university of groningen

Core, Periphery, and the Green Frontier: A World-Systems Analysis of the EU's Critical Raw Materials Diplomacy with the Democratic Republic of Congo.

Author: Eva Beausoleil

Student Number: S5039169

Campus Fryslân, Leeuwarden (Netherlands)

Bachelor Thesis - Global Responsibility & Leadership

Under the Supervision of: Dr. Karsten Schulz

6th of June 2025

Table of Contents

Abstract

This thesis examines how the European Union's Critical Raw Materials Act (CRMA) reproduces global inequality through its partnerships with the Democratic Republic of Congo, applying world-systems analysis and ecologically unequal exchange theory to understand these dynamics. The research question investigates how the CRMA perpetuates colonial-era extractive relationships while externalizing environmental and social costs to peripheral states like the DRC.Through analysis of EU-DRC cobalt relations, this study reveals that despite rhetoric of sustainable development and strategic partnerships, the CRMA institutionalizes core-periphery dynamics that concentrate technological and economic benefits in European nations while displacing ecological burdens to African communities. The framework demonstrates how formal equality in partnership agreements masks substantive hierarchy, with non-binding European commitments contrasting sharply with enforceable trade constraints on partner countries.The analysis challenges dominant narratives presenting EU raw materials diplomacy as mutually beneficial cooperation, instead revealing how ostensibly progressive environmental policies can reproduce colonial structures of domination.The thesis contributes to critical scholarship on the European Green Deal by demonstrating that without addressing fundamental power asymmetries in the capitalist world-system, sustainability efforts risk becoming new forms of "green" imperialism that perpetuate global environmental injustice.

Introduction

The European Union's efforts to transition to a "green" economy through its Critical Raw Materials Act (CRMA) are amongst the most ambitious international efforts to balance environmental sustainability with geopolitical independence. But behind the talk of sustainable development and working together, there is a more worrying situation: it constitutes the perpetuation of colonial-era extractive relationships between core and peripheral states. This thesis examines how the EU's critical raw materials diplomacy with the Democratic Republic of the Congo (DRC), particularly in relation to cobalt extraction, reproduces patterns of ecologically unequal exchange that characterise the capitalist world-system.

The research question guiding this analysis is: "How does the European Union's Critical Raw Materials Act reproduces global inequality through its partnerships with the Democratic Republic of Congo, and what insights does world-systems theory offer for understanding this environmental injustice?" This inquiry is both timely and critical, as the EU is preparing to announce its strategic projects abroad, whilst the DRC, despite the fact that it controls around 70% of global cobalt reserves, continues to undergo severe environmental degradation, social displacement, and economic marginalisation (RAID and AFREWATCH, 2024).

Drawing on Immanuel Wallerstein's world-systems analysis, this thesis argues that the CRMA institutionalises core-periphery dynamics that externalise environmental and social costs to peripheral states like the DRC whilst concentrating technological and economic benefits in core European nations. The framework of ecologically unequal exchange (EUE), as developed by Hornborg (1998) and elaborated by Givens et al. (2019), provides the analytical lens through which these dynamics become visible. It is argued that EU's green diplomacy does not facilitate a just transition to sustainability; rather; it perpetuates what the Commons Network (2024) calls "global sacrifice zones"—regions where local populations bear the environmental and social costs of the Global North's technological transformation.

This analysis contributes to critical scholarship on the European Green Deal in that it shows how progressive climate policies (or, better put, ostensibly progressive policies) can reproduce colonial structures of domination and exploitation. It demonstrates that, if one does not address fundamental power asymmetries in the capitalist world-system, efforts toward sustainability risk becoming new forms of what El-Ojeili and Hayden (2022) describe as the core system dynamic of endless accumulation of capital dressed in green rhetoric.

The thesis is divided into six main sections. Following this introduction, the literature review contextualises the CRMA within broader EU policy frameworks whilst documenting the significance of DRC cobalt for the green transition. The methodology section introduces world-systems analysis and ecologically unequal exchange as complementary theoretical frameworks. The analysis applies these frameworks to EU-DRC relations, demonstrating how cobalt extraction exemplifies EUE dynamics. The discussion explores the implications of this analysis for understanding contemporary capitalism and environmental justice, whilst the conclusion synthesises findings and suggests directions for future research.

The stakes of this analysis extend far beyond academic debate. As RAID and AFREWATCH (2024) demonstrate, "72% reported recurring skin diseases including itching, spots, rashes, and white patches on the skin following contact with contaminated water" (p. 1) from industrial cobalt mining. Understanding these dynamics through a world-systems lens reveals that the apparent tension between environmental goals and social justice is not accidental but structural — rooted in the hierarchical organisation of the capitalist world-economy.

Literature Review

The Evolution of EU Critical Raw Materials Policy

The way the European Union has dealt with critical raw materials has changed over time. Each crisis has shown the EU's weaknesses in its main supply chains. The foundation for contemporary policy in this area emerged from the 2008 Raw Materials Initiative (Regulation (EU) 2024/1252). The initiative was the first to express EU concerns about dependency on imports for industrial inputs. However, the current EU framework took shape thanks to three major policy developments: the European Green Deal's climate commitments, geopolitical tensions highlighting supply vulnerabilities, and industrial competitiveness pressures from global rivals. EU Regulation (2024/1252)

Launched in December 2019, the European Green Deal established the general framework for European climate action with the ambitious goal of achieving carbon neutrality by 2050. As the European Commission (2019) declared, this was "Europe's man on the moon moment" — a transformative agenda requiring massive investments in clean technologies, renewable energy, and industrial decarbonisation (European Commission, 2019, COM(2019) 640 final). But the implementation of the Green Deal rapidly exposed fundamental contradictions between environmental objectives and the material requirements for achieving them.

The geopolitical context shifted dramatically following Russia's invasion of Ukraine in February 2022, and the COVID pandemic, which exposed European dependencies not only in energy but across multiple strategic supply chains. The European Commission's subsequent Strategic Compass emphasised the need for "strategic autonomy" in critical sectors, whilst the REPowerEU plan accelerated the transition away from Russian fossil fuels EU Regulation (2024/1252). These developments coincided with growing concerns about Chinese dominance in critical materials processing and the United States' Inflation Reduction Act, which threatened to disadvantage European clean technology manufacturers (Friends of the Earth Europe, 2023)

The Critical Raw Materials Act, formally adopted as Regulation (EU) 2024/1252, emerged from these environmental, geopolitical, and economic pressures. It states that "the general objective of this Regulation is to improve the functioning of the internal market by establishing a framework to ensure the Union's access to a secure, resilient and sustainable supply of critical raw materials" (European Union, 2024, Art. 1(1)). This shows a basic problem in European policy: trying to combine market integration, security and sustainability goals, using methods that might not be compatible in practice.

The CRMA Framework and Implementation Mechanisms

The CRMA operates through three interconnected pillars designed to enhance European resilience whilst maintaining global competitiveness. First, the Regulation aims to "lower the risk of supply disruptions related to critical raw materials likely to distort competition and fragment the internal market, in particular by identifying and supporting strategic projects that contribute to lowering dependencies and diversifying imports" (European Union, 2024, Recital 7). This pillar creates the Strategic Projects mechanism through which the Commission can designate certain raw materials projects as European priorities, providing streamlined permitting and financial support (European Union, 2024, Arts. 5–11).

The strategic projects framework embodies the core-periphery logic underlying the EU's raw materials policy. Projects must "strengthen the Union's security of supply for strategic raw materials" whilst demonstrating "sufficient technical feasibility" and being "implemented in an environmentally and socially sustainable manner" (European Union, 2024, Art. 5(1)). However, the Regulation does not give a great deal of details about how these requirements (which are potentially contradictory) will be balanced in practice, particularly for projects in third countries where European enforcement capacity remains limited, such as the DRC.

The second pillar focuses on monitoring and risk mitigation via enhanced surveillance of global supply chains. The Regulation mandates the creation of a monitoring dashboard and requires regular stress testing of strategic raw materials supply chains. The European Critical Raw Materials Board, which is composed of "representatives of Member States and of the Commission," is in charge of coordinating these activities. And the Board also establishes "standing subgroups on financing, public acceptance, exploration, monitoring and strategic stocks as well as one on circularity, resource efficiency and substitution" (European Union, 2024, Arts. 16–19, 34(2), 34(7))

The third pillar emphasises circularity and resource efficiency as a way of reducing import dependencies. The Regulation sets binding benchmarks for 2030: "the Union should (...) produce at least 10% of the Union's consumption of strategic raw materials" through domestic extraction, "the Union processing capacity should (...) produce at least 40% of its annual consumption of strategic raw materials," and "Union recycling capacity should (...) produce at least 25% of the Union's annual consumption of strategic raw materials" (European Union, 2024, Recital 15). Additionally, the Regulation states that "efforts should be undertaken to ensure that, by 2030, the Union is not dependent on a single third country for more than 65% of its supply of any strategic raw material."(European Union, 2024, Recital 15).

These benchmarks show the extractive logic that underlines European green industrial policy. Even with significant investments in domestic capacity and recycling, the EU will remain fundamentally dependent on raw materials imports from peripheral regions. The 65% single-country threshold encourages diversification. But it does not address the broader pattern: multiple peripheral countries supply raw materials for European industrial development whilst bearing the environmental and social costs of extraction.

Strategic Partnerships and Global Gateway Integration

The external dimension of EU critical raw materials policy operates above all through

strategic partnerships. These are formalised as Memoranda of Understanding with resource-rich countries. As Gerasimcikova et al. (2024) state, "as of July 2024, the EC has established strategic partnerships on critical raw materials with Argentina, Australia, Canada, Chile, the DRC, Greenland, Kazakhstan, Namibia, Norway, Rwanda, Serbia, Ukraine, Uzbekistan, and Zambia." (p.35). These partnerships promise cooperation in "extracting, processing, refining, recycling and sustainable sourcing of strategic raw materials" whilst promoting "environmental and social sustainability, good governance and meaningful engagement of local communities." (p.35).

However, these partnerships are non-binding, and this creates systematic asymmetries in their implementation. As Müller, Ghiotto, and Bárcena (2024) demonstrates, "whilst MoUs are not intended to 'create rights or obligations under international or domestic law' (...) Free Trade agreements do have a binding nature with specific rules for both partners and can often contradict the objectives of the SPs, such as 'the creation of local value added.'" (p. 15) This creates a system with two tiers, in which European commitments remain voluntary, and, at the same time, partner countries face binding constraints through trade agreements that limit their autonomy in terms of policy.

The Global Gateway strategy provides the financial and institutional infrastructure for implementing these partnerships. Launched in December 2021 as Europe's response to China's Belt and Road Initiative, the Gateway promises to "mobilise up to €300 billion of investments" between 2021 and 2027 through "sustainable and high-quality infrastructure" that promotes "democracy, good governance, transparency and the rule of law." (Gerasimcikova et al., 2024, p. 4). However, critical analysis reveals this framework contains major flaws.

Gerasimcikova et al. (2024) identify three fundamental flaws in Global Gateway implementation. First, "the Global Gateway's main source of funding is the EU's development cooperation policy and budget, whose primary mission, according to the EU's founding treaties, is 'the reduction and, in the long term, the eradication of poverty.'"(p. 4) Yet their analysis reveals that "the presence of European companies in the majority of analysed projects points to a high risk that the Global Gateway prioritises the promotion of opportunities for European businesses in the Global South over development objectives such as poverty reduction." (p. 4)

Second, the Gateway creates "a risk of negative impacts on human rights and the environment" through large-scale infrastructure projects that displace communities and degrade ecosystems, whilst environmental and social impact assessments remain weak or absent (p. 5). Third, "the way in which the Global Gateway has been developed and implemented has not been democratic or transparent," with "partner countries, parliaments, and local civil society have no real say" whilst "decision-making is opaque, dominated by EU officials, development finance institutions, and big corporate lobbies." (p. 5)

The DRC Context: Colonial Legacies and Contemporary Challenges

To understand contemporary EU-DRC relations, one must acknowledge the deep impact of Belgian colonial rule and subsequent European economic involvement in the Congo. The Belgian Congo (1908-1960) operated as a vast extractive enterprise characterised by brutal labour exploitation and systematic resource extraction, that *"*has left deep marks on the country's social and economic structures and continues to shape the dynamics of resource extraction to this day*"* (Commons Network, 2024). European colonial ventures in the Congo

were explicitly designed to extract wealth for metropolitan development and this a dynamic that persists in modern forms of resource governance.

The colonial economy was based on taking raw materials like rubber and ivory out of the Congo and selling them to European markets. This meant that the Congolese people suffered forced labour, violence and cultural destruction. Independence in 1960 did not end European economic dominance, as the European countries (and, later, the EU and its member states) maintained significant commercial interests in Congolese mining. Also, independence in 1960 did not end European economic dominance, as Mobutu Sese Seko was backed into power by Belgium and the US, ensuring that "economic sovereignty was not on the agenda for his thirty years rule" (Commons Network, 2024).

The Democratic Republic of the Congo (DRC) faces a lot of challenges which affect how it engages with European raw materials diplomacy. The country is one of the world's poorest despite having lots of minerals, and experts call this the "resource curse". This is the idea that having plenty of natural resources can sometimes make it hard for a country to develop. Weak state capacity, widespread corruption, and ongoing conflict in eastern regions create governance challenges that complicate efforts to transform mineral wealth into broad-based development. (Commons Network, 2024).

The cobalt sector is a good example of this. The DRC has about 70% of the world's cobalt reserves, but it makes only a small amount of money from selling cobalt because of its position in global commodity chains. Industrial mining operations, dominated by multinational corporations including Glencore, China Molybdenum Co., and others, export raw materials for processing in China, Europe, and other locations. Artisanal mining, whilst employing an estimated 200,000 people, is conducted under hazardous conditions, with minimal safety protections or fair compensation (RAID and AFREWATCH, 2024)

Recent Congolese government efforts to capture greater value from mineral exports reflect a policy shift toward local value creation. The DRC government has implemented export restrictions requiring that "if export licenses are to be granted, then you must transform locally or you won't be allowed to export," as officials state they "don't want to just be a supplier of raw cobalt" but want to be "a full participant of the value chain within the country." However, these efforts face resistance from international partners, with traders warning that market instability "will move away from cobalt" and industry representatives expressing concerns about supply security and the potential for downstream markets to "find an alternative" (Cook & Shi, 2025).

European Green Transition and Raw Materials Dependencies

The EU's green transition requires massive quantities of critical raw materials that European geology cannot provide in sufficient quantities (EU) 2024/1252. Electric vehicle batteries, wind turbines, solar panels, and energy storage systems, these all depend on materials like lithium, cobalt, rare-earth elements, which need to be imported from peripheral regions. Demand for these materials is expected to increase several hundred percent by 2040 to meet global climate targets, creating intense competition for access to reserves (Friends of the Earth Europe, 2023).

Cobalt is very important in European plans to reduce carbon emissions. Lithium-ion

batteries are used in electric vehicles and to store renewable energy. Cobalt is an essential part of these batteries because it makes them more stable and long-lasting. The Commons Network (2024) documents that "68% of Cobalt and 36% of Tantalum imported to the EU are from the DRC". This means that achieving the European climate goals is directly linked to what happens with the mining in Congo. This will increase as European car makers invest a great deal in making electric vehicles, and the European Battery Alliance aims to increase the number of batteries made in Europe.

Despite this, the environmental and social costs of cobalt extraction remain, for the most part, invisible in European policy discourse. European consumers enjoy the benefits of clean technology — reduced air pollution, lower carbon emissions, quieter transportation — but, at the same time, extraction sites in the DRC experience what RAID and AFREWATCH (2024) document as systematic environmental degradation and social displacement. This geographic separation of benefits and costs is a clear example of what environmental justice scholars term "environmental load displacement"— the systematic transfer of ecological burdens from privileged to marginalized populations.

The scale of this displacement becomes apparent when examining projected demand increases. The Commons Network (2024) notes that "to reach the 2°C global temperature target (...) rare mineral supply would need to quadruple by 2040," with "50 to 60% of extracted minerals end up in batteries of privately owned cars." This huge increase in extraction will put a lot of pressure on the environment in communities that are already at risk. But it will be good for European manufacturers, consumers, and policymakers, because they can say they are leading the way on climate change even though they don't have to deal with the damage caused by their consumption patterns.

Corporate Governance and Regulatory Frameworks

The governance of European raw materials supply chains reveals significant gaps between stated commitments to sustainability and actual corporate practices. Whilst the EU has established various regulatory frameworks — including the Corporate Sustainability Due Diligence Directive, the Batteries Regulation, and the CRMA's own certification schemes — implementation remains weak and enforcement limited.

The CRMA's approach to environmental and social safeguards illustrates these limitations. The Regulation requires strategic projects to be "implemented in an environmentally and socially sustainable manner" but defines this primarily through "compliance with applicable law" and participation in "certification schemes" (European Union, 2024). Given the weak regulatory capacity in many partner countries, this approach, in effect, delegates environmental protection to voluntary corporate initiatives rather than binding requirements.

Civil society organisations have highlighted systematic failures in existing certification schemes. The EU Raw Materials Coalition (2024) note that "significant incidents over the past years have shown the weaknesses of certification schemes (...) a false certificate (...) led to 272 deaths and a huge environmental disaster". (p. 27). Yet the CRMA continues to rely a lot on these mechanisms instead of establishing independent monitoring or binding environmental standards.

In addition, the institutional exclusion of affected communities from governance processes reflects broader patterns of corporate capture in EU policymaking. Friends of the Earth Europe (2023) highlight how industry is forging the EU Critical Raw Materials Act through privileged access to Commission officials whilst civil society organisations face systematic exclusion from key consultations. This pattern ensures that the big business priorities are the most important when it comes to making new rules, whilst environmental and social concerns are put to one side.

Methodology

This thesis employs world-systems analysis as its primary methodological framework, complemented by the theory of ecologically unequal exchange, to examine the EU's critical raw materials diplomacy with the Democratic Republic of Congo. This methodological approach diverges significantly from traditional international relations theory and conventional economic analysis by treating the global economy as a single, integrated system characterised by hierarchical relationships between core, semi-peripheral, and peripheral zones.

World-Systems Analysis: Theoretical Foundations

Immanuel Wallerstein's world-systems analysis emerged in the 1970s as a critique of both modernisation theory and orthodox Marxist approaches to development. As El-Ojeili and Hayden (2022) demonstrate, WSA fundamentally differs from mainstream international relations theory by rejecting the analytical separation of economic, political, and social spheres. Instead, Wallerstein (1974) conceptualizes the modern world-system as "a single world-economy" organised around capitalist accumulation and characterised by an international division of labour that emerged in the long sixteenth century (1450-1640). (Wallerstein 1974a, 15, as cited in El-Ojeili & Hayden, 2022, p. 120)

World-systems analysis challenges conventional approaches to international relations. As Wallerstein explains, the world-system is "above all, a world-economy" where "the basic linkage between the parts of the system is economic" (Wallerstein, 1974a, p. 15, as cited in El-Ojeili & Hayden, 2022, p. 120). El-Ojeili and Hayden (2022) argue that this holistic approach proves particularly valuable for understanding environmental issues that conventional approaches struggle to conceptualise within fragmented analytical frameworks.

The world-system encompasses three main structural components. First, the international division of labour organizes global production through unequal exchange relationships between core areas specializing in capital-intensive, high-technology production and peripheral areas providing raw materials and labour-intensive goods. As Wallerstein (1974) explains, this creates "a hierarchical division of labour" whereby "core (strong states, variety, and specialization in profitable monopolised production), periphery (weak states and engaging in labour-intensive, lower-ranking, and less profitable production), and semi-periphery (situated between exploiters and exploited)." (Wallerstein, 1974a & 2005, as cited in El-Ojeili & Hayden, 2022, p. 120-121).

Second, the interstate system provides the political framework within which economic competition occurs, with sovereign states serving instrumental functions for capital accumulation whilst maintaining formal equality. Unlike realist international relations theory, which treats states as autonomous actors in an anarchic system, WSA understands state

behaviour as shaped by systemic imperatives of capital accumulation. As El-Ojeili and Hayden (2022) note, states function "domestically, to ensure the interests of ruling groups against subalterns, and, at a world-systemic level, as a 'means of assuring certain terms of trade in economic transactions.'"

Third, the geoculture constitutes the ideational framework that legitimises systemic hierarchies. Wallerstein (2011) defines geoculture as "a set of ideas, values, and norms that were widely accepted throughout the system and that constrained social action thereafter."(Wallerstein, 2011b, p. xvi, as cited in El-Ojeili & Hayden, 2022, p. 123). The dominant modern geoculture is centrist liberalism, which emerged after the French Revolution and "served as a cultural-symbolic subsystem helping to bind, normalize, legitimize, and transmit the social reproduction of the inherently inequitable world-system." (Wallerstein, as cited in El-Ojeili & Hayden, 2022, p. 123).

Ecologically Unequal Exchange Theory

The theory of ecologically unequal exchange, developed by Hornborg (1998) and elaborated by scholars including Givens et al. (2019), extends world-systems analysis to incorporate environmental dimensions of global inequality. EUE theory argues that "global political–economic factors (…) shape the unequal distribution of environmental harms and human development; wealthier and more powerful Global North nations have disproportionate access to both natural resources and sink capacity for waste in Global South nations" (p. 1, Givens et al., 2019).

The theoretical foundation builds on Stephen Bunker's (1985) analysis of extractive economies in the Amazon, which demonstrated how world-system exchange opportunities organised "modes of extraction" that simultaneously created environmental degradation and economic underdevelopment. Bunker showed that extractive relationships systematically undermined "the local social, political, and economic capacity necessary to resist exploitation," creating self-reinforcing cycles of dependency and environmental destruction. (p. 23)

Hornborg (1998) articulates the core mechanism of EUE through his observation that "raw materials have greater productive potential" but "are priced lower than processed goods", creating "distorted valuations that drive global ecological degradation and inequalities". This shows that the way the market works makes environmental services and natural resources seem less valuable than processed goods and technology. This idea is called "ecological debt" by Martinez-Alier et al (2016).

Givens et al. (2019) identify several key features of EUE relationships that prove particularly relevant for understanding EU-DRC cobalt relations. First, "Global South nations are structurally positioned as both a tap for resources and a sink for waste within the world-economic system of extraction, production, and consumption."(p. 2). Second, environmental load displacement operates both "spatially, to other locations across the planet, and temporally, to future generations". (p. 4) Third, these processes create what they term the "consumption/degradation paradox" whereby "Global North countries consume more resources yet experience less environmental degradation within their borders" whilst "Global South countries have incurred worsening environmental harms, without proportional increases in resource consumption by domestic populations." (p. 7)

Analytical Framework Application

In order to apply world-systems analysis and EUE theory to EU-DRC relations, it is necessary to identify the specific mechanisms through which core-periphery dynamics operate within the critical raw materials sector. This analysis examines four key dimensions: the structural position of the EU and the DRC within the world system; the organisation of cobalt commodity chains; the role of institutional frameworks in facilitating unequal exchange; and the environmental and social consequences of these relationships.

The structural analysis positions the EU as a core region characterised by advanced industrial capacity, technological innovation, financial dominance, and strong state institutions capable of coordinating complex policy frameworks. The CRMA itself exemplifies core region characteristics: sophisticated institutional mechanisms, technical expertise, and the capacity to project regulatory influence globally through trade agreements and investment flows. The European Critical Raw Materials Board, with its "standing subgroups on financing, public acceptance, exploration, monitoring and strategic stocks as well as one on circularity, resource efficiency and substitution" (European Union, 2024, Art. 34(2) & 34(7)), demonstrates the institutional sophistication that enables core regions to manage complex global supply chains.

The DRC is different. Its economy is focused on mining and selling minerals, but its government is weak, it is in debt, and it is not very technologically advanced. Despite having lots of valuable minerals, the country focuses on mining rather than processing, manufacturing, and technological development, which happens in other countries. This affects how much power the EU and DRC have, and what they can do. The EU can decide the terms for accessing raw materials, whilst the DRC is limited in how it can develop.

The analysis of the supply chain shows where cobalt comes from, how it is made, and how it is used in Europe. This approach shows how value is shared along the chain, with most of it going to companies based in Europe and other important regions. These companies are involved in processing, battery manufacturing, and making final products. In contrast, Congolese actors receive very little compensation even though they face environmental and social costs. The separation of extraction and value addition (the process of adding value to raw materials) follows the same patterns seen in the past, where less developed regions provide raw materials for industrial development elsewhere.

The institutional analysis examines how EU policy frameworks — including the CRMA, Global Gateway, and strategic partnerships — structure market access and investment flows to favour European interests whilst constraining DRC policy autonomy. The contrast between non-binding partnership commitments and enforceable trade agreement provisions exemplifies how formal equality masks substantive hierarchy embedded within institutional arrangements.

Methodological Contributions and Limitations

This methodological approach has several advantages when it comes to analysing the relationship between EU-DRC raw materials. Unlike other approaches that see the EU and DRC as separate entities, WSA shows how they are actually both part of a single global system that

affects how they interact. The framework is different from economistic approaches. Economistic approaches focus on market efficiency. The framework shows how power relations and structural hierarchies determine distributional outcomes. WSA is different from other approaches that treat current arrangements as if they are natural. WSA shows how these current arrangements have been created over time and how they can change (El-Ojeili & Hayden, 2022).

The combination of EUE theory and world-systems analysis is really useful for understanding the environmental aspects of global inequality, which are often missed by more traditional approaches. Most environmental economics assumes that economic growth and environmental impact can be separated through new technology. EUE shows that this is often wrong, because the environmental costs are moved from one place to another instead of being got rid of completely. This is important because it helps us understand how European green plans might cause environmental problems in other places and at other times.

But there are important problems with this approach that need to be considered carefully. Some critics say that world-systems analysis focuses too much on the economy and not enough on politics and culture. The framework's broad focus might hide important differences between the main and surrounding areas. The focus on structural constraints (long-term global trends) may overlook the ability of smaller (peripheral) groups to challenge or change global agreements (El-Ojeili & Hayden, 2022).

These limitations are dealt with by paying close attention to the political and cultural sides of EU-DRC relations, recognising the differences between the two regions, and analysing Congolese resistance strategies. The goal is not to present a definitive account of inevitable exploitation, but to reveal how current arrangements reproduce inequality whilst identifying potential alternatives that could support more just and sustainable relationships.

Analysis

Core-Periphery Dynamics in EU Critical Raw Materials Policy

The European Union's Critical Raw Materials Act illustrates what Wallerstein (1974) identifies as the core system dynamic of endless capital accumulation, operating through institutional mechanisms that systematically reproduce hierarchical relationships between core and peripheral regions (Wallerstein, 1974a & 2005, as cited in El-Ojeili & Hayden, 2022, p. 120). When looking at the CRMA's rules about supply chain diversification and strategic partnerships from a global perspective, it becomes clear that they are actually clever ways of making sure Europe can continue to access resources from less developed countries whilst limiting the growth options of these countries.

The Regulation's basic structure uses core-periphery assumptions throughout (European Union, 2024). The EU has identified 34 raw materials as being very important for its competitiveness (European Union, 2024). This suggests that the EU should be seen as the main consumer of minerals around the world. It also means that countries that have a lot of resources are seen as suppliers rather than potential competitors or partners that can develop in their own way. The 2030 benchmarks established in the Regulation—"the Union should (...) produce at least 10% of the Union's consumption of strategic raw materials" through domestic extraction, "the Union processing capacity should... produce at least 40% of its annual consumption of

strategic raw materials", and "Union recycling capacity should (...) produce at least 25% of the Union's annual consumption of strategic raw materials" (European Union, 2024, Recital 15)—reveal the extractive logic underlying European industrial policy.

Even as the EU develops some domestic capacity, these targets show that it still depends a lot on importing raw materials whilst keeping value-added activities within European borders (European Union, 2024). The additional requirement that "efforts should be undertaken to ensure that, by 2030, the Union is not dependent on a single third country for more than 65% of its supply of any strategic raw material" (European Union, 2024, Recital 15) encourages diversification but does not challenge the broader pattern whereby multiple peripheral countries supply raw materials for European industrial development whilst bearing environmental and social costs of extraction.

The strategic projects mechanism illustrates how formal equality masks substantive hierarchy in global governance arrangements. Projects in third countries must demonstrate "local value addition" to qualify for EU support, yet this requirement operates within trade frameworks that systematically constrain value-addition possibilities (European Union, 2024). The Regulation states that strategic projects should "provide cross-border benefits beyond the Member State concerned, including spillover effects further down the value chain" (European Union, 2024, Art. 5), but defines these benefits primarily in terms of European supply security rather than genuine development outcomes for partner countries.

The European Critical Raw Materials Board epitomises the governance structures that El-Ojeili and Hayden (2022) identify as characteristic of core regions: strong institutional capacity, technical expertise, and coordination mechanisms that enable coherent strategy formulation and implementation. Composed of "representatives of Member States and of the Commission, whilst being able to ensure participation of other parties as observers, in particular the European Parliament" (European Union, 2024, Art. 34), the Board reproduces exclusionary decision-making patterns that marginalise peripheral countries despite their central role in supplying the materials that European policies aim to secure.

The DRC as Peripheral Supplier in the World-System

The Democratic Republic of Congo's position within the cobalt commodity chain illustrates what Wallerstein (1974) identifies as the peripheral role in the world-system's international division of labour (Wallerstein, 1974a, as cited in El-Ojeili & Hayden, 2022, pp. 120-121). The DRC has around 70% of the world's cobalt, but most of the processing, manufacturing and technology development happens in other countries. (RAID and AFREWATCH, 2024). This means that the places where raw materials are found are still poor and have a negative effect on the environment, even though they are not benefiting from the economic growth that comes from the production of goods.

RAID and AFREWATCH's (2024) detailed report on the impacts of industrial cobalt mining shows how unequal exchange affects the environment at a local level. Their research documents systematic environmental degradation affecting entire watersheds, with "at least 22 scientific studies and 20 civil society reports clearly demonstrate that the rivers, lakes, streams, groundwater and wetlands near the DRC's cobalt and copper mines are severely polluted by mining activities". (p. 2) The pollutants include "copper, cobalt, lead, arsenic, cadmium,

uranium, manganese, mercury and acidified pollutants (such as sulphuric acid, of which huge amounts are used by industrial mines)" that contaminate air, soil, and water throughout mining regions. (p. 2)

The health problems documented by RAID and AFREWATCH (2024) show how the damage to the environment affects people living in poor, peripheral communities. Their survey shows that "56% of those interviewed said women are increasingly experiencing gynaecological and reproductive issues such as irregular menstruation, urogenital infections, more frequent miscarriages and, in some cases, birth defects", whilst "72% reported recurring skin diseases including itching, spots, rashes, and white patches on the skin following contact with contaminated water".(p. 1) Additionally, "56% expressed serious concerns about the health of their children, who they said seem to experience the effects of water pollution more intensely than the adults". (p. 1)

The economic impact of this exploitation is clear in the huge differences in the value captured at different points in the cobalt supply chain. RAID and AFREWATCH (2024) document that "99% of those who relied on fishing or agriculture said their yields have dramatically decreased" due to mining pollution, forcing "59% said they have been forced to reduce their food intake to one meal a day" and "75% say they could no longer afford healthcare or medicine when sick". (p. 1& p. 2) These impacts illustrate what Bunker (1985) identified as extractive industries' tendency to impoverish local resource bases whilst undermining economic systems that might provide alternatives to mining dependence.

The testimony documented by RAID and AFREWATCH (2024) powerfully captures the lived experience of peripheral exploitation. As one resident of Tshabula explained: "When COMMUS started polluting the river, we women started having itching, infections and infertility, these were the signs of pollution on our health. Even our periods were irregular." (p. 32). Another resident of Noa stated: "We live in an environment that brings us more problems than solutions. We are becoming sick, our soil and water are polluted, and our lands are taken from us." (p. 1) These voices reveal the human costs of arrangements that European policy discourse presents as mutually beneficial partnerships.

The artisanal mining sector, which employs a significant portion of the DRC's population, including an estimated 40,000 children, shows how desperate economic conditions force people to take dangerous and unfair jobs (Commons Network, 2024).Working without safety equipment in dangerous conditions for very low wages, artisanal miners represent what Wallerstein (1983) terms the "semi-proletarianized" workforce, which is a term used to describe people in poor, peripheral areas who have no other options and so have to take any job they can, even if it means being exploited (Wallerstein, 1983, as cited in El-Ojeili & Hayden, 2022).

Environmental Load Displacement and European Green Transition

The EU's green transition through critical raw materials imports illustrates what Hornborg (1998) identifies as the fundamental mechanism of ecologically unequal exchange, the systematic transfer of environmental costs from consumption sites to extraction sites through market mechanisms that undervalue natural resources relative to processed goods. This process creates what Givens et al. (2019) conceptualise as "environmental load displacement" whereby

"wealthier and more powerful Global North nations have disproportionate access to both natural resources and sink capacity for waste in Global South nations". (p. 4)

In other words, European consumers enjoy the benefits of clean technology, such as reduced air pollution and lower carbon emissions in European cities, whilst the places where minerals and metals are extracted in the DRC experience ongoing environmental problems that would be unacceptable in Europe.

The Commons Network (2024) documents the scale of this environmental displacement by noting that "68% of Cobalt and 36% of Tantalum imported to the EU are from the DRC", making European climate goals directly dependent on Congolese extraction. The organisation conceptualizes eastern DRC as a "sacrifice zone" where "its people and environment bear the cost of the green and digital transition, as the increased demand for raw minerals fuels armed conflict, exploitation of its rural population and extractivism in its soil".

The effects of environmental problems on the world last for a long time. They cause pollution and damage to the environment that will affect future generations. As Givens et al. (2019) explain, EUE theory encompasses both spatial displacement "to other locations across the planet, and temporally, to future generations". (p. 4) RAID and AFREWATCH (2024) show that the acidification of water sources and contamination of agricultural land will cause long-lasting damage to the environment, affecting Congolese communities long after current mining operations have finished. At the same time, Europeans will benefit from the technologies produced from this extraction.

The increase in demand shows how these dynamics are getting stronger. The Commons Network (2024) says that to keep the rise in global temperature under 2°C, we would need to make sure that the supply of rare minerals increases by four times by 2040. At the moment, 50 to 60% of the minerals that are extracted are used in batteries in privately owned cars (Commons Network, 2024). This huge increase in extraction will put pressure on the environment in communities that are already at risk, whilst benefits will go to European manufacturers, consumers, and policymakers. They can say they are leading the way on climate change without admitting that their consumption patterns are responsible for the ecological debt.

Global Gateway as Institutional Mechanism for Core Dominance

The Global Gateway strategy provides the financial and institutional framework through which the CRMA's external dimensions operate. This shows how development cooperation has been used to achieve European industrial policy goals. Gerasimcikova et al. (2024) demonstrate that "the Global Gateway's main source of funding is the EU's development cooperation policy and budget, whose primary mission, according to the EU's founding treaties, is 'the reduction and, in the long term, the eradication of poverty.'" (p. 4). But their analysis shows that Gateway projects mostly help European businesses rather than helping to develop countries.

The use of development finance to access raw materials is a strategy that analysts identify as being typical of how core regions manage peripheral relationships. Gerasimcikova et al. (2024) document that "in 25 of the 40 Global Gateway projects explored, at the time of writing the report at least one European company benefited from the project", including "large companies such as Siemens, A.P. Moller Group, SUEZ, and BioNTech". (p. 4). This pattern

shows how public money is used to help private companies make more money, and how these deals are presented as if they are helping with development.

The infrastructure projects that get funded through the Gateway put European business interests before local development needs. The Lobito Corridor, which connects the DRC and Zambian mining regions to Atlantic ports, is a good example of this (Wala Chabala & Hofmeyr, 2025). The project is supposed to promote African economic integration, but it mostly just makes it easier for African countries to sell their raw materials to European markets. It doesn't really support regional value chains or help local industries in Africa to develop (Wala Chabala & Hofmeyr, 2025). This pattern reflects what El-Ojeili and Hayden (2022) identify as the instrumental relationship between political and economic power in the world-system, whereby infrastructure investments serve to "assur[e] certain terms of trade in economic transactions" rather than promoting genuine development (Wallerstein, 1974a, p. 16, as cited in El-Ojeili & Hayden, 2022, p. 121).

The institutional governance of Gateway projects reproduces exclusionary patterns that characterise broader EU-Africa relations. Gerasimcikova et al. (2024) document how "the Global Gateway was unilaterally introduced by the European Commission and the High Representative/Vice President of the European Commission, excluding Global South countries from its design, governance, and priority-setting process from the start". (p. 5) This approach, where decisions are made from the top down, makes sure that European priorities are the most important when choosing which projects to work on and when putting these projects into action. This means that African voices are not heard, even though they are the ones who have to deal with the main costs and risks.

Gerasimcikova et al. (2024) documented transparency and accountability failures. These show how institutions are systematically excluded. This means that there is no effective oversight of Gateway operations. They find "a gaping hole in publicly accessible information on projects' financing, tendering processes, awarded contracts, and independent and transparent financial, human rights, and environmental assessments". (p. 6) This opacity "makes it impossible to monitor and evaluate how projects contribute to development objectives, or the risk of negative impacts in recipient countries," creating conditions whereby European institutions can claim development impact whilst avoiding accountability for adverse consequences. (p. 6)

Strategic Partnerships and Asymmetric Governance

The EU's partnerships with countries that have a lot of natural resources show how modern relationships between the centre and the periphery work. These relationships are formal and equal, but in reality, there is still a big difference in power between the two sides. The EU and DRC signed an EU-DRC Strategic Partnership in October 2023. This partnership promises to work together on five important areas: "integration of sustainable CRM value chains," "mobilization of funding for the development of infrastructure," "cooperation to achieve sustainable and responsible production," "cooperation on research and innovation", and "building of capacity to enforce relevant rules" (Neema, 2024). But because these commitments don't have to be followed, they can lead to unfair differences in how they are put into practice.

As the Müller, Ghiotto, and Bárcena (2024) demonstrates, "whilst MoUs are not

intended to 'create rights or obligations under international or domestic law'... Free Trade agreements do have a binding nature with specific rules for both partners and can often contradict the objectives of the SPs, such as 'the creation of local value added.'" (p. 15). This creates what world-systems analysts would recognise as characteristic core-region strategies for managing peripheral relationships: voluntary commitments that serve legitimating functions whilst binding constraints operate through separate institutional mechanisms.

The way strategic partnerships are set up can lead to some people being left out, which is a reflection of wider power imbalances in the world. Neema's research (2024) explains how partnership agreements are mostly made by government officials from Europe and Africa, with "significant corporate representation but minimal participation from Congolese civil society organisations". This means that the partnership frameworks reflect what companies want and what the government wants, rather than what the community needs or what is needed to protect the environment.

The problems that strategic partnerships face when trying to put plans into action show the ways in which peripheral countries are restricted by the way the world is organised. Despite promises of technology transfer and capacity building, the DRC's weak institutions and external debt mean it cannot negotiate favourable terms or enforce environmental protections. As the EU Raw Materials Coalition (2024) note, these partnerships remain vague and lack a proper definition of what 'value addition' and 'beneficial for both partners' actually means, creating opportunities for core regions to interpret commitments in ways that serve their interests whilst avoiding binding obligations.

Corporate Governance Failures and Regulatory Capture

The way European raw materials are supplied shows clear patterns of companies influencing the rules to make it easier for industry, whilst ignoring environmental and social issues. Friends of the Earth Europe (2023) documents how "industry is forging the EU Critical Raw Materials Act" through privileged access to Commission officials whilst civil society organisations face exclusion from key consultations (p. 1). This pattern reflects what world-systems analysts identify as characteristic features of core-region governance: the way in which state institutions are organised so that they support capitalist interests, whilst also keeping up the appearance of democracy through official consultation processes.

The CRMA's approach to protecting the environment and society is an example of how rules can make companies look responsible without actually making them do anything that might reduce their profits (EU Raw Materials Coalition, 2024). The Regulation requires strategic projects to be "implemented in an environmentally and socially sustainable manner" but defines this primarily through "compliance with applicable law" and participation in "certification schemes" (European Union, 2024, Art. 5). Given the weak regulatory capacity documented by RAID and AFREWATCH (2024) in the DRC, this approach ensures that environmental deterioration continues whilst providing legal protection to European companies and institutions.

The failures of certification schemes documented by EU Raw Materials Coalition (2024) reveal the inadequacy of voluntary corporate governance approaches for preventing environmental and social harm. They note that "significant incidents over the past years have shown the weaknesses of certification schemes... a false certificate... led to 272 deaths and a

huge environmental disaster (...) the case of ITSCI (...) laundered large amounts of minerals linked to conflict and human rights abuses." (p. 27) Despite these documented failures, the CRMA still relies heavily on companies assessing themselves and setting their own standards, rather than having strict rules or independent monitoring.

The systematic exclusion of affected communities from governance processes reflects broader patterns whereby core-region institutions prioritise commercial interests over democratic participation. RAID and AFREWATCH (2024) document how "no company was willing to provide evidence, such as audits or third-party assessments, confirming that their practices were effective in curbing environmental contamination". (p. 2) This pattern makes sure that companies get to decide everything, whilst the people who suffer from the extraction process have no say in how it is governed.

Resistance and Counter-Hegemonic Responses

Despite structural constraints imposed by core-periphery relationships, Congolese responses to European raw materials diplomacy demonstrate what Wallerstein terms "anti-systemic movements" that challenge hegemonic arrangements (Wallerstein, 1991a & 1991b, as cited in El-Ojeili & Hayden, 2022, pp. 126-127). The DRC has recently decided to restrict cobalt exports and to increase the amount of value added locally (Cook & Shi, 2025). This shows that the political leaders in the DRC understand that extracting resources has not led to the country's development (Cook & Shi, 2025).

Civil society resistance takes multiple forms that challenge the legitimacy of existing arrangements. Counter Balance (2025) documents how European demand for critical minerals indirectly supports "blood minerals and broken promises" that fuel conflict in eastern Congo whilst European institutions maintain plausible deniability regarding their role in perpetuating violence. Congolese civil society organisations increasingly challenge these arrangements, demanding accountability for European companies and transparency in mineral supply chains that currently remain opaque.

International solidarity movements provide additional channels for challenging European raw materials policies that reflect what Givens et al. (2019) identify as emerging global environmental justice networks. These movements connect local struggles in the DRC to wider problems of unfair treatment of the environment. They also challenge the idea that Europe's move towards using more environmentally friendly energy sources necessarily means that it will continue to take advantage of African resources.

However, these efforts to resist face a number of big challenges. World-systems analysis can help us understand these challenges. As Bunker (1985) demonstrated, extractive relationships systematically undermine "the local social, political, and economic capacity" necessary to resist exploitation. (p. 23) The damage to the environment, the dependence on the economy, and the people being forced to leave their homes because of cobalt mining weaken the communities and institutions that could challenge these situations. This creates cycles where the environment and society become more and more marginalised, as Givens et al. (2019) explain.

World-Systems Analysis as Critical Framework

The application of world-systems analysis to EU-DRC cobalt relations reveals structural dynamics that remain invisible in conventional policy discourse whilst providing frameworks for understanding alternatives to current arrangements. Unlike state-centric approaches that treat the EU and DRC as independent actors negotiating mutually beneficial agreements, WSA reveals how both are positioned within a single global system that shapes their interactions according to systemic imperatives of capital accumulation.

The usefulness of world-systems theory becomes clear when looking at the differences between what Europe says about climate change and what is actually being done to achieve its green transition goals. Whilst European policymakers present the CRMA as promoting "sustainable development" and "mutually beneficial partnerships", the actual implementation reproduces classical colonial patterns whereby peripheral regions provide raw materials for core-region industrial development whilst bearing environmental and social costs.

The integration of ecologically unequal exchange theory with world-systems analysis proves essential for understanding environmental dimensions of global inequality that mainstream approaches often overlook. As Givens et al. (2019) demonstrate, EUE theory reveals how "global political–economic factors, especially the structure of international trade, shape the unequal distribution of environmental harms and human development." (p. 1) Applied to EU-DRC relations, this framework illuminates how European green transition strategies systematically displace environmental costs whilst concentrating technological and economic benefits in core regions.

The theoretical contribution extends beyond academic analysis to provide tools for understanding contemporary global environmental politics. As El-Ojeili and Hayden (2022) argue, world-systems analysis offers "cogent, compelling challenges to the field of IR theory" (p. 1) by revealing how environmental governance operates through global economic structures that systematically privilege core regions. This case study demonstrates that addressing global environmental challenges requires confronting the fundamental organisation of the world-system itself rather than pursuing technical fixes within existing arrangements.

Discussion

Theoretical Implications for Environmental Governance

This analysis shows that world-systems analysis is still relevant for understanding environmental politics around the world. It can help address environmental issues that mainstream international relations theory struggles to understand. By revealing how the EU's Critical Raw Materials Act reproduces core-periphery dynamics through institutional mechanisms that systematically disadvantage peripheral regions, this study contributes to what El-Ojeili and Hayden (2022) identify as world-systems analysis's capacity to provide "cogent, compelling challenges to the field of IR theory". (p. 1)

The integration of world-systems analysis with ecologically unequal exchange theory proves particularly valuable for understanding how environmental governance operates within capitalist world-economy structures. As Givens et al. (2019) argue, EUE theory provides "an important global political–economic approach for research in environmental sociology and other environmental social sciences as well as for sustainability studies more broadly". (p. 1). This case study shows how seemingly technical problems, like getting hold of important raw

materials, bring up big questions about fairness in the environment and how we can keep developing without hurting the planet.

The analysis shows the problems with the usual ways of making environmental policies for Europe. These policies mostly look at how they work in Europe, and don't think about how they might affect the rest of the world. Research on the European Green Deal has mostly looked at how it affects EU countries. This includes how well the policies work, how the different organisations are working together, and the challenges of putting the policies into practice. However, it has not paid much attention to how European environmental policies affect countries in the Global South. This study shows how important it is to look at the bigger picture and understand how European policies fit into international inequality and environmental injustice.

The findings go against the commonly held view that EU raw materials diplomacy is a win-win situation for both European and African partners. The analysis shows how the formal equality between partners actually creates a hidden hierarchy within institutional arrangements. This corresponds to what Bogojević (2024) identifies as the "colonial legacies" that continue shaping contemporary EU-Africa relations despite formal decolonisation and legal equality.

Contradictions in European Green Transition

The analysis shows major differences between what the EU says it will do to protect the environment, human rights and sustainable development, and what it actually does in relation to its raw materials policies. These contradictions show the major tensions between the need for capitalism to grow and the need to protect the environment. These tensions can't be solved by technical fixes or market mechanisms alone. The CRMA's use of natural resources from remote areas goes against the EU's stated beliefs in environmental justice and sustainable development.

The scale of environmental displacement documented through this analysis demonstrates that European green transition strategies, despite reducing emissions within European borders, continue to depend on environmental load displacement that reproduces global inequalities. RAID and AFREWATCH's (2024) documentation of systematic water contamination, health impacts, and economic displacement in DRC mining regions reveals how European climate action depends on African environmental sacrifice. This pattern confirms what Givens et al. (2019) identify as the "consumption/degradation paradox" whereby core regions avoid environmental costs whilst peripheral regions bear disproportionate burdens. (p. 7)

The certification schemes and voluntary standards that the CRMA establishes for environmental and social safeguards exemplify what the EU Raw Materials Coalition (2024) identify as inadequate responses to systematic environmental and human rights violations. The Regulation's focus on companies regulating themselves and using market-based mechanisms (like prices) shows that political compromises have been made that put industry interests before environmental protection and community rights. This shows how capitalism makes it hard to protect the environment. It puts profits before protecting communities and ecosystems.

The strategic partnerships framework reveals how contemporary development cooperation reproduces colonial relationships through formal mechanisms that appear to respect sovereignty whilst constraining policy autonomy. The fact that partnership MoUs are not legally

binding, combined with the enforceable trade agreement provisions that limit the development options of partner countries, creates an unfair situation that benefits Europe but not Africa. This pattern goes against what the EU says about working together and making each other better off, and it keeps on creating dependency relationships that were common in colonial times.

Environmental Justice and Global Inequality

The findings raise fundamental questions about the possibility of environmental justice within existing global economic structures characterised by systematic inequality between core and peripheral regions. Whilst research on environmental justice started with local struggles against environmental racism, this analysis shows how environmental injustices work through global mechanisms that move ecological costs from rich to poor populations across national borders.

The concept of ecological debt provides a framework for understanding the historical and ongoing environmental transfers that characterise EU-DRC relations. As Martinez-Alier et al. (2016) argue, meaningful environmental governance requires recognising that core regions owe peripheral regions compensation for centuries of resource extraction and environmental degradation that enabled industrial development. When we look at important raw materials, this point of view suggests that the European green transition needs to do more than just avoid causing harm in the future. It also needs to deal with the environmental problems that have already happened. And it needs to make sure that the people who are affected are involved in decisions made about development.

The effects of environmental injustice on people and the environment are not just limited to the present, as they also include long-term damage to the environment that will affect future generations in less developed regions. RAID and AFREWATCH (2024) show that the acidification of water sources and contamination of agricultural land is causing permanent damage to the environment. This goes against the principles of sustainability that say that the well-being of future generations should be considered. This pattern shows how European consumption patterns now have a negative effect on African communities, whilst Europeans do not take responsibility for the long-term consequences.

The institutional mechanisms needed to tackle environmental injustice go beyond technical reforms. They also include fundamental changes to global governance structures. At the moment, these structures put European interests before democratic participation by affected communities. The EU Raw Materials Coalition (2024) gives a full list of what should be done, including strong environmental and social standards, asking affected communities what they think using Free, Prior and Informed Consent protocols, and paying fair compensation for environmental damage. But to put these recommendations into practice, there needs to be a challenge to the power of big business and state interests that currently dominate the governance of critical raw materials.

Alternative Development Models and Systemic Transformation

The resistance strategies documented throughout this analysis show possible alternatives to current arrangements, whilst revealing the structural constraints that peripheral regions face within existing global structures. The DRC is trying to get more money from its mineral exports by banning exports. Groups in society are demanding more honesty and

transparency. And movements around the world are challenging Europe's role in environmental destruction. According to Wallerstein (1991), these movements are "anti-systemic" and challenging the status quo (Wallerstein, 1991a & 1991b, as cited in El-Ojeili & Hayden, 2022, pp. 126-127).

However, the success of these movements depends on broader transformations in global political economy that extend beyond individual countries or sectors. Alternative development models that prioritise local needs over export markets offer potential pathways for more just arrangements, though they face significant structural constraints within the capitalist world-economy. The institutional capacity necessary for implementing such alternatives requires addressing the systematic underdevelopment of peripheral state institutions that results from centuries of extractive relationships.

The temporal contradictions embedded within current policies present particular challenges for systemic transformation. Whilst European decarbonisation may reduce long-term climate risks, the immediate environmental and social costs of critical raw materials extraction fall disproportionately on African communities, who have contributed least to climate change and who lack the resources to adapt to its consequences.

The potential for a just transition within current structures is constrained by the systemic imperatives of capital accumulation, which drive continuous growth and geographic expansion. As demonstrated by this analysis, even seemingly progressive environmental policies such as the European Green Deal have the potential to perpetuate colonial relationships when implemented within global systems that systematically favour core regions. Meaningful alternatives may require more fundamental transformations in global economic organisation than current policy frameworks acknowledge.

Implications for Future Research

This analysis suggests several important areas for future research on how the world manages its environment and the role of critical raw materials in international relations. First, looking at how the EU works with other African countries and regions could show if the patterns seen here are a standard part of European policy or if they depend on specific situations. The way cobalt is produced in the DRC and its history might mean that things are done differently there than in other countries or with other materials.

Second, if one looks at history in more detail, one can understand better how today's systems are based on what happened in the past. This also helps to spot times when things changed or broke away from the past. There needs to be a more systematic examination of the relationship between modern raw materials diplomacy and historical patterns of European-African economic relations. This will help us to understand both continuities and changes in global environmental governance.

Thirdly, a more detailed study of resistance movements and their organising strategies could inform broader discussions about possibilities for transforming global environmental governance. This analysis looks at different ways that people in the Congo are fighting against the European policy to use up their natural resources. Research that looks at how these movements are organised, who they are working with, and how well they are doing, could provide important information about how these policies are put into action, which is something that structural analysis cannot provide.

Fourth, the environmental problems caused by European policies on critical raw materials go beyond the DRC to other African countries and regions affected by extractive industries. Research that looks at how similar dynamics work in different situations could help improve our understanding of environmental racism and global inequality. It could also help connect local environmental struggles to larger, more systemic issues.

Finally, it is important to look at how other countries, especially China, can work together in different ways. Investment by China in African mining and processing facilities may lead to different development possibilities. However, these investments also create relationships that involve the extraction of resources. These relationships need to be examined carefully using a world-systems perspective.

Conclusion

This thesis has demonstrated how the European Union's Critical Raw Materials Act reproduces fundamental patterns of inequality and environmental injustice that characterise the capitalist world-system. Through detailed analysis of EU-DRC relations regarding cobalt extraction, the study reveals how ostensibly progressive environmental policies perpetuate colonial relationships whilst displacing ecological and social costs from core to peripheral regions. The application of world-systems analysis and ecologically unequal exchange theory illuminates structural dynamics that remain invisible in conventional policy discourse whilst providing frameworks for understanding alternatives to current arrangements.

The key findings challenge dominant narratives about European green transition that present critical raw materials diplomacy as mutually beneficial cooperation supporting both European decarbonisation and African development. Instead, the analysis shows how the CRMA creates and maintains a hierarchy between the core and the periphery. This is done through strategic partnerships that promise cooperation but actually limit the ability of partner countries to make their own policies. It also uses development finance that channels public resources to support European companies, certification schemes that give a false sense of security without any real protections, and governance frameworks that don't allow affected communities to have a say.

The environmental justice implications extend beyond immediate pollution to fundamental questions about who bears the costs of global sustainability efforts. RAID and AFREWATCH's (2024) documentation reveals the devastating reality behind European green rhetoric: "72% reported recurring skin diseases including itching, spots, rashes, and white patches on the skin following contact with contaminated water," "99% of those who relied on fishing or agriculture said their yields have dramatically decreased," and "75% say they could no longer afford healthcare or medicine when sick." (p. 1 &2) These statistics represent not merely unfortunate side effects but structural features of arrangements that systematically externalise environmental costs to peripheral populations.

The theoretical contributions demonstrate the continuing relevance of world-systems analysis for understanding contemporary global environmental politics. Whilst traditional international relations theories find it hard to include environmental issues in their usual frameworks, world-systems analysis shows how environmental governance is linked to global

economic structures that systematically favour certain regions. The connection with ecologically unequal exchange theory is very useful for understanding how environmental policies that appear progressive in one country can cause global injustices by moving ecological costs around in space and time.

The analysis exposes fundamental contradictions between European climate rhetoric and the material practices required to achieve green transition goals. In effect, development cooperation has been instrumentalised to serve European industrial policy objectives rather than addressing poverty reduction mandates established in EU treaties.

The policy implications show that market-based approaches to environmental protection, which are very common in European policy today, may not be good enough. The CRMA mostly uses voluntary standards, corporate self-regulation, and certification schemes. González et al. (2024) say that this creates a basic problem between supply security and environmental protection rules. If these underlying reasons for environmental damage are not addressed, such as the pressure to make as much money as possible, the separation of production and consumption in different places, and not including affected communities in decision-making, technical solutions will not deal with the main causes of environmental injustice.

The resistance strategies documented throughout this analysis provide hope for alternative arrangements whilst revealing the structural constraints that peripheral regions face within existing global arrangements. The DRC's attempts to capture greater value from mineral exports through export bans, civil society organisations' demands for accountability and transparency, and international solidarity movements challenging European complicity in environmental destruction represent what Wallerstein (1991a, as cited in El-Ojeili and Hayden, 2022) identifies as "anti-systemic movements" that challenge hegemonic arrangements.

However, the success of these movements depends on broader transformations in global political economy that extend beyond individual countries or sectors. As this analysis demonstrates, the environmental degradation, economic dependency, and social displacement created by cobalt mining systematically undermine "the local social, political, and economic capacity" (Bunker, 1985, p. 23) necessary to resist exploitation, creating self-reinforcing cycles of marginalisation that characterise peripheral positions in the world-system.

The implications for environmental governance are profound. Whilst European political discourse increasingly emphasises sustainability and global partnerships, this analysis reveals how current approaches systematically exclude Global South perspectives and experiences. Just transition cannot be achieved within individual countries or regions when the costs of transition are displaced globally through mechanisms that reproduce historical patterns of exploitation and environmental racism.

The research adds to wider discussions about the connection between capitalism and environmental sustainability. Ecological modernisation theory says that economic growth and environmental impact can be separated by technological innovation. But this case study supports different views that focus on the ways capitalism makes it hard to protect the environment. The EU's move towards using more environmentally friendly energy, despite being a big step forward in technology, still relies on taking resources from the environment and causing harm to it, which increases inequalities around the world and causes unfair harm to the environment.

The ultimate question raised by this analysis concerns the possibility of environmental sustainability within capitalist world-economy structures characterised by endless accumulation, systematic inequality, and geographic displacement of environmental costs. As El-Ojeili and Hayden (2022) note, world-systems analysis reveals "the dull and continual pressure exerted by profit, growth, and competition on all spheres of life, towards the autonomisation and prioritisation of the market realm." This structural imperative creates fundamental obstacles to environmental protection that technical solutions cannot overcome.

The continuing relevance of Wallerstein's framework for understanding contemporary environmental politics suggests that addressing global environmental challenges requires confronting the fundamental organisation of the world-system itself rather than pursuing reforms within existing arrangements. Whilst this thesis does not provide definitive answers to questions about systemic transformation, it demonstrates the analytical value of world-systems perspectives for understanding environmental governance whilst revealing the structural obstacles that market-based approaches to sustainability cannot address.

Future research should extend this analysis to other critical raw materials and regions to determine whether the patterns identified here represent systematic features of European environmental policy or context-specific arrangements. The connections between local environmental struggles and global economic structures require more systematic analysis that links community-level impacts to systemic dynamics whilst identifying potential pathways for more just and sustainable alternatives.

The temporal dimensions of environmental justice deserve particular attention in future research. The relationship between contemporary raw materials diplomacy and historical patterns of colonial extraction requires deeper examination to understand both continuities and changes in global environmental governance. Only through such analysis can we begin to develop frameworks for addressing the ecological debts that core regions owe to peripheral populations whilst building genuinely sustainable and equitable relationships between nations and peoples.

As the testimony documented by RAID and AFREWATCH (2024) powerfully demonstrates, the human costs of current arrangements demand urgent attention. One resident of Noa captured the essential injustice when stating: "We live in an environment that brings us more problems than solutions. We are becoming sick, our soil and water are polluted, and our lands are taken from us." (p. 1). Until the global environment is governed in a fairer way, efforts towards sustainability will not be complete or just, and will continue to cause problems for the environment that these campaigns were originally set up to solve.

References

Bogojević, S. (2024). The European Green Deal, the rush for critical raw materials, and colonialism. *Transnational Legal Theory*. Advanced online publication. https://doi.org/10.1080/20414005.2024.2399408

Bunker, S. G. (1985). *Underdeveloping the Amazon: Extraction, unequal exchange, and the failure of the modern state*. University of Illinois Press.

El-Ojeili, C., & Hayden, P. (2022). The clash of interpretations: World-systems analysis and international relations theory. In Z. Cope & I. Ness (Eds.), *The Oxford handbook of economic imperialism* (pp. 115-132). Oxford University Press. https://doi.org/10.1093/oxfordhb/9780197527085.013.5

European Commission. (2019). *The European Green Deal* [COM(2019) 640 final]. Publications Office of the European Union. https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640

European Union. (2024). Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April 2024 establishing a framework for ensuring a secure and sustainable supply of critical raw materials and amending Regulations (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1724 and (EU) 2019/1020. *Official Journal of the European Union*, L, 1252. https://eur-lex.europa.eu/eli/reg/2024/1252/oj/eng

EU Raw Materials Coalition. (2024). *Limiting environmental damage, human rights abuses and Indigenous Peoples' rights violations: Civil society guidelines for the implementation of the EU Critical Raw Materials Regulation*. Heinrich Böll Foundation. https://www.boell.de/sites/default/files/2024-02/eeb-crma-2.pdf

Commons Network. (2024, July 16). Global sacrifice zones: The cost of the energy and digital transition on the DRC.

https://www.commonsnetwork.org/2024/07/16/global-sacrifice-zones-the-cost-of-the-energy-and-digital-transition-on-the-drc/

Cook, A. (2025, May 19). *DRC cobalt export ban decision set for June 22 - Fastmarkets*. Fastmarkets. https://www.fastmarkets.com/insights/drc-prepares-for-new-decision-on-cobalt-export-ban-in-june/

Counter Balance. (2025, February 5). *Blood minerals and broken promises: How the EU fuels crisis in the DRC*. https://counter-balance.org/news/blood-minerals-and-broken-promises-how-the-eu-fuels-crisis-in-the-drc

Friends of the Earth Europe. (2023). *Mining the depths of influence: How industry is forging the EU Critical Raw Materials Act*. https://friendsoftheearth.eu/wp-content/uploads/2023/07/Mining-the-depths-of-influence.pdf

Gerasimcikova, A., & Sial, F. (2024). *Who profits from the Global Gateway? The EU's new strategy for development cooperation*. Oxfam Italia. https://www.oxfamitalia.org/wp-content/uploads/2024/10/EU-GG-report-2024-embargoed-oct03.pdf

Givens, J. E., Huang, X., & Jorgenson, A. K. (2019). Ecologically unequal exchange: A theory of global environmental injustice. *Sociology Compass*, *13*(5). https://doi.org/10.1111/soc4.12693

Hornborg, A. (1998). Towards an ecological theory of unequal exchange: articulating world system theory and ecological economics. *Ecological Economics*, *25*(1), 127–136. https://doi.org/10.1016/s0921-8009(97)00100-6

Müller, B., Ghiotto, L., & Bárcena, L. (2024). *The raw materials rush: How the European*

Union is using trade agreements to secure supply of critical raw materials for its green transition. Transnational Institute. https://www.tni.org/files/2024-01/The_Raw_Materials_Rush.pdf

Neema, C. G. (2024, March 6). *Navigating critical mineral supply chains: The EU's partnerships with the DRC and Zambia*. Africa Policy Research Institute. https://afripoli.org/navigating-critical-mineral-supply-chains-the-eus-partnerships-with-the-drc-and-zambia

Rights and Accountability in Development (RAID), & AFREWATCH. (2024). *Beneath the green: A critical look at the environmental and human costs of industrial cobalt mining in DRC*. Rights and Accountability in Development. https://raid-uk.org/wp-content/uploads/2024/03/Report-Beneath-the-Green-DRC-Pollution-March-2024.pdf

Wala Chabala, E. D., & Hofmeyr, J. (2025). *A game changer in flux: Recent developments and risks in the Lobito Corridor*. Africa Policy Research Institute. https://afripoli.org/a-game-changer-in-flux-recent-developments-and-risks-in-the-lobito-corridor