Regulating Artisan and Small-Scale Mining in the Democratic Republic of the Congo: Approaches and Challenges

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Table of Contents

List of Figures

Abbreviations

3T	Tin, Tungsten, Tantalum
ASM	Artisanal and Small-Scale Mining
CFR	Council on Foreign Relations
DRC	Democratic Republic of the Congo
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
IGF	Intergovernmental Forum
IMF	International Monetary Fund
KPN	Katanga Policy Network
LSM	Large-Scale Mining
MME	Ministry of Mines and Energy
MMR	Mineral Mining Resources
MNC	Multinational Corporations
NGO	Non-Governmental Organisation
OECD	Organisation for Economic Co-operation and Development
PPP	Public-Private Partnership
SDG	Sustainable Development Goals
tr	Trillion
UN	United Nations
UNDP	United Nations Development Programme
USGS	United States Geological Survey
U.S.	United States
ZEA	Artisanal Exploitation Zones

Abstract

The Democratic Republic of the Congo (DRC) is a mineral resource-rich country that has seen significant growth in mining over recent decades. This has provided a space for the Artisanal and Small-Scale Mining (ASM) sector to emerge as an important source of employment in this impoverished country. ASM in the DRC is primarily an unregulated informal sector that directly employs one million Congolese people. The ASM sector is plagued by complex issues, including facilitating the trade in conflict minerals, which is a funding mechanism for ongoing armed conflicts in the Eastern Provinces of North and South Kivu. ASM mining activities are also the cause of significant health and environmental impacts and contributes to the exploitation of child labour. This means there is a need to establish both a policy and a regulatory framework to support the ASM sector while protecting people and the environment from harmful consequences.

This thesis investigates attempts by the DRC government to establish a cohesive mining policy that incorporates an ASM regulatory framework and the challenges that prohibit it. A desktop review of the secondary literature was undertaken using key search terms focused on secondary sources from specific databases to extract archived sources and data. The databases searched included: ProQuest, Google Scholar, SpringerLink, Wiley Online Library, and the OECD Library.

The research found that the attempts by the DRC state and local level governments to regulate have been motivated by economic interests rather than to address the environmental effects, which has been the case in some comparative countries. Economic interests have focused on maximising profits, whereas countries that have focused on environmental interests have focused on minimising the environmental impacts of ASM. In the DRC, a state-based partnership with a private actor created a monopoly that only served two specific commodities in the ASM sector. More recently, the state has restricted export trade in Cobalt to affect market pricing to drive prices upward. This illustrates that state interference in the sector is a distinct barrier and deterrent to attracting more private actors with Foreign Direct Investment (FDI). The way forward is for the DRC to resolve the conflicts and not exert power over PPPs by limiting export trade and potential profitability. Without establishing a peaceful environment, there can be no successful attempt to regulate the ASM sector and reduce poverty, which has been achieved in one of the comparative countries examined in this thesis.

Statement of Originality

Declaration

I certify that this thesis does not incorporate without acknowledgement any material previously submitted for a degree or diploma in any university and that to the best of my knowledge and to the best of my knowledge and belief, does not contain any material previously published or written by another person except where due reference is made in the text

Signed: ……Trezor Zaira……...
Date: 7/11/2021

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Chapter 1: Introduction

1.1 Artisan Mining and the Political Economy of the DRC

Since 1960, the post-colonial DRC has been marked by political crises and conflict, resulting in continuous social and economic instability. This has meant that free-market neoliberalism has never been fully implemented in many parts of Africa, including the DRC (Moore 2001; Vanthemsche 2012). However, the increased worldwide demand for cobalt for lithium batteries and coltan for resistors with the development of smartphones, tablets and national broadband networks presents the DRC with a unique opportunity to take advantage of global market opportunities.

The DRCs natural mineral wealth is estimated at US$24tr and places the country as one of the resource-wealthiest in the world (Globaledge 2020). Coupled with changing global production dynamics, the increased demand for cobalt and other minerals has led to a flourishing artisan mining sector in the DRC (Schütte & Näher 2020). Private actors such as Apple, Dell, Microsoft, Sony, Google, Tesla, Samsung, Daimler AG, and Volkswagen have been capitalising and exploiting the DRCs natural wealth, the lack of regulation of the mining sector and low labour costs (Sovacool 2019; Fudget-Galvez 2020). As a result of global demand, ASM has expanded, bringing much-needed employment opportunities to Congolese society.

There is no generally accepted definition of artisan mining; however, the OECD Due Diligence Guidelines defines ASM as: 'formal or informal mining operations with predominantly simplified forms of exploration, extraction, processing and transportation' (OECD 2016, p. 65). Typically, ASM requires minimal capital to commence operations and is a high labour-intensive technology (Sidorenko, Sairinen & Moore 2020). Artisan mining generates a low productive output but serves as an essential source of income, particularly in low-income and poverty-stricken areas (Ávila 2003; Fritz et al. 2018). D'Avignon (2018) notes that ASM is typically illegal and operated without a regulatory framework. Bryceson and Jønsson (2013) point out that many people working in ASM spend their entire professional life in this industry, indicating that it provides an essential means for many to sustain employment. In the DRC, artisanal and small-scale mining has been defined by

Congolese law as extracting and concentrating mineral substances using artisanal tools, methods, and processes (Congolese Mining Code 2002).

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Figure 1.1 Tantalum Ore Price – Reflecting Global Demand 1995-2016
(prnnewswire.com 2015).

One primary mineral mined in Eastern DRC is coltan, which is needed to make tantalum capacitors found in electronic devices, particularly mobile phone technology (USGS 2008). Between 2004 and 2014 that there was a 250 per cent increase in the productive capacity of tantalum from 600 tonnes to 2000 tonnes, with the price increasing from 2010, indicating recovery from the Global Financial Crisis (Figure 1.1; The Hague Centre for Strategic Studies 2013; Schütte & Näher 2020). Central and East Africa are now the largest producers of tantalum ore, accounting for 50 per cent of global tantalum mined in 2018 (Schütte & Näher 2020).

Similarly, the DRC holds over 50 per cent of the world's cobalt resources and accounts for more than 70 per cent of global cobalt production, with approximately 15-30 per cent of that being mined by artisan miners (CFR 2020). The DRC's productive capacity of cobalt

increased by 50 per cent between 2010 and 2018, while total mine production increased only by 10 per cent (Figure 1.2). This suggests that the DRCs share of cobalt production has overtaken other countries, while Australia and Canada's have shrunk. Despite this vast increase in cobalt output, it is estimated that as of 2019 that the DRC still held the largest cobalt reserves in the world (Sovacool 2019).

Over the past three decades, the demand for cobalt has risen threefold, paralleling digital technology's growth and declining demand for carbon-based products (Calvão, Mcdonald & Bolay 2021). With a move to decrease global carbon emissions, the growing demand for battery use for cars, mobile devices, and solar storage presents an economic opportunity for the DRC to further increase productive capacity to meet this demand. But it also presents a series of challenges as to how best to regulate the potential growth of the ASM sector, as any further growth will certainly correlate to an increase in ASM activity and have consequential effects.

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Figure 1.2 Cobalt Mining Production 2010-2018
(Sovacool 2019).

There is a direct correlation between the increase in artisan mining in the DRC and the demand for minerals. According to the Intergovernmental Forum on Mining, Minerals, Metals and Sustainable Development (2017), from 1999 to 2017, global artisan mining increased threefold from 13 to 40 million mining operators. Over twenty-five years, it rose 666 per cent from 6 million to over 40 million from 1993-2017 (Figure 1.3, Fritz et al. 2018).

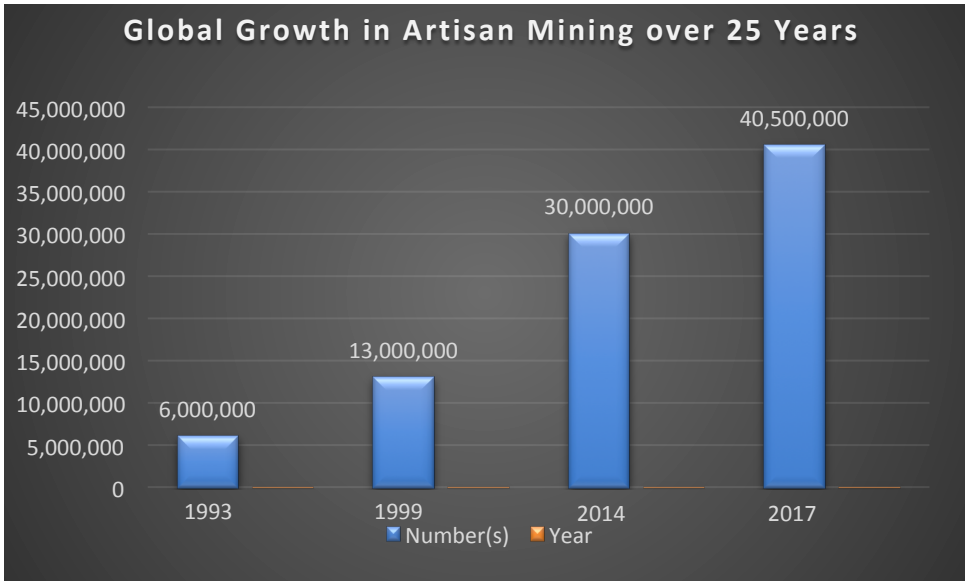

Figure 1.3. Number of ASM Operators Worldwide:
Shows the Growth in the Number of ASM Operators Worldwide Between 1993 and 2017. (Fritz et al. 2018).

For over two decades, mineral exploitation in the DRC has been dominated by western corporations, including some underwritten by multinational financial institutions such as Citibank in the DRC (Montague & Berrigan 2001). Often the exploitation of the DRCs natural resources has been facilitated by western governments like the USA, which have brokered agreements between US corporations and Eastern region coltan dealers (Montague & Berrigan 2001). These coltan dealers are frequently warlords and rebels who use the proceeds from conflict or 'blood' minerals to fund the acquisition of weapons (Montague & Berrigan 2001). These weapons perpetuate existing conflicts in the Eastern region of the DRC and worsen the social conditions of those living in this area. It can be argued that this is due to a lack of a regulatory framework that could restrict the trade of conflict minerals that fund these activities, which is a consequence of a broader lack of governance structure within the DRC (Mahoney 2016).

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Figure 1.4 Artisanal mining sites of the DRC classified by minerals
(Kyba et al. 2019, p154)

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Figure 1.5 DRC Provinces
(Africa Center for Strategic Studies 2016)

Figure 1.4 shows the distribution of ASM by mineral type within the DRC Provinces. Figure 1.5 shows the decoupage of the provinces from 11 (on the left) to 26 (on the right). The maps clearly show the distribution is heavily concentrated across the Eastern provinces, with coltan predominantly found in the Kivu provinces and Katanga, where conflicts remain an issue. The geographic distribution is intensely located in Eastern Provinces suggests that governance is a primary concern not just for the ASM sector but also for the wider geographic area. It would be necessary to end the conflicts for any governance to be enacted. However, how to do so is the challenge. To date, all attempts have been unsuccessful.

1.2 Regulating Mining in a Neoliberal Environment

For four decades, most governments worldwide have adopted a political approach that has placed 'the market' at the centre of their economic agenda. Neoliberalism is focused on free markets and free trade to organise the economy (MacLaran & Kelly 2014). It has been stated that 'the linchpin of neoliberal ideology is the belief that open, competitive, and unregulated markets, liberated from all forms of state interference, represent the optimal mechanism for economic development' (Brenner & Theodore 2002, p. 350). It is also a doctrine for change, especially in the political context that focuses on deregulation, trickle-down economics, and privatisation. The state assumes a new role in governance that creates a favourable environment for private sector activity and regulates specific sectors (Peck & Tickell 2002; Pallumbo & Bellamy 2010).

Although neoliberalism is often associated with a 'deregulated' economic approach to free trade and promotes competition, Peck and Tickell (2002, p.390) argued that market failures have led states 'to embrace a range of extramarket forms of governance and regulation.' The transition from 'government' to 'governance' changed the ways governments relate to society through a greater emphasis on regulatory processes (Palumbo & Bellamy 2010). However, in Africa, it has been typically the case that artisan mining has been regulated by modifying existing frameworks (Mutemeri et al. 2016). Using existing frameworks that are not specifically targeted at ASM does not address the distinct needs of ASM, but it also does not reflect the contemporary approach of governance.

Neoliberalism stresses a deregulated free-market approach to economic activities (Hayek 1945; Harvey 2005). This suggests that society would benefit from a lack of regulation since entrepreneurial opportunism could thrive, which the government can only achieve by not restricting trade. In the DRC, artisan mining has remained primarily unregulated at the state level. However, as of 2018, the DRC Regulatory Authority passed a law that required private actors to only engage with those artisan miners who belonged to cooperatives (Calvão, Mcdonald & Bolay 2021). Mining cooperatives are essentially NGOs representing artisan miners and their socio-economic interests by advocating policies that support their productive capacity (Fonteneau et al. 2011).

In the Eastern provinces of North and South Kivu, miners must form cooperatives to be legally recognised at the governmental level and as legitimate traders (De Haan & Geenen 2016). However, the reality is that those cooperatives are controlled by 'customary elites' to exude power and for political and economic gain (De Haan & Geenen 2016). Most artisan miners are still operating in an unregulated industry with significant risks (Rigterink & van de Walle 2020). The lack of regulation poses significant risks to communities and their peace, security, and general safety (Singo & Seguin 2018). However, the lack of regulation has also enabled thousands of artisan miners to take advantage of the sector's growing demand and exploit the opportunities that prevail from a neoliberal economic approach. Furthermore, given the DRCs poverty levels, it has enabled those artisan miners to forge a living in rural areas dominated by 'poverty-stricken subsistence practices.' (Calvão, Mcdonald & Bolay 2021).

Most governments and policymakers agree that the artisan mining sector should be regulated through a legal framework and controlled by a central state system (Geenen 2012; Singo & Seguin 2018). This would effectively curtail the exploitation of miners, reduce risks to health and the environment, help alleviate money laundering, human rights violations, and the financing of illegal weapons. Regulating the sector presents new sets of challenges. Firstly, private actors are critical to establishing regulatory enforcement, particularly where trade is concerned (Siegel, Spapens & van Uhm 2020). Secondly, regulatory frameworks have resulted in the emergence of illegal operators, private actors, including corporations, that have exploited loopholes in regulatory frameworks, thereby reducing the effectiveness of governance (Siegel, Spapens & van Uhm 2020). Thirdly, in a neoliberal context of shared governance responsibilities, designing accountability and compliance mechanisms that can

effectively monitor those private actors is challenging. This is because these private actors are primarily focused on economic profit. The state needs to hold these actors accountable through effective compliance mechanisms (Siegel, Spapens & van Uhm 2020).

1.3 Aims, Objectives, and Significance

This thesis examines the issue of the lack of a cohesive governance strategy for the DRCs artisanal mining sector. It explores whether public-private partnerships can be an effective framework in countries like the DRC, where the state has not regulated the sector.

This thesis will propose to investigate the following research question:

> What challenges prohibit the DRC from establishing a cohesive ASM policy and regulatory framework to lessen health and environmental risks?

This research will draw from a specific case study, the Katanga Policy Network, alongside other cases drawn from Chile, Colombia, Ghana, and Mongolia to establish a comparative understanding of how their frameworks differ, what has worked, and under what circumstances. It will examine the effects of labour exploitation, the driving force behind ASM regulation in these countries, and consider the effects of labour exploitation.

The significance of this research is threefold. Firstly, regulation helps promote the political stability required for free markets to flourish (Aikins 2009). Greater internal security would make private actors feel secure about investing in the DRC and take advantage of the economic opportunities in the mining sector. The DRC is desperate for economic investment, with more than 66 million citizens living on US$1.90 a day (UNDP 2019). While laws protect foreign investments, the state's limited capacity to implement them effectively generates insecurity among prospective investors. Furthermore, it detracts from enticing the investment required to achieve significant change on a socio-economic development level that could increase living standards.

1.4 Research Methods

A Systematic desktop review of the secondary literature will be undertaken primarily using secondary sources from specific databases to extract archived sources and data. The

databases searched included: ProQuest, Google Scholar, SpringerLink, the Wiley Online Library, and the OECD Library. In searching these databases, this thesis employed the following search words to collect information from secondary sources to address the research question.

Key search terms: artisanal small-scale mining (ASM), coltan, cobalt, large-scale mining (LSM), DRC, health, environment, technology, impact, demand, workers, policy, framework(s).

1.5 Organisation of the Chapters

This thesis is structured in six chapters, with chapter one discussing the contextual background of the political economy of the DRC and how artisan mining is a largely unregulated sector. It discussed how neoliberalism advocates market deregulation and how regulation is accommodated within this ideological framework. Within this context, the chapter presents the research problem and its relevance.

Chapter two presents the literature review focusing on artisan mining in Africa and the DRC. It will discuss the role of states in regulating economic activity and the current value of artisan mining from a macroeconomic perspective. Furthermore, it discusses arguments for regulating the ASM sector and frameworks that exist.

Chapter three addresses the social and economic impacts of artisan mining in the DRC. Among the key social issues, it discusses the exploitation of child workers and the impacts on miners' health and the environment. Concerning economic impacts, it considers the microeconomic effects of artisan mining within the context of poverty levels within the DRC.

Chapter four identifies possible frameworks for regulation. It evaluates how any framework could regulate the sector within the theoretical construct of neoliberalism and achieve economic growth. Furthermore, it will consider the role of the state and private actors in regulating the mining sector.

Chapter five assesses existing policymaking in the artisan mining sector. It outlines the Katanga Policy Network and regulatory efforts made by four countries: Chile, Colombia,

Ghana, and Mongolia, and evaluates their underlying motives for forming a policy framework and its effectiveness.

Chapter six concludes by summarising the thesis chapters. It identifies the main findings and presents possible further research.

Chapter 2: Literature Review of ASM in the DRC

2.1 Introduction

This chapter provides an overview of ASM and how the demand for minerals has accelerated its growth globally and in the DRC. It discusses the scope and historical context of ASM in the DRC. It identifies the policy struggles between ASM and LSM and the role that multinational corporations (MNCs) have played in driving the growth and its economic impact. It explains the effects reforms to date have had and the arguments for and against regulating the sector.

Around 80 countries globally have artisan and small-scale mining sectors; it is estimated that there are around 40 million artisan miners. However, it has been suggested that this number may be as high as 100 million. Comparatively, large-scale mining accounts for 7 million workers worldwide (World Bank 2013; Fritz et al. 2018). Therefore, the scale of ASM in terms of employment is considerably greater at six to twelve times as many miners. Thus, there is a significant economic benefit and impact to be considered when regulating the sector.

In Africa, 70-80 per cent of artisan mining is informal and spans 40 countries, including 23 in sub-Saharan Africa (Fritz et al. 2018). Artisan mining is typically conducted in copper, diamonds, gold, tin, cobalt, coltan, and sapphires, amongst other minerals (Schwartz, Lee & Darrah 2021). Recent research suggests that conservatively the number of artisan miners in Africa is approximately 9 million, but four and twelve times as many people depend on this sector for their livelihoods (Ledwaba & Nhlengetwa 2016; Persaud et al. 2017; Hilson & McQuilken 2014). Thus, as many as 60 million Africans rely on ASM (Fritz et al. 2018). The lack of accurate data on the sector is due to the activity being informal and/or illegal (AMDC 2015). While ASM is mostly informal and generally lacks a regulatory framework, some states have formalised ASM and have legislated that ASM must be licensed. One such example is Ghana, discussed in chapter five.

2.2 Artisanal Mining in the DRC

Since 1983, the ASM sector has been significantly increasing both in terms of employment and productive capacity. It is now estimated that there are 1 million artisan miners in the DRC, and the dependency of ASM, which includes families and associated businesses, is approximately six-fold that of operators (Fritz et al. 2018). ASM mining is seen as providing a viable income as compared to agricultural work alone. Further economic analysis of ASM incomes is discussed in chapter three (see Figure 3.1).

The DRC government initially supported the unregulated growth as it sought to take advantage of mineral resources to trade during the economic hardship of the period (Geenen & Radley 2014). During the Congo wars from 1996-2003, several mining areas came under the control of armed groups to increase funding for their military actions (Geenen & Radley 2014). These paramilitary takeovers occurred in the Eastern provinces where the primary coltan deposits are situated, such as North and South Kivu, two provinces still undergoing conflict today. As of 2009, Eastern DRC had 23 coltan mining sites, with North Kivu having fourteen and South Kivu having nine sites (Nest 2011). In the Eastern province of Katanga, cobalt mining has achieved record levels of growth and development due to the lack of conflicts that have precipitated in increased economic activity (Garrett & Lintzer 2010). However, attaining the same levels in the Kivu provinces will be a lengthy process due to the logistical challenges brought about by continued conflict and security concerns (see Figures 1.4 and 1.5 in chapter 1) (Geenen & Radley 2014).

The rise of ASM has also been promoted by high levels of poverty, which has facilitated the exploitation of workers. The conflict-prone Kivu provinces have been continually prone to 'conflict minerals' traded by rebels and government forces to provide financial support for the ongoing war (Diemel & Hilhorst 2018). The armed conflicts in these provinces are funded through the illegal trade of those minerals mined by those ASM workers held hostage to work due to poverty. This vicious cycle stems from the lack of political stability in the DRC and an underlying lack of infrastructure hindering economic development, which is needed to improve living standards (Guyguy & Xu 2019).

The government has struggled with managing the demand for resources and competitive aspects of corporate profitability, balancing and regulating sectors like ASM, and protecting its citizens against human rights and social justice violations (Ayres 2012). Many mines are controlled ostensibly by warlords who seek to profiteer to sustain financial operations, which

adds additional pressure on the counterbalance of judicial and political enforcement of the sector. There is a need to control the trade in arms and blood minerals by regulating the ASM sector and enforcing agreements while maintaining free trade in minerals such as coltan (Ayres 2012). The state must hold private actors to account where they have acted to support known mines that contribute to violence and where minerals are being traded (Ayres 2012). In addition, the state must also ensure that regulatory control does not diminish the Congolese people livelihoods derived from the ASM sector.

2.3 The Role of the State in Regulating ASM

Legislation of the ASM in the DRC began shortly after the second Congo war 1998-2003 with the passing of three legal documents: the 2002 Mining Code, the 2002 Investment Code, and the 2003 Mining Regulations (Geenen & Radley 2014). These documents not only provided legal structure to the ASM sector but have been instrumental in determining how ASM is directed in Eastern DRC (Geenen & Radley 2014). The most significant of the documents, the DRCs 2002 Mining Code, sets out how artisan miners as part of cooperatives are legally permitted to work only in those areas recognised officially as artisanal exploitation zones (ZEAs) (Geenen & Radley 2014). Artisan miners in these ZEAs must have an annual *carte d'exploitant artisanal*, an official authority that permits them to mine and complies with Mining Regulations that protect the environment and water usage hygiene and security (Geenen & Radley 2014). These permits have been viewed as a step toward regulating and formalising ASM in South Kivu.

The DRC government has been slow to recognise the need to legislate an ASM framework. Instead, it has been looking to redirect the focus from ASM to large-scale mining (LSM) projects and attract foreign direct investment (Geenen & Radley 2014). The World Bank has been a proponent in regulating the sector by investing significant sums (US$1.2 bn between 1988-2012) in attracting foreign investment in LSM (Hilson, Hilson & McQuilken 2016). Similarly, the DRC government has also had considerable financial support from the International Monetary Fund. Their view was that they could generate greater revenues from large-scale mining companies rather than extract income from independent ASM miners (Geenen & Radley 2014). The DRC government believes that having more LSM projects would generate greater profits and be easier to control than ASM (Geenen & Radley 2014).

Subsequent governments have attempted to invoke policy initiatives directed at both ending the conflicts and ending the practice of exploiting those mineral resources for financial gain, without consideration for its impact, thereby attempting to reshape ASM in the provinces (Diemel & Hilhorst 2018). This pits the two sectors at different crossroads. On the one hand, the government needs to revitalise the LSM sector who want specialised considerations in exchange for their FDI. At the same time, the ASM sector with limited resources still operates unregulated and serves a primary economic function while also fuelling conflict in the Eastern provinces.

This contrast can be bridged by recognising that ASM is essential as it is entwined with LSM in the global cobalt supply chain and is integral to increasing development by creating so many jobs (Baumann-Pauly 2020). The need to regulate ASM has been driven by mitigating environmental and health impacts (Singo & Seguin 2018). Furthermore, it would mean increased licensing fees and tax revenues, along with responsible sourcing, which could help to reduce the funding source of the conflicts (Calvão et al. 2021). ASM mining reforms in the Katanga province that commenced in 2010-2011, included changes to taxation, introducing cooperatives, and governance, and have been subject to significant debate about their perceived level of success and particularly the consequences of these initiatives (Diemel & Hilhorst 2018). The reforms have been heralded as having increased governance and transparency by both NGOs and policymakers (OECD 2012). Bafilemba, Mueller and Lezhnev (2014) asserted that there had been a 67 per cent decrease in militarisation between 2010 and 2014.

However, according to other researchers, the reforms have had an adverse impact on the livelihoods of the ASM communities (Diemel & Hilhorst 2018). It has been suggested that the reforms have been directed primarily at reducing 'conflict-free sourcing' rather than focusing on bringing stability and peace to the provinces (Diemel & Hilhorst 2018). Rather than targeting conflict zones, the focus has been to target non-conflict zones, thus narrowing the scope of implementation and failing to recognise the impact of those policies on the artisan miners (Diemel & Hilhorst 2018).

The actual intention has been to target the conflict commodity rather than improve the Congolese people's socio-economic condition by advocating for due diligence instead of improving livelihoods (Diemel & Hilhorst 2018). Furthermore, they have been state-

sponsored with little regard for the economic impact on the ASM miners or their communities (Iguma 2017; Bashwira 2017). When such policy reforms are implemented, it has interrupted established trade patterns resulting in international mineral purchasers withdrawing from the DRCs market. This then impacts the ability to optimise the economic benefits from natural resource extraction within those areas and improve the livelihoods of the mining communities (Cuvelier et al. 2014; Diemel 2016). Given that ASM employs more people than the LSM sector, it follows that increasing LSM projects would not generate a significant number of job opportunities. The primary motivation for policy reform has been solely to lure capital investment into LSM activities and increase mineral rent through taxes and production levies.

2.4 The Role of Private Actors in the Mining Sector

Multinational financial institutions and western governments have been dominant in policy development, establishing and managing control mechanisms, and designing certification processes, particularly regarding to conflict minerals like diamonds (Siegel, Spapens & van Uhm 2020). This form of industry self-regulation sets penalties on those companies who violate the industry standard and works with the government to circumvent the continuation of trade in conflict minerals can have both positive and negative effects (Siegel, Spapens & van Uhm 2020). This shows how private actors can add value to a sector. It illustrates a cooperative approach between private actors such as MNCs and governments that enables the them to support local government and augment governmental activities across a sector while preserving the economic activity and providing oversight to protect their financial investment. It has been suggested that the private actors' role is justified because they can ensure best practices. This is because they play a central role in developing, financing, and providing due diligence to the sector, assuring global consumers (Diemel & Hilhorst 2019). However, there are some important drawbacks associated with industry self-regulation.

First, it suggests that the government is unwilling to police the sector, as they benefit from private actors assuming the responsibility. This also holds true when a government cannot undertake a more dominant role, as with the DRC. Second, Siegel, Spapens and van Uhm (2020) argue that private actors who establish their regulation and enforcement can also undermine established laws. For example, allowing private actors too much oversight and influence can allow corrupt practices within governing bodies, and criminal activities are

more likely. Through PPPs, state and private actors can collaborate to develop regulations and enforce governance (Bora 2017). However, there is a need for external audits of these PPPs to maintain compliance with existing law. The World Bank has supported the Ministry of Mines in implementing certification and tracking programmes at the mine sites has been underwriting the drive toward increasing governance in the sector (Diemel 2018). Similarly, with private mineral buyers paying civil servants' salaries and providing transport to access mine sites, they undertake to ensure credibility by ensuring due diligence, enabling them to claim responsible sourcing practices (Diemel & Hilhorst 2019). However, this could potentially pose a conflict of interest, as the private actors are ostensibly able to influence governmental officials.

2.5 Economic Impact of ASM: A Need to Formalise and Regulate

Globally, ASM accounts for 20-25 per cent of the production of cobalt, tantalum, gold, tin, and diamonds, and as such, it provides an enormous economic benefit (Schwartz, Lee & Darrah 2021). According to the World Bank (2019), ASM is considered 'indispensable' and 'the most important nonfarm activity in the developing world' and provides an opportunity to lessen rural poverty. ASM has replaced subsistence farming, especially since climate change has affected farmers' ability to derive a sustainable livelihood, and it offers employment opportunities for those who have lost their rural livelihoods. It represents a means to vary and augment rural people's income sources despite the inefficient nature of ASM (Schwartz, Lee & Darrah 2021). Thus, the emergence and growth of ASM provides a significant economic value to many developing countries on a global level.

However, for ASM to fully realise its full potential, the sector needs to be formalised and regulated (Debrah, Watson & Quansah 2014). If ASM is formalised, it can increase communities' prosperity without detrimental environmental impacts and thus create a sustainable practice for development due to its economic viability (Debrah, Watson & Quansah 2014). Regardless of ASM's inefficient practices, it does carry economic viability for it provides income, for so many citizens. Formalising the sector would mean establishing a legal and economic code that serves as a framework that considers regulatory compliance for worker safety, the environment, taxation, and mineral rights (Siegel & Veiga 2010; de Theije & Salman 2018). ASM policies have been initiated to regulate the sector in terms of protecting against child labour practices and assuring that artisan miners receive fair prices

across all aspects within the sector (O'Faircheallaigh & Corbett 2016). In addition, formalising ASM should consider the enforcement of land-use, property rights, and fiscal regulation and how this framework will affect social and environmental concerns (Salo et al. 2016). Thus, formalising the sector would enable the state to improve governance and thereby minimise negative impacts, but to do so, it must consider local mining perspectives (Salo et al. 2016).

Nonetheless, formalising the sector can have detrimental effects, requiring miners to go through application processes. The inherent legal costs are a deterrent and subsequently has increased illegal ASM practices (Aizawa 2016). Maintaining an informal standing is likely, so long as the economic benefits sustain a miner's living standard. The miners are willing to assume the legal and physical risks for greater economic returns, enabling them to feed their families (Aizawa 2016). In Africa, to increase formalised ASM practices, there has been a movement toward reducing the legal risks by offering motivational incentives (Aizawa 2016). Governments have attempted to offer specifically demarcated areas for ASM identified as mineral-rich where miners would purchase a license to mine (Aizawa 2016). This achieves control of the mining practice, revenue from license fees, taxes and royalties derived on a legal standing (Aizawa 2016). It also serves to limit ASM activities to specified geographical areas and thereby reduces the environmental impact. In addition, it serves as the first step to providing ASM miners access to land where they have rights to mine, and thus it is a form of formalising the practice.

In the DRC, attempts to formalise ASM have been bureaucratic and have failed to address the underlying issues of conflict, poverty, illegal practice, and state control (Geenen 2012; Wakenge et al. 2021). In Eastern DRC, the state government imposed a ban on mining at one stage, given the severity of the conflicts in several provinces (Geenen 2012). This radical decision reflected the need to enforce some degree of control in the provinces and represented a show of force by the state (Geenen 2012). However, it did not prevent the rebel forces from still undertaking mining practices and generating other forms of illegal income. It did not stop corruption, with compensation to legal authorities being offered in exchange for the ASM to continue (Geenen 2012).

The fact remains that a decade on, the DRC still struggles with formalising ASM despite a desire to do so. In 2019, the state formalised an agreement with Gécamines, a Congolese

commodity trading company that took control of ASM for copper and cobalt exports. Initially, this seemed like a potentially viable solution if it had been applied nationally. However, it fragmented the ASM sector by only targeting two commodities and giving one company a monopoly over these while leaving other ASM minerals unregulated. Both the state and local governments recognise the role and importance of ASM to the economy on both the micro and macro levels. However, the two appear opposed in their approaches to formalising the practice, as evidenced by the partnership with Gécamines and the Katanga Policy Network approach, which will be further discussed in chapter 5. The rationale to formalise ASM exists, but government departments lack resources and a capacity to follow through with any mandate (Singo & Seguin 2018). Regulatory reforms have been attempted but have had limited success (Wakenge et al. 2021). Meanwhile, mining revenues have increased while no universal formalised regulatory framework has been adopted.

Barriers exist for artisan miners, such as access to legal sites, lack of security, threats from rebels, extensive corruption, and administrative failings of local governments (Singo & Seguin 2018). Requiring any formal licensing has resulted in conflict between industry and the artisan miners who are forced into designated mining zones, which are expensive and a deterrent to miners (Singo & Seguin 2018). Consequently, many designated artisanal sites remain unmined for various reasons: lack of funding, armed conflict in an area, insufficient geological knowledge, and tensions between ASM and large-scale corporations (Singo & Seguin 2018). To further complicate matters, despite DRC law, many mine sites remain uninspected by the government. Thus, there is a lack of potential production and earning capacity (Singo & Seguin 2018). This latter point seems counter to the aim of the state, which has been to maximise profitability for the state.

2.6 Conclusion

There is a global need to regulate ASM to protect people's health, safety and to sustain their livelihoods, and the DRC is no exception. While regulating ASM could ensure increased safety and reduce environmental waste it can and has been shown to prohibit miners from legally mining due to prohibitive costs, forcing them to work illegally. This then fails to address the issues of unregulated ASM. Accelerated growth in the ASM sector fuelled by a demand for the DRCs resource-rich minerals has seen global MNCs drive the production. Over the past decade, the DRC has failed to implement a coherent policy and regulatory framework during this unprecedented growth. Attempts to date have been poorly targeted at

LSMs and ignored the discrete nature of ASM. Any framework must acknowledge the ASM sector's specific differences from LSM. The disparity between the two has been ignored. The state has assumed a limited role, driven by an economic desire not to solve the social issue of poverty or reduce the impact on the environment or associated health risks.

Chapter 3. Economic and social impacts of ASM in the DRC

3.1 Introduction

With over seventy-five per cent of the citizens of the DRC dependent on less than US$1.90 a day, they have a strong motivation to seek any employment opportunity that can alleviate the stress of poverty (UNDP 2019; The World Bank 2021c). As an informal occupation, it is easy to find/create employment opportunities in ASM, and this accounts for a growing number of Congolese citizens engaged in the sector (Geenen 2012; Bryceson & Geenen 2016); Fritz et al. 2018). However, the consequences of such work pose significant risks to their health and environment (Aizawa 2016; Sovacool 2019). Schwartz, Lee and Darrah (2021) state that these miners were simply trading one form of intergenerational poverty for another. To fully understand the importance of ASM, it is necessary to look at what ASM brings to the livelihoods of those working in the sector. This chapter will discuss the macro and microeconomic benefits of ASM and consider the implications of exploiting labour, the impact on the miners' health, and the environment.

3.2 Macro and Micro Economic Benefits

3.2.1 Macroeconomic Effects

The importance of mining to the DRC national economy cannot be ignored. The consequence of the impact on growth and value has seen the DRC rank first in terms of the Mining Contribution Index (MCI) (Ericsson & Löf 2019). The Mining Contribution Index measures the economic value of mining and its contribution to national economies. It correlates factors that reflect the importance of governance in mineral resource management and the impact of mineral wealth on economic and social development (ICMM 2020). This ranking reflects the growth of mineral production and exports, which have seen the DRC rise from 29th in the rankings in 1996 (Ericsson & Löf 2019). It also reflects the significance of global demand for the DRCs natural resources and their abundance to meet that demand. In the DRC, mineral exports account for 86 per cent of total exports, and the DRC is viewed as the second most important country globally for mineral exports (Ericsson & Löf 2019). It also shows how reliant the DRC is on mineral exports to drive its economy.

In the DRC, government revenue is highly dependent on natural resources, accounting for 33 per cent of total export earnings. Copper is the leading generator of export earnings, and cobalt accounts for 33 per cent of the total mineral export revenue generated (IMF 2019). According to the International Monetary Fund (IMF) (2019), natural resource extraction in the DRC has more than doubled in the past decade (2005 – 2017) from 11 per cent to 25-26 per cent. This translates into generating 95 per cent of the DRCs export earnings (IMF 2019). The DRC's copper and cobalt exports combined account for 70 per cent of the country's total exports, with the DRCs cobalt exports accounting for 96 per cent of the total cobalt produced worldwide (Greencarcongress 2021; Ziswa 2021). From an ASM perspective, from 2016 to 2020, on average, ASM accounted for 14 per cent of the total DRCs cobalt output (Ziswa 2021). Similarly, mineral rents have increased tenfold in terms of GDP contribution. (Ericsson & Löf 2019). Mineral rents are the change in value between the total cost of production and the value of those mineral stocks at world prices (World Bank 2021a).

The overall effect of mining in the DRC is that it contributes about 41 per cent of the total GDP of US 50.4 billion to their economy (World Bank 2021b). Annualised growth of GDP was predicted at 4.4 per cent in 2019 and revised downward by 90 per cent to 0.8 per cent for 2020 (World Bank 2021c). While demand for natural resources has kept GDP growth rising, other sectors have lagged and shrunk by 1.6 per cent due to the global pandemic (World Bank 2021c). As a result, the DRC government has cut spending by as much as 10.2 per cent, as the country's current account balance, which reflects net trade imports over exports, has increased by 4 per cent (World Bank 2021c). The DRC government, while having significant natural resource exports, is highly reliant on imports. Global demand for exports has shrunk during the pandemic, but domestic demand for imports like medicines and refined petroleum still exists (OEC 2019). Therefore, the DRC must keep up mineral exports, especially with the continued growth in batteries and the demand for cobalt likely to continue to increase for the foreseeable future. This clearly illustrates the dependency the DRC has on mineral exports, to which ASM significantly contributes.

3.2.2 Microeconomic Effects

Socio-economic research has shown that the primary reason people participate in ASM is 'push' factors driven by the need to meet their livelihood needs, given a lack of alternative sources of employment (Wilson et al. 2015). As such, ASM provides income to those

communities living within immediate proximity to the mines, as well as those communities further afield (Wilson et al. 2015). With that, ASM's extensive reach and benefits have been a source of economic subsistence for needy farmers and, in turn, a stimulus for small business growth opportunities, including the potential to expand existing agricultural production (Wilson et al. 2015). In this regard, ASM is a macroeconomic driver that facilitates microeconomic opportunities for those who want to sustain agricultural farming and those who wish to transition into the mining sector.

The correlation between ASM and subsistence agriculture has shown strong links in rural Ghana, where ASM provides a means for income diversification (Okoh & Hilson 2011). The benefit of ASM is that it allows subsistence farmers an opportunity to have income generation during both the dry season through mining and farm during rainy seasons (Okoh & Hilson 2011). This affords people a level of economic security that might not otherwise be possible if not for ASM. As such, these people need and are dependent on ASM (Wilson et al. 2015). It has been suggested that while ASM is a form of economic relief, it is a type of 'poverty trap'. These farmers and their families have limited means to invest, have little education, and use basic extraction methods to survive (Wilson et al. 2015).

Typically, artisan and small-scale mining are found in rural areas that foster local communities opportunities and promotes infrastructure development and sustainability for the miners and their families (Hentschel, Hruschka & Priester 2002). ASM in such areas creates a knock-on effect at the local economic level. Most of the revenue generated is invested locally, making a substantial socio-economic contribution to development (Hentschel, Hruschka & Priester 2002). The revenue generated in the form of income creates local purchasing power spent on products, goods, and services at the local level, such as housing, foods, schooling, tools, and equipment to pursue mining (Hentschel, Hruschka & Priester 2002). Even when ASM is conducted illegally, the return of the sale of those products produced means that the cash generated or goods traded are still received locally (Hentschel, Hruschka & Priester 2002).

In Kenya, informal ASM is the primary form of employment in mining communities and is seen as an alternative means of income greater than that generated through farming (Barreto et al. 2018). In Mozambique, miners transition seasonally between traditional agricultural farming and ASM to supplement their incomes. In Liberia, agricultural foods such as rice are

used as incentives to entice workers to support mining activities (Hilson 2016). Whether it is full time or to supplement incomes, the shift from agricultural farming to ASM has not been merely a result of the opportunity but rather out of necessity. In some cases, small farm holders have typically struggled to produce sufficient crops to generate an income due to their plot size (Hilson & Garfoth 2012). The socio-economic challenges that many sub-Saharan African countries face essentially comes down to poverty and the ability to generate an income to sustain themselves and their families.

In eastern DRC provinces like Katanga and North and South Kivu, approximately 90 per cent of all artisan mining is conducted in an informal capacity (Geenen 2012; Fritz et al. 2018). ASM provides opportunities to low-skilled workers in developing countries, and the DRC ranks third globally in terms of the number of workers employed in the sector (Geenen, Stoop & Verpoorten 2021). In the Eastern DRC provinces of North and South Kivu, over 382,000 miners are believed to work at 2700 sites, with the majority 66 per cent in the gold mining sector (Geenen, Stoop & Verpoorten 2021). There are now almost 3000 mines in Eastern DRC, with 6.9 per cent mining Coltan (Matthysen 2018). With a million ASM workers in the DRC and using known multiplier effects of three to seven, this suggests that as many as three to seven million people depend on ASM in the DRC (World Bank 2019; Geenen, Stoop & Verpoorten 2021). This then equates to between 3.2 per cent and 7.5 per cent of the total population of the DRC's 93 million citizens (Worldometers 2021). If we solely consider those on less than US$1.90 a day, the figure becomes greater, with the range going from 5 per cent to 11.6 per cent assuming 60 million people are in that cohort.

Suppose we extrapolate the average earnings of US$1.90 for a year that is approximately US$693 a year or just under US$58 per month. Recent research indicates a wide variance in what ASM workers earn in a study conducted in South Kivu. Perks (2011) reported that gold miners were earning between US$80 – US$150 per month. Geenen, Stoop and Verpoorten (2021) reported a range from US$24 to US$191 per week across four ASM job categories, with pit managers earning the most and *pelleteurs* or excavators earning the least. The other two categories are 'experts' who made US$52 per week, and right-hand workers of the pit managers made US$92 per week (Geenen, Stoop & Verpoorten 2021). The mean of this distribution was US$89.75 per week. If we extrapolate this average to an annual income, the potential earnings are US$4,467, an almost sevenfold income of the average earning of those on less than US1.90 a day ($4,467/$693.5=6.73). Figure 3.1 below shows where the DRC

ranks in terms of poverty globally. The DRC ranked fifth with an annual average GDP of US$457 per capita.

Image removed due to copyright restriction.

Figure 3.1 The World's Top 25 Poorest Countries
(Ang 2021)

Beyond the economic benefits of artisan mining, miners in the DRC are considered to be of a higher social standing culturally than farmers (Rubbers 2020; Geenen, Stoop & Verpoorten 2021). The ASM miners are categorised as skilled and unskilled, and even permanent unskilled miners are given benefits that day labourers are not (Rubbers 2020). With both day labourers and permanent unskilled miners earning an average of $150 a day, a permanent miner will also receive transport to and from the site, access to healthcare, and holidays (Rubbers 2020). This figure fits within the range reported by Geenen, Stoop and Verpoorten (2021). Permanent workers are also afforded greater stability as a day labourer is subject to being dismissed without notice. DRC government labour law prohibits working more than

thirty days in a two-month period as a day labourer, or they are classified as indefinitely employed with contractual obligations and rights. These workers must supplement their incomes; however, artisanal miners frequently violate this practice (Rubbers 2020). With the high numbers of artisan miners comes a dependency on the sector to have sustainable demand, yet some have called for a reduction. However, one study found that as much 60 per cent of households had relied on artisan mining in the Eastern copper-cobalt belt of the DRC, thereby suggesting that any regulatory changes or reduction in demand would have an adverse effect on those dependent households (Faber, Krause & De La Sierra 2017). The detrimental impact would decrease household incomes with little opportunity to find alternative employment, particularly for unskilled workers.

3.3 Exploitation of Artisan Mine Workers

The increasing growth in the ASM sector has seen an influx of families being brought into the sector, including children (André & Godin 2013). With that, there have been not only patterns of child labour but corresponding abuse, and in some instances, this is instigated by police or government officials (Sovacool 2021). However, in some cases, the abuse is initiated by the families themselves or the mining community, resulting in child slavery (Sovacool 2021). Faber, Krause and De La Sierra (2017) found that 31.8 per cent of the population sampled (15,023) were children in the mining sector. Of the child population (4,714), more than 50 per cent were over 15 years of age, with 75 per cent employed as surface workers, cleaners, or sorters (Faber, Krause & De La Sierra 2017). The primary justification for children being employed was that children came from homes that were poorer on average. On average, the family would have more children, and they were from families with less education and lived near the mining site (Faber, Krause & De La Sierra 2017). Those children participating in the mining process were older than average and predominately male, less educated, and not typically enrolled in school (Faber, Krause & De La Sierra 2017).

The fact that children are engaged in ASM has resulted in women being the most vulnerable and exploited cohort in the sector. The children are viewed as integral to mining activities that women do not perform (Sovacool 2021). As a result, this group are not given opportunities to the prime mining sites and subsequently do not receive equal income (Sovacool 2021). The reported reasons were that they lacked the physical ability that men

offer, and they had a propensity for being sick and were more likely to get hurt on the job (Sovacool 2021). The driving force of child exploitation is poverty, such that parents will often send their daughters when financial hardship occurs (Sovacool 2021). The implications of child labour in ASM present two opposing issues. The first is the economic dependency that precipitates the need for families to allow children to engage in mining activities despite inherent health risks. Furthermore, that the potential for abuse by officials, families and communities suggests a broader social concern. Any form of a regulatory framework must consider specific issues that specifically target children's exploitation, as their issues are complex and reflect a structural failing of the education system (Faber, Krause & De La Sierra 2017).

According to the International Labour Organisation (ILO), forced labour is one of the worst forms of labour (ILO 2021). Some have suggested that child mining is the worst in terms of exploitation (Hilson 2010). It could be argued that the exploitation of child labour within mining is an important reason for regulation, particularly when private actors, frequently multinational enterprises, are making significant profits. Child labour in the mining sector has been viewed as like that in the agricultural sector, in that it is menial and not seen as an exploitative practice (O'Driscoll 2017). This is a contradictory perception and has been a contentious issue that has created ambiguity regarding what is seen as exploitative work (O'Driscoll 2017).

For children working in subsistence farming, the situation is different as they work for financial self-sufficiency for the family. It should not be overlooked that in both agriculture and mining, children work for their daily survival. André and Godin (2013) concurred with this within the context of agricultural systems, where a child's role is considered the norm within that social system. The fact is that the work performed in both instances is similar, and in some cases, the work, in either case, it is a means to survive (O'Driscoll 2017). In either instance, children are integral members of a social group, perform a critical role, and are part of the social order yet are unprotected.

3.4 Impacts on Health

ASM, as a manual labour process, exposes the miners to direct risks associated with mining operations. However, research into the health and environmental effects of mining cobalt in

Africa, specifically in the DRC, has been limited (Banza et al. 2009). What is less known is that the health impacts extend beyond the miners. One study in Katanga of 351 miners on-site and an area 400km from the site using a urinary spot sample showed that those living closer to the site had considerably higher concentration levels of cobalt in their bodies (Banza et al. 2009). Of particular concern was the fact the findings showed similar concentration levels in both adults and children. Compared to cobalt concentration levels in the USA, they were substantially higher than any previous record for a general population (Banza et al. 2009). These findings not only illustrate the impact of cobalt concentration at the sites and within 400km, but it suggests that the pervasive effects on the environment may extend beyond the areas tested (Banza et al. 2009).

It can be argued that cobalt mining affects those directly involved with the process and impacts extended areas beyond the primary site, suggesting there could be an impact on those not directly involved with mining the resource. With the expected increase in demand for cobalt and the likely increase in the ASM sector, this would only exacerbate the issues and emphasise the need to regulate the sector. This would then have the potential to ensure miners' health and well-being and their families and communities. Mining that is not under health and environmental regulations has a ripple effect and transfers to the health care system that barely functions and relies on foreign support, especially international NGOs.

In 2014, Cheyns et al. (2014, p. 313) researched a 'non-occupationally exposed population' in a mining area in the DRC, taking a urinary sample and including a dietary questionnaire and an environmental sample. This research study similarly found significantly high levels of cobalt; alarmingly, the study showed that of the children sampled, their concentration levels were 50 per cent greater than the adults (Cheyns et al. 2014). Elevated cobalt levels were noted in fruits and vegetables and drinking water and fish from a nearby lake (Cheyns et al. 2014). The fish contamination was correlated to the elevated levels of cobalt in the adults, while for children, their cobalt contamination was correlated to dust ingestion (Cheyns et al. 2014).

Informal mining activities have been associated with respiratory health issues (Ngombe et al. 2016; Ngombe et al. 2018). In 2016, Ngombe et al. (2016) conducted a small study of 104 miners in one city in the Katanga province, where it was found that the miners had significantly higher symptoms than those of the control group. Conditions such as wheezing

were five times higher, shortness of breath eight times higher, coughing was two and half times higher, asthmatic conditions fifteen times higher, elevated conditions also existed for rhinitis, conjunctivitis, and eczema (Ngombe et al. 2016). The findings suggested that the miners' conditions resulted from a lack of proper protective equipment, which had resulted in their elevated respiratory conditions (Ngombe et al. 2016).

Dust exposure was also found in a study that examined 199 coltan miners who were shown to have three times the level of airborne particulates that also impeded their respiratory function (Ngombe et al. 2018). Those miners were also found to have reduced breath expiration levels (Ngombe et al. 2018). These three studies (Banza et al. 2009; Cheyns et al. 2014; Ngombe et al. 2018) show that over a decade, ASM significantly impacted not only those who work directly in the mines but also those who work directly in the mines those who reside at significant distances from the site. More alarmingly are the consequences that extend beyond individual miners to those not directly involved, as well as children who will now suffer and are likely to have long-term health complications. The extent to which cobalt mining affects health and the environment, especially beyond the site into communities, is a significant issue directly associated with an unregulated ASM sector.

Prevalent problems due to ASM include accidents, dust inhalation, overexertion, toxic gas, chemical exposure, overheating, along with drug and alcohol addiction (Schwartz, Lee & Darrah 2021). These health conditions are a consequence of the fact that for developing countries, in which ASM is predominantly practised, the process is highly primitive, due to it being manually intensive (Burki 2019). The fact remains that ASM in Eastern DRC is often associated with criminal gangs, corrupt governments, paramilitary groups, or military actors. This means that the miners are subject to dictatorial behaviours with little concern for their health and only for financial gain (Schwartz, Lee & Darrah 2021).

3.5 Environmental Impacts

While it is widely acknowledged that ASM brings socio-economic development, the negative impacts are generally agreed upon. Immediate intervention in the ASM sector is required to lessen the impact on communities (Hilson 2014; Zvarivadza & Nhleko 2018). The impact of ASM on the environment has also been recognised as just one of several challenges that the DRC faces (Sovacool 2019). This issue has endured since their colonial past. Still, more

recently, it has been correlated with public health concerns, which has elevated the necessity for the country to focus on it (Sovacool 2019). However, the severity of the environmental impact caused by ASM is now considered far more serious than previously thought (Banza et al. 2018).

The effects of ASM on the environment have been shown to have a lasting effect long after a mine has been abandoned (Otamonga & Poté 2020). The consequence and correlation between ASM and health and the environment impact the present and transcends future generations. In the DRC, the legacy of ASM once a mine has been abandoned presents sustainable development issues that cause environmental degradation and present long-term financial and social challenges (Hilson 2014; Diemel & Cuvelier 2015; Radley & Vogel 2015; Haslam & Ary Tanimoune 2016). This suggests that the impact of mining in terms of health and the environment both during and post-mining activities will have adverse effects that counter the socio-economic benefits while the mine is in production (Otamonga & Poté 2020).

The lasting impact of abandoned mines presents several concerns, with the most serious being acid rock drainage. This is due to storage areas containing waste rock piles left open to the weather, whereby the runoff contaminates water supplies with acidity and dissolved metals (Otamonga & Poté 2020). This does not even address underground contamination due to rock drainage or the fact that mines are frequently left accessible, with unblocked or barricaded shafts, tunnels, or pits that pose safety concerns and public health risks (Otamonga & Poté 2020). Pollution of waterways, including drinking water through toxicity or a build-up of silt, the lack of sanitation at the site resulting in effluent being disposed of in rivers, thereby contaminating the water and the fish are also environmental concerns (Otamonga & Poté 2020). These issues stem from a lack of regulatory oversight, which is also compounded due to the mines being remotely located and lacking standard sanitation resources (O'Faircheallaigh & Corbett 2016).

3.6 Conclusion

ASM poses a problem for those who work in the sector, and indeed the DRC. On the one hand, it helps to reduce pervasive poverty. However, there is a price paid by the miners and those living within the area, both short-term and long term. Despite this, the focus of

policymakers and private sector actors has been on economics and maximising profitability. ASM is a significant contributor to total cobalt production and a sizeable asset to GDP, which helps the overall economy. The overall expected growth of global demand for cobalt coupled with the DRCs vast mineral wealth, especially cobalt, suggests they will see considerable growth, which means greater numbers of ASM. This will only increase the existing health and environmental issues, which will, in turn, cause a greater socio-economic issue in the future. However, this co-dependency of macro and microeconomic needs for the state and ASM miners must be at the forefront of any policy framework. The miners on the micro-level are dependent on this for their livelihood, just as the DRC is for them to mine the minerals. Any policy framework must be inclusive of both economic needs, but not without consideration for the welfare of those working in the sector and the environmental damage it causes.

Chapter 4: Defining a Regulatory Framework for ASM

4.1 Introduction

Just as a legal framework, such as a constitution, is a precursor for political stability, the latter is a prerequisite for economic development, without one the other folds. For a regulatory framework for ASM to be effective in the DRC, there must be political stability in that region or province. The DRC is a republic and, in 2006, adopted a constitution with the first peaceful democratic transfer of presidential power taking place in January 2019. And yet, the DRC remains a politically and economically unstable country. This instability creates a complex environment for further business opportunities, especially for foreign investors (The World Bank 2021c).

For the DRC to be an attractive proposition to private actors and further investment opportunities, the state's role should ensure political stability and reduce conflict. Without doing so, being able to attract foreign direct investment remains a risky proposition. It has been suggested that regulating ASM could be a means to 'peacebuilding, state-building and post-conflict reconstruction processes in conflict-affected and high-risk areas (CAHRAs)' (De Haan 2021). Furthermore, there are a number of connections between mining and the UN SDG 16 that states: 'Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels' (UN 2021).

> Mining can contribute to peaceful societies and the rule of law by preventing and remedying company-community conflict, respecting human rights and the rights of indigenous peoples, avoiding illicit transfers of funds to public officials or other persons, ensuring transparent reporting of revenue flows, and supporting the representative decision-making of citizens and communities in extractives development (UNDP, 2016, p.2; De Haan 2021).

This chapter will discuss the role of the state and private actors in regulating ASM and consider this within forming a PPP.

4.2 The State's Role in Regulating ASM

Historically, state governments have failed to derive sufficient economic gains from mining natural resources mainly due partly to incentives they offer MNCs in the form of tax incentives (Akabzaa 2009; Rutherford & Ofori-Mensah 2011; Freebairn 2012). Environmental groups and communities have criticised governments for sustaining mining policy frameworks that benefit MNCs instead of citizens (Hilson & Nyame 2006; Taabazuing et al. 2012). Communities have suffered displacement by MNCs, resulting in them being deprived of their livelihood, and the land then suffers from mining activities resulting in environmental damage.

To date, the DRC government has failed to provide a coherent framework to govern the ASM sector (Wakenge et al. 2021). This failure has been prevalent for over two decades, and any attempt to reform the ASM sector. Vogel and Raeymaekers (2016) stated that transnational reforms have only increased regulatory compliance problems. To align ASM with the globalised mining economy would require a significant overhaul on multiple levels, production, logistics, and regulation of the ASM sector (Vogel & Raeymaekers 2016). Typically, formalised ASM frameworks have focused on regulating the sector through monitoring to drive tax revenue, both legal and illegal (Maconachie & Hilson 2011).

In the DRC, this has meant both provincial and state governments have sought to maximise their tax revenues. However, this process has been uncoordinated, and frequently it is decentralised and has favoured personal gain or supported armed patronage (Müller-Koné 2015). The state government faces a significant challenge in thwarting illegal taxation. This is a common theme in the informal mining sector and suggests it can be considered a value-added benefit in a formalised sector (Matthysen et al. 2019). Even in mining areas where armed conflict has ceased, collecting unofficial taxes by state personnel remains a challenge, which indicates either a lack of local or state government regulatory control or that this practice is endorsed by those state actors (Weyns, Hoex & Matthysen 2016).

Similarly, access to land rights and natural resources are also a necessity for economic development opportunities. In turn, these could increase the prosperity and stability for the citizens and attract investment (Samndong & Nhantumbo 2015). Where state actors are open to corruption or willing to sell off parcels of land and with unregulated control of the sector,

these actors can exploit the opportunities with little regard for the community. Such corruption, whether at a local or national level, reinforces political instability and deters private investment. The state actors must ensure community inclusivity and a development regime that affords equitable returns. Thus, a PPP that includes state, local governments, development agencies, and civil organisations supporting and protecting local community land rights is necessary for economic development and ensures access and control of resources (Samndong & Nhantumbo 2015).

MNCs typically require special consideration from state governments as a means of a guarantee when considering investing in Large-scale mining (LSM) in the form of resource access and long-term tenure. These large mining conglomerates are afforded considerable advantage as they have the resources, information, political sway, investment and can affect decision-making to gain access to those lands. In contrast, local communities have limited capabilities (Samndong & Nhantumbo 2015). LSM corporations do not only have the resources, but they also have access to and relationships with high-level government officials, unlike their ASM counterparts, which yields them distinct advantages (Huggins, Buss & Rutherford 2017). The ASM-LSM relationship has been contentious as they compete for the same resources and perceive each other as competition (World Bank 2009; IGF 2017). Given the inherent LSM advantages and their ability to deliver FDI, governance frameworks are typically biased towards the LSMs, which creates a power imbalance and results in the ASM being viewed as an illegal activity (Siegel & Veiga 2009; IGF 2017).

The idea of illegal activity has seen Ghanaian officials calling illegal ASM as a ‘menace’ (O’Faircheallaigh & Corbett 2016). One of the prevailing issues with regulatory frameworks has been getting miners to comply with licensing requirements and legislative laws, which creates a contradiction, as the government wants compliance but cannot ignore the economic importance of ASM; this is the case in Ghana (O’Faircheallaigh & Corbett 2016). Any enforcement of regulatory framework to suppress illegal mining activity would therefore harm economic productivity not only on the miners, their communities but also on a macro level. In Ghana’s case, the implementation of the ASM policy occurs at a local level and is enforced by varying means and with varied consequences (O’Faircheallaigh & Corbett 2016). As such, this is not a national policy, such that any level of success in regulating ASM and indeed illegal mining is achieved by local government officials (Hilson & Garforth 2012).

This suggests that, regardless of the national policy or local political officials attempts to regulate ASM, forces are constantly working to undermine attempts to eradicate illegal ASM. In the case of corruption, certain powerful 'big men' can secure large mining concessions that then perpetuate illegal ASM activities (O'Faircheallaigh & Corbett 2016). For example, in Ghana, the local officials are integral in the oversight of payment processes, the negotiation of the transfer of land contracts to large companies (O'Faircheallaigh & Corbett 2016). This indicates that these officials are, on the one hand, attempting to eradicate ASM by allocating the land to large companies while ignoring local community customs. Given the focus on LSM, it suggests it is about economic considerations above all else.

4.3 The Role of Private Actors in Regulating ASM as a PPP

Neoliberalism and globalisation have resulted in changes to the public-private relationship with the private sector, providing an investment that has meant that state governments have transformed their strategic economic policies to accommodate this change (Dansereau 2005). Under neoliberalism, PPPs have emerged as being central to supporting infrastructure projects (Heame 2014). PPPs in mining have typically been between MNCs and state governments, whereby the MNC incentivises the state to provide preferential access to mining areas (Akabzaa 2009; Rutherford & Ofori-Mensah 2011; Freebairn 2012).

PPPs in mining present an opportunity for foreign direct investment, create employment, further sustainable development, and provide a key role in sector governance given the trade implications (Dansereau 2005; Siegel, Spapens & van Uhm 2020). PPPs can provide significant financial investment to explore projects in new areas or maximise an existing site's potential (Lavlinskii 2016). This is largely due to the state lacking sufficient financial resources or an unwillingness to commit them and requiring the necessary infrastructure to capitalise on the site without external funding (Lavlinskii 2016). By forging PPPs, states can increase private sector involvement in addressing social and economic development issues that can lead to poverty reduction (Considine & Giguére 2008).

Two decades ago, the World Bank proposed that public-private partnerships (PPPs) in the mining sector were the way forward, based on the assumption that

> cooperation between business, civil society and government can only produce a win-win situation for all as it provides long-term benefits to the business sector while meeting the social objectives of civil society and the state by helping create stable social and financial environments (Dansereau 2005).

The World Bank's good governance agenda aimed to achieve economic and environmental sustainability and poverty alleviation (Dansereau 2005). For good governance to be effective, the World Bank argued that it is necessary to reform states and improve economic management, transparency and make them more democratic (Dansereau 2005). It suggested reducing direct state influence over the mining sectors and governing them through public-private partnerships (Dansereau 2005). In doing so, this would lead to improved political stability and more secure environments to invest in (Cleeve 2012). For PPPs to function, they must recognise that these partners would have discrete interests and expectations.

While state governments are the principal agents in advanced capitalist countries for setting the strategic economic agenda, this is not the case for developing countries. In low-income developing countries, private actors have assumed the primary role in service delivery, outlined in the Sustainable Development Goals (SDG) for 2030 (Pérez-Pineda & Wehrmann 2021). SDG number 17 focuses on collaborative partnerships for development, whereby PPPs could achieve sustainable goals in terms of poverty, health, and the environment (Peyser & D'Esposito 2020). Private actors provide investment and can assume important roles that would otherwise not be undertaken by state governments. Furthermore, private actors are vital in supporting regulatory reforms in the mining sector (Wakenge et al. 2021).

As states transform their economies, the introduction of public-private nexus has seen the states transfer the responsibility of 'principal agency' from the state to private actors when it comes to development (Dansereau 2005). States are now focused on market-driven economies. This structural adjustment has seen PPPs assume an increasing role in supporting the states in fostering a collaborative approach to regulatory frameworks, particularly in the mining sector, as advocated by the World Bank (Dansereau 2005). This new role that the private actors assume within the PPP structure represents a natural de-evolution of state governments, whereby the state outsources control, particularly as it relates to governance (Backer 2011). What this achieves is a vested interest by all stakeholders in the PPP. The

private actors are now not only investors but share in the compliance to the regulatory framework, and thereby, they are endorsing it.

Furthermore, the advent of PPPs is viewed as a funding source for investment in services, infrastructure, and social development programmes that would otherwise have to be funded by the state (Quiggin 2005). The risk is the reliance on external actors to drive economic growth and social development when their objective is profitability, and they are unlikely to reinvest the profits locally. Furthermore, the state transfers the risk of failure by subcontracting an activity to the private actor who assumes the risk (Quiggin 2005). In developed countries, assuming the risk is seen as a determining factor in which private actors can provide the best value for service (Quiggin 2005).

In many instances, powerful MNCs share with the state the regulatory power in terms of governance and oversight (Backer 2011). Private actors are viewed as providing greater transparency in the public domain and answer to regulatory bodies, e.g., international accounting standards, since they are concerned about reporting requirements and investor requirements (Mulgan 2000). However, if private actors are not held to account, they could profit as state actors do from under-developed regulations (Siegel, Spapens & van Uhm 2020). Mulgan (2000) stated that the public sector is typically more rigorous regarding accountability requirements with the process or policy-related matters. Through governance and transparency, private actors have greater experience in complying with international regulatory standards. It would follow that if there were an international regulatory agency for mining, including ASM, then having private actors responsible would be a synergy given their track record. Given the global desire to regulate ASM, curtail conflict minerals, and reduce child labour exploitation, it seems appropriate to have actors familiar with meeting global governing standards rather than public actors who are only accountable domestically to public opinion.

Critical success factors, those that are necessary for PPPs to have successful outcomes in infrastructure projects, could be grouped into specific categories: the stability of the macroeconomic environment, the sharing of responsibility between the two sectors, a stable political and social environment, transparency and efficiency in the procurement process, and prudency at the governmental level (Chan et al. 2010). This suggests the critical association between state and private actors in understanding the scope of expectation, but more so, that

the state provides stability at the eco-political level. This then ensures that investment is utilised to facilitate profitability both within the society and in terms of the productive capacity to realise long term economic returns. At the governmental level, Sanni (2016) noted that economic policy, good governance, political support, and favourable socio-economic conditions were vital for PPPs to be successful. From this, Sanni (2016) confirmed Dansereau (2005), and regardless of whether it is infrastructure or mining, key critical success factors apply to promote favourable conditions for PPPs like the strength of the partnership, a stable socio-economic, political environment, and good governance.

4.3.1 Using PPPs to Regulate Mining and Create Investment Opportunities in the DRC

Despite the DRCs attempts at reforming governance, particularly in the natural resources sector, as of 2020, the DRC ranked 183 in the 190 countries listed for doing business (The World Bank 2021c). This instability suggests that for a regulatory framework to be implemented, there needs to be an MNC willing to undertake the risk with the support of a global financial institution, e.g., The World Bank or IMF. However, given the instability, this remains unlikely for the DRC given their poor governance track record. The lack of governance and a regulatory framework enables national army commanders and private businesspeople to enrich themselves through bribes and coercive payments. Any regulatory framework would not be enforced, as it would impact their economic benefit.

For ASM in the Eastern region of the DRC, including north and south Kivu and Katanga, two vastly different scenarios have existed. With both Kivu provinces still undergoing conflict, there is markedly little political stability. In North Kivu, most ASM mines are controlled by armed insurgents and the DRC military (Wakenge et al. 2021). Therefore, any form of regulatory framework at a state level is unlikely. There have been types of ‘hybrid’ governance regulations by non-state actors focused on extraction and economic trade regulations that comprise a combination of statutory, customary, and martial law in the Tin, Tungsten, Tantalum (3T) sector (Wakenge et al. 2021). Hybrid governance also considers local governance as well as the exclusion of women Wakenge et al. 2021).

To improve governance in North Kivu and Katanga, the World Bank has invested heavily in the DRC by committing US$1.65 billion for human capital development to support reform initiatives and the social sector. Governance was also included as a provision (World Bank

2021c). For the Katanga province, the World Bank had previously jointly funded the program PROMINES, but this was withdrawn in 2016 (Diemel 2018). The Katanga Policy Network was formed through two PPPs between the Katanga provincial government and MMR and *Cooperative des Artisanaux Minières du Congo* (CDMC). These PPPs formed the basis of a regulatory body. They sought to implement iTSCi as a basis for a responsible mineral sourcing policy initiative in the province for LSM operations (Diemel 2018). This will be discussed in-depth in chapter 5.

To facilitate change within the context of a PPP in the DRC, FDI is required given the governments' inadequate investment and allocation to the mining sector, and for this to occur, political stability from conflict, administrative corruption, stricter adherence to domestic laws is necessary (Guyguy & Xu 2019). FDI drives economic growth and capitalises on export opportunities and has been viewed as a prerequisite for international development, particularly in developing countries. A state will offer incentives to attract multinational corporations (MNC) to invest (Andersen, Kett & von Uexkull 2017). Given the DRC's export-orientated natural resources sector, it is necessary to find a solution to manage the conflicts to encourage MNCs. Only then can PPPs be established, whereby the domestic investment can be expected that is essential for increasing economic development (Javed et al. 2012).

Implementing measures to augment political stability and enable FDI to occur is one avenue to address the DRCs poverty issue. ASM currently is a means to increase household income and works toward reducing the nations poverty levels. The FDI that is invested in mining is targeted at LSMs and does not support ASM. It expands the LSM sector to increase production and achieve a profit for the MNCs and revenue for the state. However, it has been asserted that western interference in developing countries can create dictatorships, and with that, the reforms necessary for free market opportunities fail to materialise (Gerring & Thacker 2005; Gatwiri, Amboko & Okolla 2020). This is because MNCs seeking investment opportunities become dependent on those in power who afford the MNCs rights to operate and grant access to land.

Nonetheless, those in power want to attract investment and improve their countries living standards and are dependent too on the MNCs. There is a co-dependency as both sides get richer, the state gaining more power through financial incentives and taxes/fees generated.

The MNCs must retain the economic opportunity to recoup their investments, so they must preserve the state government to be assured of the same rights. It has also been contended that private actors have a detrimental effect on state government(s), undermining their legitimacy (Batley & Mcloughlin 2010). This would suggest that PPPs are not necessarily advantageous in establishing regulatory frameworks for the governance of a sector, as they would be acting to serve their interests and not the interests of the state or people. Furthermore, they are financially powerful and have resources they can leverage to exert influence over the design and implementation of a framework to suit their needs.

MNCs are not likely to invest in conflict areas as this is a risky proposition. Given the lack of a regulatory framework and lack of MNCs investing in these areas, ASM continues to thrive. Those private actors who benefit from cobalt and coltan mining cannot be seen to be associated with armed conflict and insurgents any more than they can with child labour. The fact remains they are only willing to invest in a region where there is positive news coverage where they have acted responsibly and with full transparency, which then adds value to their brand (Jorns et al. 2015). Thus, peace must be achieved before any economic opportunity can be realised, as it requires political stability. For PPPs to be successful, they must be managed, thus monitoring and compliance through the government is necessary.

4.4 Conclusion

The DRC government's failure at establishing a coherent ASM policy and regulatory framework presents a unique opportunity to develop PPPs to further economic growth and development. However, what is evident is that both state and provincial governments have to date acted independently and with one primary objective – to generate tax revenues. The disparate approach to governance has been largely self-serving and benefitted individuals and supported the armed conflict. For any regulatory framework to succeed on a broad national level, the various political levels must agree to a unified approach. One way to achieve an agreed approach would be to work with private actors. In the sustainability sector, private actors have filled the void bringing state actors and NGOs together and creating a hybrid form of governance that augments existing state governance systems (Lambin & Thorlakson 2018).

Forming a PPP could serve multiple goals, from bringing FDI into mining to creating a collaborative approach to a regulatory framework and implementing control mechanisms, all of which the DRC needs. Private actors could be held to account to standards outlined in the PPP to protect the environment and health of workers by using international public law to enforce human rights (Chirwa 2004; Hackett & Moffett 2016). However, in the DRC, the overriding lack of governance extends beyond the ASM sector. Until the state can control the fighting and conflicts, especially in the Eastern provinces, any attempt to establish and implement a regulatory framework with the support of a PPP is unlikely. The priority lies with the state to stop the conflicts and provide the setting that provides economic opportunity and development. MNCs will want to capitalise on the global demand as this translates into profits.

Chapter 5: The Effectiveness of Regulating the ASM Sector

5.1 Introduction

Research has shown that regulatory frameworks can be initiated at a national, regional, or local level and can vary in whether they work independently or collaboratively to regulate the ASM sector (Verbrugge et al., 2014; De Haan & Geenen 2016). National frameworks prescribe the processes by which ASM must be licensed and outline specific regulations regarding safety and the environment (O'Faircheallaigh & Corbett 2016). Conversely, at a regional or local level, the enactment of policy and regulations is highly variable based on the political party involved. It could include tribal governance and how land is allocated (O'Faircheallaigh & Corbett 2016). From this, it can be understood that there must be a collaborative approach to forming regulatory frameworks that encompass national interests but does not overlook the differences of regional or local interests. Collaborative governance is not a new concept; it has been applied to mining in South Africa, where local governments and mines collaborate along with mining companies. However, in this case, it has not fostered positive collaborative partnerships (van der Watt & Marais 2021).

Given the damaging impacts to the environment and health of the miners and their families, as discussed in chapter 3, the need to regulate ASM seems essential. Understanding the successfulness of various ASM regulations will enable further insight into the likelihood of a successful implementation of a framework in the DRC. It would further provide an understanding of what approach to regulation and policymaking, national or regional or local, or indeed a collaborative approach involving the various scales of governance, would work in the DRC. This chapter will examine the Katanga Policy Network as a regional model before analysing how regulatory frameworks have worked in Chile, Colombia, Ghana, and Mongolia and what can be learned from these cases.

5.2 Comparison of National versus Regional/Local Policy and Regulatory Frameworks

Whether they are operating at national, regional, or on a local level, the success of regulatory frameworks systems varies in each case (O'Faircheallaigh & Corbett 2016). Several factors determine the legitimacy of government ASM regulations. The location of the mining site, the scale of the mineral deposits, and the type of resources to be mined are essential in

whether the regulations are perceived as legitimate (O'Faircheallaigh & Corbett 2016). For example, in the case of the Katanga Policy Network, the partnership with LSM and local government caused friction with the local ASM (Diemel 2018). At the national level, the DRCs partnership with the private company Gécamines excluded other potential competitors and only focused on ASM in copper and cobalt. Another factor is the level to which government policy and the regulatory framework is forcibly enforced or driven by incentives; in the case of nationally driven regulations, they are a combination of both factors (O'Faircheallaigh & Corbett 2016). It has been suggested that a 'rights-based' approach could support ASM miners, whereby they can earn a living and have decent working conditions, which must be included in any formalisation (Singo & Seguin 2018).

Typically, national regulatory frameworks have favoured MNCs and FDI (Fritz et al. 2018). Nonetheless, the implementation of national frameworks has been slow, and this is due to a combination of a lack of resources and government strategy (Singo & Seguin 2018; Fritz et al. 2018). Also, they fail due to their focus on taxing ASM along with fees and royalties, which incentivises ASM miners to circumvent regulations and sell on the black-market (Fritz et al. 2018). National policy initiatives and regulations have offered incentives to ASM miners to establish formal entities that provide infrastructure, technical, financial, and educational support, along with allocating ASM miners land and mining rights (O'Faircheallaigh & Corbett 2016). In turn, they enforce deterrents when ASM miners do not comply with the regulations or fail to formalise into an entity (O'Faircheallaigh & Corbett 2016). Using incentives extends beyond ASM miners and are an expectation in collaborative governance, although not always evenly allocated.

Large-scale mining companies have a distinct economic advantage that gives them leverage to exert influence over governments. LSM exert their influence often to restrict ASM to increase their access to land rights (O'Faircheallaigh & Corbett 2016; Huggins, Buss & Rutherford 2017). For example, an LSM can supersede an ASM who has concessions or have illegal ASM operators removed from a particular mining site (O'Faircheallaigh & Corbett 2016; Singo & Seguin 2018). These types of clampdowns frequently occur as part of a larger directive to regulate ASM, such as the military being employed to force ASM miners to attain mineral rights and thus reduce the environmental impact (O'Faircheallaigh & Corbett 2016). This type of coercive approach where the military is employed to restrict ASM operations is short-lived as they are resource-intensive and only occur infrequently. When the crackdown

has ended, the ASM miners return and resume their activities (O'Faircheallaigh & Corbett 2016). While LSMs undeniably offer significant economic development possibilities, they bring an imbalance of power that negatively affects ASM workers. However, this can only happen for two reasons; first, this imbalance of power and favouritism in some cases is afforded due to the states allowing it to happen. Second, it occurs due to the lack of a regulatory framework underpinned by legislation that could support and protect ASM.

5.3 The DRC and the Katanga Policy Network

With the DRC having attempted mining reform with limited success, one example that had some degree of achievement at the regional level to regulate mining was in the Katanga province in the DRC. It adopted a progressive policy in the Katanga Policy Network (KPN) which sought to reform the ASM sector in the province through a consortium of public and private actors (Radley & Vogel 2015; Diemel 2018). Although the extraction of natural resources is not faced with the same challenges of conflict that North and South Kivu face, the province experienced problems related to extortion by state officials in the form of taxation practices (Diemel & Hilhorst 2018). The local officials, including police and intelligence agents, exerted power and leverage to extort taxes citing safety as the predominant issue to justify their illegal activities (Diemel & Hilhorst 2018).

The KPN was a response to governance issues in the changing economic landscape in the province from 2005 when foreign direct investment began flowing into the area from large MNCs who traded on the world markets (Hönke 2010). These private actors had a vested interest in preserving security by shaping local governance in the area. Stable security ensures their investment has the potential to yield a return. MNCs were given the power as the state discharged responsibility to police and secure mining areas to the companies to deal with grievances (Hönke 2010). In particular, conflicts over local mining and land rights between communities and the MNCs were pervasive and escalated (Hönke 2010).

The KPN was highly instrumental in initiating reforms to the 3T sector from 2009-2011. It was led by the local government and comprised several private actors led by Mineral Mining Resources (MMR), a large mineral trader. They had monopolised the mining trade and were the top producer of coltan. There was also a mining cooperative, *Cooperative des Artisanaux Minières du Congo* (CDMC), because there was limited interest locally (Diemel 2018).

Mining cooperatives are essentially organised as a consortium of miners who are forced to seek an organised entity given governmental requirements but are individuals within a formalised structure. MMR contracted with AVX, their largest buyer in Northern Katanga and CDMC, later replaced by COMIDEK for Southern Katanga (Diemel 2018). Using the International Tin Research Institute (iTSCi) and following the Tin Supply Chain Initiative, these actors designed a policy reform framework to reduce illegal trade in mineral resources. The Tin Supply Chain Initiative is an NGO working with private actors and local and provincial governments following OECD Due Diligence Guidelines. They worked with the partners in the KPN to reduce conflict financing, bribery, and human rights violations in the natural resource supply chain within the province (Diemel & Cuvelier 2015; iTSCi 2011, 2012).

The KPN, under the direction of the national government in Kinshasa and Katangese provincial government, had wanted to embrace the iTSCi policy initiative and sought to isolate and lock out those actors who facilitated warmongers and used mining to fund the purchase of arms, resulting in violent conflicts (Wakenge, Dijkzeul & Vlassenroot 2018). The intent was to increase control of the supply chain and drive all trade so that the state controlled it and thereby cut off the supply to conflict areas (Diemel 2018). This would place the state as the principal-agent for overseeing any problems (Diemel 2018). Doing this would increase transparency in the ASM sector and further security in the region (Wakenge, Dijkzeul & Vlassenroot 2018).

The stakeholders in the KPN were aligned through their desire for consensus despite varying degrees of interest. All had agreed to a common set of values related to implementing conflict-free minerals policy and driving the exploitation and trade of the 3T resources (Diemel 2018). Their shared primary goal was to increase the transparency of the ASM sector (Wakenge, Dijkzeul & Vlassenroot 2018). A shared set of values to reduce exploitation and stop extortive behaviour formed the basis of strategic decision-making of the PPP actors. This expedited the broad implementation of policy initiatives to stop the continued conflicts and exploitative practices in Katanga, which contrasted that in the Kivu provinces (Diemel 2018). This fundamental difference can be explained because it would be easier to implement policy directives in a province not besieged by conflict (Katanga) than in the Kivu provinces, where conflict was rife.

One of the benefits of the KPN was the sizeable initial investment by one of the private actors, MMR (Diemel 2018). This commitment and the agreements with local government and mining cooperatives created stability for LSM to benefit in a stable region. PPP projects have a number of criteria used to assess and determine the degree of success, and seven criteria are considered critical for that partnership to succeed (Osei-Kyei et al. 2017). Of these, meeting the public need and having a long-term partnership and profitability are relevant for the KPN. Firstly, there was a public need to create a non-violent conflict-free area for employment and trade, which was arguably achieved.

However, the KPN was short-lived because it ignored ASM and fragmented the sector by focusing on a monopolistic PPP. Thus, the partnership, while evolving, caused tensions, and there was intermittent violence. In 2011, conflicts began to erupt in some areas of Katanga, and the Indian buying house of MMR then began to face stronger market competition, whereby they lost their monopoly (Diemel 2018). The policy reforms did not stop the smuggling of coltan (Tantalum). ASM miners and négociants (mine-based middlemen) have aided the smugglers in their trafficking of coltan (Wakenge, Dijkzeul & Vlassenroot 2018). These tight associations can leverage the relationships to circumvent official regulatory controls, whereby all parties seem to benefit (Wakenge, Dijkzeul & Vlassenroot 2018). In this regard, the failure of the KPN partnership echoes Ramadas, Sambasivan and Xavier (2018), for they concluded that collaborative governance fails due to its ineffectiveness in governing, which can be applied to the KPN with the inability to manage a fragmented sector. They noted that when this occurs, the collaborative governance (partnership) fails to achieve its outcomes (Ramadas, Sambasivan & Xavier 2018). While KPN was successful early on, it eventually fractured, and the conflicts resumed (Diemel 2018).

Lastly, profitability was good for the principal investor MMR, but this would change over time. However, in terms of an effective conflict mineral policy, the KPN initiative is viewed as successful. It curtailed transporting minerals into the Kivu provinces by imposing a tax, which caused Kivu traders to cease operations (Diemel 2018). Given that the Kivu provinces lack stability, and mining is undertaken with significantly more risk than in Katanga, cutting the source of income to fuel the conflicts is one approach, but others in support of this are necessary, like regulatory control. In some areas of South Kivu, the government has imposed a ban on mining due to a lack of oversight (Reuters 2021). This only serves to increase the

illegal mining trade and fails to address the continued conflicts. Furthermore, it backfires on local citizens by reducing their opportunities to work in the ASM sector and earn a living.

5.4 Regulating ASM in Chile, Colombia, Ghana, and Mongolia

This section examines the regulatory frameworks of four countries to determine whether they have been effective and at what level these frameworks have been initiated. In doing so, it will examine the underlying motives that served as the basis for policies and frameworks, such as addressing health and environmental impacts and alleviating child exploitation, as noted in chapter 3. Additionally, it asks whether these motives were to generate increased revenue or meet international regulatory standards, or were they politically motivated or perpetuated by economic opportunity and the lure of FDI, as stated in chapter 4. It will identify the degrees of success and /or failure and thematic commonalities that could inform how a national framework could be devised in the DRC. In examining these four countries, comparisons to the KPN will be considered.

5.4.1 Chile

Mining has been vital to Chile's economy, accounting for 15 per cent of GDP in 2013, but in 2017 this had fallen to 9 percent (Comisión Chilena del Cobre 2021; Aguilar-Pesantes et al. 2021). Nevertheless, mining remains Chile's primary source of export revenue, contributing 53 per cent at US$2.8 bn in 2017, which has contributed to the development of the country by decreasing poverty and raising living standards, as well as providing universal care for the citizens (Comisión Chilena del Cobre 2021; Aguilar-Pesantes et al. 2021). The impact of mining, despite its economic benefits to the citizens, has raised concerns over new mining projects (Aguilar-Pesantes et al. 2021).

Within the Chilean mining sector, ASM is considered a low entrepreneurial skilled occupation. According to the Alliance for Responsible Mining (2018), it was estimated that in 2014 there were 17,000 ASM miners. There is very little recognition of the socio-economic circumstances that precipitate these people to become ASM miners (Ávila 2003). The lack of attention paid to ASM has resulted in environmental damage and social conflicts and, in some cases, exacerbated existing poverty (Ávila 2003). For Chile, Ávila (2003) suggested that any ASM regulatory framework should be designed differently from previous

attempts that were essentially welfare-based programmes. A framework should be evaluated and monitored with specific timelines and assessed for the long-term viability of mining operations (Ávila 2003). Furthermore, it would be essential to have a network of resources, financial, educational, and labour, to guarantee the framework's short-term and medium-term economic sustainability (Ávila 2003).

For Chile, designing a regulatory framework with a primary objective of protecting and reducing environmental impact was a priority. The regulations enabled the government to accurately quantify ASM's environmental impact, e.g., mining waste (Aguilar-Pesantes et al. 2021). To undertake this, the Chilean government established criteria as classification controls for the resource extraction process by regulating the size of companies and the mechanisms employed to extract the minerals, thus assessing the potential risk to the environment (Aguilar-Pesantes et al. 2021). The government has also established limits on how much the companies could mine based on their size and technology, thus controlling the extraction process, mitigating potential environmental risk. In addition, for the past decade, the LSM and ASM sectors have been integrating corporate social responsibility (CSR) into regulatory frameworks (Aguilar-Pesantes et al. 2021).

CSR has been a risk management strategy focused on supply chains, whereby there have been restrictions or taxes imposed to limit the export of raw minerals (Aguilar-Pesantes et al. 2021). In addition, the adoption of 200 best practices have been included, e.g., the safe processing of toxic water and the tailing of dams (Aguilar-Pesantes et al. 2021). This trend follows a global trend initiated in finance and the refinery sectors (Aguilar-Pesantes et al. 2021). This has been achieved by imposing taxes and or restrictions on mineral exports and imposing import restrictions targeted at reducing the production of conflict minerals (Aguilar-Pesantes et al. 2021). These CSR initiatives comprise a broader risk management strategy that monitors and protects the supply chain (Aguilar-Pesantes et al. 2021).

The Chilean framework has identified areas deemed vulnerable concerning the distance to populated areas, whereby they have developed methods to manage and assess the environmental risk (Aguilar-Pesantes et al. 2021). Furthermore, the government passed a law to regulate mining operations and facilities when they close, requiring management plans to mitigate environmental damage and limiting those companies who close mines from starting new operations when a closure plan has been approved (Aguilar-Pesantes et al. 2021). Such

frameworks limit the exposure of excessive mining without accountability while reducing environmental impact. For Chile, their success compared with other Latin American countries has been their adaptive capability towards embracing new technologies, resulting in improved efficiency and reduction of by-product waste, thereby reducing the environmental impact (Aguilar-Pesantes et al. 2021). Chile continually revises its national programmes procedures to align with international standards to protect air and water has reduced the impact on the environment (Aguilar-Pesantes et al. 2021).

Chile's approach to establishing a regulatory framework has been vastly different from that of the DRC. It has adopted a national framework approach driven by environmental concerns. It has addressed the issue of how mines that are closed should follow set procedures and passed laws to enforce this. Chile has achieved economic growth and development by decreasing poverty levels and providing universal healthcare; neither has happened in the DRC. This is despite the fact that mining contributes US50.4 billion to the DRC GDP (World Bank 2021b); very little has trickled down to ordinary citizens. This raises the question as to how the different states are prioritising and focusing their budgets. Despite Chile's relative success, it has resulted in significant damage to the environment in terms of water contamination, along with the soil becoming polluted and affecting the air space (Aguilar-Pesantes et al. 2021). In the context of the DRC, where poverty is a prevalent factor, there needs to be more focus on the socio-economic conditions and the growth and scope of ASM as a primary form of income generation and its contribution to sustaining livelihoods.

For Chile, only in the past few years have they begun to consider utilising PPPs for future initiatives as far as lithium are concerned (bnamericas 2015). With the expectation of increased global demand for lithium, this will strain the environment and could likely cause further damage. It is clear that to date, Chile has relied on the government to drive regulation and that PPPs are viewed as the only avenues to maximise potential profits from lithium. Nonetheless, Chile has two PPPs mining lithium, both MNCs, which has resulted in decreased water levels due to extraction used in the mining process (Morse 2020), demonstrating PPPs can be useful in reducing the burden of mining on the environment.

5.4.2 Colombia

For three decades, successive governments have attempted to formalise the ASM sector without much success. The failure was largely due to the government's lack of capacity, as the ASM sector could not meet the required timelines for filing legal titles and were not provided adequate support (Singo & Seguin 2018). Moreover, government focus had been biased towards the LSM sector supported by the 2001 Mining Code, which by not differentiating between LSM and ASM, thereby disadvantaged the ASM sector since the LSM entities could meet the stipulated requirements (Singo & Seguin 2018). This has resulted in creating another challenge as there was a conflict between the ASM and the LSM.

The Colombian government recognised that they needed the ASM sector and attempted to renew their strategy of formalising the sector (Singo & Seguin 2018). As of 2014, the Colombian government adopted the National Formalization Policy requiring that the ASM sector must adhere to operating with a legal title and that there was an increasing level of formalisation process, whereby miners could comply with labour, economic, tax, technical, and environmental specifications (Singo & Seguin 2018). A progressive framework established over time meant that ASM miners would be compelled to adhere to the process and keep them regulated rather than comply in a timely fashion (Singo & Seguin 2018). This approach to a regulatory framework has shown that if it is too bureaucratic and has too many hurdles, it perpetuates non-compliance.

In Colombia, the Ministry of Mines and Energy (MME) is responsible for overseeing the formalisation and regulation of the 300,000 ASM sector (Veiga & Marshall 2019). To date, this has been largely ineffective, with only 7 per cent of the mining operatives being registered (Veiga & Marshall 2019). The issue has been the implementation, as the ASM miners find the formalised regulations challenging, despite multiple government agencies working together. The MME, with the Ministry of the Environment and Sustainable Development, the Army and local authorities have been unable to control illegal mining activities and attempts to formalise the sector have increased informality (Veiga & Marshall 2019). While PPPs operate in Colombia, there has been no incentive to support regulatory reforms in the ASM sector.

The principal intention of mining regulation, including ASM, has been to generate tax revenue, whereby it would reduce illegal mining operations, whereby legitimising the sector increases its attractiveness for FDI as mining is a central pillar of the Colombian economy (Lugo & Pardo 2020). With ASM accounting for 70 per cent of all mining in Columbia, there is potential for significant tax revenue (Echavarria 2014). However, there is limited compliance to pay tax, and approximately 65 per cent of ASM miners fail to pay any royalties (Echavarria 2014). Colombia has two tax systems: surface tax, which is essentially a license for land rights to mine, and royalties based on productive output, both apply to ASM miners (Echavarria 2014). Similarly, illegal mining and trafficking of mineral resources have increased as exports rose from 2016 to 2017. Criminal organisations use the illegal gold smuggled out of the country for money laundering (Veiga & Marshall 2019). However, the consequence of the regulation has meant that the productive capacity of regulated miners' output has been less than that of the unregulated ASM, which correlates to the government losing potential tax revenue from informal mining (Veiga & Marshall 2019).

The challenges facing the Colombian government are much like those of the DRC about formalising an ASM regulatory framework. The rural poor have undertaken this entrepreneurial activity to take advantage of the abundant resources (Singo & Seguin 2018). The need to forge a living has seen rapid growth in the ASM sector and mining being undertaken on government-held land without the required permits – again denying the government income generation (Singo & Seguin 2018). Much like the DRC, Colombia has suffered from internal conflicts and a protracted peacebuilding process, with armed militia and criminal organisations exerting an influence (Singo & Seguin 2018). The conflicts in Colombia have created displacement, and ASM workers must maintain records both legal and accounting-based for five years. Still, given the conflicts and displacement, most have not provided such documents (Echavarria 2014).

In Colombia, the challenges are also compounded by socio-cultural struggles as Afro-Colombians attempt to secure protection for mining their lands (Singo & Seguin 2018). External actors threaten those local ASM miners and communities who have established mining with speculative licenses, and direct foreign investment conflicts frequently occur between the ASM and these foreign LSM (Singo & Seguin 2018). Much like the DRC, Colombia has focused on income generation as a driving force for regulating mining, specifically ASM. The DRC, like Colombia, has also been unsuccessful in its intention of

regulating ASM. Given both countries have similar historical pasts mired in conflict, they both have needed to focus on economic rebuilding and subsequently changing the perception to the wider world to attract investment.

5.4.3 Ghana

In Ghana, artisanal and small-scale mining has been the primary cause of deforestation, with gold deposits accounting for approximately 16 per cent of the country's geographic area (Barenblitt et al. 2021). This vast area enables the country to mine 70 per cent of sub-Saharan gold and makes Ghana the 7th largest producer of gold globally (Barenblitt et al. 2021). This reflects a phenomenal increase in the production of gold, with Ghana having only produced 5 per cent of the worldwide output, reflecting a fourteenfold increase in three decades (Barenblitt et al. 2021). This monumental rise has seen artisan mining grow on a parallel scale. With that, it has created extensive damage to the environment through deforestation and contamination through the use of mercury (Espejo et al. 2018). With the advent of the United Nations Sustainable Development Goals (SDG), Ghana has adopted measures to regulate ASM and accurately measure the effects of ASM (Government of Ghana 2019). For Ghana, the impact of gold mining impacts on several SDGs, with deforestation correlating to SDG Goal 15 'Lives on Land', especially in terms of freshwater (UNSDG 2015; Barenblitt et al. 2021).

Ghana adopted The Ghanaian Mining Act (2006) as a legal framework for mining with stipulations for ASM, focusing specifically on promoting and managing the sector (Macdonald et al. 2014). Ghana undertook to eliminate unlawful ASM practices by banning those operators who conduct operations illegally (Fritz et al. 2018). The Act further stipulates that a collective of up to ten people or any cooperative of the same number can apply for a mining license, and they are afforded the right to mine no more than 10Ha of allocated ASM land (Macdonald et al. 2014). The Ghanaian national framework works in conjunction with the Minerals Commission Office. In addition, a consortium of governmental agencies, including the Environmental Protection Agency (EPA), has been established in each of the nine primary ASM regions (Macdonald et al. 2014). These collaborative agencies have been established to process ASM mining applications and oversee mining activities within each jurisdiction (Macdonald et al. 2014).

Despite this, there still exist issues around the use of some chemical elements, such as mercury. Despite its lethal toxicity, mercury is still legal in Ghana, suggesting that the framework is not fulfilling its intention to protect the environment, which was the reason for the legalisation of ASM (Macdonald et al. 2014). The Ghanaian regulatory framework aims to manage the ASM sector and increase its efficiency. It requires that miners have licenses and are limited to a maximum of a 10 Ha area. However, it has yet to fully take hold, and illegal ASM operations continue to grow, with many operators breaching the regulations (Macdonald et al. 2014). Illegal mining operators lack the required permits, have no mining concessions or rights to mine, and misuse-controlled substances, like cyanide and mercury (Macdonald et al. 2014).

The central barrier is that the miners have found it challenging to attain the permits and licenses, which are cost-prohibitive. As of 2008, it was estimated that there were only 300 legally registered ASM operators of the approximate 300,000 to 500,000 ASM miners believed to be operating despite the regulations (Macdonald et al. 2014). As a developing country, Ghana has attempted to implement measures to reduce ASM's environmental impact, yet with elements like mercury and coupled with lack of compliance and enforcement. The question remains as to its actual effectiveness. There is a need for a broader approach that includes educational and training programmes to improve understanding, increase control, and monitor the impact of ASM (Macdonald et al. 2014).

Ghana's efforts to regulate ASM to establish a framework focused on sustainable development has been ineffective due to a lack of coherent understanding of the scope and scale of ASM (Debrah, Watson & Quansah 2014). The legal framework is broad and does not consider the various ASM activities coupled with municipality lump sum fees designed to mitigate environmental damage, which ASM miners cannot afford (Debrah, Watson & Quansah 2014).

With its focus more on environmental impacts, the effect on livelihoods has been overlooked as people are driven to ASM out of an economic need. Agricultural poverty has forced people to look for more sustainable incomes, with ASM being the answer. In Ghana, this need has seen an inverse effect on food production as previously employed farmers move to ASM, which has resulted in a decline of food production with a corresponding increase in ASM, which has affected GDP (Gilbert & Albert 2016). However, if regulation then impedes the

ASM sector, limiting the ability of all ASM miners, the effects are to their livelihood, increased poverty results. Similarly, there would be an impact on Ghanaian GDP.

5.4.4 Mongolia

Mongolia adopted a national ASM framework in 2010 by amending its Laws on Minerals and Land, which legally recognised ASM as an alternative type of employment that was vital for economic development (Singo & Seguin 2018). This transformational shift changed the focus from viewing the miners as criminals to one that positions them as responsible Mongolian citizens (Singo & Seguin 2018). As of 2014, the Mongolian government enacted its first State Mineral Policy, which set out its medium-term strategy, including revisions to the 2010 framework and managing and developing the ASM sector (Singo & Seguin 2018).

The policy established changes to the framework that included formalised trading in conjunction with the state Central Bank to expand ASM development and growth within the sector (Singo & Seguin 2018). The regulatory framework underwent further revisions that included setting government obligations, integrating human rights, considering technical barriers related to equipment, and rehabilitating mining sites (Singo & Seguin 2018). Typically, LSM sites have been well regulated, and, as such, mine closure practices have been followed. The ASM sector has posed a significant risk to the environment (McIntyre et al. 2016). One such method is capping, where waste is covered with soil, which redirects water away from the waste and limits the waste's spread (McIntyre et al. 2016). However, this has a limited impact as it is subject to capping, and its effectiveness is not fully known (McIntyre et al. 2016). The Mongolian policy and the legal framework stipulated that ASM miners were considered unregistered partnerships made up of a minimum of five ASM miners (Singo & Seguin 2018).

As of 2016, there were 722 ASM cooperatives or partnerships along with 72 non-governmental organisations, with access to the land granted by agreements between ASM miners and local jurisdictions in conjunction with the Mineral Resources and Petroleum Authority of Mongolia, or in some instances by LSM entities (Singo & Seguin 2018). What is clear is that Mongolia has approached this from a national level of authority while the KPN was localised. This collaboration at the local level is different from the KPN as it links ASM with the local government rather than the provincial government taking sole responsibility.

Furthermore, Mongolia is looking to regulate the entire ASM sector; KPN was not. In addition, the framework has broad stipulations beyond licensing, legal entity status, land rights and health and safety regulations, gender equality, provisions for social and health insurance, and child protection (Singo & Seguin 2018).

Mongolia's emergence from communism gave rise to ASM and, much like the DRC, is a means for many to find employment and, as such, has benefitted communities (Singo & Seguin 2018). At the provincial and local government level, established offices were required to offer obligatory outreach, support, and services to the miners (Singo & Seguin 2018). The contrast between the DRCs KPN and Mongolia's approach to ASM regulation is that it was geared at creating a monopoly and solely directed at maximising economic gain.

By establishing the ASM policy and framework, there has been some progress in Mongolia, with more than 10 per cent of the ASM sector having formalised their status (Singo & Seguin 2018). This movement reflects the commitment by the government to formalise the sector and transform the informal nature of ASM to professional status (Singo & Seguin 2018). There have been significant achievements in environmental protection, reducing mercury, expanding economic contribution, providing social security, and accountability (Singo & Seguin 2018).

Aspects such as economic contribution have been realised due to the ASM operators investing in safety and productivity and through agreements with LSM organisations (Singo & Seguin 2018). The economic contribution made by ASM on a local level has seen a transformation within the local mining communities. Not only are they dependent on mining, but they now actively participate in mining processes in the area and engage with the stakeholders giving them greater self-empowerment (Singo & Seguin 2018). At the state level, management of the ASM sector has improved in terms of both financial contribution and human resources. All this has equated to the ASM miners viewing the profession as more prestigious and protected (Singo & Seguin 2018).

5.5 Conclusion

This chapter has highlighted four distinct countries that each have established ASM frameworks. None have sought to approach it as the DRC has by creating a monopoly

through a private-public partnership. The most common theme has been to address the environmental impacts of ASM. Some sought to regulate nationally by enacting laws, and some have established partnerships at a local level. This suggests that there are multiple ways to attempt to regulate the sector. What is evident is that poverty drives ASM. Making any framework prohibitive in terms of the licensing costs or creating barriers to obtaining the required documentation will make a regulatory framework ineffective. ASM miners will seek ways to avoid compliance, and this will render their activities illegal. Here there is a parallel with the DRC. The exclusion of ASM in the KPN caused miners to seek to act illegally and escalate their activities when market opportunities were limited. Similarly, the national agreement with Gécamines focused on cobalt and has divided the ASM sector and failed to address any environmental concerns in other ASM industries.

Chapter 6: Conclusion

This thesis sought to investigate the challenges that prohibit the DRC from establishing a cohesive ASM policy and regulatory framework to lessen health and environmental risks. In chapter 2, the research showed that the DRCs prior efforts to implement a coherent policy and regulatory framework had been targeted at LSMs and failed to consider the discrete nature of ASM's or mining communities. In chapter 3, the research showed that the focus of the DRC has been on maximising economic profitability rather than addressing environmental and health concerns. Notably, cobalt is predominantly mined by ASM, and it plays an important role and should not be discarded when considering reforms. ASM's current environmental and health impacts outlined in Chapter 3 will continue and will likely cause an increase in related health and environmental issues as the demand for cobalt increases.

With any additional growth, there will be more miners and thus more health and environmental issues. Thus, ASM should be at the forefront of any policy framework. From these findings, the DRC government's attempts at ASM reforms have not considered the importance of ASM cobalt mining and its long-term viability. Still, the DRC government does recognise its economic value to the overall GDP. There is a co-dependency in that the DRC needs ASM, primarily because it provides employment opportunities and contributes economically. There is an opportunity for growth given the global demand for mineral resources, especially cobalt.

The KPN experiment in the Katanga province brought local government and private actors together to form a PPP. It was, to some degree, a short-term success depending on how it is evaluated. However, it created a monopoly and alienated the ASM sector, and therefore was not a viable long-term solution that could not be enacted on a national level. It was undertaken in a province not besieged by conflict, which would not have been possible in the conflict-torn Kivu provinces. Conflicts in the DRC serve as a continual barrier to ASM regulation and impact on a broader social eco-political level.

Historically, the ASM initiatives in the DRC have been geared toward generating tax revenue. The state's current approach exploits economic opportunity as a state entity, reflecting a non-neoliberalist monetary policy. The government's actions rely on tax revenue

rather than the free market determining their share of profits from the sector. Essentially, the DRC government wants to tax the private partner rather than settle for profits derived from market-driven forces. This means the DRC government is thus interfering in the free market principles of neoliberalism, which is counter to this economic ideology, according to Brenner and Theodore (2002). This does not bode well for attracting future investment and decreases the likelihood of other private actors assuming financial risk in a country where conflict is still prevalent, and government interference in the market is a barrier to free trade. For the DRC to undertake reforms for the ASM sector and attract FDI, there must be an openness to trade, especially if they wish to form PPPs.

The 2019 state agreement with Gécamines, a Congolese commodity trading company that took control of ASM for copper and cobalt exports, initially seemed like a potentially viable PPP solution if applied nationally. However, it fragmented the ASM sector by only targeting specific commodities, such that regulating two left the preponderance unregulated. This created another monopoly; whereby other minerals were not part of the agreement. The state restricting cobalt exports as of May 2021 represents state interference and a move to an autocratic dictatorship, not a free market. In neoliberalist economies, states should intervene when monopolies exist, not to create them. Frederich Hayek's (1945) belief was that free markets were more efficient and that having active government control or perpetuating interference in them not only limits competition but is a deterrent to prospective investors.

With ASM viewed as an 'indispensable' form of employment, especially in the developing world, the DRC is highly dependent on this sector. When considered in conjunction with the global demand for cobalt, there is an opportunity for both the state and the sector to prosper. The DRCs reliance on cobalt for export income reflects its economic dependency on ASM and an opportunity that will continue to increase as the demand for more cobalt for lithium batteries and growth in electric automobiles continues to grow. Thus, there is a co-dependency and one that needs to be mutually respected. This would suggest a need for the government and ASM sectors to collaborate in forging a framework that regulates the sector and formalises its activities, not one driven solely by the state but with input from the ASM sector.

What is clear from Chapter 5 is that in several other countries, ASM reform has been driven by addressing environmental concerns directly correlated to health impacts. Thus, addressing how ASM is conducted would mitigate risks to both. Those countries that enacted change

have adopted a collaborative approach with other agencies to implement those reforms. For the DRC to undertake such an approach, it would require a paradigm shift in philosophy towards focusing on the environment and adopting a neoliberalist approach to economics, whereby there is no state interference. In either case, this will more than likely fail if the conflicts are not addressed.

Suppose the DRC intends to attract PPPs for investment and establish partnerships for a regulatory framework, thereby creating new governance in the sector. In that case, it must not act in a manner that prevents private actors from operating to profit from the free market. For the state to address partnerships for development, collaboration is necessary as it can address resource limitations and work toward meeting the SDGs. By creating PPPs as partners for development, the state and LSMs could support the ASM sector as it transitions to a formalised sector by providing universal health and oversight on the environmental front. Future research should consider assessing and quantifying the effects of regulatory control on ASM by measuring the impact on miners' wages, changes to health, and communities.

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