



CRITICAL MINERALS - GS III MAINS

Q. 'Critical Minerals' are crucial for the Indian growth momentum and to align India with the rising opportunities. Discuss (15 marks, 250 words)

News: *Seven critical mineral blocks see less than three bids in first round*

What's in the news?

- Recently, India's Mines Ministry launched the third tranche of e-auction of critical minerals.

Critical Minerals:

- Critical minerals are those minerals that are **essential for economic development and national security**, the lack of availability of these minerals or concentration of extraction or processing in a few geographical locations may lead to supply chain vulnerabilities and even disruption of supplies.

Critical Minerals in India:

- In July 2023, the government identified **30 minerals** as Critical Minerals by amending the **Mines and Minerals (Development and Regulation) Act, 1957**, through the MMDR Amendment Act, 2023, empowering the Central Government to auction blocks of these minerals.
- **The 30 critical minerals are Antimony, Beryllium, Bismuth, Cobalt, Copper, Gallium, Germanium, Graphite, Hafnium, Indium, Lithium, Molybdenum, Niobium, Nickel, PGE, Phosphorous, Potash, REE, Rhenium, Silicon, Strontium, Tantalum, Tellurium, Tin, Titanium, Tungsten, Vanadium, Zirconium, Selenium and Cadmium.**

Economic Importance of Critical Minerals:

1. As Underlined by Erstwhile Planning Commission:

- In India, some efforts were made in the past to identify the minerals that are critical for the country, including an initiative in 2011 by the Planning Commission of India that highlighted the need for the critical minerals.
- That report analyzed 11 groups of minerals under categories such as **metallic, nonmetallic, precious stones and metals, and strategic minerals**. From 2017 to 2020, a big thrust was accorded to the study of exploration and development of rare earth elements in the country.

2. Economic Development:

- Industries such as **high-tech electronics, telecommunications, transport, and defence** heavily rely on these minerals.
- They are **essential for green technologies** like solar panels, wind turbines, batteries and electric vehicles.



- They are also required for **fertilizers**, construction, magnets for industries, transport, consumer electronics, defence, etc.
- Given India's significant domestic demand and potential in these sectors, their growth can lead to job creation, income generation, and innovation.

3. National Security:

- These minerals are **vital for defence, aerospace, nuclear, and space applications**, necessitating the use of high-quality and reliable materials capable of withstanding extreme conditions and performing complex functions.
- To ensure defence preparedness and self-reliance, India must secure a steady supply of critical minerals.

4. Environmental Sustainability:

- As far as India is concerned, the availability of critical minerals (and rare earths) is crucial as it has massive plans to become net-zero by 2070. By 2030, India wants to set up 500 GW of non-fossil fuel power generating capacity.
- It also wants 30% of private cars, 70% of commercial vehicles and 80% of two/three wheelers to go electric. All this will not be possible without a steady source of lithium and other minerals required to manufacture batteries.

5. Promoting Industrial Activities through Vertical Integration:

- The identification of these minerals — which form part of multiple strategic value chains, including clean technologies initiatives such as zero-emission vehicles, wind turbines, solar panels; information and communication technologies, including semiconductors; and advanced manufacturing inputs and materials such as defence applications, permanent magnets, ceramics etc. — contribute significantly to industrial production and robust supply-chain networks.

6. International Cooperation:

- These collaborations enable India to diversify its import sources, reduce dependency on China and enhance mineral security and resilience. It has led to the formation of the US-led Minerals Security Partnership (MSP).

Challenges:

1. Limited Availability of Critical Minerals:

- The rare availability of critical minerals poses a challenge in meeting the growing demand for these minerals.

2. Geopolitical Risks:

- Complex supply chains can be disrupted by hostile regimes or politically unstable regions, leading to supply chain disruptions.

3. Dominance of Certain Countries:

- A few countries, such as China, are the dominant producers of critical minerals, leading to concerns over supply disruptions in case of a geopolitical conflict.

4. Increasing Demand for Critical Minerals:

- With the shift towards renewable energy technologies and electric vehicles, the demand for critical minerals such as copper, lithium, and rare earth elements is increasing rapidly.



5. Reliance on Foreign Partners:

- Countries with limited reserves and higher requirements for critical minerals may have to rely on foreign partners to meet their domestic needs, leading to supply chain vulnerabilities.

Government Measures:

1. Identification of 30 Critical Minerals by the Indian Govt:

- In July 2023, released a list of 30 critical minerals for India.

2. Allowed Mining:

- The government amended a key law to allow for the mining of three critical minerals, lithium, niobium, and REEs, earlier this year.
- To attract bidders, the government also specified new royalty rates for critical minerals, matching global benchmarks.

3. Increased Exploration Work by Geological Survey of India:

- The Geological Survey of India has taken up 125 projects in the current fiscal to explore critical mineral reserves in the country.
- It had carried out mineral exploration in Salal-Haimna areas (Reasi district, J&K), and estimated 5.9 million tonnes of lithium ore.
- In the preceding eight fiscal years, a total of 625 mineral exploration projects were undertaken.

4. Centre of Excellence for Critical Minerals:

- A Report of the Committee on Identification of Critical Minerals, released in June 2023, recommended that a Centre of Excellence for Critical Minerals should be established.
- This is to frame policies and incentives for creating a complete value chain of critical minerals in the country.

5. Khanij Bidesh India Ltd. (KABIL):

- A joint venture company namely Khanij Bidesh India Ltd. (KABIL) is mandated to identify and acquire overseas mineral assets of critical and strategic nature (lithium, cobalt) to ensure supply side assurance.

6. Mineral Security Partnership (MSP):

- India has recently been inducted into MSP.
- It is a US-led collaboration of 14 countries that aims to catalyse public and private investment in critical mineral supply chains globally.