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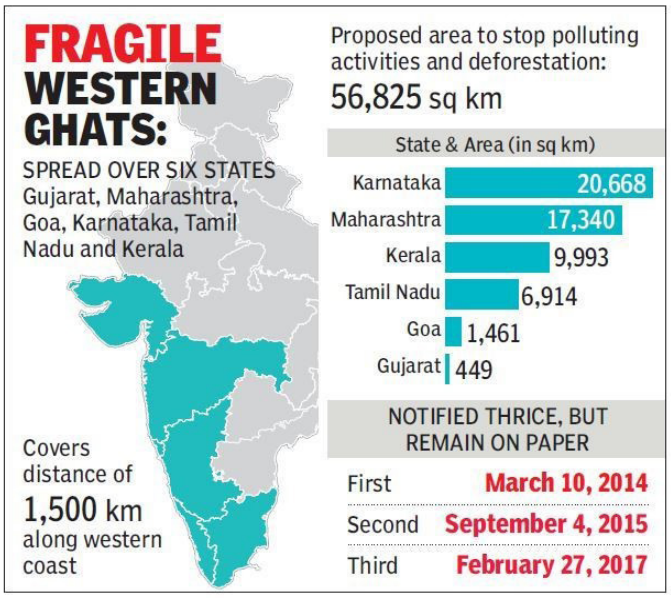
Ecologically Sensitive Areas (ESAs) in Kerala

Context: The Kerala government recently submitted a revised proposal to the Centre, requesting the designation of 8,590.69 sq km as Ecologically Sensitive Areas (ESAs).

- This revised proposal, smaller by 121 sq km than the initial submission in May 2024, includes 98 villages across 12 districts and 29 talukas in Kerala.
- The revisions are based on feedback from the Local Self Government Department to balance ecological protection with local needs.



Centre's ESA Notification:

- The Centre's July 2024 draft notification demarcates 56,825 sq km as ESA across the Western Ghats, spanning Gujarat, Maharashtra, Goa, Karnataka, Kerala, and Tamil Nadu.
- Activities such as mining, quarrying, and the establishment of highly polluting industries or thermal power plants are prohibited in these zones. A 60-day window was provided for states to submit objections and suggestions.

What Are ESAs?

- ESAs are regions designated under the Environment Protection Act, 1986, by the Ministry of Environment, Forest and Climate Change (MoEFCC) for their ecological importance. Typically, they are:
  - » Located within 10 km of protected areas like national parks and wildlife sanctuaries.
  - » Designed to act as "shock absorbers," minimizing ecological damage from development.
- The ESA boundaries often vary beyond 10 km to account for ecological corridors. These areas aim to reduce human impact, protect ecosystems, and serve as transition zones between highly protected and less-regulated areas.

The Western Ghats and ESA Designation

- The Western Ghats, a biodiversity hotspot, has been under scrutiny for ecological conservation.
  - » **WGEEP Report (2011):** Madhav Gadgil's panel highlighted the ecological sensitivity of the Western Ghats.
  - » **Kasturirangan Committee (2013):** Identified 59,940 s.q. km as ESA across six states, recommending restrictions on high-impact activities like mining.

Implications:

- Kerala's ESA proposal reflects efforts to protect its biodiversity while addressing community concerns. For the Western Ghats, ESA designation ensures habitat preservation, biodiversity protection, and mitigation of climate change effects. However, challenges include balancing conservation with development, addressing community needs, and enforcing ESA regulations effectively.
- Kerala's commitment to ESA highlights the critical role of sustainable governance in conserving ecological wealth while ensuring socio-economic equity.

Pennaiyar River Water Sharing Dispute

Context: Water disputes between Indian states are common, especially when rivers flow across multiple regions. The ongoing dispute between Tamil Nadu and Karnataka concerns the sharing of the Pennaiyar River water.

- The Supreme Court recently directed the Union government to submit the report of the Negotiation Committee formed to mediate the dispute.

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What is the Pennaiyar River?

- The Pennaiyar River (also known as Ponnaiyar) is a vital river in southern India, flowing primarily through Karnataka and Tamil Nadu.
- It originates from the Nandi Hills in Karnataka and flows southward into Tamil Nadu before draining into the Bay of Bengal.
- The river provides crucial water resources for agriculture, drinking, and irrigation, particularly in Tamil Nadu, where it supports the irrigation needs of districts like Chennai, Vellore, and Cuddalore.

The Legal Dispute:

- The dispute began in 2018, when Tamil Nadu filed a case before the Supreme Court, accusing Karnataka of constructing check dams and diversion structures on the river.
- Tamil Nadu claimed that these projects obstructed the flow of water to its own territories, particularly during drought periods.

Tamil Nadu's Argument:

- The state cited an 1892 agreement between the princely states of Mysore (now Karnataka) and Madras (now Tamil Nadu) regarding water sharing.
- Tamil Nadu argued that this agreement was still valid and binding on both states.

Karnataka's Argument:

- Karnataka contested the relevance of the 1892 agreement in modern times, asserting its right to construct diversion structures for its needs.

About Agreement of 1892:

- **Prior Consent:** The Mysore Government must obtain prior consent from the Madras Government before constructing any new irrigation reservoir or anicut.
- **Full Information:** The Mysore Government must provide full information regarding the proposed work to the Madras Government.
- **Protection of Prescriptive Rights:** The Madras Government can refuse consent only to protect prescriptive rights (existing water rights).
- **New Irrigation Works:** The agreement applies to new irrigation works across rivers, including reservoirs and anicuts.

Mediation Efforts and the Role of the Union Government

- To resolve the dispute, the Union government facilitated negotiations between Tamil Nadu and Karnataka.
- The Supreme Court directed the Union government in January 2024 to form a Negotiation Committee under Section 4 of the Inter-State River Water Disputes Act of 1956.
- The Negotiation Committee is tasked with finding a resolution to the dispute by mediating between the two states.
- The court has now given the Union government two weeks to submit the Negotiation Committee's report.

National Disaster Mitigation and Capacity Building Initiatives: A Step Toward a Resilient India

Context: A high-level committee, chaired by Union Home Minister Amit Shah, has approved a significant allocation of Rs. 1115.67 crore for disaster mitigation and capacity-building projects across various states. This funding aims to enhance preparedness and resilience in the face of disasters. Disaster related fund and projects are governed under disaster management act, 2005.

Projects which has approved:

- **National Landslide Risk Mitigation Project:**
  - » **Funding:** Rs. 1000 crore
  - » **Coverage:** This project will benefit 15 states, including Arunachal Pradesh, Assam, Himachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland,

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Sikkim, Tripura, Uttarakhand, Karnataka, Kerala, Maharashtra, Tamil Nadu, and West Bengal.
  - » **Purpose:** The aim of this project is to reduce the risk of landslides, especially in hilly and mountainous regions. Landslides are a significant hazard in these areas, often causing damage to infrastructure and loss of life. This project aims to reduce these risks and improve the resilience of these regions.
- **Training and Capacity Building of Civil Defense Volunteers:**
  - » **Funding:** Rs. 115.67 crore
  - » **Purpose:** This initiative is focused on enhancing disaster preparedness by providing specialized training to civil defense volunteers across all states and Union Territories (UTs). These trained volunteers will be equipped to effectively respond to disasters, save lives, and mitigate damage in their communities.

About Disaster Management Act, 2005

- The Disaster Management Act, 2005 (DM Act) provides India with a legal and institutional framework for disaster management. Key provisions include:
  - » **Disaster Management Authorities:** The creation of the National Disaster Management Authority (NDMA) and State Disaster Management Authorities (SDMAs) to formulate disaster policies and plans.
  - » **National Disaster Response Force (NDRF):** A specialized force for immediate disaster response, including search and rescue and medical aid.
  - » **Disaster Mitigation Plans:** Mandates disaster prevention, mitigation, and recovery plans at national, state, and district levels.
  - » **Disaster Management Funds:** Establishes the National Disaster Response Fund (NDRF) and National Disaster Mitigation Fund (NDMF) for disaster relief and mitigation projects.
  - » **Capacity Building:** Focuses on training government officials, communities, and civil defense volunteers for disaster response.
  - » **Early Warning Systems:** Requires the development of systems to warn populations about impending natural disasters like floods and cyclones.

ISRO Gets Government Approval for Venus Mission "Shukrayaan"

Context: The Indian government has approved Shukrayaan, India's ambitious Venus Orbiter Mission (VOM), set for launch in March 2028. This landmark mission will mark India's entry into Venus exploration, targeting the study of the planet's extreme environmental conditions.

Mission Objectives:

- Shukrayaan aims to enhance our understanding of Venus, often called Earth's "sister planet," by focusing on three key objectives:
  - » **Investigating Venus' Atmosphere:** The mission will study the composition, temperature, and pressure of Venus' dense atmosphere, dominated by carbon dioxide and sulfuric acid clouds. This will provide insights into the planet's extreme greenhouse effect.
  - » **Exploring Venus' Surface:** Using advanced radar and imaging systems, the spacecraft will map Venus' topography, geological features, and mineral composition, overcoming challenges posed by thick cloud cover.
  - » **Analyzing Venus-Sun Interaction:** Shukrayaan will examine how solar winds interact with Venus' magnetic field and study the Sun's impact on the planet's ionosphere, contributing to a better understanding of Venus' magnetic environment.

Payloads and Technology:

- The spacecraft will carry 16 Indian-developed payloads

and three international ones. Key instruments include:

- **Venus Surface Emissivity and Atmospheric Mapper (VSEAM):** A hyperspectral spectrometer for surface and atmospheric mapping.
- **Venus Ionospheric and Solar Wind particle AnalySer (VISWAS):** A plasma analyzer studying the ionosphere and solar wind interaction.
- **Venus InfraRed Atmospheric gases Linker (VIRAL)**: A spectrometer analyzing atmospheric composition and temperature.

Launch and Budget:

- The Shukrayaan mission is slated for launch aboard the LVM-3 (GSLV Mk III) launch vehicle, India's most powerful rocket. The spacecraft will be placed in orbit around Venus, where it will conduct a range of scientific experiments over the course of its mission.
- The estimated cost of the mission is approximately ₹1236 crores, reflecting the scale and complexity of the project. The mission's approval is a testament to the growing capabilities of the Indian Space Research Organisation (ISRO) and its determination to contribute to global space science.

Other ISRO Ambitions:

- **Chandrayaan 4:**
  - Follow-up to Chandrayaan 3.
  - Collaboration with Japan.
  - Aims to land on the Moon's south pole, exploring water ice.
  - Features a 350 kg rover, 12 times larger than the previous one.
- **Gaganyaan Mission:**
  - India's first manned mission to space, with an initial unmanned flight.
  - Expected launch in two years, paving the way for Indian astronauts in space.
- **India's Space Station:**
  - First module to launch in 2028.
  - Smaller than the ISS, with five modules.
  - Fully operational by 2035.

Power Packed News

Surface Hydrokinetic Turbine Technology

The Central Electricity Authority (CEA) has recognized Surface Hydrokinetic Turbine (SHKT) technology as an innovative and cost-effective solution for renewable energy generation.

About Surface Hydrokinetic Turbine Technology:

- Surface Hydrokinetic Turbine Technology generates electricity using the kinetic energy of flowing water without requiring dams or barrages, offers power at 2-3 per unit.
- SHKT technology is particularly valuable for areas with limited grid access, offering base-load, round-the-clock renewable energy.
- Its ability to integrate with existing water infrastructure, such as canals and hydropower tailrace channels, positions it as a scalable solution for enhancing India's renewable energy capacity to gigawatt levels.
- Economically, SHKT presents low installation costs, making it attractive for renewable energy buyers and generators. Environmentally, it minimizes ecological disruption by eliminating the need for large-scale civil infrastructure.
- It aligns with India's goals for net-zero emissions by providing a sustainable alternative to conventional hydropower.

Army Receives Sabal-20 Drones

- The Indian Army has received Sabal-20 logistics drones from EndureAir Systems, designed for deployment in the eastern sector. These electric unmanned helicopters, developed by EndureAir—incubated at the Indian Institute of Technology

(IIT-K), Kanpur—feature variable pitch technology and can carry payloads up to 20 kg.

- The drones are optimized for long-range deliveries and high-altitude operations, with advanced Vertical Take-Off and Landing (VTOL) technology, making them ideal for rugged terrains.
- Their low RPM design minimizes noise, ensuring enhanced stealth during sensitive missions. Deliveries began after a tender was issued in late 2023.

IIT-K Launches Anālakshya Metamaterial Surface Cloaking System (MSCS)

- IIT-Kanpur has unveiled the An lakshya Metamaterial Surface Cloaking System (MSCS), a significant breakthrough in stealth technology.
- Developed by Professors Anantha Ramakrishna, Kumar Vaibhav Srivastava, and J. Ramkumar, this cutting-edge system offers near-perfect wave absorption across a broad spectrum, significantly enhancing radar invisibility.
- The technology improves SAR imaging resistance and provides effective protection against radar-guided missiles.

About Analakshya MSCS:

- The Anlakshya MSCS is a textile-based broadband metamaterial microwave absorber, designed to boost stealth capabilities, making it a critical advancement for defense.
- By countering radar detection methods, particularly Synthetic Aperture Radar (SAR), it offers substantial improvements in the radar invisibility of military assets, marking a major leap forward in defense technology.

India Rises to 49th Position in Network Readiness Index 2024

- India has climbed 11 ranks to secure the 49th position in the Network Readiness Index (NRI) 2024, up from 60th in 2023.
- The NRI evaluates 133 economies across four pillars: Technology, People, Governance, and Impact. It has been published by the Portulans Institute, an independent non-profit research and educational institute based in Washington DC.

- India ranks 1st in AI scientific publications, AI talent concentration, and ICT services exports. It also holds 2nd place in FTTH/Building Internet subscriptions and mobile broadband internet traffic. Additionally, India is 3rd in domestic market scale and 4th in annual investment in telecom services.
- The Digital India initiative has been instrumental in expanding broadband access, boosting tele density from 75.2% to 84.69%, and increasing internet subscribers from 25.1 crore to 94.4 crore.
- India also improved its global mobile broadband speed ranking from 118th to 15th after launching 5G services in 2022.
- Looking ahead, India's Bharat 6G Vision aims to make it a leader in future telecom technologies, reflecting its ongoing digital progress and innovation.