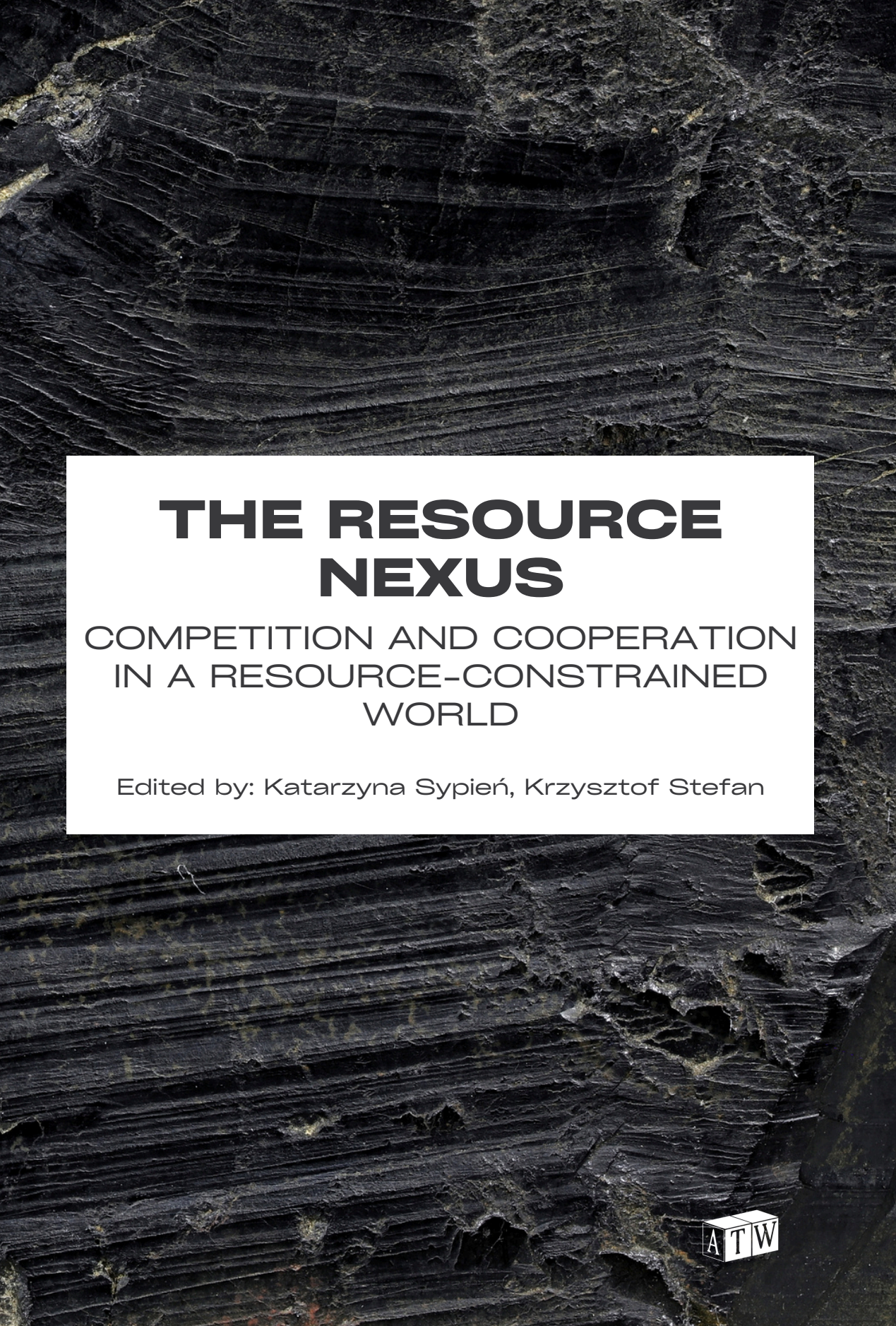

THE RESOURCE NEXUS

COMPETITION AND COOPERATION IN A RESOURCE-CONSTRAINED WORLD

Edited by: Katarzyna Sypień, Krzysztof Stefan

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The Resource Nexus: Competition and Cooperation in a Resource-Constrained World

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CHAPTER 1

The legacy of resource dependence – an introduction

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From the beginning of human civilisation, access to resources has been crucial for the people living in hunter-gatherer tribes, later in villages, cities, city-states, states and empires. Early humans needed flint to produce tools and weapons, while advanced economies rely on energy resources (e.g., natural gas, oil) and rare earth elements (e.g., lithium or cobalt). Raw materials have been both the source of prosperity and armed conflict. Silver enabled Athens to build a powerful fleet that defeated the Persians at the Battle of Salamis in 480 BC. Between 1519 and 1572, the Spanish conquistadors destroyed the Aztec and Inca empires motivated by an intense desire for gold. Later, the influx of gold and silver from South America turned Spain into an empire on which the sun never set. In the late 19th century, Spain and its former colonies of Bolivia, Chile,

Ecuador and Peru fought over the guano-rich Chincha Islands. Following the rise of industrialisation, the amount of raw materials needed to sustain an industrialised economy increased. In the 20th century, oil became the lifeblood of the world economy. Oil was one of the reasons why Hitler decided to advance towards the Caucasus in 1942, an endeavour that ended in disaster for Nazi Germany. Similarly, Japan attacked the United States and conquered Malaya and the Netherlands East Indies because the Empire of Japan needed crude oil to fuel its economy and war effort. For the US – the global superpower – securing its interests in the oil-rich Middle East was an important factor. The Carter Doctrine stated it clearly: "It demands the participation of all those who rely on oil from the Middle East and who are concerned with global peace and stability. [...] We must call on the best that is in us to preserve the security of this crucial region. Let our position be absolutely clear: An attempt by any outside force to gain control of the Persian Gulf region will be regarded as an assault on the vital interests of the United States of America, and such an assault will be repelled by any means necessary, including military force" (138. Address by President Carter on the State of the Union Before a Joint Session of Congress). When Saddam Hussain invaded Kuwait in 1990, largely for economic reasons, including the control of this oil-rich state, the US-led coalition liberated Kuwait and crippled Iraq's war capabilities (Kostiner, 2009, pp. 78–114; Hallion, 2022, pp. 87–92). After that, Hussein's regime was not a threat for regional US allies, nor could it attempt to control or destabilise the oil market. Overall, many researchers underline the fact that control over natural resources has been one of the key determinants of military conflicts and wars (Acemoglu, Golosov, Tsyvinski & Yared, 2012; Homer-Dixon, 1991; Toset, Gleditsch & Havard, 2000; Westing, 1986). In the 1980s, the term "resource war" was popularised, as a metaphor describing tensions between the US and the Soviet Union over the control of fossil fuels and minerals in disputed areas, primarily over oil in the Middle East and minerals in Southern Africa (Le Billon, 2007; Klare, 1981). In the book entitled *Resource Wars: The New Landscape of Global Conflict* (2001), Michael

Klare argues that control of crucial natural resources has become increasingly important and will be the main cause of future wars. These conflicts will be not only about oil, or rare earth metals, but also over water and arable land. In 1980, Boutros Boutros-Ghali commented that "The next war in our region will be over the waters of the Nile, not politics" (Musau, 2023, p. 365).

A resource can be both a blessing and a curse for a state or region. The Democratic Republic of the Congo (DRC) is vivid sample how ineffective governance and external pressure can lead to poverty and conflicts, despite the fact that the DRC is such a mineral-rich country, e.g., housing over 60% of the world's coltan reserves, essential for renewable energy technologies and almost all electronics. Another negative example is the Panguna copper mine, located in Bougainville, Papua New Guinea. The mine opened in 1972, and at the time it was the largest open-pit copper-gold mine. Prior to its closure in 1989 (as a result of industrial sabotage and the subsequent uprising by local tribes), the Panguna mine accounted for 8% of Papua New Guinea's gross domestic product, 35% of its export earnings and 12% of the revenue of the central government in Port Moresby (Elek, 1992, p. 62). However, local landowners who lost their land to mining, and faced challenges generated by the contamination of water and soil, received between 0.2 and 1.35% of the mine's profits (Firth, 2020, p. 192; Regan, p. 358). Most of the revenues were transferred to Papua New Guinea's central government and the Rio-Tinto company, which resulted in armed conflict in Bougainville (1988–1989). The copper-gold mine is still closed, and Bougainville will probably become an independent state in 2027, if the current political process continues. The disregard of local communities' interests by large international corporations when exploring for resources also takes place in many other regions of the world. In southern Peru, the Chinese company Minerals and Metals Group owns the Las Bambas copper mine. This has become a source of controversy for local people, who highlight the mine's significant negative socio-environmental impact on their lives (Johnson, 2022). Uranium has become Niger's strategic asset, although state

uranium revenues have done little to alleviate poverty or instability in the country. France gained the real benefits of Niger's uranium, although in June 2025 Niger's military junta said it would nationalise the majority French-owned local uranium company (Muia & Winter, 2025). The question is whether it will really improve the situation in deprived areas in Niger. The examples given above show that having resources alone does not guarantee prosperity and development for a local community, region or state. The issue of "resources" has been, and continues to be, analysed by researchers (Auty, 1993; Sachs & Warner, 1995, 2001; Humphreys, Sachs & Stiglitz, 2007). The "resource curse" describes the paradoxical situation in which a country with valuable natural resources underperforms economically, due to poor governance, corruption or just by concentration on a few resource-dependent industries. Apergis and Payne (2014), Ismail (2010), Bruno and Sachs (1982), and many others, have studied the "Dutch disease" issue, which occurs when a resource boom reduces the internal incentives to produce, and/or the international competitiveness of, domestically produced non-resource tradable goods (Mien & Goujon, 2021, p. 2).

The "resource curse" and "Dutch disease" illustrate the problems caused by the abundance of natural resources. It is also worth remembering that, according to the popular proverb: "A great fortune in the hands of a fool is a great misfortune". However, it is clear that minerals, oil and other resources can make those who possess them rich and prosperous, whether they are private individuals, corporations or states and empires. Mining.com (2025) estimates that the world's most valuable miners had a combined market capitalisation of just under $1.5 trillion, reaching a respectable $213 billion so far in 2025. States also can benefit from resources. Ville and Wicken (2013) underline that both Australia and Norway have achieved modern levels of development as resource-based economies, simultaneously avoiding the "resource curse". The People's Republic of China is trying to enhance its control over rare earth minerals, which are essential for electronics, automotive systems and defence systems. This is a significant advantage for the PRC in the rivalry

of contemporary great powers. The Russian Federation uses its energy resources to strengthen its geopolitical position by making consumers dependent on Russian energy supplies. Before the full-scale Russian invasion of Ukraine, Russia supplied the EU with fossil fuels (oil, natural gas). Germany, for instance, relied on Russian gas. Berlin sought commercial benefits from importing cheap Russian gas and also had plans to become Europe's major energy hub. However, Russian-German energy cooperation was complicated by Russia's revisionist politics (Kedzierski, 2022; Chikhladze, 2022, p. 2).

Overall, natural resources can be both a source of armed conflict, poverty, inequality and crime, and a foundation for wealth, prosperity, development and progress. They are an essential part of human civilisation; without them, society as we know it would collapse. Therefore, every effort to explain and illustrate the phenomenon and significance of resources is important.

The book *The Resource Nexus: Competition and Cooperation in a Resource-Constrained World* is structured around three analytically distinct yet interrelated thematic threads: (1) natural resources and regional power dynamics, (2) resource management and economic development, and (3) political instability and environmental consequences of resource exploitation. These themes were deliberately selected to capture the multifaceted nature of resource governance, reflecting its geopolitical, socio-economic and environmental dimensions. They emerged from a critical review of contemporary scholarly debates and policy discourses surrounding global resource challenges, particularly under conditions of scarcity and geopolitical contestation. Their inclusion enabled a structured yet interdisciplinary examination of how resource interdependencies shape conflict, cooperation and development trajectories across different regional contexts. Each contributing author concentrated on one of these axes, allowing for a nuanced exploration of the resource nexus from complementary disciplinary and regional perspectives.

The first thematic thread explores how natural resource endowments shape geopolitical influence, economic sovereignty and regional

hierarchies of power. In global politics, resources such as oil, gas, rare earth elements and freshwater are not merely commodities but strategic assets that states leverage to project power and secure autonomy. Moreover, states and regional actors use control over these resources – and the technologies developed from them – to influence international relations and reshape global security dynamics (Klare, 2012, chapter 1; Scholvin & Wigell, 2018, pp. 74–75; Allouche, 2011, p. 54; Boersma & Johnson, 2012). In an era of deepening globalisation and interdependent supply chains, such control over extraction and transit points grants states disproportionate leverage across multiple sectors of the global economy (Korinek & Kim, 2011, pp. 8–15; Ramberg, Chen, Paltsev & Parsons, 2015). Moreover, the uneven structures of extraction and import – where resource-rich regions often serve as primary exporters to industrialised consumer economies – reinforce asymmetries of power and dependency within the international system (Bridge, 2008, pp. 397–404; Burchardt & Dietz, 2014, pp. 472–478). It also addresses the formation of resource-based coalitions and institutions, which exemplify how states can coordinate resource governance to gain geopolitical leverage (Colgan, 2013). The securitisation of resource access further illustrates the strategic importance of controlling production, transit and supply routes (Kaplan, 2010, pp. 35–50; Szyliowicz & Zamparini, 2022, pp. 717–718). Additionally, the thread engages with the rise of resource nationalism, where states reassert sovereignty over extractive sectors to counterbalance external influence (Wilson, 2015). By examining these dynamics, the theme provides a critical framework for understanding how natural resources function as both tools of cooperation and drivers of competition. Its inclusion in the book allows for a nuanced analysis of the enduring and evolving role of resources in shaping regional and global power structures.

The second thematic thread delves into the intricacies of resource management and its intersection with economic development in the contemporary world. A development model based primarily on resources can prove to be an effective path to modernisation for developing countries, but only with careful management of those resources

and the potential wealth they generate. A well-known example of successful implementation is Norway (Okpaleke & Abraham-Dukuma, 2020, pp. 127–130), whereas countries like the Democratic Republic of the Congo illustrate the opposite dynamic (McFerson, 2009, pp. 1535–1537). It can be argued that for resource-rich countries, attracting enterprise and reinvesting earnings in education and the promotion of entrepreneurship is of great importance (Drake, 1972, pp. 960–962). The direct impact of resources on development, and how they shape political dynamics in specific regions, has long been debated by scholars. There is no consensus on the exact relationship between resource abundance and governance or development – in some cases, the correlation has even been described as statistically insignificant (Ning Ding & Field, 2005, p. 501). Some researchers argue that high resource exports often increase corruption levels and negatively affect governance, while others suggest the reverse: that countries with weak institutions and poor governance are more likely to rely on resource exports (Busse & Gröning, 2013, pp. 3–5). Moreover, the lack or scarcity of certain vital resources, such as water or fossil fuels, can have a huge impact on the security and political dynamics of specific countries and regions, including their foreign relations (van Agt, 2013, pp. 196–197). Given the complexity and ambivalence of this relationship, addressing this theme within the book is invaluable. It offers diverse empirical cases showing how natural resources shape economic performance, political stability and institutional development across regions – highlighting the risks and dynamics stemming, inter alia, from managing scarce resources and navigating dependence on resource imports.

The third thematic thread addresses the complex chain between resource extraction, political instability and environmental degradation – an intersection that has become increasingly central in both academic analysis and policy debates. The so-called "resource curse" or "paradox of plenty" has demonstrated how natural resource wealth, rather than guaranteeing development and stability, often exacerbates governance failures, deepens institutional fragility and fuels conflict, particularly in

countries with weak regulatory capacity and extractive-dependent economies (Ross, 2004, pp. 338–339). Natural resources, when unequally distributed or controlled by political elites, can serve as both a source of revenue for patronage networks and as a target for insurgent groups, thereby intensifying social fragmentation and state vulnerability (Humphreys, 2005). The environmental consequences of extractive activity, particularly in the so-called Global South, further entrench instability. Large-scale mining, oil drilling and logging frequently result in deforestation, biodiversity loss, water contamination and the displacement of local populations (Bebbington et al., 2018, p. 13165). These disruptions disproportionately affect indigenous communities and marginalised rural populations, leading to contested land claims and resistance movements (Li, 2011, pp. 477–478). The militarisation of extractive zones – under the pretext of "securing" resource corridors – often leads to violent confrontation between state forces, private security actors and local populations, further entrenching cycles of violence (Le Billon, 2001, pp. 565–567). Importantly, these dynamics are embedded within transnational structures of demand and capital flow. The global push for energy transition, including demand for lithium, cobalt and rare earths, risks reproducing extractivist patterns in ecologically sensitive regions (Kiggins, 2015). Environmental degradation and socio-political grievances in such regions are thus not isolated phenomena but are structurally linked to consumption patterns and technological priorities in the so-called Global North. Sustainable and inclusive governance mechanisms are essential to mitigating the destabilising effects of extractivism. These include environmental peacebuilding, participatory resource management, benefit-sharing frameworks and the legal empowerment of affected communities (Brand, Boos & Brad, 2017, p. 38; Maachi, Saadane & Chehri, 2025). Addressing these issues requires not only local reforms but also a rethinking of global supply chains and accountability in international investment regimes. In this light, resource governance emerges not merely as a technical or environmental challenge, but as a central question of justice, sovereignty and long-term peacebuilding.

In addition to the three main thematic threads, the book incorporates several interconnecting themes that recur with varying intensity across different chapters and help weave individual contributions into a cohesive analytical fabric. One such transversal thread interrogates the tension between national sovereignty and the structural dependencies generated by global supply chains, international commodity markets and foreign direct investment. While resource-rich states have historically pursued economic strategies based on comparative advantage – often centring on a single commodity – the volatility of global markets and the complexity of transnational production networks have increasingly constrained their autonomy (Karl, 1997; Moran, 2011; Brunnschweiler & Bulte, 2023, p. 2). The notion of "resource sovereignty" is further complicated by the dominance of multinational corporations in extractive sectors and the geoeconomic leverage exerted by consumer economies in the so-called Global North (Bridge & Le Billon, 2017). In this context, the capacity of states to control the terms of extraction, pricing and distribution is often limited by contractual obligations, technological dependencies and the need to maintain investor confidence (Pellegrini, 2011, pp. 21–22, 149–150). Moreover, the integration of raw materials into highly specialised global value chains– especially in strategic sectors such as rare earth elements or lithium – has made unilateral resource governance increasingly difficult (Kiggins, 2015; Farrell & Newman, 2019, p. 48, 74–75). The contributions in this book thus explore whether and how states can reclaim forms of strategic autonomy under such conditions. They examine the viability of industrial diversification, the strategic use of export controls and regional cooperation frameworks as potential pathways to enhance agency within an interdependent system. This theme ultimately underscores the broader paradox of the contemporary resource nexus: that the very instruments of globalisation meant to foster development may, under certain conditions, erode the sovereign capacity to govern resources in the national interest.

Another recurring notion is strongly connected to the colonial legacy of many developing countries whose economies are dependent on natural

resources. More often than not, the divergence in incomes across countries after the Industrial Revolution and the hardship in establishing strong political institutions and effective governance are attributed to the colonial legacy of the Global South (De Juan & Pierskalla, 2017). One of the most important reasons for the colonial expansion of European powers was the acquisition of natural resources (Munyai, 2020, pp. 1–2). This trend often continues today in the form of neo-colonial relationships between developed countries and emerging economies and low-income, resource-rich countries – especially in Africa (Langan, 2017, Chapter 2 & 4). This theme is visibly highlighted throughout most of the chapters, as many of them address the problems faced by countries that are former colonies, with some of them still being subjected to neo-colonial dependence.

Many of the chapters also touch on the issues of violence, corruption and general instability associated with natural resources – mostly in underdeveloped countries – which often stem from the previously described colonial past of these regions. In recent decades, there has been growing scholarly interest in exploring a potential correlation between natural resource abundance and armed conflict, with some studies demonstrating that the presence of natural resources often leads to longer and more violent wars (Hinkkainen Elliot & Kreutz, 2019, pp. 500–501). Evidence from numerous countries – such as Brazil, India and various non-democratic regimes – has also shown a positive correlation between windfalls of natural resource wealth and increased levels of corruption (van der Ploeg, 2011, pp. 374, 378). In general, the contestation over resources by both state and non-state actors has led to a significant decline in stability, particularly in countries and regions with weaker institutions, such as India, Niger, Afghanistan and the Democratic Republic of the Congo, as repeatedly illustrated throughout this book's chapters. However, it is worth noting that contrasting examples – such as Norway or Botswana – also exist (Okpaleke & Abraham-Dukuma, 2020, p. 127; Hillbom, 2008, pp. 191–193, 209–211).

Described cases also frequently draw from the theoretical concept of the "resource curse". Also referred to as the "paradox of plenty", this

phenomenon refers to a tendency identified in academic literature: that resource-rich countries often experience slower economic growth than their resource-poor counterparts (Busse & Gröning, 2013, pp. 1–2). The origins of the theory are commonly traced to the discovery of oil reserves in the North Sea, which led to deindustrialisation in the Netherlands and the United Kingdom – a process later dubbed "Dutch disease" (Di John, 2011, pp. 168–170). Although some studies suggest that the resource curse is avoidable in countries with strong institutions (Mehlum et al., 2006, p. 16), the concept remains a valuable analytical tool in examining resource governance and instability in resource-rich nations, as it highlights recurring patterns across numerous distinct cases. This concept also intersects with debates about governance quality, rentierism and institutional development –raising important questions about the extent to which natural wealth supports or undermines democratic stability and long-term economic diversification (Lawson-Remer, 2012).

Another theme is the crisis of state legitimacy in the context of extractive development. In many cases, states have not only failed to safeguard public goods – such as clean water, arable land or air quality – but have actively enabled, or directly participated in, extractive activities that harm both ecosystems and affected populations (Bebbington et al., 2018, pp. 13166–13167; Li, 2011, p. 480). The prioritisation of short-term fiscal or geopolitical gains over long-term sustainability has deepened citizen distrust, particularly in regions where communities experience displacement, pollution or resource scarcity without adequate redress or compensation. This legitimacy crisis is exacerbated in contexts where formal democratic institutions exist, but mechanisms of accountability are weak or co-opted. Governments may invoke the language of development while suppressing dissent and limiting access to legal recourse or participatory governance (Aidee, 2022, pp. 13170–13171). Moreover, shared resources such as rivers, forests or groundwater – often considered part of the commons – are frequently subject to privatisation or elite capture, undermining collective rights and further alienating communities (Le Billon, 2001, p. 568, 570–572). This dynamic creates a paradox: the state,

ostensibly responsible for stewarding national resources and protecting its citizens, becomes complicit in processes that generate ecological harm and socio-political marginalisation. Leifsen et al. (2017, pp. 1051–1052) demonstrate how participatory mechanisms in mining contexts across Latin America and Asia are often instrumentalised to manage dissent rather than empower citizens. While local resistance movements and international watchdogs occasionally force policy change, structural barriers to civic engagement remain high – especially in regions with authoritarian governance or entrenched clientelist networks.

The final cross-cutting theme is resource governance. This topic is addressed – either explicitly or implicitly – in virtually every chapter of the book, as resource governance is a fundamental component of policymaking, both domestic and foreign, and functions across multiple levels: from the rights of individuals and communities, through societal and national perspectives, to regional and international frameworks (Saito-Jensen, 2015, pp. 4–5, 9–11). Various governance tools are examined in the book, including legislation, public consultation processes and accountability mechanisms. It is also important to recognise different models of governance, particularly with regard to the degree of centralisation. The engagement of local and indigenous communities in governance has recently become a particularly significant area of inquiry, as it is part of a broader movement toward the empowerment of marginalised groups and the recognition of their rights (Hernes et al., 2021, pp. 1–4). State ownership of natural resources – and thus the state's direct role in managing them – remains a key factor in the development trajectories of many countries. The role of the state has been extensively analysed in academic discourse, especially concerning how state-society relations in resource-rich countries have often contributed to rentier dynamics and patterns of underdevelopment (Nem Singh, 2024, pp. 30–31). This theme, like the others described above, serves as a conceptual thread connecting the individual chapters of the book into a cohesive whole – contributing meaningfully to the broader discussion on how natural resources shape contemporary economies, development paths and political systems.

This book offers a comprehensive and critical exploration of the contemporary dynamics shaping global resource politics. It brings together selected contributions from emerging researchers whose work spans a wide range of disciplinary perspectives and regional specialisations. The authors draw on international relations, security studies, political economy, environmental governance and development studies, as well as insights from area studies focused on Europe, Eurasia, Asia, the Middle East and Africa. Their analyses are further informed by approaches from migration studies, legal and institutional analysis, and energy and climate policy. Collectively, the chapters reflect the multidimensionality of today's resource-related challenges and contribute to rethinking the conceptual and strategic frameworks through which global interdependencies, contestations and cooperative arrangements over natural resources are examined.

Julia Badura uses the case of the Kumtor gold mine in Kyrgyzstan to explore how large-scale resource extraction shapes political authority, environmental stability and social trust in resource-dependent states. She demonstrates how Kumtor, while central to the national economy since 1997, has also generated long-term socio-environmental harm and contributed to the erosion of institutional legitimacy. The chapter situates the mine within the framework of the resource curse, illustrating how extractive industries can exacerbate state fragility, particularly in post-Soviet contexts marked by limited transparency and weak regulatory oversight. Badura traces how local resistance, geopolitical tensions and the eventual nationalisation of the mine in 2021 reflect a broader crisis of governance and legitimacy, and argues that without robust accountability mechanisms, the economic benefits of resource extraction remain precarious and can deepen social inequalities. The chapter calls for rethinking resource management not merely as an economic issue, but as a deeply political and institutional challenge.

Brian Chaggu utilises the case of coltan mining in the Democratic Republic of the Congo to illustrate how the presence of globally demanded resources can exacerbate political instability and fuel local conflicts. The

chapter highlights the challenges of managing such resources in countries that, despite their abundant natural wealth, suffer from weak institutional and regulatory frameworks. It also describes the relationship between local militias and state actors, and how their activities are shaped by the dynamics of coltan extraction in the DRC. This situation often results in serious social and ecological harm to local communities, which remain impoverished even as their territories generate vast mineral profits. Although certain international initiatives have sought to engage multinational companies and impose due diligence requirements to improve the situation, their impact has so far been negligible. The analysis argues for the urgent need to implement cooperative governance structures and ethical sourcing practices. Furthermore, the chapter underscores the importance of continued research into institutional reforms and technological innovations that could support a transition toward more sustainable and equitable resource governance in the DRC.

Mateusz Jedliński analyses the impact of uranium extraction in Niger on the country's historical, geopolitical and strategic role in international politics. The presence of a strategically crucial resource such as uranium can enhance a country's significance in global energy security, given the importance of nuclear power for many contemporary developed and emerging economies. However, resource abundance without a strong institutional and legislative framework can also deepen underdevelopment and entrench unsustainable extractivist dynamics. This has placed Niger at the intersection of competing foreign interests – particularly from France, China and Russia – each seeking to secure access to its resources. The chapter also examines how the recent coup d'état in Niger has affected its political and economic landscape and sovereignty, focusing on uranium extraction as the central point of analysis. It also contributes to the broader debate on how natural resources and regional power structures shape international alignments and postcolonial state-building in the Sahel region.

Cezary Krata investigates how Germany's long-standing dependence on imported fossil fuels – particularly from Russia – exposed the

structural vulnerabilities of its energy system during the 2022 energy crisis. The chapter situates this fragility within the broader context of the Energiewende and the liberal logic of energy markets, showing how these frameworks collided with geopolitical realities after Russia's invasion of Ukraine. Through qualitative analysis of policy reports, party discourse and institutional responses, the chapter argues that the crisis marked a turning point: Germany's previous reliance on trade as a tool of transformation (*Wandel durch Handel*) was supplanted by a securitised, state-led approach to energy policy. Krata examines not only the rapid infrastructural and regulatory shifts – including diversification efforts and expansion of LNG capacity – but also the politicisation of fossil fuels within party politics. He shows that fossil resources now function as contested political symbols, with far-reaching implications for Germany's democratic stability, strategic autonomy and climate agenda.

Weronika Krupa offers a critical examination of the gap between China's ambitions and its current performance in the global semiconductor industry. The chapter explores how, despite possessing abundant natural resources essential for chip production – such as silicon, gallium and germanium – China remains dependent on foreign technologies and supply chains, especially those controlled by geopolitical rivals like the US, Taiwan, Japan and South Korea. Through analysis of industrial strategies, resource endowments and political constraints, the chapter demonstrates that China's struggle to lead the sector stems not from lack of materials, but from systemic economic and political dependencies. It also considers how trade restrictions and export controls have complicated Beijing's goals of self-reliance. At the same time, the chapter highlights the state's ongoing determination to overcome these barriers, positioning semiconductors as a central priority in China's developmental agenda. Ultimately, the study shows that technological leadership in a resource-rich country is shaped less by physical abundance than by the geopolitical structure of the global economy.

Jakub Mądry analyses Poland's natural gas dependency on Russia through the theoretical framework of complex interdependence, focusing

on the political and economic implications triggered by the 2022 Russian invasion of Ukraine. The chapter highlights how the sudden disruption of Russian gas supplies exposed Poland's sensitivity – short-term economic and political costs – while also assessing its longer-term vulnerability regarding alternative supply routes and domestic production capacity. **Mądry** demonstrates that despite Poland's initial heavy reliance on Russian gas, the country swiftly diversified its imports and strengthened infrastructure, thus reducing vulnerability and enhancing energy security. The study further explores how this shift affected Poland's geopolitical position within Central Eastern Europe, revealing the interplay between resource dependency, sovereignty and regional power dynamics. The chapter concludes that Poland's experience underscores the importance of proactive energy policy and infrastructure development in managing complex interdependence in resource-sensitive sectors.

Zuzanna Piotrowicz uses the case of the socio-environmental conflict surrounding the Las Bambas mine in southern Peru to highlight the problems and challenges posed by newly emerging neo-colonial dependencies based on unsustainable extractivist practices. Chinese state-owned enterprises are examined through the lens of their involvement in Peru's mining sector to demonstrate how they leverage investment strategies to secure access to copper – a strategic resource for the Chinese economy. The chapter investigates both the direct impact of these dynamics on Peru and its local communities, as well as the responses of the government in Lima and those directly affected by the project. When situated in a broader context, this case illustrates historical patterns of political violence and exclusion in Peru's rural areas, while also underscoring the need for further examination of Chinese neo-colonial tendencies in their relations with the Global South and the long-term implications of Chinese investment in the Andean part of South America.

Krzysztof Stefan explores how water scarcity and its implications for India shape various dimensions of the country's internal security landscape. Water security – consistently threatened in India by ongoing trends such as climate change, demographic pressure, poor governance

and pollution – is presented as a vital component of national stability. The analysis highlights key structural challenges in managing water scarcity, including an outdated and decentralised governance model and the persistent knowledge-governance gap, which significantly undermines the effectiveness of water management in India. Although the chapter concludes that the outlook for India's water security in the coming years is alarming and that current measures have proven largely ineffective, it suggests that the consequences can still be mitigated. This would require a paradigm shift in governance, substantial investment in the water management sector and legislative reforms aimed at addressing the root causes of insecurity.

Katarzyna Sypień analyses the strategic and multifaceted engagement of China, Japan and South Korea in Arctic extractive industries, focusing on how these East Asian actors navigate legal and geopolitical constraints imposed by Arctic states. The chapter highlights a triadic actor model – governments, state-owned enterprises and private firms – that works in coordinated but low-profile ways, using joint ventures, diplomatic efforts and technological partnerships to gain incremental access to mineral and energy resources without provoking direct conflict. **Sypień** outlines a "salami-slicing" strategy that involves gradually building influence and integrating into Arctic supply chains while adhering to sovereignty norms. The study emphasises the growing geopolitical and economic importance of the Arctic and how East Asian states' investments and cooperation reshape global resource flows and Arctic governance. It provides an examination of the mechanisms and implications of this geoeconomic shift, emphasising its quiet yet transformative impact on the region.

Besmillah Taban offers an in-depth examination of how the Taliban have used Afghanistan's natural resources to finance terrorism and organised crime. Focusing on both the insurgency period (2001–2021) and developments after the 2021 takeover, the chapter illustrates how the group built an extensive and multilayered financing system based on illegal mining, logging and, particularly, narcotics trafficking. The

Taliban's taxation of opium, control over forested areas and strategic use of smuggling routes enabled them to sustain military operations and governance functions. Special attention is paid to the group's interactions with transnational criminal networks, which helped expand the reach of Afghan opiates and minerals. While claiming reformist intentions after 2021, the Taliban's growing involvement in synthetic drug production and continued exploitation of resources raise concerns about the entrenchment of a war economy. The chapter contributes to broader academic debates on the nexus between resources, conflict and non-state armed actors.

This volume, composed of the chapters described above, offers a multifaceted exploration of the complex dynamics shaping resource competition and cooperation in a world facing increasing environmental and geopolitical constraints. By bringing together perspectives from emerging scholars across disciplines and regions, it deepens our understanding of how natural resources influence political, economic and social relations globally. The editors would like to sincerely thank the Strategic Program "Excellence Initiative" at the Faculty of International and Political Studies of the Jagiellonian University for generously funding the publication of this volume. They also extend their gratitude to the Faculty for its continuous support of research conducted by emerging scholars. It is hoped that this collection will provide a thoughtful and multifaceted reading experience, offering useful perspectives on the complex issues surrounding natural resources in the contemporary world.

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CHAPTER 2

East Asian stakeholders in Arctic mining: interests, investments and implications

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Abstract: This chapter investigates the evolving presence of China, Japan and South Korea in Arctic extractive industries, with a focus on their strategic navigation of legal and geopolitical constraints. Through a comparative analysis of state behaviour and enterprise activity, it identifies a triadic actor model – governments, state-owned enterprises and private firms – operating in tacit coordination to incrementally embed East Asian interests in the region. These actors employ low-profile, institutionally adaptive strategies such as joint ventures, diplomatic engagement and technological partnerships to circumvent sovereignty sensitivities and gain durable access to mineral and energy resources. The findings suggest a cumulative, salami-slicing approach that eschews confrontation in favour of technocratic integration and supply chain influence. While this geoeconomic strategy remains partially obscured by limited transparency, its implications for Arctic governance and global resource flows are substantial, marking a quiet but consequential shift in the region's geopolitical economy.

Keywords: Arctic governance, East Asia, resource extraction, salami-slicing strategy, state–business coordination, state-owned enterprises.

INTRODUCTION

The Arctic is becoming a strategically vital region in the global competition for natural resources. The region holds an estimated 13% of the world's undiscovered oil and 30% of its untapped gas (U.S. Geological

Survey, 2008), alongside substantial quantities of minerals such as nickel, copper, cobalt, lithium, rare earth elements, graphite, iron ore, phosphates, bauxite and diamonds, as well as living natural resources – fish (Bastos, 2018). Its emerging maritime routes, such as the Northern Sea Route (NSR), further enhance its economic and geopolitical importance (Farré et al., 2014).

Access to Arctic resources is limited to eight Arctic states – Russia, the United States, Canada, Norway, Denmark (via Greenland), Finland, Sweden and Iceland – which hold sovereignty under international law. However, non-Arctic actors, particularly from East Asia, are increasingly involved. China, Japan and South Korea, despite lacking territorial claims, have gained Observer status in the Arctic Council, enabling participation in governance and resource projects (Babin & Lasserre, 2019, pp. 146–147). Backed by state-supported investments, they engage in mining ventures through partnerships with Arctic firms, aiming to secure critical minerals and diversify supply chains amid growing global demand as a part of broader geopolitical and economic strategy.

The aim of this chapter is to investigate the nature, structure and strategic implications of East Asian engagement in Arctic mining. It seeks to answer the following research questions: how do East Asian actors gain access to Arctic resource projects despite legal and geopolitical constraints? How do these actors navigate the sovereignty-based constraints imposed by Arctic states? How does this reshape Arctic power dynamics and global resource flows? Its central hypothesis is that their engagement follows a "salami-slicing" strategy – avoiding overt challenges to Arctic states' authority while steadily deepening influence through layered tactics: state-backed investments in mining projects, strategic observer status in governance bodies and partnerships that create long-term dependencies. Over time, this approach not only secures resource access but embeds East Asian actors as indispensable players in Arctic supply chains, shifting geopolitical and economic power dynamics.

The analysis draws on a stakeholder theory framework, which enables a systematic classification of East Asian actors based on their level of

involvement and strategic interests. Additionally, concepts from regional developmentalism and state–business coordination models help explain how national policies shape and support international ventures in politically sensitive regions such as the Arctic. The study uses stakeholder theory to analyse actor involvement, alongside regional developmentalism frameworks to explain state-business coordination. Methodologically, it relies on qualitative analysis of policy documents, investment data and case studies of key mining projects, comparing strategies across China, Japan and South Korea.

STAKEHOLDERS IN ARCTIC MINING

A stakeholder is broadly defined as any actor with an interest in a given activity and may be classified as investor, contributor, observer or end user, depending on their level of involvement (Gutterman, 2023). Stakeholders can also be distinguished as committed or uncommitted. Committed stakeholders – such as investors and contributors (including delivery entities) – are directly invested and often exert influence or control over the activity. Uncommitted stakeholders, including observers, end users and sometimes also regulators and interest groups, may not endorse the activity but can still affect its outcomes (McGrath & Whitty, 2017, p. 731). This chapter focuses on committed stakeholders due to their active role in the process of accessing and controlling the extraction and distribution of natural resources.

In Arctic resource extraction – an area involving both Arctic and non-Arctic actors – three main stakeholder groups emerge: government ministries and agencies, state-owned enterprises (SOEs) and private firms. In East Asia, ministries of foreign affairs (MFAs) are particularly central. China, Japan and South Korea have issued Arctic strategies emphasising economic engagement. China's MFA, in its 2018 Arctic Policy White Paper, endorsed enterprise participation through cooperative mechanisms that respect environmental and Indigenous concerns

(China's Arctic Policy, 2018). Similarly, Japan's Foreign Minister Taro Kono, in a 2018 Arctic Circle speech, highlighted ventures such as the NSR and joint energy projects, stressing responsible, collaborative investment. South Korea's Arctic policy is coordinated by its MFA and five other ministries under the 2013 Master Plan (Government of the Republic of Korea, 2018). China's National Development and Reform Commission (NDRC) also plays a key role, overseeing Arctic economic planning and signing a 2015 memorandum of understanding (MOU) on NSR cooperation (Hsiung, 2020; NDRC, n.d.). Polar research institutes and agencies – Polar Research Institute of China, Chinese Arctic and Antarctic Administration, Korea Polar Research Institute and Japan's National Institute of Polar Research – support Arctic policy through scientific research and implementation (Zhuravel, 2016, pp. 100, 109–110, 119). These institutions act as strategic facilitators. East Asian governments back their Arctic agendas with financial and diplomatic support to secure mining rights and partnerships, following a regional developmentalist model marked by strong state-business cooperation and the promotion of national champions to enhance competitiveness and state power (Weiss, 1995). An example of how ministries have facilitated the continued resource-related activities of SOEs in the Arctic can be seen in China's 2017 agreement with Russia to jointly develop the NSR, allowing SOEs such as COSCO Shipping to expand their transport operations – currently they conduct approximately 30% of voyages along NSR (Martins, 2023).

SOEs have become key drivers of East Asia's growing presence in Arctic mining. Bolstered by robust government backing, they lead investment in both resource development and supporting infrastructure (Kim & Ali, 2017). In China, SOEs play an especially prominent role. The China National Petroleum Corporation (CNPC) and China National Offshore Oil Corporation (CNOOC) are major investors in Arctic energy, particularly Russia's Yamal LNG (CNPC holds a 20% stake) and Arctic LNG 2 (both companies hold 10% stakes) – cornerstones of Sino-Russian cooperation (Offshore Energy, 2013; Si, 2019). Japanese SOEs Mitsui,

Mitsubishi and Japan Oil, Gas and Metals National Corporation (JOGMEC) also held a 10% stake in Arctic LNG 2, although the investment was suspended following Russia's invasion of Ukraine (Humpert, 2019). China Minmetals Corporation, one of the largest metal and mineral trading companies in the world, via its subsidiary CMN owns a 72% share in MMG Minerals company and leads Canada's Izok Corridor project in Nunavut, Canada. This project is crucial for Nunavut, as it could create 1,100 construction jobs and 710 permanent positions, stimulate local businesses and reduce unemployment (14.2%), while its infrastructure investments may make future mines viable and provide long-term economic benefits (Lajeunesse & Lackenbauer, 2016, pp. 81–86). Quebec also seeks Chinese investment to advance its $80-billion Plan Nord, with China's third-largest steelmaker co-developing an iron mine at Lac Otelnuk (Lajeunesse & Lackenbauer, 2016, p. 80). In addition, Shenghe Resources acquired a 12.5% stake in the Greenland's Kvanefjeld rare earths project to secure access to a deposit that may hold up to 20% of the world's rare earth elements. (Barradas, 2023). China Non-Ferrous invested in the Kvanefjeld project to secure, through an agreement, processing of those elements in China (Lajeunesse & Lackenbauer, 2016, p. 86). Greenland presents a value for China, as it has deposits of rare earth elements, uranium, iron ore, lead, zinc, petroleum and gemstones (Lajeunesse & Lackenbauer, 2016, p. 85). Korea Resources Corporation actively pursues Arctic mining opportunities, while Korea Gas Corporation owns 20% of the Umiak SDL 131 gas field – securing 5% of South Korea's LNG imports – and signed an MoU with the Alaska Gasline Development Corporation to collaborate on LNG project development and operations (Foreign Policy Association, n.d.; Alaska Gasline Development Corporation, 2017). Before the invasion of Ukraine, the South Korean company Daewoo Shipbuilding & Marine Engineering secured a $3.5 billion contract to build 16 Arctic LNG tankers for Russia's Novatek and Yamal LNG ("DSME in Yamal LNG Shipbuilding Deal, Russia" 2013). Japanese public company Sumitomo Corporation holds a 5% interest in Alaska's Stone Boy project, with confirmed gold, silver and

antimony deposits (Sumitomo Corporation, 2011). SOEs from China, Japan and South Korea also form joint ventures (JVs) with Russian, Canadian and Nordic firms to gain Arctic access, manage operational risks and expand geopolitical influence. Their focus lies in long-term investments in strategic minerals and energy – securing high-risk, high-reward projects to enhance resource security and global positioning (Lajeunesse & Lackenbauer, 2016, pp. 95–99).

While SOEs dominate Arctic ventures, private firms such as Baowu Steel Group, Huawei Marine Networks, Samsung Heavy Industries, Hyundai Heavy Industries, Hitachi and Komatsu are increasingly active in supporting roles. Their contributions span primarily technology, logistics, equipment, trade and sometimes investments. For instance, Hitachi and Komatsu develop mining machinery for Arctic conditions (Hitachi, n.d.); Marubeni Corporation engages in Arctic mineral financing and trade (Marubeni Corporation, 2023); and Hyundai and Samsung Heavy Industries build ice-class vessels essential to Arctic logistics (Kim & Kim, 2025). Moreover, in the Raglan District in Canada, Chinese company Jilin Jien Nickel Industry Co. invested $735 million to produce nickel, copper, platinum and palladium, with the first shipment sent to China via the Northwest Passage (NWP) in 2014. In Yukon, initially invested Chinese SOEs – such as Yunnan Chihong's $100 million lead-zinc venture with Selwyn Resources – but now the Wolverine zinc-silver mine operates under the privately held Chinese firm Jinduicheng Molybdenum (Lajeunesse & Lackenbauer, 2016, pp. 80–81).

East Asian engagement in Arctic mining relies on a synergistic relationship between government agencies, SOEs and private firms, where each actor plays a complementary role. Government agencies set the strategic direction and secure diplomatic ground, SOEs operationalise state goals through high-risk investments, and private firms bring in technological innovation and commercial flexibility. Rather than competing, these actors form a layered ecosystem that collectively enhances East Asia's capacity to enter, influence and sustain a presence in the Arctic resource landscape.

INVESTMENT PATTERNS AND STRATEGIES

East Asian investment strategies in Arctic mining reflect differing national priorities and risk tolerances, particularly in the realm of direct investment, which tends to be more state-driven and strategically oriented. China leads with large-scale, capital-intensive projects backed by strong government support and integrated infrastructure development. Firms such as CNPC and CNOOC exemplify this model, operating under tight state coordination to align with national resource security goals. This is evident in the Silk Road Fund's 9.9% stake in Russia's Yamal LNG, which secures both energy access and critical logistics infrastructure for broader Arctic operations (Schach & Madlener, 2018, p. 9). In contrast, Japan and South Korea pursue a more cautious approach, relying on state-backed agencies to provide selective funding and technical expertise. Their focus lies in high-return, strategic resource niches, balancing opportunity with risk aversion (Schmid, 2019). While direct investments offer long-term strategic control, they carry significant financial exposure and political risk, especially in sensitive geopolitical environments (Hossain et al., 2024).

To mitigate such risks, JVs are widely used as lower-risk, collaborative investment mechanisms (Beamish, 1993). These allow East Asian actors to partner with Arctic stakeholders, combining capital, technology and local expertise. China is particularly active here, forming JVs with Russian firms like Novatek in projects such as Arctic LNG 2, where Chinese financing and engineering align with Russian territorial access and operational capacity. Although energy-focused, such ventures significantly support mining logistics and infrastructure development (Grigoriev, 2025). In the relatively undeveloped Arctic mining sector, where existing foreign-run mines lack strategic value for Canada, Chinese SOEs typically avoid active operations and instead partner with Canadian firms to develop promising reserves using Chinese financing (Lajeunesse & Lackenbauer, 2016, p. 85). Japan and South Korea, while less directly involved in extraction, contribute through JVs that enhance Arctic mineral transport

capacity (So et al., 2021, p. 91). Politically acceptable and adaptive to local regulations, these arrangements trade operational control for stability. Ultimately, China emphasises strategic influence through assertive direct investments, while Japan and South Korea favour partnership-driven, risk-sharing models – revealing a nuanced divergence in East Asian Arctic investment strategies (McCaleb & Szunomár, 2016, p. 200, 209).

MINING DYNAMICS

East Asian countries involvement in Arctic resource extraction requires balancing economic interests with geopolitical sensitivities. As Observers of the Arctic Council, they must navigate the sovereignty and regulatory frameworks set by Arctic states, the primary custodians of the region's resources (Babin & Lasserre, 2019, pp. 145–146). China's growing presence in the Arctic, through investments in projects such as Yamal LNG and Arctic LNG 2, as well as scientific expeditions (Fadeev et al., 2024, p. 23), has raised concerns among Arctic nations about its geopolitical ambitions. These concerns are intensified by China's Belt and Road Initiative, which extends into Arctic regions and fuels suspicions regarding its strategic intentions (Gapon, 2024, p. 26; Fravel et al., 2022, pp. 141–142). In contrast, Japan and South Korea take a more technocratic approach, focusing on scientific cooperation, sustainable practices and technology exchange. By prioritising environmental responsibility, they maintain positive relations with Arctic states, which often view them as more acceptable partners in resource extraction (Tonami, 2016; Kim & Stenport, 2021, pp. 23–24).

Arctic resource extraction is both a technical and politically sensitive issue, involving multiple stakeholders: local governments, Indigenous communities, national authorities and foreign investors. JVs have become the primary model for East Asian involvement, enabling shared financial risks and access to local expertise. In Russia, for example, Asian firms collaborate on energy and mining projects such as Yamal LNG, blending Asian capital with Russian operational knowledge.

These ventures facilitate infrastructure development in the resource-rich but infrastructure-limited Arctic (Tulaeva et al., 2019). Japan and South Korea also partner with Swedish and Finnish firms, focusing on technology exchange, sustainable practices and logistics, particularly in Arctic shipping infrastructure (Khorrami, 2021). Arctic states are increasingly cautious about granting foreign control over resources, particularly those vital for national security or economic independence. The strategic importance of critical minerals, such as rare earth elements and nickel, further complicates negotiations, as these minerals are essential for both civilian and military applications, especially for East Asian countries aiming to reduce dependence on non-allied sources. The Arctic's resources thus hold both economic and geopolitical significance (Tulaeva et al., 2019; Marsili, 2022, p. 150; Sypień, 2024, p. 132). Achieving a balance between economic ambitions and political sensitivity is crucial for the success of East Asian Arctic ventures. The strategies of China, Japan and South Korea resembles "salami-slicing" tactics which refer to a gradual, incremental strategy of gaining influence or control by making small, seemingly insignificant advances that accumulate over time into substantial gains, often while avoiding direct confrontation or drawing attention to the broader strategic objective (Maass, 2021, pp. 35–37). In the discussed cases, this is both evident in the order in which the various actors get involved – government ministries and agencies create the right conditions for SOEs and private entrepreneurs – and in the gradual nature of gaining prominence in the Arctic mining sector, albeit the Chinese approach is more aggressive and effective.

IMPLICATIONS FOR GLOBAL RESOURCE MARKETS AND REGIONAL POWER DYNAMICS

East Asian involvement in Arctic mining is quietly reshaping the structure and resilience of global mineral supply chains. With demand for critical minerals such as rare earths, cobalt, lithium and nickel soaring, East

Asian economies have turned to resource diversification strategies emphasising upstream investment in politically stable jurisdictions. Arctic resources are increasingly seen as an antidote to the volatility and export risks of traditional supply regions – especially by mineral-hungry Japan and South Korea, which hedge against vulnerabilities through equity investments and long-term offtake agreements (Dou et al., 2023; Stensdal, 2015).

The Arctic itself is fast emerging as a new resource corridor, with East Asian investments in extraction projects often paired with infrastructure plays – ice-class vessels, LNG terminals and port facilities along the Northern Sea Route. For Japan and South Korea, these efforts bolster energy and materials security; for China, they fit seamlessly into a global trade network built under the Polar Silk Road banner. As Arctic shipping routes become increasingly viable, even remote mineral sites are drawn deeper into global supply chains (Beveridge et al., 2016, p. 405, 410). Meanwhile, strategic stockpiling and resource nationalism have become defining features of Arctic resource governance (Kangasluoma & Lempinen, 2022, p. 401). The strategic styles vary: China, guided by the 2018 Arctic White Paper and an expanding web of bilateral deals, takes a proactive, multifaceted approach, blending politics, science and economics. Its SOEs, buoyed by concessional finance and diplomatic heft, are deeply entrenched in Arctic ventures (Tulaeva et al., 2019; Gapon, 2024, p. 23). Japan and South Korea, by contrast, play to their strengths in sustainable stewardship, presenting themselves as high-skill, low-risk partners, particularly appealing where Western investment is hampered by sanctions or environmental, social and governance (ESG) requirements (Heng & Freymann, 2023) and engaging leading private companies specialising in the development of technologies capable of operating in Arctic conditions.

East Asian countries influence in Arctic mining has broader consequences for global power dynamics. Control over strategic mineral reserves enhances the economic sovereignty of both producing and consuming states, impacting global manufacturing and defence industries (Jones, 2024; Nolan, 2025). East Asian investments also shift geopolitical

influence, particularly in the Russian Arctic, where China's presence counters Western disengagement. These trends raise concerns among Euro-Atlantic actors about strategic dependency and governance asymmetries (Heng & Freymann, 2023), prompting renewed diplomatic engagement in Arctic forums. This shift also fuels Western concerns over Russia's growing dependency on China in a subsequent field.

CONCLUSION

East Asian engagement in Arctic mining manifests a complex yet coherent triadic configuration, encompassing governmental institutions, state-owned enterprises and private firms. Each actor group contributes distinct, yet mutually reinforcing, roles: government ministries articulate strategic aims and cultivate diplomatic access; SOEs absorb capital-intensive risks in line with national policy imperatives; and private firms provide specialised technologies and operational acumen. Rather than acting in isolation, these entities operate in orchestrated coordination, enabling China, Japan and South Korea to navigate sovereignty-bound constraints while incrementally embedding themselves in Arctic extractive value chains. Although calibrated to avoid geopolitical provocation, their presence is reshaping the landscape of mineral and energy resource extraction in the High North.

East Asian actors use adaptive, low-friction strategies to access Arctic resources, prioritising joint ventures, scientific cooperation and multilateral engagement to gain legitimacy while respecting sovereignty norms. They integrate through bilateral agreements and policy alignment, minimising regulatory resistance. Their growing investments in LNG and critical minerals are reshaping Arctic supply chains, turning the region into a key node in global resource networks. This incremental involvement reflects a broader East Asian geoeconomic vision, subtly reconfiguring power dynamics under a cooperative facade. The "salami-slicing" approach – incremental and non-confrontational – gains

empirical support. Chinese SOEs leverage concessional finance and diplomacy to gain influence through minority stakes and infrastructure investments, while Japan and South Korea emphasise technology and sustainability for soft power. Both avoid zero-sum strategies, fostering interdependence and positioning East Asia as key players in Arctic extraction. This engagement reflects broader global trends, where globalisation, capital mobility and complex supply chains enable geographically distant actors to assert strategic presence and shape extractive regimes without traditional hard power instruments.

Nonetheless, significant informational lacunae persist. Investment flows, often routed through opaque instruments and third-country intermediaries, remain difficult to trace and quantify. Scientific cooperation, while discursively benign, may conceal dual-use motives with extractive or strategic implications. Host-country screening mechanisms, especially in jurisdictions with limited transparency, further obscure the real scale and character of East Asian involvement. While this study establishes the strategic logic of East Asian Arctic engagement, future research would benefit from more granular investment data, regulatory impact analysis and longitudinal tracking. In the absence of greater transparency, the full scope and consequences of this quiet geo-economic incursion will remain partially hidden, warranting increased attention from scientists and politicians.

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CHAPTER 3

China's utilisation of natural resources in the semiconductor industry: competition, ambitions and future potential

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Abstract: In the information age, semiconductors and chips have become the centre of attention for leading and aspiring world powers and growing economies. Following its rapid rise as the world's leading manufacturer and exporter, China was expected to excel in the semiconductor industry. While it has certainly shown strong commitment to the manufacture of semiconductors and chips, it is yet to claim its position as their leading producer – a title currently held by what China considers its rebel province, the Republic of China (Taiwan). This chapter examines the stark contrast between China's potential to become the world's number one semiconductor manufacturer and its current reality, where it remains behind smaller economies such as Taiwan, Japan and South Korea. It explores China's vast natural resources vital for the production of semiconductors, including silicon, germanium, palladium, boron and gallium, and offers a critical take on the state of the semiconductor sector in the PRC.

Keywords: China semiconductors, semiconductors industry, semiconductors manufacture, China chips, semiconductors and chips.

1. INTRODUCTION

Semiconductors, by many considered the driving force behind today's technological revolution (Hatcher, 2025), provide substantial economic and political benefits to their manufacturers. Their usage ranges from

electronics to transportation, renewable energy, healthcare, military and countless other industries (Hamil, 2023). The significance of semiconductors in politics, the economy and technology cannot be overstated, as they are the key driving force behind current geopolitical shifts, trade tensions and technological competition.

While countries such as the People's Republic of China (PRC), the United States, the Republic of China (ROC, Taiwan), Japan, South Korea and Germany fiercely compete for the title of world's number one semiconductor manufacturer, technological development thrives and political tensions grow (World Population Review, 2025). This chapter seeks to answer why – despite having a vast array of natural resources needed for the manufacture of semiconductors (such as silicon, boron, germanium, gallium and palladium), the PRC fails to claim the place of being a leading global semiconductor producer. The chapter will analyse the Chinese semiconductor industry, its reality, ambitions and potential, as well as claim that what stops China from reaching global leadership is a combination of economic and political factors. It does not, however, aim to portray China as a failed semiconductor manufacturer. This chapter will highlight not only the obstacles and challenges facing the industry, but also the future potential of the PRC and its ambitions towards global semiconductor leadership. In its analysis, this chapter will rely on policy papers, reports, datasets and expert opinions to draw a comprehensive image of the Chinese semiconductor sector. It will approach both economic and political aspects of the industry and compare China's existing production ambitions with its current reality. The chapter will begin with an overview of the significance of semiconductors towards global technology, politics and economy. It will emphasise that having vast natural reserves does not necessarily guarantee one country's success in semiconductor production, highlighting the contrast between potential and reality in the Chinese context. It will then describe the position of the Chinese semiconductor industry from a global perspective, observing several challenges that tame its growth and self-sufficiency.

Lastly, this chapter will combine analysis of the current industry challenges with an examination of the future ambitions and potential of the PRC, assessing its targets and goals while keeping in mind the economic and political shifts affecting them. Through its examination, this chapter will highlight how these two factors influence the Chinese semiconductor industry, leading it to fail in claiming the place of being a leading global semiconductor manufacturer – at least for now.

2. THE SEMICONDUCTOR INDUSTRY INSIDE AND OUTSIDE OF CHINA

Studies and reports show the semiconductor industry as a key for future technological dominance, driving the current economic trends and stabilising national security. Publications such as "The Weak Links in China's Drive for Semiconductors" by the Institut Montaigne describe the crucial role of semiconductors in China's long-term development strategy (Institut Montaigne, 2021). Simultaneously, papers such as "China's Quest for Semiconductor Self-Sufficiency" portray the Chinese semiconductor industry from a global perspective, highlighting the potential implications on other countries such as the United Kingdom and South Korea (Janjeva et al., 2024). No matter the perspective, be it technology, economy or security-focused, the message is clear: semiconductors will play a great role in shaping the future geopolitical landscape. Thus, it is imperative to focus on semiconductors while assessing both the present day and future course of politics, trade and technology.

2.1. SEMICONDUCTORS, THEIR USAGE AND GLOBAL SIGNIFICANCE

In an interview for the StanfordReport (2023), Professor Srabanti Chowdhury has described a semiconductor as an element which can both conduct and block electricity, allowing for a quick switch in the flow of the electrical current (Kubota & Abott, 2023). Widely used in computing,

semiconductors serve as a foundation for the development of memory units and microprocessors (Wang & Huang, 2023). They are a key to the production of not only mobile phones and data centres, but also energy systems, electronic vehicles (EVs) and optoelectronics (Wang & Huang, 2023). Professor Chowdhury underlines that:

> "We're always among semiconductors. They are in your computer, your cell phone, your watch, your car, and even in LED lights. Semiconductors are so important because you cannot run your daily life without them. The smarter the world gets, the more the need for semiconductors will increase" (Kubota & Abott, 2023).

Moreover, semiconductors mark a crucial element in the development of military and defence technologies such as satellites, missiles, sensors, actuators and stealth aircrafts (Shivakumar & Wessner, 2023; Gargeyas, 2022). Thus, the application of semiconductors covers numerous industries such as computing, ICT (Information and Communications Technology), military, energy and transportation. Noting their significance across multiple industries, countries such as China, the US and Taiwan shifted their focus to semiconductor production early on, with companies such as the Taiwanese TSMC (Taiwan Semiconductor Manufacturing Company Limited), American Nvidia and the Chinese SMIC (Semiconductor Manufacturing International Corporation) being founded in 1987, 1993 and 2000 accordingly (Tung, 2002; Wang et al., 2024; Li & Feng, 2022).

2.2. CHINA'S SEMICONDUCTOR INDUSTRY

The PRC's industrial planning within the semiconductor sector reaches back to the 1950s, with the "Outline for Science and Technology Development, 1956–1967" marking the country's very first official long-term strategy for technological development (VerWey, 2019). Since 1956, the Chinese semiconductor industry has been steered by the recurring

Five-Year Plans (FYPs), which navigated the PRC's ambitions for technological growth and self-sufficiency (VerWey, 2019). The Chines semiconductor industry has benefited from the top-down, state-led approach. This includes state subsidies, industrial policies and directives towards state-owned enterprises designed specifically to support its growth (VerWey, 2019). As of today, the main beneficent seems to be, along the existing FYPs, the Made in China 2025 policy, which supports the PRC in becoming 70% self-sufficient in the semiconductor industry by 2025 (Janjeva et al., 2024). Furthermore, the state actively assists the industry, with President Xi Jinping underlining its vitality in fulfilling China's strategic goals as early as 2014 (VerWey, 2019). The Big Funds I, II and III have supported domestic semiconductor firms such as SMIC, Huahong Group and CR Micro starting in September 2014 (Janjeva et al., 2024). Over the years, governmental funds have navigated billions of RMB (renminbi) towards the development of semiconductor technology, along the existing frameworks such as lowered taxes and R&D tax credits (Janjeva et al., 2024). The most recent – The Big Fund III from May 2024 – focuses on the development of large manufacturing plants as well as the strive for self-sufficiency and lack of dependence on Western companies, central to this chapter's analysis (VerWey 2019). The Big Fund III also supports the construction of new fabrication plants (fabs) in China, aiming to develop a truly indigenous industry (VerWey, 2019). The top-down approach is crucial for the survival of the Chinese semiconductor industry, with the state being directly or indirectly in control of 43% of its registered capital (Janjeva et al., 2024).

While central to the Chinese Communist Party's (CCP's) directives, semiconductors are not unique to China in their importance to long-term national strategies. Due to their widespread usage and significance in industries such as the military, healthcare and green energy, semiconductors take centre stage in Taiwan, the US, Japan and South Korea (Thadani & Allen, 2023). With its main manufacturing competition based in its economic rival, the US, and in what the PRC considers a rebel province, Taiwan, geopolitical tensions drive the Chinese

semiconductor industry almost as much as technological ambitions and economic needs (Hamil, 2023). Hence, Taiwan, South Korea, Japan, the US and China – as the world's top five semiconductor manufacturers – become the leading actors in this chapter's analysis, with particular focus on the geopolitical triangle between China, the US and Taiwan. With the extensive tariffs introduced between February and April 2025 by the administration of the current US President, Donald Trump, towards both China and Taiwan (albeit avoiding the semiconductor industry in Taiwan's case), with the strive for self-sufficiency on China's side, and with Taiwan's reliance on international trade and cooperation, the geopolitical triangle becomes the canvas for the current and future course of development for the semiconductor sector (Chung et al., 2025). Each of the actors has its own reasons for entering the competition. For China, manufacturing semiconductors is central to its ambition of becoming a self-sufficient, global tech superpower, as well as dispersing the Western hegemony and ensuring national security (Goodrich, 2024). Consequently, the US relies on semiconductors for upholding the very same technological dominance and ensuring its position as a global leader, simultaneously supporting the military sector and increasing national security (Semiconductor Industry Association, 2019). Lastly, for Taiwan, semiconductors helped establish the country's importance in trade and technology, thus highlighting its global position, especially in light of its disputed statehood (Reinsch & Whitney, 2025).

3. CHINA'S NATURAL RESOURCES AND THE SEMICONDUCTOR SECTOR

The core analysis of this chapter focuses on the contrast between China's potential and its reality in semiconductor manufacture, taking into account its near-dominance in the export of natural resources needed for producing semiconductors. Through analysing the key materials used

during the semiconductor manufacturing process and China's position in their respective global markets, this chapter will underline the PRC's advantageous position in the semiconductor industry. Then, by contrasting China's abundant natural resources with its economic and geopolitical challenges, it will aim to explain why China seems to lack definite dominance in the aforementioned sector.

3.1. GERMANIUM AND GALLIUM

Baskaran and Schwartz (2024) identify four key minerals essential to the process – germanium, gallium, silicon and palladium. Germanium, a scarce material sourced from zinc, is crucial to the manufacture of high-speed transistors and wafers, and is predominantly found in China, with about 60% of world export coming from the PRC (Baskaran & Schwartz, 2024). In 2023, the total value of China's exports of germanium oxides and zirconium dioxides reached $124,990.09, with 15,401,300 kg of material exported (World Bank, 2023b). China's leading competition in the semiconductor industry – Japan and the United States – follow right behind with a total export value of $48,848.53 and $45,127.76 respectively (World Bank, 2023b). In order to be used in semiconductor production, germanium needs to be refined – and with the majority of its refinement frameworks established in the PRC, the country gains significant advantage not only with the export of the mineral, but, most importantly, in its utilisation in the semiconductor sector (Baskaran & Schwartz, 2024). Similar robustness can be observed in the case of gallium, with China having exported $141,167.37 total value of the mineral in 2023 (combined with the export of hafnium, indium, niobium, rhenium and thall), right behind Brazil, which exported $210,669.49 (World Bank, 2023a). Gallium's critical role in semiconductor production can be highlighted by its usage in groundbreaking technological achievements, such as the construction of the world's largest N-polar gallium nitride wafer, considered a true maverick in the semiconductor sector, allowing for lower production costs and better

adaptation of semiconductors in electric vehicles (EVs) and satellites (Zhang, 2025). Both germanium and gallium are byproducts of other materials, called "minor metals", and with their significance to the semiconductor sector and their mass-scale export by China, they provide substantial benefit to the PRC (Liang & Marsh, 2023).

The data presented above, though relatively recent, can lack a crucial component in the 2025 analysis – the trade tensions between China and the US. It is vital to note that in December 2024, following the US's further technology restrictions imposed on the PRC, China responded with an export licensing system on numerous natural resources, including germanium and gallium, to the US, thus affecting the state of global germanium and gallium markets and contributing to the shielding of Chinese natural resource exports from one of its main technological competitors (S&P Global, 2025).

3.2. SILICON AND PALLADIUM

The next two key materials described by Baskaran and Schwartz are silicon and palladium, of which China has exported a total value of $124,990.09 and $26,970.65 in 2023 (World Bank, 2023d; 2023c). That year, China was the world's leading silicon exporter, having sold 563,729,000 kg of the material, mostly to Vietnam, Japan, South Korea, Indonesia, Thailand and India – all of which are its key competitors in the semiconductor industry (World Bank, 2023d; 2023c). Being the most popular material used in the production of chip wafers (used for the production of microchips), silicon gives China an enormous advantage in the field (Baskaran & Schwartz, 2024). Goswami (2023) describes it as "the most economically important mineral for semiconductor manufacturing", and though widely spread, only the refined, pure silicon can be used for chip production, further exemplifying China's dominant hand as its world's number one producer, accounting for around 70% of the global market. As for palladium, the only mineral that China is not in the world's top two exporters, the PRC has exported a total value of

$26,970.65, way behind its competitors such as the US, South Korea and Japan (World Bank, 2023c). Palladium is used to ensure the longevity of semiconductors, with its high durability marking a key factor in the production and maintenance of chips (Baskaran & Schwartz, 2024). Thus, the mineral is crucial not only for manufacturing semiconductors but also for ensuring their long-term use. In 2023, China imported approximately $1,220,938.78 of palladium, unwrought or in powder form (World Bank, 2023c). Its main exporters to China are Russia, the US, Japan, South Korea and Germany (World Bank, 2023c). From the perspective of natural resources, palladium seems to be the only challenge among the four key elements needed for semiconductor production, as outlined by Baskaran and Schwartz (2024). In all except one of the four key resources, China upholds its position as at least the second global manufacturer, strengthening its position within the semiconductor manufacturing industry.

As such, focusing solely on natural resources and minerals, China has all the means to become a leading global semiconductor manufacturer. This chapter, however, wishes to outline several challenges halting China's development in the semiconductor sector, thus pushing it behind its competitors such as the US, Japan and South Korea.

3.3. INDUSTRIAL DOMINANCE AND LACK THEREOF

Despite China's upper hand in the global export of minerals crucial for producing semiconductors, the country fails to claim the title of a world leader within this sector. In fact, China holds the world's third largest number of semiconductor manufacturing plants, and the world's fifth largest production of semiconductors (World Population Review, 2025). Although still on the top five podium, these numbers contrast with the existing aspirations of the PRC. This chapter wishes to identify two major intertwined factors behind this issue: economic dependence and geopolitical pressure. The production of semiconductors is a lengthy process which relies strongly on the value chain, described by the Institut

Montaigne as "a chain of trust" (Institut Montaigne, 2021). The Institut outlines the three main stages of the production chain:

- Design – mostly within the fabless model, without physical manufacturing infrastructure and mostly dominated by the US;
- Manufacturing – mostly in the control of the Taiwanese TSMC (Taiwan Semiconductor Manufacturing Company Limited) and UMC (United Microelectronics Corporation), Chinese SMIC (Semiconductor Manufacturing International Corporation) and American Global Foundries;
- Assembly, testing and packaging – divided mostly between Chinese and Taiwanese firms (Institut Montaigne, 2021).

The equipment and infrastructure used throughout the production chain – from design and manufacture to assembly, testing and packaging – come from various destinations, private firms or state-subsidised actors. Institut Montaigne highlights that of the leading semiconductor manufacturers, "only a few industry giants integrate all three phases" of the production chain (Institut Montaigne, 2021, p. 10). The dominant actors within the market (by revenue) are Intel, Samsung, SK Hynix and Micron Technology – all American or South Korean firms (Institut Montaigne, 2021). For years, China has relied on international interdependence in the microelectronic sector, with its main competitors subsequently relying on the PRC throughout the manufacturing process. When it comes to the equipment and software, Institut Montaigne notes that "China's manufacturing capacity does not meet the need of its foundries", underlying the PRC's dependence on global supply chains (Institut Montaigne, 2021, p. 27).

The Institut Montaigne highlights China's reliance on foreign intellectual property (IP), foreign equipment and technologies in all stages of the semiconductor production process (Institut Montaigne, 2021). The road to self-sufficiency is prolonged and challenging, but, perhaps exactly because of that deeply-rooted interdependence, the PRC's ambitions seem to stay right on course. It is essential to mention that a big portion of the

equipment and IP needed for the development of semiconductor technology comes from China's main competition – the US and Taiwan (Institut Montaigne, 2021). Amidst an upcoming trade war, the US has pressured Taiwan to limit its economic and technological cooperation with China, which left the ROC – operating under a direct threat of a Chinese invasion – to cease accepting new orders from Chinese firms such as Huawei (Institut Montaigne, 2021). The political tensions between China, the US and Taiwan fuel geopolitical tensions between the countries and influence global economic trends, especially in the field of semiconductors (Silver et al., 2023). The US has imposed licensing against Chinese semiconductors, most notably throughout the Biden and the Trump administrations (Institut Montaigne, 2021; Caloca, 2025). Taiwan have also been affected by US licensing, with 32% tariff on the island's exports imposed in April 2025, although one notably excluding semiconductors (Chang & Huang, 2025).

This geopolitical triangle between China, the US and Taiwan affects the Chinese semiconductor industry by – perhaps ironically – pushing it further towards isolationism, thus *de facto* forcing the PRC to rapidly implement its 70% self-reliance strategy. The US, aiming to strengthen its military and technological dominance, and Taiwan, seeking a security guarantee under the threat of a Chinese invasion, create a tight lock, simultaneously challenging the Chinese semiconductor industry and fuelling its strive for self-reliance.

4. LOOKING BEYOND NATURAL RESOURCES

The paradox of China's ongoing isolation within the semiconductor industry is one of the most important points in this chapter's discussion, mostly due to its unpredictable nature. The state of the global semiconductor supply and production chains changes rapidly. However, as of now, the key dynamics appear to be centred around the intersection of politics and economics, with rising tensions, new tariffs and licenses

affecting China's global position in the semiconductor industry. It remains to be seen if President Trump's engagement in the trade war will in fact benefit the American tech industry, contributing to its self-reliance – an ambition notably similar to the objective outlined by the CCP for their national semiconductor sector (Yeh, 2025).

The challenges facing the Chinese industry certainly affect its lack of global leadership in semiconductor manufacturing. But, possibly, can the same strive for separating China from the global supply chain force the PRC to become more self-reliant? It is indeed difficult to provide an answer to this discussion with full certainty. Taking into account the unpredictability of the Trump administration, the rapidly changing geopolitical and economic environment across the globe and the rapid technological development, the implications cannot be calculated precisely. After all, China has already exceeded expectations in the semiconductor industry. The policy paper prepared by the Institut Montaigne, which served as a core source for this chapter's analysis, states that China will not be able to claim technological supremacy within the semiconductor sector until it can develop at least a 7-nanometer manufacturing process which it calls the "The 7-nanometer threshold", which at the time was only found in Taiwan (Institut Montaigne, 2021, p. 15). The smaller the manufacturing process, the better the overall production capacity: for example, 5-nanometer technology allows "15 more times the number of transistors than 30 nm technology" (Institut Montaigne, 2021, p. 15). However, since then, China has not only fully developed a 7-nanometer but also claimed to have developed a 5-nanometer chip, and although still a generation behind TSMC, it is investing broadly in the development of semiconductor technology, offering large sums of subsidies and investments to firms such as SMIC (Staff, 2024).

China's commitment to research and development of new technologies cannot be underestimated while analysing its position on the global semiconductor market. China is not the world's leading semiconductor manufacturer – geopolitical and economic factors have halted its aspirations to become one. Yet, perhaps, it is precisely these factors that will

in turn push the PRC towards more rapid development of indigenous technology and towards achieving the CCP's ambition of self-reliance?

5. CONCLUSION

This chapter depicted semiconductors as one of the most important technological and economic factors, fuelling the development of the electronics, health, military and many other sectors. It has been established that the CCP views semiconductors as pivotal in China's long-term development strategy, aiming for the country to become at least 70% self-reliant when producing semiconductors by 2025 (Janjeva et al., 2024). The CPP's attention to the semiconductor sector cannot be understated, marking one of the top priorities of the People's Republic in its FYPs (Janjeva et al., 2024).

Yet, despite its significant advantage with minerals needed for semiconductor production such as germanium, gallium, palladium, silicon and boron, China fails to claim the title of the world's leading semiconductor manufacturer, remaining behind its main competition – the US, Taiwan, Japan and South Korea (World Bank, 2025a; 2025b; 2025c; 2025d; 2025e; World Population Review, 2025). This chapter has highlighted the PRC's economic dependence on the global production chain, showing how the complexity of the semiconductor manufacturing process results in the PRC's dependence on its strategic rivals, thus halting its self-reliance. This economic interdependence is later affected by geopolitical tensions, with new licences limiting China's trade capabilities. Hence, it has established that a combination of economic and political factors challenge China's ambition to become the world's leading semiconductor manufacturer. In a world of limited resources, an upper hand in vital minerals offers an outstanding advantage in the global market. However, the semiconductor industry does not operate in a vacuum. In the case of China, a significant advantage in natural resources is not enough to gain definite dominance over other economies in semiconductor production.

Other forces, such as political tensions and economic trends, influence the course of technological development, thus highlighting the interplay between natural resources and the reality of global power shifts.

This chapter ended its discussion by questioning whether the newly imposed tariffs and the ongoing isolation of China from the global semiconductor market may in fact contribute to its smoother adaptation of the 70% self-reliance objective. It remains uncertain whether the PRC will reach its 70% self-reliance threshold, and whether its deepening separation from the global supply chain will push it away from interdependence.

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CHAPTER 4

Niger's uranium as a cause for geopolitical struggle

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Abstract: This chapter analyses the geopolitical, historical and strategic significance of uranium extraction in Niger, a country that – despite its economic marginality – has played a disproportionately central role in energy and security frameworks. The study explores how uranium, a critical material for nuclear power and defence industries, has historically tied Niger to France through neocolonial economic structures, while also positioning it at the crossroads of contemporary global rivalries involving France, China and Russia. It argues that uranium has functioned not only as an export commodity but as a geopolitical lever – shaping Niger's internal politics, external alignments and economic sovereignty. Through a combination of historical analysis and political economy, the chapter examines the evolution of Niger's uranium sector from colonial extraction to its strategic reconfiguration following the 2023 military coup. The coup, and the subsequent expulsion of French interests, created space for new actors to enter the resource landscape, shifting the dynamics of foreign influence in the Sahel. Ultimately, the chapter contributes to broader debates on natural resources and regional power by highlighting the strategic centrality of uranium in shaping international alignments, resource governance and postcolonial state-building in West Africa.

Keywords: Niger, Uranium, Geopolitics, Neocolonialism, Sahel.

INTRODUCTION

The international struggle for control over natural resources continues to shape regional politics and global security. Among these, uranium – as

a critical input for nuclear energy and defence – is increasingly recognised as a strategic asset. While uranium production is often associated with industrialised states or large-volume producers such as Kazakhstan or Canada, Niger, a landlocked Sahelian state, has emerged as a pivotal actor in this geopolitical equation. Despite being one of the poorest countries globally, Niger's uranium reserves have long attracted foreign interest, particularly from France, and more recently from China and Russia. These entanglements exemplify how natural resources intersect with issues of economic sovereignty, security and neocolonialism – making uranium a useful lens through which to analyse regional power dynamics and global competition.

The central research question of this chapter is: "How has uranium shaped Niger's international position, internal politics and relationships with global powers across different historical and geopolitical phases"? The hypothesis proposed here is that uranium has functioned not simply as an economic resource, but as a strategic lever of influence, dependency and bargaining, especially in moments of political rupture such as the 2023 military coup. The chapter argues that while Niger has historically been subordinated in uranium-related partnerships, recent developments reflect an emerging pattern of resource-based agency – albeit one that risks reproducing extractive dynamics under new geopolitical umbrellas.

The analysis draws on several theoretical frameworks: first, from dependency theory, which helps to explain Niger's structural position in unequal global economic arrangements; second, from the political economy of resources, particularly concepts such as the "resource curse", resource sovereignty and the resource-security nexus; and third, from geopolitical neo-classical realism, which illuminates how global and regional actors instrumentalise resource access as part of strategic positioning.

Methodologically, the chapter adopts a qualitative approach grounded in case study analysis. It draws from a combination of historical institutional analysis, policy documents, reports by international organisations (e.g., the International Monetary Fund – IMF, European Commission) and secondary academic literature including political economy, African

studies and security studies. Archival data and investigative journalism sources have also been used where relevant to trace changes in contracts, political alignments and foreign investment patterns. Particular emphasis is placed on the events surrounding the 2023 coup and the role of actors such as Orano, Rosatom and China National Nuclear Corporation (CNNC) in shaping current developments.

The chapter is structured as follows. The first section outlines the strategic importance of uranium, emphasising its centrality to energy security and defence planning, particularly in France and the EU. The second section traces the historical and geopolitical trajectory of Niger's uranium sector, focusing on the colonial and postcolonial role of France, the marginalisation of local communities and Tuareg resistance. The third section analyses the contemporary geopolitical realignment that has followed the 2023 military coup, emphasising the growing role of alternative global powers and Niger's use of uranium as a bargaining tool.

This analysis seeks to contribute to the broader theme of the monograph – natural resources and regional power dynamics – by showing how resource-rich but institutionally weak states can simultaneously be objects and agents of geopolitical strategy. Niger, while small in output compared to other producers, exemplifies the asymmetric, strategic leverage that critical materials confer in the context of regional instability, international rivalry and the reconfiguration of postcolonial dependencies.

THE STRATEGIC IMPORTANCE OF NIGER'S URANIUM

Uranium, as a cornerstone of civilian nuclear energy and a critical component in the defence industry, plays an increasingly strategic role in contemporary global affairs. Among the countries supplying this resource, Niger has emerged as one of the world's key producers. Despite its status as one of the poorest nations globally, Niger holds considerable geopolitical weight due to its uranium deposits, making it a focal point of

interest for global powers such as France, China and Russia (IMF, 2024). The control and management of this strategic resource have profound implications not only for regional security in West Africa but also for the broader dimensions of global energy security and industrial sovereignty, particularly within the European Union.

According to the World Nuclear Association (2024), Niger is the world's seventh-largest uranium producer. In 2022, it mined approximately 2,020 tonnes of uranium, accounting for about 4% of global production. These figures may appear modest in comparison to top producers such as Kazakhstan and Canada, yet they are highly significant due to the strategic dependencies they create. More importantly, uranium exports represent a critical share of Niger's economy and international relevance. Uranium is one of the country's top exports, accounting for approximately 43% of total exports in 2023 (World Integrated Trade Solutions). For France, which used to source roughly 20% of its nuclear fuel from Niger (Maad, 2023), the country is a key partner in ensuring the uninterrupted functioning of its 56 nuclear reactors, which provide over 70% of France's electricity supply. However, following the 2023 coup in Niger and the subsequent revocation of Orano's mining licenses by the military junta, France has faced significant challenges in maintaining its uranium supply, in response increasing imports from countries such as Kazakhstan, Namibia, Uzbekistan and Australia (Ross, 2024).

For Niger itself, uranium's value transcends economics. Among sub-Saharan African states, it is one of whose natural resources give it direct leverage in global strategic calculations. While many African economies depend on exports of agricultural goods or oil, Niger's uranium links it to nuclear energy markets and security frameworks. This gives the country a rare geopolitical currency – one that, if managed wisely, could strengthen its bargaining position and attract diversified partnerships.

The history of uranium mining in Niger is closely tied to French state interests. Since the 1970s, the French company Areva (now Orano) has operated major uranium mines in Arlit and Akokan. This relationship reflects broader post-colonial ties, where economic structures often

mirrored earlier forms of political dominance. However, the economic and political landscapes are no longer shaped solely by France. France's declining control over Niger's uranium sector is part of a broader erosion of its influence in West Africa, where the historic system of *Françafrique* – based on military ties, political loyalty and economic privileges – is increasingly contested by other actors. In countries such as Mali, Burkina Faso and Niger, French troops have been expelled, and diplomatic alliances have shifted, exposing the limits of postcolonial dominance.

Over the past two decades, China has made significant inroads, notably through the CNNC, which has acquired licenses to exploit the Azelik mine through its subsidiary Somina. While Chinese operations have faced setbacks due to security concerns and local resistance, they represent a clear diversification of Niger's foreign partnerships and signal Beijing's long-term strategic interest in securing alternative uranium supplies (Cabestan, 2018, pp. 595–598). China continues to pursue long-term engagement framed as mutually beneficial development, leveraging infrastructure projects and diplomatic non-interference to secure footholds in key extractive sectors.

Russia has also emerged as a player in the broader uranium market, deepening its involvement in Niger, especially after 2022. Although it does not yet dominate Nigerien uranium projects directly, Rosatom's activities in neighbouring countries and its broader African strategy suggest a growing interest. Russia has capitalised (and had influences in creating) on the vacuum left by the French through a hybrid strategy combining military cooperation, political symbolism and covert influence. The Kremlin deploys actors such as the African Corps to offer security guarantees, while simultaneously opening doors for state-backed enterprises such as Rosatom to negotiate future access to resources. This approach, grounded in transactional alliances and anti-Western rhetoric, allows Moscow to position itself as a strategic partner without the historical baggage associated with former colonial powers. In my opinion, the Kremlin sees Niger's uranium as a means to both diversify supply sources and, first and foremost, forge strategic alliances in a rapidly developing new scramble for Africa.

After Russian aggression in Ukraine in 2022, the vocal point of the EU's policy, was to reduce its energy dependency on Russia and develop energy sovereignty. Niger's uranium could offer an alternative that is both geographically and politically more aligned with European interests. Indeed, uranium has been officially designated a "critical raw material" by both the EU and the United States (European Commission, 2023; U.S. Department of Energy, 2022). This classification underscores the importance of securing access to this radioactive element not only for energy purposes but also for its role in national defence, including nuclear deterrence and propulsion systems. Uranium thus occupies a special place within what is known as the "resource-energy-security nexus".

The concept of the "resource nexus" emphasises the interdependence between natural resources (such as water, energy and minerals), environmental stability and security (Bleischwitz et al., 2017, pp. 4–8). Uranium is emblematic of this linkage. As a material essential for both civilian and military uses, its accessibility directly impacts energy security, technological development and strategic autonomy. In the case of Niger, this nexus is particularly evident. Security threats in the Sahel – including terrorism, military coups and foreign interventions – have a direct bearing on global energy markets due to the vulnerability of uranium supply chains. At the same time, global demand for clean energy (for example produced by nuclear power plants) and geopolitical rivalries drive international powers to increase their presence in uranium-rich regions. This dual dynamic makes Niger not just a supplier of a resource but a potential chokepoint in a complex system of geopolitical interdependencies.

HISTORICAL AND GEOPOLITICAL BACKGROUND

Niger's uranium industry is not only a central pillar of the country's economy but also a critical lens through which one can view the interlocking histories of colonialism, postcolonial dependence, geopolitical

competition and internal instability. The trajectory of uranium extraction in Niger reveals a complex story of foreign dominance, unbalanced development and contested sovereignty that continues to shape the country's politics and international role. The discovery of uranium in Niger in 1956 by French geologists laid the groundwork for what would become a long-term strategic relationship between France and its former colony. Following Niger's independence in 1960, France quickly secured access to uranium through defence agreements and institutional ties, preserving its ability to exploit resources critical to its national nuclear energy strategy (Tertrais, 2014, pp. 2–3). The logic of *Françafrique* – the informal network of influence Paris maintained across former colonies – manifested in the control over Niger's raw materials, particularly through the creation of bilateral structures and mining joint ventures that ensured French dominance. In the early 1970s, France oversaw the creation of two key companies: SOMAÏR (Société des Mines de l'Aïr) in 1968 and COMINAK (Compagnie Minière d'Akouta) in 1974, both operating in the uranium-rich Aïr region. These joint ventures, nominally involving Niger's state-owned company SOPAMIN, were dominated by French interests – especially Areva, in which the French state held most of the capital (Tertrais, 2014, p. 4). Infrastructure such as the "Uranium Highway" connecting Arlit to the Benin border was developed specifically to support the extraction and export of uranium to France. This neocolonial arrangement had long-term consequences. By 1982, uranium accounted for nearly 75% of Niger's export earnings and was the single most important revenue-generating activity (IMF, 2013, p. 18). While this created macroeconomic growth, most benefits bypassed the majority of Nigeriens, concentrating wealth in the capital and foreign boardrooms.

The unequal distribution of benefits from uranium extraction, especially its minimal impact on local development in the north, became a major driver of Tuareg resistance. The Tuareg, a nomadic population inhabiting the mining regions, were largely excluded from employment, infrastructure and decision-making. Their grievances sparked a series of uprisings beginning in the early 1990s, intensifying again in the 2000s.

The Mouvement des Nigériens pour la Justice (MNJ), active from 2007, demanded greater local control over natural resources and compensation for environmental damage and displacement. Rebel forces targeted mining infrastructure, kidnapped foreign workers and directly challenged the Nigerien state's alliance with foreign mining firms (van Walraven, 2019, pp. 3–4). In one striking episode, MNJ fighters abducted French employees of Areva near Arlit, humiliating the government and revealing the vulnerability of critical infrastructure (van Walraven, 2019, p. 4). The Nigerien government's approach was characterised by denial and repression. Civilian deaths, disappearances and torture were widely reported in Agadez and Iferouâne during the 2007–2009 uprising, with confirmations of arbitrary executions and the use of civilians to detonate landmines (van Walraven, 2019, p. 54). Rather than leading to reconciliation, the state's militarisation of the conflict entrenched mistrust among Tuareg communities, weakening long-term stability and alienating crucial actors in uranium-producing regions.

The dominance of foreign firms in Niger's uranium sector, especially Areva, has long been a source of political tension. In 2014, Niger sought to renegotiate its contract with Areva, demanding a fairer share of profits, increased local employment and higher taxes. These negotiations revealed the structural imbalance in power: Areva threatened to halt operations and invoked contractual protections, while Niger faced pressure to maintain investment flows (Tran, 2014). The IMF and World Bank further constrained Niger's fiscal space through structural adjustment programs throughout the 1990s and 2000s. These programmes promoted deregulation and prioritised foreign investment while pushing the Nigerien government to cut public spending and privatise services (IMF, 2013, pp. 20–21). By 2015, Areva had suspended development of the Imouraren mine amid falling global uranium prices, while labour unrest flared at Somaïr over unpaid bonuses (van Walraven, 2019, p. 95). These events illustrated both the vulnerability of the sector to external market forces and the limits of government leverage in shaping outcomes that favour national development. As a result, Niger remained

trapped in a paradox: rich in uranium, but unable to convert this into broad-based development or industrial capacity. Niger remained heavily dependent on aid and unable to invest in critical infrastructure or social programmes. Attempts to diversify partnerships – with China, for example – were seen as potential escapes from the French-dominated structure but often replicated the same extractive logics with different flags (Pharens, 2023).

The 2023 military coup in Niger marked a turning point in the whole international structure of Western Africa. After decades of close military and economic cooperation, the new Niger's junta, under Abdourahamane Tchiani, rapidly distanced itself from France, expelled French troops, and cancelled Orano's permit to develop the aforementioned Imouraren mine – one of the largest uranium deposits in the world (Pécout et al., 2024). In doing so, the junta framed its actions as part of a broader struggle for sovereignty and anti-colonial emancipation. This political upheaval has brought uncertainty into the uranium supply chain, raising concerns about energy security for nuclear-dependent nations. As Baba Freeman (2023) highlights, while Niger contributes about 4% to the global uranium supply, the coup's ramifications extend beyond immediate market disruptions, potentially affecting long-term investment and the stability of critical mineral supply chains essential for the energy transition.

As Raphale Pharens from the Foreign Policy Research Institute (FPRI) (2023) notes, the uranium crisis in Niger is part of a wider "perfect storm": political upheaval, jihadist insurgencies, climate stress and foreign rivalries converging on a fragile state. The vacuum left by France has opened space for new players, notably Russia, which is cultivating ties with Niger's junta and exploring investment opportunities in the resource sector. This geopolitical reconfiguration underscores how uranium is not only a mineral resource but also a lever of international alignment. As mentioned above, both the EU and the US have designated uranium a "critical raw material". This implies that they both hold interests in securing and accessing stable sources of extraction in, among other places, sub-Saharan Africa. Unfortunately for the West, this need could be jeopardised by

a new landscape of multipolar rivalry on the continent and growing African agency in itself fuelled by anti-western sentiment.

URANIUM AND CONTEMPORARY GEOPOLITICAL RIVALRY

Since the military coup of July 2023, a sharp recalibration of power has taken place in Niger. The disruption of France's dominance, alongside the emergence of Russia, China and other regional actors, has transformed the state into a stage of international competition. As a consequence, uranium has become not only an economic resource but a central tool of political leverage and geopolitical reconfiguration.

For decades, France maintained privileged access to Niger's uranium, primarily through the state-controlled firm Orano, which dominated extraction via joint ventures such as SOMAÏR and COMINAK. Uranium supplied from Niger has covered up to a fifth of France's nuclear fuel needs, providing strategic autonomy for Paris (Tertrais, 2014, p.4). However, the July 2023 military coup challenged this legacy. The new junta increasingly aligned itself with anti-French rhetoric and policy. In June 2024, the military authorities revoked Orano's license to develop the massive Imouraren deposit, citing a failure to begin extraction operations within agreed timeframes (Pécout et al., 2024). Orano later confirmed it had lost operational control of its assets in the country (Patton & Mallet, 2024). The coup significantly weakened French leverage not only economically but also diplomatically. As Grégoire (2011, p.8) noted, France's uranium dominance in Niger had been ensured by longstanding elite networks and postcolonial dependency. The recent upheaval of these networks reveals the fragility of neocolonial arrangements under new regional leadership.

The most alarming development in the region from a Western perspective is high activity of Russian federation in Western Africa. Moscow has moved swiftly to fill the vacuum left by Paris. Since 2023, Niger has developed closer ties with the Kremlin, including discussions to allow Russian

investment in uranium mining (Payne Institute, 2023). These overtures are part of a broader regional trend, with Mali and Burkina Faso similarly turning to Russia for military support and economic alternatives. The Wagner Group (and now it's successor – African Corps), Moscow's unofficial proxy in Africa, has reportedly established a presence in the region. While its precise role in Niger remains opaque, its footprint in neighbouring countries suggests that Russian influence may extend beyond diplomacy into the security of uranium installations (Pharens, 2023). For Moscow, access to uranium is not only an economic opportunity but a geopolitical tool in the broader confrontation with the West.

Other power that makes its interests in Niger visible is China. Beijing's interest in Niger is more economic than political. Its strategy, often framed as "infrastructure diplomacy", includes funding roads, pipelines and energy grids in exchange for access to natural resources. Although its presence in Niger's uranium sector is not yet as significant as in oil, Chinese companies have expressed interest in strategic minerals (Zidan, 2024).

Importantly, both China's and Russia's actions avoid the neocolonial associations that plague French policy. This provides Beijing and Moscow with soft power advantages. China's approach has been perceived as more respectful of national sovereignty, making its partnerships more palatable to post-coup authorities (Mia, 2025). A trend is also visible in neighbouring countries (Issaev et al., 2022, pp. 425–444).

The US maintains limited economic interests in Niger's uranium sector but is increasingly concerned about regional instability and Russian penetration. Washington's security cooperation with Niamey – particularly through drone operations against jihadist groups – was disrupted by the 2023 coup. US aid has since been partially suspended. Washington's policy has been historically focused on governance and human rights concerns. However, as it is in most African countries, these appeals often fail to gain traction in contexts where governments seek tangible security guarantees or economic benefits over normative rhetoric.

Neighbouring countries also have played an important role. Nigeria, as the dominant actor in Economic Community of West African States

(ECOWAS), has led the bloc's diplomatic response to the coup, including threats of intervention and economic sanctions. These measures, however, have had limited effect, as the junta has consolidated power and found alternative allies (Obasi, 2023). Algeria, which shares a long and porous border with Niger, has expressed concern over both jihadist spillover and the geopolitical vacuum created by France's departure. Given its own uranium reserves and strategic ambitions in the Sahara, Algeria could become a more active player in regional uranium politics.

Perhaps the most significant development since the 2023 coup is the transformation of uranium from almost exclusively French commodity into a bargaining chip. The junta has used it to attract new partners, demand the renegotiation of contracts and reject what it sees as unequal terms imposed by Western powers. As Nathalie Zidan (2024) points out, uranium has effectively become a "diplomatic currency" through which Niger negotiates its place in a rapidly changing world. This resource diplomacy has extended into Niger's relationships with the EU. As Europe seeks to diversify energy sources amid tensions with Russia, Nigerien uranium has become even more critical. The EU has expressed interest in resuming cooperation, but only under revised terms that acknowledge the changed political context (Mia, 2025).

CONCLUSIONS

This chapter has demonstrated that uranium in Niger is far more than a mineral commodity – it is a strategic asset embedded in a complex web of historical legacies, global power competition and domestic political contestation. The analysis traced how France's longstanding control over Niger's uranium sector was rooted in colonial and neocolonial structures that shaped unequal economic arrangements, limited national sovereignty and exacerbated regional inequalities. Despite contributing significantly to France's nuclear energy security and Europe's broader strategic autonomy, uranium revenues have done little to alleviate poverty

or instability in Niger, particularly in its northern regions, which remain underdeveloped and conflict prone.

The 2023 military coup constituted a rupture in this longstanding pattern. By revoking Orano's license and expelling French military forces, the new Nigerien leadership reframed uranium as a tool of sovereignty and reoriented the country's external alignments toward Russia and China. While this suggests a degree of agency and a potential departure from France-dominated neocolonialism, it also raises critical concerns: will new actors replicate the same extractive logics under different geopolitical banners? Can Niger move beyond resource dependency towards a developmental model rooted in transparency, equity and local empowerment?

These questions point to several areas for further research. First, there is a need to analyse the long-term impact of Russia and China's involvement in Niger's uranium sector – not only in economic terms but in relation to environmental standards, labour conditions and political influence. Second, the evolving role of regional organisations, such as the Alliance of Sahel States and ECOWAS, deserves closer attention: could coordinated resource governance enhance regional bargaining power and reduce dependency? Finally, more research is needed on grassroots responses to these geopolitical shifts – particularly in uranium-producing communities, where disenfranchisement and environmental degradation remain acute.

By placing Niger's uranium within the broader framework of natural resources and regional power dynamics, this chapter contributes to the understanding of how strategic raw materials intersect with issues of economic sovereignty, geopolitical influence and postcolonial resistance. It shows that control over uranium has not only shaped Niger's external relations but also served as a catalyst for domestic instability and international realignment. The case of Niger reveals that resource control in fragile states is a geopolitical fault line – where global competition, national agency and regional instability collide.

Ultimately, the Nigerien case underscores a broader tension facing resource-rich but institutionally weak states: whether strategic minerals

will serve as levers of development and sovereignty – or remain vectors of dependency and elite capture. As global powers compete for access to critical materials like uranium, the challenge for Niger and its neighbours is not only to navigate multipolar rivalry but to redefine the terms of engagement in ways that serve their long-term interests.

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CHAPTER 5

Polish import of natural gas from the perspective of complex interdependence

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Abstract: The Russian invasion of Ukraine not only destabilised international security but also triggered a significant supply shock in fossil fuel markets, including natural gas. This disruption has resulted in a complex economic situation in countries dependent on Russian imports such as Poland, highlighting the urgent need to diversify supply routes and enhance energy security. This chapter examines Poland's natural gas imports from Russia through the lens of the theory of complex interdependence and, on this basis, draws conclusions regarding the country's geopolitical position and sovereignty.

Keywords: complex interdependence, natural gas, Poland, sensitivity, vulnerability.

1. INTRODUCTION

In the world of limited resources, the public sector has to ensure the state's energy security, which is defined by International Energy Agency (IEA) as having uninterrupted access to energy at an affordable price (IEA, n.d.). In this context natural gas plays a major role in heating, electricity production, and in automobiles and chemical industry. Nonetheless, it should be noted that natural gas is a fossil fuel that generates greenhouse gas emissions (GHG), albeit to a lesser extent than coal (PGNiG

Grupa ORLEN, n.d.). Poland, located in Central Eastern Europe (CEE) and a member of the European Union (EU), has long faced challenges in its gas sector due to import dependency, particularly from the East. This situation, present also within other EU countries, reached its critical point after February 24, 2022, marking the full-scale Russian invasion of Ukraine and the subsequent cessation of the majority of Russian pipeline gas export to Europe. Deliveries to Poland, Bulgaria, Finland, Denmark and the Netherlands stopped completely when those to Germany, Italy, France and others were reduced (Di Bella et al., 2024, p. 3). The unilateral, aggressive actions of Russia – one of the biggest global gas producers and exporters – resulted in a sudden reduction of supply, heightening geopolitical tensions and soaring gas prices, especially across European stock exchanges (Gradzewicz et al., 2024, p. 1). However, signs of Russian unreliability and the use of energy policy as a tool of influence had surfaced earlier. Already in 2021 there were issues with flow through the Yamal pipeline,[1] and eventually it became clear that Gazprom would not fulfil its contract with Poland. Even earlier examples include the 2006–2009 gas crises (Hebda, 2023, p. 116 & 120). The events of 2022 only confirmed the position that Russia uses raw materials as tools of coercion and hybrid warfare. Given the situation of Poland, which had to completely revamp its energy policy, including its gas policy, in face of potential interruptions of supply and skyrocketing prices, it can be concluded that there was an asymmetrical interdependence in the gas sector between Poland and Russia. According to Robert Keohane and Joseph

[1] In order to provide more context, it is necessary to introduce the structure of interconnections in the Polish natural gas sector before 2022. The most important part of it was the Yamal-Europe gas pipeline running from Russia through Belarus (Kondratki entry point), Poland and Germany (Mallnow entry point), which was one of the main transport routes for Russian natural gas to Europe. Furthermore, with Germany, Poland had an additional GCP GAZ-SYSTEM/ONTRAS interconnector in Lasów. In the case of Belarus, there were two additional interconnectors – Vysokoye and Tietierovka. Other interconnectors operated on the border with the Czech Republic (Cieszyn) and Ukraine (GCP GAZ-SYSTEM/UA TSO). The last major component of the structure was the LNG terminal in Świnoujście (Urząd Regulacji Energetyki, 2022).

Nye (2011, pp. 3–4 & p. 8), interdependence occurs when interconnectedness between countries or other actors generates reciprocal, costly effects of transactions. Additionally, interdependence is complex, which means, that although states still play a major role, they operate in a multidimensional environment composed of non-state actors and encompassing many spheres, such as military, economic, social and ecological. Interdependence can be a source of both benefits and losses. Asymmetry in this regard, as seen in the case of Russia and Poland, can be a source of power[2] in international relations. However, it should be taken into consideration, that complex interdependence is composed of two dimensions, namely sensitivity and vulnerability. Sensitivity refers to costs in the short term, occurring within a fixed policy framework, thus tied to some event before the policy change. Vulnerability, on the other hand, addresses long term costs and the relative availability and affordability of alternative choices. Therefore, vulnerability is more important in determining the distribution of power and the conceptualisation of interdependence between actors (Keohane & Nye, 2011, pp. 10–13). The main purpose of this chapter is to examine how Poland's natural gas import after the onset of the Russian-Ukrainian war fits into the concept of complex interdependence. The answer to this question is important as it will allow the degree of Polish gas and energy security to be approximated, and conclusions about Poland's geopolitical position in CEE to be formulated. The author adopts the following research hypothesis: in the context of interdependence with Russia in the gas sector, Poland's sensitivity outweighed its vulnerability. To verify it, he will answer the following research questions: what was the supply structure of the Polish gas sector before February 2024? What were the immediate effects of the Russian invasion of Ukraine on the Polish gas sector? Was Poland able to quickly and effectively diversify its supply routes and ensure an adequate level of natural gas? The research methods used in the chapter are comparative

[2] Power in this context is understood as the ability of an actor to get others to do something they otherwise would not do (and at an acceptable cost to the actor) (Keohane & Nye, 2011, p. 10).

and qualitative analysis of academic and press articles, government websites, reports, research papers and think-tank resources. The paper is structured as follows. Section 1 is an introduction. Section 2 provides the background and context to identify Polish sensitivity. Section 3 contains the main analysis relevant to outlining vulnerability. Section 4 is a discussion on the chapter's findings and includes recommendations for further action. Lastly, section 5 concludes the chapter.

2. BACKGROUND AND CONTEXT

Natural gas has played an increasingly important role in the Polish economy in recent years. This is reflected in its consumption, which increased by about 25% between 2012 and 2022 (Hebda, 2022a, p. 1). Additionally, Poland is undergoing an energy transformation towards decarbonisation and an increased share of renewable energy sources (RES) in the energy mix. This aligns more broadly with EU policy and law – more specifically with the European Green Deal (EGD) – which aims to reduce GHG emission by 55% by 2030 and achieve climate neutrality by 2050 (Sajniak, 2022, p. 123). However, due to the preponderance of coal in the energy sector, transformation requires a transitional period to maintain stability. Natural gas is designated to serve as a "bridge fuel", as emphasised by the Energy Policy of Poland until 2040 (EPP 2040) (Hebda, 2022a, pp. 1–2). That indicates a continuation of the growing demand for this raw material in the future. In 2021, Poland's gas consumption totalled 23.3 billion cubic metres (BCM), and Polish dependence rate on gas imports stood at 83.6%. Polskie Górnictwo Naftowe i Gazownictwo (PGNiG)[3] imports from Russia via the Yamal pipeline amounted to about 9.9 BCM. Liquefied natural gas (LNG) supplied via the Świnoujście terminal accounted for about 20% of imports (3.9 BCM). Domestic

[3] State-owned company PGNiG, part of the Orlen Group, is the most important player in the Polish natural gas market. It is responsible for the majority of the import. In addition to trade, it is also involved in production and services.

production amounted to 3.7 BCM, while imports from western and southern directions reached 2.3 BCM (INFOR, 2022). Thus, the share of Russian gas in PGNiG imports amounted to approximately 60%. It should be noted that presented situation still seemed better than in the past – between 2014 and 2021 Poland managed to reduce imports from Russia by 14% (Rzeczycki, 2023, p. 5). This unfavourable supply structure was due to several decades-long existence of transmission infrastructure (the Yamal pipeline) and an agreement between PGNiG and Gazprom (Hebda, 2025, p. 4).

When Russia attacked Ukraine on February 24, 2022, both Polish and European gas markets suffered a severe supply shock. Even though gas supplies to Europe began declining as early as the second half of 2021 due to unilateral actions by Russia,[4] this could not match the 56% drop in 2022. Initially, Gazprom reduced volumes under existing contracts only with countries that did not want to pay for gas according to the ruble scheme (e.g., Poland) but later extended it even to countries that complied with it (Łoskot-Strachota, 2023, pp. 1–2). In the case of Poland, the flow of gas ceased completely on April 27, 2022, and subsequently in May 2022 the Polish side terminated the Yamal contract (Hebda, 2023, p. 120).

Russia's actions have destabilised the gas market in Europe and led to its partial and temporary disintegration due to infrastructural bottlenecks and low filling of storage facilities. This was evident through the clear spread between prices in the various European gas hubs (Di Bella et al., 2024, p. 4). The scale of the crisis was also reflected in soaring and volatile gas prices on the Title Transfer Facility (TTF) exchange – up several hundred per cent from standard prices (Gradzewicz et al., 2024, pp. 1–2). The Polish Towarowa Giełda Energii (TGE) market exhibited a similarly adverse trend. From February to March 2022, prices increased from 375zł to 726zł per MWh. They then temporarily declined to 427zł in May, reaching a record high of 1,100zł per MWh within three

[4] In 2021, Gazprom stopped selling gas through stock exchanges.

months in August 2022 (Energy.instrat, 2025). Furthermore, data on average quarterly purchase prices of natural gas imported from EU member states or member states of the European Free Trade Agreement (EFTA), published by the President of the Energy Regulatory Office, are instrumental in illustrating the situation. In the first and second quarters of 2022, they averaged 440zł per MWh. However, in the third quarter they rose sharply and ranked at 886zł per MWh (Urząd Regulacji Energetyki, 2025). Soaring energy prices coupled with rising food prices and disruptions in global value chains, resulted in an increase in inflation (from 5.2% in 2021 to 13.2% in 2022) and slowdown of Poland's GDP growth (from 6.9% in 2021 to 5.6% in 2022) (Gradzewicz et al., 2024, p. 1).

The analysis in this section allows us to answer the first and second research questions. Firstly, Poland's natural gas supply structure before February 2022 was dominated by imports from Russia. The main importing company was 60% dependent on that direction. Secondly, the beginning of the Russian invasion on Ukraine destabilised European and Polish gas markets, leading to a dramatic increase in prices, which in turn brought about severe macroeconomic consequences. These findings enable the formulation of an important conclusion – Poland exhibited a relatively high degree of sensitivity in the context of gas interdependence with Russia.

3. POLISH RESPONSE ANALYSIS

This section examines the Polish response to the supply shock described above, thus outlining Poland's vulnerability. This will allow conclusions about the state's position in the region and how natural gas supplies affect energy security and economic sovereignty to be developed.

Even prior to the outbreak of the war in Ukraine, Poland was taking steps to diversify its gas supply. In 2015, the LNG gas terminal in Świnoujście was commissioned, and over the years its regasification capacity has been gradually increasing. As a result of this investment, LNG

import from global suppliers became possible. Furthermore, in 2016, the Polish government revisited the Baltic Pipe concept,[5] which had been abandoned in the early 2000s. Work had been progressing even before the Russian aggression, and the project was originally scheduled to be completed in the autumn of 2022. Another initiative aimed at eliminating dependence on Russian gas is the North-South Gas Corridor (NSGC), which being a major regional project, aims to integrate the transmission systems of CEE countries through the development of interconnectors. It is based on several gas entry points – namely the Polish, Lithuanian and Croatian LNG terminals. (Hebda, 2022b, pp. 2–5). Poland had already embarked on a path towards diversification of its gas supply even before February 2022. Nevertheless, the Russian invasion significantly accelerated this effort. The implementation of the Baltic Pipe project occurred within the expected timeframe. Its official launch took place on September 27, 2022, and two months later it reached its full capacity. The pipeline allows imports of 10 BCM of gas per year, which accounts for more than 60% of Poland's domestic demand. In addition, construction of several NSGC components has been completed. A Polish-Lithuanian interconnector with a capacity of 2 BCM was launched in May 2022, providing access to the Klaipeda terminal. This was followed six months later by the commissioning of the Poland-Slovakia interconnector with a capacity of 5.7 BCM (Hebda, 2023, p. 120). Already at this stage, it is evident that the completed projects allowed Poland to achieve the goal of developing infrastructure, enabling transmission from directions other than the East. Nevertheless, Poland's efforts did not end there. In January 2025, the expansion of the LNG terminal in Świnoujście was completed. As of 2025, its regasification capacity amounts to 8.3 BCM (Stachura, 2025). There are

[5] The Baltic Pipe is a pipeline allowing natural gas imports to Poland from the Norwegian Continental Shelf. Already in 2000, Poland's PGNiG, Norway's Statoil and Denmark's DONG had reached an agreement on the project. The pipeline was supposed to be built by 2003, but the Polish government cancelled the deal due to concerns about an oversupply of natural gas (Hebda, 2022b, p. 5).

also projects still under construction, including the second interconnector with the Czech Republic (STORK II) (Hebda, 2024, p. 5) and the Floating Storage Regasification Unit (FSRU), a permanently moored vessel designed to unload, store and regasify LNG. Its capacity will be at least 6.1 BCM per year. The terminal will be located in the Gdańsk region and will become operational in 2027 or 2028 (GAZ-SYSTEM, n.d.). In summary, Poland's response to the crisis in terms of transmission infrastructure adjustment has been relatively swift and effective. This was largely possible due to the fact that Poland's actions were not completely ad hoc but were rooted in earlier gas policy directions aimed at gradual diversification.

Another important element of the Polish reaction to the energy crisis was the amendment of EPP 2040. This strategy came into force at the beginning of 2021, so it had to be adjusted to the rapid change in the geopolitical situation. On March 29, 2022, the Polish government adopted the guidelines for updating EPP 2040. A fourth pillar of energy policy was added – energy sovereignty – the concept of which entails a rapid decoupling of the national economy from imported fossil fuels and their derivatives from the Russian Federation and other sanctioned countries. The updated strategy further lists the tools necessary to achieve this goal. These are diversification of supply and investment in domestic production, storage and alternative fuels. In this context, new technological solutions, the dynamic development of RES and improvement of energy efficiency are of great significance. The strategy also emphasises the need to temporarily increase the use of coal in electricity generation, among other things, in the event of a reduction in gas supplies. It also draws attention to the necessity of accelerating investment in nuclear energy. Undeniably, EPP 2040 in certain aspects does not correspond to the goals of the EU's climate policy and EGD. Nevertheless, this is due to the priority given to security of electricity supply (Hebda, 2023, pp. 117–118). The analysis carried out in this part of the chapter shows that in response to the sudden crisis caused by the Russian invasion of Ukraine, Poland

swiftly updated its energy policy, focusing on the most important issue in the short term: energy security and reliability of supply.

An important question arises: how did infrastructural adjustment and policy revamp translate into the actual gas supply structure? In 2022, the gas supply structure was as follows. The largest volume of gas – 7.29 BCM – was imported from the northern direction (LNG, Baltic Pipe, interconnector with Lithuania). LNG definitely dominated here with a volume of 6.04 BCM. More than half of this value was imported from the United States. It should be emphasised that for the first two months the Baltic Pipe operated with limited capacity due to the need to complete technical work. The amount of natural gas imported through this source was therefore limited and amounted to 0.7 BCM. The interconnector with Lithuania enabling access to the Klaipeda terminal accounted for 0.55 BCM. The second major source of gas was domestic production, amounting to 3.43 BCM. 3.4 BCM was imported from the western direction and 2.9 BCM from the eastern direction, i.e., from Russia. Small volumes of gas (0.03 BCM) also arrived from the south, via an interconnector with Slovakia (Grupa ORLEN, n.d.; Hebda, 2024, p. 4). Comparing these figures to those presented in the previous section, the deep restructuring of supplies and the marginalisation of the Russian direction is visible. It should be recalled that on April 27, 2022, supplies via the Yamal pipeline ceased completely. Thus, since 2023, Poland has no longer imported any Russian gas, and even LNG has come from other sources, which is quite significant in the broader European context. This is particularly important given that Russia remains one of the largest suppliers of LNG to the EU (Paszkowski, 2025, pp. 1–2). In 2023, additional changes occurred in the supply mix. The volume of LNG rose slightly to 6.5 BCM. Additionally, the importance of the Baltic Pipe increased prominently, with 6.2 BCM being imported.[6] For this reason, imports from

[6] Natural gas brought in by the Baltic Pipe comes both from contracts with contractors operating on the Norwegian Continental Shelf and from PGNiG's own production. The term "own production" refers to both domestic sources and those extraction assets abroad.

the western and southern directions decreased significantly – together they amounted to 0.9 BCM and were supplementary in nature. 0.2 BCM each were imported from Lithuania and Ukraine. Domestic production experienced a slight decline and amounted to about 3.3 BCM (PGNiG Grupa ORLEN, 2024). A notable achievement in 2024 was the substantial increase in gas production from PGNiG's own sources. While domestic production remained at 3.3 BCM, production in Norway increased by as much as 45% to 4.5 BCM. Moreover, the company plans to further increase it over the coming years (PGNiG Grupa ORLEN, 2025).

The next aspect to examine is gas prices. Market conditions of TGE have stabilised considerably since 2023 compared to the sharp surges in 2022. Prices have largely stabilised from month to month, although minor fluctuations have persisted. The highest average gas price – about 315zł per MWh – was in January 2023, while the lowest – about 137zł per MWh – in February 2024. Average annual gas prices in 2023, 2024 and so far in 2025, were 215zł, 178zł and 219zł per MWh, respectively. This marks a significant difference compared to the 2022 level of 557zł per MWh (Energy.instrat, 2025). In the case of average quarterly purchase prices for natural gas imported from EU or European Free Trade Association (EFTA) member states, a significant decline was already observed in Q4 2022 – from about 886zł to 473zł per MWh. This trend continued in subsequent quarters. The average price in 2023 and 2024 was around 210zł and 171zł per MWh, respectively (Urząd Regulacji Energetyki, 2025). In addition to the supply diversification described above, several additional factors likely contributed to the stabilisation of gas prices. At the EU level, emergency regulations were implemented, such as mandatory gas storage requirements and energy-saving targets. Additional instruments were introduced to intervene in market operations in the form of joint purchases and price caps on stock exchanges (Łoskot-Strachota, 2023, p. 1). Furthermore, the supply shock resulting from the Russian invasion did not lead to a total, but only a partial disintegration of the European market, thus avoiding an even bigger crisis. This occurred for two main reasons.

Firstly, the European cessation of Russian pipeline gas supplies was gradual and did not cover the entire supply, but only most of it. Secondly, the decrease in European gas demand was greater than anticipated (Di Bella et al., 2024, pp. 9–10).[7]

The data presented lead to optimistic conclusions, although several challenges remain that warrant attention. While diversification of supply and expansion of transmission infrastructure has been a definite success, the problem is capacity. This is particularly concerning the NSGC and related interconnectors. Moreover, Poland's neighbours are not as well integrated into the system, which can lead to infrastructural bottlenecks (Hebda, 2024, p. 10). Consequently, Poland has little chance of importing more gas from the southern direction as a part of further diversification. In addition to that, the anticipated rise in gas demand may present a growing challenge.

The analysis in this section provides an answer to the third research question. Thanks to the fact that for many years it had been making efforts to secure new gas supply routes and diversify suppliers, Poland was able to finish its infrastructural expansion and cut itself off from Russian natural gas. It also made efforts to expand its own gas sources. Moreover, the update to its energy strategy was executed appropriately in response to the crisis. Furthermore, Poland's success in this regard is reflected in gas prices, which have stabilised and fallen to acceptable levels. Undoubtedly, there are still several issues such as bottlenecks, difficulties with broader CEE energy sector integration and growing gas demand. However, it can be concluded that Poland was indeed able to quickly and effectively diversify its supply routes and ensure an adequate supply of natural gas. This leaves us with another important conclusion – Polish vulnerability in the context of gas interdependence with Russia was relatively low.

[7] The author does not delve deeper into the issues of these other factors. However, their specific impact on the Polish gas sector may be a promising area for further research.

4. DISCUSSION

Before presenting the final conclusions, it is important to discuss some of the implications of the findings and identify the main challenges and opportunities. At the outset, it should be emphasised that efficient diversification of the gas sector, effective decoupling from Russian supplies, alleviation of the gas prices and existing infrastructure, particularly NSGC,[8] increased Poland's regional importance and strengthened its energy sovereignty. Considering these factors, along with Poland's geographical location, this country has a chance of becoming a major hub for the transmission of LNG and Norwegian gas to CEE. This could contribute to the reduction of CEE countries' dependence on Russian gas – especially those that have no access to the sea. However, existing bottlenecks in the NSGC are a major threat in this context. These include, on the one hand, the low capacity of interconnectors and their poor integration with the transmission systems of CEE countries, and, on the other hand, Poland's marginalisation of alternative gas supply routes. A potential lack of consensus among CEE countries on the directions of gas imports, which would undoubtedly hinder Poland's effective regional policy, may represent a significant obstacle. Therefore, the author agrees with Hebda's (2023, p. 121) position that Poland and neighbouring EU countries should pursue a common energy policy geared toward reducing dependence on Russia and increasing EU funding for modernisation and expansion of energy infrastructure.

Moreover, the current situation does not guarantee that Poland's vulnerability will remain low in the future in the face of possible new threats. One such threat could be potential sabotage or direct attacks targeting key infrastructure supplying gas from the northern direction. In this hypothetical situation, the main challenge to maintaining energy security would be the infrastructural bottlenecks discussed earlier,

[8] These factors can be collectively called "vulnerability lower than sensitivity".

and the lack of significant gas supply contracts from directions other than the north.

Another issue is the projected growing demand for natural gas, partly resulting from the ongoing energy transition. Due to geographical constraints, some volume of natural gas will inevitably have to be imported or extracted abroad. This precludes the possibility of continuous and absolute supply security. In this context, it is important to develop RES and nuclear power more quickly to prevent an extended transition period. Potential ideas of prolonging reliance on gas in the energy sector seem inappropriate, considering Poland's climate commitments under EU law and global agreements, as well as its lack of gas production self-sufficiency. These commitments are legally binding and relatively strict. In the Paris Agreement adopted in 2015 under the United Nations Framework Convention on Climate Change (UNFCCC), parties committed to create long-term greenhouse gas emission development strategies to limit global warming to 1.5°C above pre-industrial levels (UNFCCC, n.d.). Subsequently, in 2018 the EU, as one of the parties to the convention, adopted its strategy titled, "Clean Planet for All". Based on this strategy, among other things, in 2019 the European Commission published a communication on the EGD – a comprehensive strategy outlining a pathway to achieve climate neutrality by 2050. In addition, in 2020 the European Council approved an ambitious goal of reducing net GHG emissions by at least 55% by 2030 compared to 1990 levels (Ministerstwo Rolnictwa i Rozwoju Wsi, n.d.). Poland as a member of the EU and a party to the Paris Agreement, ought to follow its obligations in accordance with international law. Nonetheless, in the short to medium term, Poland should seek to take advantage of its favourable conditions to become a natural gas transmission hub and, as a result, bolster energy security in CEE. This may contribute to strengthening its geopolitical position in the region and ensuring energy sovereignty.

5. CONCLUSION

Concluding the chapter's findings, the author successfully answered all the research questions. Prior to February 2022, the structure of natural gas supplies to Poland was dominated by imports from Russia. The Russian invasion of Ukraine destabilised European and Polish gas markets triggering a dramatic increase in prices and causing serious macroeconomic consequences. Nevertheless, Poland was able to swiftly sever its dependence on Russian supplies. It also made progress in increasing domestic production and updating its energy strategy. Infrastructural development significantly contributed to those efforts. Poland's actions subsequently contributed to the decline in gas prices. These findings confirm the validity of the adopted research hypothesis: in the context of interdependence with Russia in the gas sector, Poland's sensitivity outweighed its vulnerability. Areas requiring further research include infrastructural bottlenecks in NSGC and potential threats to Polish transmission infrastructure in the north. Additionally, a detailed study of the impact of EU-level instruments on the Polish gas sector and price reductions would be valuable. Nevertheless, this chapter provides insight into the interplay between natural resources and regional power dynamics through an analysis conducted within the framework of complex interdependence. It outlines the state's position in a world of limited resources and enables conclusions about energy sovereignty and geopolitical standing.

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CHAPTER 6

Impact of the energy crisis in 2022 on the German political landscape and resource policy

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Abstract: The objective of this chapter is to deliver an in-depth analysis of the contemporary political situation in Germany, focused on Germany's raw materials policy. The discussion will address the implications of the policy of "change through trade" (*Wandel durch Handel*) and the *Energiewende*, which led to Germany's growing dependence on Russian raw materials, and the Kremlin's application of energy coercion policies as a means of exerting influence over Berlin. This chapter will demonstrate Germany's endeavours in the area of raw materials diversification, with a focus on the strategies employed to ensure the stability of supply.

Keywords: Energy security, *Energiewende*, Russo-German relations, energy transition.

1. INTRODUCTION

The German energy transition, also known as *Energiewende*, has long been a cornerstone Germany's domestic and foreign policy. Central to these ambitions are the objectives of decarbonisation, energy independence and long-term sustainability. Thus far, the *Energiewende* has significantly reshaped the country's energy system (Wiertz et al., 2023, pp. 1–2). However, the 2022 energy crisis, triggered by Russia's invasion of Ukraine and the collapse of energy ties between Berlin and Moscow,

called into question the foundation of this transition, leading to unforeseen consequences (Wiertz et al., 2023, pp. 1–2). This chapter investigates Germany's vulnerability to raw material shocks, focusing on the impact of fossil fuel imports on energy security and political stability. It examines how the sudden collapse of Russian gas flows disrupted the energy architecture of Europe's largest economy, triggering economic hardship, political polarisation and a reorientation of energy and security policy.

This chapter aims to answer the following research questions:

- How did resource dependency shape Germany's vulnerability during the 2022 crisis?
- How did Germany address the shortage of gas and manage supply security post-2022?
- How do German political parties frame and debate the issue of fossil raw materials?

The hypothesis guiding this study is that Germany's lack of sufficient domestic fossil resources exacerbated its energy vulnerability and contributed to the 2022 crisis, which triggered structural changes in both energy strategy and political discourse. Methodologically, this chapter employs qualitative analysis of policy reports, academic articles, think tank podcasts and electoral data. The study is based on three primary sources and reports on Germany's energy policies during and after the crisis, and international analyses of the political impact of the 2022 energy crisis. The chapter is structured as follows: Section 2 provides historical and geopolitical context for Germany's fossil fuel reliance, particularly in relation to Russia. Section 3 analyses the crisis itself, including infrastructure measures, diversification strategies and their socio-economic impact. Section 4 explores the evolving positions of key political parties towards fossil resources. The final section discusses the long-term implications for Germany's energy transformation and political landscape.

2. BACKGROUND AND CONTEXT

The Federal Republic of Germany, a highly developed nation both economically and technologically, faces significant challenges due to its heavy reliance on fuel imports. In light of the current geopolitical landscape – particularly the war in Ukraine – this dependence poses a substantial problem for Germany (Halser & Paraschiv, 2022, p. 8). Additionally, the transition to renewable energy sources (RES), the phase-out of nuclear power and the pursuit of increasingly ambitious decarbonisation which is to reduce them by 55% by 2030 with respect to 1990, further complicate the situation (Kędzierski et. al., 2020, p. 8–13). Germany's considerable energy needs stem from its status as the world's fourth largest economy by GDP and the largest in Europe. At the same time, the country has positioned itself as a leader in promoting renewable energy and reducing carbon emissions, seeking to enhance its soft power influence globally (Kędzierski et al., 2020 p. 28).

ENERGY AND CLIMATE POLICY

Since the 1980s, Germany has demonstrated a strong commitment to ambitious greenhouse gas emission reduction targets, recognising its role as a leader in environmental stewardship. A fundamental aspect of this commitment has been setting an example for other nations to promote a global shift toward reduced environmental impact (Kędzierski et al., 2020, p. 8). Germany aimed to catalyse similar actions by other countries, with the support of the European Commission. Between 1990 and 2009, Germany successfully reduced its emissions from 1,251 million tonnes of CO_2 to 908 million tonnes, largely due to the modernisation or decommissioning of former GDR industries. During the same period, the United Kingdom (UK) reduced its emissions by 25%, France by 8% and Italy by 4% (Kędzierski et. al., 2020, p. 9).

Since 2010, Germany has experienced an upward trend in greenhouse gas emissions. In 2011, Angela Merkel's government, with Merkel then serving as chancellor of Germany, decided to phase out nuclear power plants by 2022 – a move widely considered the symbolic start of the *Energiewende*. This decision resulted in an initial surge in emissions during the early stages of the decade, due to increased reliance on lignite and hard coal. The growth in the share of RES within the energy mix proved inadequate in counterbalancing this increase (Kędzierski et. al., 2020, p. 16).

Germany's emissions have been on a downward trend since 2016, largely due to the substitution of coal with less polluting natural gas. However, the nation has only recently achieved a level of emissions comparable to that of 2009, marking a significant delay compared to the initially anticipated 2016 emissions peak. Despite this progress, increasing pressure from various groups continues to advocate for more ambitious reductions in CO_2 emissions (Ośrodek Studiów Wschodnich, 2020a.). A prime example of this pressure is the 2014 European Council Summit, which called for the EU to increase its emissions reduction target by a minimum of 40% by 2030. The achievement of the target by Germany was initially met with scepticism, as projections indicated that instead of the anticipated 40% reduction in 2020 compared to 1990, only 32% reduction would be achieved. However, projections did not account for the accelerating decline in coal use, and although Germany fell short of the target, emissions were ultimately reduced by 35%. Between 2016 and 2019, coal use fell from 40% to 28% (Ośrodek Studiów Wschodnich, 2020a).

WANDEL DURCH HANDEL

The concept of *Wandel durch Handel*, which can be translated as change through trade, is an idea that generations of German politicians have embraced. This concept was deeply rooted in post-reunification foreign policy, which assumed that strengthening trade and economic relations, especially with Russia, would lead to political change and pacification

through the creation of mutual dependencies (Bunde, 2025, p. 4). The doctrine of economic interdependence was adopted by the doctrine of Ostpolitik during the Cold War, aiming for a pacifist outcome. German Ostpolitik was the policy towards Russia and its neighbours in Central and Eastern Europe. Historically, this policy has sought to maintain a balance between relations with Russia and its neighbouring states. Nevertheless, since 1999, a considerable paradigm shift has occurred, resulting in the prioritisation of relations with Russia over other states in the region and overall alliance policy (Krause, 2023, p. 126). In the context of German foreign policy, particularly regarding relations with Russia, this concept posited that the fostering trade and economic ties with Russia would gradually liberalise and transform Russia's political landscape. In German foreign policy discourse, this perspective maintained that gas pipeline projects with Russia were purely commercial ventures, without security implications. German politicians adhered to a doctrine of "commercial logic" and remained sceptical that economic interdependence could be exploited for geopolitical purposes. The concept of *Wandel durch Handel* was widely accepted among the German elite and broader society, defining the boundaries of what was deemed feasible within the context of German foreign policy (Bunde, 2025, p. 5).

THE HISTORY OF ECONOMIC RELATIONS WITH RUSSIA

As early as the 1960s and 1970s, the USSR began exporting natural gas to Western Europe, starting with Austria in 1968 and followed by West Germany in 1973. These relations were both economic and political in nature. They formed an integral component of the broader policy of détente, particularly within the framework of Chancellor Willy Brandt's Ostpolitik, aimed at normalising relations with the Eastern Bloc. For the USSR, the export of gas provided a source of hard currency and a means to expand its influence in Western Europe (Bieliszczuk, 2018, p. 18).

In the aftermath of the dissolution of the Soviet Union, the Russian Federation continued to utilise energy as a foreign policy instrument, as

articulated in the 1991 Falin and Kvitsky doctrine (Bieliszczuk, 2018, p. 25). This doctrine called for military influence to be replaced by economic influence, making the countries of the former post-Soviet bloc increasingly dependent on raw materials from Russia, thus maintaining their sphere of interest (Mróz & Paszkowski, 2023, p. 71). In addition to its role as an export commodity, natural gas became a political instrument, particularly with the former Eastern Bloc countries. This was exemplified by several interruptions of gas supplies to Ukraine and other countries in the region to exert political or economic pressure. Furthermore, difficulties in gas transit through Ukraine – encompassing disputes over prices, debts and illegal off-takes – prompted Russia to construct alternative transmission routes. The first step was the construction of the Yamal-Europe pipeline. However, the decision to build Nord Stream 1 (NS1) in 2006 was pivotal, as it enabled the complete bypass of Ukraine and Belarus. The pipeline became operational in 2011 (Bieliszczuk, 2018 p. 29).

In this context, the Nord Stream 2 (NS2) project appears as a logical continuation of Russia's export strategy. As with its predecessor, the objective was to increase gas transport capacity to Germany and other parts of Europe, while circumventing Ukrainian territory. Despite its official presentation as a purely economic project, NS2 had a profound political and geostrategic dimension. In historical context, the NS2 project represented not only the strengthening of Russian-German ties, but also a repetition of the pattern whereby gas supply served as a tool of international politics (Bieliszczuk, 2018, p. 25–26).

CONSEQUENCES OF ECONOMIC RELATIONS WITH RUSSIA

Russia's historical rivalry with the West has been characterised by a rejection of values promoted by Western nations. Rather than advocating for individual freedom and human rights, Russia placed an emphasis on authoritarian rule and a neo-imperialist political approach, presenting the West as degenerate and corrupt. The prevailing sentiment throughout history suggests that the prospect of peaceful coexistence was regarded

not merely as a possibility, but as an inevitability. Moreover, it is Germany that has been identified as a potential mediator between Western and Russian interests. However, the war in Ukraine provided a unique opportunity to test this approach (Rebes, 2017, p. 60).

From Russia's perspective, it is engaged in an ongoing conflict with the West; consequently, it employs two primary instruments in its efforts to counteract the West's actions: military force (which was put to use in Ukraine in the form of a full-scale invasion) and energy resources. Russia seeks to avoid confrontation with NATO, yet it has resorted to the use of energy as a bargaining chip in an attempt to exert pressure on the West (Ośrodek Studiów Wschodnich, 2022). Russia's strategic aim is to weaken the West, thereby creating an energy crisis that is anticipated to culminate in a political crisis. This destabilisation may prompt governments to review their policies towards Russia and the war in Ukraine. Russia aims to pressure the West into compelling Kyiv to agree to a *de facto* ceasefire on Russian terms and to reduce its support for Ukraine in the form of arms supplies. From an economic perspective, this demonstrates the continued use of natural gas as a tool of economic pressure of Russia (Ośrodek Studiów Wschodnich, 2022). Concurrently, there have been calls for the resumption of transmission via NS2. In a similar vein, Russia utilised NS1 to pursue its agenda during the war, leading to a 40% reduction in gas transmission in June 2022 and a complete halt of flows for 10 days on July 10th. Moreover, Russia raised the issue of turbines held by Canada under sanctions, with Germany requesting the return of these turbines. Officially, Gazprom has confirmed its inability to restore normal gas transmission through NS1. EU leaders have accused the Russian government of deliberately reducing gas supplies to Europe to prevent the replenishment of gas storage facilities in preparation for the winter period. This strategy appears to be motivated by creating an atmosphere of instability and fear among European nations, potentially influencing their decision-making process and securing an exception to sanctions. The strategy of blackmail and the maintenance of low supply levels, combined with deliberate transport issues, is intended to coerce

the West into making economic or political concessions to secure the supply (Ośrodek Studiów Wschodnich, 2022).

Since 2022, Russia has shifted its approach to Gazprom – from presenting it as a reliable supplier to weaponising it for geopolitical leverage. The Kremlin has been willing to sacrifice up to three-quarters of Gazprom's revenue to pressure Western states, even at the cost of damaging its own credibility as a trading partner. This strategy aims to coerce political concessions and foster divisions within the EU, where some states may feel more privileged in energy access. These tensions are further exacerbated by supply uncertainty and rising energy prices (Ośrodek Studiów Wschodnich, 2022).

In 2022, Germany was distinguished by some of the highest energy prices in Europe, stemming from a long-standing reliance on Russian raw materials and imports. A growing expectation persists that Russia will continue using gas as blackmail. Extremist groups such as the German left and AfD have called for lifting sanctions to restore access to raw materials, citing their pro-Russian orientation. Similar appeals emerged within the eastern CDU/CSU, where sanctions were portrayed as harming eastern Germany rather than Russia (Ośrodek Studiów Wschodnich, 2022).

Germany's longstanding energy partnership with Russia, once perceived as a pillar of economic pragmatism and stability, has emerged as a critical geopolitical vulnerability in the wake of the 2022 energy crisis.

3. ANALYSIS

GERMAN REACTION TO ENERGY CRISIS

Germany's pre-2022 energy architecture relied heavily on Russian natural gas, with dependency exceeding 50% (IEA, 2025, p. 35). This dependence, coupled with minimal domestic production capacity (6% of demand) and limited strategic reserves, created acute vulnerability when Russian supplies were disrupted (IEA, 2025, p. 35). The Nord Stream

infrastructure sabotage and supply curtailment precipitated what the IEA termed "one of the most serious raw material crises in modern German history" (IEA, 2025, p. 12).

The German government's crisis response centred on rapid infrastructure development and supply diversification. In the short term, the government focused on crisis containment through emergency procurement, accelerated infrastructure deployment and temporary regulatory relaxations. The commissioning of floating LNG terminals, beginning with Wilhelmshaven in December 2022, followed by facilities in Mukran and Brunsbüttel, represented unprecedented acceleration in German infrastructure development (IEA, 2025, pp. 35–36). This expansion was enabled by the LNG Acceleration Act, which not only streamlined approval processes but incorporated provisions for future hydrogen compatibility (IEA, 2025, p. 36). Simultaneously, the activation of dormant coal plants was authorised to stabilise the power grid during peak demand, despite environmental opposition. Supply diversification was achieved through new long-term contracts with Qatar, Norway and the United States, fundamentally realigning Germany's energy relationships (IEA, 2025, p. 35). Regulatory interventions, including mandated storage requirements, successfully achieved 95% capacity before winter 2022–2023 despite initial commercial resistance (IEA, 2025, p. 36). The crisis catalysed abandonment of the *Wandel durch Handel* doctrine that had guided German-Russian energy relations. The Scholz government not only suspended Nord Stream 2 but explicitly acknowledged the strategic failure of previous policy (IEA, 2025, p. 13). Germany intensified utilisation of Western pipeline connections with the Netherlands, Belgium and Denmark, while increasing LNG imports via European hubs (IEA, 2025, pp. 35–36).

Demand-side management proved equally significant, with consumption decreasing 18% between 2021–2023 through industrial agreements, conservation measures and price signals (IEA, 2025, p. 35). However, these savings came at a social and political cost, as lower-income households and energy-intensive manufacturing sectors bore the brunt of

rising prices and usage restrictions. This reduction, though effective, imposed disproportionate burdens on energy-intensive industries and lower-income households.

Germany's energy crisis response represents a paradigm shift from market-driven to security-oriented resource policy. The government reframed its approach under the concept of crisis resilience, prioritising supply security and industrial protection over cost efficiency. Despite political costs, including temporary coal reactivation and high consumer prices, Germany developed its first coherent fossil resource strategy since the 1970s.

ENERGY PRICES DURING THE 2022 CRISIS AND ITS POLITICAL IMPORTANCE

One of the most immediate and disruptive consequences of the 2022 energy crisis in Germany was the unprecedented surge in energy prices. Before Russia's invasion of Ukraine, Germany sourced over 55% of its gas imports from Russia, making it one of the most gas-dependent countries in Europe (IEA, 2025, p. 35). The rapid reduction in Russian gas deliveries, combined with market panic and supply uncertainty, drove electricity prices to record highs. In August 2022, wholesale electricity prices reached €669.44 per megawatt-hour (MWh), a tenfold increase from 2020 levels (Trading Economics, 2023).

These price hikes had cascading economic and social effects. Inflation surged to 10.4% in October 2022, the highest rate recorded in reunified Germany (Destatis, 2023). Households, particularly those with lower incomes, were disproportionately affected. Meanwhile, energy-intensive industries faced significant operational disruptions, prompting calls for compensation and state support (Halser & Paraschiv, 2022, p. 19).

Despite the turmoil, support for the *Energiewende* – Germany's long-standing transition to renewable energy – remained relatively high. As of 2020, approximately 80% of the population supported the shift to renewables, with the Greens securing around 20% of the vote (Ośrodek

Studiów Wschodnich, 2020a). However, the energy price crisis exacerbated political divides and tested this consensus. Populist parties, particularly the AfD, framed the energy transition as a costly and elitist project. Their rhetoric found traction in regions where the economic burden of transition was most acutely felt (Yazar & Haarstad, 2023, p. 6–7).

This politicisation of energy was especially visible in the discursive strategies of the AfD, which increasingly portrayed climate policy as a threat to national identity and economic security. Accusations of an "eco-dictatorship" became central elements of the party's communication (Hernandes & Kalanaki, 2025), particularly in economically disadvantaged eastern states such as Saxony and Thuringia. These regions, historically more reliant on lignite and coal industries (Frymark, 2024), experienced higher vulnerability to energy inflation. The relative weakness of renewable infrastructure in the east and lower household income levels contributed to a deeper sense of marginalisation. Electoral results reflect this divide: by 2025, the AfD had doubled its vote share nationally, from 10.4% to 20% (Statista, 2025).

In contrast, the Greens reinforced their position as leading advocates of climate policy, arguing for faster implementation of renewables and social justice mechanisms to ensure equity in the transition. The CDU/CSU, while broadly supportive of climate goals, focused on maintaining industrial competitiveness and cushioning vulnerable social groups. This included criticism of the pace of the *Energiewende*, and a greater emphasis on affordability and stability (Ośrodek Studiów Wschodnich, 2020b).

In response to the crisis, the federal government introduced emergency measures, including energy subsidies, one-time relief payments and the gas price brake. Moreover, the rapid commissioning of LNG terminals, such as the one in Wilhelmshaven in December 2022, helped diversify supply (IEA, 2025, p. 36). Yet the longer-term question remains whether Germany can sustain public support for the transition amid high costs and geopolitical instability.

Economic forecasts indicate that achieving full decarbonisation could cost up to €2 trillion by 2050, placing additional pressure on public

budgets and political consensus (Ośrodek Studiów Wschodnich, 2020b). At the same time, Germany aspires to global leadership in climate governance – a central component of its soft power strategy. Despite accounting for only around 2% of global emissions, it seeks to set an example of a viable low-carbon transition (Ośrodek Studiów Wschodnich, 2020b). The energy crisis made clear that affordability and resilience must become core pillars of the *Energiewende*, not just ecological ambition. Failure to address the social dimension of energy prices risks further polarisation and the erosion of trust in democratic institutions.

GAS DIVERSIFICATION STRATEGIES AFTER 2022

As a response to the unprecedented disruption of Russian gas supplies in 2022, Germany initiated a structural redefinition of its gas import system, centred around the rapid development of domestic liquefied natural gas (LNG) infrastructure. Until that point, Germany had no operational LNG terminals and relied entirely on pipeline imports. Following the collapse of Germany's primary gas supplier, the creation of direct LNG import capacity became a cornerstone of the country's energy security strategy.

By 2023, LNG accounted for 8% of Germany's total gas imports, primarily sourced from the United States and Qatar. This development was made possible through the accelerated deployment of Floating Storage and Regasification Units (FSRUs) and planning of land-based terminals. The Wilhelmshaven FSRU, Germany's first LNG terminal, entered operation in December 2022 with a capacity of 5 billion cubic meters (BCM) per year. This was followed by the Mukran terminal, which obtained its operating license in mid-2024 and is expected to deliver up to 13.5 BCM annually into the national transmission network (IEA, 2025, pp. 35–36). Additionally, the Brunsbüttel land-based terminal, projected to be operational by 2027, represents a long-term infrastructural anchor (IEA, 2025, p. 85).

The legal and procedural foundation for this infrastructural shift was established by the LNG Acceleration Act, passed in 2022. This legislation significantly simplified permitting processes and mandated that

all land-based terminals must be hydrogen-ready by 2043, enabling a long-term pivot toward decarbonised fuels (IEA, 2025, p. 36). The law reflects a new paradigm of energy governance, where infrastructure must be not only rapidly deployable but also adaptable to future technological and environmental demands.

Since September 2022, Russian Gas has not been included in the German energy mix. The graph below illustrates the primary sources of natural gas (CLEW, 2024).

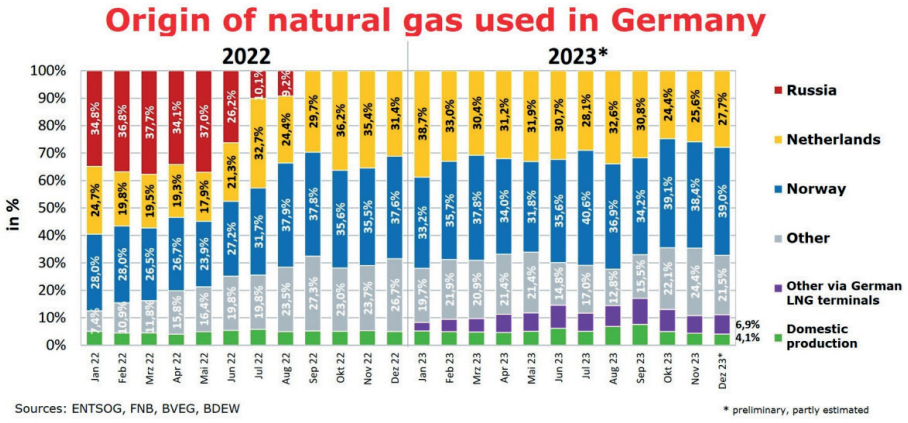

FIGURE 1. ORIGIN OF NATURAL GAS USED IN GERMANY. SOURCE: CLEAN ENERGY WIRE 2024: HTTPS://WWW.CLEANENERGYWIRE.ORG/FACTSHEETS/GERMANYS-DEPENDENCE-IMPORTED-FOSSIL-FUELS

The IEA underscores that Germany maintains the largest gas storage capacity in the European Union, exceeding 24 BCM, and that strategic storage targets were fully met ahead of the 2022–2023 heating season (IEA, 2025, p. 36). These logistical and infrastructural achievements were instrumental in preventing systemic supply shortfalls despite the loss of Russian volumes.

In conclusion, the LNG buildout marks not just a technical solution to a short-term crisis but a transformative shift in Germany's energy infrastructure logic. By moving from pipeline dependency to modular LNG flexibility, and linking this to future hydrogen capability, Germany has initiated a structural turn in its approach to gas security and energy sovereignty.

4. DISCUSSION

PARTY POSITIONS ON RESOURCE POLICY POST-2022

The energy crisis sharpened the distinctions among Germany's major political parties in their approach to resource policy and supply security. While all parties recognised the urgency of diversification after the collapse of Russian imports, their interpretations of how to achieve sovereignty and sustainability diverged considerably.

CDU/CSU emphasised pragmatic security-of-supply measures. The party supported the rapid buildout of LNG infrastructure and advocated for the temporary reactivation of coal-fired plants, while also endorsing the expansion of gas storage capacities. Although formally committed to the goals of *Energiewende*, CDU/CSU remained cautious about overcommitting to volatile renewables without ensuring baseload security and industrial competitiveness.

SPD, as the leading force in the governing coalition, adopted a centrist balancing act. It pursued infrastructure acceleration, notably through the LNG Acceleration Act, but sought to cushion social impacts via energy subsidies and regulatory price caps. SPD also supported new long-term gas contracts with Qatar, Norway and the United States. However, critics from both left and right accused the party of strategic indecision – being caught between market logic, geopolitical alignment and ecological responsibility.

The Greens faced a complex dual challenge: defending ambitious climate policy while legitimising short-term fossil infrastructure expansion. Their framing of LNG terminals as "hydrogen-ready" infrastructure was central to squaring this tension. The party remained sceptical of new long-term gas contracts and voiced concern over carbon lock-in and fossil path dependency.

Finally, the AfD framed the crisis as evidence of ideological failure. It rejected the premises of decarbonisation altogether and called for a full return to domestic coal and nuclear power, often invoking national

sovereignty and cost-of-living arguments. In doing so, the party reinforced its identity as an anti-system actor using energy policy as a populist wedge issue, especially in eastern federal states.

This divergence illustrates that energy and resource politics are no longer technocratic matters but foundational issues of political identity and programmatic conflict.

5. CONCLUSION

The 2022 energy crisis revealed the structural fragility of Germany's energy system, rooted in decades of increasing dependency on imported fossil fuels – particularly Russian gas. This resource dependency significantly amplified the country's vulnerability during the crisis, confirming the core hypothesis that the lack of sufficient domestic reserves constituted a central risk factor. The disruption of gas supplies and resulting price shocks exposed the limitations of a model based on liberalised markets, import reliance and gradual transition.

In response, Germany undertook a rapid and multidimensional transformation of its energy policy, centred on securing alternative supply routes, expanding LNG infrastructure and reasserting the role of the state in critical energy functions. This comprehensive shift addressed the second research question: Germany's post-crisis management of gas shortages relied not only on technical infrastructure but also on emergency subsidies, strategic gas storage regulation and accelerated permitting procedures. While these measures enhanced short-term resilience, they also raised long-term questions about carbon lock-in and democratic legitimacy.

Politically, the crisis functioned as a catalyst for discursive polarisation. Parties interpreted the shock through ideologically distinct lenses, confirming the third research question. The AfD framed fossil fuel scarcity as a consequence of "eco-dictatorship" and positioned itself as a defender of national energy sovereignty. In contrast, the Greens attempted

to reconcile crisis management with long-term decarbonisation, while the SPD and CDU/CSU sought to balance affordability with energy security. These contrasting responses demonstrate that fossil resources are no longer neutral economic inputs, but highly politicised symbols of national strategy, identity and inequality.

In sum, the findings support the hypothesis that Germany's fossil fuel dependency not only shaped its crisis exposure but also triggered profound changes in political discourse and energy governance. The German case shows that resource management is now a central axis of democratic stability and strategic orientation, linking infrastructure, identity and institutional legitimacy.

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CHAPTER 7

Water scarcity as a strategic internal security threat in India

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Abstract: This chapter analyses how water scarcity in India impacts the country's internal security, extending beyond environmental concerns to affect agricultural productivity, population stability and inter-state relations. Applying political ecology theory and the concept of water security, the analysis demonstrates that persistent water stress, further strengthened by population growth, climate change and governance inefficiencies, has intensified vulnerabilities within India. Based on a qualitative approach and relevant case studies, the chapter highlights the structural challenges of India's decentralised water governance model and the knowledge-governance gap that hinders effective management. Future prospects are concerning, as many underlying problems are expected to persist. Nevertheless, strategic shifts in governance paradigms, targeted investments in sustainable water management and comprehensive legislative reforms could significantly mitigate the risks. Recognising water scarcity as a strategic internal security issue will be essential for enhancing India's resilience and stability in the coming decades.

Keywords: Water, India, water governance, water security, environmental security, internal security.

INTRODUCTION

Water, as a fundamental natural resource for human health and well-being, has become increasingly important in recent decades. Constantly growing water consumption, caused by rapid population growth in certain

areas of the world such as South Asia, where population has grown by 200 million people over the last decade (World Bank, 2025a), as well as climate change and overexploitation of water resources have led experts worldwide to raise serious concerns about water security and its shortages in the future. These problems can have significant implications for certain countries, whose water resources are subject to particularly intense stress caused by ongoing trends affecting water security worldwide (Omolere, 2024).

This chapter addresses the following questions: how does water scarcity influence internal security in India? What are the most important trends impacting India's water security? How does the decentralised water governance structure affect the country's capacity to address its growing challenges in terms of water security? How does agricultural use of groundwater impact water security in India? How does water pollution interact with water scarcity in India, and what implications does this have for internal security and effective water governance? To analyse these questions, two main analytical frameworks are applied: political ecology theory and the concept of water security. Political ecology theory analyses the interconnected political, economic and social factors and their impact on the availability of natural resources, including water. Application of this approach helps explain how the scarcity, governance and distribution of water resources affect internal security situation in India, intensifying internal economic disputes and deepening socio-economic disparities between different regions within India. At the same time, the water security concept, which refers to ability of a population to ensure sustainable access to sufficient amounts of clean water, highlights how certain environmental issues and resource stress can undermine internal stability and governance within a state. Together, these two approaches underline the importance of analysing the issue of water scarcity beyond development and environmental perspectives, exploring its implications as a strategically important concern for India's internal security and state resilience. The text will strive to prove the author's hypothesis that the existing problems of water scarcity and the unavailability of clean water,

if not properly addressed, will lead to future internal instability in the country in social, governance and environmental aspects.

The methodology applied in this chapter is a qualitative, interpretative approach drawing on a diverse range of secondary sources and statistical data – scholarly articles, policy briefs, research papers, official government reports and data from sources such as the World Bank and Statista. The analysis, being grounded in a case-oriented approach, offers a synthesis of currently available data and literature review which allows the study to show, based on a selected set of examples, how the phenomenon of water scarcity has affected the internal security dynamics in India. The study focuses on synthesising already existing knowledge to assess the relationship between environmental issues and socio-political stability of a state.

WATER SCARCITY AND MANAGEMENT IN INDIA – BACKGROUND AND TRENDS

India is a prime example of a country struggling with water scarcity. It has the largest population in the world – 1.44 billion people (World Bank, 2025a) – which translates to 18% of the world's population, yet its water resource potential of 1999.2 billion cubic metres (BCM) is just a little over 4% of the total river water in the world, and only 1139 BCM of that has been classified as total utilisable water by the latest Indian Central Water Commission Annual Report (2024, p. 12). Asthana and Shukla (2014, p. 27) indicated over 10 years ago that India's utilisable water resources, although sufficient at the time, will become increasingly stressed by the continuous growth of country's population, urbanisation, industrialisation and agriculture. Qadir (2024, Table 3.1) highlights both recent and projected declines in annual renewable water resources per capita in South Asian countries, with India projected to experience a decrease of 13.2% between 2015 and 2030, and 21.6% between 2015 and 2050. These trends seem to have continued over the last decade, and as pointed

out by Fernando (2024) the challenges of water scarcity in India persist due to insufficient policy direction, disputes between the central government and provincial administrations, as well as internal and external security issues highlighted by Asthana and Shukla.

Certain regions of the India are significantly more affected than others. Based on a 2019 report Complex Water Management Index, by the Indian government's public policy think tank, NITI Aayog, 16 out of 27 Indian states and Union Territories assessed in the report have been classified as low performing in water resource management. Most of those territories are in the northern part of the country, and only one of the northeastern and Himalayan states has not been classified as low performing according to the report. The report indicates that the 16 low-performing states account for almost 50% of the country's population, 40% of its agriculture and 35% of its economic output (NITI Aayog, 2019, pp. 61–62). Another commentary by World Resources Institute classifies 54% of the country (mostly its east coast and northeast part) as facing high to extremely high water stress (Shiao et al., 2015). Water stress is a problem which occurs when "the demand for water exceeds the available amount during a certain period or when poor quality restricts its use" (European Environment Agency, 1999, p. 155).

Although the 2019 NITI Aayog report notes improvements in water resource management across most Indian states, the pace of progress remains inadequate. India is facing what is described as its worst water crisis in history, with over half a billion people – mainly in the north, northwest and along the east coast – experiencing high to extreme water stress, and an estimated 200,000 annual deaths linked to unsafe water access due to scarcity and contamination resulting from poor management and unsustainable practices (Shiao et al., 2015; Chaudhary, 2024). It is worth noting that in recent years the issue of water security has been one of the country's priorities, but it seems that we are yet to see any significant improvements resulting from that shift in focus.

A fundamental legal limitation affecting India's ability to manage water resources strategically is the absence of a unified national water

framework law. While the Indian Constitution assigns responsibility for water primarily to individual states (Indian Constitution, art. 243ZC), inter-state rivers and related disputes fall under the central government's jurisdiction (Indian Constitution, art. 262). However, this division has created a fragmented regulatory landscape, with states pursuing divergent policies and lacking incentives for coordination. Furthermore, corruption and the lack of enforceable national standards on groundwater use, pollution control and water allocation exacerbates inequalities and hinders effective long-term planning. Scholars and policy experts have long argued that without a national framework law to guide coherent, integrated water governance – one that sets minimum standards while respecting federal autonomy – India's legal architecture will remain insufficient for tackling the growing pressures on its water system (Khambete, 2023).

FROM SCARCITY TO VITAL SECURITY THREAT

There are several important trends that significantly affect India's water security problems: groundwater overexploitation, internal disputes over the resource, climate change, industrialisation, water contamination by municipal waste, demographic pressure and the private sector's resistance to potential change in the water resource development approach (Chaudhary, 2024; Ghosh & Ghosh, 2024; Indian Infrastructure, 2024; Adeel & Böer, 2024, pp. 15–17). Water security is a crucial issue for the country's stability and internal security considering how important it is for population's overall health (Cushing et al., 2023) and agricultural production, which constitute 16% of India's GPD (World Bank, 2025b).

One of the major factors impacting India's water scarcity is the overexploitation of groundwater, stemming primarily from intensive agricultural production in certain regions of the country, such as Punjab in northwestern India (Katyaini et al., 2021, pp. 11–13). Irrigation in these areas predominantly relies on groundwater, with approximately 60% of irrigated land depending on groundwater supplies (Katyaini & Barua,

2017). Given that India has the fifth highest percentage of irrigated agricultural land in the world (World Bank, 2022), this creates significant pressure on the country's groundwater resources. Another crucial factor is the strong seasonal variability of water availability. India's monsoon climate causes over 70% of annual precipitation to occur within just three to four months, concentrating most of the river flows within this brief period. As a result, heightened water stress persists for the remaining part of the year, contributing to a wide range of problems such as drought and floods, both severely affecting the country's water and internal security (Jain, 2019, pp. 569–570). This also shows the connection between economic and ecological factors, which both affect India's water security challenges, especially when considered jointly.

The intensification of crop production is a major driver of groundwater depletion, a problem further exacerbated by policies providing free or subsidised power to farmers in certain rural areas. This problem can be evident in the 98% of cultivable area irrigation dependent on groundwater and in the 12-fold increase in the number of tube wells between 1970 and 2010 (Katyaini et al., 2021, pp. 11–12). While such subsidies may offer short-term relief for agricultural productivity, they leave the underlying issue of groundwater depletion unaddressed, creating serious long-term risks. Change in rainfall variability is also a significant factor for the Indian agriculture sector. The already scarce water resources in India, combined with ongoing trends that further impact water quality and availability, continue to reduce crop yields and agricultural output among Indian farmers. (Aryal et al., 2020, p. 5048 & Table 2). Applying political ecology theory demonstrates how these unsustainable land cultivation practices can translate into a further weakening of the country's water security as a self-propelling problem.

The various threats and challenges discussed in this chapter are connected to water governance in India, which is fundamentally decentralised. According to the Constitution of India, states are responsible for the planning, development and management of water resources within their territories, except for inter-state rivers and disputes, which

fall under the competence of the central government (Katyaini et al., 2021, pp. 4–5, Indian Constitution, art. 243ZC, art. 262). This governance structure has not proven particularly effective, as a significant gap persists between water-related knowledge and actual governance practices. The issue is often addressed only superficially, with water needs viewed mainly through the lens of economic sustainability. This overlooks the crucial role of water governance for rural livelihood security, and broader social, economic and environmental sustainability (Katyaini & Barua, 2015, pp. 11–13).

It is important to note the role played by the local authorities and central government in water resource management in India. Water governance in India is decentralised and shaped by a reductionist approach rooted in the country's federal structure. Most river basins are managed at the state level, with the central government having limited authority to resolve disputes, while the private sector plays a significant role in governance. (Ghosh & Ghosh, 2024). These factors can be considered among the most important reasons for numerous conflicts over the jurisdiction of water bodies and river basins in India, which happen both between states and between local and central governments (Modak et al., 2021). In addition to public stakeholders, there is also the issue of the private sector, which is primarily focused on short-term economic gains neglecting long-term implications of unsustainable approaches to water management (Ghosh & Ghosh, 2024). This problem is further exacerbated by the issue of corruption (SIWI, 2018), where relevant government authorities or judges can be easily controlled using money coming from private entities who benefit from the current unsustainable governance structure. Applying the study's main theoretical framework indicates that this political factor – unsustainable and decentralised water governance – is a big contributor to the country's inability to address its resource shortage issues.

Another important challenge for India's internal security that stems from water scarcity is the internal dispute over water governance. With 25 major river basins and 103 sub-basins scattered across the country,

most of them lying in the territories of multiple states, India has had a longstanding problem with inter-state river water disputes (Salve, 2016, p. 502). One of the most well-known examples of such conflicts is the dispute over the Cauvery River basin between the states of Karnataka and Tamil Nadu in the south of India. After more than three decades of competence disputes and unsuccessful attempts of the judiciary and the government to resolve them, the final agreement came into force in February 2013. The result of this dispute was later upheld by the Supreme Court, which also declared the river a national resource and directed the government to formalise the Cauvery Management Scheme (Sharma et al., 2020, pp. 5–7; Thapliyal, 2023). Under this scheme, the two bodies, the Cauvery Water Regulation Committee (CWRC) and the Cauvery Water Management Authority (CWMA), were created and are now responsible for water management in the Cauvery River basin (Ramakrishnan, 2023).

Inter-state disputes over water claims are likely to persist. Historically, such disputes have endured for decades, despite a number of effective central government interventions. Existing mechanisms – such as court rulings and tribunal decisions – often address conflicts reactively, without tackling their root causes. The recurrence of those disputes has been linked to judicial bodies struggling to address emerging environmental concerns and adapt to changes in state boundaries, which complicates water-sharing claims (Salve, 2016, p. 520). By looking at this issue through the scope of political ecology theory, we can easily notice how these political and structural factors negatively affect India's capacity to address its water security challenges.

Other factors linked to water scarcity are population growth, urbanisation and industrialisation. India has recently become the most populous country in the world, and although the rate of its population growth has been steadily slowing down over the past two decades, the population is still growing, while the water supply in the country is not improving due to numerous ongoing unfavourable trends mentioned earlier (MacroTrends, 2025). India's urbanisation has also been increasing – its urban population has been growing significantly faster in recent years

compared to its rural population. According to data from 2018–2022, India's urban population grew by 42.5 million, representing a 9.2% increase compared to 2018, while its rural population increased by only 5.67 million, equating to a 0.55% increase over the same period (Statista, 2024). The country's economic and industrial growth has been a major factor attracting people to the cities, but it also places additional strain on India's water security. The primary issue associated with the factors described above is the deterioration of water quality in municipal water bodies, resulting from the large amounts of wastewater and pollution being discharged by the growing population and expanding industry (Asthana & Shukla, 2014, pp. 93–95, 119–120). A study from 2022 found that in 118 cities across India, wastewater is either indirectly discharged into water bodies or, like in other 41 cities, directly into rivers. The study also highlighted that 38,791 million litres of untreated sewage are being released into water bodies on a daily basis, amounting to 62% of total sewage across the country (Jadeja et al., 2022, p. 2).

The water contamination briefly described here is the second underlying issue of India's water security. The central government is struggling to address this issue properly, which can be seen as yet another governance related issue. It is a social and political problem, and by applying the theoretical framework of political ecology it is clearly visible how this problem affects the availability of water as a resource and in turn the country's water security. Due to the scope of this chapter, the issue is only considered as a factor interacting with water scarcity, as discussing it thoroughly would require a separate chapter.

IMPLICATIONS FOR GOVERNANCE AND STABILITY

The lack of proper adjustments in the management of water resources risks deepening existing problems, particularly as the current legal framework and governance system have been largely ineffective in controlling the overexploitation of groundwater by Indian farmers. This

ineffectiveness is also evident in how inter-state disputes are resolved. Although constitutional mechanisms for resolving inter-state water disputes – such as the establishment of tribunals – are a valuable legal framework for addressing India's rising water security threats, their outcomes have been mixed. Some tribunals and central government actions have been effective, such as the Bhargava Tribunal's resolution of the Narmada water dispute. However, in many cases, tribunals have failed to resolve conflicts conclusively, as state governments are often reluctant to compromise on their claims to water resources (Salve, 2016, pp. 519–520). This reflects deeper structural issues within the country's water governance model and its focus on the states' role in managing this crucial resource.

Nonetheless, some recent improvements have been made, though they remain inadequate. In 2019, the Indian government established the Ministry of Water Resources, tasked with managing various programmes focused mainly on river rejuvenation. These initiatives aim to restore the uninterrupted and clean flow of major rivers, such as the Ganga, by promoting inter-sectoral cooperation to increase water availability and ensure a more equitable distribution of this resource (Jadeja et al., 2022, pp. 3–4).

Aside from water scarcity, India's water security is also negatively impacted by the contamination of water. It is an underlying issue that interacts heavily with water scarcity, as together they constitute the two main challenges for the country in terms of providing its population with a sufficient amount of safe water. Addressing this issue should also be a crucial concern for India's decisionmakers.

The current prospects for addressing water scarcity in India appear rather pessimistic, as ongoing trends such as population growth, climate change, unsustainable governance practices and intensification of agricultural production are expected to persist. Significant efforts will be required to mitigate their effects. While some water-related challenges are being addressed – particularly at the central government level – the pace and scale of worsening problems mean current interventions may not

suffice. India's present water governance system is increasingly unsustainable, based on a paradigm that prioritises the short-term gains of private entities, while a persistent knowledge-governance gap in many highly water-stressed states continues to hinder major improvements in water management (Ghosh & Ghosh, 2024; Katyaini & Barua, 2015, pp. 11–13).

Finally, the problem of water pollution raises serious concerns for the future. Urbanisation in India shows no sign of slowing down, and growing population centres will require collaborative efforts to manage rising demands for safe drinking water and effective sewage treatment. Without significant improvements in municipal water governance, the pressure on urban water systems is likely to intensify, exacerbating both health and security risks (Jadeja et al., 2022, p. 4).

Although water scarcity is likely to persist and worsen, there are viable measures that can mitigate both current and future problems. Firstly, it is crucial to implement and promote measures that enhance water sustainability across all types of water sources, including groundwater, lakes, reservoirs, rainwater and river basins. This should involve a wide range of actions, some of which are already being implemented, such as rainwater harvesting, agricultural drainage water recycling and the prevention of water loss (Qadir, 2024, pp. 66–70). In addition, appropriate legislation is needed to prevent the overexploitation of groundwater, promote the sustainable intensification of agriculture and encourage the diversification of production areas – actions that will require joint decision-making at multiple levels of governance (Katyaini et al., 2021, p. 17). Other important steps include investment in desalination facilities in coastal areas and efforts to increase productivity in particularly water-stressed regions to reduce overall water usage (Qadir, 2024, pp. 71–72). Proper preparations in the field of crisis and disaster response management are also crucial, given that a significant proportion of India's population remains at risk of becoming climate refugees due to floods, drought and climate change (Fernando, 2024).

However, many necessary improvements in water security may not be achievable without a thorough re-evaluation of the current water

governance paradigm. A shift from state-centric structural intervention to a more holistic, integrated model is essential (Ghosh & Ghosh, 2024), likely supported by a new legal framework for water resource administration. Such a reform should aim to bridge the persistent knowledge-governance gap in water management aptly highlighted by Katyaini and Barua (2015, pp. 11–12), thereby enhancing India's capacity to address the environmental, social and security challenges linked to water scarcity.

CONCLUSION

This chapter has explored the multilayered impact of water scarcity on India's internal security, demonstrating that the issue extends beyond environmental and developmental concerns to constitute a systemic threat to the country's social, economic and political stability. Drawing on the frameworks of political ecology theory and water security, the analysis has shown how decentralised governance, agricultural overuse of groundwater, demographic pressures and pollution converge to erode the resilience of institutions and communities alike.

While not examined in depth, the study also highlighted the important role of water pollution in weakening India's water security. Its interaction with scarcity – particularly by reducing the volume of safe, usable water – underscores the need for further research. Understanding this dynamic is crucial for designing integrated solutions that address both quantity and quality dimensions of water access.

The findings indicate that rural populations dependent on groundwater irrigation are both disproportionately affected by and key contributors to resource depletion. Weak regulatory frameworks and subsidy-driven overextraction have led to unsustainable practices that exacerbate inequality and heighten the risk of displacement and rural distress. Simultaneously, water pollution – from untreated sewage, industrial waste and agricultural runoff – has sharply reduced urban water availability, intensifying stress and widening disparities.

India's decentralised and fragmented water governance system has proven inadequate in addressing these compound threats. Although recent reforms have shown some promise, they remain insufficient. Jurisdictional conflicts, implementation gaps and political inertia continue to obstruct long-term planning and integrated management.

The chapter supports the hypothesis that, without significant reform, India is likely to face growing internal instability across social, governance and environmental dimensions. Reframing water scarcity as a strategic national security concern is essential. Key priorities should include integrated, multi-level governance; stronger regulation of groundwater use; investment in pollution control; and a decisive shift toward long-term sustainability.

Ultimately, recognising water as both a fundamental right and a strategic resource will be vital to preserving India's internal stability in the face of mounting environmental and demographic pressures.

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CHAPTER 8

Coltan, global resource nexus and the struggle of control in the Democratic Republic of the Congo

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Abstract: This chapter examines the complexities of coltan mining in the Democratic Republic of the Congo (DRC), emphasising how global demand shapes local political instability and environmental degradation. Despite housing 60–80% of the world's coltan reserves, the DRC remains mired in poverty and conflict, largely due to ineffective governance and external market pressures. The interactions between local armed groups, state complicity and multinational corporations exacerbate these challenges, resulting in severe social and ecological consequences. The analysis highlights the urgent need for cooperative governance and ethical sourcing practices to mitigate the detrimental impacts of resource exploitation. It calls for further research into institutional reforms and technological innovations that could foster transparency and sustainability in mineral supply chains, ultimately contributing to a more equitable resource nexus in an increasingly constrained world.

Keywords: Coltan, Democratic Republic of the Congo, resource governance, political instability, environmental degradation, ethical sourcing, global demand.

INTRODUCTION

Coltan (columbite-tantalite) is a critical mineral embedded in virtually every high-tech device produced today, from smartphones and tablets to electric vehicles and renewable energy technologies. Its significance

extends beyond technological innovation, as it serves as a vital component in tantalum capacitors, which are essential for the functionality and performance of electronic devices. A substantial portion of the world's coltan is sourced from the Democratic Republic of the Congo (DRC), particularly from its eastern provinces, where local artisanal mining operations operate in often conflict-prone and unregulated environments. The increasing global demand for coltan has not only elevated its strategic importance on the international market but has also intensified local struggles over control and access to this valuable resource.

In the DRC, the dynamics of coltan extraction are deeply intertwined with political instability, governance challenges and environmental degradation. The extraction process is frequently marred by violence, with armed groups exerting control over mining operations and financing their activities through the coltan trade. This situation exacerbates existing socio-economic inequalities and fuels ongoing conflicts, highlighting the complexities of resource governance in a country rich in natural resources but characterised by weak institutional frameworks.

This chapter addresses the central question: how does the global demand for coltan shape political instability and environmental degradation in the DRC, and what does this reveal about the broader global resource nexus? To unpack these issues, the chapter employs a case study approach, incorporating secondary data analysis, policy reports, academic literature and findings from non-governmental organisations (NGOs) to assess both local and global dynamics affecting coltan mining in the DRC. The subsequent sections provide background on the DRC's coltan sector, detailing the various actors involved in its extraction and the competing global interests at play. This is followed by a thorough analysis of the coltan-related conflict and its environmental outcomes, emphasising the interplay between resource extraction and socio-political unrest. The discussion then engages with broader implications for global governance and sustainability, while the conclusion reflects on the findings and offers recommendations aimed at fostering more equitable and sustainable practices in the global resource landscape. Through this comprehensive

examination, the chapter seeks to illuminate the critical linkages between local resource struggles and global consumption patterns, ultimately calling for enhanced cooperation and ethical governance in order to address the multifaceted challenges posed by coltan extraction in the DRC.

GEOPOLITICAL SIGNIFICANCE AND STRUCTURAL DYNAMICS OF COLTAN MINING IN THE DRC

Coltan, short for columbite-tantalite, is a vital mineral used predominantly in the production of tantalum capacitors, essential components in consumer electronics like smartphones, tablets, and computers. The growth in demand for these technologies from the late 1990s onward significantly raised the importance of coltan on the global market. It is estimated that 60% to 80% of the world's coltan reserves are concentrated in the DRC, particularly in the eastern provinces such as North Kivu and South Kivu. Despite this abundance, the DRC's inability to exert effective governance in these regions has empowered local militias and armed groups to take control of coltan mining operations. These groups often finance their military activities through profits from the coltan trade, as evidenced by the involvement of the Democratic Forces for the Liberation of Rwanda (FDLR), M23 and various Mai-Mai militias (International Peace Information Service, 2020, p. 15)

The relationship between armed groups and state actors in the DRC is multifaceted. On one hand, local militias operate autonomously, leveraging the lack of effective regulatory authority to monopolise resource extraction. On the other hand, state actors often exhibit complicity, either through corruption or incompetence, thereby facilitating the informal networks that dominate the coltan trade (Wood, 2018). The DRC government has struggled to impose law and order across vast regions; external actors have sometimes exacerbated the situation by providing resources or military support to these groups, leading to further entrenchment of conflicts (Global Witness, 2020).

International companies play a pivotal role in the coltan trade, often benefiting from tax regulations while inadvertently supporting conflict. Many electronics manufacturers maintain supply chains that are inadequately scrutinised for ethical sourcing practices. For instance, companies like Apple and Samsung have faced scrutiny over their supply chains, with concerns raised about sourcing coltan from conflict-affected areas (Kauffman, 2023). Even with due diligence obligations such as those stipulated by the Dodd-Frank Act, many corporations struggle to trace their raw materials back to compliant sources, given the complexity and opacity involved in the supply chains (Barrow, 2020).

Some firms have increased efforts to ensure ethical sourcing through initiatives such as the Responsible Business Alliance (RBA) and the Organization for Economic Co-operation and Development (OECD) Due Diligence Guidance for Responsible Supply Chains. However, the effectiveness of these initiatives is questioned due to weak enforcement and inconsistencies in reporting practices among companies. Additionally, third-party auditing processes often come under scrutiny, raising concerns about the reliability of figures that report compliance with conflict-free claims (McGrow, 2021, p. 160).

The geopolitical stakes surrounding coltan have implications extending beyond the immediate conflict zones. Nations like China, the United States and countries in the European Union rely heavily on a continuous supply of critical minerals that support technological development and transitions to renewable energy sources. The DRC's strategic importance has led these nations to engage in partnerships with local leaders, often at the cost of perpetuating systemic injustices in the region. Recent trends indicate that the demand for coltan is projected to increase, particularly as electric vehicles and renewable energy technologies become more mainstream, thereby ensuring continued global reliance on minerals sourced from conflict-prone areas such as the DRC.

Section 1502 of the Dodd-Frank Act was a pioneering effort aimed at addressing conflict minerals by mandating transparency and due diligence for companies sourcing materials. However, these regulations face

significant challenges. While some mining operations have been scrutinised, studies indicate that many groups have adapted by shifting operations or exploiting loopholes in the system (Wood, 2018). Moreover, the implementation of such policies has proven difficult; evidence suggests that the Act may have inadvertently intensified violence as armed groups sought alternative revenue streams amidst heightened scrutiny.

Organisations such as the OECD have developed additional frameworks to improve due diligence and promote responsible sourcing (OECD, 2022). However, the effectiveness of such guidelines remains inconsistent across the industry, and many companies continue to report difficulty in assuring consumers of the ethical provenance of their products (McGrow, 2021).

COLTAN EXTRACTION, CONFLICT AND ENVIRONMENTAL DEGRADATION IN THE DRC

The Democratic Republic of the Congo serves as a compelling case study in the examination of how global economic forces intersect with local governance failures to produce widespread political instability, environmental degradation, and human suffering. This analysis focuses on the DRC's coltan sector – particularly in the eastern provinces of North Kivu and South Kivu – as a critical example of the "resource curse", wherein countries endowed with abundant natural resources experience heightened conflict, corruption and underdevelopment rather than prosperity.

The DRC possesses a significant share of the world's coltan reserves, a critical mineral essential for the manufacture of tantalum capacitors used in mobile devices, electric vehicles and renewable energy systems. As global demand for digital devices and green technologies accelerates, the pressure on coltan-rich regions within the DRC has intensified. Artisanal and small-scale mining has proliferated in response to these global market dynamics, yet it operates largely within informal, unregulated frameworks

that expose miners to severe labour abuses, environmental hazards and economic exploitation (Nkulu et al., 2018; Landrigan et al., 2022).

At the local level, weak institutional structures have significantly exacerbated the challenges posed by international demand. Corruption, regulatory gaps and an absence of state enforcement have allowed criminal networks and armed factions to dominate the coltan trade. State actors frequently demonstrate complicity or incompetence, failing to regulate extraction activities or ensure the equitable distribution of revenues (Wakenge et al., 2018). These conditions have allowed militias such as the FDLR, Mai-Mai groups and the M23 rebel movement to establish control over key mining sites. During the early 2000s, amid a global electronics boom, armed groups generated up to $3 million per month from coltan exploitation (Mantz, 2008, p.45).

Since 2021, the re-emergence of the M23 rebel group has reaffirmed the close link between mineral extraction and conflict financing, with recent estimates indicating monthly earnings of approximately $2.5 million from illicit coltan activities (Mirera, 2022; Berr et al., 2023). These armed factions not only perpetuate cycles of violence but also impose severe burdens on local miners, including forced taxation that can amount to 30% of individual earnings (Krauser, 2020, p. 1975).

The human cost of this unregulated mining economy is deeply troubling. Investigations by humanitarian organisations and the U.S. Department of Labor reveal that as much as 40% of the workforce in some artisanal mining sites consists of children (Rodríguez et al., 2024). These children often labour under dangerous conditions, including long hours, physical strain, inadequate protective equipment and exposure to toxic substances. Such practices are among the worst forms of child labour as defined by the International Labour Organization (Brusselen et al., 2020; Godelive et al., 2023). The persistence of child labour and hazardous working environments underscores the absence of social protection and viable economic alternatives in mining communities, conditions that are further entrenched by governance failures and the prioritisation of short-term profits over long-term welfare.

Environmental degradation represents another critical dimension of the coltan crisis. Artisanal mining, often carried out with rudimentary tools and without ecological safeguards, has led to widespread deforestation, soil erosion and contamination of water sources. Protected ecosystems, such as Kahuzi-Biega National Park – a UNESCO World Heritage Site – have experienced significant habitat destruction, placing endangered species such as mountain gorillas at serious risk. (Spira et al., 2017, p. 728) The extraction process generates mining waste and releases heavy metals that pollute surrounding landscapes, with serious consequences for both biodiversity and human health (Isah et al., 2019). The degradation of these natural resources, which are vital for local subsistence and ecological stability, not only undermines community resilience but also triggers population displacement and broader regional insecurity (Erusani & Aji, 2022).

Despite the DRC's vast mineral wealth, mining communities remain deeply impoverished. They frequently lack access to basic services such as healthcare, education and clean water (Kimengsi et al., 2022). This disjuncture between resource abundance and widespread poverty reflects a broader pattern of "elite capture", whereby revenues from coltan extraction are monopolised by a small group of politically connected actors. Meanwhile, local populations – whose lands and labour sustain the mining economy – receive minimal benefits and bear the brunt of environmental and social harm. These dynamics are further compounded by the complicity of multinational corporations, many of which source coltan without adequate verification of its ethical provenance. Regulatory frameworks such as Section 1502 of the Dodd-Frank Act and the OECD Due Diligence Guidance have attempted to improve transparency and ethical sourcing, yet their implementation has been inconsistent and often circumvented through smuggling and fraud (Barrow, 2020; McGrow, 2021). Auditing mechanisms and third-party verifications are frequently unreliable, rendering "conflict-free" claims suspect.

Emerging technologies, such as blockchain-based traceability systems, offer potential solutions to improve transparency in mineral

supply chains. These technologies could enable consumers and corporations to track the origin of minerals more reliably and ensure compliance with ethical standards (Tayebi-Khorami et al., 2019; Mirera, 2022). However, the adoption of such innovations remains limited, particularly in regions plagued by conflict and infrastructural deficits. A sustainable resolution to the coltan crisis therefore requires a multifaceted and integrated strategy. Strengthening local governance structures, enforcing labour and environmental protections, and empowering local communities through participatory development models are essential. International efforts must go beyond technical solutions and address the deeper political economy of mineral extraction, including the demilitarisation of mining zones and the creation of viable alternative livelihoods for mining-dependent populations.

The analysis yields several key findings and insights. First, the DRC's coltan sector epitomises the paradox of resource wealth coexisting with pervasive poverty and conflict. The extraction of a globally valuable mineral has not translated into local development but has instead reinforced systems of violence, exploitation and underdevelopment. Second, the commodification of coltan has entrenched armed conflict by providing a lucrative revenue stream for rebel groups and militias, further destabilising the region. Third, the unregulated nature of the mining industry has enabled widespread human rights abuses, particularly the use of child labour, and has caused profound ecological damage with long-term consequences for both people and wildlife. Fourth, international supply chains remain deeply implicated in sustaining these harmful practices due to insufficient oversight and enforcement of ethical sourcing standards. Finally, while traceability technologies and international guidelines represent steps in the right direction, they must be part of a broader strategy that addresses systemic governance failures and promotes inclusive, community-centred development. Only through such a comprehensive approach can the DRC move toward a future where its mineral wealth serves as a foundation for peace, equity and sustainability.

IMPLICATIONS FOR GLOBAL GOVERNANCE AND SUSTAINABLE RESOURCE MANAGEMENT

The case of coltan extraction in the DRC offers profound insights into the broader themes addressed in the Dresden Nexus Conference: The Future of Resources – Resources for the Future (8–10 April 2025). At its core, the coltan trade reveals a fundamental paradox: vast resource wealth coexists with entrenched poverty, conflict and environmental degradation. This paradox underscores the global inequalities embedded within resource governance structures and highlights the urgent need for more equitable and sustainable frameworks. The implications extend well beyond the confines of the DRC, touching upon global power dynamics, ethical consumption and environmental responsibility in an increasingly interconnected world.

The findings illustrate how the dynamics of global consumption are intimately linked to local extraction practices. The supply chains for high-tech devices are not merely technical or logistical frameworks but are embedded in broader socio-political contexts that influence and are influenced by local communities. Resource extraction, especially under weak governance conditions, generates complex feedback loops, where environmental degradation, social dislocation and political instability exacerbate each other. In the DRC, the degradation of land and water resources due to artisanal coltan mining has led to ecological harm and forced migration, thereby contributing to regional insecurity (Isah et al., 2019; Nsengiyumva et al., 2023). These outcomes challenge the notion that resource development inherently leads to economic progress, revealing instead the vulnerability of communities situated within exploitative extractive regimes.

A key challenge illuminated by this analysis is the weakness of institutional and regulatory frameworks in resource-rich, governance-poor states. In the DRC, pervasive corruption and limited state capacity have allowed informal networks and armed groups to monopolise mineral

wealth, fuelling violence and undermining efforts to establish the rule of law (Wakenge et al., 2018). This institutional fragility not only facilitates environmental harm and labour abuses but also inhibits the possibility of redistributing resource benefits more equitably. Moreover, global supply chains often lack the transparency necessary to ensure that minerals like coltan are ethically sourced. While some corporations have adopted due diligence standards, inconsistencies in implementation and enforcement continue to limit their efficacy.

At the same time, the case study also reveals significant opportunities. Technological innovations such as blockchain-based traceability systems offer promising avenues for enhancing transparency and accountability in mineral supply chains. These tools could empower consumers to make ethical purchasing decisions, while holding corporations accountable for the sourcing practices embedded in their products (Tayebi-Khorami et al., 2019). Additionally, the promotion of regional cooperation and the strengthening of local governance institutions present viable pathways towards more inclusive and sustainable management of natural resources. When local communities are empowered to participate in decision-making processes and to share in the benefits of extraction, the potential for conflict diminishes and the prospects for sustainable development improve (Wakenge et al., 2018; Antoci et al., 2019).

Policy recommendations emerging from this analysis emphasise the need for a multi-level governance approach that integrates local, national and international actors. At the international level, multilateral agreements and certification schemes should be strengthened to monitor and enforce ethical sourcing practices. These mechanisms must go beyond technical compliance to address structural inequalities and power imbalances that shape the resource nexus. At the national level, capacity-building efforts should focus on regulatory reforms, anti-corruption measures and the development of inclusive institutions that prioritise environmental and social justice. Locally, benefit-sharing frameworks and community engagement strategies should be institutionalised to ensure that mining activities support – not undermine – local development.

In conclusion, the DRC's coltan sector exemplifies the interdependencies that define today's global resource landscape. It illustrates how local resource extraction is entangled with global consumption patterns, geopolitical interests and institutional asymmetries. Addressing the challenges identified in this case requires more than technical solutions; it necessitates a fundamental rethinking of how resources are governed, who benefits from them and at what cost. By aligning resource governance with principles of justice, sustainability and cooperation, the international community can begin to transform the resource nexus from a site of competition and exploitation into one of shared benefit and collective responsibility.

CONCLUSION

This chapter elucidates how the strategic value of coltan situates the Democratic Republic of the Congo at the nexus of a global resource crisis characterised by local instability, environmental degradation and fierce international competition. The findings underscore the paradox of resource wealth coexisting with entrenched poverty and conflict, revealing that despite the DRC's extensive mineral endowments, the country continues to suffer from systemic governance failures and the pressures of external market demands.

Given the complexities surrounding coltan extraction, further research should focus on the potential for long-term institutional reforms that could enhance governance and accountability within the mining sector. Additionally, an exploration of how emerging global powers influence the mineral trade dynamics and the effectiveness of innovative technological solutions, such as digital traceability systems, could provide valuable insights into enhancing fair practices in resource management.

This chapter contributes to the overarching theme of the monograph, "The Resource Nexus: Competition and Cooperation in a Resource-Constrained World", by illustrating the intricate ties between

local extraction practices and global consumption behaviour. It highlights the urgent need for cooperative governance frameworks that prioritise sustainable development and justice in resource management, especially in contexts marked by political instability and environmental consequences. As such, the case of coltan in the DRC serves not only as a critical example of the challenges posed by resource exploitation but also as a call to action for collaborative efforts in addressing these pressing global issues.

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CHAPTER 9

Kumtor Gold Mine as a crucial aspect of the Kyrgyz economy – benefits, risks and perspectives

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Abstract: Kumtor Gold Mine, located in north-western Kyrgyzstan at an altitude of over 4,000 metres above sea level, is one of the highest elevated gold deposits in the world. Since it began operating in 1997, the mine has become a key element of the national economy, accounting for a significant portion of the state's income and export of raw materials. Kumtor Gold Mine, one of the largest mineral deposits in Asia, plays a crucial role in Kyrgyzstan's economy, serving as a key source of revenue and exports. Its exploitation has significant environmental and social consequences. The mining process contributes to degradation of glaciers, pollution of water resources and generation of toxic waste, which has triggered resistance among local communities. Moreover, Kumtor Gold Mine operations were the main subject of numerous political tensions and its nationalisation in 2021 had a significant impact on the international relations and economic stability of the country. The aim of this study is to analyse the mine's multifaceted influence with a particular focus on environmental, social and economic aspects, as well as highlighting the necessity of implementing sustainable resource management strategies.

Keywords: Kyrgyzstan, Kumtor Gold Mine, resource management, environmental impact, resource curse, foreign investment, post-Soviet states.

INTRODUCTION

Modern conflicts are increasingly induced by conflicting interests in dividing natural resources. This is not just an economic issue, but also a social, environmental and political one. One such example of this multidimensional problem is Kumtor Gold Mine in Kyrgyzstan. Its history, which will be briefly outlined later in the argument, illustrates the difficult choices that developing countries must make between immediate economic gains, long-term environmental and social consequences. At the same time, it can illustrate how the exploitation of raw materials can affect an unstable political situation, fuel internal conflicts and lead to tensions in the international arena. The aim of this research study is to conduct a multi-level analysis of the impact of the Kumtor mine, considering environmental, social and economic aspects. The chapter also attempts to assess the effects of this type of exploitation on the stability of the state and indicates the need to implement sustainable strategies for managing abundant natural resources in the Issyk-Kul region of Kyrgyzstan. The focus of reflection is not only the direct effects of mining, but rather the broader institutional, political and geopolitical consequences that are related to the fact that they are in the hands of the state or foreign entities. The case study will be conducted through one that combines qualitative and documentary research, using available reports from international organisations, government documents, media reports and academic literature. The starting point is a reflection on the concept of the "resource curse". The following sections of the article will present the historical background and geopolitical context of the Kumtor mine's operation, as well as the main actors involved in the exploitation processes. Then, an in-depth analysis of the impact of the mine's operations on the current political and social situation in the country and on the state of the natural environment will be conducted. The discussion section will address the broader implications of the Kumtor mine's case for resource policy in unstable regions. The

chapter will end with a summary of the main findings and suggestions for further research directions.

THE SOCIO-ECONOMIC AND FINANCIAL FRAMEWORK

Kyrgyzstan, a post-Soviet Central Asian republic, has faced many political and economic challenges since gaining independence in 1991.[1] The country is relatively poor compared to its neighbours in spite of its wealth in natural resources[2] (Blank, 2008). Being rich in uranium, coal, iron ore, water resources and gold is the centre of the issue. Kyrgyzstan is a major gold producer in Central Asia, with an estimated annual production of 15–23 tonnes of gold, mainly from the Kumtor mine, which is estimated to have reserves of 288 tonnes of gold. 40% of Kyrgyzstan's export is gold, generating around 15% of the country's GDP, which adds up to $120 million in total. The main recipients are Switzerland (67%), China and Hong Kong (23%) and the United Arab Emirates (2.5%) (Östensson et al., 2023). Although Kyrgyzstan has other mineral resources, gold is a key export commodity and a significant source of income for the economy. The best-known and most controversial mining operation in the country is the Kumtor mine, which is located at an altitude of 4,000 metres above sea level in the Tien Shan mountains and has been operating since 1997. Gold was discovered in 1978, but due to high costs, the development of the mine was delayed. It was only after Kyrgyzstan gained independence that the government was able to attract Western investors to

[1] According to the December 2024 Emerging Europe analysis, despite economic growth (around 7% in recent years, 8.1% in the first half of 2024), Kyrgyzstan's GDP per capita is still below $2,000 per year, which is significantly lower than most of its neighbours, who have higher per capita incomes.

[2] According to a detailed review by EBSCO Research (2024), Kyrgyzstan has large hydropower resources (85.6% of electricity production), coal, oil, natural gas, uranium, gold, rare earth metals, and potential for renewable energy sources such as wind and solar energy, which are in the planning or early development stages.

begin developing its own mineral resources (Kumtor Gold Company, n.d.). Cameco Corporation was ultimately selected because of its favourable financial and technological capabilities. As one of the largest uranium producers in the world, the company also had extensive mining experience, with a growing involvement in gold mining. Technology and capital were also in its possession. Cameco agreed to utilise local labourers and transit companies (Fumagalli, 2015). Delving into details, the 1992 Master Agreement between the Kyrgyz government and Cameco Corporation included the right to exploit exclusive rights to evaluate and develop the project. The ownership structure: Kumtor Gold Company (KGC) was established. Cameco held 33% of the shares, with the rest, 67%, belonging to state-owned company Kyrgyzaltyn. Cameco agreed to build the mine infrastructure and manage the mining operations taking operational responsibilities. The agreement also included taxing laws, employment of Kyrgyz citizens, and the import and export of gold and other materials (Master Agreement, 1992).

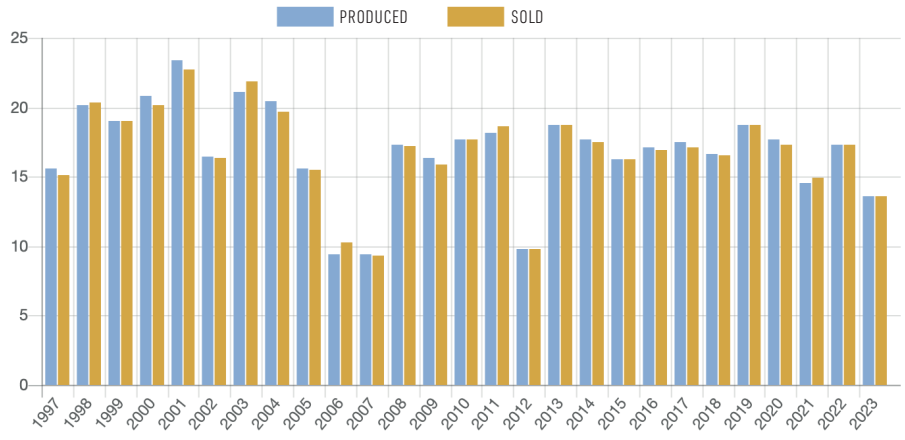

FIGURE 1 ANNUAL GOLD PRODUCTION IN KUMTOR GOLD MINE (IN TONNES)
SOURCE: KUMTOR GOLD COMPANY (N.D.).

The above graph shows the annual production (*произведено*) and sales (*реализовано*) of gold at the Kumtor mine in tonnes from 1997 to 2023.

Production increased from about 15 tonnes in 1997 to over 20 tonnes in 2000–2002. The highest level of production during this period was 23 tonnes in 2002. In the initial period of extraction, the richest layers of the deposit were exploited, which allowed for high extraction efficiency at low cost per unit (Centerra Gold Inc., 2004). In 1996, the plant reached full production capacity, allowing for stable and fast production growth (IMF, 1998). An additional factor was the rise of gold prices after they hit the bottom in 1999. The decline in production occurred shortly after the peak. The decrease in gold production was the result of the collapse of the excavation wall in mid-2002, which limited access to the deeper zones of the deposit (SEC Technical Report, 2004). After the richer layers of the deposit were exhausted, lower-value ore was extracted, resulting in a natural decline (Centerra Gold Inc., 2006). Another aspect is the increase in the stripping ratio – in order to gain access to new mining zones, it was necessary to remove more and more overburden – in 2006, the ratio of which reached 23:1 (Centerra Gold Inc., 2008). This was followed by a period of stabilisation.

Since 2009, production has increased and then stabilised at 15–18 tonnes per year until 2014, with a short-term decline in 2012 (approximately 10 tonnes). In 2019–2020, extraction approached 20 tonnes per year, reaching one of the highest levels of the mine's operation. In recent years, 2021–2023, extraction fell again – in 2023 it amounted to 14 tonnes. This was the result of mining ore with a lower gold content, with an average content of 2.74 g/t, compared to 3.51 g/t in 2022. At the same time, the gold recovery rate decreased from 80.42% to 78.56%, which directly translated into a decrease in extraction (Kumtor Gold Company, 2024). One reason for this was depletion of resources available through the open pit method. The company's reports indicate that underground mining and reclamation of waste material heaps are planned in the future (Kumtor Gold Company, n.d.).

Although the Kumtor mine was supposed to become a symbol of pro-development and economic hope for the country, attracting foreign investors and generating revenue for the budget, over time the project

became increasingly controversial, related to concessions, lack of financial transparency, inadequate compensation for local communities, and environmental and social consequences. The main actors involved in the Kumtor dispute are:

- The Government of Kyrgyzstan, which attempts to increase control over resources and improve the living conditions of citizens. Its actions are often motivated by social and political pressure
- Centerra Gold Inc., a Canadian company that has been the mine operator since its inception. It is committed to maintaining profits and minimising regulation
- Local communities and residents of mountainous regions, who are often employed in the mining sector, and who are most exposed to degradation of the environment, for example, the melting of glaciers that supply the population with water
- Environmental and non-governmental organisations, both local and international, which raised the alarm about the environmental situation, i.e., Bankwatch Network, which drew attention to, among others: "The destruction of glaciers has created massive waste mixed with ice, acids and heavy metals which estimated at two billion tonnes. After Canadians depart, melting masses will inevitably end up in Lake Issyk-Kul and the Naryn River" (GlacierHub, 2016)
- Geopolitical actors, such as Russia and China, for whom maintaining stability in the region is of strategic importance, and who are actively investing in Kyrgyzstan's infrastructure and natural resources (Syrgak kyzy & Lee, 2025).

Currently, the Kumtor mine is in the hands of the Kyrgyz state, which took it over in 2021 on a wave of accusations against the Canadian company for environmental violations, and financial misconduct (Pikulicka-Wilczewska, 2021). The state currently manages the mine through a national company Kyrgyzaltyn JSC, but it has struggled with problems in terms of technology and little experience. Although the

above paragraph shows a short-term increase in budget revenues, concerns have arisen about future profitability, deterioration of relations with foreign companies and exacerbation of environmental threats. The situation of Kumtor is becoming an example of the global trend of increasing pressure on developing countries to balance the need for economic independence with maintaining investment attractiveness and environmental protection.

THE MULTIDIMENSIONAL BALANCE SHEET OF KUMTOR'S FUNCTIONING: GAINS, LOSSES AND SOCIAL TENSIONS

The Kumtor Gold Mine remains one of the key pillars of the Kyrgyz economy (Kumtor Gold Company, n.d.-a). In 2023, approximately 13,577 tonnes were extracted, which, although slightly below the planned 14 tonnes, still generated revenue of $849 million – significantly above the planned $734.2 million. Net profit reached $302.4 million, exceeding previous forecasts ($194 million) by more than 50%. The fiscal impact of the enterprise is also significant – 17.2 billion kyrgyz som (approx. $193 million) was paid to the state budget in the form of taxes and other mandatory fees. Additionally, the mine is one of the largest employers in the country (Kumtor Gold Company CJSC, 2024). At the end of 2023, it employed a total of 4,623 people, including 3,417 full-time employees and 1,206 people under external contracts. Importantly, 99.9% of the staff were Kyrgyz citizens, which highlights the local nature of employment and limited dependence on foreign labour (Minex Forum, 2023). In terms of capital investments, the company allocated $111.5 million in 2023 to modernise the mining infrastructure, including the purchase of 93 units of equipment and the implementation of gold extraction technology from low-grade ores (Kumtor Gold Company, 2025). In parallel, work was carried out on the development of the Togolok deposit, the estimated reserves of which exceed 17 tonnes of gold (The Times of Central

Asia, 2024). The company also strives to work for the local community and the environment. In 2023 alone, funds totalling nearly $17.5 million were transferred to regional funds, including: $8.4 million for the Issyk-Kul region, $5 million for the Naryn region, $1.6 million for the Development Partnership Fund and $1.5 million for the Nature Development Fund (Kumtor Gold Company, 2024). The company is also involved in projects in the field of education, agriculture, environmental protection and humanitarian aid. Plans for the coming years include increasing production to 12.5 tonnes of gold in 2024 and starting to exploit the deposited resources, which may contain up to 120 tonnes of the precious metal (The Times of Central Asia, 2024). In the longer term, the development of underground mining is also planned, which is to enable the continuation of production activities while reducing environmental pressure. The mine is scheduled to end its operations in 2026 (Kumtor Gold Company, n.d.).

Despite the significant economic benefits of the mine, there are also many negative consequences, particularly for society and the natural environment. They can be divided into political and economic spheres, such as the decision to nationalise, lack of financial transparency and allegations of corruption, environmental effects and social tensions. From the initial stages of the mine's operation, tensions arose between the Kyrgyz government and the operator, Centerra Gold Inc. As mentioned earlier, the authorities repeatedly renegotiated the terms of the contracts, raising issues of the state's underestimated share of profits and insufficient environmental supervision. The conflict culminated in the decision to nationalise the mine in May 2021, motivated by the company's violation of environmental standards and financial regulations. The conflict's escalation was so intense that it led to reception of international arbitration, causing global repercussions and damage to the country's image as a stable investment destination (Bankwatch, 2016).

The exploitation of deposits at high altitudes is associated with a particular threat to glaciers and water resources, which are crucial for the region. Environmental organisations have been warning for years about the

deteriorating conditions of the glaciers. Approximately a billion tonnes of rock waste (in the period of time between 1994 and 2014) are being stored near them, causing accelerated melting and increasing deposition of dark dust on the ice, leading to higher heat absorption. This in turn affects the reduction of water resources feeding the Naryn River, which is important as it is a major source of drinking water and resources for irrigation of agricultural areas (Aliev et al., 2021). The Naryn River is also a key source of energy in the region through numerous hydroelectric power plants, such as Toktogul Hydroelectric Power Plant (Kyrgyzenergo, 2020). The problem is evident in the aspect of surface and groundwater contamination. The mine employs a harmful method of gold extraction that generates waste containing cyanide and acids. This can lead to groundwater contamination and potential flooding of chemically contaminated waste by water from the melting Petrov Lake, which is growing due to the intensification of glacier melting.

Another problem is the accumulation of waste, which has grown to such an extent that it poses a threat to the stability of dams. There are also concerns about the leakage of waste into the Naryn River and subsequently into neighbouring countries, posing a cross-border threat. Environmental degradation inevitably impacts human health and well-being. Contaminated water increases the morbidity rate of kidney, liver and nervous system diseases among residents living in proximity of the mine.

The problems mentioned above led to numerous social protests that began after the ecological disaster in 1998. Initially, they were local and focused on demands for compensation, health and environmental protection. Over time, the activities of local NGOs such as Karek transformed into a social movement that, thanks to roadblocks and cooperation with national organisations – Tree of Life, Taza Tabiyat, Citizens Against Corruption, Human Rights Bureau and Kylym Shamy – gained nationwide significance. Around 2012, the protests were partially appropriated by political elites, especially the Ata-Jurt party, which included nationalisation slogans in its political campaign. The local narrative, focused on environmental justice, was replaced by a nationalist discourse of state

sovereignty (Horrocks-Taylor, 2018). The turning point in the history of the Kumtor mine was its nationalisation in May 2021. The Kyrgyz government, citing violations of environmental regulations, took control of the plant and established a temporary state administration. Officially, these actions were aimed at protecting the national interest, the natural environment and securing profits due to the state. This decision affected Centerra Gold Inc., which had previously managed the mine, and became the subject of international debate. On the one hand, Kyrgyzstan's actions can be interpreted as an attempt by a developing country to regain control over its natural resources. On the other hand, many observers point to a strong political and economic background, related, among other things, to the desire to increase budget revenues and consolidate power by the then state leadership (International Crisis Group, 2022). Although the allegations against the Canadian company were justified – Bankwatch Network reports confirmed serious environmental contamination – the manner and speed of the mine takeover raised suspicions. Accusations of violating international investment law appeared, and Centerra Gold Inc. took Kyrgyzstan to an arbitration tribunal in Stockholm. The state's actions were perceived as unilateral, and some experts assessed them as political revenge, rather than an expression of genuine concern for the environment (Kalyuzhnova & Pomfret, 2021). Moreover, nationalisation took place in the context of growing political tensions in the country – after the 2020 coup, the new president, Sadyr Dzhaparov, used slogans of regaining national wealth to legitimise his own rule. The nationalisation of Kumtor became an element of a populist campaign, and its motives were not transparently communicated (HRW, 2021). Although the intensity of the protests decreased after 2021, new criticisms of state governance emerged: lack of transparency, low participation of local communities in decision-making processes and insufficient benefits for the region. The conflict has not been resolved – it has only changed its form and actors. Nationalisation has not solved the fundamental problems – local communities still demand real influence and fair distribution of profits.

It should also be noted that despite the state's takeover of the mine, it lacks the necessary technological expertise and experience in managing mining projects. After a short-term increase in budget revenues, problems with operational efficiency, equipment maintenance and environmental management began to appear – as confirmed by internal audits of the state-owned company managing Kumtor (OECD, 2022). From a geopolitical standpoint, the takeover of the mine has weakened the trust of Western investors (World Bank, 2023) and at the same time brought Kyrgyzstan closer to China and Russia – two actors that have been investing in the region's infrastructure and resources for years (Gullette & Kalybekova, 2013). It can therefore be argued that the nationalisation of Kumtor not only failed to solve the environmental and economic problems but also deepened Kyrgyzstan's dependence on external powers and its isolation in the international arena.

KUMTOR AS AN ILLUSTRATION OF THE "RESOURCE CURSE"

The case of the Kumtor mine may illustrate typical features of the phenomenon known as "the resource curse". Paradoxically, countries rich in natural resources struggle with serious economic, social and political problems. Theoretically, the presence of deposits should be the foundation for the stable development of the country. In practice, however, excessive dependence on exports combined with the lack of stable institutions leads to corruption, internal conflicts, nationalisation and stagnation (Sachs & Warner, 2001). Kyrgyzstan, despite being rich in mineral resources and extracting them to gain significant income for years, has neither been able to transform its natural potential into long-term development nor achieved social development or political stability. On the contrary, the situation around the mine has become the focal point of political disputes, a source of social tensions and a tool for populist narratives. For years, resource management in Kyrgyzstan has been dependent

on the interests of the ruling government (Yuldashev & Sahin, 2016). Successive governments have used the mine as a tool to legitimise their authority, promoting slogans about reclaiming national wealth or opposing Western corporations. In this context, the decision to nationalise Kumtor in 2021 was not merely a reaction to alleged environmental abuses, but also a manoeuvre designed to strengthen the position of the new government, which emerged after political turmoil and protests. Unfortunately, such actions – although popular in the short term – create enormous legal uncertainty and deter potential foreign investors. The lack of a stable institutional framework and the rule of law makes Kyrgyzstan a high-risk country. According to the OECD report (2022), foreign direct investment in the region has significantly declined since 2021, and the arbitration proceedings with Centerra Gold Inc. have further discouraged entities from cooperating with the Kyrgyz government. Kyrgyzstan lacked strong supervisory institutions, transparency, civic participation and a long-term development strategy. Revenue from gold mining was not effectively invested in infrastructure, education or diversification of the economy. Moreover, local communities, especially in mountainous regions, did not experience tangible benefits from the mine's operations – instead, they experienced side effects in the form of environmental pollution or limited access to clean water (Yusupova, Yugai, Choguldurov & Khubieva, 2024) Was nationalisation necessary? On the one hand, the government gained full control over the profitable economic sector, theoretically allowing it to secure the state interests. On the other hand, the way in which nationalisation was carried out – fast, not very transparent and without independent control mechanisms – only deepened the problems. There is a lack of appropriate know-how, technological support and transparent management. To avoid further deepening the resource curse, Kyrgyzstan should reform courts and audit bodies, increase transparency, social inclusion, sustainable development, and diversify the economy. By implementing these reforms, Kyrgyzstan can transform Kumtor from a symbol of problems into a symbol of reform and responsible management.

CONCLUSIONS

The case of the Kumtor mine in Kyrgyzstan is a clear example of the tension between the need for economic development and the risk of environmental, social and political destabilisation. On the one hand, gold mining brought undeniable budgetary profits, jobs and an influx of foreign investments to the state. On the other hand, the lack of transparency, international disputes and the final decision to nationalise revealed how easily conflicts and the erosion of trust occur, both domestically and internationally. An analysis of the experience of Kyrgyzstan allows us to formulate several conclusions. Natural resources alone do not guarantee development success; strong and transparent institutions are essential to ensure fair distribution of profits and the protection of the public interests. Secondly, nationalisation as a tool for regaining control over natural resources makes sense only when accompanied by responsible management and readiness for reforms. Otherwise, it risks deepening existing problems such as corruption and the marginalisation of civil society. In a broader context, the Kumtor case opens the door to further comparative research with other countries facing similar challenges. It would be interesting to compare Kyrgyzstan with Kazakhstan, which, despite similar conditions, has chosen a different path to control the mining sector. Countries such as Peru, where tensions surrounding mining are equally strong, could also provide valuable comparisons. This chapter contributes to the broader subject of the monograph that concerns understanding how natural resources not only shape economies but also influence political and social relations in developing countries. It also demonstrates that resource management is not merely a technical or economic issue, but above all a political and institutional one. In the absence of transparency and strong social oversight mechanisms, even the most promising projects can turn into a source of crises and long-term tensions.

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CHAPTER 10

The Las Bambas project and China's impact on Peru's extractivist model

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Abstract: The aim of this article is to analyse the socio-environmental conflict surrounding the Las Bambas mine in southern Peru. Owned by the Chinese company Minerals and Metals Group, the mine is one of the largest copper mining sites in the world and a source of controversy for local people, who have been highlighting its severe negative socio-environmental impacts since the project's inauguration. The article analyses actions taken by the Peruvian government, strategies employed by Chinese investors and resistance movements of local communities. Through the case study method, the paper highlights how Chinese state-owned enterprises have leveraged strategic investments to secure access to Peru's vast mineral resources, intensifying land conflicts and reinforcing economic dependency. By situating the Las Bambas project within the broader context of socio-environmental disputes linked to extractivist policies in the country, the article illustrates how this specific case reflects historical patterns of political violence and exclusion in rural zones of Peru.

Keywords: Las Bambas mine, Chinese investments, extractivism, socio-environmental conflict, indigenous rights, Peru.

INTRODUCTION

The Las Bambas mine, located in Cotabambas province in Peru's southern Andean highlands, is a large-scale open-pit copper project operated by Minerals and Metals Group (MMG), a subsidiary of China Minmetals Corporation. Copper concentrate is transported over 400 km by heavy

trucks and has thus triggered tensions due to its environmental and social impacts on predominantly Quechua communities (INEI, 2018). Despite generating significant national revenue (MMG, 2023a), the project has faced resistance over perceived environmental harm, inadequate consultation and unequal benefit distribution. This paper examines the Las Bambas conflict as a reflection of ongoing political exclusion and local resistance to extractivism and neoliberalism, with China playing a key role in shaping the region's resource governance.

The specific research questions guiding the chapter are: how has the development and operation of the Las Bambas mine contributed to socio-environmental conflict in southern Peru? What roles have the Peruvian state and Chinese investors played in shaping the dynamics of the conflict? In what ways do local community responses and resistance movements reflect broader historical patterns in the Andean highlands? All these issues come together in the main research question posed by the author, which is: how does China's growing presence in Latin America's mining sector align with and reinforce the deeply rooted violent legacies of colonial domination that continue to shape extractive practices across the region in the 21st century?

The chapter employs a qualitative case study method, focusing on the Las Bambas mining conflict as a representative example of broader socio-environmental tensions in Peru. The methodology includes analysis of corporate reports and environmental impact assessments related to the mine; media analysis to trace conflict events and the portrayal of key actors; secondary literature review drawing on academic sources related to extractivism, Chinese foreign investment and socio-environmental conflicts in Latin America; and interpretive analysis using theoretical frameworks such as Extractivism and Postcolonial Theory to situate the empirical case within larger structural and historical contexts.

The article begins by defining the phenomenon of extractivism in the Peruvian context and the socio-environmental conflict associated with it. The focus then shifts to the Las Bambas mine case itself, analysing the roots of conflict, situation development and the characteristics of

criminalisation deployed by the Peruvian state and Chinese company. The paper concludes with discussion on whether Chinese state-owned enterprises replicate the exclusionary and colonial practices of Western actors despite using a very different narrative, as well as an identification of the main challenges and opportunities in the future.

THE CONTEXT OF *EXTRACTIVISMO* IN PERU

To begin with, it is important to clarify the key concepts addressed in this paper –particularly extractivism and the associated socio-environmental conflict – and to analyse their meaning in the Peruvian context. Extractivism, in general terms, refers to an economic model based on the large-scale extraction of natural resources for export, typically in raw form and without local industrial processes that generate added value (Gudynas, 2013). As Riofrancos (2020) explains, it is also a syndrome encompassing the various pathological effects of political and economic dependence on resource extraction. In Latin America, extractivism has been deeply tied to colonial history, in which European metropolises exploited resources of their colonies for their own benefit (Galeano, 1973). In the modern context, this model has been perpetuated under the logic of neoliberalism, which promotes economic liberalisation, the reduction of trade barriers and market deregulation, favouring large multinational corporations that dominate resource extraction in developing countries. As Alimonda (2015) states, mining and its far-reaching consequences have played a central role in shaping the enduring structures of Latin American coloniality. This form of coloniality – understood as the persistence of colonial frameworks of social organisation beyond the end of formal colonial rule – is intricately linked to, and indeed constitutive of, the formation and evolution of modernity (Quijano, 2000). Crucially, the European conquest did not simply integrate Latin America into an already established capitalist order. Instead, the emergence of global capitalism itself – and more recently, its neoliberal variant – was

contingent upon the violent extraction of mineral wealth from territories later defined as part of the Americas. As Gudynas (2013) argues, this model not only deepens socioeconomic inequalities, but also perpetuates a form of internal colonialism in which national elites and foreign corporations benefit at the expense of Indigenous and peasant communities, who are the most affected by the environmental and social impacts of large-scale mining.

Peru's full-scale transition to neoliberalism began in the 1990s under the authoritarian presidency of Alberto Fujimori. His administration implemented sweeping economic reforms aimed at liberalising the economy, reducing state intervention and promoting foreign direct investment, particularly in the large-scale mining sector. The policies were designed to stimulate national economic growth, but primarily benefited urban centres, while rural Andean communities remained marginalised. Fujimori's reforms included the 1992 General Mining Law, which facilitated resource extraction with minimal state oversight and enabled the relocation of communities (OSINERGMIN, 1992). While decentralisation was also part of the neoliberal agenda, institutional capacity to manage mining development and mitigate its social and environmental impacts remained weak, particularly in remote regions. This strongly deepened social inequalities and reinforced perceptions that the neoliberal model prioritised investor interests over local welfare.

In Peru, since 2004, the institution responsible for monitoring social conflicts is the Ombudsman's Office (Defensoría del Pueblo). Their reports from 2007 to 2017 indicate that socio-environmental conflicts constitute the majority of these cases, representing 68% of the total, while conflicts specifically related to mining are the most numerous, accounting for 62% of all socio-environmental cases (Paredes, 2017). It is worth noting that several key actors are involved in Peru's socio-environmental conflicts: the state, transnational companies, local municipalities and rural or Indigenous communities, among others. All of them played an important role in the Las Bambas case, which will be discussed later. These types of conflicts in Peru mainly arise from

disputes over the use, access to and control of natural resources. Some of the main causes include environmental impacts, the lack of local benefits and the criminalisation of resistance. The exclusion of local communities from decision-making processes, also one of the main sources of conflict, is believed to be rooted in colonial ethnopolitical dynamics. Although the mechanisms promoting greater inclusion and participation of Indigenous communities in dialogue were theoretically developed, such as the Peruvian law of prior consultation (Congreso de la República, 2011) or ILO Convention No. 169 (ILO, 1989, art. 6, 15), which Peru ratified in 1994, their implementation has been weak and inconsistent, hindered by strong ties between political elites and mining interests. Prior consultation is frequently not implemented with communities that may be affected by a project, or it is conducted only after decisions have already been made.

THE LAS BAMBAS CONFLICT DEVELOPMENT, VIOLENCE AND CRIMINALISATION

Mining is central to Peru's economy, contributing around 10% to the national GDP and 60% of export revenues (BBVA, 2023). China, a major investor in Peruvian copper, accounts for one-third of global overseas investment in the sector (Sanborn & Chonn Ching, 2017). The Las Bambas mine was originally owned by Swiss company Xstrata, which received initial approval for its Environmental Impact Assessment (EIA) in 2010 after public consultations with local people. The EIA was well received, largely due to the promise of jobs and community revenue (Peruvian Times, 2010). However, following China's condition for approving the Xstrata-Glencore merger, the Las Bambas mine was sold in 2014 to Chinese state-led company MMG. The ownership change brought significant alterations to the project: while the initial plan involved transporting copper concentrate through a 215-km underground pipeline, the revised version replaced it with a land-based transportation system relying on

trucks using local roads. The roads, already used by residents, were not originally designed for high-volume mining traffic. Nevertheless, the Peruvian government reclassified them to a higher-level national route, amid several reported irregularities (Leyva, 2018, pp. 3–15). Notably, revisions to the EIA occurred during the transition period and were approved after MMG had already taken control.

Following the EIA modification, the transport of copper now relies on a fleet of over 100 heavy-duty trucks traveling daily along a 438-km route on public roads shared with local communities, on route to the Pillones railway station (MMG Las Bambas, 2023a). Although the mining company has allocated over $341 million to upgrade and maintain these roads (MMG, 2021a), the continuous flow of large vehicles has had a lasting and disruptive impact on the everyday life and well-being of nearby residents, farmers and animals (World Bank 2021, p. 82).

From the perspective of the local community, one reason for the frustration was therefore the vision of disruption to their daily life by making local rural roads accessible to noisy trucks accompanied by large quantities of fossil dust. Another reason was the undeniable negative environmental impact. Despite MMG's claim to comply with environmental agreements and standards (MMG Las Bambas, 2014 & 2023b), various scholars have shown possible environmental damage (Maiza-Larrarte & Claudio-Quiroga, 2025; Leyva, 2018), which undermined the credibility of the company's sustainability claims. During the construction phase in 2014, the project generated significant volumes of hazardous waste, including over 133,000 tonnes of hydrocarbon-contaminated soil and approximately 8,400 tonnes of waste oils (MMG Las Bambas, 2014 & 2015b). Current annual estimates indicate the production of around 150 to 180 million metric tonnes of tailings and waste, alongside over 2,000 tonnes of hazardous materials. Water usage represents another critical environmental concern, especially in a region such as Apurímac where many residents lack reliable access to potable water (DRVCS, 2020). The 2021–2022 data reveals that Las Bambas consumed between 80 and 100 billion litres of water annually, of which approximately 4%

were freshwater sources (MMG Las Bambas, 2022 & 2023b), and which raises serious questions about the sustainability of resource distribution in an area marked by hydrological stress. The mine is also responsible for annual emissions of approximately 600,000 to 730,000 tonnes of CO_2-equivalent gases. In addition, air quality monitoring data reports the presence of 12,000 to 25,000 particles per cubic metre of harmful pollutants, such as nitrogen oxides and PM10 particles, which are linked to respiratory and cardiovascular diseases. Land degradation further illustrates the project's ecological toll. By 2020, over 3,380 hectares of land had been disturbed, accounting for roughly half of the total concession area. Despite these disruptions, only 101 hectares – around 3% of the affected area – had been rehabilitated by that year, underscoring the limited scope of restoration efforts relative to the scale of disturbance. While the company reports investing approximately $4 million annually in environmental management, equivalent to just under 0.2% of its $2 billion revenue in 2022 (MMG Las Bambas, 2022 & 2023), the proportionality of this figure casts doubt on the adequacy of corporate environmental responsibility measures. Most of the expenditure is directed towards waste management and environmental monitoring, yet the continuing scale of environmental degradation suggests the need for far more robust and accountable environmental governance mechanisms (Maiza-Larrarte & Claudio-Quiroga, 2025, p. 7).

From an economic standpoint, local communities have sought inclusion in the mining supply chain by requesting roles as transportation providers, aiming to secure long-term economic benefits from the project. What might thus appear as conflicting environmental and economic demands are in reality reflections of the communities' efforts to assert their right to self-determination. It should be stressed, therefore, that the main reason for the dissatisfaction of Indigenous residents – apart from environmental and financial issues – was the way decisions were made and the fact that local communities were excluded from the closed-door consultation process. From their perspective, participation goes beyond merely being consulted; it entails having a tangible impact

on decision-making processes, allowing them to engage in the mine's economic cycle while ensuring that environmental standards are upheld, and that local perspective is respected. Protesters specifically criticised the government of President Ollanta Humala for allowing MMG to modify the EIA without prior consultation with local communities affected by the mine (Los Angeles Times, 2015).

Las Bambas commenced its first copper shipment to China in January 2016, and by 2017 it was responsible for around 20% of Peru's monthly copper output (Rodríguez & Seminario, 2023, p. 9). Contrary to early projections, production has fallen short of expectations, largely due to opposition from Indigenous communities and the company's controversial use of Peruvian police forces to suppress dissent. The escalation of the dispute transformed what was initially a localised mining operation into a broader regional conflict involving MMG, national law enforcement and Indigenous groups from Apurímac. Following the ownership transfer in early 2015, protests quickly erupted at Las Bambas. In February, Challhuahuacho residents struck, detaining contractor workers while demanding improved infrastructure and local labour opportunities. On September 25, community members demanded the dismantling of a processing plant deemed harmful and the annulment of the revised EIA. Violence escalated on September 28, when locals protested near the site against MMG's alleged breaches with Quechua communities, resulting in four protester deaths, 17 detentions and injuries to at least 24 police officers (El Comercio, 2018). A similar incident in October 2016 saw a local blockade of the public road used by the mining company, which led to one fatality among the protesters and injuries to many civilians and police officers (El Popular, 2016).

For MMG, escalation of the conflict posed a serious risk to the viability of its global mining activities. In contrast, the Peruvian government remained focused on safeguarding the economic benefits derived from Las Bambas, which led to widespread criminalisation of protests (Saldaña Cuba & Portocarrero Salcedo, 2017, p. 334). Criminalisation practices manifested through the targeting and criminal profiling of protesters,

selective and prejudiced application of legal measures, as well as lethal use of force against them. It is therefore worth delving into the very issue of the apparatus of violence in this case and the repressive mechanisms that have enabled MMG to operate in Las Bambas. Some scholars tag corporate practices in Latin America as authoritarian (Glasius, 2018; Rodríguez & Seminario, 2023), since transnational companies can procure exclusive use of force in the region's states to offset and suppress civil protest, even within a formally democratic framework. On August 13, 2015, the Director of the Peruvian National Police and the CEO of Las Bambas mine formalised a Cooperation Agreement (Policía Nacional del Perú, 2015), which reaffirmed the mutual commitments established in 2012 by Xstrata with the police. However, under MMG's administration, a new framework emerged in favour of Chinese interests. The agreement granted Las Bambas the power to manage police operations under its own private jurisdiction, including the ability to adjust payment schedules or dismiss officers for misconduct. In other words, the Peruvian National Police came under the influence of Chinese state capital. Operational directives then classified Indigenous protesters and organisations opposing the government and MMG as "adverse forces", thereby equating dissent in historically marginalised areas with terrorism. In contrast, "friendly forces" were defined to include the Peruvian army, political actors, judicial authorities and the firefighting department (Seminario, 2023, pp. 147–157).

The authoritarian strategies, however, are not unique to Chinese-owned mining operations. Western companies operating in Peru have similarly relied on repressive tactics to manage opposition. A notable case is the Conga mining project, operated by Yanacocha (majority-owned by US-based Newmont Mining), where widespread protests against environmental damage were met with a state of emergency, militarisation and deadly police repression (Millones, 2016, pp. 640–647). While each mining-related conflict has its own characteristics, the pattern of violence – especially the targeted and racialised killing of Indigenous and environmental leaders who call for corporate

accountability – has become a recurring and systemic feature of not only Peruvian, but also the entire Latin American extractive industry (Global Witness, 2023).

REPRODUCING INEQUALITIES IN SINO-PERUVIAN COOPERATION

Since the early 2000s – and more markedly after the 2008–2009 financial crisis – significant changes have emerged from within the global capitalist system itself. These shifts have restructured the international division of labour and given rise to new centres of economic growth that increasingly extend into postcolonial regions for large-scale raw material extraction. In this context, China's growing prominence in economic globalisation is reshaping the dynamics of global capitalism and its accompanying practices in the Global South, especially in Latin America. The acquisition of Las Bambas was strongly backed by China Development Bank, which provided a blend of equity investments and government-guaranteed loans, supported by high-level diplomatic engagement to secure the endorsement of the Peruvian government at both national and regional levels (MMG, 2014b). China's influential role in the global mining sector is particularly notable, given that it accounts for approximately half of global copper demand (Rodríguez, 2018). The dominant market position enables China to exert considerable influence over supplier countries. In stark contrast, Peru's economy has become increasingly reliant on extractive industries (Crabtree & Durand, 2017, pp. 27–53), and particularly on Chinese state-linked investments (Gonzalez-Vicente, 2012, pp. 111–122), reinforcing structural asymmetries in this relationship. Las Bambas has become a contested extractive site, where promises of economic growth and poverty alleviation clash with widespread experiences of marginalisation, abuse and injustice. In this context, the operational frameworks of state capital and neoliberal authoritarian governance have fostered a remarkably coordinated set

of repressive practices designed to facilitate the extraction and export of copper from the Andes to China. Rodríguez & Seminario (2023) use the term "para-coloniality" to describe operational strategies of Chinese state capital, which, although not rooted in Eurocentric colonial history, reproduce and benefit from its enduring structures. In the case of Las Bambas, this is reflected in how Chinese investments rely on the coercive apparatus of the Peruvian state to suppress dissent and facilitate resource extraction. The Sino-Peruvian extractive domain is further shaped by mutually reinforcing discourses of global empowerment. On the Chinese side, state investments are typically portrayed as a form of mutual benefit, with officials asserting that China has historically been subjected to Western imperialistic pressures (Strauss, 2012). This narrative gained institutional reinforcement with the release of "China's Policy Paper on Latin America and the Caribbean" (2016), in which the Chinese government explicitly frames its engagement with the region as a "shining example" of South-South cooperation, based on equality and shared development. Such discursive strategies seek to legitimise China's expanding presence in Latin American extractive sectors, even though asymmetries between these partners are tangible. Meanwhile, alliances between the state and business interests in Peru promote Chinese investments by constructing a national identity centred on mining, framing any opposition to the mining model as not only anti-development, but also as a threat to the very essence of Peruvian identity (Himley, 2014, pp. 178–179). In this context, the resistance of rural communities against extractive projects cannot be seen solely as an environmental struggle, but as an act of reaffirming agency of historically and structurally marginalised communities – as well as redefining of what is means to be Peruvian.

In the case of Las Bambas, although MMG formally commits to human rights, stating in its 2018 Sustainability Report its adherence to UN Principles (MMG Las Bambas, 2018), the company in this instance followed only the Peruvian state's formal approval of the modified EIA. Their approach therefore ignored complex local dynamics and the sensitive history of broken promises in mining-affected communities. The

core issue, however, lies not just in adopting human rights frameworks, but in how these standards are interpreted and implemented. While instruments such as ILO Convention no. 169 and the Peruvian law of prior consultation emphasise broad, inclusive participation, interpretations of what it means to effectively listen vary greatly between state actors, firms and peasant communities. For local organisations, participation goes beyond mere consultation, as it involves direct decision-making power and equitable access to economic and environmental benefits. Therefore, the conflict reveals the limitations of current participatory frameworks, which reduce community involvement to formal consultation, neglecting the deep histories of dispossession experienced by Indigenous populations. Local actors are not just passive recipients of imposed norms but rather active norm-makers, who seek to expand and reinterpret international human rights standards on their own terms. This points to both challenges – such as decolonising business practices, addressing regulatory ambiguity and overcoming entrenched state-corporate alliances that enable the criminalisation of dissent – and opportunities, including the potential for bottom-up norm innovation, stronger transnational solidarity and the development of more binding accountability mechanisms for foreign investors. Ensuring meaningful participation, redistributive benefits and culturally contextualised environmental safeguards should thus be central to any future framework guiding extractive investment in contexts marked by historical marginalisation and socio-environmental vulnerability. This necessitates action on multiple levels: the Peruvian state must strengthen regulatory enforcement and prioritise the protection of affected communities over short-term extractive revenues; foreign corporations and their home states should adhere to robust human rights and environmental due diligence frameworks; and the international community, including global institutions such as the UN Working Group on Business and Human Rights, should play a more assertive role in fostering binding standards and monitoring compliance. Without such shared responsibility, current dynamics will only reproduce extractive injustice under the guise of development and cooperation.

CONCLUSION

Mining-related conflicts are often marked by violence and reflect the deeply entrenched global inequalities embedded in the international division of labour under capitalism. Historically dominated by Western corporations, the landscape of resource extraction is now increasingly shaped by the rise of Chinese state capital in the Global South. This chapter examined the intersection of Chinese state capital and extractive practices in Peru, focusing on the Las Bambas mining project. It was shown how Chinese investments, while not directly rooted in Eurocentric colonial history, continue to perpetuate colonial dynamics in the Global South. They do this both by exploiting Peru's neoliberal legal and economic framework, which sustains the country's position of peripherality and dependence on foreign capital, by excluding Indigenous groups from decision-making processes that would be compatible with local dynamics, and by employing strategies of criminalising resistance that reflect colonial echoes of marginalisation and repression.

There remain several areas for further research, particularly how global power dynamics are shifting with the increasing influence of Chinese investments in the mining sector. Additionally, the question of what the long-term socio-environmental consequences of Chinese extractive practices in the Andes will be. The relationship between the evolving role of China and the continued persistence of local resistance movements also raises important questions about contemporary forms of economic exploitation.

This chapter contributes to the overall theme by investigating the links between resource extraction, social conflict and environmental degradation, highlighting the complex intersection of state-corporate power and local resistance in the context of the mining industry. It underscores the need to reconsider the global development framework, particularly in light of emerging powers such as China, and how their investments can reshape economic and environmental landscapes in the

Global South. The discussion challenges the current discourse on development and offers a more nuanced understanding of the ways colonial legacies persist in modern global relations, even if under other auspices.

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CHAPTER 11

The role of natural resources in financing terrorism and organised crime: a case study of the Taliban in Afghanistan

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Abstract: This study explores the critical role of natural resources in financing terrorism and organised crime, focusing on the Taliban during two key periods: the war against the Afghan state and people (2001–2021) and the regime established by the group following its 2021 takeover. Using the theoretical frameworks of war economy and informal economy, the chapter analyses how natural resources especially minerals, narcotics and timber have shaped illicit financial networks and strengthened the Taliban's grip on power. During the war, these resources funded logistics, recruitment and arms purchases; after the takeover, resource exploitation has reinforced the regime's political and economic control. The research methodology combines qualitative analysis of reports, financial documents and secondary sources with quantitative data from expert interviews. Findings show that the Taliban institutionalised informal economic structures and incorporated illegal mining, narcotics trafficking and cross-border trade into its model of governance. This process has contributed to regional instability, strengthened transnational criminal networks and increased collaboration with extremist groups such as al-Qaeda and ISIS-Khorasan. The study offers new insight into how natural resources sustain terrorism and authoritarianism in Afghanistan and beyond, highlighting the long-term implications of illicit resource exploitation for regional and international security.

Keywords: Terrorism, organised crime, Taliban, natural resources, illicit financing.

INTRODUCTION

One of the key factors behind the continuation of the Taliban's war against the people and government of Afghanistan (2001–2021) and the consolidation of their power after the collapse of the Islamic Republic in August 2021 has been their extensive access to financial resources derived from illegal economies and the exploitation of natural resources. Contrary to the belief that the Taliban were mainly funded by foreign aid or specific governments or terrorist networks, evidence shows the group secured much of its finances for warfare, survival and expansion through drug trafficking networks, illegal resource extraction, farmer extortion and forced taxation.

During the conflict, the Taliban built a self-sustaining financial structure by controlling opium and heroin production, trafficking, deforestation and illegal mining. This structure supported military operations, paid fighters, financed weapons and expanded their influence. Their collaboration with transnational human trafficking, money laundering and drug networks has also posed broader regional and global security threats.

After their return to power in 2021 and the establishment of the "Islamic Emirate", the Taliban secured economic and political ties with China, Russia, Iran and some Central Asian nations, despite lacking international recognition. Without a transparent legal system, they handed Afghanistan's natural resources to foreign (mainly Chinese) and local companies, many lacking operational standards. Reports of widespread deforestation, unchecked coal extraction and ongoing drug trade despite a declared ban on poppy cultivation demonstrate how this illicit economy underpins the regime's survival.

This chapter is based on secondary data, including investigative reports, case studies, reputable sources and documents from organisations such as the United Nations Office on Drugs and Crime (UNODC). It also draws from the author's field experience as a senior law enforcement officer with over two decades of service, offering analysis of the Taliban's economy and its security and humanitarian consequences.

BACKGROUND

Afghanistan holds geopolitical importance as a link between Central and South Asia, close to the Middle East. It is rich in gold, copper, lithium and rare earth elements, with estimated values between one and three trillion dollars. However, conflict and corruption have obstructed legal exploitation, enabling illicit activity.

The Taliban's rise in the 1990s followed the collapse of the Soviet-backed government. During this time, jihadist groups, some backed by Western powers, operated in Afghanistan. The post-Soviet collapse created opportunities for the Taliban to seize territory.This study centres on the Taliban, which evolved from a militant group to a de facto regime. Their interest lies in controlling resources to fund operations, consolidate authority and expand influence. With a background in extremist terrorism, the Taliban has turned natural resources into a major income source.

The group has also harboured jihadist organisations such as al-Qaeda, Tehrik-e Taliban Pakistan (TTP), the East Turkestan Islamic Movement, the Islamic Movement of Uzbekistan, Jaish al-Adl and ISIS-Khorasan. These groups have used Taliban-held territories and resources to support their activities.

Criminal networks connect insurgents with global markets. They provide income and help the Taliban avoid oversight. A key activity is drug trafficking. Afghanistan remains the world's top opium producer, with Taliban-controlled farms supplying the trade. UN reports estimate the Taliban earns hundreds of millions annually from opium.

Beyond drugs, these networks smuggle minerals such as gold, gems and rare metals. Due to poor oversight and corruption, extraction is often illegal. The Taliban controls many mines and exports minerals through black markets in Pakistan, Iran and China. Over the past two decades, these networks have enabled the Taliban to generate revenue and procure arms and supplies via regional black markets, including advanced weapons such as night-vision devices.

These operations have funded terrorism and organised crime, fuelling regional instability and harming the global economy through smuggling and corruption. Since 2021, the Taliban has intensified resource exploitation. Illegal mineral extraction, deforestation, the drug trade and efforts to gain legitimacy via regional ties especially with China are central to its regime.

The literature review addresses three areas: (1) natural resources and terrorism financing; (2) informal economy and organised crime; and (3) the Taliban's resource exploitation.

FINDINGS AND ANALYSIS

1. THE TALIBAN'S ILLEGAL FINANCIAL NETWORKS (2002–2021)

The Taliban's illegal financial networks are among the most complex and effective systems for insurgent financing globally. These networks generate significant income through activities such as illegal mining (especially gold and precious stones), deforestation, and drug production and trafficking. These operations have continued both during the insurgency period (2001–2021) and after the Taliban's takeover in 2021. This section explores these networks in detail.

ILLEGAL MINING

Afghanistan is rich in mineral, oil and gas resources spread across many of its provinces. The country possesses vast deposits of mineral-rich stones, including veins of iron, copper, gold, rare earth elements and other globally significant natural resources. According to various reports, including data published by the former Afghan government, the total value of these natural resources is estimated to exceed one trillion US dollars. However, these resources have not been effectively developed throughout the 20th and 21st centuries (MoMP, 2019, p. 7).

Afghanistan's natural wealth includes oil, gas, gold, copper, iron, lithium and precious stones such as emeralds and lapis lazuli, with detailed assessments previously released by the former Afghan authorities (MoMP, 2021).

MAP 1: HUSSEIN & HADDAD. (2021 SEP 24). MAPPING AFGHANISTAN'S UNTAPPED NATURAL RESOURCES.

Terrorist groups such as the Taliban, along with organised crime networks, have illegally exploited these resources, using them to finance their operations and activities.

Provinces such as Badakhshan, Ghazni and Helmand, rich in mineral deposits, have become major centres for illegal mining activities. For

instance, gold mines in Ghazni and Badakhshan have been extensively exploited by the Taliban in recent years. These operations typically rely on cheap labour and disregard for environmental standards, leading to the destruction of farmland and contamination of water sources.

A member of the Badakhshan Provincial Council stated in an interview in 2020 that the Taliban had been operating in most districts, including Raghistan, where a gold mine is located. They extracted gold from this area with their forces and smuggled it into neighbouring countries (Hosseini, 2020).

Mohammad Ali (a pseudonym), a private investor in a Ghazni stone mine, told me he paid the Taliban 5,000 Afghanis (around $90) per truckload between 2014–2018 due to insecurity that the Taliban deliberately created (Author, personal communication, March 23, 2025). This pattern was repeated across Afghanistan in Taliban-controlled mining zones.

Based on my field experience and information gathered during my professional duties, the extracted minerals are smuggled through complex transnational networks involving local traders, corrupt officials and international criminal groups, particularly to Pakistan and Iran.

According to an official report from the Ministry of Mines and Petroleum of the former Afghan government, the Taliban was extracting resources from 280 small and large mines. In addition, 184 other mines were being exploited by criminal groups and local powerbrokers. The report indicated that the Taliban employed traditional and primitive mining techniques without proper safety measures, leading to low productivity and placing local workers' lives at risk (MoMP, 2020).

During the conflict years, illegal mining activities in at least 14 of Afghanistan's 34 provinces remained beyond the control of the central government. These operations now generate an estimated $200–300 million annually for the Taliban, making it the group's second-largest income source after narcotics (Dupee, 2017, p. 31). Afghanistan's abundant mineral resources, particularly gold and precious stones, have been a major factor behind the Taliban's efforts to seize and maintain control over resource-rich areas.

DRUG PRODUCTION AND TRAFFICKING

Afghanistan is the world's largest producer of opium. The Taliban controls a significant portion of opium cultivation, production and trafficking, making it one of the group's primary sources of income. The provinces of Helmand and Kandahar have simultaneously served as epicentres of both drug production and Taliban insurgency (Fazli, 2022, p. 15). Farmers, often under pressure from the Taliban, resort to cultivating poppy. The group imposes taxes on them and maintains control over trafficking routes.

The opium produced is trafficked through extensive smuggling networks to countries such as Pakistan, Iran, Central Asian states and Turkey, eventually reaching Europe, Australia, other parts of Asia, Africa and North America (UNODC, 2015, p. 13). These operations rely on complex transnational networks involving local actors, corrupt officials and international criminal organisations.

Experts and officials disagree on the magnitude of the Taliban's drug-trade profits, their estimates ranging widely between $40 million to $400 million annually. US officials have estimated that the drug economy generated $200 million annually for the Taliban in the years leading up to 2021 (Fazli, 2022, p. 16). These financial resources have significantly strengthened the group's military and economic capabilities.

THE ROLE OF DRUGS IN FINANCING

Drug trafficking is a multibillion-dollar business, constituting a significant portion of organised crime revenues. A large part of the income from drug trafficking is funnelled into the treasuries of terrorist groups. Over the years, major transnational terrorist groups have emerged as key players in controlling the illicit drug trade networks. With increasing surveillance on traditional financial routes, terrorist organisations regularly seek alternative resources to fund their activities.

The Taliban have made the production and trafficking of drugs (mainly opium) their primary source of income, and this was already the case after the formal overthrow of their rule in Afghanistan (Karolczak, 2022, p 326). Estimates of the Taliban's annual share of the illicit drug economy range from $100 million to $400 million (BBC, 2021). Among these, drugs, particularly opium and heroin, played a central role in financing the Taliban during the insurgency. As the world's largest producer of opium, Afghanistan became the primary source of the Taliban's income.

According to numerous reports from international organisations such as Special Inspector General for Afghanistan Reconstruction (SIGAR), Afghanistan is the world's largest producer of opium, and opium poppy is the country's largest cash crop, with an estimated annual export value ranging from $1.5 billion to $3 billion in recent years (SIGAR, 2017, P,iv). and Afghan Taliban earned around $155 million in 2009 (UNODC, 2011). This massive production enabled the Taliban to generate substantial income through the taxation of farmers and control of trafficking networks.

TAXATION ON FARMERS

Between 2007 and 2021, the Taliban imposed significant taxes on farmers in areas under its control, especially on opium poppy cultivation. These taxes, often presented as *zakat*[1] زکات (alms) or *ushr*[2] عشر (tithe), amounted to 10–15% of opium output. Collected revenues funded weapons, equipment and fighter salaries.

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1 *Zakat* is one of the five pillars of Islam that are obligatory for every capable Muslim. It is an act of charity that is given to the eligible people of *zakat* as discussed in the holy Quran. https://ulumalazhar.com/what-is-zakat-in-islam-a-guide-to-obligatory/#What_is_Zakat_in_Islam

2 *Ushr* is a tax on the agricultural produce of land levied on the Muslims at the rate of 10% if the land is irrigated by rainfall and at the rate of 5% if the land is irrigated artificially. https://islamicmarkets.com/dictionary/a/al-ushr#:~:text=Definition%20of%20%22Al%2D'ushr,See%20also%20al%2Dzakah.

Although lacking a centralised tax system, local commanders enforced collections by force. These funds were mainly used for military and terrorist activities against Afghan civilians and international forces.

A 2012 UN report noted: "Where they can, the Taliban raise two forms of traditional taxation, namely, *ushr*, a 10% tax on harvest, and *zakat*, a 2.5% tax on wealth. As the main economic activity in areas under Taliban control is farming, much of its poppy cultivation, *ushr* is the main source of their income; but the Taliban will also tax services, such as water or electricity, although they have no influence over their supply" (Domínguez, 2016)

CONTROL OF SMUGGLING NETWORKS

The Taliban did not merely supervise opium poppy cultivation but also controlled key drug trafficking networks comprising local traders, corrupt officials and international criminal groups. These networks enabled opium smuggling to Pakistan, Iran and Turkey. Revenues from trafficking amounted to hundreds of millions of dollars annually, fuelling Taliban military operations.

Three major smuggling routes run from Afghanistan: westward through Iran and Turkey toward the Balkans, northward through Central Asia to Russia and Eastern Europe, and southward via Pakistan and the Indian Ocean to the Gulf of Oman and Africa. The Taliban, cooperating with groups such as Tehrik-i-Taliban Pakistan (TTP), Jaish ul-Adl, Ansarullah (Tajikistan) and the Islamic Movement of Uzbekistan, as well as transnational criminal groups, co-managed much of these routes, also facilitating trafficking in migrants, humans, goods and US dollars.

Their involvement was multilayered. Many smugglers were Taliban members who viewed trafficking as a core source of income. Others were taxed by the Taliban through *zakat* and *ushr* systems, collecting portions of the drug value from producers. Those who resisted these taxes faced harsh punishments, including death (Domínguez, 2016). Numerous reports confirm that the Taliban maintained systematic control over these networks.

A former Afghan National Police officer in Nimroz told me: "Where no government forces existed, the Taliban created insecurity to ease the path for traffickers." He added that the Taliban not only trafficked themselves but also helped recruit individuals into networks managed by others (Author, personal communication, March 24, 2025).

The map of poppy fields and drug labs over the past two decades shows a direct link between insecurity and narcotics. Southern provinces such as Helmand, Kandahar, Urozgan and Zabul, which were highly insecure after 2007, also hosted the highest poppy cultivation and lab concentrations.

A US House Foreign Relations Committee report confirms this link, calling narcotics in Helmand the Taliban's primary source of income: "If the operation in Helmand Province displaces the Taliban and disconnects the insurgency from one of its prime sources of drugs, it will represent a critical step... But it is only a start..." (United States Senate, 2010, p. 13).

During my role as Head of Criminal Investigations in 2021, we documented Taliban groups collecting up to 10% protection fees from traffickers and farmers in Helmand, Urozgan, Zabul, Nimroz and Nangarhar. Taliban fighters protected shipments and stored drugs in exchange for cash. They also coordinated transport with smuggling groups.

Domínguez (2016) confirms this strategy: "The Taliban receive large sums from traffickers because they protect drug markets, escort convoys, and facilitate transportation," said a Helmand resident.

Another Taliban tactic was eliminating competitors to secure control over the drug economy. In various provinces, they partnered with networks and used violence to remove rivals, further consolidating their grip.

DEFORESTATION AND TIMBER SMUGGLING

Afghanistan's forests, especially in the east and south, were extensively cut down by the Taliban and smuggled to countries such as Pakistan. These activities not only harmed the environment but also served as a key income source for the Taliban.

Regions such as Nangarhar, Kunar, Khost, Nuristan and Paktia became hubs for deforestation. The Taliban used local labour and simple equipment to cut trees and smuggle timber. Felled timber was moved across unofficial crossings into Pakistan. The Taliban used extensive smuggling networks, including local traders, corrupt officials and international criminal groups. The timber was sold in markets in Pakistan and beyond, generating large revenues.

A member of the Afghan Senate claimed in an interview with the media in 2017 that approximately 3,000 trees from the forests of Kunar province were being cut down and smuggled every day by anti-government forces (Nida, 2017). At that time, the Taliban was the only armed group operating in remote areas of Kunar province. Later reports suggested that the forests of this province had also become a key financial source for ISIS-Khorasan (Glinski, 2019), which used the same methods and networks for timber smuggling that the Taliban had initiated.

REGIONAL AND INTERNATIONAL CONSEQUENCES

The Taliban's illicit financial activities have had far-reaching consequences beyond Afghanistan, affecting both regional stability and global security. These include the strengthening of transnational criminal networks, rising drug and arms trafficking and the Taliban's expanded ties with international terrorist organisation. This section examines these impacts and their broader implications for regional and global security.

Strengthening of transnational criminal networks

The Taliban's illegal financial activities helped strengthen transnational criminal networks. These networks included groups involved in the trafficking of drugs, weapons and humans, operating at both a regional and international level.

According to multiple reports, migrant smuggling networks had close ties with drug trafficking networks, particularly in western Afghanistan, which was under Taliban control. These networks cooperated to protect

shipments of narcotics and migrants as they were smuggled through Iran, resulting in substantial profits for the Taliban.

Given the widespread and ongoing illegal migration of Afghan citizens to neighbouring countries, especially Iran, and from there to Turkey in the hope of reaching European countries, this process presented a major opportunity for the Taliban and the drug trafficking networks under its control or alignment. Mohammad Asif (a pseudonym), an Afghan migrant who crossed into Iran illegally from the border region of Nimroz province in western Afghanistan in 2019, recalled that among the group of migrants, some individuals who could not afford to pay the smugglers' fees were asked to carry small amounts of narcotics, which they later discovered upon reaching Esfahan in Iran. (Author, personal communication, March 21, 2025)

Increased interaction with international terrorist groups

Illegal resource exploitation has increased cooperation among terrorist groups inside and near Afghanistan. Each group controlled certain territories and needed mutual support for mining, drug processing, timber smuggling and financial flows. The Taliban has acted as an umbrella for groups like al-Qaeda and TTP, who received funds via resource smuggling. Informal systems such as *hawala*[3] remain widely used to transfer these funds.

These partnerships have heightened regional and global insecurity, leading to increased violence and a stronger presence of terrorist organisations. Moreover, illicit revenues have allowed the Taliban to acquire and traffic advanced weapons used both inside Afghanistan and in neighbouring countries, intensifying regional violence.

Additionally, the Taliban's illegal trade practices have damaged the legal economy, especially in mining. Illicitly extracted resources are sold far below market value, making legal operators uncompetitive.

[3] *Hawala* – حواله – the remittance system is an informal mechanism for transferring money, where cash is delivered at one point in the world and received at another with a code, typically for a low fee. This process is commonly used in Afghanistan, Iran and Pakistan, even in the daily transactions of people.

2. THE TALIBAN AFTER 2021

In August 2021, following political agreements between the United States and the Taliban, and the cessation of NATO's military aid, particularly from the United States, the government of Afghanistan collapsed. The Taliban declared the re-establishment of their regime under the name "Islamic Emirate of Afghanistan". Despite the fact that no country officially recognises this regime, and the group is accused of committing extensive international crimes, including genocide and gross human rights violations, especially against women, the Taliban has managed to secure political and economic relations with several countries, including China, Russia, Iran and some Central Asian nations, by leveraging Afghanistan's natural resources.

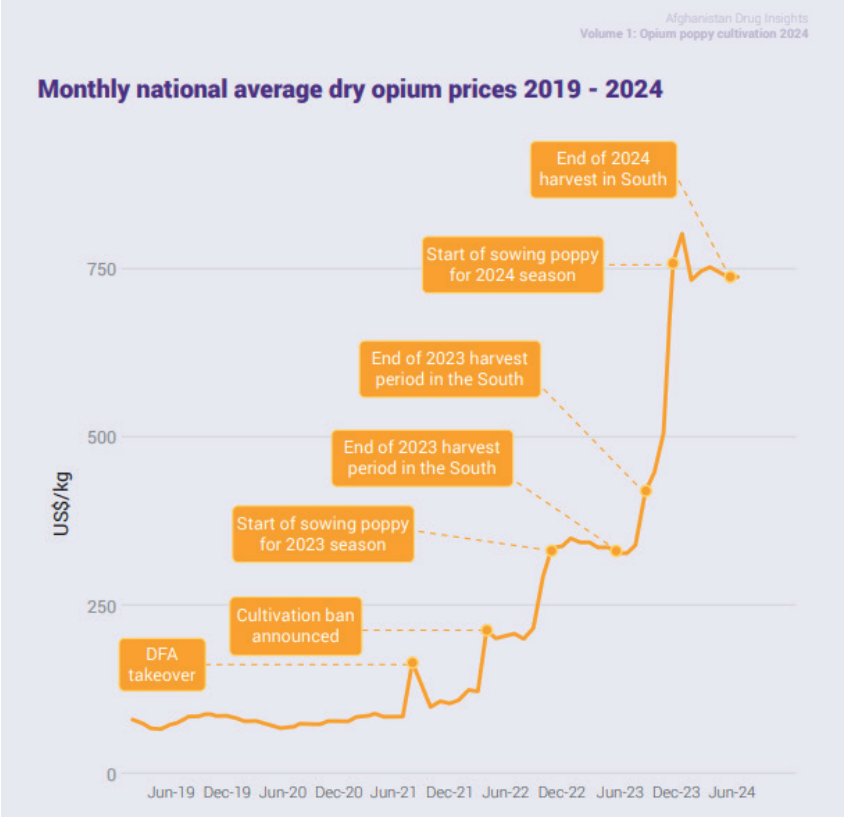
The Taliban regime operates in an absolute legal vacuum, without any transparent financial mechanisms. They have handed over Afghanistan's natural resources to foreign companies, primarily from China, and some local companies, for extraction, leading to enormous financial gains. Former Vice Chancellor of Kabul University Reza Farzam (2024), in a research article, describes the current situation as the plundering of Afghanistan's natural resources by the Taliban. He documents several instances of illegal actions by the Taliban and their signing of contracts with companies that are not even operational, highlighting the unregulated extraction of Afghanistan's natural resources.

At the same time, studies show that the Taliban in many provinces, especially in winter, have been recklessly cutting down forests to use as fuel, which has opened the door for further exploitation by others (Etilaatroz Newspaper, 2023). Additionally, during the first two years (2022–2023), coal extraction increased dramatically beyond necessity, becoming an unprecedented source of financial income (Langar, 2022).

Although the Taliban announced a ban on the cultivation of opium poppy, multiple reports from neighbouring countries' police officials, especially from Iran, suggest that there has been no change in the volume

of drug trafficking originating from Afghanistan. Some analysts believe that the ban on poppy cultivation is a tactic used by the Taliban to monopolise the drug trade. This has allowed the group to increase its control over drug reserves and trafficking, while pressuring farmers who previously cultivated opium to cease and take control of the reserves for themselves. In response to market demand, the Taliban has shifted towards the production of synthetic drugs (Taban, 2024, p 125).

According to a report by the UNODC, the price of opium in Afghanistan has increased significantly since the Taliban took power (UNODC, 2024). Furthermore, some experts assert that the Taliban has shifted its focus from heroin production to methamphetamine production (O'Donnell, 2024).



GRAPH 1: MONTHLY NATIONAL AVERAGE DRY OPIUM PRICES 2019–2024 (UNODC, 2024).

CONCLUSIONS

Natural resources are a fundamental part of national wealth and human development, and their effective management can have a significant impact on improving a country's economic and social conditions. However, in fragile or conflict-ridden countries, illegal exploitation of these resources often strengthens non-state actors, including terrorist groups, and leads to disastrous consequences at both a regional and global level.

In Afghanistan, the Taliban's illegal exploitation of resources such as gold, lapis lazuli, oil, gas and forests has not only increased the group's income but also had negative effects on regional and global security. These resources have contributed to the growth of transnational criminal networks, the spread of religious extremism, drug trafficking and cooperation with international terrorist groups. The income derived from these resources has enhanced the Taliban's ability to purchase weapons, recruit fighters and expand territorial control.

The corruption cycle in Afghanistan has been facilitated by the involvement of regional terrorist networks, cross-border criminal groups and high-demand markets. The Taliban has also benefited from sharing profits with corrupt officials in the former Afghan government and neighbouring countries and exploited legal gaps in the West to increase drug production, further strengthening their financial resources.

From 2001 to 2021, the Taliban's reliance on illegal income sources to sustain its war against the Afghan government and NATO forces was evident. This pattern continued after the Taliban regained power and was even reinforced, as the group openly disregarded international laws and standards, transitioning from traditional drugs to industrial substances such as methamphetamines.

Addressing this issue requires urgent, coordinated and multilateral action at both the regional and global level. Governments must adopt a pragmatic approach in dealing with the Taliban and refrain from signing illegal contracts. The development and implementation of a coordinated

international strategy to combat drug trafficking and illegal trade, independent of individual countries' political interests, is essential.

Any negligence by the involved countries could undermine collective efforts. Strengthening laws, increasing penalties for those involved in the trafficking of natural resources and cultural heritage, and dismantling financial networks linked to the Taliban are immediate and necessary actions. Long-term solutions must address the structural roots of the problem, including weak governance, systemic corruption and the informal economy.

International cooperation is vital for the sustainable control of this phenomenon. Future policies should focus on promoting transparency in natural resource management, reducing local communities' reliance on illegal markets, and monitoring the role of multinational companies and financial intermediaries in this cycle. Only through such comprehensive strategies can effective counterterrorism financing be achieved.

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From the reviews

A strong asset of this monograph is its interdisciplinary character, which is particularly important, as such an approach should guide contemporary reflections on energy security, including in the context of access to natural resources. The authors draw on various scientific disciplines, such as international relations, security studies, political economy, environmental and development management, as well as regional studies. It is also worth emphasising that, according to the declaration in the introduction, the authors of the individual texts are young researchers, likely from different countries, which may contribute to presenting a broader and fresher perspective on the issues under analysis.

Prof. dr hab. Andrzej Podraza

The publication submitted for review contains a collection of chapters of significant scholarly value. This value stems from the fact that most of the authors address important issues that are also current from the perspective of decision-makers, members of the academic community, and, no less importantly, readers seeking to understand the problems discussed in the individual texts.

Dr hab. Robert Kłaczyński, prof. UKEN

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