Resources Dhan (GOBARdhan) initiative, a significant multi-ministerial effort by the Government of India, has been making strides in converting biodegradable and organic waste into valuable resources.

Background:

- Since its launch in June 2023, **GOBARdhan has aimed at transforming waste, including cattle dung and agricultural residues**, into biogas, compressed biogas (CBG), and organic manure.

- The initiative promotes a **circular economy** through a holistic **"Whole of Government" approach.**

- The **2023 budget announcement** of an investment of Rs. 10,000 Crore for the establishment of 500 "waste to wealth" plants.

- As of the fiscal year 2023-24, **198 plants, including 12 CBG and 186 biogas plants, have been set up, and 556 more are under construction**.

Key Developments:

- **Expansion of CBG Trading**: CBG has been included in the list of activities for trading carbon credits, enhancing revenue opportunities for CBG plant owners.

- **Tax Exemption for CNG blended with CBG**: Central excise duty exemption has been granted to CNG blended with CBG, preventing double taxation and promoting the use of eco-friendly fuels.

- **Fertilizer Control Order Amendments**: Amendments have been made to the Fertilizer Control Order, including exemptions for the sale of Fermented Organic Manure (FOM) and Liquid Fermented Organic Manure (LFOM), boosting organic manure utilization.

- **Research Initiatives**: The Indian Council of Agricultural Research (ICAR) has undertaken research on the utilization of bioslurry in various cropping systems, promoting the benefits of FOM/LFOM on soil health and farm productivity.

- **Market Development Assistance (MDA) Scheme**: Implemented to incentivize the sale and marketing of FOM/LFOM, fostering organic farming.

- **CBG-CGD Synchronization Scheme Extension**: The CBG-CGD synchronization scheme of the Ministry of Petroleum and Natural Gas has been extended for ten years, strengthening CBG production and consumption.

- **Biofuel Blending Mandate:** The National Biofuel Coordination Committee (NBCC) has approved the introduction of mandatory 5% CBG blending, further promoting CBG utilization.

- **Unified Registration Portal**: The Department of Drinking Water and Sanitation launched the Unified Registration Portal for GOBARdhan on June 1, 2023, streamlining the registration process for CBG and biogas plants nationwide.

Prospects of GOBAR-Dhan:

- With India's substantial cattle population, estimated at 300 million, and a daily dung production of about 3 million tonnes, the economic **potential of waste conversion is enormous**.

- The **GOBAR-Dhan initiative, aligned with the Swachh Bharat Mission-Gramin,** aims to create wealth and energy from cattle and organic waste, potentially supporting 1.5 million jobs.

Successful Insights and Business Models:

- Rural communities, **employing cooperative models**, have demonstrated successful aggregation of cattle waste for biogas plants, providing cost-effective alternatives to conventional LPG gas cylinders.

- Initiatives like the **GOBAR Bank in Surat** showcase innovative approaches, where community biogas plants offer benefits such as cheap cooking gas and bio-slurry for organic farming.

Suggestions for Improvement

- **Private sector investments and local entrepreneur involvement are crucial** for generating wealth from waste in rural areas.

- **Panchayats, village communities, and informal sanitation service providers can play pivotal roles** in optimizing animal and organic waste resources.

- **Strategic policy interventions are essential for scaling up the sector, leading to economic growth**, increased incomes, and the realization of Swachh villages.

UNCHECKED POWERS: CONCERNS SURROUNDING THE POST OFFICE ACT COMMUNITIES

Context: The recent enactment of the Post Office Bill, 2023, replacing the colonial-era Indian Post Office Act, 1898, has raised apprehensions about the unbridled powers of interception granted to post office authorities.

Background:

Reforms in Telecommunications Act:

- On December 24, 2023, the President approved

the Telecommunications Bill, 2023, which replaces the Indian Telegraph Act, 1885, and the Indian Wireless Telegraphy Act, 1933.

- Section 20(2) of the new Telecommunication Act addresses interception, similar to section 5(2) of the Telegraph Act of 1885, but procedural details and safeguards are yet to be prescribed.

- Interception under the IT Act:

- Section 69(1) of the Information Technology (IT) Act, 2000, widens the scope of interception without requiring a 'public emergency.'

- Procedural rules were **notified in October 2009**, setting the stage for lawful interception.

Historical Perspective The PUCL Case:

- The Supreme Court, in the **People's Union for Civil Liberties (PUCL) vs Union of India (1996) case**, laid down procedural safeguards for telephone interception.

- The Court emphasized the need for **just, fair, and reasonable procedures** to prevent arbitrary use of interception powers.

Concerns about Post Office Act:

- The new Post Office Act **lacks procedural safeguards** to prevent misuse of interception powers.

- The Act's interception provision, without conditions **like 'public emergency' or 'public safety,'** raises concerns about privacy infringement.

Need for Safeguards:

- **Right to Privacy:**

  The right to privacy, protected under **Article 21** of the Constitution, remains relevant in postal communications, as highlighted in various judicial pronouncements.

- **International Commitments:**

  India's commitment to **Article 17 of the International Covenant on Civil and Political Rights, 1966**, mandates protection against arbitrary interference with privacy.

- **Constitutional Directives:**

  Despite the omission of certain clauses in the Indian Constitution, the Supreme Court, in **Justice K.S. Puttaswamy (Retd.) &Anr. vs Union of India &Ors. (2017)**, affirmed the right to privacy as integral to fundamental rights.

Apprehensions and Recommendations:

- **Ambiguity in 'Emergency':**

The vague term **'emergency' in the Post Office Act** should draw guidance from existing rules like 419A of the Telegraph Rules or the IT Rules.

- **Accountability Measures:**

  The Act lacks **provisions to hold authorities accountable** for misuse. In contrast, the lack of accountability may lead to constitutional court interventions for privacy infringements.

Compensation and Relief:

- The **absence of disciplinary actions** for misuse demands a robust mechanism for relief, including compensation, for individuals facing unauthorized interceptions.

- The concerns surrounding the Post Office Act's interception powers underscore the imperative need for procedural safeguards. Balancing security needs with individual privacy is crucial to prevent arbitrary use and safeguard citizens' fundamental rights. The central government's proactive measures in prescribing rules and ensuring accountability can mitigate fears of misuse and uphold the constitutional principles governing privacy.

ANALYSING THE RISING GAP IN INCOMES

Context: There are certain discrepancies in the recent report by the State Bank of India (SBI) which highlights that India has witnessed a significant fall in inequality over the last decade.

Key Concerns with the Report:

- **Challenges in Data Analysis:**

  ➤ The analysis is based on taxpayer data, presenting challenges as a significant portion of income-earners falls below the tax threshold.

  ➤ Preliminary nature of the study necessitates further research to account for potential errors, self-reporting issues, and seasonal adjustments.

- **Gini Coefficient Trends (2017-18 to 2022-23)**

What is Gini Coefficient?

◉ The **Gini coefficient** is a **statistical measure** designed to **represent the degree of income inequality** within a specific population.

◉ The Gini coefficient **ranges from 0 to 1**, with 0 representing perfect equality and 1 representing perfect inequality.

➤ The Gini coefficient, representing income inequality, decreased from 0.4297 to 0.4197 during the period.

➤ Disaggregated by employment type, the Gini coefficient fell for regular wage and casual wage workers but rose slightly for the self-employed.

Table 1: Gini coefficients

	2017-18	2022-23
Overall	0.4297	0.4197
Self-employed	0.37077	0.3765
Regular wage workers	0.43947	0.43198
Casual wage workers	0.27619	0.263

❏ Polarisation in Income Growth

➤ An analysis of decile-wise income growth reveals a polarisation trend, especially among self-employed workers.

➤ While the majority experienced healthy income growth (8%-9%), the top 10% saw a rate of around 7.23%, outpacing the bottom 20% with only 1.67% growth. *(see figure below)*

❏ 90/10 Ratio and Self-Employed Divergence

➤ The 90/10 ratio, measuring income gap between the top and bottom 10%, increased from 6.7 to 6.9.

➤ Notably, the 90/10 ratio significantly rose for self-employed individuals, with the income of the top 10% being 8.3 times that of the bottom 10%.

Table 2: The 90/10 ratio

	2017-18	2022-23
Overall	6.667	6.94
Self-employed	6	8.33
Regular wage workers	8.75	7.25
Casual wage workers	4	3.56

❏ Impact of Women's Labor Force Participation

➤ The rise in women's labor force participation, primarily in low-paid, part-time self-employed work, contributes to increased income gaps among the self-employed.

➤ While overall Gini coefficient reduction suggests lower inequality, the divergence in self-employed incomes contradicts this trend.

Consequences of Discrepancies in Income Inequality Studies

❏ Policy Misdirection:

➤ Inaccuracies in studies can lead to misguided policy decisions, hindering effective strategies to address income inequality.

Figure 1: The rate of growth of average weekly income of each decile over a five-year period
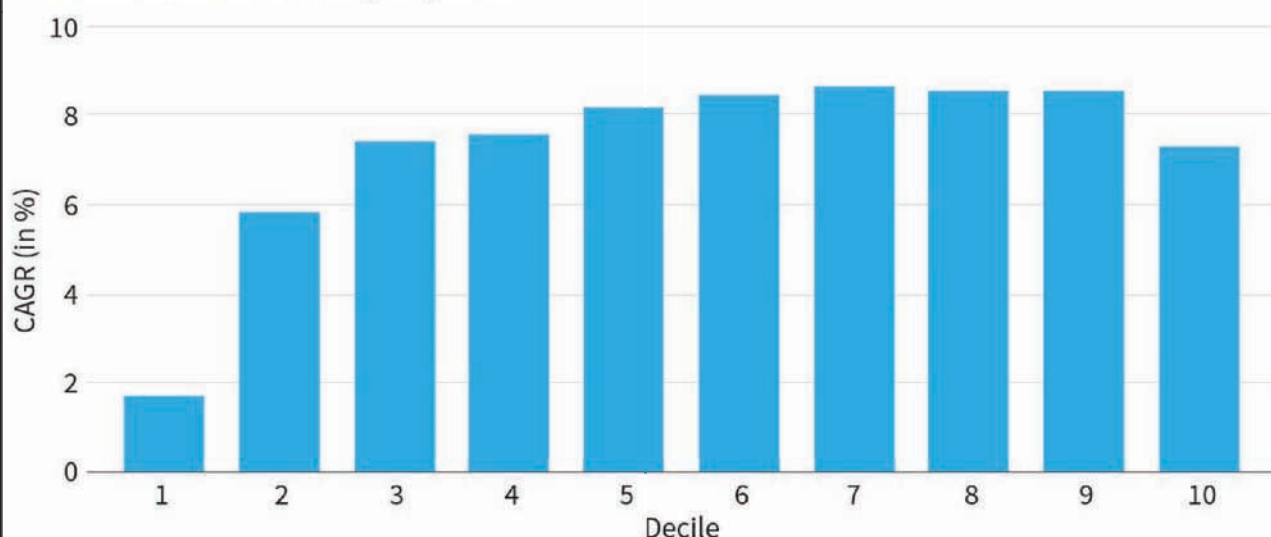
- **Public Trust Erosion:**
  - ➤ Conflicting findings may erode public trust, creating skepticism about the severity of income inequality and impeding support for necessary interventions.

- **Inequality Denial:**
  - ➤ Discrepancies provide room for denial, hindering efforts to tackle root causes and promote social and economic justice.

- **Resource Allocation Challenges:**
  - ➤ Challenges in resource allocation arise, with policymakers struggling to distribute resources effectively based on inconsistent data.

- **Benchmarking Difficulty:**
  - ➤ Establishing benchmarks for measuring progress becomes challenging, impeding the assessment of policy impact over time.

- **Impact on Research:**
  - ➤ Persistent discrepancies may slow progress in understanding income inequality dynamics within the academic community.

- **Ineffective Advocacy:**
  - ➤ Advocacy efforts are weakened as inconsistent data hampers the ability to strengthen arguments and mobilize support for change.

- **Global Cooperation Hurdles:**
  - ➤ Global comparisons and cooperation face obstacles due to inconsistent data, hindering coordinated strategies to address income disparities globally.

GIG ECONOMY

Context: The report on the Future of Work highlights that Gen Zs and millennials prefer gig roles due to flexible work locations and a emphasis on specialized skills.

Key Highlights of the report:

- **Future job landscape:** Firms are focusing on geographical expansion for talent exploration and strategic partnerships for competitive advantage and market access.

- **Tier 2/3 city prominence:** Expansion into smaller cities gains traction for harnessing untapped innovation potential and diverse talent pools.

- **Drivers for expansion:** Small organizations prioritize talent availability and cost savings, while larger tech firms focus on diverse skill sets and untapped talent in emerging technology hubs.

- **Industry transformation:** The tech industry in India undergoes significant transformation, shifting from traditional offices to exploring remote work and adapting to evolving workspace dynamics.

- **Balance in the future of work:** The evolving work landscape will be defined by a dynamic balance between efficiency improvements from automation and the expansive potential of creativity through continuous innovation.

What is gig economy?

- As per the **World Economic Forum (WEF)**, gig economy is defined by its focus on **workforce participation and income generation via "gigs"**, single projects or tasks for which a worker is hired.

- Gig economy includes **all platforms** that **hire independent workers** across sectors like e-commerce, technology, food & beverages, home services among others.

- Gig workers are typically **hired by companies on a contractual basis** and are not considered employees. They do not receive some of the benefits that on-roll staffs do.

- **Classification:** Gig workerscan be broadly classified into:
  - ➤ **Platform workers:** Those whose work is based on online software apps or digital platforms such as food aggregator platforms Zomato, Swiggy, Ola, and others.
  - ➤ **Non-platform-based workers:** Casual wage and own-account workers in conventional sectors, engaged part-time or full-time.

Benefits of Gig Economy:

- **For Workers:** Gig economy can provide more flexibility, autonomy, income opportunities, skill development, and inclusion.

- **For Employers:** It can enable access to a large and diverse pool of talent, lower fixed costs, higher scalability, and better customer satisfaction.

- **For Customers:** It can offer more choice, convenience, quality, and affordability.

Who is a gig worker?

An individual, employed transactionally on a time or task-based manner, having the flexibility to choose their hours of work

15 million
freelance workers across various sectors

90 million
jobs could potentially the added by the gig economy in the near future

Breakdown of India's gig workforce

- **Higher-skill freelancing:** IT, Design, Management — 42%
- **Personal services:** Care, Wellness, Teaching — 17%
- **Low-skill gig work:** Cleaning, Microtasks — 19%
- Deliveries — 8%
- Ridesharing — 4%
- Others — 10%
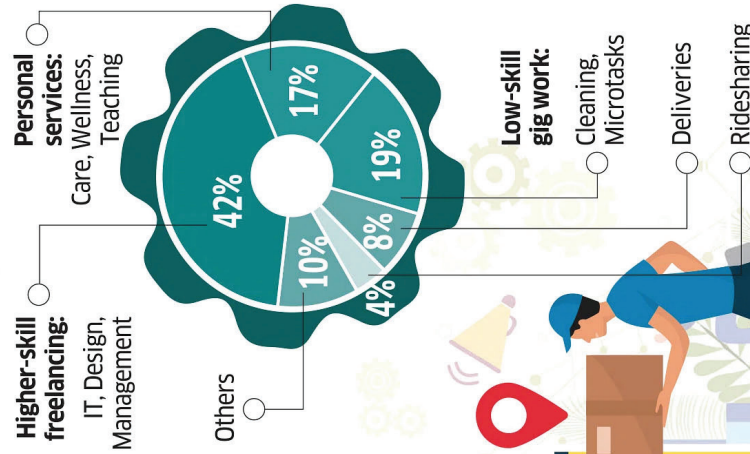
Key players in India's gig economy

Uber and Ola (Personal transport)

Swiggy, Zomato, Delhivery, Dunzo (Delivery)

Urban Company, Housejoy (At-home personal services)

FlexingIt and Upwork (High-skilled and professional tasks)

% of companies looking to hire gig workers – by sector

Sector	2020	FUTURE (2-5 YEARS)
FMCG – Pharma	15%	69%
Financial Services, Banking & Insurance	32%	56%
Manufacturing	35%	65%
Technology & BPO	57%	60%
Services	47%	76%
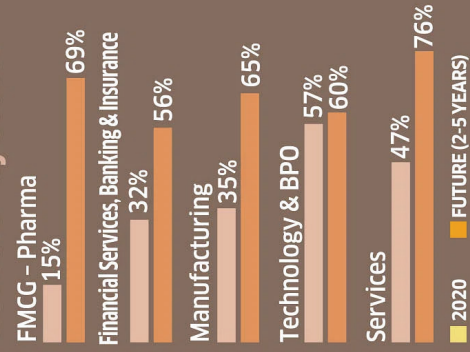
Current trend in the Indian Economy

◉ about 47% of gig work is in medium skilled jobs

◉ about 22% in high skilled

◉ about 31% in low skilled jobs

The trend shows the concentration of workers in medium skills is gradually declining and that of the low skilled and high skilled is increasing.

Expected trend

◉ While in 2020-21, the gig workforce constituted 2.6% of the non-agricultural workforce or 1.5% of the total workforce in India, by 2029-30, gig workers are expected to form 6.7% of the non-agricultural workforce or 4.1% of the total livelihood workforce in India.

Significance of Gig Economy in India

◉ **Boosting Employment Opportunities:** In India's quest to provide employment opportunities, the gig economy plays a crucial role by expanding job availability and enhancing labor force participation.

◉ **Addressing Skill Diversity:** Approximately 47% of gig work involves medium-skilled jobs, 22% in high-skilled roles, and 31% in low-skilled positions, catering to a diverse range of skills in the workforce.

◉ **Youthful Demographic Advantage:** With a large population of educated and tech-savvy youth, India leverages its demographic dividend, as many millennials seek the gig economy for its flexibility and work-life balance.

◉ **Empowering Female Labor Force:** The gig economy benefits female workers by providing income-generating opportunities, choice, and flexible work arrangements, leading to an increase in women's participation from 18% to 36%.

◉ **Post-Retirement Opportunities:** Contract work's flexibility attracts retirees, enabling them to continue working on their terms even after retirement.

◉ **Democratization of Job Opportunities:** The gig and platform sector, characterized by low-entry barriers, holds significant potential for democratizing job opportunities and fostering inclusive job creation in India.

◉ **Technological Advancements Driving Change:** Rapid technological advancements, especially in AI, robotics, and data analytics, eliminate workplace limitations, enhancing productivity and improving the living standards of gig workers.

◉ **Revolutionizing Last-Mile Delivery:** The gig economy has revolutionized the last-mile delivery industry, making it more accessible, affordable, and efficient through innovative work models.

◉ **Facilitating Remote Work:** Telecommunications have made work more dynamic, enabling collaboration irrespective of geographical constraints, fostering the growth of remote work.

◉ **Enabling Start-Up Culture:** Gig workers serve as a cost-effective alternative for businesses, allowing project-by-project hiring without the obligation of providing traditional employee benefits.

STATE EXPENDITURE SURGE: A CATALYST FOR ECONOMIC GROWTH

Context: In response to the fiscal challenges brought about by the Covid-19 pandemic, state governments in India have undergone a transformative fiscal consolidation.

The Background and The Numbers

◉ The shift is notable in the fiscal deficit, which remained **below 3 percent of the Gross Domestic Product (GDP) in both 2021-22 and 2022-23**, despite increased borrowing capacity granted by the Union government.

◉ State governments play a pivotal role in **India's fiscal landscape,** contributing significantly to overall government expenditure.

◉ Accounting for over **three-fifths of total general government spending**, states have historically emphasized revenue expenditure, covering aspects such as salaries, pensions, interest, and subsidies.

◉ However, a **notable shift occurred in 2023-24**, with a discernible increase in capital expenditure.

Need for Capital Expenditure:

◉ The **surge in capital expenditure by states during April-November 2023** reflects a strategic pivot in their spending priorities.

◉ While **revenue expenditure grew modestly by 9.3 percent**, the capital outlay witnessed a substantial 45.7 percent jump.

◉ This **alteration is vital for economic growth**, as a higher ratio of capital outlay to total expenditure, reaching an eight-year high of 14.1 percent, indicates a greater proportion of funds directed toward productive assets.

Driving Forces behind Capital Expenditure:

- Firstly, the **proactive release of monthly tax devolution** and timely disbursements of funds for special capital assistance schemes by the Union government have played a crucial role.

- Notably, **advance installments, traditionally released towards the fiscal year-end**, were expedited in June and December of 2023.

- The Union government approved **substantial capital expenditure and released funds under special assistance schemes**, contributing to the surge in states' capital investments.

- **Secondly, buoyant state revenues** have added impetus to capital expenditure.

- States' **own tax revenues and non-tax revenues have grown** at robust rates of 11.5 percent and 19.5 percent, respectively, during the initial eight months of the year.

- **This growth, outpacing nominal GDP growth**, signifies efficient tax administration and increased formalization of the economy.

- However, the **reliance on mining industry revenues remains unevenly distributed, benefiting mineral-rich states disproportionately**.

Fiscal Challenges and Market Borrowings:

- Despite robust revenue growth, **states face challenges due to a significant shortfall** in grants from the Union government, resulting in an average 5.5 percent growth in overall revenue receipts.

- This discrepancy has led states to **resort to increased market borrowings**, reaching a record Rs 5.8 trillion in the first nine months of the year.

- While this has enabled higher capital expenditure, achieving the **targeted aggregate fiscal deficit of 3.1 percent of GDP for states in 2023-24 may prove challenging**.

INDIAN FIRMS ALLOWED DIRECT LISTING ON GIFT-IFSC INTERNATIONAL MARKETS
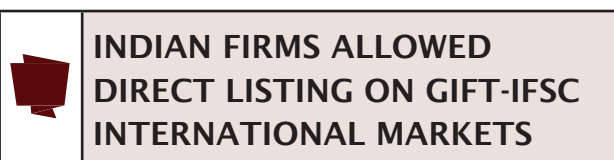
Context: The Indian government's recent decision to permit direct listing of securities by public Indian companies on the international exchanges of GIFT International Financial Services Centre (GIFT-IFSC) marks a significant stride in enhancing access to global capital.

Expectations: Foster economic growth, foreign investment, and broaden investor opportunities.

Background:

- To facilitate direct listings on **GIFT-IFSC's international exchanges**, the Department of Economic Affairs and the Ministry of Corporate Affairs have introduced amendments to regulatory frameworks.

- The revised **Foreign Exchange Management Rules and the newly notified Companies (Listing of Equity Shares in Permissible Jurisdictions) Rules** lay the foundation for public Indian companies to issue and list shares on approved international exchanges.

Framework and Regulatory Oversight:

- The permitted international stock exchanges at **GIFT-IFSC include India International Exchange and NSE International Exchange**.

- Both operate under the regulatory supervision of the **International Financial Services Centres Authority (IFSCA)**.

- GIFT-IFSC, as India's premier **international financial services centre**, aims to facilitate global connectivity for the Indian economy, fostering the seamless flow of global capital into the country.

Potential Impact on Indian Capital Market:

- This policy initiative is poised to **reshape the Indian capital market landscape**, offering a viable alternative for Indian companies, especially start-ups and those **in sunrise and technology sectors**, to access global capital.

- The Finance Ministry anticipates that this move will **align Indian companies' valuations with global standards,** enhance foreign investment inflows, unlock growth opportunities, and diversify the investor base.

Flexibility for Public Indian Companies:

- Under this initiative, **public Indian companies gain the flexibility** to raise capital in both domestic and international markets.

- They **can leverage domestic exchanges** to raise capital in rupees and the IFSC international market to raise capital in foreign currency from global investors.

Strategic Benefits and Outlook:

- The government envisions that this initiative will **particularly benefit Indian companies with global ambitions,** fostering expansion into other markets.

- Additionally, it is expected to **boost the capital**

market ecosystem at GIFT-IFSC by introducing new investment opportunities, diversifying financial products, and enhancing liquidity.

AI UNVEILS HIGH-RESOLUTION INSIGHTS INTO ARCTIC PERMAFROST CHANGES

Context: **New insights from artificial intelligence about permafrost coverage in the Arctic may soon give policy makers and land managers the high-resolution view they need to predict climate-change-driven threats to infrastructure such as oil pipelines, roads and national security facilities.**

Warming Arctic and Rapidly Changing Permafrost

◉ The Arctic is experiencing warming at a rate four times faster than the global average.

◉ Permafrost, a vital component of the Arctic, is undergoing rapid changes with significant consequences.

Challenges in Current Models and Infrastructure Threats

◉ **Existing models:**Existing models lack the resolution needed to understand the impact of permafrost thaw on the environment and infrastructure.

◉ Threats:Thawing permafrost poses threats to infrastructure such as oil pipelines, roads, and national security facilities.

◉ **Pan-Arctic models:**Current pan-Arctic models have a resolution of about one-third square mile, insufficient for specific location assessments.

What is Permafrost?

◉ Permafrost is any ground that remains **completely frozen** — **32°F (0°C) or colder** — for at least **two years**

◉ Permafrost is **most common in regions** with high mountains and in Earth's higher latitudes — near the **North and South Poles.**

What Is Permafrost Made of?

◉ Permafrost is made of a combination of **soil, rocks and sand that are held together by ice.** The soil and ice in permafrost stay frozen all year long.

◉ Near the surface, permafrost soils also contain large quantities of **organic carbon—a material leftover from dead plants that couldn't decompose, or rot away, due to the cold**.

◉ Lower permafrost layers contain soils made **mostly of minerals**.

◉ *A layer of **soil on top of permafrost** does **not stay frozen all year.**

◉ *This layer, **called the active layer**, thaws during the **warm summer months** and **freezes again in the fall.**

In colder regions, the ground rarely thaws—even in the summer. There, the active layer is very thin—**only 4 to 6** inches **(10 to 15 centimeters)**. In warmer permafrost regions, the **active layer** can be several meters thick.

Why Permafrost thawing occurs?

◉ As Earth's climate warms, the permafrost is thawing. That means the ice inside the permafrost melts, leaving behind water and soil.

◉ Thawing permafrost can have dramatic impacts on our planet and the things living on it.
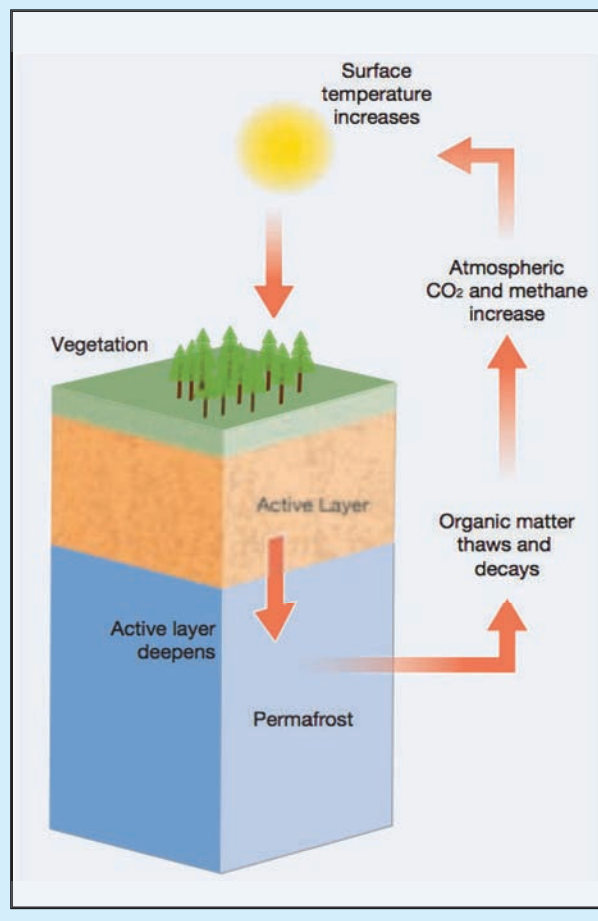
Innovative AI Application for Permafrost Data

◉ **Los Alamos National Laboratory:**Researchers at Los Alamos National Laboratory, led a team that employed **supervised machine learning**, a form of AI, for **permafrost data analysis**.

◉ **High-resolution view:**The**AI models offer a high-resolution view**, determining permafrost coverage at just **under 100 square feet,** surpassing the coarse resolution of current pan-Arctic models.

◉ **Higher Accuracy:**The**Los Alamos AI model achieved an accuracy of 83%** in predicting permafrost coverage, **outperforming the 50% accuracy of the pan-Arctic model**.

Environmental Impacts and Thawing Permafrost Consequences

◉ **Large Land Extent: Permafrost covers** approximately **one-sixth of the exposed land** in the **Northern Hemisphere**.

◉ **Environmental hazards:**Thawing **permafrost** leads to environmental hazards, including **land-surface subsidence**, **altered groundwater, changed soil chemistry, and the release of carbon into the atmosphere.**

◉ **Climate change impact:**As**air temperatures rise** due to climate change, **thawing ground releases water, impacting lower terrain, rivers, lakes, and oceans.**

AI Models Evaluation and Future Plans

◉ The **Los Alamos AI model demonstrated higher accuracy** than the pan-Arctic model but requires further improvement for site-specific predictions.

◉ The team tested **three different AI approaches—extremely randomized trees**, **support vector machines**, and **an artificial neural network—** finding mixed results with support vector machines showing promise for transferability.

◉ Future plans involve **refining AI algorithms** for better transferability across diverse Arctic landscapes.

Way Forward:

The **integration of AI in permafrost analysis** marks a significant advancement, offering a detailed understanding of changes in the Arctic landscape. The technology's potential to provide high-resolution data can play a crucial role in predicting and mitigating climate-change-driven threats to critical infrastructure in the region.

HOW THE WEATHER DEPARTMENT USES SATELLITES TO TRACK NORTH INDIA'S FOG

Context: The Kalpana 1 & INSATs 3A, 3D, and 3DR satellites have bolstered India's weather monitoring and warning services

◈ **Extended Period of Heavy Fog Across North India**

➤ **Heavy fogs in North India:**Since December 2023, regions including Bihar, Uttar Pradesh, Uttarakhand, Haryana, Delhi, and Punjab in North India have been grappling with heavy fog.

➤ **IMD warnings:** The India Meteorological Department (IMD) warned of "very dense fog" in several states, impacting visibility to less than 50 meters in some areas.

A satellite image the IMD shared on January 16, 2024, showing the fog (outlined in red) blanketing North India at 8.30 am on the same day.

◈ **Insights from INSAT 3D Satellite Maps**

➤ **Fog Patterns:**IMD has been using INSAT 3D and INSAT 3D R satellite maps to provide real-time alerts on fog patterns.

➤ **RGB imaging:**The satellite maps, utilize RGB imaging based on solar reflectance and brightness temperature.

➤ **Dense fog:** It is generally a thick white cloud that forms close to the land or sea. Temperatures should be lower and abundant moisture should be available near the surface."

➤ **Mechanism:** The land surface cooling down at nigh which also led the air close to the surface also cools down. As cooler air cannot hold as much moisture as warm air(supersaturation), the water vapour in the air condenses and form fog.

Condition for fog formations:

◉ Low temperature

◉ Abundant moisture near the surface

◉ High humidity(some instance where at lower humidity it may result in fog)
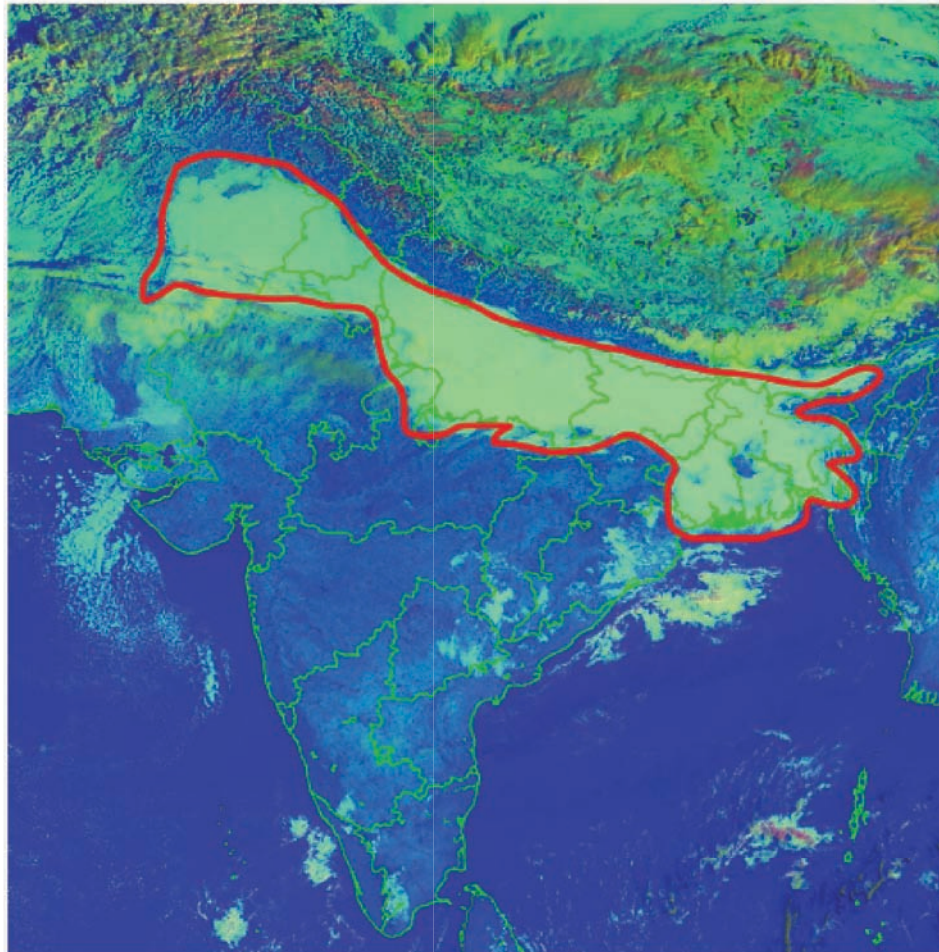
- **Solar Reflectance and Brightness Temperature: Key Factors**

  ➤ **Solar reflectance:**It is a measure of solar energy ref lected by a surface compared to the incident solar energy.

  ➤ **Brightness temperature:**It is linked to an object's temperature and thermal radiation, contributes to the coloration of the images.

- **INSAT 3D's 'Day Microphysics' and 'Night Microphysics' Data**

  ➤ **RGB colorscheme:**'Day Microphysics' assesses solar reflectance at three wavelengths (0.5 μm, 1.6 μm, and 10.8 μm) to determine the RGB color scheme.

  ➤ Cloud type analysis:'Night Microphysics' relies on the difference between two thermal infrared signals to assign colors, aiding in cloud type analysis.

Analysis of Satellite Data:

- The detailed coloration derived from **INSAT 3D and INSAT 3DR satellite maps** enables the identification of **various cloud types, initial stages of convection, thunderstorm maturation, snow**
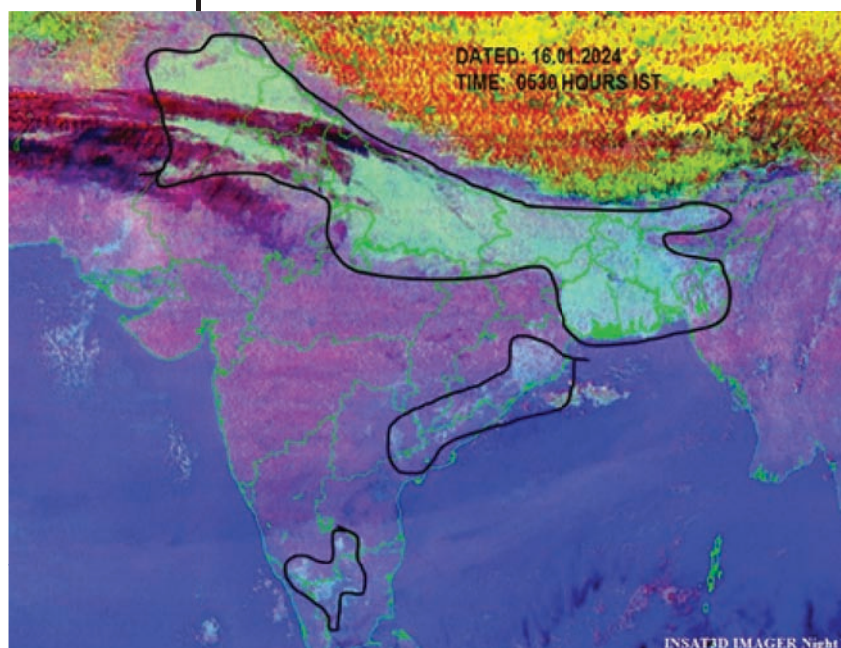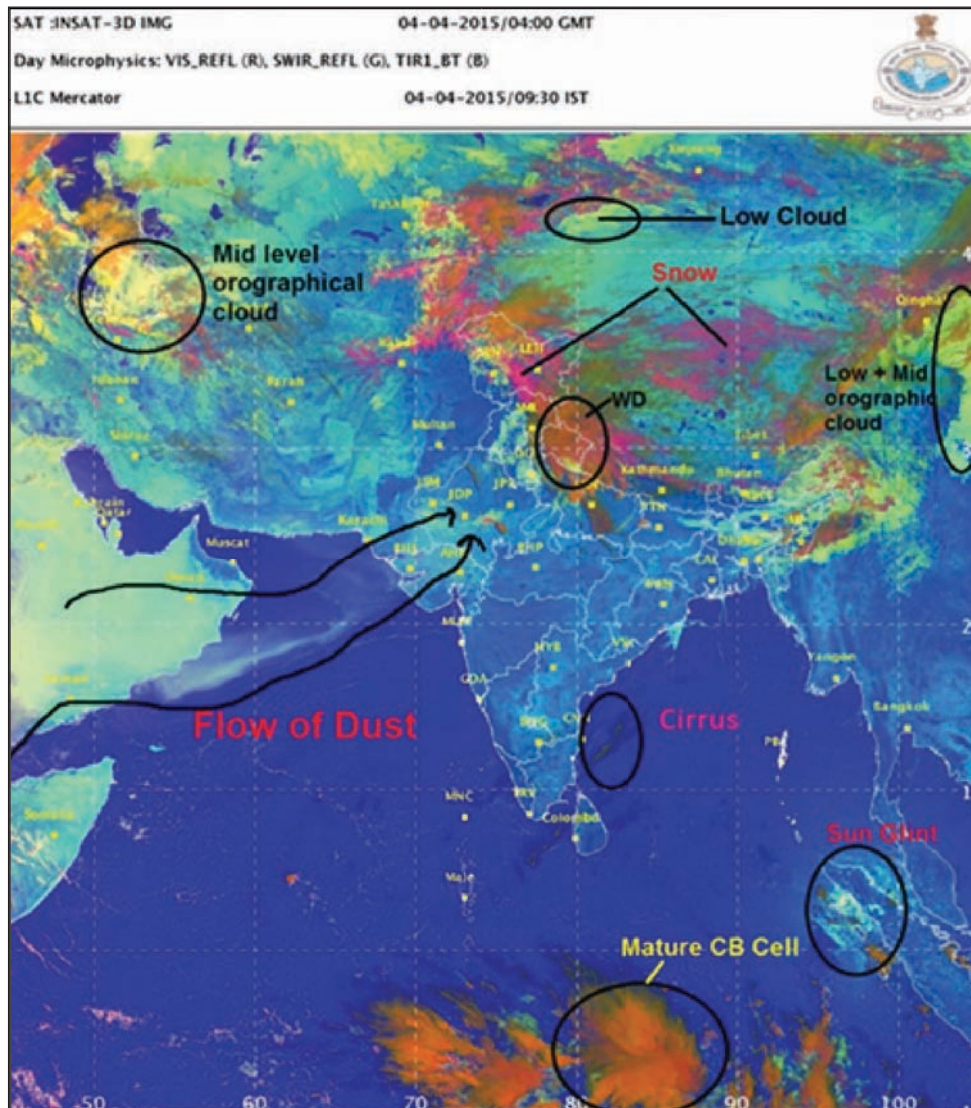
areas, and fire detection.

- The technology also facilitates **tracking moisture droplets, temperature variations, and aids in the prediction of weather events such as cyclones.**

- The **integration of AI and satellite data**, as showcased in this **fog monitoring scenario**, underscores the critical role technology plays in understanding and responding to complex climate phenomena.

- **Future Prospects with INSAT 3DS Satellite**

  - **Meteorological satellite:** In 2024, the Indian Space Research Organisation (ISRO) plans to **launch the INSAT 3DS meteorological satellite.**

  - **Enhanced technology:** INSAT 3DS, the successor to INSAT 3DR, is expected to further enhance spatial resolution, spectral channels, and overall functionality for advanced weather

monitoring.

Way Forward:

- The **continuous monitoring of North India's fog** through advanced satellite technology not only highlights the current weather challenges but also emphasizes the need for ongoing advancements in satellite capabilities.

- The imminent **launch of INSAT 3DS** marks another stride in India's commitment to **cutting-edge meteorological observation and weather prediction.**

EXTREME COLD STILL HAPPENS IN A WARMING WORLD – IN FACT CLIMATE INSTABILITY MAY BE DISRUPTING THE POLAR VORTEX

Context: While the world can expect fewer of severe cold events in the future, many regions need to remain prepared for exceptional cold when it does occur.

Arctic Cold Blast Hits the US: Understanding the Science behind Severe Winter Weather

◘ **Severe Winter Weather Grips Much of the US**

➤ Over the past few days, an **extremely cold Arctic air mass** has swept southward across much of the US.

➤ **Daily low temperature** records have been broken from **Montana to Texas**.

➤ **Tens of millions of people** have been **affected by dangerously cold temperatures**, heavy lake-effect snow, and snow squalls in the Great Lakes and Northeast regions.

➤ The occurrence of severe cold events is often associated with disruptions or changes in the **stratospheric polar vortex**, which **influences the behavior of the polar jet stream**.

◘ **Link between Stratospheric Polar Vortex and Jet Stream**

➤ **Jet Stream Meandering:** The polar jet stream, which separates Arctic and temperate air, dips southward during severe cold events.

➤ **Stratospheric polar vortex:** Changes in the **stratospheric polar vortex**, located even higher above the jet stream, can lead to the distortion and southward movement of the jet stream.

➤ Understanding the connection between the stratospheric polar vortex and the jet stream

helps explain the dynamics of Arctic cold blasts reaching lower latitudes.

Tropospheric polar vortex versus stratospheric polar vortec
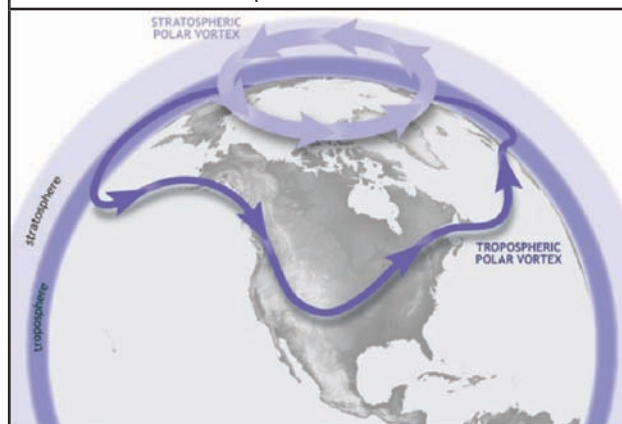
◘ **Global Warming and Severe Cold Events**

➤ **Extreme temperatures:** Despite experiencing the hottest year on record, the US faces severe cold events.

➤ No single weather event can prove or disprove global warming.

➤ Studies indicate a **decrease in the number of extreme cold events with global warming**.

➤ While global warming leads to a decrease in extreme cold events, it doesn't eliminate them entirely. The complexity of atmospheric patterns plays a role in occasional severe cold outbreaks.

◘ **Arctic Amplification and Vortex Disruptions**

➤ **Arctic amplification:** Research suggests that Arctic amplification, linked to global warming, may contribute to stratospheric polar vortex disruptions.

➤ For e.g. the February 2021 cold wave in Texas was associated with a stretched stratospheric polar vortex.

➤ Arctic amplification may influence the intensity and frequency of severe cold events, showcasing the interconnected nature of global climate systems.

◘ **Preparing for Exceptional Cold Events in a Warming World**

➤ **Decline in Severe Cold Waves:** While the number of severe cold events is decreasing, their intensity may not be correspondingly decreasing in some regions.

➤ **Interconnected phenomena:** Enhanced understanding of the connections between Arctic conditions, the stratospheric polar
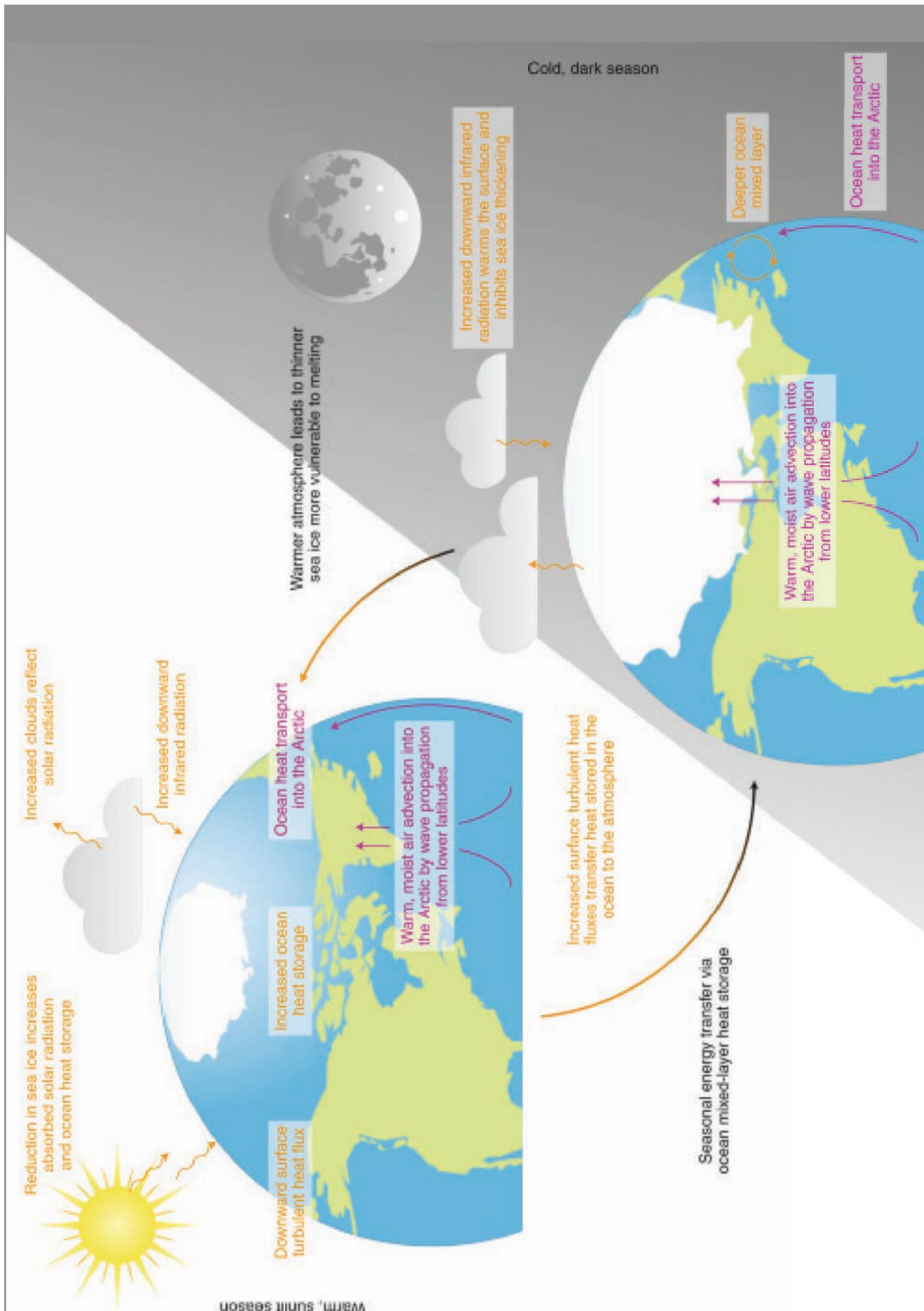
vortex, and surface weather patterns is crucial for preparedness.

➤ Despite the **overall decrease in severe cold events**, regions must remain prepared for exceptional cold occurrences. A comprehensive understanding of the influencing factors is essential for effective climate adaptation strategies.

Way Forward:

The recent Arctic cold blast in the US prompts a closer look at the intricate relationship between the stratospheric polar vortex, jet stream dynamics, and global warming. While global warming influences the overall trend of fewer severe cold events, the complexity of atmospheric interactions highlights the need for continued research to enhance climate resilience and preparedness for extreme weather events.

INDIA'S COASTAL FUTURE NEEDS SAFEGUARDING
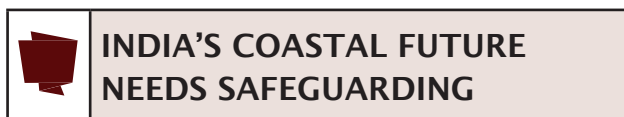
Context: Reclamation, dam construction, sand mining, sewage disposal and human settlements have increased the rate of coastal erosion.

Background:

India's extensive coastline, spanning 7,500 kilometers and hosting 1,200 islands, is not only an economic powerhouse but also a strategic asset. However, the region faces multifaceted challenges, necessitating a comprehensive policy response.

Economic Significance of India's Coastline

◘ **Economic Contribution:**

➤ India's coastline, home to nine coastal states and six Union territories, contributes significantly to the national GDP. Cities like Mumbai, Kolkata, Chennai, Surat, and Visakhapatnam collectively contribute nearly 25% to India's GDP.

➤ The coast hosts major and non-major ports handling 1.4 billion metric tonnes of cargo, connected to robust freight and logistics infrastructure.

◘ **Blue Economy Impact:**

➤ India's blue economy, supporting 95% of all businesses in the country through transportation, accounts for approximately 4% of the GDP.

➤ The country is a major global exporter of fish, rice, coconut, fruits, pepper, and other coastal commodities, with a thriving fishing industry sustaining millions of livelihoods.

Climate Crisis and Coastal Vulnerability

◘ **Climate Change Ranking:**

➤ India ranks third among the top 50 nations facing the most danger from climate change by 2050.

◘ **Hazards and Economic Costs:**

➤ The coastal zones are exposed to land-sourced and marine hazards, including shoreline erosion, tropical cyclones, and storm surges.

➤ Almost 5,700 km of India's 7,500 km coastline is prone to cyclones and tsunamis, leading to estimated economic costs ranging from $27 billion for Mumbai to $43 million for Baleshwar district in Odisha.

◘ **Human-Induced Exacerbation:**

➤ Human activities such as reclamation, dam construction, sand mining, and sewage disposal have increased coastal erosion, raised flood risks, and led to land loss.

Policy Responses and Challenges

◘ **Mission Sagarmala:**

➤ Initiated in 2015, Mission Sagarmala prioritizes port modernization, community development, and coastal tourism.

◘ **Policy Framework for Blue Economy:**

➤ The Draft Policy Framework for India's Blue Economy, prepared in 2020, underscores seven priority areas, emphasizing the economic, ecological, and geopolitical importance of coastal zones.

◘ **Coordination Challenges:**

➤ Overlapping jurisdictions among local, state, and Union governments, armed forces, and public sector enterprises hamper coordinated policy responses.

➤ Mumbai's coastline exemplifies the complexity, with numerous agencies managing different parts, resulting in conflicts and poor coordination.

Way Forward:

Coordinated Policies for Coastal Resilience

▫ **Strengthening Mission Sagarmala:**

➤ Enhance the implementation of Mission Sagarmala by fostering port modernization, community engagement, and sustainable coastal tourism.

▫ **Blue Economy Priorities:**

➤ Focus on the seven priority areas outlined in the Draft Policy Framework, addressing marine spatial planning, fisheries, aquaculture, logistics, infrastructure, and offshore energy.

▫ **Coordinated Governance:**

➤ Address jurisdictional conflicts by establishing systematic engagement mechanisms among local, state, and Union entities, armed forces, and local communities.

▫ **Climate Resilience Strategies:**

➤ Develop and implement climate resilience strategies to mitigate the impact of climate change on coastal infrastructure and ecosystems.

Way Forward:

India's coastline, while a critical economic and strategic asset, faces escalating risks from climate change and human-induced activities. Coordinated and comprehensive policy responses, as outlined in Mission Sagarmala and the Draft Policy Framework for Blue Economy, are imperative to ensure the resilience of coastal regions. Overcoming jurisdictional challenges and engaging local communities are crucial steps toward safeguarding India's coastal sustainability and economic vibrancy.

SC RESERVES JUDGEMENT ON ENVIRONMENTAL RELEASE OF GM MUSTARD

Context: The apex court stated it will determine what is best for the nation in a "highly technical" and scientific matter.

IBackground:

◉ The Supreme Court concluded proceedings on the **environmental release of genetically modified (GM) mustard.**

◉ The decision was deferred by the newly-formed bench, comprising **justices BV Nagarthan and Sanjay Karol.**

Issue: The deferral of the decision suggests the complexity and sensitivity of the GM crop issue, requiring a thorough examination of scientific and technical aspects before reaching a conclusion.

Court's Inquiry into GEAC and TEC Reports

▫ **Data and Facts:**

➤ The court inquired on why the **Genetic Engineering Appraisal Committee (GEAC)** had not referenced the reports of the **Technical Expert Committee (TEC)** on biosafety of GM crops.

➤ **Court's scrutiny:** The court's scrutiny of the reports highlights the importance of scientific assessments in making informed decisions on environmental releases of GM crops.

Concerns Raised

▫ **Data and Facts:**

➤ **Potential contamination:** Concerns were raised about the **potential contamination** of other mustard varieties if open plantations of GM Mustard are allowed.

➤ **Food Export Risk:** He emphasized the risk to India's potential for exporting organic food.

Arguments on Open-Field Trials and Food Security

◉ **Open-field trials:** Solicitor General argued that open-field trials are essential and scheduled at eight locations under supervision.

◉ **Indigenous production and Food Security:** He highlighted the importance of indigenous production for food security and reduced dependency on foreign market imports.

Way Forward:

◉ The Supreme Court's decision to **defer the judgment** on the **environmental release of GM Mustard** reflects the intricacies involved in balancing environmental, scientific, and economic considerations.

◉ The court's thorough review, legal representation, and acknowledgment of the technical nature of the issue underscore the commitment to making an informed decision that aligns with India's broader interests.

THE FREE MOVEMENT REGIME AND INDIA-MYANMAR BORDER DYNAMICS

Context: The recent announcement by Home Minister to fence the India-Myanmar border and reconsider the Free Movement Regime (FMR) has sparked debates.

Background:

◉ The roots of the India-Myanmar border complexities trace back to the **Treaty of Yandaboo in 1826,** dividing people of the same ethnicity and culture without their consent.

◉ The FMR, **introduced in 2018 as part of the Act East policy**, aimed to improve diplomatic ties and facilitate movement for border residents.

◉ However, **recent events and security considerations prompt a reassessment**.

What is the FMR?

◉ The FMR permits people **on either side of the India-Myanmar border** to travel up to 16 km without a visa, fostering cultural ties and facilitating local trade.

◉ It also aimed at providing **better access to education and healthcare facilities**.

◉ However, the ease of movement also raised concerns about **trafficking and security issues**.

Why is the FMR Under Scrutiny?

➤ The primary trigger for reconsidering the FMR was the **conflict in Manipur in 2023**.

➤ The Manipur government expressed worry about the **"influx" of Myanmar nationals and linked it to ethnic violence**.

➤ The suspension of the **FMR during the COVID-19 lockdown, extended after the Myanmar military coup**, further intensified the debate.

Scale of Migration:

➤ The civil war in Myanmar led to a **surge in refugees seeking** shelter in India, particularly in Manipur and Mizoram.

➤ Manipur pushed back thousands, expressing concern over the **number of Myanmar nationals**. Meanwhile, **Mizoram accommodated refugees due to shared ethnic ties**, seeking funds from the Centre to support them until normalcy returns in Myanmar.

Opposition from Mizoram and Nagaland:

◉ Mizoram Chief Minister opposes fencing the border and ending the FMR, emphasizing ethnic ties with the Chin people across the border.

◉ Similarly, Nagaland, particularly through the Naga Students' Federation, condemns these moves, considering them regressive and exacerbating regional conflicts.

NISAR MISSION

Context: NISAR Mission on track for early 2024 launch.

Key Highlights

▢ **Launch Date and Status:**

➤ The **NASA-ISRO Synthetic Aperture Radar** (NISAR) mission is set for an "early 2024" launch.

➤ The mission is **on track**, with final tests scheduled for the current week.

▢ **Testing Update:**

➤ All tests, except the acoustic tests, have been completed.

➤ Vibration test was successfully conducted, marking progress in the mission's preparation.

▢ **Enormous Data Volume:**

➤ NISAR is designed as a **low earth orbit (LEO) observatory** with a unique feature of generating an enormous volume of reliable, high-resolution data over a three-year mission life.

➤ The data will be valuable for **scientific research, monitoring applications, forest management, agriculture monitoring, and disaster monitoring.**

▢ **Open Science and Data Policy:**

➤ NISAR adopts an **open science and open data policy**, making it distinct in its scope.

➤ **Processed and validated data** will be made open to the **public on data servers** in both India and the U.S., enhancing accessibility.

▢ **Observation Capabilities:**

➤ **NISAR** employs **synthetic aperture radar** to scan Earth's land and ice-covered regions twice every 12 days in ascending and descending passes.

- ➤ **Capable of penetrating cloud cover** and operating day and night, NISAR is expected to revolutionize earth-observing capabilities.

- ◻ **Mission Objectives:**
  - ➤ NISAR aims to **provide spatially and temporally consistent data** for understanding changes in **Earth's ecosystems, ice mass, vegetation biomass, sea level rise, groundwater, and natural hazards.**
  - ➤ It will serve as a reliable data source for disaster monitoring and mitigation.

Background:

- ◉ NISAR has been built by space agencies of the US and India under a partnership agreementsigned in 2014.
- ◉ NISAR is expected to be launched in January 2024 from SatishDhawan Space Centre into a near-polar orbit.
- ◉ The satellite will operate for a minimum of three years.

About NISAR:

- ◉ NISAR stands for NASA-ISRO Synthetic Aperture Radar.
- ◉ It is an Earth observation satellite.
- ◉ The 2,800 kilograms satellite consists of both L-band and S-band synthetic aperture radar (SAR) instruments, which makes it a dual-frequency imaging radar satellite.
- ◉ NASA has provided the L-band radar, GPS, a high-capacity solid-state recorderto store data, and a payload data subsystem.
- ◉ And the ISRO has provided the S-band radar, the GSLV launch systemand spacecraft.
- ◉ Another important component of the satellite is its large 39-foot stationary antenna reflector
- ◉ It is made of a gold-plated wire mesh, the reflector will be used to focus the radar signals emitted and received by the upward-facing feed on the instrument structure.

Deployed Radar Antenna Reflector (~12 m diameter)
GPS Antenna
Deployed Radar Antenna Boom (~9 m length)
Deployed Solar Array
Spacecraft Bus (I3K)
L-band SAR Electronics
Feed RF Aperture (L- and S-band)
S-band SAR Electronics
Radar Instrument Structure

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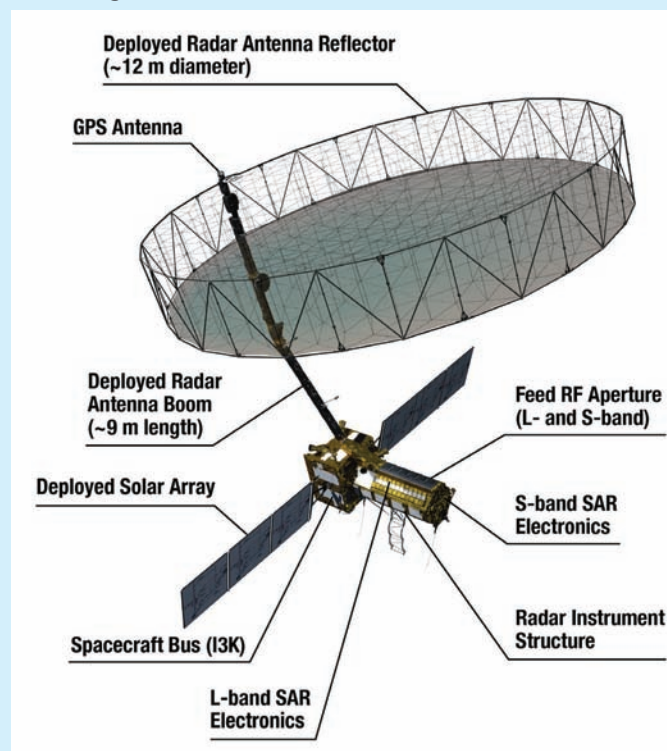
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Section B [SPECIALS]

Topic

☨ **Temple Architecture In India**

TEMPLE ARCHITECTURE IN INDIA

Context: Inauguration of RamLalla temple in Ayodhaya. Temple is in NAGARA style.

Origin of temple architecture in India:

The origin of temple architecture in India can be traced to the Vedic period (circa 1500–500 BCE), where rituals were performed outdoors. The ancient name we are getting for temple is devalaya or where diety resides.

- Initially, simple structures were built to house deities and facilitate worship. Over time, the architectural style evolved, incorporating various regional and cultural elements, leading to the diverse temple designs seen across India.

- They served as centers for spiritual and cultural activities, with intricate designs reflecting the cosmological and philosophical beliefs of the time.

- Over the centuries, various dynasties and rulers contributed to the evolution of temple architecture, resulting in distinctive regional styles such as Dravidian and Nagara. Temples became not only religious centers but also architectural marvel.

When and why it started?

- The concept of temples originated during the second and first centuries BCE.Second-century BCE Brahmi inscriptions at Besnagar commemorate the erection of a religious column in honor of 'Vasudeva' by Heliodorus.

- An inscription at Ghosundi from the first century BCE records the construction of a stone enclosure for worshiping 'Sankarshana' and 'Vasudeva' by chieftain Gajayana.

- Kautilya's Arthasastra suggests building temples based on the divisions of vastu, not only for site deities (Vastu-Devata) but also for Aparajita, Jayanta, Siva, and Vaisravana.

- Kharavela is noted to have repaired temples of different sects damaged by the wind. The second-century existence of temples is mentioned in Hala's Gatha-Saptasati.

- The Bilsad inscription references a temple to Skanda-Mahasena.

- These were the initial signs of temples as evident from archaeological and literary sources, however the temples in modern sense came to be built from times of Gupta period 4th AD onwards. The inspiration behind temple building came from sculpture traditions Of Gandhara and Mathura school of art.

- These sculpture were made for representations of Buddha (Mahayan School which worships Buddha as god) and themes of Buddhism which were made religious purpose. The Gandhara art also percolated the sculpture making traditions to north with advent of mathura school of art. In this school of art, various gods were represented in anthropomorphic form and used for religious and aesthetic purpose.

Revival of Brahmanical form of religion

During the times of GUPTA Empire, there was a revival of brahmanical religion and it was patronized by rulers. The religion was, also to act as legitimizing force for their rule. as per historian it was aggressively promoted and helped in mainstreaming their legacy.

- Thus the start of temple making had a logical socio-political connection and contemporary realities. However the early temples were not elaborate as we see today but it was made up of stone erected on a raised platform with deity being placed on it.

- The next of development in temple making comes during the rule of Pallavas where the stone temples saw the parallel existence of cave temples and monolith (made from single stone) temples for e.g Mamallapuram, Ratha temple etc. The early examples of cave temples is KailashNath temple at Ellora built by Rashtrakuta king Krishna I.

Evolution of temple architecture

- From stone temples to cave temples, Monolith temples and grandeur temples with elaborated shikharas (nagara style) and huge gopurams (Dravida style).

- During the Gupta Empire in India, a shift in architectural preference emerged, with the rise of free-standing structures gradually overshadowing the popularity and prominence of cave constructions. This transformation can be linked to the pivotal role these temples played as communal centers, drawing people together.

- The inception of free-standing temples is exemplified by enduring structures such as those in Deogarh and the Dashavatara temple dedicated to Vishnu, constructed in the 6th century CE. These temples marked a departure from the earlier reliance on cave structures, signifying a new era where architectural focus shifted to standalone edifices that not only served religious functions but also became vibrant hubs for community gatherings.

◉ During the fifth century CE, the Gupta dynasty witnessed the inception of temples characterized by a single-celled sanctum and a portico known as the 'Mandapa,' supported by four pillars. Notable examples include Temple at Sanchi, Tigwa, and Eran.

◉ A noteworthy survivor from this era is the Bhitargaon temple in Kanpur, Uttar Pradesh, are markable brick structure adorned with depictions of Vishnu and Durga. Another temple attributed to the Gupta dynasty is the Dasavatara temple at Deogarh.

◉ As the Gupta Age unfolded, marked by profound religious fervor, numerous temples emerged, dedicated to Hindu deities like Shiva, Vishnu, Surya, and Kartikeya.

◉ Regrettably, the legacy of these early structures faced challenges. The Huna invaders and the passage of time led to the destruction of many of these temples, with only a few enduring remnants, like the Bhitargaon temple, providing insights into the architectural and religious richness of that era.

◉ Subsequently, during the Chalukya, Pallava, Rastrakuta, Chola, Pratihar, and Parmar periods, temple construction evolved into grand, towering, and magnificent structures, shaping the diversity of Indian temple architecture.

The Transformative Phase

Indian temple architecture underwent a transformative journey from the simplicity of flat-roofed, monolithic structures to the intricate 'shikhara' designs.

◉ **Gupta Period -** Laying the Foundation: During the Gupta period, temple architecture established its roots, introducing fundamental elements like the square sanctum and pillared porch. Temples of this era featured a covered processional path (Pradakshana Path), integral to worship rituals.

◉ **Architectural Progression:** Early Gupta temples boasted monolithic flat slab roofs, evolving into later structures embracing the distinctive 'Shikhara.' Gupta style advanced through changes in plan and ornamental details on pillars and doorframes.

◉ **Sculptural Elements:** Temples adorned their walls with sculptures portraying deities, celestial beings, couples, directional deities, and decorative motifs. Consecration ceremonies adhered strictly to religious canons for carving and installing deities.

◉ **Introduction of Shikhara:** Gupta temples transitioned from flat roofs to low, curved Shikharas, marking the emergence of the Nagara style.

◉ **Panchayatan Temple Style:** The introduction of Panchayatan temple construction brought forth the concept of subsidiary shrines surrounding the main deity's temple. Subsidiary shrines formed a crucified layout, enhancing the overall architectural complexity.

◉ **Styles of Temple Architecture:** Core components of Hindu temple architecture encompass Sanctum Sanctorum (Garbhagriha), Mandapa, Shikhara, and Vahana. Mithun sculptures, considered auspicious, often adorned temple entrances.

Nagara School of Architecture (North Indian Temple Architecture):

◉ The Nagara style, prevalent from the 5th century AD in northern India, featured various sub-schools.
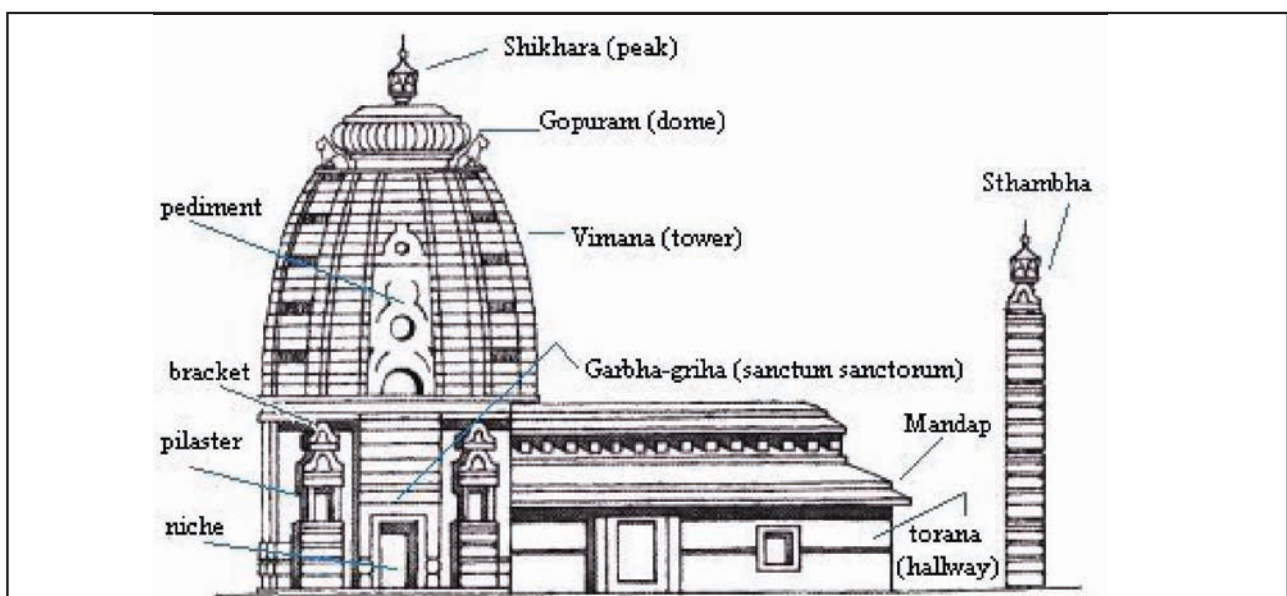
- Rekha Prasad and Latina: Latina, or rekha-prasada, represented a shikhara square at the base, with walls curving inward. This style symbolized simplicity and grace.

- Phamsana Style: Phamsana buildings were broader and shorter than Latina ones, featuring roofs composed of several slabs that gently rose to a single point.

- Vallabhi Style: Vallabhi buildings were rectangular with roofs rising into vaulted chambers, adding diversity to the Nagara order.

   (See image on previous page)

Regional Styles in Detail

- **Odisha School:**
  - Odisha temples showcased lavishly decorated exteriors with intricate carvings, contrasting with plain interior walls.
  - The shikhara in this school, known as rekha deul, exhibited almost vertical roofs with a sharp inward curve.

- **Khajuraho School (Chandela School):**
  - Khajuraho temples, patronized by the Chandela rulers, featured intricate erotic sculptures. Kandariya Mahadev Temple, Lakshmana Temple at Khajuraho, Visvanatha Temple etc.
  - There are many temples at Khajuraho, most of them devoted to Hindu gods. There are some Jain temples as well as a Chausanth Yogini temple.

- **Maru-Gurjara Style:**
  - North-Western parts of India including Gujarat and Rajasthan, this school developed under the patronage of Solanki rulers (later Chalukya) of Gujarat (11th to 13th century).
  - Developed under the Solanki rulers in North-Western India, this style emphasized decorative arched gateways (torans) and step-tanks (suryakund). These are devoid of any carvings.
  - Most of the temples are east-facing and designed such that every year during the equinoxes, the sun-rays fall directly into the central shrine.
  - Example: Modhera Sun Temple, Gujarat (built in 1026–27 by Bhima-I)

- **Assam:**
  - In Assam, the Ahom style developed by the 12th-14th centuries, showcasing a blend of the Gupta idiom and local influences.
  - The style that came with the migration of the Tais from Upper Burma mixed with the dominant Pala style of Bengal and led to the creation of what was later known as the Ahom style in and around Guwahati.
  - The Kamakhya temple in Assam, built in the 17th century, exemplifies this regional style.

- **Bengal:**
  - Bengal showcased the Pala style between the 9th and 11th centuries, followed by the Sena style until the mid-13th century.
  - Terracotta brick temples during the Mughal period incorporated local building techniques.
  - Indian temple architecture reflects a diverse journey shaped by regional rulers, dynasties, and religious beliefs.
  - The intricate designs, sculptural elements, and architectural features contribute significantly to the cultural heritage of the subcontinent.
  - The 9th century Siddheshvara Mahadeva Temple in Barakar in Burdwan District, for example, shows a tall curving shikhara crowned by a large amalaka and is an example of the early Pala style.

RAM Lalla mandir: Architecture and uniqueness.

- **Architectural style:**
  - The Ram Lalla Mandir is designed in the Nagara Style, drawing inspiration from the Gurjara-Chalukya style within the Nagara architectural tradition.
  - Gurjara-Chalukya architecture is classified as part of the Nagara style of temple architecture, showcasing a blend of artistic elements.

- **Mandapas and Layout:**
  - The temple features five mandapas in the middle of the garbhagriha (sanctum sanctorum) and on the entryway, showcasing a well-defined spatial layout.

- **Main Deity:**

   The presiding deity of the temple is Ram Lalla Virajman, representing the infant form of Lord Rama, an incarnation of Lord Vishnu.

- **Accompanying Deity and Idol Collection:**

   The temple includes idols representing various deities, such as incarnations of Shiva, the 10 Dashavataras, the 64 Chausath Yoginis, and the 12 incarnations of the goddess Saraswati.

GRAND ABODE OF LORD RAM

Completion time 3 TO 3.5 YEARS

An artist's impression of the Ram temple in Ayodhya

▶ 3-storey Ram temple will have 5 dome-shaped mandaps and 1 'shikhar'

▶ Original design had 2 storeys, 3 mandaps and 1 shikhar. Sanctum sanctorum will be octagonal

▶ Number of pillars increased from 212 to 360

▶ Temple design based keeping in consideration Vastu Shastra, says chief architect Chandrakantbhai Sompura who also designed the Akshardham temple of Gujarat. His grandfather

▶ Prabhakarji Sompura had designed the Somnath temple

▶ Nagar style Ram temple has been designed keeping in mind Shilpa Shastra specifications

Temple height up from 141 feet to 161 feet

▶ Stones from Banshi mountains in Rajasthan will be used

▶ 4 more temples, smaller in size, will surround the main structure

▶ Over 2 lakh bricks with 'Sri Ram' inscribed on them in various languages, collected over 30 years ago from across the country, will form the foundation of the temple

Total Area | Ram temple will be built in 10 acres and the remaining 57 acres will be developed as the temple complex

Temple height | 161 feet

Total columns | 360

Total floors | 3

Total mandaps | 5 (kudu, rang, nritya, kirtan and prarthana)

Width of stairs | 16 feet

◇ **Main Structure and Construction:**

➤ Elevated on a raised platform, the main structure of the temple spans three storeys, showcasing a fusion of modern and traditional construction techniques.

➤ Traditional materials like Bansi Paharpur Pink Sandstone, granite stones in the plinths, and white Makrana marble are utilized in construction.

◇ **Innovative Features:**

➤ Utilization of Traditional Materials: The temple avoids the use of steel or iron, relying on traditional construction materials.

➤ Innovative Anointment System: During every Ram Navami at noon, a system of mirrors and lenses focuses the sun's rays on Ram Lalla's idol. This unique anointment requires no electricity,

utilizing brass instead of iron or steel.

◇ **Surrounding Parkota:**

➤ The temple is enclosed by a rectangular compound wall, known as Parkota, a characteristic feature typically associated with the Dravida style.

How Ram Lalla temple is unique and can last 1000 years?

◉ One of the most significant scientific innovations in the temple's construction is its foundation. The temple is built on a 15-meter thick layer of rolled compacted concrete, which includes 56 layers of compacted concrete made from fly ash, dust, and chemicals.

◉ This robust base is further reinforced by a 21-foot thick plinth of granite, designed to protect the temple from moisture. The foundation's pillars are likened to those supporting mammoth bridges over mighty rivers, ensuring the temple's robustness against seismic activity.

◉ The temple's design is capable of enduring an earthquake of up to magnitude 6.5, and is projected not to need repairs for 1,000 years. The team measured historical earthquake intensity in the region stretching from Ayodhya to Nepal and simulated it in the laboratory to design a unique foundation for the temple.

◉ Based on the advice of the Indian Institute of Technology in Chennai, engineers dug the ground 15 meters removing the top soil, which is believed to be clayey. It was then filled with the re-engineered soil.

◉ The re-engineered soil used for the foundation can solidify into stone within 14 days, with a total of 47 layers.

◉ The use of stone in the temple's construction, noting that it lasts longer than other materials and avoids the issue of rusting iron.

◉ The Ram Lalla Mandir stands as an architectural marvel, seamlessly blending Nagara and Gurjara-Chalukya styles. Its layout, incorporation of diverse deities, traditional materials, and innovative features contribute to its significance as a sacred and culturally rich structure

Parkota (rectangular compound wall) 732 metres long and 14 feet wide around the temple

East-West length 380 feet

Width 250 feet

Height 161 feet

Total 392 pillars and 44 doors

Entry from the east, ascending 32 stairs through the Singh Dwar

Three storeys, with each floor 20 feet high

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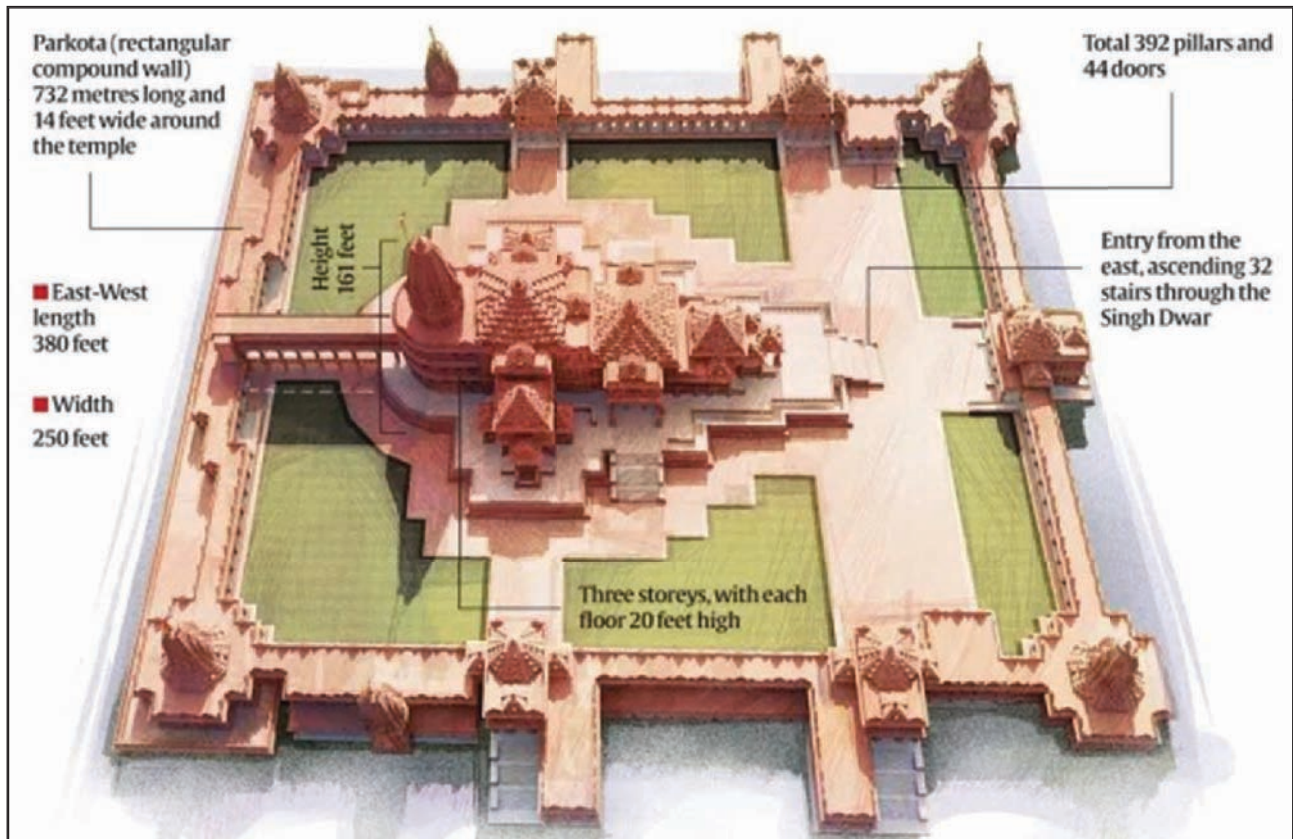
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Section C [PRELIMS]

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- ℭℌ Bharat Ratna
- ℭℌ Supreme Court to Examine BSF Jurisdiction Extension in Punjab
- ℭℌ Union Government Forms Committee to Explore SC Sub-Categorisation
- ℭℌ Karnataka Cabinet Advocates Constitutional Amendment for Internal Reservation Among SC Communities
- ℭℌ Indigenous Mobile Hospital (BHISHM)
- ℭℌ Delay in Operationalizing Venture Capital Fund for Scheduled Tribes Raises Concerns
- ℭℌ Government Allocates Rs. 235 Crores for Next-Generation Administrative Reforms
- ℭℌ Advancing Leprosy Eradication: India's New Treatment Regimen
- ℭℌ MNRE launches scheme to incentivise production of green hydrogen
- ℭℌ Government's Initiative to Promote Nature Tourism at Ramsar Sites

BHARAT RATNA

CONTEXT: Karpoori Thakur will be awarded the Bharat Ratna, India's highest civilian award.

About Karpoori Thakur

- Karpoori Thakur was born on January 24, 1924, in Pitaunjhia, a village in Bihar, India.

- Son of a marginal farmer from the Nai (barber) community, the socialist icon went on to serve twice as Chief Minister of Bihar — first between December 1970 and June 1971 as part of the BharatiyaKranti Dal and later between December 1977 and April 1979 from the Janata Party.

- Popularly called as "Jannayak", or People's Leader, Thakur was a freedom fighter, incarcerated during the Quit India movement in 1942.

- He has been seen as the architect of much of the social justice plank in Indian politics.

- He was part of the anti-Emergency movement, along with another great socialist leader, Jayaprakash Narayan.

About "Bharat Ratna"

- **Establishment:** The Bharat Ratna was established on January 2, 1954, by the President of India to recognize exceptional service or performance in various fields.

- **Criteria for Award:** The award is given for exceptional service in any field of human endeavor, including art, literature, science, public service, and sports. It is intended to be awarded without distinction of race, occupation, position, or sex.

- **Posthumous Awards:** The Bharat Ratnacan be awarded posthumously. In some cases, the government has conferred the honor on individuals after their death in recognition of their exceptional contribution to the nation.

SUPREME COURT TO EXAMINE BSF JURISDICTION EXTENSION IN PUNJAB

CONTEXT: The extension granted to BSF in terms of area of its jurisdiction has emerged as a recent flashpoint between the state of Punjab and Union Home Ministry, with the state challenging the constitutional validity of the Centre's notification issued in October 2021.

Background:

- Punjab **contests the extension of BSF's jurisdiction from 15 km to 50 km from the Indo-Pakistan border, invoking Section 139 of the BSF Act, 1968**.

- The constitutional debate revolves around **whether the Centre's move infringes upon Punjab's legislative domain** and dilutes its authority over the police and maintenance of public order.

Supreme Court's Intervention:

- A **three-judge Bench**, led by Chief Justice of India D.Y. Chandrachud, has taken up the case.

- The court aims to **determine if all border states should be treated uniformly in delineating BSF's jurisdiction** and whether the Centre's actions constitute an encroachment into Punjab's legislative territory.

Constitutional Challenge:

- Punjab questions the **constitutional validity of the Centre's October 2021 notification, utilizing Section 139 of the BSF Act**.

- This section **empowers the Centre to confer duties and powers on BSF** members concerning Central Acts, aiming to enhance control over trans-border crimes in collaboration with State Police.

Key Legal Issues:

- The Supreme Court will scrutinize whether the Centre's notification **signifies an arbitrary exercise of power and an unconstitutional interference** into Punjab's authority.

- The court will specifically consider if the **expansion of BSF's jurisdiction to 50 km surpasses the defined 'local limits of area** adjoining the borders of India' under Section 139.

Factors for Consideration:

- The **court will delve into the factors that should be considered when demarcating BSF's jurisdiction** in a border area within a state.

- This involves an exploration of the differences in **topography, population concentration, and other relevant aspects**.

Legal Arguments:

- Solicitor General, representing the Union government, highlights varying BSF jurisdictions

in different states, citing **examples like 80 km in Gujarat and 50 km in Rajasthan**.

◉ Punjab's Advocate General contends that factors such as **topography and population concentration should determine BSF jurisdiction**, emphasizing that Punjab's smaller size includes cities and towns within the 50 km ambit.

UNION GOVERNMENT FORMS COMMITTEE TO EXPLORE SC SUB-CATEGORISATION

CONTEXT: In response to the demand for sub-categorisation of Scheduled Castes (SCs) by the Madiga community, the Union government has established a five-member committee of Secretaries, chaired by the Cabinet Secretary, to examine and devise a method for the fair allocation of benefits, schemes, and initiatives among the diverse SC communities nationwide.

Background:

◉ The move follows the longstanding struggle of the **Madiga community**, dating back to 1994, advocating for the **sub-categorisation of SCs.**

◉ This demand led to the creation of the **Justice P. RamachandraRaju Commission in 1996** and a **subsequent National Commission in 2007**, both affirming the possibility of sub-categorisation.

Need for Equitable Distribution:

◉ With over 1,200 SCs in the country, certain **forward and dominant communities have overshadowed the more backward ones** in terms of benefit distribution.

◉ The Madiga community, constituting at least **50% of the SCs in Telangana**, has raised concerns about the unequal allocation of benefits, particularly reservations, where the **Mala community is perceived to have garnered the majority**.

Supreme Court's Role:

◉ Simultaneously, **a seven-judge Constitution Bench of the Supreme Court** is set to scrutinize the permissibility of sub-categorisation among SCs and Scheduled Tribes.

◉ While the court focuses on the **constitutionality of sub-categorisation** in reservations for jobs and education, the government's committee is mandated to explore alternative strategies for

addressing grievances.

Committee's Focus:

◉ The committee, formed earlier this month, includes representatives from the **Home Ministry, Law Ministry, Tribal Affairs Ministry, and Social Justice Ministry**.

◉ Explicitly instructed not to delve into **reservation-related questions deemed sub-judice**, the committee aims to explore avenues such as special initiatives and targeted focus on existing schemes.

Legal Perspective:

◉ In 2005, the Union government had **contemplated legal options for SC sub-categorisation**.

◉ The possibility was acknowledged by the then Attorney General of India, contingent on **"unimpeachable evidence"** indicating a necessity.

◉ Both the **National Commissions for Scheduled Castes and Scheduled Tribes, however, argued against** constitutional amendments, emphasizing the urgency of ensuring the prioritized delivery of existing schemes and benefits.

Awaiting Census Data:

◉ Legal experts suggest that for the government to justify **sub-categorisation, a comprehensive caste census with socio-economic data is imperative**.

◉ Experts emphasize the need for a **100% count of all castes to determine the empirical basis** for allocating benefits among various SC communities.

About Madiga Community

◉ The Madiga community is a significant community in the Indian state of Telangana, and they are primarily engaged in traditional **occupations like leatherwork and related activities**.

◉ **Occupation:**Leatherwork, including tanning and crafting of leather goods. They often work with **animal hides** to produce items like footwear, bags, and other leather products.

◉ **Social Status:**The Madiga community has **faced social discrimination and historically occupied a lower social status**.

◉ **Cultural Practices:**The Madiga community has its **own cultural practices, including festivals, rituals, and traditional art forms**.

KARNATAKA CABINET ADVOCATES CONSTITUTIONAL AMENDMENT FOR INTERNAL RESERVATION AMONG SC COMMUNITIES

CONTEXT: Karnataka Cabinet has recommended that the Centre amend the Constitution by inserting Article 341 (3). This proposed amendment would empower states to implement internal reservation policies among Scheduled Castes (SCs).

Background:

◎ The genesis of this recommendation traces back to the State Assembly election in 2023 when the Ruling party pledged to present the **A.J. Sadashiva Commission** report on internal reservation.

◎ This report, submitted in 2012, had been closed by the then government during its final days in power, which instead proposed internal reservation under four distinct categories.

Need for Constitutional Amendment:

◎ The then government's decision to **close the commission report and endorse internal reservation** under specific categories, including SC (Left), SC (Right), touchables (Banjara, Bhovi, Korcha, Korma, and others), and others, prompted the new government to seek a constitutional amendment.

◎ Social Welfare Minister emphasized the **necessity of Article 341 (3)** for states to make adjustments to the reservation matrix, citing the supremacy of Parliament.

Legal Framework:

◎ The minister referred to a **Madras High Court order** stating that there can be **"no quota within a quota"** and highlighted a legal battle in Punjab, where a seven-judge Bench is deliberating on a similar issue.

◎ The decision aligns with the understanding that states cannot act **independently without a constitutional amendment**.

INDIGENOUS MOBILE HOSPITAL (BHISHM)

CONTEXT: Amid preparations for the upcoming 'PranPratishtha' ceremony in Ayodhya, two cutting-edge ArogyaMaitri Disaster Management Cubes, part of the broader "Project BHISHM," have been strategically deployed to enhance medical readiness.

About Project BHISHM

◎ **"Project BHISHM" (Bharat Health Initiative for Sahyog, Hita, and Maitri)** is a comprehensive initiative designed to provide rapid and comprehensive care for up to 200 casualties during emergencies.

◎ **The ArogyaMaitri Disaster Management Cube**, a key component, incorporates cutting-edge technology, including Artificial Intelligence (AI) and data analytics, for effective coordination and real-time monitoring.

Rapid Deployment and Flexibility

◎ The cube comprises **72 easily transportable components**, facilitating swift deployment within an astounding 12 minutes.

◎ Its unparalleled flexibility allows **transport by hand, cycle, or even drone**.

◎ This capability proves crucial in bridging the **crucial time gap from primary care to definitive care, potentially saving lives in emergencies**.

Features of the Aid Cube

◎ Robust, waterproof, and lightweight design.

◎ Configurable for various emergency scenarios, from airdrops to ground transportation.

◎ Advanced medical equipment RFID-tagged for efficient repacking and redeployment.

◎ Integration of state-of-the-art BHISHM software for quick item location and monitoring.

The World's First Portable Disaster Hospital

◎ Developed in India, the portable disaster hospital, a set of "mini-cubes," is hailed as the world's first.

◎ Its readiness to be shared globally marks a significant milestone.

Lifesaving Capabilities

The portable hospital 'Project BHISHMA,' includes:

◎ Fully equipped operation theatre.

◎ Mini-ICUs and ventilators.

◎ Blood-testing equipment and X-ray machine.

◎ Cooking station for self-sufficiency.

◎ Capabilities to handle various injuries, including bullet, burn, head, spinal, and chest injuries, fractures, and major bleeding.

Modular Setup

- The life-saving equipment is packed in "mini-cubes" carried in an **"AarogyaMaitri Cube Cage."**

- These cubes are used to **set up a mobile hospital**, offering flexibility in deployment based on space availability.

- Two 'AarogyaMaitri' mother cubes **combine to form a complete kit**, ensuring water- and corrosion-proof storage.

Global Humanitarian Efforts

- Under 'Project BHISHMA,' India is positioned to provide critical m**edical supplies to developing countries facing natural disasters or humanitarian emergencies**.

- **Deployments in Sri Lanka and Myanmar showcase** India's commitment to global humanitarian efforts.

Future Considerations: India is actively exploring deploying these mobile hospitals in remote tribal areas, showcasing the potential for broader applications in enhancing healthcare accessibility in challenging terrains.

DELAY IN OPERATIONALIZING VENTURE CAPITAL FUND FOR SCHEDULED TRIBES RAISES CONCERNS

CONTEXT: Despite being announced in the 2022-23 budget, the Venture Capital Fund for Scheduled Tribes (VCF-ST), aimed at supporting tribal entrepreneurs, is yet to take off.

Background:

- The VCF-ST, introduced as a key scheme amid a major tribal outreach effort by the government, mirrors a **similar fund for the Scheduled Castes (SC) and Other Backward Classes (OBC).**

- The scheme is designed to provide **concessional finance** to new incubation and startup ideas initiated by the Scheduled Tribes.

Need for VCF-ST:

- The delay in operationalizing the VCF-ST, which allows businesses to seek financial assistance up to Rs 5 crore, is **impacting ST entrepreneurs** who hoped for timely implementation to aid their recovery from the pandemic's adverse effects.

- The fund is crucial for offering financial support to expand businesses and overcome **difficulties faced in securing loans from traditional banking channels**.

Allocation and Revisions:

- In the budget for FY 2022-23, initially allocated **Rs 50 crore for the VCF-ST**.

- This was **later revised to Rs 20 crore**.

- For the fiscal year **2023-24, Rs 30 crore** was allocated for the fund.

- The **Ministry of Tribal Affairs, the nodal ministry for the scheme**.

GOVERNMENT ALLOCATES RS. 235 CRORES FOR NEXT-GENERATION ADMINISTRATIVE REFORMS

CONTEXT: With a renewed focus on administrative reforms aligning with the aspirations of Viksit Bharat, the government has approved an outlay of Rs. 235 crores for the revamped Scheme for Administrative Reforms of DARPG.

- **Implementation Timeline:** This ambitious initiative is set to unfold over the next two years (2024-25 and 2025-26) under the 15th Finance Commission Cycle.

Background:

The Scheme for Administrative Reforms encompasses two verticals:

- **Comprehensive System for Redressal of Public Grievances**

- **Administrative Reforms**

Need for Administrative Reforms:

- The allocation includes a substantial Rs. 128 crores for the Comprehensive System for Redressal of Public Grievances.

- The primary objective is to develop an **AI-assisted Public Grievance Redressal System (CPGRAMS),** emphasizing accountability and transparency in the administrative machinery.

- The project aims to integrate **all grievance portals into a unified CPGRAMS**, streamlining the public grievance redressal process.

- With a focus on **technology adoption and capacity building**, the revamped Scheme aims to enhance grievance redressal efficiency.

Components of the Comprehensive System:

- Saturation of Services

- Seamless Service Delivery to citizens up to the last mile

- Government Process Reengineering for Efficient Decision-Making

- Strengthening knowledge sharing platforms

Performance Metrics:

- In 2023, CPGRAMS processed **19,45,583 public grievance cases** until the end of November, with 19,60,021 cases successfully redressed.

- The central secretariat achieved a milestone by addressing **over 1 lac cases per month** for the past 17 months, while States/UTs managed to handle over 50 thousand cases per month.

- The revamped Scheme aims to further **reduce grievance redressal time, currently averaging 17 days**.

Administrative Reforms Allocation:

The Scheme for Administrative Reforms, backed by an allocation of Rs. 107 crores, will focus on multiple initiatives:

- Prime Minister's Awards for Excellence in Public Administration

- National e-Governance Awards Scheme

- Civil Services Day Conferences

- Regional Conferences for Replication of Good Governance Practices

- Documentation and Dissemination activities, including the Good Governance Index

- Annual Conference of the International Institute of Administrative Sciences in February 2025

- Special Campaigns for Institutionalizing Swachhata, Reducing Pendency, Increasing Efficiency in Decision Making, and SushasanSaptah events in 2024 and 2025.

- International Exchange and Cooperation activities.

ADVANCING LEPROSY ERADICATION: INDIA'S NEW TREATMENT REGIMEN

CONTEXT: The Health Ministry, in a significant move, has introduced a new treatment regimen for leprosy, with the ambitious goal of halting its transmission at the sub-national level by 2027. This initiative aligns with the UN's Sustainable Development Goals, pushing the deadline forward by three years.

Background:

- Ministry of Health and Family Welfare has **greenlit a three-drug regimen for Pauci-Bacillary (PB) cases, replacing the existing two-drug regimen lasting six months**.

- This decision is rooted in the **latest global scientific research and evidence-based practices**.

Implementation Timeline and WHO's Role:

- The World Health Organization (WHO) has committed to providing the **revised drug regimen starting April 1, 2025**.

- States and Union Territories are urged to submit their requisitions for **anti-leprosy drugs a year in advance.**

- Simultaneously, the revised **classification of leprosy and the treatment regimen for PB and multi-bacillary (MB) cases in India will come into effect**.

- Despite the **efficacy of the existing two-drug regimen**, the introduction of a third drug, clofazamine, has been met with some questioning.

- Healthcare experts, point out that the **two-drug regimen is already effective, and the third drug may introduce additional side effects**.

Understanding Leprosy:

- Leprosy, caused by Mycobacterium leprae bacteria, is a chronic infectious disease impacting the skin and peripheral nerves.

- If left untreated, it can lead to permanent disabilities.

- The bacteria spread through droplets from the nose and mouth during close contact.

- Multi-drug therapy (MDT), consisting of dapsone, rifampicin, and clofazimine, is recommended by the WHO for curing leprosy.

Rationale Behind Three-Drug Regimen:

- PB patients exhibit **fewer visible bacteria and show no signs of advanced disease** in biopsies, while MB patients **have visible bacteria and may display i**ndications of more advanced disease.

- The new treatment regimen is seen as a significant stride towards achieving the collective goal of

eradicating leprosy in India by 2027.

MNRE LAUNCHES SCHEME TO INCENTIVISE PRODUCTION OF GREEN HYDROGEN
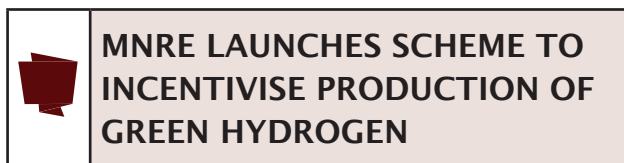
CONTEXT: Rs 17,490 crore has been set aside for the Strategic Interventions for Green Hydrogen Transition (SIGHT) programme, to bolster domestic electrolyser manufacturing, green hydrogen production.

Accelerating India's Green Hydrogen Revolution: MNRE's SIGHT Programme

◉ India is poised to revolutionize its energy landscape with the recent launch of the National Green Hydrogen Mission by the Union Ministry of New and Renewable Energy (MNRE).

◉ The mission, backed by substantial financial allocations and incentives, aims to propel the adoption of green hydrogen as a key component of India's sustainable energy future.

Strategic Interventions for Green Hydrogen Transition (SIGHT) Programme

◉ **Financial Commitment:** Under the National Green Hydrogen Mission, a staggering Rs 17,490 crore has been allocated for the Strategic Interventions for Green Hydrogen Transition (SIGHT) programme. This initiative targets the augmentation of domestic electrolyser manufacturing and green hydrogen production.

Mode-2B: An Innovative Approach

◉ **Aggregating Demand:** Implemented under Mode-2B, the SIGHT scheme adopts a strategic approach by aggregating demand and soliciting bids for green hydrogen production and supply. The competitive selection process aims to ensure cost reduction and rapid expansion.

◉ **Tranche I Capacity:** Tranche I of Mode 2B offers a bidding capacity of 200,000 million tonnes per annum, creating significant opportunities for stakeholders in the green hydrogen sector.

Execution and Oversight

◉ **Role of MoPNG and CHT:** The execution of the scheme will be entrusted to agencies nominated by the Union Ministry of Petroleum and Natural Gas (MoPNG), primarily oil and gas companies. The Centre for High Technology (CHT) will play a pivotal role in providing secretarial, managerial, and implementation support.

Industry Adoption and Initiatives

◉ **Indian Oil Corporation's Ambitious Plan:** Leading the charge, Indian Oil Corporation announced plans last year to convert 50% of its grey hydrogen to green hydrogen by 2030. This involves establishing green hydrogen plants across all its refineries.

◉ **HPCL's Green Hydrogen Plant:** Hindustan Petroleum Corporation is also actively contributing to the green hydrogen transition, with the construction of a 370 tonnes per annum green hydrogen plant at its Visakhapatnam refinery.

Incentives and Criteria

◉ **National Green Hydrogen Standard:** To qualify for incentives under the scheme, bidders must meet the criteria outlined in the 'National Green Hydrogen Standard' as notified by MNRE.

◉ **Direct Incentives:** The scheme offers a direct incentive over three years from the commencement of production and supply. Rates include Rs 50/kg of green hydrogen in the first year, Rs 40/kg in the second year, and Rs 30/kg in the third year.

Monitoring and Challenges

◉ **Scheme Monitoring Committee:** A scheme monitoring committee, co-chaired by key officials from MoPNG and MNRE, along with experts, will oversee the implementation and performance of capacities awarded or established under the scheme. It will also address challenges and recommend measures.

◉ **World Economic Forum Report:** A recent report by the World Economic Forum highlighted limited on-the-ground traction for green hydrogen in India, with key players adopting a cautious 'wait-and-watch' approach.

Way Forward:

India's National Green Hydrogen Mission, with the SIGHT programme at its core, signifies a pivotal step towards a sustainable and low-carbon energy future. As the country strategically invests in green hydrogen, balancing innovation with incentives, the transition holds promise for substantial environmental gains and economic growth. The coming years are poised to witness a transformative shift in India's energy narrative, ushering in an era of green hydrogen prominence.

GOVERNMENT'S INITIATIVE TO PROMOTE NATURE TOURISM AT RAMSAR SITES

CONTEXT: The Central government aims to boost tourism at ecologically-sensitive wetlands, known as Ramsar sites.

About Ramsar Sites:

- Ramsar sites are wetlands designated as internationally important under the Ramsar Convention.

- Ramsar sites are identified for international importance, especially for waterfowl habitat.

- Examples in India: Chilika Lake (Odisha), Sundarbans (West Bengal), Bhitarkarnika Mangroves (Odisha), and more.

Objective of the Initiative:

- Shift from high-value tourism to nature tourism at fragile wetlands.

- Direct support for conservation actions.

- Empower local communities and economies.

AmritDharohar Capacity Building Scheme 2023:

- Launched by the Union Tourism Ministry and the Ministry of Environment, Forest, and Climate Change.

- Aims to promote the conservation values of Ramsar Sites, generate employment, and support local livelihoods.

Implementation:

- Convergence with various central government ministries, state wetland authorities, and formal/informal institutions.

- Training facilitators, tourism service providers, and stakeholders.

- Collaboration with State Tourism Departments.

Focus Areas:

- **Skill Development:** Training programs at pilot Ramsar sites - Sultanpur National Park, Bhitarkanika Mangroves, Chilika Lake, Sirpur, and YashwantSagar.

- **Alternative Livelihood Program (ALP):** Participants trained for 15 days each at Sultanpur, YashwantSagar, and Sirpur.

- **ParyatanNavik Certificate:** Boatman certification for tourism at Bhitarkanika and Chilika.

Significance of Nature Tourism:

- Nature tourism focuses on natural attractions like birdwatching, photography, stargazing, camping, etc.

- Targets high-value tourists interested in diverse natural and cultural resources.

Importance of Wetlands:

- Essential for global biodiversity conservation and sustaining ecosystems.

- Nature tourism at Ramsar sites aligns with the conservation of these vital areas.

- The government's initiative aims to strike a balance between promoting tourism and ensuring the ecological sustainability of Ramsar Sites.

- Nature tourism not only benefits local economies but also contributes to the preservation of unique ecosystems.

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NEWS IN SHORT

Madhika

Madhika, a language spoken by the Chakaliya community is fast becoming extinct

About

- Madhika is a language spoken by the Chakaliya community that migrated from Karnataka centuries ago.
- It is on the brink of extinction as the younger generation increasingly chooses to adopt Malayalam.

Madhika Language

- It is a blend of Telugu, Tulu, Kannada, and Malayalam.
- Madhika is a language spoken by the Chakaliya community that mi grated from Karnataka centuries ago.

Chakaliya community

- The Chakaliya community migrated from Karnataka several centuries ago, indicating a long and complex history of movement.
- The Chakaliya community has preserved its cultural traditions over the years, reflecting a blend of Karnataka's heritage with influences from their new surroundings.

PakkePaga Hornbill Festival begins in Arunachal

The 9th edition of the **PakkePaga Hornbill Festival (PPHF)** began in **Seijosa**, Arunachal Pradesh, near the **Pakke Tiger Reserve**.

About

- The **Nyishi people**, the **largest tribal group in Arunachal Pradesh**, play a crucial role in hornbill conservation, transitioning from **hunters to conservationists**.
- Nyishi Elite Society President TanaShowren emphasized the connection between tribal traditions and conservation, calling for a **balanced approach**.
- PPHF was declared a **'state festival' in 2019,** and 2024 year's **theme,** "**DomutohDomutoh, Paga hum Domutoh**," translates to **'Let Our Hornbills Remain' in Nyishi**.
- The festival featured a **skit on hornbill conservation**, **millet competition**, and **cultural presentations** from various communities in the region.

'Pradhanmantri Suryodaya Yojana'

Solar roof-top scheme to electrify one crore households with solar electricity.

About:

- Ministry Concerned:**Ministry of New and Renewable Energy.**
- Currently, there is **no centrally compiled estimate** of the number of households in India with rooftop solar installations.
- In spite of increases in installed solar capacity, the **growth in the number of rooftop solar installations** has been muted.
- As of July 31, 2023, only 2.2 GW (1 GW is 1,000 MW) worth of rooftop installations were reportedly installed in Indian homes.
- So far, about 56 GW has been installed in the utilities (July 2023) and 12 GW in rooftops.
- Rooftop solar installations include panels in offices and homes.
- Of the nearly 12 GW of rooftop solar installations as of July 2023, about 87% are "non-residential", according to a report by JMK Research.
- The varied sizes of home-installations, which start anywhere from 1 kw, make estimates of the number of households hard to compute.

- India has consistently added around 2 GW annually (rooftop) but most of these are in offices and buildings.
- Currently, the incentive structures are such that it benefits commercial entities more than individual houses (to install solar panels).

ROSHNI – Centre of Women Collectives led Social Action (CWCSA)

Ministry of Rural Development and Lady Irwin College renews MoU for ROSHNI-CWCSA today

About:

- During the five-year term of MoU, MoRD will work with ROSHNI – Centre of Women Collectives led Social Action (CWCSA), to strengthen interventions for better results of Food, Nutrition, Health and WASH (FNHW) for rural communities.
- This partnership will strengthen nutrition, gender equity and livelihoods for women.
- Director of Lady Irwin College is the Chairperson of ROSHNI-CWCSA.
- This initiative will enhance capacity building of community resource persons (CRP) for FNHW and gender interventions."
- ROSHNI-CWCSA is supported by UNICEF India technically and financially
- ROSHNI assists DAY-NRLM to improve food, nutrition, health, and WASH (FNHW) outcomes for 9.96 crore Self Help Group (SHG) members and their households across the country.
- It envisions breaking the self-perpetuating cycle of malnutrition - illness - out-of-pocket expenditure for addressing poverty.

'Vaibhav' fellows

The Department of Science and Technology (DST) announced the first batch of 'Vaibhav' fellows.

About

- Scheme is "open-ended" and was meant to facilitate meaningful collaboration, and potentially attract diaspora scientists to work in India.
- Twenty-two scientists, mostly based at North American and European institutes including the California Institute of Technology, the University of Oxford, the University of Michigan, the University of Geneva, the University of Waterloo, Canada, and the University of Oslo, will spend anywhere from a month or two annually, for a maximum of three years, at host Indian institutes.
- Currently, the institutions include the Indian Institute of Science, the Indian Institutes of Technology, the Indian Institutes of Science, Education and Research, and the Tata Institute of Fundamental Research, among others.
- The Vaibhav fellows are expected to begin a project, technology start-up, within three years along with the host institute, build long-term research connections with the institute, collaborate with the host faculty and bring in new ideas to the field, in Indian university and research settings.

About Scheme

- The Vaibhav fellowship scheme, first set into motion in June 2023, and is involve the Indian diaspora more closely to further India's development, bears striking similarities to another scheme, called **Visiting Advanced Joint Research Faculty (Vajra) scheme**, again of the DST, initiated in 2018.
- Here too, diaspora Indian scientists were incentivised to spend short periods in Indian institutions.
- Both schemes would continue as they had different objectives. "Vajra was open to all foreign scientists, whereas Vaibhav is exclusively for the Indian diaspora," said Professor Ajay Kumar Sood, Principal Scientific Advisor.
- While the Vajra scheme did see participation and visits by foreign faculty, the Vaibhav scheme – other than the emphasis on Indian diaspora – expected clear, translational outcomes in areas of science of research that the government had earlier identified as critical to development.

8th Meeting of National Technical Textiles Mission

Ministry of Textiles approves 11 R&D projects valuing INR 103 Crores across different areas of Technical Textiles

□ **Focus on Collaboration for Indigenous Development**

➤ Union Minister PiyushGoyal chaired the 8th Meeting of the Mission Steering Group (MSG) of the National Technical Textiles Mission (NTTM).

➤ Emphasized the need for collaborative efforts between the Government and industry to enhance indigenous development of technical textiles products.

□ **Strategic Project for High-Strength Carbon Fiber**

➤ One of the projects focuses on the development of **high-strength carbon fiber** for strategic applications.

➤ Aiming to make India **self-reliant** in the field of **Technical Textiles**.

□ **Project Distribution Across Application Areas**

➤ Approved projects cover various application areas of technical textiles:

● 2 Protech

● 2 Meditech

● 2 Mobiltech

● 1 Buildtech

● 2 Smart Textiles

● 1 Sustainable Textiles

□ **Institute and Research-Led Initiatives**

➤ **Research in India:**Research projects led by reputed institutes and research bodies, including CSIR-NAL, ATIRA, NITRA, IIT Delhi, ICT-Mumbai, NIT-Jalandhar, and Colorjet India Ltd.

➤ **Technological advancements:**Collaboration with esteemed institutions emphasizes the importance of academic and research partnerships in driving technological advancements.

□ **Review of National Technical Textiles Mission Progress**

➤ **Review of Mission:**Union Minister reviewed the progress of various components of NTTM, including sanctioned R&D projects, academic initiatives, quality control orders, patents guidelines, and outreach activities.

Ayush Diksha

Foundation Stone Laying Ceremony for the construction of 'AyushDiksha - A Human Resource Development Centre of the Government of India', of Central Council for Research in Ayurvedic Sciences, Ministry of Ayush, New Delhi, was held at Central Ayurveda Research Institute (CARI), Bharatpur, Bhubaneshwar.

About:

● Approved budget of Rs.30 crore will promote state-of-the-art facilities.

● The construction will be consists of two Auditoriums with a capacity of 30-40 trainees each, 40 Central Air Conditioned Rooms with attached bathrooms for apprentice accommodation, VIP and VIP suites.

● An area dedicated to a natural library and discussion room, adequate parking space, Modular pantry, dining lounges and other necessary facilities are included.

● The Institute will provide a teaching-training programme to all the stakeholders of Ayush in general and Ayurveda in particular at the national level.

● It will also help in collaborating with other national institutions for capacity development, strengthening human resources in Ayurveda, facilitating research and development, maintaining high quality standards and generating revenue besides achieving self-sufficiency.

- **CARI (Central Ayurveda Research Institute),** Bhubaneswar is an autonomous body of the Ministry of Ayush, Government of India.

- Promoting and furthering research in Ayurveda on a scientific basis.

- The Centre will provide training programmes throughout the calendar year and is part of the initiative towards strengthening quality human resources in the Ayush sector

India elected vice-chair of UN fisheries body

Established in 1965, the COFI is an intergovernmental forum that addresses issues on international fishing and aquaculture, providing policy guidance on fisheries management, recognising global challenges, and promoting collective solutions to ensure the environmental, economic and social sustainability of the fishing industry.

About:

- For the first time in 59 years, India was appointed as the first vice-chair of the UN Food and Agriculture Organization (FAO) Committee on Fisheries (COFI) Sub-Committee on Fisheries Management.

- The grouping also makes recommendations to the FAO Council or its Director-General.

- The Sub-Committee on Fisheries Management is a new sub-group formed under the COFI in 2022, during the 35th session of the FAO Committee on Fisheries (COFI), held in Rome.

- It will work closely with the two other COFI sub-committees, the Sub-Committee on Aquaculture and the Sub-Committee on Fish Trade.

- India is one of the top fishing nations with over 28 million inland and marine fisheries. It is also one of the founding members of the FAO, whose headquarters is in Rome.

- The country's inclusion as a member of the committee "would give much-needed balance & perspective to the global narratives concerning fisheries governance & management (especially for artisanal & small scale fisheries)".

- Improving global fisheries management remains crucial to restore ecosystems to a healthy and productive state and to protect the long-term supply of aquatic foods.

- This improvement also includes eliminating illegal, unreported, and unregulated fishing and on addressing the impacts of the climate crisis, and biodiversity degradation that are also heavily impacting aquatic and coastal ecosystems and dependent communities.

RBI panel proposes framework for State guarantees

Through the framework State governments may publish/ disclose data relating to guarantees, as per the Indian Government Accounting Standard (IGAS). It will lead to better fiscal management by the state governments.

About:

The RBI's working group on state government guarantees has proposed the following:

- The word 'guarantee' should include all instruments, which create an obligation, contingent or otherwise, on the part of the state government.

- "The purpose for which Government guarantees are issued should be clearly defined.

- State governments may consider fixing a ceiling for incremental guarantees issued during a year at 5 per cent of Revenue Receipts or 0.5 per cent of Gross State Domestic Product, whichever is less,"

- "State governments may consider charging a minimum guarantee fee for guarantees extended and additional risk premium may be charged based on the risk category and the tenor of the underlying loan.

- State governments may publish/ disclose data relating to guarantees, as per the Indian Government Accounting Standard (IGAS)

- The terms of reference of the Working Group included prescribing a uniform guarantee ceiling for the states, uniform reporting framework for the guarantees given by the State Governments and assessing the adequacy of states' contribution to the Guarantee Redemption Fund.

Japan's 'moon sniper' landing mission

Japan becomes the fifth country to put a spacecraft on the moon with its precision landing of the Smart Lander for Investigating Moon (SLIM) probe.

Precision Landing Technology:

- The SLIM project, over two decades in development, marks JAXA's second attempt at lunar landing following the setback with the OMOTENASHI lander in 2022.

- The precision landing technology aims to achieve a remarkable feat by landing within 100 meters (328 feet) of the target, a vast improvement over the conventional accuracy of several kilometers for lunar landers.

- "**Vision-based navigation"** is a key aspect of the technology. As the probe descends, it uses its camera's images to match existing satellite photos of the Moon, enabling it to recognize its position and execute a precise touchdown.

- This innovation is crucial for future exploration of **hilly moon poles**, identified as potential sources of oxygen, fuel, and water.

- Additionally, the technology aids in **selecting optimal locations** for **solar power generation**, enhancing a lunar lander's chances of survival.

- **Other Lunar Missions:** Various nations and private companies are actively participating in lunar exploration.

- **U.S. startup Intuitive Machines** plans to launch its **IM-1 lander** in mid-February, while **China aims to send the Chang'e-6 spacecraft** to the far side of the Moon in 2024 for sample retrieval. **NASA's lunar polar exploration rover VIPER** is scheduled for launch in November, with recent delays announced for the Artemis moon program.

PM declares open Khelo India Youth Games

About

- Welcoming the participants, the prime minister remarked that they were together "showcasing the true spirit of **'Ek Bharat Shrestha Bharat'"** and said that for Indian sports, "the Youth Games is a great way to start the new year 2024".

- PM underscored the government's commitment to providing international exposure to young athletes and making India a crucial player in **the global sports economy**.

- Chief Minister MK Stalin outlined **Tamil Nadu's vision to become the sports capital of India**. He acknowledged TN Sports Minister Udhayanidhi Stalin for steering the state in that direction.

- CM Tamil Nadu highlighted the **Dravidian model's commitment to inclusivity**, mentioning the state's welcome to sportspersons from Manipur, fostering a spirit of brotherhood.

- PM recognized Tamil Nadu's contribution to sports, citing tennis champions like the **Amritraj brothers**, **hockey captain Bhaskaran**, **chess players VishwanathanAnand** and **Praggnanandhaa**, and **Paralympic champion Mariyappan**.

- Union Sports Minister praised Tamil Nadu's achievements in sports, highlighting the phenomenal rise of 18-year-old chess player Praggnanandhaa.

National Girl Child Day

Every year on January 24th, National Girl Child Day (NGCD) is being celebrated nationwide.

About:

National Girl Child Day is observed annually on January 24th in India.

- The day aims to raise awareness about the challenges faced by girls in society and to promote their empowerment.

- National Girl Child Day was initiated by the Ministry of Women and Child Development and the Government of India.

- It was first celebrated in 2008 to address issues related to the girl child and promote gender equality.

- The primary objective is to create awareness about the importance of the girl child and highlight the discrimination and inequalities they face.

- It focuses on promoting education, health, and nutrition for girls and ensuring their overall well-being.

- National Girl Child Day aligns with the United Nations' Sustainable Development Goals, particularly Goal 5 (Gender Equality), emphasizing the importance of empowering women and girls.

Khanjar

The 11th edition of India-Kyrgyzstan Joint Special Forces Exercise KHANJAR has commenced at the Special Forces Training School in Bakloh, Himachal Pradesh.

About

- The exercise is scheduled to be conducted from 22nd January to 3rd February 2024.
- It is an annual event conducted alternatively in both the countries. The Indian Army contingent comprising 20 personnel is being represented by troops from The Parachute Regiment (Special Forces) and the Kyrgyzstan contingent comprising 20 personnel is represented by Scorpion Brigade.
- Aim of the exercise is to exchange experiences and best practices in Counter Terrorism and Special Forces Operations in Built-up Area and Mountainous Terrain under Chapter VII of United Nations Charter.
- The exercise will emphasise on developing Special Forces skills, advanced techniques of insertion and extraction.

Ex. Desert Knight

About:

- Countries: India, France, UAE
- Air forces exercise over Arabian Sea, against the backdrop of the rising global concerns over Houthi militants targeting several commercial vessels in the strategic waterways in the region.
- The Indian Air Force (IAF) component at the drills consisted of Su-30 MKI, MiG-29 and Jaguar fighter jets besides AWACS (airborne early warning and control aircraft, C-130-J transport plane and air-to-air refuelling aircraft.
- "The main focus of exercise 'Desert Knight' was on enhancing synergy and interoperability between the three air forces," the Indian Air Force said.
- The exercise took place in the Indian FIR (Flight Information Regions) and with IAF aircraft operated from several bases in India.
- The French participation included the Rafale fighter aircraft and a multi role tanker transport, the UAE Air Force fielded the F-16.
- The aircraft of the French and the UAE air forces operated from the Al Dhafra air base in the UAE.

SPECIES IN NEWS

Kumki Elephants

Odisha government seeks urgent deployment of kumki elephants from Tamil Nadu
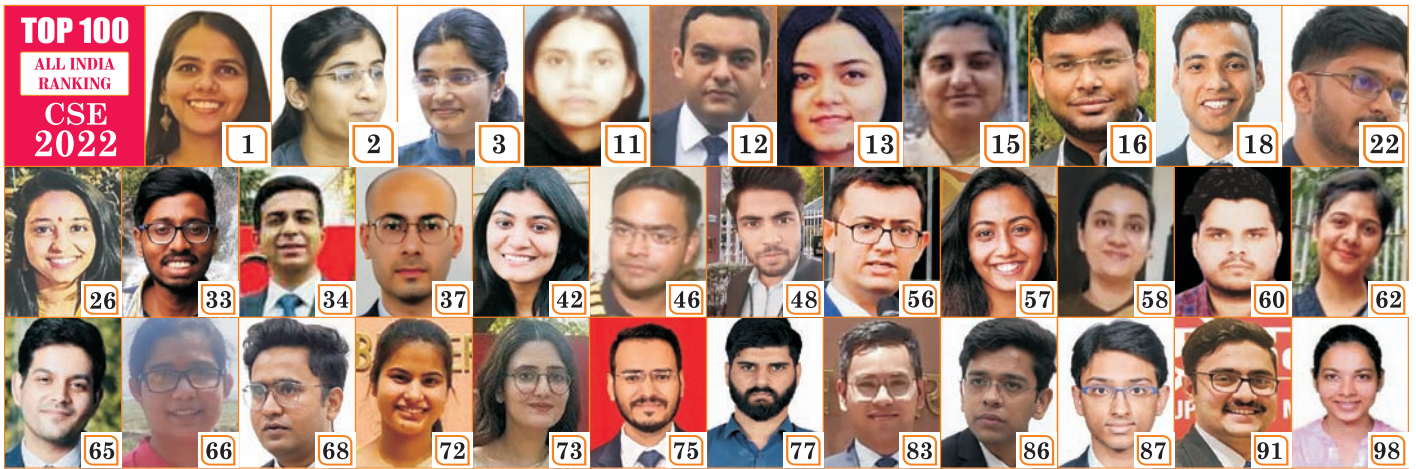
About:

Kumki elephants can be deployed strategically to help manage and drive wild elephants thereby reducing damage to crops, human habitations.

Kumki Elephants:

- Kumki elephants are **trained captive elephants** in India, play a crucial role in **wildlife conservation efforts.**
- Kumkis are used for **capturing, calming and herding wild elephants** or to lead wild elephants away in conflict situations.
- The **training process aims** at **preserving some of the wild dominant character** in them, so that they can control wild elephants by force if necessary.

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