Background Guide: UNGA

Governing the Geopolitics of Rare Earths and Critical Minerals.

Letter from the Executive Board

United Nations General Assembly

Dear Delegates,

It is our pleasure to welcome you to the United Nations General Assembly. We look forward to engaging with you on an agenda that lies at the heart of some of the most significant political, economic, and ethical challenges facing the international community today: **Governing the Geopolitics of Critical Minerals and Rare Earths**.

At first glance, minerals may appear to be a technical or economic subject. Yet the materials discussed under this agenda underpin modern life in profound ways. From renewable energy systems and electric vehicles to digital technologies, medical equipment, and national defence infrastructure, critical minerals form the material foundation of contemporary societies. As global demand for these minerals accelerates, so too do concerns related to supply security, environmental degradation, social justice, and geopolitical competition.

This agenda has been selected for the General Assembly because it raises questions that extend beyond any single country or sector. Issues of sovereignty over natural resources, unequal distribution of benefits and burdens, environmental harm across borders, labour conditions, and strategic dependence cannot be resolved through markets or bilateral negotiations alone. They require multilateral dialogue, shared principles, and an appreciation of the limits and possibilities of international cooperation.

The United Nations General Assembly does not possess enforcement authority over trade, mining, or industrial policy. However, it plays a crucial role in shaping global norms, articulating collective concerns, and framing what is considered legitimate behaviour in international politics. Your task as delegates is not to “solve” the issue in absolute terms, but to engage with its complexity, acknowledge competing interests, and explore pathways that reduce harm, manage risk, and promote equitable outcomes.

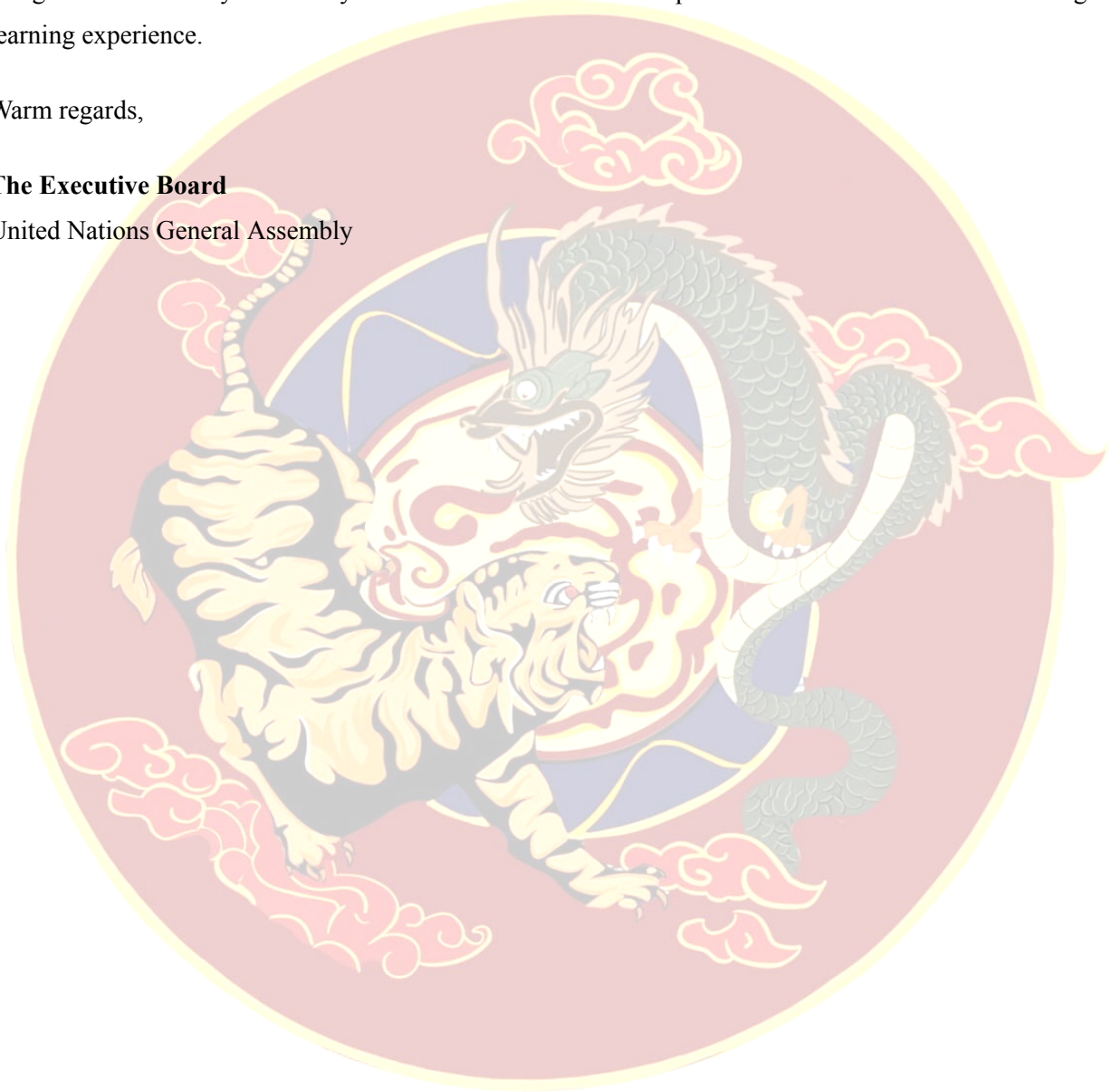
We encourage you to approach this committee with curiosity, restraint, and analytical depth. Strong participation will require you to move beyond slogans and simple answers. You will need to understand how mineral supply chains function, where power is concentrated, how international law applies and where it falls short, and why well-intended policies can sometimes create unintended consequences.

Most importantly, we urge you to remember that this agenda is not abstract. Decisions made around critical minerals affect real communities, ecosystems, and future generations. Your deliberations should reflect an awareness of these human and environmental dimensions alongside national interests.

We look forward to thoughtful debate, respectful engagement, and well-reasoned contributions from all delegations. We wish you the very best for the committee and hope this conference serves as a meaningful learning experience.

Warm regards,

The Executive Board
United Nations General Assembly



The United Nations General Assembly: Mandate, Authority, and Committee Structure

Mandate of the United Nations General Assembly

The United Nations General Assembly is the main deliberative and representative organ of the United Nations. It was established in 1945 under the Charter of the United Nations and serves as the only UN body in which all member states are represented on an equal basis, each with one vote (United Nations, 1945).

The General Assembly's mandate is broad and political rather than executive or judicial. Under the UN Charter, the General Assembly is authorised to:

- Discuss and make recommendations on any issue within the scope of the UN Charter (United Nations, 1945, Art. 10)
- Promote international cooperation in political, economic, social, cultural, and humanitarian fields (Art. 13)
- Encourage the progressive development and codification of international law (Art. 13)
- Promote human rights and fundamental freedoms for all (Art. 13)
- Consider principles governing disarmament and international peace (Arts. 11–14)
- Review the functioning of other UN organs (Arts. 10–17)

Unlike the Security Council, the General Assembly does not have enforcement powers. Its resolutions are not legally binding, except in matters related to the internal functioning of the UN, such as budgetary decisions and administrative matters (United Nations, 1945, Arts. 17–18). However, General Assembly resolutions carry political, moral, and normative authority, particularly when adopted by large majorities or by consensus (UN General Assembly, 2019).

This makes the General Assembly a forum for global legitimacy-building rather than rule enforcement.

Why UNGA Discusses Issues Like Critical Minerals

Issues are brought before the General Assembly when they:

- Affect a large number of states
- Involve questions of equity, development, or global justice
- Cut across multiple domains such as trade, environment, security, and human rights
- Cannot be resolved by markets or bilateral negotiations alone (United Nations, 1945; UNGA, 2015)

Critical minerals fall squarely within this category. They raise questions about:

- Sovereignty over natural resources (UNGA, 1962)
- Unequal distribution of costs and benefits between producing and consuming states (UNEP, 2020)
- Environmental and social harm that can cross national borders (United Nations, 1972; United Nations, 1992)
- Strategic competition, dependency, and security concerns (IEA, 2025)
- The long-term sustainability of global energy and technological transitions (IEA, 2024)

Because no single international institution governs critical minerals comprehensively, the General Assembly becomes a space where norms are debated, narratives are contested, and shared principles are articulated (UNEP, 2020).

Powers and Limitations of the General Assembly

What the General Assembly Can Do

The General Assembly can:

- Pass resolutions expressing collective political positions of the international community (United Nations, 1945, Art. 10)
- Establish principles and norms, such as Permanent Sovereignty over Natural Resources (UNGA, 1962)
- Mandate studies, reports, and assessments by UN agencies and expert bodies (United Nations, 1945, Art. 13)
- Convene high-level meetings, special sessions, and thematic debates (UNGA, 2019)
- Create subsidiary bodies and committees (United Nations, 1945, Art. 22)
- Provide platforms for states to explain, justify, and contest their policies publicly

Over time, repeated resolutions and debates can shape international expectations and influence state behaviour indirectly, contributing to the development of customary international law and global norms (UNGA, 2019).

What the General Assembly Cannot Do

The General Assembly cannot:

- Impose sanctions
- Enforce compliance with its resolutions
- Regulate international trade or investment directly
- Override national sovereignty
- Compel states to follow its recommendations

As a result, its influence operates through persuasion, legitimacy, and political pressure rather than coercion (United Nations, 1945).

Committee System of the General Assembly

To manage its wide-ranging agenda, the General Assembly works through six Main Committees, each focusing on a specific thematic area. Most substantive discussions take place in these committees before resolutions are adopted in plenary (UNGA, 2019).

First Committee – Disarmament and International Security

Focuses on arms control, disarmament, and international security issues.
Critical minerals may appear here when linked to defence technologies, strategic materials, or military supply chains.

Second Committee – Economic and Financial (ECOFIN)

Deals with economic growth, development, financing, and sustainability.
Critical minerals are most commonly discussed here, particularly in relation to development, trade, industrialisation, inequality, and sustainable resource use (UNEP, 2020).

Third Committee – Social, Humanitarian, and Cultural

Addresses human rights, labour issues, Indigenous rights, and social development.
Environmental justice, displacement, labour conditions, and child labour linked to mining are often raised in this committee (OHCHR, 2011).

Fourth Committee – Special Political and Decolonisation

Focuses on self-determination, decolonisation, and special political issues.
Resource sovereignty and historical extraction patterns may arise in this context (UNGA, 1962).

Fifth Committee – Administrative and Budgetary

Handles UN finances and administrative matters.
While not directly related to mineral governance, it determines funding for UN programmes addressing environmental protection and development.

Sixth Committee – Legal

Deals with international law and legal questions.
Issues such as sovereignty over natural resources, treaty interpretation, environmental obligations, and state responsibility relevant to mineral governance may be debated here.

How Resolutions Are Adopted

Resolutions in the General Assembly are typically adopted by:

- A simple majority for most questions (United Nations, 1945, Art. 18), or
- A two-thirds majority for important questions such as peace and security, admission of new members, and budgetary matters

Resolutions may be adopted by vote or by consensus. While not legally binding, resolutions adopted by overwhelming majorities carry strong political weight and frequently influence subsequent negotiations, institutional practice, and national policies (UNGA, 2019).

Introduction to the Agenda - Governing the Geopolitics of Rare Earths and Critical Minerals

Why Critical Minerals Matter Today

Modern economies depend on a group of materials that rarely attract public attention, yet quietly underpin everyday life and strategic power. Smartphones, laptops, renewable energy systems, electric vehicles, satellites, medical imaging equipment, data centres, and advanced defence technologies all rely on specific mineral inputs that are difficult or impossible to substitute at scale. These materials include lithium, cobalt, nickel, graphite, manganese, copper, gallium, germanium, and a group collectively known as rare earth elements. Governments and international organisations increasingly refer to these materials as *critical minerals*.

The term “critical” does not imply geological scarcity. Many of these minerals exist in substantial quantities globally. Instead, a mineral becomes critical when two conditions coincide: it plays a central role in key economic or strategic sectors, and its supply is vulnerable to disruption due to concentration, long development timelines, geopolitical tension, environmental constraints, or regulatory barriers (International Energy Agency [IEA], 2024). Criticality is therefore a political and economic designation rather than a purely scientific one.

Critical minerals as enablers of contemporary life

Critical minerals are foundational to three interlinked transformations shaping the twenty-first century: the energy transition, digitalisation, and defence modernisation. Each of these domains depends on materials that have no easy substitutes and require complex global supply chains.

The global shift toward low-carbon energy systems is one of the most powerful drivers of mineral demand. Renewable energy technologies are significantly more material-intensive than fossil fuel-based systems. Electric vehicles require lithium, cobalt, nickel, manganese, and graphite for batteries, as well as rare earth elements for electric motors. Wind turbines rely heavily on rare earth magnets for efficiency, while solar energy systems require large quantities of copper, silicon, and silver (IEA, 2024).

According to the *Global Critical Minerals Outlook 2024*, demand for several key minerals is projected to increase dramatically by 2040 under policies already announced by governments. Lithium demand could increase by approximately eight times, graphite by four times, and demand for nickel, cobalt, and rare earth elements by roughly two to three times, depending on the policy pathway and technological assumptions (IEA, 2024). These projections are directly linked to climate commitments rather than hypothetical scenarios.

At the same time, mineral demand is accelerating due to digital transformation. Data centres, artificial intelligence hardware, semiconductors, telecommunications infrastructure, and advanced electronics all require specialised materials, including gallium, germanium, copper, and rare earth elements. These technologies are increasingly viewed as strategic assets rather than neutral commercial goods, further elevating the political significance of their material inputs.

Defence and security considerations reinforce this trend. Modern weapons systems, radar technologies, satellites, and communications equipment depend on specialised alloys, magnets, and electronic components that rely on critical minerals. As a result, mineral supply chains are now closely linked to military readiness and strategic autonomy, particularly among major powers (IEA, 2025).

Why supply systems struggle to keep pace

While demand for critical minerals is growing rapidly, supply systems face structural constraints that limit their ability to respond quickly. Mining is not a short-term activity. New mineral projects often require 10 to 20 years to progress from exploration to production due to geological uncertainty, financing challenges, environmental assessments, community consultation, permitting processes, and infrastructure development (UNEP, 2020).

Processing and refining facilities face similar barriers. These stages are technologically complex, capital-intensive, energy-intensive, and environmentally sensitive. They also generate significant waste and pollution, making them politically and socially contested. As a result, expanding processing capacity is often slower and more difficult than expanding mining itself (IEA, 2025).

This creates a structural mismatch. Demand can increase rapidly due to policy decisions, technological adoption, or geopolitical shocks, while supply responds slowly. The result is price volatility, heightened geopolitical leverage, and competition over control of supply-chain bottlenecks.

Concentration and hidden chokepoints in supply chains

Public discussion often focuses on where minerals are mined, but mining is only one part of the supply chain. In many cases, the greatest concentration, and therefore the greatest vulnerability lies in downstream stages such as processing, refining, and manufacturing.

Even when mining is geographically diversified, dependence on a small number of processing hubs can recreate systemic risk. The International Energy Agency has consistently highlighted that processing capacity for several critical minerals is far more concentrated than mining itself, making these stages strategic chokepoints (IEA, 2025).

This explains a key paradox in contemporary mineral geopolitics. Countries with abundant mineral deposits may remain economically vulnerable and politically constrained, while countries with limited geological resources can exert disproportionate influence by controlling refining capacity, manufacturing ecosystems, and technology integration. Power in mineral governance is therefore distributed unevenly across the value chain rather than determined solely by resource endowment.

The shift from markets to security

As vulnerabilities in mineral supply chains have become clearer, governments have increasingly reframed critical minerals as strategic assets rather than ordinary commodities. This shift is often described as *securitisation*, meaning that economic issues are treated as matters of national security.

In January 2026, the United States issued a presidential action titled *Adjusting Imports of Processed Critical Minerals and Their Derivative Products into the United States*, explicitly linking processed minerals to national security concerns under Section 232 of the Trade Expansion Act of 1962 (The White House, 2026). This action signalled that vulnerability extends beyond raw extraction to downstream processing and manufacturing.

Similarly, the European Union adopted the *Critical Raw Materials Act*, which sets benchmarks for domestic extraction, processing, and recycling, and introduces diversification targets to limit dependence on any single external supplier (European Commission, n.d.). These policies reflect a broader global trend: mineral supply chains are increasingly treated as strategic infrastructure that must be secured rather than markets that can be left to global price signals.

While such policies may enhance national resilience, they also fragment global markets and intensify

competition. When multiple states pursue similar strategies simultaneously, the result can be duplication of supply chains, reduced efficiency, and increased geopolitical tension.

Environmental and social costs enter the global debate

At the same time that minerals are promoted as enablers of climate solutions, their extraction and processing raise profound environmental and social concerns. Mining can cause land degradation, water pollution, biodiversity loss, and the generation of large volumes of hazardous waste. Communities near mining sites often experience displacement, livelihood disruption, and health risks (UNEP, 2020).

Labour conditions in some mineral supply chains remain a serious concern. Artisanal and small-scale mining, which supports millions of livelihoods globally, often takes place under unsafe conditions and with limited regulatory oversight. In certain contexts, child labour and forced labour have been documented, drawing international scrutiny and prompting calls for stronger governance mechanisms (ILO, n.d.; UNICEF, 2017).

This creates a central tension in contemporary governance debates. Critical minerals are essential for addressing climate change and technological development, yet their extraction can undermine environmental protection and social justice if governance does not improve. As a result, mineral supply chains sit at the intersection of climate policy, development policy, human rights, and security.

Why critical minerals appear on the UN General Assembly agenda

The United Nations General Assembly does not regulate mining operations, impose trade tariffs, or direct industrial policy. Yet critical minerals increasingly appear on its agenda because they raise questions that cannot be resolved through markets or unilateral state action alone.

These questions include the distribution of benefits and burdens from mineral extraction, the management of transboundary environmental harm, the ethical dimensions of supply chains, and the risks of geopolitical escalation over essential resources. UNGA provides a forum where producing countries, consuming countries, and transit states can articulate concerns, contest narratives, and frame norms for acceptable behaviour.

Even without enforcement power, the language adopted in UNGA debates shapes legitimacy in international politics. How states justify mineral policies, how environmental and social harms are

framed, and how responsibility is allocated across supply chains are all influenced by the normative environment shaped in multilateral forums.

The Historical Evolution of Global Resource Governance

Understanding the current geopolitics of critical minerals requires looking beyond present-day supply chains and policy debates. Contemporary tensions are rooted in a longer history of how the international system has governed natural resources. Over the past seventy years, global resource governance has moved through several distinct phases: post-war sovereignty, developmental resource nationalism, market-led liberalisation, and the recent return of security-oriented thinking. Each phase has left institutional, legal, and political legacies that shape today's mineral governance challenges.

Post-war foundations: sovereignty as a corrective to colonial extraction

In the decades following the Second World War, global resource governance was shaped by the collapse of colonial empires and the emergence of newly independent states. For many of these states, control over natural resources was inseparable from political independence. Colonial economic systems had been structured around extraction for external benefit, with limited domestic industrial development and little concern for local welfare.

In this context, resource sovereignty emerged as a foundational principle of international political economy. This principle was most clearly articulated in 1962, when the United Nations General Assembly adopted Resolution 1803 (XVII) on *Permanent Sovereignty over Natural Resources*. The resolution affirmed that states have the right to regulate and exploit natural resources within their territories in accordance with national development objectives and the well-being of their populations (UNGA, 1962).

Although Resolution 1803 was not legally binding, it became a powerful normative reference. It shaped state practice on nationalisation, licensing, taxation, and control over foreign investment. For developing countries, sovereignty over resources was understood as a corrective to historical exploitation and a necessary condition for economic development.

At the same time, environmental considerations played a minimal role in early post-war resource governance. Rapid industrialisation and economic growth were prioritised, and extraction was largely treated as a technical and economic matter rather than a social or ecological one. This emphasis on ownership and control would later prove insufficient to address the broader consequences of resource

dependence.

Resource nationalism and the New International Economic Order

During the 1970s, natural resources moved to the centre of global debates about economic inequality and development. Many developing countries argued that the international economic system locked them into low-value extraction while industrialised states captured the majority of profits through processing, manufacturing, and technology.

This critique formed part of the broader movement for a New International Economic Order (NIEO), which sought to rebalance global economic relations. Resource-rich states pursued policies such as nationalisation of extractive industries, renegotiation of contracts, and increased state participation in mining and energy sectors. In some cases, producer countries attempted to coordinate supply or influence prices through collective action.

UNGA resolutions during this period increasingly linked natural resources to development rights, equity, and global justice. These resolutions reinforced the idea that resource governance was not merely about efficiency, but about fairness and historical responsibility.

However, the NIEO era also revealed structural limits. Commodity markets remained volatile, technological substitution reduced leverage in some sectors, and political pressure from major consuming countries constrained collective action. By the late 1970s and early 1980s, global economic conditions shifted dramatically.

Liberalisation, globalisation, and the rise of corporate power

The debt crises of the 1980s marked a turning point in global resource governance. Many resource-rich states faced severe fiscal pressure and were encouraged, often through conditional lending, to liberalise their economies, attract foreign investment, and reduce direct state control over extractive sectors.

From the late 1980s onward, global resource governance increasingly relied on market mechanisms and private capital. Multinational corporations expanded their role across mining, processing, and trade. Governance shifted away from multilateral coordination toward bilateral investment treaties, commercial contracts, and private risk-management arrangements.

This period produced mixed outcomes. On one hand, mineral production increased and global supply chains became more integrated. On the other hand, environmental damage, labour exploitation, and community displacement became more visible, particularly in regions with weak regulatory capacity. Governance responses remained fragmented and largely voluntary, relying on corporate social responsibility initiatives rather than binding international rules (UNEP, 2020).

Crucially, this phase also reshaped power relations in resource governance. Control increasingly shifted away from states toward corporations that managed technology, finance, and downstream processing. Even where states retained legal ownership of resources, effective leverage often rested elsewhere.

The emergence of environmental governance alongside extraction

Environmental concerns began to enter global resource governance more explicitly in the 1970s and 1990s, particularly following the Stockholm Conference on the Human Environment (1972) and the Rio Earth Summit (1992). These milestones established the principle that states have both the right to exploit their resources and the responsibility to prevent environmental harm beyond their borders.

Despite this recognition, environmental governance remained weakly integrated into resource extraction. Environmental impact assessments, waste management, and pollution control were implemented unevenly across countries. For much of the late twentieth century, environmental protection was treated as secondary to economic growth, particularly in resource-dependent economies.

This legacy continues to shape critical mineral governance today. Many of the environmental risks associated with mining and processing: tailings failures, water contamination, biodiversity loss, reflect decades of regulatory gaps and underinvestment in oversight capacity (UNEP, 2020).

From markets to security: the contemporary shift

The early twenty-first century marked another major transition. Supply disruptions, rising geopolitical competition, and the accelerating energy transition exposed the limitations of market-driven resource governance. States began to reassess the risks associated with dependence on concentrated supply chains, particularly where processing and refining were dominated by a small number of actors.

Unlike earlier periods, contemporary resource politics focus less on ownership of deposits and more on control of value chains. Processing, refining, manufacturing, and technology integration have become the

primary sites of strategic leverage. This shift explains why states with limited geological resources can wield significant influence, while resource-rich countries may remain vulnerable.

The International Energy Agency has noted that this concentration creates systemic risks and increases the likelihood that minerals will be used as tools of geopolitical pressure (IEA, 2025). As a result, states increasingly frame mineral policy through the language of security, resilience, and strategic autonomy.

Historical legacies shaping today's critical mineral debates

The current geopolitics of critical minerals cannot be understood in isolation. They reflect layered historical legacies:

- the post-war emphasis on sovereignty and control,
- the development-focused critiques of the NIEO era,
- the market-driven liberalisation of the late twentieth century,
- the partial integration of environmental concerns, and
- the recent return of security-oriented thinking.

Each phase addressed certain problems while leaving others unresolved. Sovereignty corrected colonial extraction but did not ensure sustainability. Liberalisation increased supply but weakened public oversight. Environmental norms emerged but lacked enforcement. Security framing highlights vulnerability but risks escalation.

These unresolved tensions converge in today's debates on critical minerals, making governance both urgent and contested.

What Are Critical Minerals and How the Supply Chain Works

Critical minerals are not defined solely by their physical properties. They are defined by how modern economies use them and how global supply chains are structured. A mineral becomes “critical” when it plays an essential role in key technologies and when disruptions in its supply would cause significant economic, political, or security consequences. Because technologies, industries, and geopolitical relationships evolve, lists of critical minerals vary across countries and over time (IEA, 2024).

To understand why critical minerals have become such a major governance challenge, it is necessary to examine how they move from the ground into finished products. Mineral supply chains are not linear pipelines. They are complex systems involving multiple stages, each with different actors, risks, and concentrations of power. Vulnerability at any one stage can affect the entire system.

From geology to extraction: where sovereignty begins

The first stage of the supply chain is exploration and extraction. Exploration involves identifying mineral deposits through geological surveys, sampling, and testing. Extraction refers to mining the ore from the earth through open-pit, underground, or artisanal methods.

This stage is most closely associated with national sovereignty. States control access to mineral deposits through licensing regimes, environmental permits, land-use approvals, and taxation systems. In principle, this gives governments strong authority over mineral resources located within their territory, consistent with the doctrine of permanent sovereignty over natural resources (UNGA, 1962).

In practice, however, extraction often depends heavily on foreign capital, technology, and expertise. Large-scale mining projects require substantial upfront investment and technical capacity that many resource-rich countries do not possess domestically. As a result, even when states retain legal ownership of resources, operational control and financial leverage may lie with multinational corporations or external investors (UNEP, 2020).

Extraction is also the stage most directly associated with environmental and social impacts. Mining alters landscapes, generates large volumes of waste, consumes water, and can disrupt local communities. These impacts create political resistance and regulatory delays, which further slow supply responses to rising demand.

Processing and refining: the least visible but most strategic stage

After extraction, raw ore must be processed and refined before it can be used in industrial applications. Processing separates valuable minerals from waste rock, while refining increases purity and prepares materials for manufacturing.

This stage is often overlooked in public discussions, yet it is one of the most strategically important segments of the supply chain. Processing and refining are technologically complex, energy-intensive, and environmentally sensitive. They also face strict regulatory requirements related to pollution, waste management, and worker safety.

As a result, processing capacity is far more geographically concentrated than mining. The International Energy Agency has repeatedly identified refining and processing as major chokepoints in critical mineral supply chains, where dependence on a small number of countries creates systemic risk (IEA, 2025).

This concentration has profound implications. A country may host mineral deposits but still depend on foreign processing capacity to make those resources economically useful. Conversely, a country with limited geological resources can exert significant influence by controlling processing infrastructure. Power in mineral governance therefore shifts downstream, away from extraction and toward industrial capability.

Manufacturing and technology integration: where value is captured

Refined minerals are incorporated into manufactured products such as batteries, magnets, electronic components, and advanced alloys. This stage represents the point at which minerals generate the greatest economic and strategic value.

Manufacturing and technology integration are dominated by firms and countries with advanced industrial ecosystems, intellectual property, skilled labour, and access to capital. Control at this stage allows actors to shape standards, capture profits, and influence downstream markets.

From a governance perspective, this explains why many resource-rich countries struggle to move beyond extraction. Without access to processing and manufacturing capabilities, they remain locked into lower-value segments of the supply chain, despite bearing much of the environmental and social cost of

extraction (UNEP, 2020).

For consuming countries, dependence on foreign manufacturing capacity can raise concerns about supply security, technological dependence, and strategic vulnerability. These concerns increasingly drive industrial policy and diversification strategies.

Transport, trade, and logistics: the connective infrastructure

Between extraction, processing, and manufacturing lie complex systems of transport, trade, and logistics. Minerals and mineral-based products move through ports, shipping routes, rail networks, and customs systems. These flows are shaped by trade rules, insurance markets, financing arrangements, and geopolitical conditions.

Disruptions at this stage can occur due to conflict, sanctions, export controls, or infrastructure failures. Because mineral supply chains are globally integrated, disruptions in one region can rapidly affect industries elsewhere.

Logistics and trade also interact with finance. Commodity traders, banks, and insurers play a significant role in determining which projects are viable and which supply chains are considered acceptable risks. This further complicates governance, as financial actors often operate across jurisdictions and beyond the reach of single governments.

Where power concentrates along the value chain

A key insight from value-chain analysis is that power is unevenly distributed. While extraction is geographically widespread, strategic leverage often concentrates downstream, particularly in processing, refining, and manufacturing.

The International Energy Agency has highlighted that supply security risks persist even when mining expands, if downstream concentration remains unchanged (IEA, 2025). This means that simply opening new mines does not automatically reduce vulnerability or geopolitical tension.

This structure also explains why mineral geopolitics cannot be understood solely in terms of “resource-rich” versus “resource-poor” countries. Influence depends less on where minerals are located and more on who controls the stages that turn minerals into usable technologies.

Implications for governance and policy debates

The structure of critical mineral supply chains creates several governance challenges. First, policies focused only on extraction risk missing the most important sources of vulnerability. Second, environmental and social costs are often concentrated at the earliest stages, while economic benefits accumulate downstream. Third, efforts to secure supply through national policies can fragment global markets and intensify competition.

These challenges help explain why critical minerals have become a geopolitical issue rather than a purely economic one. They also explain why governance debates increasingly focus on value chains rather than individual commodities.

Why Critical Minerals Have Become a Geopolitical Issue

Critical minerals did not suddenly become important in the twenty-first century. What has changed is the way states understand and respond to their importance. Over the past two decades, minerals have moved from being treated primarily as commercial commodities to being framed as strategic assets linked to national security, technological leadership, and geopolitical influence. This shift explains why mineral policy has become closely intertwined with foreign policy and why competition over supply chains has intensified.

From economic inputs to strategic assets

For much of the post-war period, minerals were governed mainly through markets. States intervened to regulate ownership, taxation, and environmental standards, but supply and demand were largely shaped by price signals and private investment. Even during periods of resource nationalism, minerals were viewed primarily as sources of revenue and development rather than as instruments of geopolitical leverage.

This began to change in the early twenty-first century as three trends converged: rising demand linked to energy transition technologies, increasing concentration in processing and manufacturing, and growing distrust between major powers. Together, these trends transformed minerals into strategic assets whose availability could shape industrial competitiveness and security outcomes (IEA, 2024).

Once minerals are framed as strategic, market logic alone is no longer considered sufficient. Governments begin to prioritise resilience, redundancy, and control over efficiency and cost minimisation. This shift marks the beginning of what scholars describe as the “securitisation” of mineral supply chains.

Supply concentration and vulnerability

A central driver of mineral geopolitics is supply concentration. While mineral deposits exist across many regions, production and especially processing are often dominated by a small number of actors. This creates dependency relationships that are difficult to unwind quickly.

The International Energy Agency has documented that for several critical minerals, a single country or a

small group of countries controls a large share of global processing capacity, even when mining is more geographically dispersed (IEA, 2025). This concentration increases vulnerability to disruptions caused by political decisions, trade disputes, or conflict.

From the perspective of consuming countries, such dependencies raise concerns about economic coercion and supply reliability. From the perspective of producing countries, concentration can limit bargaining power and reinforce unequal value distribution along supply chains.

Energy transition and strategic competition

The global energy transition has intensified these dynamics rather than easing them. While renewable energy technologies are intended to reduce dependence on fossil fuels, they introduce new forms of dependency on mineral inputs. Unlike oil and gas, which are consumed continuously, many minerals are embedded in long-lasting infrastructure such as batteries, grids, and turbines. This creates competition not only over supply flows, but also over control of future industrial ecosystems.

As countries race to scale up clean energy industries, access to critical minerals becomes a determinant of industrial leadership. Governments increasingly view mineral supply chains as extensions of industrial policy, linking them to employment, technological innovation, and export competitiveness (IEA, 2024).

This has contributed to a paradox: global climate goals require cooperation and shared access to resources, yet national strategies increasingly prioritise self-sufficiency and strategic advantage. The result is heightened geopolitical tension around materials that are central to collective climate action.

Trade tools and economic statecraft

Geopolitics over critical minerals is rarely expressed through direct confrontation. Instead, it operates through trade tools, regulatory measures, and industrial policy instruments. Export controls, tariffs, subsidies, investment screening, and standards setting have become key mechanisms through which states attempt to secure advantage or reduce vulnerability.

In recent years, major economies have expanded the use of such tools to address perceived mineral risks. These measures are often justified under national security or environmental exceptions within international trade law, even when their effects extend beyond narrowly defined security concerns (WTO, 2019).

This form of economic statecraft blurs the line between economic and security policy. It also complicates global governance, as actions taken by one state to enhance resilience can be perceived by others as protectionist or coercive, leading to retaliatory measures and fragmentation.

Great power rivalry and narrative framing

Competition over critical minerals cannot be separated from broader patterns of rivalry among major powers. Minerals intersect with concerns about technological leadership, military capability, and influence over global standards. Control over processing technologies, battery chemistries, and advanced manufacturing confers long-term strategic advantages that go beyond immediate supply security.

Narratives play an important role in this competition. States frame their mineral policies in terms of resilience, sustainability, or ethical sourcing, while simultaneously pursuing strategic interests. These narratives shape international perceptions and influence which policies are seen as legitimate within global forums.

For smaller and developing countries, this rivalry creates both risks and opportunities. On one hand, they may face pressure to align with competing blocs or adopt regulatory standards shaped elsewhere. On the other hand, strategic competition can increase investment interest and bargaining leverage, provided governance capacity is sufficient to manage it.

Minerals as instruments of influence, not weapons of war

Unlike oil embargoes or military blockades, mineral geopolitics usually operates gradually. Disruptions may take the form of delayed approvals, regulatory tightening, export licensing changes, or shifts in standards rather than abrupt cut-offs. These measures are often legal under domestic law and difficult to challenge internationally.

This incremental nature makes mineral geopolitics especially complex. Effects accumulate over time, reshaping supply chains, investment patterns, and technological pathways. Governance responses therefore require long-term perspective rather than crisis management alone.

Why geopolitics complicates cooperation

Once minerals are framed through a geopolitical lens, cooperation becomes more difficult. Trust declines, information sharing is reduced, and policies are evaluated through the lens of relative gains rather than

collective outcomes. Even initiatives aimed at improving sustainability or transparency may be interpreted as strategic moves.

This does not mean cooperation is impossible. It does mean that cooperative arrangements must contend with deep structural incentives that push states toward unilateral action. Recognising these constraints is essential for understanding why global mineral governance remains fragmented despite shared interests.

International Law and Global Rules Governing Critical Minerals

Despite the growing strategic importance of critical minerals, there is no single international treaty that governs their extraction, processing, trade, and use. Instead, mineral governance is shaped by a patchwork of legal principles and institutional arrangements developed for different purposes and at different moments in history. These include international law on state sovereignty, global trade rules, environmental law, human rights law, and a growing set of voluntary standards related to corporate responsibility. Understanding this fragmented legal landscape is essential for explaining both what states are permitted to do and why cooperation remains difficult.

Permanent sovereignty over natural resources

The foundational legal principle governing minerals is permanent sovereignty over natural resources. This principle affirms that states have the right to control, regulate, and exploit natural resources located within their territories in accordance with national priorities. It was formally articulated in 1962 through UN General Assembly Resolution 1803 (XVII) (UNGA, 1962).

Permanent sovereignty grants states authority over mining licenses, ownership structures, taxation, export policies, and conditions placed on foreign investors. It remains especially significant for developing countries, where control over mineral resources is closely linked to development strategies and political legitimacy.

However, sovereignty does not imply absolute freedom. International law increasingly recognises that sovereignty must be exercised in a manner consistent with other international obligations. This tension lies at the heart of contemporary mineral governance debates.

International trade law and critical minerals

International trade law plays a major role in shaping mineral flows. Under the rules of the World Trade Organization (WTO), states are generally discouraged from imposing quantitative restrictions on exports and imports. In principle, this framework supports open markets and predictable trade relations.

At the same time, WTO law includes exceptions that are particularly relevant to critical minerals. States

may restrict trade to protect human health, conserve exhaustible natural resources, or safeguard national security. In recent years, governments have increasingly relied on these exceptions to justify export controls, tariffs, and industrial policy measures related to critical minerals (WTO, 2019).

This creates legal ambiguity. While many mineral-related measures may be defensible under WTO rules, their widespread use risks undermining trust in the trading system. Moreover, trade law does not address upstream extraction conditions or downstream value-chain concentration, limiting its effectiveness as a comprehensive governance tool.

Environmental law and transboundary responsibility

Environmental law introduces another layer of obligation. Key international declarations, including the Stockholm Declaration (1972) and the Rio Declaration (1992), establish that states have the right to exploit their natural resources but also the responsibility to ensure that activities within their jurisdiction do not cause environmental harm beyond their borders (UNEP, 1972; UNEP, 1992).

These principles are highly relevant to critical minerals. Mining and processing can generate pollution that affects shared river systems, air quality, and biodiversity. Waste storage failures and chemical runoff can have cross-border impacts, raising questions of international responsibility.

However, most environmental obligations related to mining are implemented through domestic regulation rather than binding international enforcement mechanisms. This results in uneven standards and significant governance gaps, particularly in regions with limited regulatory capacity (UNEP, 2020).

Human rights law and mineral supply chains

Human rights law further shapes mineral governance, particularly where extraction and processing affect local communities and workers. International human rights treaties obligate states to protect individuals from abuses, including forced labour, child labour, unsafe working conditions, and involuntary displacement.

Many documented human rights concerns in critical mineral supply chains occur through private actors rather than direct state action. Because international human rights law primarily binds states, not corporations, governance relies heavily on domestic enforcement and voluntary international standards.

The UN Guiding Principles on Business and Human Rights outline expectations for corporate due

diligence and state oversight, but they are not legally binding. Similarly, OECD due diligence guidelines provide frameworks for responsible sourcing but depend on national implementation (UNEP, 2020).

This creates a gap between global norms and local realities, particularly in informal or artisanal mining sectors where state oversight is weak.

Investment law and contractual governance

A significant portion of mineral governance occurs through investment treaties and contracts rather than multilateral agreements. Bilateral investment treaties (BITs) and investor–state contracts establish protections for foreign investors, including guarantees against expropriation and unfair treatment.

While these instruments can attract investment, they can also constrain policy space. Environmental regulations, export restrictions, or changes in taxation may trigger legal disputes. As a result, states may hesitate to strengthen governance for fear of litigation, particularly where fiscal capacity is limited.

This contractual layer of governance often operates with limited transparency, reducing public oversight and complicating accountability.

Voluntary standards and soft law

In response to governance gaps, a range of voluntary initiatives has emerged. These include certification schemes, reporting standards, and sustainability frameworks aimed at improving transparency and accountability in mineral supply chains.

Such initiatives can raise awareness and improve practices among participating firms. However, their voluntary nature limits coverage and enforcement. Companies and countries most associated with governance risks are often least likely to participate fully.

Why law alone cannot resolve mineral geopolitics

Taken together, existing legal frameworks address parts of the critical mineral challenge but not the whole. Sovereignty protects state authority but does not ensure sustainability. Trade law promotes openness but struggles with security-driven measures. Environmental and human rights law articulate obligations but lack enforcement. Investment law protects capital but may limit regulatory flexibility.

This fragmented legal architecture explains why critical mineral governance remains a political issue debated in forums such as the United Nations General Assembly. Law shapes the boundaries of action, but it does not eliminate conflict or resolve underlying power asymmetries.

The Role of the United Nations System in Critical Mineral Governance

The United Nations system plays an important but often misunderstood role in the governance of critical minerals. It does not function as a global regulator of mining, trade, or industrial policy. Instead, its influence lies in norm-setting, agenda-shaping, knowledge production, and coordination across issue areas that are otherwise governed in fragmented ways. Understanding what the UN can and cannot do is essential for evaluating why critical mineral debates increasingly appear in UN forums despite the absence of binding enforcement power.

The United Nations General Assembly as a political forum

The United Nations General Assembly is the most representative political body in the international system. Every UN member state has a seat and a vote, making the General Assembly a central arena for expressing collective concerns and contesting dominant narratives.

In the context of natural resources, the General Assembly has historically played a key role in articulating principles related to sovereignty, development, and equity. Resolution 1803 (XVII) on Permanent Sovereignty over Natural Resources illustrates how UNGA resolutions can shape global expectations even without legal binding force (UNGA, 1962). Similar dynamics apply to critical minerals today.

UNGA debates on critical minerals tend to focus on broad questions rather than technical regulation. These include fairness in access to resources, unequal distribution of benefits along value chains, environmental harm associated with extraction, and the implications of strategic competition for developing countries. Through resolutions, high-level meetings, and thematic debates, the General Assembly helps frame what counts as legitimate concern and responsible behaviour.

Although UNGA cannot compel states to change mineral policies, its language influences how states justify their actions. Over time, repeated references to sustainability, equity, and cooperation can shape diplomatic expectations and inform the work of other institutions.

The United Nations Environment Programme and environmental governance

Environmental dimensions of critical mineral governance fall primarily within the mandate of the United Nations Environment Programme. UNEP produces assessments, guidelines, and policy frameworks that analyse the environmental impacts of mining and mineral processing, including land degradation, water pollution, waste management, and biodiversity loss.

UNEP's work has been particularly important in highlighting that mineral extraction is not automatically aligned with sustainable development goals. Reports have shown that without strong governance, mining can undermine long-term environmental and social outcomes, even when minerals are used in climate-friendly technologies (UNEP, 2020).

While UNEP does not enforce regulations, its assessments shape international understanding of risks and best practices. These insights often inform national policies, donor strategies, and the work of development agencies. UNEP also contributes to cross-sectoral dialogue, linking mineral governance with climate policy, biodiversity protection, and pollution control.

Regional commissions and technical frameworks

Several UN regional economic commissions contribute to mineral governance through technical frameworks and policy guidance. For example, the United Nations Economic Commission for Europe has developed classification systems and reporting standards aimed at improving transparency and sustainability in resource management.

These frameworks seek to standardise how countries assess, report, and manage mineral resources, making it easier to compare practices and identify risks. Adoption, however, remains voluntary, and implementation varies widely depending on national capacity and political priorities.

Regional commissions can also serve as platforms for dialogue among neighbouring states, particularly where mineral extraction affects shared ecosystems or cross-border infrastructure.

Human rights mechanisms and accountability

Human rights concerns related to critical minerals are addressed through the UN's human rights architecture, including treaty bodies, special rapporteurs, and thematic working groups. These

mechanisms can investigate abuses, issue recommendations, and raise international attention around issues such as forced displacement, unsafe labour conditions, and impacts on Indigenous peoples.

The UN Guiding Principles on Business and Human Rights provide a widely accepted framework outlining state duties and corporate responsibilities. However, these principles are non-binding and rely on national implementation. As a result, enforcement remains uneven, particularly in informal or artisanal mining contexts where state capacity is limited.

Despite these constraints, UN human rights mechanisms play an important role in norm development. They help establish expectations that certain practices are unacceptable, even when enforcement is weak.

Knowledge production and coordination

Beyond formal mandates, the UN system contributes to mineral governance through research, data collection, and coordination. Agencies collaborate with governments, academia, and civil society to produce reports that map supply chains, identify risks, and evaluate policy options.

This knowledge-producing role is particularly valuable in a domain characterised by information asymmetries. Data on reserves, production, processing capacity, and environmental impacts are often fragmented or politically sensitive. UN assessments can help create shared reference points, even when states disagree on policy responses.

Coordination across agencies also helps connect mineral governance with broader agendas, including sustainable development, climate action, and economic inclusion.

Institutional limits and structural constraints

Despite these contributions, the UN system faces significant limitations. The most powerful tools shaping mineral supply chains: export controls, subsidies, industrial policy, investment screening remain firmly under national control. States are unlikely to cede authority over such tools, particularly when minerals are framed as strategic assets.

Institutional fragmentation within the UN mirrors fragmentation in the broader international system. Different agencies address minerals from environmental, developmental, or human rights perspectives, but no single body integrates these dimensions into a coherent governance framework.

As a result, the UN's role is often indirect. It shapes norms, informs debates, and highlights trade-offs, but

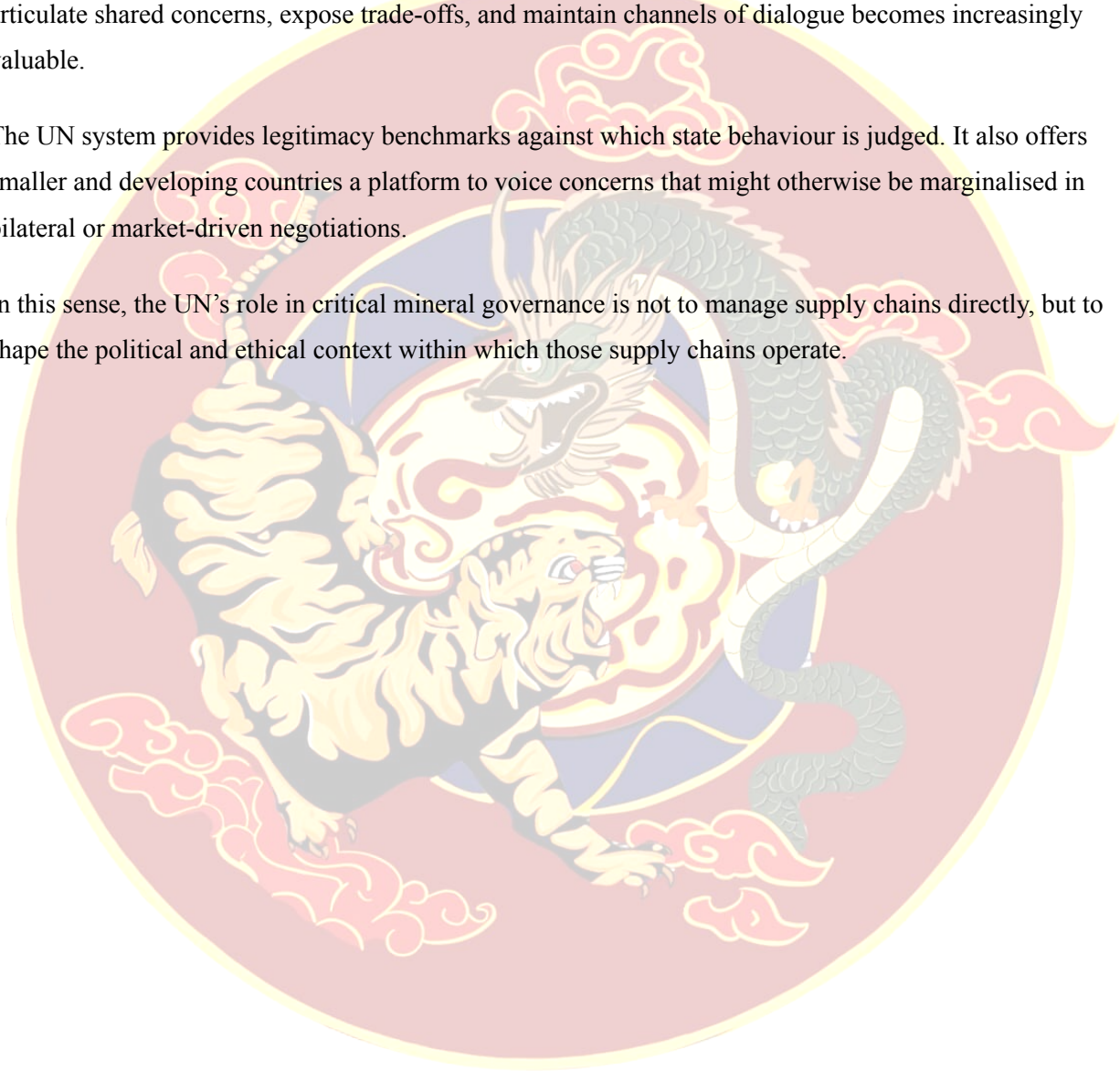
it cannot resolve underlying power struggles or enforce cooperation.

Why the UN still matters

These limitations do not render the UN irrelevant. On the contrary, they help explain why UN forums remain important spaces for debate. In a context of rising competition and unilateral action, the ability to articulate shared concerns, expose trade-offs, and maintain channels of dialogue becomes increasingly valuable.

The UN system provides legitimacy benchmarks against which state behaviour is judged. It also offers smaller and developing countries a platform to voice concerns that might otherwise be marginalised in bilateral or market-driven negotiations.

In this sense, the UN's role in critical mineral governance is not to manage supply chains directly, but to shape the political and ethical context within which those supply chains operate.



Environmental and Social Impacts of Critical Minerals

Critical minerals are frequently described as enablers of a cleaner, more technologically advanced future. Yet the environmental and social impacts associated with their extraction, processing, and transport raise serious questions about sustainability and justice. These impacts are not peripheral to mineral governance; they shape public acceptance, influence geopolitical narratives, and determine whether the global transition that depends on these materials can be considered legitimate.

Environmental disruption from extraction

Mining is inherently disruptive. Large-scale extraction alters landscapes through land clearing, excavation, and infrastructure development. Open-pit mines remove vegetation and topsoil, fragment habitats, and permanently transform ecosystems. Underground mining, while less visible at the surface, can still cause subsidence and groundwater disruption.

One of the most significant environmental risks arises from mine waste. After valuable minerals are separated from ore, large volumes of tailings remain. These tailings often contain toxic substances and are stored in large containment structures. Failures of tailings storage facilities have caused severe environmental damage, contaminating rivers, agricultural land, and drinking water sources. International assessments note that tailings management remains a critical governance weakness, particularly in regions with limited regulatory oversight and monitoring capacity (United Nations Environment Programme, 2020).

Water use is another major concern. Mining and mineral processing are water-intensive activities, often located in arid or semi-arid regions. Competition over water resources can intensify tensions between mining operations, local communities, and agricultural users. Acid mine drainage and chemical runoff can pollute surface and groundwater systems, with impacts that extend far beyond the immediate mine site.

Processing, refining, and pollution risks

Processing and refining stages present their own environmental challenges. These activities require high energy inputs and involve chemical treatments that can generate air pollution, hazardous waste, and greenhouse gas emissions. Because processing facilities are often concentrated in specific regions, local

environmental burdens can be intense.

While technological improvements can reduce emissions and waste, implementation varies widely across countries. Differences in environmental regulation, enforcement capacity, and public scrutiny result in uneven outcomes. This unevenness contributes to the relocation of environmentally intensive activities to jurisdictions with weaker governance, a pattern sometimes described as environmental burden shifting (UNEP, 2020).

Biodiversity and ecosystem impacts

Many critical mineral deposits are located in ecologically sensitive areas, including forests, wetlands, and regions of high biodiversity. Mining infrastructure such as roads and settlements can accelerate deforestation and habitat fragmentation. These impacts are often long-lasting and difficult to reverse.

Biodiversity loss linked to mineral extraction raises broader ethical and governance questions. Technologies promoted as solutions to environmental crises may depend on practices that undermine ecosystem resilience. This contradiction complicates public narratives around sustainability and weakens trust in transition strategies.

Community displacement and livelihood disruption

Social impacts of critical mineral extraction are most visible at the community level. Large mining projects can require land acquisition that displaces residents and disrupts traditional livelihoods such as farming, fishing, or pastoralism. Even when compensation is provided, loss of land and social networks can undermine long-term well-being.

In-migration of workers can strain local infrastructure, increase living costs, and alter social dynamics. Where consultation processes are weak or exclusionary, mining projects can become sources of conflict rather than development.

These issues are particularly acute where governance institutions are fragile. Limited access to legal remedies and information asymmetry between communities and corporations can exacerbate power imbalances.

Labour conditions and informal mining

Labour conditions vary widely across critical mineral supply chains. Large industrial operations may provide formal employment and safety standards, but risks remain, especially where oversight is limited. In contrast, artisanal and small-scale mining supports millions of livelihoods worldwide but often operates outside formal regulatory frameworks.

In some critical mineral supply chains, international organisations and civil society groups have documented child labour, forced labour, and unsafe working conditions. These practices raise serious human rights concerns and have prompted calls for stricter due diligence and traceability measures (UNEP, 2020).

However, governance responses are complex. Abrupt enforcement actions that shut down informal mining can remove livelihoods without providing alternatives, pushing vulnerable populations into deeper insecurity. This highlights the need to understand labour issues within broader social and economic contexts.

Unequal distribution of costs and benefits

A recurring pattern in mineral governance is the unequal distribution of costs and benefits along supply chains. Environmental degradation and social disruption are often concentrated in extraction regions, while economic value and technological benefits accrue downstream in processing and manufacturing centres.

The International Energy Agency has noted that expanding mining alone does not guarantee development gains if countries remain locked into low-value segments of supply chains (IEA, 2024). This imbalance contributes to perceptions of injustice and fuels political resistance to mineral projects.

Implications for legitimacy and global cooperation

Environmental and social impacts are not merely local concerns. They shape global debates about fairness, responsibility, and trust. If critical minerals are associated with environmental harm and human rights abuses, public support for the technologies they enable may erode.

This legitimacy challenge affects international cooperation. States and institutions promoting clean energy transitions must address the contradictions between climate goals and extraction practices. Failure to do

so risks undermining the moral and political foundations of global climate and development agendas.

Case Studies and Patterns in Critical Mineral Governance

Abstract discussions of critical minerals often obscure how governance choices play out in real-world settings. Case studies help reveal recurring patterns: how power is exercised across supply chains, how policies create unintended consequences, and how gaps between legal frameworks and local realities persist. Rather than focusing on isolated events, this section examines broad categories of cases that illustrate structural dynamics shaping critical mineral governance.

Export controls and strategic signalling

One prominent pattern involves the use of export controls and licensing regimes as tools of economic statecraft. When states restrict exports of minerals or mineral-based products, they rarely do so through abrupt bans. Instead, controls are often introduced incrementally through regulatory changes, environmental reviews, or licensing requirements.

Such measures serve multiple purposes. Domestically, they signal commitment to downstream industrial development and supply security. Internationally, they communicate strategic intent and bargaining leverage. While these actions are often justified under environmental protection or national security grounds, their geopolitical implications are widely recognised (WTO, 2019).

These cases highlight a governance dilemma. Export controls may encourage diversification and investment elsewhere, but they can also fragment markets and increase mistrust. In the absence of multilateral coordination, unilateral measures tend to provoke countermeasures rather than cooperation.

Processing concentration and dependency persistence

Another recurring pattern concerns efforts to reduce dependency by expanding mining without addressing downstream concentration. Several countries have increased exploration and extraction of critical minerals to secure supply. However, where processing and refining remain concentrated, vulnerability persists.

The **International Energy Agency** has shown that even substantial increases in mining output do not significantly reduce supply risk if processing capacity remains geographically concentrated (IEA, 2025).

This illustrates a common policy misalignment: focusing on visible extraction while overlooking less visible but more strategic stages of the value chain.

These cases reveal how governance failures can stem from partial interventions. Addressing one stage of the supply chain without coordinating across others can reinforce, rather than reduce, systemic risk.

Artisanal mining and unintended social consequences

Artisanal and small-scale mining provides livelihoods for millions of people, particularly in low-income regions. In response to documented labour abuses, governments and companies have introduced traceability systems, certification schemes, and stricter enforcement.

While these measures aim to improve accountability, they have sometimes produced unintended consequences. Sudden crackdowns on informal mining can eliminate livelihoods without providing alternatives, pushing workers into deeper poverty or illegal activity. In some cases, stricter controls have concentrated mining in the hands of more powerful actors rather than improving conditions for workers (UNEP, 2020).

These patterns underscore the limits of compliance-focused governance. Without parallel investments in formalisation, social protection, and local capacity, enforcement alone can exacerbate vulnerability.

Environmental disasters and regulatory gaps

Environmental failures in mining and processing provide another category of instructive cases. Tailings dam collapses and chemical spills have revealed weaknesses in regulatory oversight, risk assessment, and corporate accountability. Although international guidelines exist, implementation varies widely, and monitoring capacity is often insufficient.

Post-disaster responses frequently involve reviews and reforms, but systemic issues persist. Voluntary standards may improve practices among leading firms, yet high-risk operations often fall outside their reach. These cases highlight how governance gaps can persist despite technical knowledge and formal rules (United Nations Environment Programme, 2020).

Financial arrangements and long-term dependency

Less visible but equally significant are cases involving resource-backed financing and long-term supply

agreements. Governments may secure infrastructure investment or fiscal support by pledging future mineral production. While these arrangements can provide short-term benefits, they often reduce policy flexibility and obscure long-term obligations.

Because such agreements are frequently confidential, public oversight is limited. Over time, debt obligations tied to mineral exports can constrain development options and weaken bargaining power. These patterns illustrate how financial governance intersects with mineral governance in ways that are difficult to regulate through existing international frameworks.

Common patterns across cases

Across these diverse cases, several recurring themes emerge. Power is often exercised indirectly through regulations, contracts, and standards rather than direct control. Governance responses tend to be fragmented, addressing symptoms rather than structural causes. Environmental and social costs are frequently externalised to vulnerable regions, while strategic and economic benefits accumulate elsewhere.

These patterns reinforce a central insight: failures in critical mineral governance are rarely the result of isolated mistakes. They reflect systemic incentives embedded in global markets, legal frameworks, and geopolitical competition.

Understanding these patterns helps explain why debates on critical minerals persist in international forums and why simple solutions remain elusive.

Why Global Cooperation on Critical Minerals Is Structurally Difficult

At first glance, critical minerals appear to be an area where international cooperation should be straightforward. Most countries depend on reliable mineral supply chains, all face risks from disruption, and many share goals related to climate action and sustainable development. Yet in practice, cooperation has remained limited, fragmented, and often fragile. This difficulty is not accidental. It reflects deep structural features of the international system that shape how states perceive interests, risks, and responsibilities.

Sovereignty and control over strategic resources

The most fundamental barrier to cooperation is state sovereignty. Under international law, states retain primary authority over natural resources located within their territories. This authority is closely linked to national development strategies, fiscal policy, and political legitimacy, particularly in resource-rich countries (UNGA, 1962).

When minerals are framed as strategic assets, governments become especially reluctant to accept external constraints. Commitments that limit export controls, industrial policy, or licensing decisions are often viewed as threats to national autonomy. Even when states recognise shared risks, they may prioritise preserving decision-making freedom over collective solutions.

This dynamic helps explain why proposals for binding international agreements on critical minerals have gained little traction. Cooperation that appears beneficial in principle can be perceived as constraining in practice.

Asymmetries along global supply chains

Global cooperation is further complicated by unequal power relations. Control over critical mineral supply chains is unevenly distributed. Some countries host mineral deposits, others dominate processing and refining, and still others control advanced manufacturing, technology, and finance.

These asymmetries shape incentives. States that control downstream stages often benefit from existing arrangements and may resist reforms that threaten their advantage. States concentrated at the extraction stage may seek greater value capture but lack leverage to enforce changes. As a result, cooperation efforts

often reflect existing power hierarchies rather than correcting them (IEA, 2025).

Such asymmetries also influence negotiation dynamics. States enter discussions with different priorities, risk perceptions, and capacities, making consensus difficult even when interests overlap.

Fragmented institutions and legal regimes

Another structural obstacle is institutional fragmentation. Critical minerals sit at the intersection of multiple governance domains: trade, environment, human rights, investment, and security. Each domain is governed by different institutions with distinct mandates and rules.

Trade institutions focus on market access and non-discrimination. Environmental bodies prioritise ecological protection. Human rights mechanisms address labour and community impacts. Investment regimes protect capital flows. No single institution integrates these perspectives into a coherent framework.

This fragmentation allows states to justify policies under one regime while undermining objectives under another. For example, export restrictions may be defended on environmental grounds while primarily serving industrial or strategic goals. Such overlaps create ambiguity and reduce trust (WTO, 2019; UNEP, 2020).

Security framing and trust deficits

The securitisation of mineral supply chains intensifies cooperation challenges. When states frame mineral dependence as a national security issue, transparency declines and information becomes sensitive. Governments may withhold data on reserves, processing capacity, or stockpiles, fearing strategic disadvantage.

This lack of transparency undermines trust. Cooperative mechanisms depend on shared information and predictability. When states suspect that others may use minerals as tools of pressure, they are more likely to pursue unilateral diversification and stockpiling rather than shared solutions (IEA, 2024).

Security framing also encourages relative thinking. States focus on whether others gain more, rather than on collective outcomes. This logic makes cooperation fragile, particularly in periods of heightened geopolitical tension.

Speed mismatch between markets and institutions

Mineral markets and technological systems evolve rapidly. Prices fluctuate, new technologies emerge, and geopolitical alignments shift. In contrast, international institutions operate through slow consensus-based processes. This speed mismatch creates incentives for unilateral action. Governments facing immediate risks may prefer national measures over waiting for multilateral agreement. Over time, repeated unilateral actions can erode the perceived relevance of cooperative frameworks.

Ironically, the same factors that create incentives for cooperation also make it harder to achieve. Shared dependence on critical minerals increases vulnerability, but it also heightens competition over control. States fear that cooperation could expose weaknesses or limit strategic flexibility. This paradox explains why global mineral governance often advances through incremental norms and voluntary standards rather than binding rules. Cooperation occurs, but cautiously and unevenly.

Implications for global governance debates

Recognising these structural barriers does not imply that cooperation is impossible. It does suggest that expectations must be realistic. Governance arrangements are likely to remain partial, issue-specific, and politically contested.

This understanding helps explain the role of forums such as the United Nations General Assembly. In a system where binding cooperation is difficult, spaces for dialogue, norm articulation, and legitimacy-building become especially important.

The Role of the United Nations General Assembly in Governing Critical Minerals

The United Nations General Assembly occupies a unique position in global governance. It does not regulate markets, enforce environmental standards, or control investment flows. Yet it remains the most inclusive political forum in the international system, bringing together producing countries, consuming countries, transit states, and those affected indirectly by global supply chains. In the context of critical minerals, the General Assembly's role lies not in technical management, but in shaping legitimacy, framing norms, and structuring political dialogue.

Why critical minerals reach the UN General Assembly

Issues appear on the agenda of the United Nations General Assembly when they involve questions that cannot be resolved through markets or unilateral action alone. Critical minerals raise precisely such questions. They touch on sovereignty, development, environmental protection, human rights, trade, and security simultaneously.

Unlike many economic issues that are addressed primarily through trade or financial institutions, critical minerals involve fundamental distributional concerns. Who controls essential inputs for modern life? Who bears environmental and social costs? Who captures value along global supply chains? These questions are inherently political and normative, making the General Assembly an appropriate forum for debate.

UNGA as a norm-setting institution

Historically, the General Assembly has played a central role in articulating principles that later shape state behaviour. Resolution 1803 (XVII) on Permanent Sovereignty over Natural Resources illustrates how UNGA language can influence global expectations even without binding force (UNGA, 1962).

In the context of critical minerals, UNGA debates and resolutions often emphasise principles such as equitable access to resources, sustainable development, environmental responsibility, and respect for human rights. While these principles do not impose legal obligations, they establish benchmarks against which state actions are judged.

Over time, repeated articulation of norms can influence national policy, bilateral agreements, and the

work of specialised agencies. This gradual process of norm diffusion is one of UNGA's most significant contributions.

Representation and voice asymmetries

A defining feature of the General Assembly is universal representation. All member states, regardless of economic or military power, have an equal vote. This distinguishes UNGA from many other international forums where influence is weighted by economic size or financial contribution. For developing and resource-rich countries, UNGA provides a platform to raise concerns that may be marginalised elsewhere. These include unequal value distribution along mineral supply chains, environmental harm in extraction regions, and vulnerability to strategic competition among larger powers.

At the same time, equal voting power does not eliminate power asymmetries. States with greater diplomatic capacity and coalition-building ability often shape outcomes more effectively. Nevertheless, UNGA remains one of the few spaces where smaller states can collectively influence global discourse.

Agenda-setting and issue linkage

The General Assembly plays an important agenda-setting role by linking critical minerals to broader global priorities. Debates often situate mineral governance within frameworks such as sustainable development, climate action, and economic inclusion.

This issue linkage matters. When critical minerals are framed solely as security or industrial concerns, environmental and social dimensions risk being sidelined. UNGA debates help ensure that these dimensions remain visible and politically salient.

Through thematic resolutions and high-level discussions, the General Assembly can also encourage coordination across different parts of the UN system, even when formal authority remains dispersed.

Political signalling and restraint

UNGA forums also serve as spaces for political signalling. States use speeches and resolutions to communicate intentions, signal red lines, and frame their actions for international audiences. In the context of critical minerals, such signalling can clarify positions and reduce uncertainty, even when disagreement persists. While UNGA cannot prevent unilateral action, it can contribute to restraint by increasing the reputational costs of behaviour perceived as irresponsible or destabilising. This reputational

function is subtle but important in a system where enforcement mechanisms are weak.

Limits of UNGA authority and Why UNGA still matters in a fragmented system

Despite its significance, the General Assembly faces clear limits. Its resolutions are not legally binding. It cannot compel states to change export policies, industrial strategies, or investment rules. When minerals are framed as national security concerns, states are especially resistant to external influence.

Moreover, UNGA debates can be broad and abstract, sometimes lacking the specificity required to guide implementation. Without follow-up through national policies or specialised institutions, resolutions risk remaining symbolic.

These limits do not diminish the relevance of the General Assembly. In a fragmented global system characterised by competition and unilateral action, the ability to articulate shared concerns and maintain dialogue is itself valuable.

UNGA provides a common political language for discussing critical minerals beyond narrow strategic interests. It helps shape how issues are understood, what trade-offs are acknowledged, and which values are invoked.

In this sense, the General Assembly does not govern critical minerals directly. It governs the political space in which mineral governance takes place.

Key Governance Trade-offs and Dilemmas in Critical Mineral Policy

Critical mineral governance is shaped less by clear solutions than by persistent trade-offs. Governments rarely face choices between good and bad options; instead, they must balance competing priorities that cannot all be satisfied at once. These dilemmas arise from the structure of global supply chains, differences in national capacity, and the multiple roles minerals play in economic, environmental, and security systems. Understanding these trade-offs is essential for evaluating state behaviour and the limits of international cooperation.

Supply security versus environmental protection

One of the most visible dilemmas concerns the tension between securing mineral supply and protecting the environment. Expanding mining and processing can reduce dependence on concentrated suppliers and lower the risk of disruption. However, accelerating extraction often increases environmental damage, particularly when regulatory oversight is weak or rushed.

Environmental impact assessments, community consultations, and pollution controls take time and institutional capacity. When governments prioritise rapid supply expansion to meet industrial or security goals, these safeguards may be weakened or bypassed. International assessments have warned that without strong governance, mineral extraction can undermine biodiversity, water systems, and long-term ecological resilience (UNEP, 2020).

This dilemma is especially acute in the context of climate policy. Minerals are promoted as essential inputs for clean energy technologies, yet their extraction can generate significant environmental harm. This creates a paradox in which efforts to address climate change may contribute to other forms of environmental degradation if governance does not improve in parallel.

National resilience versus global efficiency

Another central trade-off involves national resilience and global efficiency. From an economic perspective, global supply chains function most efficiently when production is concentrated in locations with comparative advantage. However, such concentration increases vulnerability to disruption and geopolitical leverage.

In response, many states pursue diversification, domestic production, or regional supply chains to enhance resilience. While these strategies may reduce dependence, they often increase costs and lead to duplication of capacity. When multiple countries adopt similar resilience strategies simultaneously, global efficiency declines and competition intensifies rather than easing (IEA, 2024).

This dilemma highlights a structural tension. Measures that appear rational from a national perspective can collectively produce suboptimal outcomes at the global level. Without coordination, resilience-seeking behaviour can fragment markets and increase instability.

Accountability versus inclusion in labour governance

Efforts to address labour abuses in critical mineral supply chains raise another set of trade-offs. International pressure to eliminate child labour, forced labour, and unsafe working conditions has led to stricter due diligence requirements and traceability systems.

While these measures aim to improve accountability, they can also exclude informal workers who lack the capacity to meet compliance requirements. Artisanal and small-scale mining supports millions of livelihoods worldwide, particularly in low-income regions. Abrupt enforcement actions can remove income sources without providing alternatives, pushing workers into deeper precarity or illegal activity (UNEP, 2020).

This dilemma illustrates the limits of purely compliance-based governance. Improving labour conditions requires balancing accountability with inclusion, formalisation, and social protection. Policies that focus only on risk avoidance may shift problems rather than resolve them.

Short-term urgency versus long-term sustainability

Critical mineral policy is often driven by urgency. Governments face immediate pressures to meet climate targets, secure industrial inputs, and respond to geopolitical risks. These pressures favour short-term measures such as subsidies, fast-track approvals, and emergency stockpiling.

However, mineral projects have long time horizons. Decisions made today shape environmental outcomes, community relations, and economic structures for decades. Short-term responses that overlook long-term consequences can lock in unsustainable practices and reduce future flexibility.

This time mismatch complicates governance. Institutions designed for long-term planning struggle to

respond quickly, while crisis-driven decision-making can undermine sustainability goals. Balancing urgency with foresight remains a persistent challenge.

Sovereignty versus interdependence

Mineral governance also exposes a tension between sovereignty and interdependence. States assert control over resources within their territories, yet modern supply chains are deeply interconnected. No country controls all stages of production for all critical minerals it needs.

Policies that emphasise sovereignty, such as export controls or local content requirements, may strengthen domestic leverage but can also disrupt partners and invite retaliation. At the same time, excessive reliance on external suppliers can expose states to coercion or disruption.

This dilemma underscores a central contradiction of the international system. States seek autonomy in a context of deep interdependence. Managing this contradiction requires political judgement rather than technical optimisation.

Development goals versus value-chain realities

For many resource-rich developing countries, critical minerals are seen as opportunities for economic transformation. Governments aim to move beyond raw material exports toward processing, manufacturing, and higher value capture.

Yet upgrading along value chains requires capital, technology, infrastructure, and access to markets. Without these, attempts to impose downstream requirements may deter investment or prove ineffective. The International Energy Agency has noted that value addition strategies must be matched with realistic assessments of capacity and demand (IEA, 2025).

This dilemma reflects broader development challenges. Aspirations for industrialisation confront structural constraints embedded in global markets and technological systems.

Why trade-offs persist

These dilemmas persist because they are not temporary policy failures. They arise from structural features of the global political economy: unequal power distribution, institutional fragmentation, and competing time horizons. As a result, critical mineral governance involves continual negotiation rather than

definitive solutions.

Recognising these trade-offs helps explain why debates in international forums often emphasise principles and dialogue rather than binding commitments. It also clarifies why states may adopt policies that appear contradictory or inconsistent when viewed in isolation.

Conclusion: What Is Ultimately at Stake in Governing Critical Minerals

Critical minerals sit at the centre of some of the most consequential transformations of the twenty-first century. They enable the shift toward cleaner energy systems, underpin digital and technological infrastructures, and support modern defence capabilities. At the same time, their extraction, processing, and trade expose deep tensions within the global system. These tensions are not temporary disruptions; they reflect enduring questions about power, responsibility, and fairness in a world marked by inequality and interdependence.

At one level, debates on critical minerals appear technical. They involve supply chains, processing capacity, trade flows, and investment decisions. Yet beneath these technical discussions lies a broader question about how the international system manages shared dependence on essential resources.

Minerals are not merely inputs for production. They shape industrial leadership, technological trajectories, and geopolitical influence. Control over key stages of mineral value chains confers long-term strategic advantage. As a result, mineral governance is inseparable from questions of global order and competition.

The growing tendency to frame minerals as security assets reflects this reality. Once minerals are securitised, cooperation becomes more difficult, transparency declines, and trust erodes. States increasingly evaluate policies in terms of relative advantage rather than shared outcomes. This dynamic explains why mineral governance has become more contested even as global dependence deepens (IEA, 2024).

The legitimacy challenge

A central issue running through this guide is legitimacy. Technologies enabled by critical minerals are promoted as solutions to climate change, development challenges, and energy insecurity. Yet the processes through which these minerals are produced often generate environmental damage, labour exploitation, and community displacement.

This contradiction poses a legitimacy challenge for global transitions. If clean energy systems rely on practices that harm ecosystems and vulnerable populations, public trust in transition strategies may weaken. Legitimacy is not a moral abstraction; it affects political stability, investment decisions, and international cooperation.

Addressing this challenge requires recognising that environmental and social concerns are not secondary to mineral governance. They are integral to whether mineral-dependent transitions can be sustained politically and ethically.

Persistent inequality along value chains

Another core issue is inequality. The global distribution of costs and benefits in critical mineral supply chains remains highly uneven. Extraction regions often bear environmental and social burdens, while economic value and technological benefits accumulate downstream in processing and manufacturing centres.

Efforts to correct these imbalances face structural constraints. Moving up value chains requires capital, technology, infrastructure, and access to markets that are unevenly distributed. Without addressing these structural factors, calls for equitable benefit-sharing risk remain aspirational.

This inequality shapes geopolitical narratives. Resource-rich countries may view mineral governance through the lens of historical exploitation and development rights, while consuming countries prioritise supply security and industrial competitiveness. These differing perspectives complicate consensus-building in international forums.

Law, politics, and the limits of enforcement

International law provides important reference points for mineral governance, including principles of sovereignty, environmental responsibility, and human rights. However, as this guide has shown, legal frameworks remain fragmented and unevenly enforced.

Trade law struggles to accommodate security-driven measures. Environmental law articulates responsibilities but lacks binding enforcement mechanisms. Human rights standards rely heavily on domestic implementation and voluntary corporate compliance. Investment law often protects capital more effectively than communities or ecosystems.

These gaps explain why mineral governance cannot be resolved through legal instruments alone. Law shapes the boundaries of acceptable behaviour, but politics determines how those boundaries are interpreted and contested.

The role of dialogue in a fragmented system

In this context, the role of the United Nations General Assembly becomes clearer. The General Assembly does not manage mineral supply chains or enforce compliance. Its contribution lies elsewhere.

UNGA provides a forum where competing narratives can be articulated, challenged, and reframed. It allows states with different capacities and interests to voice concerns on an equal formal footing. It links mineral governance to broader global priorities such as sustainable development, environmental protection, and human rights.

In a system where binding cooperation is difficult, dialogue itself becomes a form of governance. Norms articulated repeatedly in UNGA debates influence expectations, shape legitimacy, and constrain behaviour indirectly. While this influence is slow and uneven, it remains significant in a fragmented international order.

This guide has not offered simple solutions, because none exist. Critical mineral governance involves enduring choices between competing priorities: security and sustainability, efficiency and resilience, sovereignty and interdependence, urgency and long-term responsibility.

These choices will not be resolved once and for all. They will be renegotiated as technologies evolve, political relationships shift, and environmental limits become more visible. What matters is not the elimination of trade-offs, but how they are recognised, debated, and managed.

Ultimately, the governance of critical minerals is about more than materials. It is about how the global community navigates shared dependence in a world of unequal power and finite ecological limits. It is about whether transitions designed to solve one set of crises deepen others, or whether governance can evolve to balance competing demands more responsibly.

The United Nations General Assembly cannot determine outcomes on its own. Yet by making trade-offs visible, articulating shared principles, and maintaining space for dialogue, it plays a vital role in shaping how these questions are approached.

As critical minerals continue to shape the future of energy, technology, and geopolitics, the way they are governed will reflect, and influence, the broader character of the international system itself.

Questions to Consider

These questions are designed to help students think critically about the material, connect different sections, and reflect on the political, ethical, and governance dimensions of critical minerals. They are not debate instructions, but analytical prompts.

Understanding Criticality and Demand

1. Why are some minerals described as “critical” even when they are not geologically rare?
2. How do energy transition technologies change the type and scale of mineral demand compared to fossil fuel systems?
3. In what ways do digital technologies and defence systems increase strategic dependence on critical minerals?

Supply Chains and Power

4. Why is processing and refining often more strategically important than mining itself?
5. How does control over downstream stages of the value chain shape geopolitical influence?
6. Why do increases in mining output not automatically reduce supply vulnerability?

Geopolitics and Security

7. What does it mean to describe mineral supply chains as a national security issue?
8. How does securitising critical minerals change state behaviour compared to treating them as ordinary commodities?
9. Why might policies aimed at national resilience increase global competition rather than cooperation?

International Law and Institutions

10. How does the principle of permanent sovereignty over natural resources shape mineral governance?
11. Why does international trade law struggle to address security-driven mineral policies?

12. What are the limits of international environmental and human rights law in regulating mineral supply chains?

Environmental and Social Impacts

13. Why are environmental and social impacts concentrated at the extraction stage of mineral supply chains?
14. How do mining-related environmental harms challenge the legitimacy of clean energy transitions?
15. Why can strict enforcement against labour abuses sometimes harm vulnerable workers?

Development and Equity

16. Why do many resource-rich countries struggle to capture higher value from critical mineral supply chains?
17. What structural barriers limit efforts to move from extraction to processing and manufacturing?
18. How do unequal cost–benefit distributions shape political resistance to mining projects?

Global Cooperation and the UNGA

19. Why is global cooperation on critical minerals structurally difficult despite shared dependence?
20. What role does the United Nations General Assembly play if it lacks enforcement power?
21. How can dialogue and norm-setting matter in the absence of binding agreements?

Reflective Questions

22. Are current mineral governance approaches more likely to reduce or reproduce global inequalities?
23. Can climate transitions be considered successful if they rely on environmentally destructive extraction?
24. What trade-offs seem unavoidable in governing critical minerals, and which might be mitigated through better governance?

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