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CRITICAL MINERAL DIPLOMACY AND INDIA–ASEAN CO-OPERATION IN THE INDO-PACIFIC: BUILDING RESILIENT SUPPLY CHAINS

Kumar Saurabh[1] **Archana Pandey**[2]

[1]Ph.D. Scholar University Department of Political Science, Ranchi University, Ranchi, Jharkhand
[2]Masters in Law, Central University of Jharkhand

Abstract

The strategic importance of critical minerals has increased and is reshaping the global geopolitics. It has made the secure and resilient supply chains essential for economic security, technological competitiveness and strategic autonomy. With Indo-Pacific emerging as a centre of economic and strategic competition, ASEAN has also become significant due to its critical mineral resources, processing capabilities, and role in regional value chains. Existing research on India-ASEAN relations focuses mainly on trade, connectivity and maritime security. The role of critical mineral diplomacy as a strategic pillar of this relationship is not much explored. The paper addresses this gap and examines how India-ASEAN engagement can strengthen critical mineral supply chain in Indo-Pacific. The study used a qualitative approach based on policy documents, official reports and comparative analysis. It argues that critical minerals represent a new dimension of India's Indo-Pacific strategy that extends beyond traditional security and trade towards economic resilience and technological security. The study offers a new perspective that critical mineral diplomacy can act as a strategic foundation for deeper India–ASEAN cooperation in the Indo-Pacific. The findings underscore the significance of institutionalizing the India-ASEAN cooperation along the entire value chain of critical minerals, ranging from exploration to extraction, processing, technological collaboration, investments, and recycling. This paper becomes more relevant in the current times when importance of critical minerals has increased due to a shift to the clean energy and digitalization.

Keywords: Critical Mineral Diplomacy, India–ASEAN Relations, Indo-Pacific, Supply Chain Resilience, Strategic Autonomy, Economic Security.

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Corresponding Author: Kumar Saurabh | **Email:** chaturvedi288@gmail.com

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I. INTRODUCTION

Critical minerals have shifted from being a niche area of mining and industrial policy to becoming a matter of international political economy and national security. Lithium, nickel, cobalt, graphite, copper, and rare earth minerals are increasingly needed for electric vehicles, batteries, renewable energy technology, electricity generation, electronics, telecommunications, and defence. International Energy Agency (IEA) indicates that the demand for critical minerals keeps growing, for instance, demand of lithium is expected to become more than triple by 2040 in the Stated Policies Scenario. Nickel, graphite and rare earths are experiencing considerable growth as well (IEA, 2026). This means that economic competitiveness in future will be dependent on access to strategic mineral resources.

However, strategic challenge is not simply regarding the availability of these minerals. New concerns are regarding where these minerals are mined, where they are processed, who controls the technology of refinement, and where manufacturing occurs downstream. According to IEA (2026), refinement of minerals still remains highly concentrated with average share of the largest refinery country of key energy minerals coming to about 70 percent in 2025. China is still the main refiner of many important minerals, and Indonesia is now the biggest contributor to growth of the refined nickel production. Diversification of mining operations for rare-earth minerals is happening much faster than the diversification of refining and downstream operations.

For India, this is an economic and strategic issue. India has aspirations in domains of electric mobility, renewable energy, electronics, semiconductor production, advanced telecommunications and defence technologies and this requires more reliable sources of minerals.

The vulnerability of India is exacerbated by disparity between its needs of minerals and capabilities along the value chain. Having a mineral deposit does not necessarily provide strategic security in a case where the processes of beneficiation, separation, refining, specialized equipment or further manufacturing depend on outside suppliers. This means that India needs to diversify its critical minerals strategy beyond domestic production via overseas investments in assets and supply relationships, technology collaboration, processing capacity building and recycling.

This need presents India with a strategic opportunity to pursue closer collaboration with Association of Southeast Asian Nations (ASEAN). Southeast Asia is not only geographically proximate to India but also has mineral resources and processing capacity development potential which will be useful for Indian industry. The ASEAN Minerals Cooperation Action Plan for 2026-2030 focuses on secure supply of minerals and increased cooperation throughout the value chain (ASEAN, 2025). Nickel resources are available in Indonesia and the Philippines; there is rare earths potential in Vietnam and processing capacity in Malaysia. Their importance for India stems from their potential to contribute to a diversified supply chain system.

This should be considered in light of the strategic environment of Indo-Pacific region. Mineral supply chains link resource producer nations, manufacturing hubs, ports, maritime corridors, technology networks, and consumers within the region. Thus, growing concentration in

refining operations and increasing imposition of export controls have led to supply chain resilience becoming a security issue. As per IEA (2026), from 2023 onwards, there has been a three-fold increase in the number of mineral tariff codes that come under the control of China's export regulations.

While Indian measures in response to China are unlikely to result in complete self-reliance and total decoupling from China, a more realistic step would be one of strategic diversification through finding additional suppliers, improving domestic refining capacity, developing new technologies, increasing recycling, and making alliances with resource-wealthy and technology-capable nations. Under this approach, ASEAN can be seen as an integral part of India's Indo-Pacific strategy. The main problem explored in this paper is how India can use critical minerals diplomacy in order to evolve from a traditional approach based on trade and connectivity cooperation with ASEAN into a more comprehensive form of economic and security cooperation. This paper suggests that cooperation can support resilient supply chains in the Indo-Pacific region only if it goes beyond trade of raw materials to include exploration, extraction, processing, refinement, technology transfer, investments, manufacturing and recycling. This can diversify the mineral sources of India as well as increase regional value addition and reduce excessive dependence on external supply chains.

II. LITERATURE REVIEW

There has been an expansion in literature related to critical minerals due to clean energy, digitization, and advanced manufacturing which have made mineral-intensive technologies strategically more important. As the earlier literature on resource security mainly focused on petroleum and conventional energy resources, there is currently growing research on lithium, nickel, cobalt, graphite, copper and rare earth elements, which are strategic inputs for technological and industrial competition. IEA (2026) looks at critical minerals as part of the nexus of energy, economic and national security with concentration of supply, trade barriers, diversification and resilience being the main concerns. One line of literature looks at critical mineral supply chains from the perspective of global political economy. According to it, mineral security cannot be understood purely on the basis of geological deposits because processing, refining, technology, infrastructure and manufacturing can also become bottlenecks. Due to high concentration of global refining capacity, the difference between diversification in mining and value chain diversification is considered important (IEA, 2026). This is particularly the case for India where access to minerals does not mean industrial and technological capability.

Theoretical lenses help add more to this analysis. The theory of complex interdependence developed by Keohane and Nye (1977) shows how economic, institutional and technological linkages generate many channels of interaction between states. The notion of weaponized interdependence introduced by Farrell and Newman (2019) reveals the way central players in international networks gain structural power. In other words, being able to control processing and refining processes is potentially a powerful asset.

Another strand of literature investigates the emerging role of ASEAN in critical mineral value chains. Seah and Huda (2024) mention copper, nickel, bauxite and rare earths as

important mineral sources and stress the importance of downstream investments, technologies, manufacturing, circularity and governance of sustainability. Similarly, studies on Indonesia cover industrial policy, environmental governance and distributive justice (Qurbani et al., 2021).

India–ASEAN academic works in existence emphasize economic integration, connectivity, Act East policy, and strategic cooperation (Kipgen, 2020), whereas there is very little work on the role of critical minerals in this area. However, some recent research tries to fill this gap. For instance, Organisation for Economic Co-operation and Development (OECD) (2026) highlights the significance of ASEAN as a provider of processed minerals and battery parts for India and also discusses the possibilities of cooperation in extraction, processing, and manufacturing of the downstream products, with a focus on India's reliance on imports of lithium, cobalt, copper, and nickel. Hence, further analysis of the link between India's mineral security, ASEAN cooperation, strategic autonomy, and Indo-Pacific supply chains is necessary.

III. RESEARCH GAP

Existing literature leaves three interconnected gaps. First, critical-mineral studies largely examine global supply chains or individual mineral-producing states, while the specific potential of India–ASEAN cooperation from India's strategic perspective remains comparatively underexplored. Second, research on India's strategic autonomy has traditionally concentrated on diplomatic, defence and major-power relations, with comparatively limited attention to critical minerals as an emerging foundation of economic and technological autonomy. Third, studies of India–ASEAN relations have focused substantially on trade, connectivity and security, while the possibility of developing a joint critical-mineral value chain—from exploration and extraction to processing, technology, investment and recycling—has not received adequate analytical attention.

This paper addresses these gaps by examining critical mineral diplomacy as an emerging instrument of India's economic-security and Indo-Pacific strategy. It specifically analyses whether ASEAN's resource and processing capabilities can complement India's mineral requirements and contribute to diversified, resilient regional supply chains.

IV. RESEARCH OBJECTIVES

The study has three objectives:

1) To investigate India's vulnerability related to critical minerals and its significance in terms of economic security and technology.

2) To analyse India–ASEAN partnership potential in various stages of critical minerals' lifecycle like exploration, extraction, processing, technology collaboration, investments and recycling.

3) To identify the obstacles to such partnership and developing an India-centric policy strategy for building resilient chains in Indo-Pacific region.

V. RESEARCH METHODOLOGY

For this study, a qualitative research methodology will be applied using secondary resources such as peer-reviewed academic journals, official government documents like Ministry of Mines (MoM), Government of India, Ministry of External Affairs, research organizations and international organization reports from International Energy Agency, Organisation for Economic Co-operation and Development, ASEAN Secretariat, United States Geological Survey (USGS).

Comparative and value chain analysis will be used. Key ASEAN countries are chosen due to the importance of their minerals to the needs of India, while both internal and foreign policies concerning mineral imports are analysed to identify the strengths and weaknesses of India. The theoretical concepts of complex interdependence, weaponized interdependence, strategic autonomy and supply chain resilience will also be used in this study.

VI. THEORETICAL FRAMEWORK

Strategic importance of critical minerals cannot be understood from a resource-security perspective because current supply chains of minerals incorporate them in relation to trade, technology, industry, and national security. Minerals can be sourced, processed, fabricated, and utilized in different nations. This fragmentation geographically brings about dependence but also asymmetrical vulnerability when certain actors play significant roles in the value chain.

6.1 COMPLEX INTERDEPENDENCE

The theory of complex interdependence propounded by Keohane and Nye (1977) provides the first theoretical basis. It focuses on the existence of various avenues of contact between states, firms, and institutions. India and ASEAN are similarly interconnected. While ASEAN has minerals and the capacity to process them, India has an increasing demand for them. Interdependence also makes one vulnerable in case of excessive dependency. Thus, the issue before India is not interdependence itself but diversification of such interdependence (Keohane & Nye, 1977).

6.2 WEAPONISED INTERDEPENDENCE

Farrell and Newman (2019) have provided another perspective through their concept of weaponised interdependence. According to them, states with central positions within global economic networks have structural power over states dependent on these networks. China provides more than 90% of refining of gallium, graphite, manganese, and rare earths, and a number of other important minerals are highly concentrated too (IEA, 2026). Concentration results in chokepoints as disruption or limitations may impact industries in many countries. For India, mineral diversification must therefore extend beyond acquiring additional raw-material sources. If new supplies ultimately pass through the same concentrated processing networks, vulnerability remains. ASEAN cooperation becomes strategically valuable because it can contribute alternative sources, alternative processing and manufacturing nodes.

6.3 STRATEGIC AUTONOMY

Strategic autonomy is particularly relevant to India's foreign-policy thinking. Critical minerals give autonomy an economic and technological dimension. A state cannot exercise meaningful strategic autonomy if essential industrial and technological sectors remain excessively dependent on external supplies that can be disrupted or politically restricted. India's National Critical Minerals Mission seeks to ensure that minerals remain available from internal and external sources while strengthening the technological, regulatory, and economic ecosystem for exploration, mining, processing, and recycling of minerals (MoM, 2025). Hence, India pursues a policy of diversified strategic interdependence rather than self-sufficiency by retaining market access while cutting down excessive reliance on single source providers, processing centres, and technologies. ASEAN can help by broadening the range of reliable mineral and industrial ties for India.

6.4 SUPPLY-CHAIN RESILIENCE

Supply chain resilience is defined as the ability of a system to withstand the shock, to adapt to new circumstances and to retain the performance of its key functions. In case of critical minerals market, resilience involves not only stockpiles, but also diversified sourcing, additional refining and processing capacity, technology capabilities, transportation infrastructure, and recycling.

New mining operations are being developed beyond the main mineral producers, but downstream facilities remain underdeveloped. IEA (2026) considers supply chain concentration as a point of vulnerability and stresses that diversification, preparedness, technology, and workforce are the components of mineral security.

India therefore requires action at multiple levels, including domestic exploration and processing, overseas mineral acquisition, strategic partnerships, recycling and technological development. India–ASEAN cooperation can complement these domestic measures by creating additional regional supply and processing pathways.

6.5 CRITICAL MINERAL DIPLOMACY AS THE ANALYTICAL CONCEPT

On the basis of these four perspectives, this paper defines critical mineral diplomacy as the strategic application of diplomacy, trading, investments, technology cooperation, and institutional arrangements to obtain critical minerals and enhance the resilience of corresponding value chains (Gereffi, 2018; Farrell and Newman, 2019). Unlike traditional resource diplomacy focused on raw materials, critical mineral diplomacy encompasses the entire chain from exploration and extraction to processing, refining, manufacturing and recycling (Gereffi, 2018). It recognises that governments alone cannot construct resilient supply chains; corporations, research institutions, financial institutions and technology providers are equally important.

For India, critical mineral diplomacy consequently becomes an instrument of economic statecraft. Its purpose is not simply to obtain minerals from ASEAN, but to develop mutually beneficial regional capabilities. ASEAN can provide resources and selected processing capabilities, while India can contribute investment, technological capacity, manufacturing demand and a large downstream market. Such cooperation can reduce excessive concentration and strengthen India's strategic autonomy (Seah and Huda, 2024).

The theoretical framework therefore establishes the central proposition of this study: India–ASEAN critical-mineral cooperation becomes strategically meaningful when interdependence is transformed from a source of vulnerability into a diversified and resilient regional network (Keohane and Nye, 1977; Farrell and Newman, 2019).

Together, these perspectives explain how cooperation can strengthen India's economic security, technological capability and strategic interests within the Indo-Pacific supply-chain architecture.

VII. INDIA'S CRITICAL MINERAL SECURITY: VULNERABILITIES AND STRATEGIC REQUIREMENTS

The critical minerals dilemma in India is a question of economic security, technological capability, and strategic independence. With fast-paced industrialization, renewable energy generation, electric mobility, advanced technology, and defence production started requiring more critical minerals which become difficult to source owing to their geographic concentration. So, the critical minerals agenda in India needs to be seen from this perspective (MoM, 2023; IEA, 2026).

In 2023, 30 critical minerals were identified on the basis of their economic significance and associated supply risks. These are lithium, cobalt, nickel, graphite, copper, rare earth metals, gallium, germanium, tungsten, titanium, and niobium which are crucial for the generation of clean energy, electronic industries, telecommunication, aviation, defence, and manufacturing industries. From these minerals, 14 minerals have economic significance and risks of supply. This is indicative of the vulnerability of India (MoM, 2023).

One vulnerability is that there is inadequate domestic production. While India has geological resources for lithium, graphite, nickel, rare earth ore minerals, and niobium, geological reserves are not synonymous with economically viable reserves or production. The domestic mineral resource will need to be mined, processed, and transported before it can be put to productive use. Similar challenges exist for cobalt, nickel and graphite, where growing demand from electric vehicles and energy storage is accompanied by inadequate domestic production (Ministry of Heavy Industries, 2025).

Rare earth elements present an even more complex challenge. Their importance extends beyond clean energy to permanent magnets, electric motors, electronics, telecommunications, aerospace and defence. India's strategic problem is therefore not simply access to rare-earth-bearing resources, but limited domestic capacity in separation, refining, metal production and high-performance magnet manufacturing. Vulnerability consequently exists at midstream and downstream stages as much as at mining (IEA, 2026).

The mineral intensity of India's development model is also increasing. Energy transition requires solar and wind power, storage, electric vehicles and transmission infrastructure, while digital transformation and defence modernisation further increase demand for specialised minerals. India's efforts to reduce dependence on imported fossil fuels through electrification and renewable energy could therefore increase dependence on imported minerals unless supply chains are simultaneously diversified. Energy security and mineral security have consequent-

ly become interconnected dimensions of long-term strategic planning (MoM, 2023; IEA, 2026).

The other equally important vulnerability pertains to processing and refining. While securing the raw materials either within or out of the country's jurisdiction is essential, the security would be constrained by the fact that the processes for extracting and refining could be predominantly located abroad. The process of refining can also be geographically highly concentrated even as there are alternatives to the sources from which the minerals may be extracted (IEA, 2026). Thus, long-term security also implies that there should be domestic capacities for separation, refining, metallurgy, advanced materials, and recycling.

India's response increasingly recognises these challenges. The National Critical Mineral Mission (NCMM), approved in January 2025 for 2024–25 to 2030–31, involves expenditure of ₹16,300 crore and is expected to attract ₹18,000 crore in investment. It covers the entire value chain, including exploration, extraction, beneficiation, processing and recovery from end-of-life materials (MoM, 2025). The Mission also emphasises overseas acquisition, recycling, research, technological advancement and financing because complete self-sufficiency is unrealistic.

India's overseas approach is visible through Khanij Bidesh India Limited (KABIL), which signed an Exploration and Development Agreement with Argentina's CAMYEN S.A. (a state-owned mining and energy company) in January 2024 for five lithium brine blocks covering approximately 15,703 hectares in Catamarca province of Argentina (MoM, 2025). Nevertheless, overseas acquisition alone cannot provide complete security because projects require long development periods, infrastructure, processing facilities and stable conditions. India therefore needs a diversified portfolio of partnerships rather than dependence on individual projects or countries (IEA, 2026).

ASEAN is strategically relevant because of its proximity, mineral resources, manufacturing networks and processing opportunities. Cooperation with multiple ASEAN economies can complement domestic exploration and overseas acquisitions by creating additional supply routes within the Indo-Pacific (Bilek, Ramdoo, and Hendriwardani 2024).

India's critical-mineral security should therefore be understood as a portfolio strategy rather than a self-sufficiency strategy. Domestic exploration can provide a foundation; overseas assets can diversify supply; ASEAN partnerships can strengthen regional access; domestic processing can capture greater value; technological cooperation can reduce external dependence; and recycling can create secondary supplies (IEA, 2026; Seah and Huda, 2024). The objective is to ensure that no single geographical source, processing centre, technology provider or transportation route becomes indispensable, thereby connecting critical minerals directly with strategic autonomy and providing a rationale for India–ASEAN cooperation within its Indo-Pacific strategy (Farrell and Newman, 2019; IEA, 2026).

VIII. INDIA'S POLICY AND INSTITUTIONAL RESPONSE

In response to the vulnerability of critical minerals, India's strategy for addressing it has moved away from a focus on extraction alone and is now expanding to embrace exploration, procurement from

overseas, processing, technology and recycling. This shift in approach indicates that India realizes that security of its economy and technology in future cannot rely only on geological endowment within India. The aim is to build a diversified supply chain that will support its strategic industries while minimizing dependency on concentrated external sources (MoM, 2023; IEA, 2026).

In response, NCMM was introduced which will cover all processes of the mineral value chain (MoM, 2025). Importance of NCMM lies in the fact that integrated nature of this mission will address the issue of mineral security in India from an industrial and technological standpoint.

Indian government has also made improvements in the regulations concerning critical minerals. This has been done by amending the Mines and Minerals (Development and Regulation) Act. Government has included 24 critical minerals under Part D of the First Schedule of this act thereby giving the Central Government ability to hold auctions for mining concessions of critical minerals. The initiative was aimed at speeding up mining of critical minerals (MoM, 2025).

The overseas dimension of India's strategy has become equally important. Under KABIL, the involvement of India for lithium exploration in Argentina is a sign of India's efforts to gain direct access to overseas minerals rather than resorting to spot-market transactions alone. Such an effort offers India more assurance of visibility regarding the supply of minerals, though overseas ventures will still be prone to geopolitical, economic, geological and logistical risks. Recycling and secondary recovery are increasingly being seen by India as part of mineral security. Recycling would alleviate pressures on imports and provide India with its own sources of minerals through secondary sources such as batteries, electronic waste, etc. This makes the consideration of secondary sources for recovery by the NCMM relevant as it brings together mineral policy and the circular economy (MoM, 2025).

However, there are several limitations in place. India's processing and refining facilities are not enough for future needs, and overseas ventures take time to become productive. Policy implementation must therefore move beyond securing individual mineral assets towards building integrated value chains. India also needs greater technological capability in mineral separation, refining, advanced materials and recycling (IEA, 2026).

Consequently, India's existing policy framework provides an important foundation but cannot independently eliminate supply vulnerability. External partnerships remain essential, and ASEAN can play a particularly important role because of its geographical proximity, mineral resources, emerging processing capacity and position within Indo-Pacific manufacturing networks (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024). The next challenge is therefore to convert India's policy framework into a structured India–ASEAN critical-mineral partnership.

IX. ASEAN AS A STRATEGIC MINERAL PARTNER FOR INDIA

ASEAN's strategic importance for India lies in its mineral resources, processing capabilities, manufacturing networks and connectivity, so that this region can potentially contribute to India's critical-mineral security. According to the 2026 review by the OECD, Southeast Asia has about 46% of the world's nickel resources, while Indonesia and the Philippines have about 68% of the world's

nickel output. However, according to the same report, India has substantial rare earth minerals and recently discovered lithium resources. Yet, both India and Southeast Asia lag in downstream processing and value addition (OECD, 2026).

For India, this creates a relationship of strategic complementarity. India has growing demand for minerals in sectors such as electric mobility, batteries, renewable energy, electronics and advanced manufacturing, whereas several ASEAN economies possess resources and emerging processing capabilities relevant to these sectors. The objective should therefore be to connect India's demand and investment capabilities with ASEAN's mineral and industrial capacities rather than establishing a conventional buyer–seller relationship (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

9.1 INDONESIA AND INDIA'S NICKEL SECURITY

Indonesia is especially significant to the nickel strategy of India. Nickel is a necessary metal in batteries, stainless steel, and other industries. Downstream-focused mineral policy of Indonesia has led to a considerable increase in its own processing capabilities and investment. Yet according to the OECD, most of the value addition still occurs at the midstream level, and this industry suffers from environmental and financial problems (OECD, 2026).

For India, Indonesia may thus serve two purposes. Firstly, Indonesia may be used as a close-by resource for nickel diversification. Secondly, cooperation may include joint refining and battery materials production. India must, therefore, look to enter into long-term business dealings and invest in Indonesia (Seah and Huda, 2024).

9.2 PHILIPPINES AND SUPPLY DIVERSIFICATION

Philippines represents another chance for diversification of India's nickel sources. This is especially significant since reliance on one source will further raise the risk of dependency that India is trying to avoid. Participation of India in mining, processing and other mineral infrastructure in Philippines can thus create an additional supply source (Seah and Huda, 2024; OECD, 2026).

India's engagement, however, should include safeguards both for environment and communities. The environmental and social pressures in the region relate to the nickel mining in Palawan. Thus, India's mineral diplomacy should ensure responsible sourcing and not consider supply security separately from environmental governance (OECD, 2026; Bilek, Ramdoo, and Hendriwardani, 2024).

9.3 VIETNAM AND INDIA'S RARE-EARTH REQUIREMENTS

Vietnam has potential to play an important role in the rare earth strategy of India. Use of rare earth elements range from permanent magnets, electric motors, electronics to renewable energy and defence technologies. Their strategic significance is increased due to the clustering of processing operations as well as magnet manufacture (IEA, 2026; Seah and Huda, 2024).

Such cooperation should be directed towards the development of a whole value chain rather than mere increase in imports. Collaboration in exploration, separation, processing, research and applica-

tion of rare earths can facilitate India to diversify its rare earth sources as well as support industrial upgrading of Vietnam (Bilek, Ramdoo, and Hendriwardani, 2024).

9.4 MALAYSIA AND MIDSTREAM COOPERATION

Malaysia is relevant because it represents an emerging processing location within Southeast Asia. It is strategically important because the principal vulnerability in critical-mineral markets often lies not at the mining stage but in refining and material processing (IEA, 2026; Seah and Huda, 2024). Developing India–Malaysia cooperation in rare-earth processing, technology and advanced materials could therefore contribute more to resilience than simple mineral trade (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

9.5 ASEAN'S INSTITUTIONAL OPPORTUNITY

ASEAN is also trying to achieve greater regional cooperation. ASEAN Minerals Cooperation Action Plan 2026–2030 provides a framework for cooperation in trade and investment, sustainable mineral development, capacity building and mineral information. It explicitly seeks greater cooperation across the mineral value chain and aims to strengthen ASEAN's capacity for downstream development (ASEAN, 2025).

This creates an institutional opportunity for India. Rather than negotiating only with individual ASEAN states, India could use the existing ASEAN framework to develop regional dialogue on critical minerals. Cooperation could include geological information, responsible-mining standards, investment facilitation, technology partnerships and regional supply-chain mapping (ASEAN, 2025; Bilek, Ramdoo, and Hendriwardani, 2024).

9.6 INDIA AS AN INVESTOR AND TECHNOLOGY PARTNER

The partnership must be equally reciprocal in nature. India should look ASEAN not just for minerals but as partners providing investments, expertise and technology in engineering, manufacturing, and processing (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

Such a partnership would allow ASEAN economies to maximise the benefit from their mineral wealth as well as increase India's leverage and visibility within the supply chain. The aim, in other words, is to forge a mineral partnership between India and ASEAN wherein mineral resources, investments, technology and manufacturing processes are mutually integrated. This would complement domestic efforts and foreign acquisitions on the part of India and generate new nodes in the Indo-Pacific supply chain (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

X. CHINA, STRATEGIC AUTONOMY AND THE INDO-PACIFIC CRITICAL-MINERAL ARCHITECTURE

The role of China in global critical-mineral supply chains is essential to understanding India's strategic vulnerability. The issue is not simply China's ownership of mineral resources but its dominance in processing, refining, specialised technologies and downstream manufacturing. The IEA reports

that China accounts for more than 90% of global refining for gallium, graphite, manganese and rare earths, while the average share of the largest refining country across key energy minerals reached 72% in 2025 (IEA, 2026).

Rare earths illustrate this concentration most clearly. In 2024, China accounted for about 60% of global production of magnet rare-earth minerals, rising to 91% in refining and 94% in sintered permanent-magnet manufacturing (IEA, 2026). The central problem is therefore vulnerability created by concentration in the midstream and downstream stages of the value chain rather than merely the availability of mineral deposits (IEA, 2026).

For India, this concentration creates a direct challenge to strategic autonomy. Its expanding electric-vehicle, renewable-energy, electronics, telecommunications and defence sectors increasingly require materials whose processing is concentrated outside the country. Consequently, disruptions to external processing or export restrictions can affect Indian industries even when alternative mineral deposits exist elsewhere. The study carried out by IEA on export control in 2025 illustrates the manner in which efficient supply chains become sources of economic security risk due to their concentration (IEA, 2026).

But this is not to say that India must pursue full decoupling from China because China continues to be a major player in international minerals trade and decoupling from China would be very costly for India. A more realistic approach is therefore de-risking through diversification. This requires multiple suppliers, greater domestic processing capacity, overseas mineral acquisitions, technological development and alternative regional value chains (IEA, 2026; OECD, 2026).

ASEAN is particularly important within this strategy because diversification does not require geographical separation from Asia. Indonesia's position in nickel, Malaysia's emerging role in rare-earth processing and Vietnam's potential in rare-earth value chains demonstrate that alternative capacities can be developed within the broader Asian economic system. The IEA also identifies Malaysia and Vietnam among countries contributing to diversification in rare-earth refining and downstream capacity (Seah and Huda, 2024; IEA, 2026).

The Indo-Pacific provides the broader geoeconomic context for this strategy. Critical-mineral supply chains connect South Asia, Southeast Asia, East Asia and global markets through production networks, ports, maritime routes, financial flows and manufacturing systems. India's engagement with ASEAN can therefore strengthen the resilience of the wider Indo-Pacific economic architecture (IEA, 2026; Seah and Huda, 2024).

Mineral security is also closely connected with maritime connectivity. Minerals extracted in Southeast Asia must move through regional transportation networks before reaching Indian processing and manufacturing centres. Disruption to ports, shipping lanes or chokepoints may consequently have implications for mineral security despite functioning mining and processing facilities. Supply-chain resilience consequently requires India to integrate mineral diplomacy with connectivity and maritime economic security (IEA, 2026).

This Indo-Pacific dimension also expands the significance of India's Act East Policy. Traditionally centred on trade, connectivity, cultural relations and strategic cooperation, engage-

ment with Southeast Asia can now incorporate critical minerals as an economic-security pillar. Mineral partnerships with ASEAN can connect India's industrial requirements with regional resource, processing and manufacturing networks (Kipgen, 2020; Seah and Huda, 2024).

The strategic objective should therefore be to create distributed supply-chain capacity, rather than simply replace one dominant supplier with another. India should pursue multiple mineral sources, processing locations and technological partnerships to reduce the ability of any single actor to exert excessive structural influence over its strategic industries (Farrell and Newman, 2019; IEA, 2026).

Thus, India–ASEAN critical-mineral cooperation can become an instrument of Indo-Pacific economic resilience. It can complement India's domestic critical-mineral policies while strengthening industrial capability and strategic autonomy. ASEAN should therefore be viewed not merely as a source of minerals, but as part of a diversified regional network through which India can strengthen supply security, manufacturing capacity and strategic autonomy (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

XI. INDIA–ASEAN CRITICAL MINERAL VALUE-CHAIN INTEGRATION

The central requirement is to develop India-ASEAN cooperation across the entire critical-mineral value chain, from exploration and extraction to beneficiation, processing, refining, manufacturing and recycling. This approach goes hand-in-hand with India's National Critical Mineral Mission, which clearly states that development of capabilities in the entire value chain is important (MoM, 2025). This also aligns with the goals of ASEAN for promoting upstream and downstream mineral cooperation under ASEAN Minerals Cooperation Action Plan 2026-2030 (ASEAN, 2025). At the extraction stage, Indian public and private companies can participate through equity investments and long-term offtake agreements. Such arrangements would provide India with greater supply visibility than dependence on short-term market purchases. The midstream stage is strategically more important. Processing, separation and refining determine whether mineral resources can be converted into industrial inputs. India should therefore pursue joint processing projects with mineral-producing ASEAN economies, particularly where India can contribute technology, capital and downstream demand. Cooperation in rare-earth separation, nickel processing and battery-material production could create alternative processing nodes outside highly concentrated supply chains. The downstream stage provides strongest opportunity for mutual economic benefit. Joint ventures could therefore connect ASEAN mineral resources with Indian and Southeast Asian manufacturing ecosystems (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

Finally, recycling should become an integral component of the regional value chain. India and ASEAN can cooperate on battery collection, electronic-waste processing, recovery technologies and common standards for secondary minerals. Recycling would create additional sources of supply while reducing pressure on primary mining (MoM, 2025; Seah and Huda, 2024).

Thus, the objective should be to establish a regional India–ASEAN critical-mineral ecosystem in which resources, capital, technology, manufacturing and recycling reinforce one another. Such integration would strengthen India's supply security while simultaneously supporting ASEAN's downstream industrialisation (Bilek, Ramdoo, and Hendriwardani, 2024).

XII. CHALLENGES TO INDIA–ASEAN CRITICAL MINERAL COOPERATION

Despite great potential, India-ASEAN cooperation has certain structural and institutional limitations. One is that there are differences in national regulations. ASEAN member states maintain different mining laws, investment regimes, environmental standards and export policies. This may create complications for regional value chain integration and raise uncertainty for Indian companies (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

The second challenge is processing and technological capability. Mineral extraction can be expanded relatively faster than sophisticated refining and downstream manufacturing. The persisting concentration of processing around the world shows that other supply chains would require large technological investments.

Thirdly, critical-mineral projects require high levels of financing and are subject to volatility. According to IEA, the investment in critical minerals fell in 2025 even though demand kept growing. Hence, India needs financial solutions that will help fund projects where there is uncertainty in their commercial profitability (IEA, 2026).

Environmental and social issues represent another problem. Mining and processing may have considerable ecological effects, and poorly regulated projects may run into local opposition. Thus, responsible sourcing should become an integral part of India's mineral diplomacy (IEA, 2023; United Nations Panel on Critical Energy Transition Minerals, 2024).

Lastly, China has well-established processing and manufacturing network that raises competition. Indian investment may face higher costs and technological barriers when attempting to establish alternative capacity. India–ASEAN cooperation must therefore focus on long-term strategic value rather than competing exclusively on short-term price (IEA, 2026; Seah and Huda, 2024).

XIII. POLICY RECOMMENDATIONS

India should establish a dedicated India–ASEAN Critical Minerals Partnership within the existing institutional framework, bringing together India's Ministry of Mines, Ministry of External Affairs, relevant ministries and ASEAN counterparts to identify priority minerals, coordinate investment and facilitate cooperation while complementing the ASEAN Minerals Cooperation Action Plan (ASEAN, 2025).

Second, India should adopt long-term investment and offtake strategies instead of relying primarily on spot-market purchases. Public-sector enterprises and private companies should secure equity stakes and long-term supply agreements in strategically important ASEAN projects, enhancing supply security and India's value-chain presence (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

Third, India and ASEAN should establish a Critical Mineral Investment Fund involving public institutions, private investors and development-finance organisations. It should focus on processing, refining, batteries, rare earths and recycling, especially since diversification projects may be costlier

at first than existing supply chains (IEA, 2026; OECD, 2026).

Fourth, cooperation should emphasise technology and processing through joint research centres and industry partnerships in rare-earth separation, refining, advanced materials, battery technologies and recycling. India's scientific and manufacturing capabilities can complement ASEAN's resource and processing capacities (Seah and Huda, 2024; Bilek, Ramdoo, and Hendriwardani, 2024).

Fifth, both sides should develop a regional critical-mineral recycling network with common standards for battery collection, electronic waste, mineral recovery and traceability. This could generate secondary supplies of lithium, nickel, cobalt and graphite while reducing pressure on primary extraction (MoM, 2025; Seah and Huda, 2024).

Sixth, critical-mineral diplomacy should be integrated with India's broader Indo-Pacific connectivity strategy. Ports, logistics corridors and maritime routes should be assessed for supply-chain security, while alternative transportation arrangements reduce dependence on individual chokepoints (Kipgen, 2020; Seah and Huda, 2024).

Lastly, India should have strategic stockpiling of minerals that are highly concentrated and not easily substitutable. These should complement diversification and domestic production by providing temporary protection during disruptions (IEA, 2026; MoM, 2023). Together, these measures can transform India–ASEAN cooperation from conventional resource trade into a strategic value-chain partnership, strengthening resilience and India's strategic autonomy without pursuing complete economic decoupling (Farrell and Newman, 2019; Gereffi, 2018).

XIV. CONCLUSION

Critical minerals are becoming an important factor for determining economic security, technology strength and strategic independence of India. Move towards electric mobility, renewable energy, advanced electronics, telecommunications and advanced defence technologies has increased the dependency on geographically clustered supply chains of minerals. Hence, the problem of critical minerals in India needs to be solved by a holistic approach including domestic exploration, overseas mineral sourcing, processing capabilities, technology, recycling and international partnerships.

India's policy response is increasingly moving in this direction through the identification of 30 critical minerals, the National Critical Mineral Mission, regulatory reforms, overseas acquisitions through KABIL and greater emphasis on recycling. However, these measures will have limited strategic effectiveness if India remains dependent on concentrated external processing and technological networks. Strategic autonomy therefore requires diversified interdependence rather than complete self-sufficiency or isolation.

In this context, ASEAN is an important strategic partner. Indonesia and the Philippines can diversify nickel supplies, Vietnam has prospects for rare earths cooperation, whereas Malaysia can assist in midstream activities and processing. The proximity of ASEAN, its manufacturing network, and increasing importance in critical minerals' value chains make it a pertinent actor. Therefore, India must

go beyond simple mineral imports towards investing in ASEAN countries through equity, offtake agreements, joint processing, technology transfer, and manufacturing as well as recycling.

Indo-Pacific provides the larger strategic context. Combining India's needs with ASEAN's resource base, processing capabilities, investments, and manufacturing networks will allow India to diversify without completely decoupling from China. Thus, critical-mineral diplomacy can become an important pillar of India's Indo-Pacific strategy, strengthen economic and technological security while create downstream value-added opportunities for ASEAN.

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