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## Critical minerals and national security: The role of strategic resource reserves in india's security strategy

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### Abstract

In national security, the importance of critical minerals is very clear, especially as India updates its security strategy in a complicated global setting. As economies shift to green energy and new technologies, it is important to look closely at the rising need for important minerals like lithium, cobalt, and rare earth elements. These minerals are not just key for clean energy development; they also help to strengthen supply chains and lessen dependence on imports from areas that have political instability. This situation leads to a look at how India acknowledges the need for strategic resource reserves to protect its economic goals and boost energy security. This understanding has resulted in policies aimed at increasing local exploration and production while promoting international collaborations to secure these important minerals. Overall, seeing the connection between critical minerals and national security shows the urgent need for a complete and informed strategy to ensure India's strength in a more competitive and uncertain global environment

**Keywords:** Critical Minerals; National Security; Resource Dependency; Geopolitical Challenges; Green Technologies; Supply Chain Resilience

### 1. Introduction

The rising worldwide need for important minerals has become a key point in national security plans, especially for nations like India that are seeking more economic independence and technological progress in many areas. India understands that relying on minerals from other countries can impact its economic stability and national security. As a result, India has started a number of broad reforms to improve its domestic mining abilities and importantly to lessen its dependence on imports from countries it sees as rivals. The National Critical Mineral Mission (NCMM), with a large budget of Rs.34,300 crore, illustrates this effort and focuses on important areas like exploring, processing, and recovering critical minerals needed for developing green technologies and sustainable energy solutions (Bisoyi SK et al., 2024). Moreover, India is taking a hands-on approach by forming partnerships with resource-rich countries, such as the actions taken by KABIL to secure reliable lithium supplies, which highlights India's dedication to creating a diverse and strong supply chain that can handle global changes and political tensions (Ministry of Mines, 2025). These strategic moves are further backed by ongoing changes in mining laws, meant to encourage private investment and participation in the mining sector, thus boosting innovation and efficiency (Jain PK, 2024b). As India's critical minerals policy develops, the implications for national security become more significant, especially in light of global resource management, sustainability efforts, and the increasing need for greener technologies that match international climate commitments (Dikgwatlhe et al., 2018)(Mildner, S. A., 2013).

#### 1.1. Definition of critical minerals and their importance

Critical minerals are key raw materials important for making advanced technologies and clean energy solutions. They are significant for national security and economic stability. However, it is necessary to look closely at the issues caused

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by global production being mainly in a few countries, especially China. India's need to import minerals like lithium and cobalt raises serious concerns about security of supply and brings up questions about possible weaknesses due to rising geopolitical tensions (Jain PK, 2024a). To tackle these issues, the Indian government has acted by putting in place strategic policies to improve local mineral exploration and mining abilities, as shown by the National Critical Mineral Mission (Jain PK, 2024b). Moreover, forming partnerships with countries rich in resources shows the government understands the difficulties of securing supply chains in an unstable global market (Bisoyi SK et al., 2024). Additionally, the upcoming sales of critical mineral blocks show India's commitment to building a strong minerals industry that serves not just economic goals but also works to strengthen resilience against global supply issues (Ministry of Mines, 2025). This focused effort emphasizes the role of critical minerals as essential parts of India's national security plans, making it crucial for policymakers to keep assessing and adapting their strategies in this changing environment.

## **1.2. Overview of India's national security concerns related to resource dependency**

India's national security issues are more connected with its reliance on critical minerals, which are crucial for technological growth and economic stability. Since the production of key minerals such as lithium and cobalt is mostly found in a few countries, especially China, India faces major challenges in ensuring steady supply chains. This situation raises key concerns about long-term sustainability and the geopolitical dangers tied to dependence on imports. To tackle this weakness, the Indian government has started actions under the National Mineral Policy 2019 to boost local exploration and mining. This plan is vital for cutting down import reliance and improving self-sufficiency (Bisoyi SK et al., 2024). The creation of Khanij Bidesh India Ltd. (KABIL) to acquire mineral assets internationally is seen as a forward-looking step to broaden resource access and lessen risks from foreign dependencies (Ministry of Mines, 2025). Moreover, the government is taking a more thorough approach linking national security with resource policies. This is shown in its initiatives to auction critical mineral blocks while improving the entire minerals value chain (Jain PK, 2024a). Furthermore, India's G20 presidency highlights the need for global cooperation in securing essential resources, reflecting a rising recognition of the strategic role of minerals in national security (Jain PK, 2024b). Overall, these various actions not only show an urgent reply to current challenges but also highlight an awareness of the need for a robust resource framework to back India's security strategy as global dynamics change and potential future crises arise (Asghar et al., 2016)(Mildner, S. A., 2013).

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## **2. The Strategic Importance of Critical Minerals**

The growing strategic value of critical minerals shows not only their key role in national security but also how they help strengthen economic stability for countries like India. As global demand for technology that depends on these minerals increases, it is important to closely examine India's reliance on imports—mainly from countries like China—which creates risks that could harm its strategic goals. This uncertain situation has led to important changes under the National Mineral Policy 2019 and updates to the Mines and Minerals (Development and Regulation) Act, 1957, aimed at improving local exploration and mining efforts (Bisoyi SK et al., 2024). Additionally, ventures like Khanij Bidesh India Ltd. (KABIL) illustrate India's active push to secure vital resources overseas (Ministry of Mines, 2025). By analyzing the broad strategies being developed—strategies that aim to identify critical minerals, build a strong value chain, and encourage sustainability—one can recognize their significant role in achieving self-sufficiency and safeguarding strategic interests in this highly competitive global environment (Jain PK, 2024a)(Jain PK, 2024b). Thus, the area of critical minerals becomes extremely important, linking economic growth with national security, highlighting the need for informed choices and careful planning (Alina C et al., 2023)(Chapman et al., 2020).

### **2.1. Role of critical minerals in modern technology and defense systems**

The growing dependence on critical minerals for technology and defense systems highlights their key role in India's national security strategy and forces us to think about the issues that come with such dependence. These minerals are essential for advanced tools like semiconductors, renewable energy systems, and military uses such as weapons and surveillance tech, which underscores the urgent need for a reliable supply chain. However, due to the concentration of global production in certain countries, mainly China, India's reliance on imports raises big questions about its strategic independence and the risks tied to this dependency (Jain PK, 2024b). To address these risks, India is improving its critical minerals policy with initiatives like Khanij Bidesh India Ltd. (KABIL), which focuses on acquiring global assets, and encouraging private companies to explore for minerals (Ministry of Mines, 2025). This forward-looking approach is not just a strategic reaction but also shows a broader awareness of the connections in the global mineral market. Additionally, the National Critical Mineral Mission plans to develop the full mineral value chain (Jain PK, 2024a), which is a strategic action that needs more examination concerning its effectiveness and sustainability. As noted in (Chapman et al., 2017) and (McWilliams et al., 1977), securing access to critical minerals is essential for protecting national and economic security, especially in a geopolitically unstable environment where power and resource situations are always changing.

## 2.2. Global supply chain vulnerabilities and their implications for India

The weaknesses shown in global supply chains greatly affect India's position on critical minerals important for national security. It is necessary to examine how these dependencies not only create risks but also reveal the geopolitical challenges India must address. A large portion of the world's production is centered in countries like China, which controls key resources such as lithium and cobalt, causing concerns about the long-term viability of such dependence. To reduce these risks, India has started reforms to improve its domestic exploration and mining abilities by changing the MMDR Act to attract private investment (Jain PK, 2024b). However, it is crucial to evaluate whether these reforms are enough and timely in light of swiftly changing global market conditions. The formation of Khanij Bidesh India Ltd. (KABIL) highlights India's goal to secure international partnerships, as seen in agreements for lithium projects in Argentina (Ministry of Mines, 2025). Still, further analysis of these partnerships is needed to ensure they do not unintentionally strengthen current vulnerabilities. With the National Critical Mineral Mission, India seeks to build a broad value chain while decreasing import reliance (Jain PK, 2024a), but achieving this objective requires ongoing assessment of potential risks in both domestic and international supply chains. The necessity for strategic resource reserves is critical, as shown by current discussions in international settings like the G20, which emphasize collaborative strategies to strengthen supply chains against disruptions (Johnson et al., 2013)(Garduño Rivera et al., 2022). Therefore, while the actions taken are praiseworthy, a well-rounded approach that includes a critical examination of global trends and dependencies is vital for India to effectively boost its strategic security in critical minerals.

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## 3. India's Current Resource Reserves and Policies

Due to changing global conditions, India is changing its resource policies to ensure it has the essential minerals necessary for both economic growth and national security. It is important to note that the production of key minerals is mainly in a few countries, with China being a leader in lithium and cobalt. This dependence raises serious concerns about supply chain risks and strategic independence. To lessen this reliance, India has made significant changes under the National Mineral Policy 2019 and has revised the Mines and Minerals (Development and Regulation) Act to improve exploration and mining in a more controlled and sustainable way. The government's goal to auction 500 mining blocks by 2025-26 shows a proactive approach to creating major opportunities for private businesses, potentially boosting economic growth and innovation (Bisoyi SK et al., 2024). Furthermore, the formation of Khanij Bidesh India Ltd. (KABIL) highlights India's effort to obtain foreign mineral resources, as evidenced by its collaborations for lithium exploration in Argentina (Ministry of Mines, 2025). The National Critical Mineral Mission also seeks to improve mineral processing while promoting domestic capabilities, reflecting a careful strategy to build a strong supply chain for key minerals. By understanding the vital role these resources have, India not only strengthens its strategic plans but also works toward a sustainable future in a more competitive global environment (Jain PK, 2024a)(Jain PK, 2024b). This complex strategy invites ongoing consideration of how to effectively manage resource acquisition along with environmental and geopolitical issues (Mildner, S. A., 2013) (Asghar et al., 2016).

### 3.1. Assessment of India's existing strategic resource reserves

The review of India's strategic resource reserves is very important for improving national security and economic development, especially given the rising global competition for key minerals. India currently relies heavily on imports for critical minerals such as lithium and cobalt, which mainly come from countries like China, raising serious concerns about whether this approach can work in the long run. This situation calls for a major strategic change that focuses not just on increasing self-sufficiency but also on effectively securing supply chains, which is necessary in a world where the availability of resources can change quickly (Bisoyi SK et al., 2024). The government has started reforms, like changes to the Mines and Minerals (Development and Regulation) Act, designed to encourage private sector investment and speed up the process of obtaining exploration licenses for 29 critical minerals (Ministry of Mines, 2025). However, it is vital to assess whether these reforms truly resolve the key problems in the mining industry. Additionally, the National Critical Mineral Mission seeks to create a complete value chain through domestic exploration, mining, and recycling initiatives (Jain PK, 2024a). Although this mission shows a forward-thinking approach, the effectiveness of these efforts largely relies on cooperation among various sectors. Understanding the significance of these resources, India aims to form partnerships for mining assets abroad and support effective research and development (Jain PK, 2024b). This comprehensive strategy highlights the need to develop India's strategic resource reserves, not just for economic stability but also to improve national security, considering the geopolitical environment that can greatly affect resource availability (Chapman et al., 2020) (Ellis et al., 2017).

### **3.2. Government initiatives and policies aimed at enhancing resource security**

With rising competition worldwide for important minerals, the Indian government has started important steps to improve resource security, which helps its security strategy and shows an understanding of related complexities. A key part of these actions is the National Mineral Policy 2019, which aims to lessen reliance on imports by promoting local exploration and mining for key minerals like lithium and cobalt. However, it is important to think about how well these policies deal with possible environmental issues and the social effects of increased mining. To address this, there have been changes to the Mines and Minerals (Development and Regulation) Act to make licensing easier and to encourage private companies to get involved in the mineral sector (Jain PK, 2024b). While this may speed up resource extraction, it raises concerns about balancing economic development with environmental protection. Additionally, the creation of Khanij Bidesh India Ltd. (KABIL) is intended to gain overseas mineral resources, such as those in Argentina, which helps to diversify supply chains (Ministry of Mines, 2025). This action shows the significance of global relationships in securing resources while also raising questions about geopolitical ties and dependency. Moreover, the National Critical Mineral Mission aims to enhance the entire value chain, from exploration to recycling, encouraging both public and private investment (Jain PK, 2024a). These strategic steps are relevant to global challenges, as stated in (Mildner, S. A., 2013) and (Crochet et al., 2024), highlighting the need for international cooperation in mineral management and the importance of working with international partners to promote sustainable practices and ensure fair resource distribution.

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## **4. Challenges and Opportunities in Resource Management**

In resource management, India faces big problems and some chances, especially with critical minerals needed for national security and tech progress. The fact that major sources of these minerals are in just a few countries, especially China, creates doubts about India's long-term strategy. This situation leads to efforts to lower reliance on imports. Such efforts include buying foreign mineral assets and making reforms to improve local exploration skills (Ministry of Mines, 2025). The launch of the National Critical Mineral Mission (NCMM) shows a clear plan to simplify processes and draw investment across the mineral value chain, from searching to recycling (Jain PK, 2024a). However, critical analysis shows that issues like regulatory barriers and the need for responsible mining practices are still big challenges (Jain PK, 2024b). Tackling these issues calls for strict regulation compliance and creative ways to focus on protecting the environment. The need to balance resource extraction and ecological concerns has been highlighted in global discussions during India's G20 leadership, showing a worldwide agreement on sustainable growth (Bigg et al., 2011). In the end, if India can handle these complicated issues well, it can become a leader in managing critical minerals, boosting its economic strength and security, while also aligning with broader global sustainability aims (Bisoyi SK et al., 2024).

### **4.1. Environmental and geopolitical challenges in mineral extraction**

Mineral extraction faces big challenges from the environment and geopolitical issues, which shape India's national security plans. The rising need for important minerals like lithium and cobalt highlights India's dependence on imports, especially from nations with ongoing geopolitical issues. This dependence raises serious questions about the long-term stability of India's mineral supply chain and its effects on national security. In response, the government has put in place reforms to enhance domestic production and lessen reliance on external sources (Jain PK, 2024a). Working with countries like Argentina for lithium exploration shows a forward-thinking method to secure necessary resources (Jain PK, 2024b). However, these efforts face the environmental costs of mining, as extraction can cause habitat loss and pollution, leading to calls for sustainable methods (Bisoyi SK et al., 2024). It is crucial to look closely at how these sustainable methods can be adopted without harming economic growth. Moreover, the global race for critical minerals can increase geopolitical tensions, requiring a broad strategy that looks at both the environmental impact and the strategic importance of mineral resources (Ministry of Mines, 2025). By taking a varied approach that balances environmental issues with geopolitical needs, addressing these challenges will be crucial for India's economic safety and stability in a more competitive global environment.

### **4.2. Potential for international collaboration and partnerships in resource management**

The possibility for international partnerships in resource management is very important for India's security strategy concerning critical minerals. Since global production of key minerals is mostly in a few countries, mainly China, India must quickly build alliances to reduce its reliance on imports and boost its domestic capabilities. A look at recent policies, like the changes to the Mines and Minerals (Development and Regulation) Act, shows India's active effort to encourage private sector participation in exploration and mining (Bisoyi SK et al., 2024). Additionally, efforts like Khanij Bidesh India Ltd. (KABIL) are crucial for securing overseas mineral assets, especially lithium from Argentina, which is essential for maintaining a steady supply chain (Ministry of Mines, 2025). It's also noteworthy that India's upcoming

auctions for critical mineral blocks indicate a strategic step toward diversification and improving its resource base, reflecting an understanding of market dynamics and resource security (Jain PK, 2024a). In the end, these collaborative actions—highlighted by international cooperation—are vital for achieving economic stability and strength (Jain PK, 2024b). They also fit with the rising global focus on sustainable resource management practices, showcasing the linked nature of today's resource issues (Lee CM et al.) (Fliessbach et al., 2012).

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## 5. Conclusion

In conclusion, India's method for securing important minerals is very important for strengthening national safety and promoting economic stability. However, it brings up important questions about how well these strategies will work and last over time. As the country tries to lessen its reliance on imports, especially from suppliers like China, it is important to carefully evaluate how well the new policy changes will work. The National Mineral Policy 2019 and the changed MMDR Act show that the government is serious about boosting local exploration and production of key minerals. Still, we need to continually assess how these changes affect the economy and the environment. Projects like Khanij Bidesh India Ltd. (KABIL), which aims to buy foreign assets and build international collaborations, need to be examined for their potential benefits and risks (Bisoyi SK et al., 2024). Additionally, creating a complete value chain that includes recycling is crucial for sustainability, but we should look at how practical and effective these recycling methods are in real situations (Ministry of Mines, 2025). The National Critical Mineral Mission tries to help this by providing significant funding to improve India's capabilities in this area. Yet, we must keep a close eye on how this money is spent and what results it brings for transparency (Jain PK, 2024a). Reports highlight that working together among different parties will boost the mineral industry and secure the resources needed for clean energy shifts and technological progress (Jain PK, 2024b). This emphasizes the need for not just careful resource management but also a flexible security plan that can handle new challenges in India's resource management (Asghar et al., 2016) (Ashraf et al., 2001).

### *Summary of the critical role of strategic resource reserves in national security*

The management of resource reserves is very important for national security, especially as countries work towards being self-sufficient in needed minerals. This leads to a closer look at how managing these resources can help reduce risks from relying too much on imports. Considering India's changing energy demands and global issues, the government has put in place various reforms to increase domestic production of vital minerals. This is especially important since India relies significantly on imports, with a few countries like China controlling most critical minerals, raising concerns about supply chain stability. By introducing policies like the revised Mines and Minerals (Development and Regulation) Act and setting up Khanij Bidesh India Ltd., India seeks to strengthen its supply chains and cut down on dependencies (Jain PK, 2024a). However, it is necessary to evaluate how effective these reforms are and if there could be unintended outcomes. Additionally, the creation of the National Critical Mineral Mission shows a strong focus on improving local skills and attracting investment for sustainable mineral extraction that aligns with green technology (Ministry of Mines, 2025). Still, the success of these programs may rely on careful planning of rules and cooperation within industries. The link between resource management and national security is becoming increasingly important, highlighted by global trends that show the need for collaborative governance in resource management (Mildner, S. A., 2013) (Crochet et al., 2024). Thinking critically about these trends helps us identify challenges and chances that may come up, thus promoting a stronger approach to maintaining national interests.

### *Recommendations for strengthening India's resource strategy in the context of security threats*

To strengthen India's resource strategy in light of changing security threats, it is important to focus on creating a thorough critical minerals framework that involves both local production and global partnerships. First, investing in better mining technologies and eco-friendly practices will improve efficiency and lessen environmental harm, thus linking economic growth to environmental care. This brings up an important question: how can India make sure these investments are both creative and eco-friendly? Also, encouraging public-private partnerships can boost funding in critical mineral exploration and processing, ensuring a strong supply chain that decreases reliance on outside sources. It is necessary to evaluate which parts of the private sector can be most effectively involved in this effort. Additionally, building strategic partnerships with countries rich in minerals can guarantee long-term access to vital resources; actions like acquiring foreign mining assets or forming bilateral trade agreements should be prioritized. This makes us think about the geopolitical effects of these partnerships and how they could influence India's foreign relations. Lastly, the government needs to create strategic reserves for critical minerals to act as a safeguard against unexpected global supply interruptions, thus improving India's national security and economic strength. This forward-looking strategy not only protects resources but also positions India as an important participant in the global resource market, making it necessary to closely monitor both local and international trends that affect resource availability.

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