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Securing supply of niche minerals crucial

They are indispensable for clean energy and hi-tech digital products. Creating KABIL, to secure minerals abroad, must be backed by further measures

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The global demand for minerals is experiencing phenomenal growth. The rapid digitisation of economies, coupled with the global quest for energy transition, has heightened the need for bulk raw materials like copper and nickel as well as niche minerals such as lithium, cobalt, neodymium, tellurium, and rare earth elements (REEs). These minerals are indispensable for the production of clean energy systems, including wind turbines, solar panels, and electric vehicles, as well as high-tech digital products.

While the global reserves of these minerals are adequate, their distribution is highly uneven. Furthermore, technological advancements over the past three decades have led to highly concentrated supply chains, with China exerting significant control over mining as well as processing of several critical minerals. This dominance has been achieved through strategic investments in processing technologies, domestic production, and overseas acquisitions, particularly in Africa and South America. Although China's proliferation in the mineral sector has benefited global industries, the Covid-19 pandemic and ongoing geopolitical tensions have exposed the vulnerabilities of this concentrated supply chain.

Consequently, mineral security has emerged as a vital policy objective worldwide. Industrialised nations have responded by identifying critical minerals and formulating strategies to mitigate supply chain disruptions. These measures include incentivising domestic production, promoting R&D for recycling and substitution along with exploring international partnerships.

India, too, faces significant vulnerabilities due to its dependence on imports for critical minerals. While the country is self-reliant in resources like iron, aluminium, and bauxite, it imports 60 per cent of its manganese and remains fully dependent on imports for certain non-metallic minerals such as fluorspar and magnesite. Additionally, India is also fully dependent on imports for minerals like germanium, heavy rare earth elements, beryllium, rhenium, tantalum, niobium, cobalt, lithium and strontium, etc., many of which are indispensable for high-tech and clean energy applications. Securing stable supply of these minerals is vital for achieving India's vision of becoming a 'Viksit Bharat'.

Fortunately, Indian policymakers have recognised the importance of mineral supply and have begun formulating a mineral security strategy. The establishment of Khanij Bidesh India Ltd (KABIL) in 2019 marked a pivotal step in these efforts. This joint venture, comprising National Aluminium Company Ltd (NALCO), Hindustan Copper Ltd (HCL) and Mineral Exploration Company Ltd. (MECL), was created to secure critical mineral assets abroad. KABIL, since then, has been exploring partnerships with countries like Argentina, Chile, Bolivia and Australia to acquire essential minerals such as lithium and cobalt.

In 2023, the Ministry of Mines further strengthened this approach by identifying a comprehensive list of 30 critical minerals essential for sectors like defence, electronics, renewable energy, and transportation. Building on this momentum, the government launched the 'Critical Mineral Mission' in July 2024, with a ₹1,500 crore budget to prioritise research and establishing national stockpiles.

Create dedicated fund

Though India's mineral security strategy has gained traction, significant gaps remain, with access to capital being one of the most pressing issues. Given the limited domestic reserves of several minerals like cobalt and lithium, acquiring mines of these minerals overseas is indispensable for long run mineral security. While KABIL has begun this process, it currently lacks the financial capacity to assume the risks associated with overseas acquisitions. To address this, the government should consider creating a dedicated fund to support such ventures, ensuring sufficient capital for mine acquisitions and the infrastructure needed to transport mineral ore from mines to India. Leveraging India's development assistance channel could also support KABIL and other Indian firms in their global endeavours, similar to China's strategy for securing critical minerals abroad.

In addition to financial limitations, gaps in domestic value chains for cobalt, lithium and REEs present another significant challenge for India. The value chain for these minerals is divided in the extraction, refining, processing and downstream manufacturing stages. For cobalt and lithium, India remains fully dependent on imports, with no significant domestic mining or refining infrastructure. In the case of REEs, although India has some capacity in mining and ore processing, refining and separation capabilities remain absent.

Furthermore, India lacks the capacity to produce advanced derivatives of cobalt, lithium, and rare earths, such as battery cathode materials, high-performance alloys, and permanent magnets. Without domestic refining and processing capabilities, mine acquisitions abroad will yield limited benefits. Therefore, India must urgently invest in developing refining and processing technologies while promoting the domestic manufacturing of advanced derivatives.

This requires two crucial steps: first, substantial investments in acquiring or developing advanced processing technologies for refining and processing, and second, offering incentives to encourage domestic production of critical materials such as battery cathode materials, high-performance alloys, and permanent magnets. Expanding the scope of schemes like the Production-Linked Incentive (PLI) could be a strategic move in this direction. Strengthening downstream manufacturing will not only reduce reliance on imports but also ensure the offtake of minerals that KABIL intends to procure in the coming years.

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