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INTEGRATION OF NORTH-EASTERN STATES

SOURCE: **INDIAN EXPRESS**

TAG: GS Paper II- **Government Policies & Interventions**

GS Paper III- **Infrastructure Growth & Development, Inclusive Growth**

UPSC PYQs

Prelims

Q. Which Schedule of the Constitution of India contains special provisions for the administration and control of Scheduled Areas in several States? (2008)

(a) Third
(b) Fifth
(c) Seventh
(d) Ninth

Ans: (b)

Mains

Q. Analyze the multidimensional challenges posed by external state and non-state actors, to the internal security of India. Also discuss measures required to be taken to combat these threats. (2021)

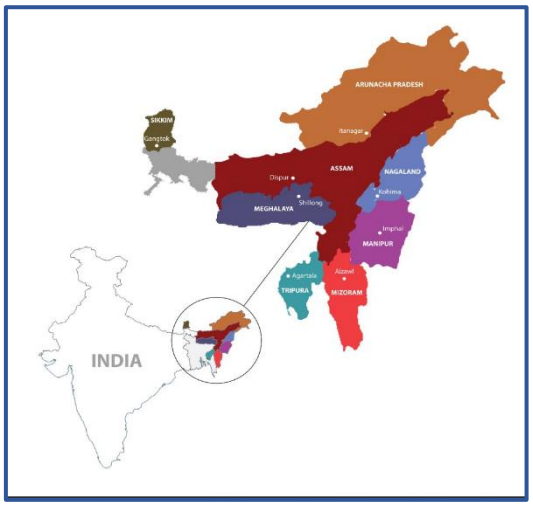
WHY IN NEWS?

- *The **historical evolution of Northeast India**, formally recognized and named through the **North-Eastern Areas (Reorganisation) Act and North-Eastern Council Act in 1971**, has gained attention.*
- *The legislation marked a **decisive shift from the colonial identity of Assam** to the establishment of Northeast India as a **distinct region.***
- *This transformation reflects a **complex interplay of colonial legacies**, **security concerns**, and **administrative decisions,** providing insights into the **region's unique identity** and challenges.*
- *Understanding the historical context becomes crucial as the term **'Northeast India' continues to shape regional discourse and national perspectives.***

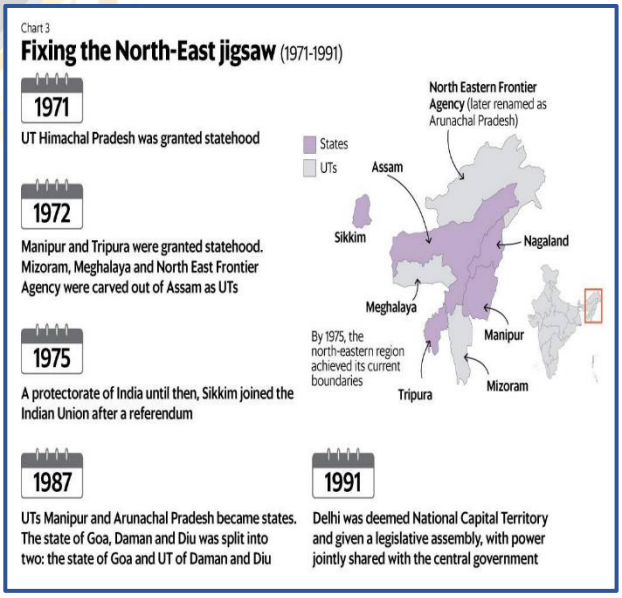
FORMATION OF NORTHEASTERN STATES IN INDIA:

- **About:**
  - The North Eastern states of India, ***including Arunachal Pradesh, Assam, Manipur, Meghalaya, Mizoram, Nagaland, Tripura, and Sikkim***, are collectively known as the **'eight sisters' or 'seven sisters and one brother.'**
  - This region, covering approximately **8% of India's total geographical area**, holds immense cultural and historical significance.
  - Rich in diversity, these states boast distinct **landscapes, communities, and ecological variations**, setting them apart from the rest of the country.

- **Assam:**
  - ***Colonial Recognition:***
    - ✓ Assam gained recognition as a **separate province in 1874** when the colonial headquarters shifted from Cherrapunji to Shillong.
  - ***British Annexations:***
    - ✓ **British annexations in the 19th century** incorporated **Upper Assam, Matak region, Khasi kingdoms, and Garo Hills into Assam.**
  - ***Formation of Assam:***
    - ✓ Assam, with hill and plain areas, was **officially formed in 1874** and served as the precursor for subsequent state creations.



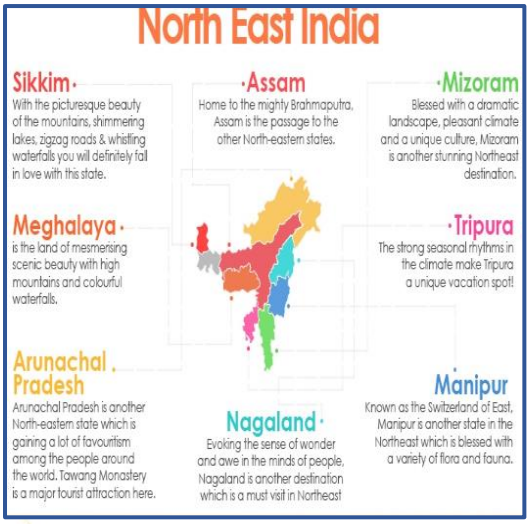
- **Nagaland, Meghalaya, Tripura, Manipur, and Mizoram:**
  - ***Nagaland Formation:***
    - ✓ Nagaland was **created in 1963**, separating from Assam, in response to the demand for **Naga-inhabited areas**.
  - ***Meghalaya's Hill Districts:***
    - ✓ **Meghalaya emerged in 1972,** combining **Khasi, Jaintia, and Garo hills of Assam**, addressing linguistic and constitutional concerns.
  - ***Manipur and Tripura Transition***:
    - ✓ Manipur and Tripura, **initially Union Territories in 1956**, achieved **statehood in 1972** after being **part of the Part C States (Laws) Act.**
  - ***Mizoram's Union Territory Status***:
    - ✓ Mizoram became a **Union Territory in 1972,** gaining **statehood in 1987** along with Arunachal Pradesh.
- **Arunachal Pradesh:**
  - ***Historical Evolution:***
    - ✓ Arunachal Pradesh traces its origins back to the **North-East Frontier Tract in 1914**, later designated as **North-East Frontier Agency (NEFA) in 1954**.
  - ***Union Territory to State:***
    - ✓ NEFA, administered by the Indian government, became a **Union Territory in 1972**, attaining **statehood on February 20, 1987.**



- **Sikkim:**
  - ***Sovereign Status:***
    - ✓ **Prior to 1975, Sikkim enjoyed sovereign status** as a protectorate under the **Indo-Sikkim Treaty of 1950.**
  - ***Referendum and Merger:***
    - ✓ Political upheaval in **1975 led to a referendum resulting** in the monarchy's abolition, and **Sikkim merged with India as the 22nd state.**

SIGNIFICANCE OF NORTHEASTERN STATES IN INDIA:

- **Historical Transformation:**
  - ***Post-Independence Governance:***
    - ✓ Northeast India underwent **significant administrative changes post-Independence** with the **enactment of the North-Eastern Areas (Reorganisation) Act and the North-Eastern Council Act on December 30, 1971.**

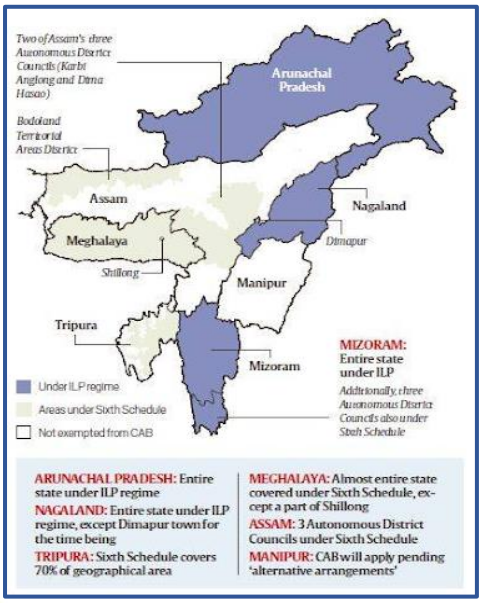


- **Geopolitical Importance:**
  - **Border Regions:**
    - ✓ Post-1947, the Northeastern sta**tes became crucial due to 98% of their borders being international,** sharing boundaries with **China, Myanmar, Bangladesh, and Bhutan**.
  - ***National Security & Economy:***
    - ✓ The geopolitical landscape, **especially after the 1962 India-China war,** heightened national security concerns.
    - ✓ The **region's strategic location** gained significance in the context of **external and domestic threats.**
    - ✓ The **region faced isolation due to its location and terrain**, impacting its development.
    - ✓ **Abundant forest resources, petroleum, and tea** are significant contributors to the economy.
- **Geography and Diversity:**
  - Surrounded by **hills, rivers, and falling within the eastern Himalayan ranges**, these states exhibit a mix of mountain ranges, plateaus, and valleys.
  - The region serves as a **gateway to East and Southeast Asia**, with abundant natural resources and diverse flora and fauna.
- **Cultural Tapestry:**
  - **Over 200 tribal groups**, speaking various Tibeto-Burman languages, contribute to the rich cultural tapestry of the region.
  - States like **Arunachal Pradesh, Meghalaya, Mizoram, and Nagaland are predominantly tribal**, while others like **Assam, Manipur, Tripura, and Sikkim have diverse religious denominations**.
- **State Highlights:**
  - **Arunachal Pradesh** is the **largest with ethnic** and **linguistic heterogeneity**.
  - **Assam,** known for its **scenic beauty** and **tea production, houses UNESCO World Heritage sites**.
  - **Manipur** has a **culturally rich history**, with contributions from women in social reforms and sports.
  - **Meghalaya**, the **'Scotland of the East,'** features a unique matrilineal system.
  - **Mizoram**, predominantly tribal, has achieved **peace and stability with economic development**.
  - **Nagaland,** a **tribal state with a brave Naga community**, played a crucial role in World War II.
  - **Tripura**, with **cultural linkages to Bengal**, has a predominantly **hilly terrain.**
  - **Sikkim**, accessible from the **plains of Bengal**, stands out for its Himalayan flora and fauna.

CHALLENGES IN INDIA'S NORTH EASTERN REGION (NER):

- **Geopolitical and Historical Struggles:**
  - ***Partition Fallout:***
    - ✓ The **aftermath of the 1947 partition** setback the NER, **hindering economic progress** and **isolating the region** from **traditional markets and sea routes**.

- ***Limited Connectivity:***
  - ✓ The **Siliguri corridor**, with a **mere 27-km width**, restricts connectivity, contributing to the region being perceived as a **'remote land.'**
- ***International Borders:***
  - ✓ **96% of the region's boundaries form international borders**, creating challenges for private investment and economic development.



❖ **Socio-Economic Disparities:**

- ***Backwardness:***
  - ✓ **Historical and geo-political factors** have led to the North East being labeled as **one of the most backward regions in India.**
- ***Isolation from Traditional Markets:***
  - ✓ The **closure of land and sea routes** has impeded commerce and **trade, cutting off access to traditional markets.**
- ***Dependence on Central Government:***
  - ✓ Overwhelming **dependence on the Central Government** for resources creates challenges in **local governance and autonomy**.

❖ **Environmental and Infrastructural Concerns:**

- ***Natural Resource Richness***:
  - ✓ **While rich in natural resources**, **poor infrastructure** and governance **hinder the effective utilization** of these resources.
- ***Floods and Erosion:***
  - ✓ **Inadequate control over floods and river bank erosion** causes substantial damage to properties and disrupts the lives of millions annually.

❖ **Ethnic and Cultural Dynamics:**

- ***Identity Quest:***
  - ✓ The **quest for ethnic and cultural identities** has contributed to a complex social landscape.
- ***Armed Insurgencies:***
  - ✓ Frustration from **seclusion, backwardness**, and governance issues has fueled armed insurgencies, posing internal security challenges.

❖ **Economic Productivity and Investment Climate**:

- ***Market Access:***
  - ✓ Limited market access, **combined with poor infrastructure and governance**, hampers economic productivity.
- ***Private Investment Hesitation:***
  - ✓ The **uneasy relationships with neighbouring countries** and the region's international borders deter private investment, affecting economic development.

GOVERNMENT INITIATIVES FOR THE DEVELOPMENT OF NORTHEAST INDIA:

❖ **Central Government's Objectives:**

- ***The government, set three core objectives for the North East Region:***
  - ✓ **Preserve and promote regional culture, languages**, and traditions across India.
  - ✓ Ensure lasting **peace by resolving disputes** and conflicts in the region.
  - ✓ Foster development, bringing the **North East on par with the rest of India**.

- **Peace Agreements:**
  - ***Bodo Accord (2020):***
    - ✓ **Resolved the five-decade-old Bodo issue in Assam**, leading to the surrender of 1615 cadres.
  - ***Bru-Reang Agreement (2020):***
    - ✓ **Settled the 23-year-old Bru-Reang refugee crisis**, relocating over 37,000 internally displaced people in Tripura.
  - ***NLFT Agreement (2019):***
    - ✓ Brought peace by **facilitating the surrender of 88 cadres with 44 weapons**.
  - ***Karbi Anglong Agreement (2021):***
    - ✓ Resolved long-running disputes in the **Karbi regions, with over 1000 armed cadres renouncing violence.**
  - ***Assam-Meghalaya Inter-State Boundary Agreement (2022):***
    - ✓ **Settled around 65% of border disputes** between Assam and Meghalaya.

- **Improvements in Security:**
  - As a result of these agreements, there has been a substantial reduction in the security situation:
  - **AFSPA reduced in Assam**, Manipur, Arunachal Pradesh, Nagaland, Tripura, and Meghalaya.
  - **Significant decrease in insurgency incidents and casualties**, with an 80% reduction in insurgency incidents from 2014 to 2020.
- **Economic Development**:
  - The government aims to make **Northeast India an economic hub through the Act East Policy**:
    - ✓ Total earmarked funds increased by **110%, from Rs 36,108 crore** in 2014-15 to **Rs 76,040 crore in 2022-23.**
    - ✓ Introduction of the **Prime Minister's Development Initiative for the North-East (PM-DevINE)** with an initial allocation of Rs 1,500 crore.
- **Act East Policy:**
  - Launched in 2014, the Act East Policy aims **to enhance economic cooperation, cultural ties, and strategic relationships with countries** in the Asia-Pacific region.
  - Facilitates **improved connectivity for the North East** with neighboring countries.
- **Transformation of the Northeast**:
  - Over the past eight years, the Union Government has **prioritized the North East's development**:
    - ✓ **Enhanced connectivity**, **improved infrastructure, and people's welfare** are integral to the core development agenda.
    - ✓ The Northeast is transitioning from the **margins to becoming one of the country's growth engines.**

Projects, Initiatives, and Schemes	*Objectives*
Ministry of Development of North Eastern Region (DoNER):	✓ **Establishment and Evolution:** The DoNER Department was established in 2001 and elevated to a full-fledged ministry in 2004.
Infrastructure Related Initiatives	✓ **Bharatmala Pariyojana (BMP):** Focus on road infrastructure development.

	✓ **RCS-UDAN:** Enhance regional air connectivity, making flying more affordable.
Connectivity Projects:	✓ **Kaladan Multi-Modal Transit Project (Myanmar):** Develop water connectivity for improved regional trade.
	✓ **BCIM Corridor:** Foster regional cooperation and economic development.
	✓ **India-Myanmar-Thailand Trilateral Highway:** Enhance road connectivity between India, Myanmar, and Thailand.
Tourism Promotion: Swadesh Darshan Scheme of the Ministry of Tourism	✓ **Swadesh Darshan Scheme:** Boost tourism in the North East, promoting economic growth.
North-East Industrial Development Scheme (NEIDS)	✓ **NEIDS:** Incentivize the MSME Sector for employment generation in the North East.
Vision Documents: North Eastern Region Vision 2020, Digital North East Vision 2022	✓ **North Eastern Region Vision 2020:** Framework for overall development, aligning with other Ministries' initiatives.
	✓ **Digital North East Vision 2022:** Leverage digital technologies for transformation and enhance the ease of living in the North East.

WAY FORWARD:

- **Strategic Implementation of Act East Policy:**
  - **Collaborate actively with State Governments** in the **North East to formulate and execute a comprehensive agenda** for Act East policy implementation.
  - **Leverage the geo-strategic location** and **natural resources of the region** to position it as a potential powerhouse for India's development.
- **Inclusive Awareness and Infrastructure Development:**
  - Foster inclusivity through **awareness campaigns to transform the region's perception** from neglected to a soft power.
  - Establish a **dedicated unit for research on physical infrastructure viability**, address the lack of higher educational infrastructure, and promote digital connectivity.
- **Land Record Management and Sports Empowerment:**
  - Strengthen the **system for maintaining formal land records to facilitate loans and reduce land-related disputes.**
  - Recognize the North East as a **growing sports powerhouse and invest in sports infrastructure** and programs to nurture talent and inspire youth.

CONCLUSION:

*The directional term "**Northeast" highlights a hierarchical relation** between the **region and the Indian heartland**. Northeasterners often **face misrecognition, racial stereotypes**, and a sense of othering**, emphasizing the need for inclusive identity recognition within the broader Indian context.***

ISRO LAUNCHES XPOSAT: WHAT IS THE MISSION AND ITS SIGNIFICANCE?

SOURCE: **INDIAN EXPRESS**

TAG: GS Paper III- **Space Technology**

UPSC PYQs

Prelims

Q. Consider the following statements: (2016)
The Mangalyaan launched by ISRO
1.is also called the Mars Orbiter Mission
2.made India the second country to have a spacecraft orbit the Mars after USA
3.made India the only country to be successful in making its spacecraft orbit the Mars in its very first attempt
Which of the statements given above is/are correct?
(a) 1 only
(b) 2 and 3 only
(c) 1 and 3 only
(d) 1, 2 and 3

Ans: (c)

Mains

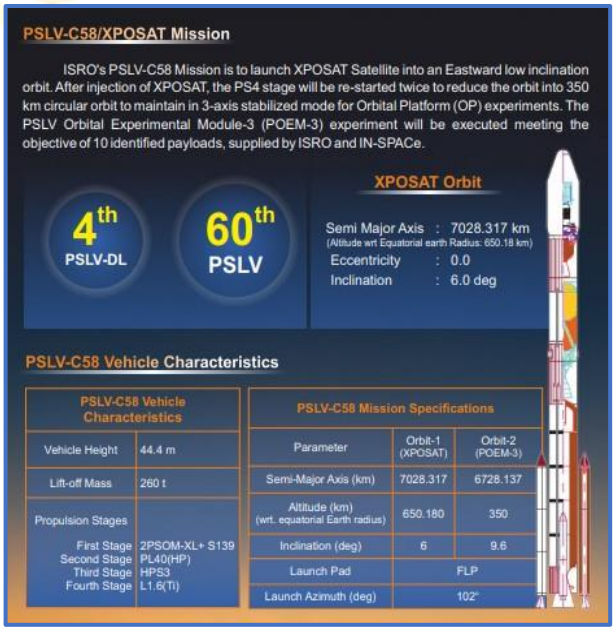
Q. What is India's plan to have its own space station and how will it benefit our space programme? (2019)

WHY IN NEWS?

- *The **Indian Space Research Organisation (ISRO)** commenced the **New Year by launching the PSLV-C58 X-ray Polarimeter Satellite (XPoSat)** mission on January 1.*
- ***PSLV's 60th mission took off from the Satish Dhawan Space Centre**, placing **XPoSat into a low inclination orbit.***

XPOSAT: ADVANCING X-RAY POLARIMETRY STUDIES:

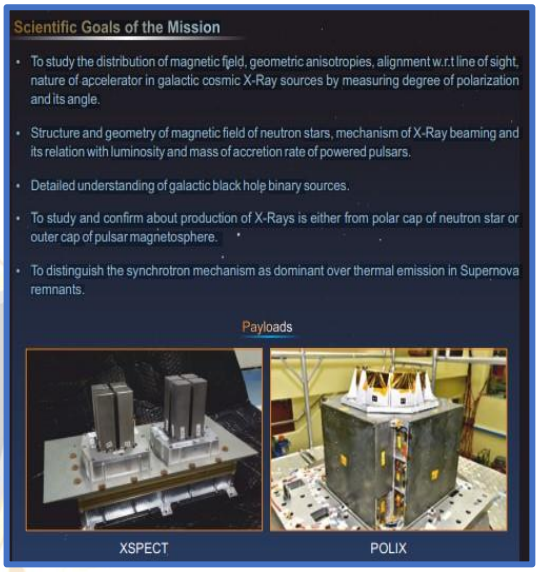
- **Introduction:**
  - XPoSat, the **X-ray Polarimeter Satellite**, marks a significant leap for ISRO as its inaugural scientific satellite dedicated **to polarisation measurements of X-ray emissions** from celestial sources.
- **Satellite Configuration:**
  - Derived from **the IMS-2 bus platform**, XPoSat's mainframe systems draw on the **heritage of IRS satellites.**
  - **Anticipated mission life of ~5 years.**
  - ***Carries two pivotal payloads***:
    - ✓ **POLIX (Polarimeter Instrument in X-rays)** developed by Raman Research Institute and **XSPECT (X-ray Spectroscopy and Timing)** by Space Astronomy Group of URSC.



- **Scientific Objectives:**
  - ***POLIX Payload:***
    - ✓ **Measure X-ray polarisation (8-30keV)** from about **50 cosmic sources using Thomson Scattering.**
    - ✓ Study magnetic **field distribution, geometric anisotropies**, and alignment with respect to the line of sight.
    - ✓ Investigate the **nature of accelerators in galactic cosmic X-ray sources**.
- **XSPECT Payload:**
  - **Conduct long-term spectral and temporal studies** of cosmic X-ray sources (0.8-15keV).
  - Examine the **structure and geometry of the magnetic field** in **neutron stars.**

SCIENTIFIC GOALS:

- **Magnetic Field Distribution:**
  - Gain insights into the **distribution of magnetic fields in galactic cosmic X-ray sources**.
  - Understand **geometric anisotropies and alignment concerning** the line of sight.
- **Neutron Stars:**
  - **Explore the structure and geometry** of magnetic fields in neutron stars.
  - **Investigate the mechanism of X-ray beaming** and its relationship with luminosity and mass of accretion rate in powered pulsars.
- **Black Hole Binary Sources:**
  - Attain a detailed understanding of **galactic black hole binary sources**.
- **X-ray Emission Production:**
  - Investigate whether **X-rays are produced from the polar cap of a neutron star** or the outer cap of a pulsar magnetosphere.
- **Supernova Remnants:**
  - Distinguish the **dominant mechanism (synchrotron or thermal emission)** in **Supernova remnants**.



SIGNIFICANCE OF XPOSAT MISSION:

- **Pioneering X-Ray Polarimetry in India:**
  - **XPoSat marks India's debut in X-Ray polarimetry**, distinguishing it from previous **imaging and spectroscopy-centric space missions.**
  - Aims **to systematically explore the polarization of intense X-Ray sources**, providing new insights beyond conventional observations.
- **Observational Capabilities:**
  - **Positioned in Low Earth Orbit (~650 km altitude, ~6-degree inclination),** XPoSat carries two scientific payloads, POLIX and XSPECT.
  - Enables simultaneous **studies of temporal, spectral, and polarization features** of bright X-Ray sources.
- **International Collaboration**:

> ***X-Ray Polarization:***
> **X-rays, composed of electric and magnetic waves, exhibit constant motion in the form of sinusoidal waves. However, when these waves become polarized, they undergo a transformation, aligning in an organized manner with both waves vibrating in the same direction.**

- **XPoSat's energy range (8-30 keV)** complements **NASA's IXPE mission (2-8 keV)** in X-Ray polarimetry.
- Coordinated **observations with IXPE will provide a comprehensive view of polarimetric data** for bright X-Ray sources.

Payload	Purpose	Agency/Company
Radiation Shielding Experimental Module (RSEM)	Evaluation of Tantalum coating effectiveness	TakeMe2Space
Women Engineered Satellite (WESAT)	Comparison of Solar Irradiance and UV Index	LBS Institute of Technology for Women
BeliefSat0	Amateur radio satellite	K J Somaiya Institute of Technology
Green Impulse TrAnsmitter (GIT)	Green bipropellant CubeSat propulsion unit	Inspecity Space Labs Private Limited
Launching Expeditions for Aspiring Technologies Technology Demonstrator (LEAP TD)	Demonstration of subsystem of microsatellite	Dhruva Space Private Limited
RUDRA 0.3 HPGP	Green Monopropellant Thruster	Bellatrix Aerospace Private Limited
ARKA200	Heater less Hollow Cathode for Hall thrusters	Bellatrix Aerospace Private Limited
Dust Experiment (DEX)	Interplanetary dust count measurement	PRL, ISRO
Fuel cell Power System (FCPS)	Demonstration of fuel cell	VSSC, ISRO
Si based High Energy cell	Demonstration of Silicon based High Energy cells	VSSC, ISRO

❖ **Diagnostic Tool for Astrophysics:**
- X-Ray polarization serves as a **crucial diagnostic tool for examining the radiation mechanism** and geometry of celestial sources.
- **Insights into mass and spin of accreting black holes, accretion flow, outflow, and jets**, among other applications.

❖ **Challenges and Breakthroughs:**
- Complex emission mechanisms from diverse sources challenge astronomers.
- **XPoSat's introduction of polarimetry measurements** is expected to break theoretical model degeneracies and enhance comprehension.

❖ **Student Engagement and Scientific Pursuits:**
- ISRO emphasizes engaging **the student community in scientific pursuits using XPoSat data**.
- **Aims to build expertise in X-Ray polarimetry in India**, laying the foundation for future advancements.

❖ **Global Impact:**
- **XPoSat anticipated to bring substantial benefits** to the global Astronomy community.
- **Contributions expected in timing, spectroscopy, and polarimetry-based observations**, especially on black holes, **neutron stars, and active galactic nuclei**.

WAY FORWARD & CHALLENGES:

❖ **Future Launch Plans:**
- Anticipation for more **launches in 2024**, with a **focus on Gaganyaan, India's human spaceflight program.**
- Expected launches **include two test flights of the Test Vehicle** and an **unmanned mission** for Gaganyaan.

❖ **Diverse Launch Vehicles:**
- Plans for PSLV, GSLV, and SSLV launches throughout the year.
- ISRO continues a streak of successes, contributing to **India's space achievements.**

❖ **PSLV Orbital Experimental Module (POEM) Platform:**
- The **fourth stage of PSLV, after XPoSat deployment**, will be used for experiments.
- Technologies tested include a **fuel cell power system**, a precursor for future space station power systems.

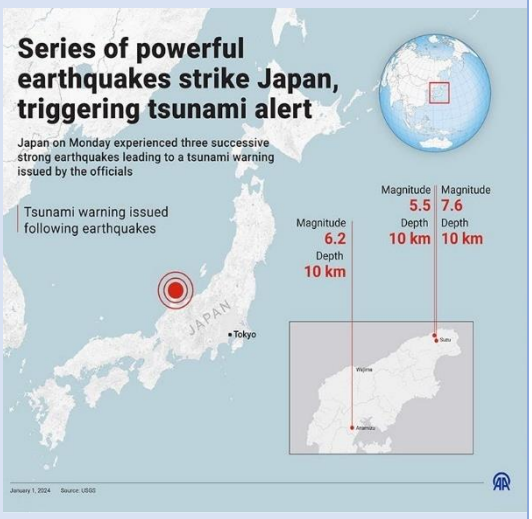
❖ **Responsible Space Practices:**
- ISRO's decision **to bring down the fourth stage to a lower orbit** reflects responsible space practices.
- Ensures a **reduced life in orbit to minimize debris creation**.

- **Space Station Plans and POEM Experiments:**
  - India **aims to set up a space station by 2035.**
  - POEM experiments, including **Women Engineered Satellite (WESAT**), contribute to technology testing for future missions.
- **XPoSat's Significance in Space Observatories:**
  - **XPoSat joins Aditya-L1 and AstroSat** as India's third space-based observatory.
  - Studying X-ray polarization adds a crucial method for understanding celestial processes.

CONCLUSION:

*In summary, **ISRO celebrates a successful start to 2024 with the XPoSat mission**, highlighting achievements, **future plans**, and contributions to **space technology advancement**. The responsible approach to space practices and the **strategic use of platforms like POEM indicate a forward-looking agenda for India's space exploration**.*

PRELIMS POINTERS:

TOPIC	DISCRIPTION
JAPAN EARTHQUAKE TRIGGERS TSUNAMI WARNING	**WHY IN NEWS?** ❖ ***A 7.6-magnitude earthquake*** *hit Japan's north-central region on* ***January 1, 2024.*** ❖ ***Tsunami waves struck coastal areas****, prompting urgent evacuation warnings.* ❖ ***Warning of potential powerful quakes*** *and* ***subsequent tsunamis*** *emphasized the seriousness of the situation.* ❖ *Recall of the* ***devastating 2011 earthquake and tsunami in Japan****, causing significant casualties and* ***the Fukushima nuclear disaster****.*  **UNDERSTANDING TSUNAMIS**: ❖ **Definition of Tsunami:** ☛ A **"tsunami" is a series of massive ocean waves** triggered by **underwater earthquakes** or volcanic eruptions. ❖ **Earthquake Impact:** ☛ When an **earthquake occurs beneath the ocean**, significant movement in the **ocean floor displaces** a substantial volume of water, initiating tsunami formation. ❖ **Volcanic Eruptions and Tsunamis:** ☛ Similarly, volcanic eruptions in the **ocean can displace water**, generating **large waves with destructive potential**. ❖ **NASA's Explanation:** ☛ NASA describes that ma**jor tsunamis typically originate in deep ocean areas,** where substantial water displacement begins. ☛ As tsunamis approach **shallower coastal regions**, their height intensifies. ❖ **Tsunami Characteristics**: ☛ Tsunami waves can **reach towering heights of hundreds of feet**. ☛ They exhibit **high speeds, comparable to jet planes**, especially in deep waters, gradually slowing near coastal areas. ❖ **Factors Influencing Tsunami Formation**: ☛ Not all earthquakes or volcanic activities result in tsunamis. ☛ The **ocean floor's topography, earthquake characteristics**, and their distance and direction play pivotal roles in tsunami creation. **JAPAN'S VULNERABILITY** ☛ **Japan's susceptibility to earthquakes and tsunamis** is due to its location along the ***'Pacific Ring of Fire.'*** ☛ This region witnesses intense **seismic and volcanic activity**, with tectonic plates constantly interacting.

- **The Pacific Ring of Fire:**
  - Described as an expansive **horseshoe-shaped zone** around the Pacific Ocean, it marks a **hotspot for earthquakes and volcanic eruptions** globally.
  - **Tectonic plates, including the Pacific, Eurasian, and Indo-Australian Plates,** converge here, leading to geological activities.
- **2011 Tragedy in Japan:**
  - The **devastating 9.0 magnitude earthquake in 2011** triggered a tsunami, causing widespread destruction.
  - **Approximately 18,000 lives were lost**, and tens of thousands were displaced.
  - **The Fukushima nuclear disaster** ensued due to the tsunami's impact.

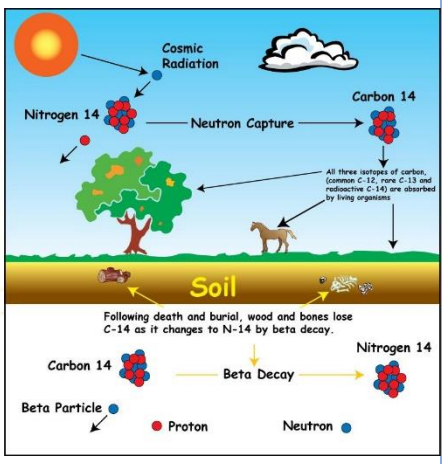
RADIOCARBON DATING

WHY IN NEWS?

- *Radiocarbon dating has resurfaced in headlines due to **its enduring impact on scientific exploration**, particularly in **archaeology, geology, and historical research.***

UNDERSTANDING OF RADIOCARBON DATING

- **About:**
  - Radiocarbon dating is a **method used to determine the age of objects**, particularly in the **realms of archaeology and history**.
- **Introduction to 'Dating':**
  - Dating is a technique to **figure out how old something is.**
- **Radiocarbon Dating Defined**:
  - Radiocarbon dating is a **specific method relying on an isotope** called **carbon-14.**



- **Carbon-14 Formation:**
  - **Cosmic rays from outer space** interact with gases in the Earth's atmosphere, creating carbon-14.
- **Cosmic Ray Interaction:**
  - **Neutrons released during this cosmic ray** interaction convert nitrogen-14 into carbon-14.
- **Continuous Creation:**
  - **Cosmic rays are constantly at work**, ensuring a continuous production of carbon-14 in the Earth's atmosphere.
- **Carbon-14's journey**
  - **Carbon-14 combines with atmospheric oxygen** to become radioactive carbon dioxide.
  - This compound **enters plants, animals**, and the overall biomass through the carbon cycle.

DECODING RADIOCARBON DATING

- **Radioactive Decay:**
  - When organisms die, they **no longer exchange carbon**, and **carbon-14 undergoes radioactive decay.**
- **Decay Prediction:**
  - The decay rate helps **predict the time elapsed since death**.
- **Testing Validity:**
  - In the late 1940s, **Willard Libby and James Arnold** tested the method on known-**age objects, validating its accuracy**.
- **Carbon-14 Half-Life:**
  - **Carbon-14 has a half-life of around 5,730 years**, making it effective for dating samples up to **about 60 millennia old**.
- **Tools of the Past:**
  - **Libby's era utilized Geiger counters**, measuring radioactive decay through electric discharges.
- **Advancements in Technique:**
  - Modern radiocarbon dating employs **Accelerator Mass Spectrometry (AMS**) for precision.
  - **AMS isolates carbon-14 through advanced mass** spectrometry techniques.
- **Particle Accelerators:**
  - Particle accelerators, a key **component of AMS**, enhance the separation of isotopes, allowing accurate dating.
  - This technology requires **specialized training and substantial investment.**
- **Wider Applications:**
  - AMS has expanded dating capabilities to geology, measuring isotopes **like strontium-87 in rocks.**

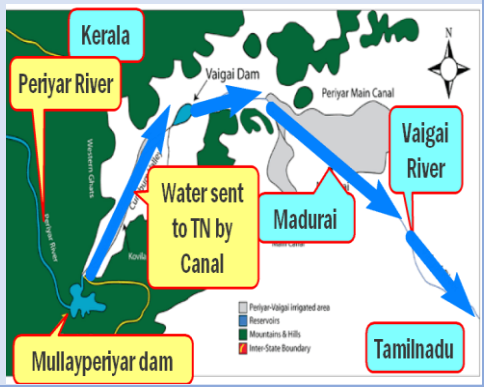
MULLAPERIYAR DAM

WHY IN NEWS?

- *Kerala is set to renew its campaign for a **new dam at Mullaperiyar**, supported by a revised **Detailed Project Report (DPR)** complying **with Central Water Commission (CWC) guidelines**, expected to be ready by March.*

BACKGROUND:

- Kerala and Tamil Nadu have been e**ngaged in a prolonged legal battle over the stability of the existing 126-year-old Mullaperiyar Dam**.
- Concerns about the s**tructural safety of the old dam prompted Kerala to advocate for a new dam**, leading to intense agitations.



MULLAPERIYAR DAM:

- **Location & Features:**
  - Situated at the confluence **of Mullayar and Periyar rivers** in Kerala's Idukki district.
  - **123-year-old dam.**

- *Stands 53.66 meters in height* and spans **365.85 meters in length**.
- **Operated and maintained by Tamil Nadu** to fulfill drinking water and irrigation needs of its southern districts.
- **Governed by a 999-year lease agreement** from the British era, granting operational rights to Tamil Nadu.
- Diverts water from the **west-flowing Periyar River** eastward to **Tamil Nadu's arid rain shadow regions**

❖ **Dam Features:**

- ***Proposed dam specifications***: **full reservoir level at 152 ft (same as existing dam)**, maximum water **level at 155 ft,** capacity of **450 million cubic meters.**
- The dam, **earthquake-resistant**, is designed to have a **lifespan of 100 years.**
- **Seismic studies conducted by the Indian Institute of Technology, Roorkee**, contribute to the dam's design.

LEMONGRASS

WHY IN NEWS?

❖ ***Tribal communities in Odisha face difficulties*** *in sustaining themselves through* ***rain-fed agriculture*** *and* ***limited natural resources****.*

❖ ***High-value aromatic crops and floriculture*** *emerge as a promising means for* ***tribal livelihood enhancement****.*

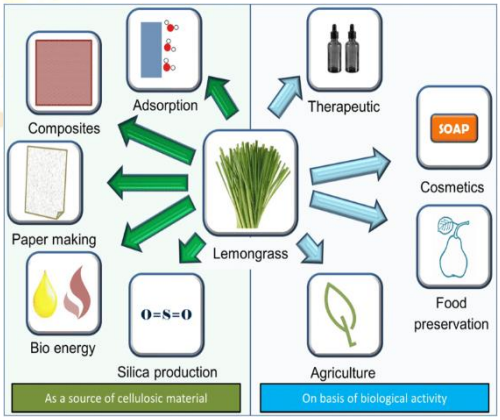
INTRODUCTION TO LEMON GRASS

❖ **Botanical Details:**

- **Lemon grass (Cymbopogan flexuosus**) is a **native aromatic tall sedge** belonging to the **Poaceae family**, primarily found in **tropical and sub-tropical regions of South East Asia and Africa.**

❖ **Geographical Cultivation**:

- Cultivated in **India along the Western Ghats (Maharashtra, Kerala**), **Karnataka, Tamil Nadu**, as well as in the **foot-hills of Arunachal Pradesh and Sikkim.**
- Introduced in India a century ago and now **commercially grown in these states.**
- Annual production **ranges between 300-350 tons.**



❖ **Objective:**

- To present a **bankable one-acre model for the high-quality commercial cultivation** of lemon grass.

LEMONGRASS FARMING IN NABARANGPUR

❖ **Experimental Lemongrass Plantation:**

- **CIMAP initiated** an experimental lemongrass **plantation in Nabarangpur, covering 300 acres.**

- **Success Stories:**
  - **Lemongrass, mentha, vetiver, and citronella cultivation** gains popularity, with notable success stories like **Techchand Naik leaving a bank job for lemongrass farming.**
- **CSIR-Aroma Mission Impact:**
  - **CSIR-Aroma Mission reaches 26 out of 30 districts in Odisha**, covering 46 clusters, **planting 850 hectares with aromatic crops**, installing 22 distillation units, and **producing 25 to 30 tonnes of aromatic oil.**
- **Future Prospects:**
  - Introduction of aromatic plants **lays the foundation for exploring livelihood opportunities in floriculture**, further diversifying income sources for farmers.
- **Uses:**
  - Lemongrass is used for treating **digestive tract spasms, stomachache, high blood pressure, convulsions, pain, vomiting, cough, achy joints (rheumatism), fever, the common cold**, and exhaustion.
  - It is also used to **kill germs and as a mild astringent**.

PSYCHOANALYSIS

WHY IN NEWS?

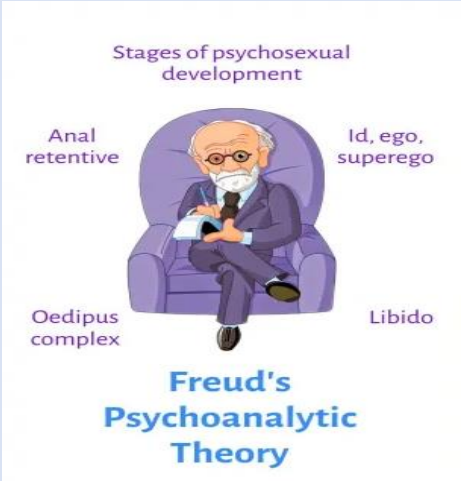
- ***Six individuals** accused in the **Parliament breach incident underwent psychoanalysis** at a government institute in the city to determine their motives.*

ABOUT PSYCHOANALYSIS

- ***Psychoanalysis**, often associated with* mental health*, is misunderstood.*
- *It's **not just a therapeutic tool but a worldview**.*

ORIGINS OF PSYCHOANALYSIS

- **Freud's Contribution:**
  - Viennese psychiatrist Sigmund Freud coined the term and developed psychoanalysis as a **treatment for symptoms resistant to other forms of therapy.**
- **Transformation Over Time:**
  - Classical psychoanalysis has evolved, **becoming less authoritarian and more practical**, influenced by developments in various fields.



UNCONSCIOUS AND PSYCHIC AGENCIES

- **Unconscious Concept:**
  - Central to psychoanalytic theory, the **unconscious involves memories and instincts cut off from consciousness** due to threatening nature.
- **Freud's Model:**

- **Freud's id, ego, and superego model** distinguishes between **instinctual, rational, and internalized social values**.
- Contemporary views **consider multiple self-states**.

PSYCHOANALYSIS IN PRACTICE:

- **Dream Interpretation:**
  - Freud often **interpreted dreams**, considering them **wish fulfilment**. Contemporary psychiatrists may **disagree on the centrality of dream analysis.**
- **Making the Unconscious Conscious:**
  - Freud believed **making the unconscious conscious drives change**. Psychoanalysis challenges **self-deception and limited choices**.
- **Therapeutic Relationship:**
  - The therapeutic relationship acts as a **change mechanism by presenting new relational experiences** challenging maladaptive models.
- **Duration of Treatment:**
  - Traditional psychoanalysis **involves frequent sessions for years**.
  - **Longer-term intensive treatment** is seen as beneficial for fundamental changes.