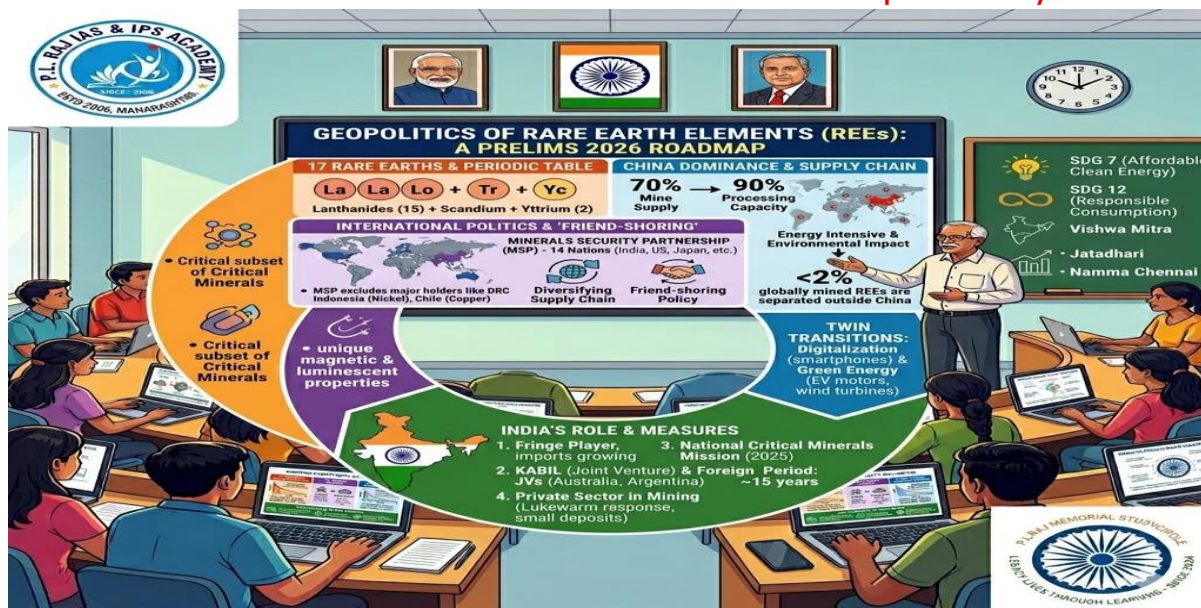


Rare Earth Elements – The Global Economic Diplomacy



Introduction

In the high-stakes world of modern technology and green energy, Rare Earth Elements (REEs) have emerged as the "vitamins" of the 21st-century industry. Recent headlines regarding a tentative export control agreement between the US and China—rated a "12 out of 10" in importance by the US President—underscore the geopolitical gravity of these minerals. For UPSC aspirants, understanding REEs is crucial, as they sit at the intersection of International Relations, Environment, and Internal Security.

Definition and Explanation – What are Rare Earths?

Despite their name, Rare Earth Elements are relatively plentiful in the Earth's crust. However, they are rarely found in concentrated, mineable deposits, making their extraction technically difficult and environmentally taxing.

1. **The Composition** – There are 17 elements in this group, including the 15 lanthanides on the periodic table, plus scandium and yttrium.
2. **Rare Earths vs. Critical Minerals** – It is vital not to confuse the two. Critical Minerals (like Lithium or Cobalt) are a broad category defined by a country based on their economic importance and supply risk. Rare Earths are a specific chemical subset. In India's list of 30 critical minerals, "Rare Earths" is listed as a generic category.
3. **Characteristics** – They possess unique magnetic, luminescent, and electrochemical properties, allowing for the miniaturization of components and increased efficiency in electronics.

Importance in the Present Age

Rare earths are the backbone of the "Twin Transitions"—Digitalization and Green Energy.

1. **Green Tech** – Neodymium and Praseodymium are essential for high-strength permanent magnets used in Electric Vehicle (EV) motors and wind turbines.
2. **Defense** – They are critical for jet engines, missile guidance systems, space station components, and night-vision goggles.
3. **Consumer Electronics** – From the glass-polishing of smartphones to the phosphors in LED screens, REEs are everywhere.

International Politics – The China Dominance and "Friend-Shoring"

The global supply chain for REEs is currently lopsided.

1. **The China Factor** – Over three decades, China meticulously built a monopoly. Today, it controls 70% of the mine supply and nearly 90% of the processing capacity. This was achieved through cheap labor and a willingness to accept high environmental costs, such as soil and water contamination in Inner Mongolia.

2. **The MSP and "Friend-Shoring"** - In 2022, the US led the formation of the Minerals Security Partnership (MSP), a 14-nation bloc (including India, Japan, and Australia). The goal is to "friend-shore"—moving supply chains away from adversarial nations to trusted allies.
3. **The Missing Links** - The MSP faces challenges as it currently excludes major resource holders like the Democratic Republic of Congo (Cobalt), Indonesia (Nickel), and Chile (Copper).

Significance to India

India is currently a "fringe player" in the REE market, but its ambitions are growing.

1. **Dependency** - India currently imports almost all its critical mineral requirements. While India has some REE deposits along its coasts (monazite sands), mining them is currently not economically viable due to a lack of processing technology.
2. **Strategic Vulnerability** - As India pushes for 100% EV transition and expanded electronics manufacturing, a supply disruption from China could halt domestic production.

Government of India's Measures

The government has recently moved from a "wait-and-watch" approach to active intervention -

1. **National Critical Minerals Mission (2025)** - A fresh framework to identify, explore, and process the 30 identified minerals essential for India's growth.
2. **Private Sector Participation** - The government recently auctioned 20 mineral blocks to private players, though initial responses have been lukewarm due to the small size of deposits.
3. **Foreign Joint Ventures** - India has signed agreements with Australia and Argentina to jointly explore Lithium and Cobalt assets abroad.
4. **KABIL (Khanij Bidesh India Ltd)** - A joint venture of three CPSEs specifically tasked with acquiring strategic mineral assets overseas.

Recent Developments and Challenges

The "gestation period" for a new REE mine is often 15 years or more.

1. **Processing Technology** - Mining is only half the battle. Separating and refining REEs is energy-intensive and high-tech. India currently lacks access to this specific technology.
2. **Economic Viability** - Many of India's domestic deposits are small. To be profitable, they often need to be "bundled" with larger mineral deposits, which remains a logistical challenge.

Conclusion

India finds itself in a position where it must depend on the "kindness of others" for its immediate REE needs. However, the path to Energy Atmanirbharta lies in bridging the 15-year gestation gap through the National Critical Minerals Mission and leveraging the MSP for technology transfer. For India, Rare Earths are not just a trade commodity; they are the fundamental building blocks of the "Viksit Bharat" dream. Success will depend on whether India can turn its coastal deposits into processed products before the next global supply shock hits.

GS Mains Practice Question (General Studies III)

"Rare Earth Elements (REEs) are the silent drivers of the global green energy transition, yet their supply chain remains dangerously concentrated. Critically analyze India's strategy in navigating this resource-constrained landscape." (34 words)

Answer Guidelines

Introduction - Define REEs and mention their 17 elements. Briefly touch upon the US-China "rare earth war."

Body Paragraph 1 (Global Context) - Highlight China's 90% processing monopoly and the emergence of "friend-shoring" through the Minerals Security Partnership (MSP).

Body Paragraph 2 (Indian Scenario) - Discuss India's 30 identified critical minerals. Explain the "processing gap"—the fact that having deposits (coastal sands) is useless without refining technology.

Body Paragraph 3 (Govt Action) - Mention KABIL, the 2025 National Mission, and international collaborations with Australia/Argentina.

Conclusion - Emphasize that REE security is a prerequisite for the "Make in India" and "EV 2030" goals.