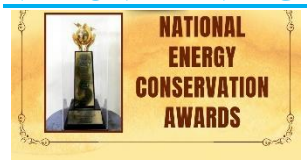
NATIONAL ENVIRONMENTAL ENGINEERING RESEARCH INSTITUTE (NEERI)

- It is a **research institute** created and **funded by the Government of India.**
- NEERI is a pioneer laboratory in the field of environmental science and engineering.
- The institute's primary mission is to conduct research and development activities related to various aspects of environmental management, pollution control, and sustainable development.
- **Formation:**
  - It was **established in Nagpur in 1958 as the Central Public Health Engineering Research Institute (CPHERI),** when environmental concerns were limited to human health with a focus on water supply/sewage disposal/communicable diseases, and to some extent, on industrial pollution and occupational diseases.
  - Slowly worldwide public awareness on the contamination of the environment on a regional to global scale started getting attention in the 1970's.
  - **In 1974, CPHERI was rechristened the** National Environmental Engineering Research Institute (**NEERI**).
- It is a **constituent laboratory of the Council of Scientific and Industrial Research (CSIR) under** the **Ministry of Science and Technology,** Government of India.
- It is devoted to **research and innovations in environmental science and engineering** besides solving a range of problems posed by industry, government, and the public.
- **Headquarters: Nagpur**
- NEERI has **five zonal laboratories** at **Chennai, Delhi, Hyderabad, Kolkata and Mumbai.**

NATIONAL ENERGY CONSERVATION AWARDS



- It is one of the most prestigious national platforms that **recognize excellence, innovation**, and leadership in **energy efficiency and conservation.**
- It was **instituted in 1991 by the Bureau of Energy Efficiency (BEE).**
- **Objective:** It is envisioned to honor the **exemplary contributions of industries**, buildings, transport undertakings, and institutions in **reducing energy consumption and enhancing energy efficiency**.
- **Purpose and Significance** -The Awards aim to **inspire industries, organizations**, and individuals to adopt **energy-efficient technologies** and practices.
- **Award Categories for NECA 2025:** Industries, Transport, Buildings, Institutions (State/SDA - Evaluation through State EE Index), Energy-Efficient Appliances, Energy Efficiency Innovation, **Content Creators and Influencers (New Category)**
    - The new category, **Digital Content Creators and Influencers**, recognises the growing influence of social media in shaping public behavior and spreading awareness about energy conservation. This new initiative aims to mobilize content creators as ambassadors of change, inspiring millions of citizens to adopt energy-conscious lifestyles.

What is the Bureau of Energy Efficiency (BEE)?

- It was set up on March 1, 2002 under provisions of **the Energy Conservation Act, 2001.**
- **Mission:** To assist in **developing policies and strategies** with a thrust on self-regulation and market principles, within overall framework of the Energy Conservation Act, 2001
- **Objective:** The primary objective of **reducing the energy intensity** of Indian economy.
- **Functions:** It coordinates with **designated consumers,** designated agencies and other organizations and recognises, identifies and utilises the existing resources and infrastructure, in performing the functions assigned to it under the Energy Conservation Act.

EXERCISE SAMUDRA SHAKTI

- It is a joint **bilateral maritime exercise** between **India and Indonesia.**
- It is a key bilateral engagement aimed at **enhancing interoperability**, strengthening mutual understanding, and sharing best practices between the two navies.
- It highlights the shared commitment of both nations towards **maintaining stability and peace** in the **Indo-Pacific region.**
- **India's participation:** The participating units include **INS Kavaratti**, an **Anti-Submarine Warfare Corvette** of the Eastern Fleet under the aegis of Eastern Naval Command (ENC).

It consists of two phases

- The harbour phase is aimed at building **camaraderie and professional rapport** that include Cross Deck Visits, Joint Yoga sessions, Friendly Sports fixtures, Professional Subject Matter Expert Exchanges (SMEE).
- **The Sea Phase** will involve dynamic and complex **maritime operations** aimed at increasing tactical coordination, including Helicopter Operations, **Air Defence Exercises**, Weapon Firing Drills, Visit, Board, **Search and Seizure (VBSS) exercises.**

Other Exercises with Indonesia:

- **Military Exercise:** Garuda Shakti
- **Maritime Exercise:** IND-INDO CORPAT.

SAIME INITIATIVE

- The **Sustainable Aquaculture in Mangrove Ecosystems** (SAIME) is a multi-stakeholder partnership (MSP) to strengthen transformative processes in shrimp trade as a basis for the **protection of mangrove ecosystems** in **West Bengal.**
- It is a **climate-adaptive and conservation-linked livelihood initiative** that integrates brackish water **shrimp-based aquaculture** with **mangrove restoration.**
- It is an **ecosystem-based, climate-adaptive**, and conservation-linked livelihood approach.
- **Implemented by:** It has been implemented in collaboration with **Global Nature Fund** (GNF) in consortium with **Nature Environment and Wildlife Society (NEWS),** Naturland, and **Bangladesh Environment & Development Society (BEDS).**

What are Mangroves?

- Mangroves are **salt-tolerant trees** and shrubs that grow in coastal intertidal zones, **primarily in tropical and subtropical regions.**
- **Characteristics of Mangroves**
    - **Salt Tolerance:** They possess specialised **root structures**, such as salt-filtering roots and salt-excreting leaves, to manage high salinity levels.
    - **Aerial Roots (Pneumatophores):** These roots help in respiration by obtaining oxygen from the air in waterlogged soils.
    - **Prop Roots:** Provide stability against tidal waves and storm surges.
    - **Vivipary (Seed Germination): Seeds germinate** while still attached to the parent tree to overcome the challenge of germination in saline water.
    - **Efficient Carbon Sequestration:** Mangroves are among the most carbon-rich ecosystems, playing a vital role in mitigating climate change.
    - **Ecological Significance:** Mangrove forests act as a **crucial buffer between land and sea**, providing habitat for various marine and terrestrial species.

MILITARY COMBAT PARACHUTE SYSTEM

- It is indigenously developed by the **Defence Research and Development Organisation (DRDO).**
- **Organizations involved:** It has been designed by DRDO's Aerial Delivery Research and Development Establishment, Agra, and Defence Bioengineering and Electromedical Laboratory, Bengaluru.

Features of Military Combat Parachute System:

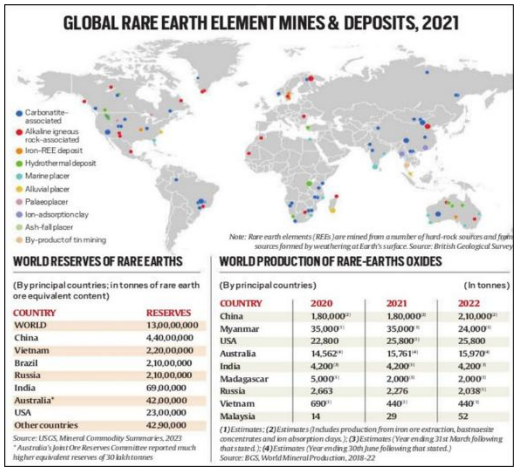
- It has successfully undergone a combat **freefall jump from an altitude of 32,000 feet.**
- It is the **only parachute system** currently in operational use by the Indian Armed Forces **capable of deployment above 25,000 feet.**
- It consists of several enhanced tactical features, including a **lower rate of descent** and superior steering capabilities.
- The system has **compatibility with Navigation with Indian Constellation** (NavIC),

Significance of Military Combat Parachute System

- It enables paratroopers to **safely exit aircraft, deploy parachutes** at predetermined altitudes, navigate accurately, and land at designated zones.
- It also provides the **freedom of use against any adversary of our choice** and is not susceptible to interference/denial of service by outside parties/nations.
- It has opened doors for **induction of Indigenous parachute systems**.
- This will also **reduce dependency on other nations** for its serviceability during times of conflict and war.

US-CHINA TRADE TENSIONS REVIVE OVER RARE EARTHS

- Rare earths refer to 17 metallic elements — from lanthanum (57) to lutetium (71), plus scandium (21) and yttrium (39) — known for their high density, conductivity, and thermal resistance.
- They are divided into light and heavy rare earths, based on atomic weight, and form an essential subset of critical minerals vital to modern industries.
- **Why They Matter?**
    - These elements are indispensable, even in trace quantities, for a wide array of technologies — from smartphones, wind turbines, and electric vehicles to weapons systems, robotics, MRI scanners, and cancer treatment equipment.
    - Their unique properties make them irreplaceable components in both civilian and defence applications, underpinning the global clean energy and digital revolutions.
    - Rare earths typically occur in low concentrations, making extraction and refining expensive and environmentally complex.
    - This high cost limits the number of countries that can profitably mine and process them.



- **China's Global Dominance**
    - According to the International Energy Agency (IEA):
        - Over 60% of rare earth mining occurs in China.
        - More than 90% of global processing and refining capacity is also controlled by Beijing.
    - This near-monopoly gives China strategic leverage in global supply chains, making rare earths a central weapon in trade and geopolitical rivalries, especially with the United States.

- **Global Reserves, Limited Production**
    - While **Brazil, Australia, and India hold substantial rare earth reserves**, their production remains minimal.
    - The reasons include:
        - Low economic viability due to high extraction costs, and
        - Environmental concerns, as rare earth mining is highly polluting and requires complex waste management systems.

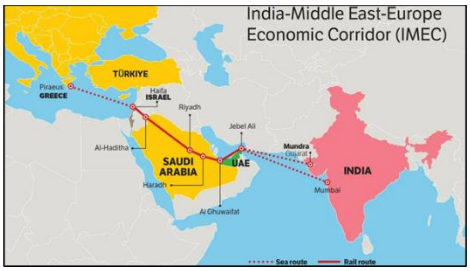
India's Domestic Initiatives and Future Plans

- India's rare earth production remains modest, led by state-owned IREL Ltd, which operates a processing unit with a capacity of over **10,000 tonnes per annum**, compared to China's 200,000 tonnes in 2023.
- However, India is actively expanding its footprint:
    - **Seven seabed blocks in the Andaman Sea** have been auctioned for exploration and mining of polymetallic nodules and crusts that may contain heavy rare earths.
    - The Department of Atomic Energy has cleared plans for a **Rare Earths Theme Park** to establish pilot plants across the value chain.
    - Two major projects — the **Rare Earth Permanent Magnet Park in Visakhapatnam** and the **Rare Earth and Titanium Theme Park** in Bhopal — are being developed with central funding to strengthen India's presence in this strategic sector.

Global Shifts Beyond China

- Globally, efforts to diversify the rare earth supply chain are gaining traction:
    - The **US is preparing an executive order** to stockpile deep-sea metals from the Pacific seabed, reducing reliance on China for battery minerals and rare earths.
    - **Japan**, which faced Chinese curbs in the early 2010s, has since rebuilt its rare earth supply chains, offering a potential model for India and Western economies seeking independence from Beijing's control.

INDIA-MIDDLE EAST-EUROPE ECONOMIC CORRIDOR

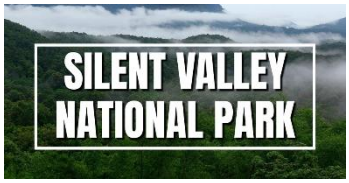


- The **India-Middle East-Europe Economic Corridor (IMEC)** is a major connectivity initiative designed to strengthen trade and transport linkages between **India, the Arabian Peninsula, and Europe**.
- Conceived as part of the G20 Summit in New Delhi in 2023, IMEC aims to provide a **seamless multimodal network** combining maritime and railway infrastructure to enhance economic integration and reduce logistical costs.
- The corridor envisions a maritime route connecting **Indian ports to those in the UAE**, followed by a **high-speed rail network** stretching across **Saudi Arabia, Jordan, and Israel** to reach the **Haifa Port**, from where goods would be transported onward to **European destinations**.
- Apart from transportation, IMEC also plans to establish an **electricity grid**, **hydrogen pipeline**, and **undersea digital connectivity**, making it a **comprehensive economic corridor** integrating energy, technology, and trade systems.

Strategic and Economic Importance for India

- For India, IMEC represents a **strategic opportunity** to diversify trade routes and reduce dependence on chokepoints such as the **Suez Canal**.
- The corridor enhances India's ability to access **European markets via the Mediterranean**, offering an alternative to China-dominated trade networks under the **BRI**.
- IMEC also complements India's **'Act West' policy**, deepening its engagement with the Middle East, a region crucial for India's **energy security**, **remittances**, and **diaspora**.
- Moreover, enhanced economic interaction through IMEC could help **counterbalance Pakistan's efforts** to forge strategic alliances in the region, particularly with Gulf countries.

SILENT VALLEY NATIONAL PARK



- It is a stretch of **pristine wet evergreen forest** located along the **southwest corner of the Nilgiris** in South India, in the State of **Kerala**.
- It constitutes the **centerpiece of the Nilgiri Biosphere Reserve**, sanctified as a **World Heritage Site** by UNESCO in 2012.
- It is nourished by the **Kunthipuzha River,** which meanders through the dense forest.
- The valley is said to be **"silent"** because of the **absence of the cicadas, a type of insect that produces a loud buzzing sound** in many forests.
- **Vegetation**: It has four types of vegetation "**West Coast tropical evergreen forest**, **southern sub-tropical broad-leaved hill forest, montane wet temperature forest, and grasslands.**
- The park's dense forests, riverine ecosystems, and high-altitude grasslands provide a habitat for a variety of species, many of which are endemic to the Western Ghats.
- **Flora**:
    - The flora of the valley includes about **1000 species of flowering plants,** 107 species of **orchids**, 100 ferns and fern allies, 200 liverworts, 75 lichens, and about 200 algae.
    - **Plants of high medicinal value** as well as the **towering Culinea trees** are also found here.
- **Fauna**:
    - The park is famous for its population of **lion-tailed macaques,** an **endangered primate species** that is **endemic to the Western Ghats.**
    - Other notable mammals include the **Nilgiri langur, Malabar giant squirrel,** Indian elephant, tiger, leopard, and gaur (Indian bison).
    - The park is also home to over 200 species of birds, including the great **Indian hornbill, Nilgiri wood pigeon,** and several species of eagles and owls.