DAILY CURRENT AFFAIRS 14-08-2024

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Japan's Megaquake Advisory

Syllabus: GS-1: Physical Geography - Earthquakes

Context:

- *Japan issues its first-ever 'megaquake advisory': What does it mean?*

Introduction to the Nankai Trough

- **Location:** *The Nankai Trough is an underwater subduction zone, approximately 900 km long, situated along Japan's southwest Pacific coast.*
- **Tectonic Activity:**
  - *The Nankai Trough is where the Eurasian Plate collides with the Philippine Sea Plate.*
  - *The Philippine Sea Plate is pushed under the Eurasian Plate, leading to tectonic stress accumulation.*
  - *This stress can result in a* **megaquake** *(an earthquake with a magnitude larger than 8).*

Historical Significance

- **Earthquake Frequency:**
  - *The Nankai Trough has historically produced large earthquakes roughly every 100 to 150 years.*
  - *These earthquakes often occur in pairs, with the second quake typically happening within two years of the first.*
  - *Example: The most recent twin earthquakes occurred in* **1944 and 1946**.

Recent Developments

- **Earthquake on August 8, 2024:**
  - *A magnitude-7.1 earthquake shook southern Japan.*
  - *The earthquake occurred on or near the Nankai Trough, raising concerns about potential future quakes.*
  - *Japan's Meteorological Agency issued its first-ever "***megaquake advisory***" following the tremor.*

Probability of a Future Megaquake

- **Risk Assessment:**

- *In January 2022, Japan's Earthquake Research Committee estimated a* **70% probability** *of a magnitude 8-9 megaquake occurring along the Nankai Trough within the next 30 years.*
- *Potentially affected areas include central Shizuoka (approximately 150 km south of Tokyo) to southwestern Miyazaki.*

Potential Impact

- **Tsunami Risk:**
  - *A megaquake along the Nankai Trough could generate tsunami waves up to* **98 feet** *high, impacting Japan's Pacific coasts within minutes.*
- **Economic and Human Impact:**
  - *A major earthquake in the Nankai Trough could affect an area covering about a third of Japan, home to half of the country's population.*
  - *The economic damage could reach up to* **$1.50 trillion**, *or more than a third of Japan's annual GDP.*

Challenges in Earthquake Prediction

- **Prediction Limitations:**
  - **Earthquake Prediction:** *Accurate earthquake prediction remains impossible due to the lack of identifiable precursory signals that indicate an imminent large quake.*
  - **Current Advisory:** *The advisory issued by Japan's Meteorological Agency is a warning rather than a prediction, urging residents to prepare for potential future events.*

Conclusion

The Nankai Trough represents a significant seismic threat to Japan, with the potential for devastating megaquakes. While predicting earthquakes remains beyond current scientific capabilities, the issuance of advisories highlights the importance of preparedness in mitigating the impact of such natural disasters.

Geographical Structures in the Indian Ocean

Syllabus: GS-1: Physical Geography

Context:

- *The recent naming of three underwater structures in the Indian Ocean—***Ashoka, Chandragupt, and Kalpataru***—highlights India's expanding influence in marine science and its dedication to ocean exploration. Here are some key points about these structures and their significance:*

Key Facts About the Underwater Structures:

Background and Significance:

- *The discoveries of these structures are part of the* **Indian Southern Ocean Research Programme,** *which began in 2004 with the National Centre for Polar and Ocean Research (NCPOR) overseeing the program.*
- *The* **program's objectives** *include studying bio-geochemistry, biodiversity, and hydrodynamics in the Indian Ocean.*

Total Structures Named:

- *Seven underwater structures have been named after Indian scientists or based on names proposed by India.*
- *This naming reflects India's growing presence in marine research.*

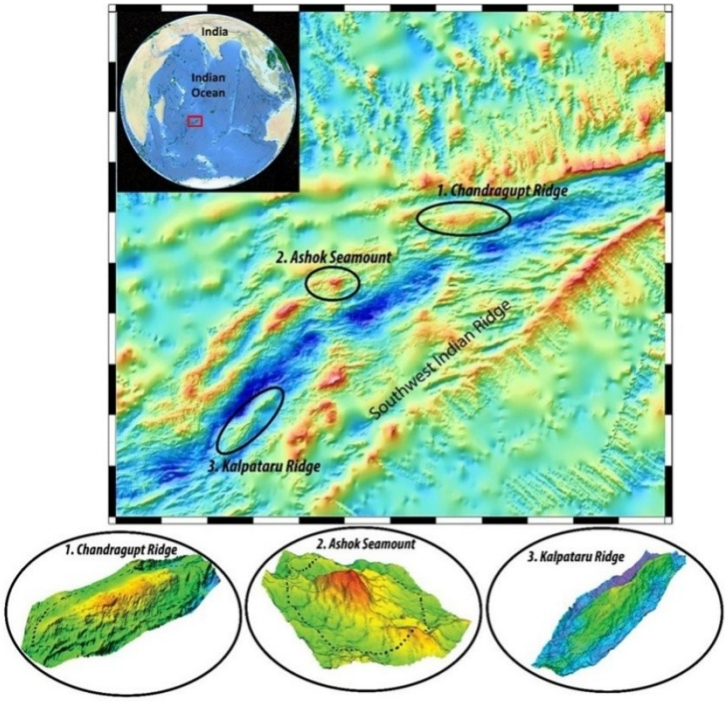
Previously Named Structures:

- **Raman Ridge***: Named after physicist Sir CV Raman in 1992. Discovered by a US oil vessel in 1951.*
- **Panikkar Seamount***: Named after oceanographer NK Panikkar in 1993. Discovered by the Indian research vessel Sagar Kanya in 1992.*
- **Sagar Kanya Seamount***: Named after the research vessel Sagar Kanya in 1991. This seamount was discovered during its successful 22nd cruise in 1986.*
- **DN Wadia Guyot***: Named after geologist DN Wadia in 1993. Discovered by Sagar Kanya in 1992.*

Recently Named Structures:

- **Ashoka Seamount***: Discovered in 2012, this seamount is an oval-shaped structure spanning approximately 180 sq km. Identified using the Russian vessel Akademik Nikolay Strakhov.*

- **Kalpataru Ridge**: *Also discovered in 2012, this ridge covers an area of 430 sq km and is considered important for marine biodiversity as it may provide habitat and food sources for various species.*
- **Chandragupt Ridge**: *Identified in 2020 by the Indian research vessel MGS Sagar, this ridge covers 675 sq km.*



Significance of the Naming:

- *The approval of these names by the* **International Hydrographic Organisation (IHO)** *and UNESCO's Intergovernmental Oceanographic Commission (IOC) underscores India's growing role in international marine science.*
- *The naming of these structures not only honors historical figures but also recognizes the* **contributions of Indian scientific effort***s in exploring and understanding the Indian Ocean.*

The Top Court as Custodian of Liberties

Syllabus: GS-2: Judiciary.

Context:

- **Former Delhi Deputy Chief Minister** *Manish Sisodia was granted bail by the Supreme Court of India after prolonged incarceration.*
- *The decision emphasizes the Supreme Court's role as the custodian of individual liberties.*

Key Highlights of the Judgment:

- **Reaffirmation of Liberty:** *The Court reiterated that liberty is a core component of constitutionalism and the rule of law.*
    - *Referenced the* **Arnab Manoranjan Goswami vs State of Maharashtra (2020)** *case, emphasizing the enduring nature of liberty.*
    - *Cited the principle from Justice V.R. Krishna Iyer (1977) that* **"bail is the rule and jail an exception"***.*
    - *The right to a fair and speedy trial is implicit in the* **right to life under Article 21** *of the Constitution.*

Previous Observations and Legal Precedents:

- **Supreme Court's October 30, 2023, Order** *(Manish Sisodia vs Central Bureau of Investigation):*
    - *The Court highlighted the potential for an inordinately delayed trial due to the extensive documentation (56,000 pages) and numerous witnesses (456).*
    - *Relied on judgments from* **Kashmira Singh (1977)** *to more recent cases such as* **P. Chidambaram (2020)** *and* **Satender Kumar Antil (2022)***.*
    - *The Court emphasized the constitutional mandate to prioritize the right to bail in cases of prolonged incarceration, referencing Section 439 CrPC and Section 45 of PMLA.*

Concerns Regarding Stringent Penal Laws:

- *The judgment addresses concerns about the* **weaponization of penal laws** *and the oppressive application of the* **Prevention of Money Laundering Act (PMLA)***.*
- **Data presented in Parliament***: Over 5,000 PMLA cases in the last 10 years, with only 40 resulting in convictions.*

- *Noted the low conviction rate and the burden of procedural delays on the accused.*

Judicial Criticism of Procedural Delays:

- *Acknowledgement of the* **oppressive nature of procedural delays** *within the criminal justice system.*
- *Referenced previous judicial observations, such as* **"the mortality of justice at the hands of law"** *(Sushil Kumar Sen, 1975; Rani Kusum, 2005).*

Caveats and Criticism:

- **Judicial Condemnation of Delays:** *Questions arise regarding the Court's earlier decision to extend Sisodia's detention based on the prosecutor's assurance of trial completion within 6-8 months.*
    - *Raises concerns about the* **prosecutor's influence** *on the judicial process, potentially conflicting with principles of natural justice.*

Guarantee of Civil Liberties:

- *The Supreme Court underscored that individual liberty should not be dependent on the fairness of the prosecutor but must be rooted in justice and inalienable rights.*
- *The judgment emphasized the Court's role in safeguarding* **civil liberties** *against executive excesses, crucial for maintaining a vibrant democracy.*

Conclusion:

- **Redemption of the Supreme Court:** *By eventually granting bail to Sisodia, the Court addressed previous concerns about ambivalence and reaffirmed its commitment to justice.*
- *The judgment highlights the need for undertrials to avoid languishing in custody and calls for a repurposing of politics towards justice and dignity for all.*

NIRF Rankings 2024

Syllabus: GS-2: Higher Education in India – Status.

Context:

- *Anna University is the number 1 state varsity in India: NIRF Rankings 2024*

New Criteria for NIRF Rankings

- **Introduction of New Categories***:*
  - *Open Universities*
  - *Skill Universities*
  - *State-Funded Government Universities*

Top State Government Universities

1. *Anna University, Chennai - 1st Place*
2. *Jadavpur University, Kolkata - 2nd Place*
3. *Savitribai Phule Pune University - 3rd Place*
4. *Calcutta University - 4th Place*

Changes in Evaluation Criteria

- **Faculty to Student Ratio***:*
  - **Medical Institutes***: Changed from 1:15 to 1:10*
  - **State Government Universities***: Increased from 1:15 to 1:20*

NIRF Ranking Parameters

1. *Teaching, Learning, and Resources*
2. *Research and Professional Practice*
3. *Graduation Outcomes*
4. *Outreach and Inclusivity*
5. *Perception*

Top Engineering Colleges

1. *Indian Institute of Technology Madras (IIT Madras) - 1st Place*
2. *Indian Institute of Technology Delhi (IIT Delhi) - 2nd Place*
3. *Indian Institute of Technology Bombay (IIT Bombay) - 3rd Place*
4. *Indian Institute of Technology Kanpur (IIT Kanpur) - 4th Place*
5. *Indian Institute of Technology Kharagpur (IIT Kharagpur) - 5th Place (up from 6th)*

NIRF Rankings Overview

Introduction:

- **NIRF (National Institutional Ranking Framework)***: An initiative by the Ministry of Education, Government of India, launched in 2015.*
- **Purpose***: To rank higher education institutions in India based on various parameters to promote competition and improve quality.*

Categories:

- **Overall***: Institutions across all disciplines.*
- **Universities***: Universities in India.*
- **Engineering***: Engineering colleges and institutes.*
- **Management***: Business schools and management institutes.*
- **Pharmacy***: Institutions specializing in pharmacy education.*
- **Medical***: Medical colleges and institutions.*
- **Law***: Law schools and colleges.*
- **Architecture***: Institutions offering architecture programs.*
- **Colleges***: Stand-alone colleges (both autonomous and affiliated).*

Ranking Parameters:

- **Teaching, Learning, and Resources (TLR)***: Quality of faculty, infrastructure, and learning resources.*
- **Research and Professional Practices (RP)***: Research output, quality of publications, patents, and consultancy.*
- **Graduation Outcomes (GO)***: Placement records, higher education, and employability of graduates.*
- **Outreach and Inclusivity (OI)***: Efforts to promote diversity, inclusion, and social responsibility.*
- **Perception (PR)***: Institutional reputation and perception among academic peers and employers.*

Process:

- **Data Submission***: Institutions submit data as per the NIRF guidelines.*

- **Assessment**: *Data is verified and assessed by a team of experts.*
- **Ranking**: *Institutions are ranked based on their performance in the above parameters.*

Importance:

- **Benchmarking**: *Helps institutions assess their performance and identify areas for improvement.*
- **Informed Choices**: *Assists students and parents in making informed decisions about higher education.*
- **Policy Making**: *Provides data for policymakers to support and enhance the higher education sector.*

Perfunctory panacea

Syllabus: GS-3; General Science

Context:

- *Recently, The Hindu published an editorial titled 'Perfunctory panacea: On the Rashtriya Vigyan Puraskar'.*

Rashtriya Vigyan Puraskar (RVP)

- **Introduction**: *The recent introduction of the Rashtriya Vigyan Puraskar (RVP) marks a pivotal shift in recognizing scientific excellence in India, replacing the long-standing Shanti Swarup Bhatnagar (SSB) awards.*
- **Objective**: *RVP aims to streamline and elevate the recognition of scientists across various career stages and disciplines.*
- **Concerns**: *Despite efforts to enhance scientific recognition, India's R&D ecosystem continues to face significant challenges, including inadequate funding, outdated infrastructure, and a less conducive environment for scientific inquiry.*

India's Major Recent R&D Achievements in Science and Technology

- **Biotechnology**:
  - *Developed indigenous vaccines like Covaxin during the Covid-19 pandemic.*
  - *Significant contribution to global vaccine supply through initiatives like Vaccine Maitri.*

- **Renewable Energy***:*
    - *Progress in solar and green hydrogen technologies; pioneered projects like the Kayamkulam Floating Solar Power Plant.*
    - *Aiming for net-zero emissions by 2070.*
- **Agriculture***:*
    - *Advances in agricultural biotechnology, including the development of high-yielding, climate-resilient crops by the Indian Council of Agricultural Research (ICAR).*
- **5G and 6G Technology***:*
    - *Developed indigenous 5G NSA Core by the Centre for Development of Telematics (C-DOT).*
    - *Nokia's 6G Lab established in Bangalore.*
- **Space Exploration***:*
    - *Successful Chandrayaan-3 mission, achieving a historic lunar landing.*
    - *Focus on future lunar exploration and resource utilization.*
- **Quantum Technology***:*
    - *Establishment of the I-Hub Quantum Technology Foundation at IISER Pune.*
    - *Initiatives under the National Quantum Mission.*
- **Supercomputing***:*
    - *Development of PARAM Siddhi-AI, one of the most powerful supercomputers in the world.*
    - *National Supercomputing Mission enhancing research capabilities.*
- **Genomics***:*
    - *GenomeIndia Project aims to sequence 10,000 Indian genomes.*
    - *Indian contribution to the SARS-CoV-2 genome sequencing through INSACOG.*
- **Nanotechnology***:*
    - *Development of novel nanomaterials like nano-coated magnesium alloy for biodegradable implants.*
    - *IFFCO Nano Urea (liquid), the world's first nanofertilizer.*
- **Robotics and Automation***:*

- *Innovations like India's first indigenously developed Polycentric Prosthetic Knee, "Kadam", by IIT Madras.*

Challenges Facing India's R&D Sector

- **Funding Famine***:*
  - *India's R&D investment is only 0.7% of GDP, much lower than the global average of 1.8%.*
  - *Private sector contribution to R&D is 37%, compared to over 65% globally.*
- **Brain Drain***:*
  - *High percentage of Indian STEM PhDs remain abroad post-graduation.*
  - *Lack of competitive salaries, research funding, and infrastructure in India contributes to this challenge.*
- **Bureaucratic Bottlenecks***:*
  - *Bureaucratic delays, including long procurement times for scientific equipment.*
- **Disconnected Curricula***:*
  - *Mismatch between academic curricula and industry needs.*
  - *Lack of early-stage research skills and innovation mindset development.*
- **Quantity Over Quality in Research***:*
  - *High research output but low citation impact, indicating concerns about research quality.*
- **Gender Gap in STEM***:*
  - *Women constitute only 35% of STEM students in higher education; fewer women in leadership positions.*
- **Intellectual Property (IP) Conundrum***:*
  - *Low patent output and grant rates compared to global standards.*
- **Interdisciplinary Divide***:*
  - *Limited collaboration across disciplines hinders innovation in emerging fields like AI, biotechnology, and nanotechnology.*

Measures to Enhance India's R&D Capabilities

- **Fund to Flourish***:*

- *Increase public R&D spending to 2% of GDP.*
- *Tax incentives for private R&D investment; establish a national research foundation and sovereign innovation fund.*

- **Brain Gain Initiative***:*
  - *Launch a "Reverse Brain Drain" program offering competitive salaries and research grants.*
  - *Implement "Flexi-Return" policy and establish a "Global Indian Scientist Network."*
- **Industry-Academia Bridge***:*
  - *Allocate 2% of CSR funds to joint research projects.*
  - *Establish "Innovation Clusters" and implement a "Researcher-in-Residence" program.*
- **Quality Quest***:*
  - *Introduce a national research integrity office and a tiered journal ranking system.*
  - *Mandatory research methodology courses for PhD students and a national mentorship program.*
- **STEM for All***:*
  - *Launch a "Women in STEM" scholarship program.*
  - *Gender-sensitive policies and research positions reserved for women.*
- **Innovation Incubators***:*
  - *Establish technology business incubators focused on deep-tech startups.*
  - *Create a national IP bank and launch "Innovation Challenge" series.*
- **Global Research Connect***:*
  - *Establish joint research centers with top global universities.*
  - *Launch "International Research Fellowship" and "Global Science Diplomacy" initiatives.*

- **Upgrading Research Infrastructure***:*
  - *Launch a "Research Infrastructure Modernization" program.*

- *Establish national research facilities and a national research cloud computing platform.*

- **Interdisciplinary Nexus***:*
  - *Establish Centers of Interdisciplinary Research Excellence and "Convergence Research" grant programs.*