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Sustainable Mining for Long Term Poverty Alleviation in the Democratic Republic of the Congo

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Abstract

This thesis explores the poverty alleviation and peace-spoiling power of the mineral extraction sector in the Democratic Republic of the Congo to arrive at a set of strategic goals for the country moving forward. Although subterranean minerals are often a source or perpetuator of violence, the potential to lift the country's rural communities out of extreme poverty makes the mining industry an essential part of the nation's development strategies. Lessons from Tanzania, Côte d'Ivoire, Guinea, Ethiopia, Zimbabwe, Nigeria, Ghana, Zambia, Uganda and Sierra Leone to arrive at best practices for increasing the multiplier effect of large-scale mining, formalization, beneficiation, capital resource development, stakeholder harmonization and conflict control. The study also finds that in order to smoothly construct and implement new programs, the traditional roles and positioning of government, corporate and community stakeholders must change toward increased inclusion.

Chapter 1: Introduction

The Democratic Republic of the Congo (DRC) suffers from extreme poverty, with 63.6 percent of people living below the international poverty line[1] and a rank of 176 out of 187 in the United Nations Human Development Index.[2] Ongoing conflicts have limited the impact of development efforts and rampant corruption within the government has robbed the country's poorest communities of opportunities for economic opportunity.

The country does, however, have the latent potential it needs to address its poverty problems given the ability and impetus to effectively manage its resources. Vast reserves of subterranean minerals provide a powerful opportunity for economic development that, when concentrated in particularly poor areas, can have a major impact on the quality of life for the poor. In order to do this, the country's government will need to control for the possibility of mineral wealth perpetuating violence while ensuring that the profits of the mining sector are channeled into economically marginalized communities and not into the hands of foreign investors or government bureaucrats.

This development can come in two primary ways. First, by supporting artisanal and small-scale mining, the government can increase the number of people profiting from mining through direct employment. Second, by supporting the growth of industrial large-scale mining operations largely funded by foreign investors, the government can channel

[1] *The impact of mining in the Democratic Republic of Congo Performance to date and future challenges*. Oxford Policy Management & Synergy, October 2013.
[2] "Democratic Republic of Congo Overview." The World Bank.

mining revenues into poorer communities and provide opportunities for economic development through small business ownership.

The Situation in the Congo

The Democratic Republic of the Congo (DRC) is in the midst of a long-term conflict that has claimed approximately 5 million lives to date.[3] At the center of this conflict is the fight for control over valuable mineral resources that have provided the funding for the more than 70 militant groups operating within the region.[4] At present, the Congolese government has little control over its most mineral rich regions, particularly the Eastern Kivu provinces, making it difficult to impose a rule of law within areas with heavy mining activities. One rebel group in particular, the National Congress for the Defense of People (CNDP) holds an area entirely outside of the control of the Congolese government and United Nations peacekeeping forces under claims that it is protecting Rwandan Tutsis from Hutu militias operating in the region.[5] The group is heavily backed by the Rwandan government. The Congolese government will need to develop the capacity to create and enforce stabilizing legislation before it heavily pursues a formalized and legalized mineral trade.

In 2009, progress toward improving the country's economic strength was made with the signing of the Poverty Reduction and Growth Facility between the DRC and the International Monetary Fund (IMF), effectively giving the country almost US$12 billion in debt relief. These payments were suspended in 2012 due to international concerns

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[3] "Congo war-driven crisis kills 45,000 a month-study". Reuters.
[4] Stearns & Vogel, The Landscape of Armed Groups in Eastern Congo
[5] *The Democratic Republic of the Congo: Roots of the Crisis*. The Enough Project.

about transparency in mining contracts.[6] In 2015, the DRC ranked in the ninth percentile[7] for corruption control according to the World Bank, meaning that the level of corruption within the nation is incredibly high. The Congolese government is widely considered to be a kleptocracy, with government officials using positions and access to public resources to secure their own wealth. Most recently, the release of the Panama Papers implicated the president at the time, Joseph Kabila, is colluding with foreign investors to sign secretive mining deals that are often not to the public's benefit.[8]

With about 60 percent of the population inhabiting rural areas, much of the DRC works in the informal sector, relying heavily on subsistence mining and agriculture.[9] Developing the capacity to exploit natural resources legally will likely prove an important part of the Congo's economic development, however the country must first reach a state in which its government is accountable and transparent enough to work with the international community and protect the interests of its citizens. Therefore, in order to undertake the formalization of the mining sector and harmonize its practices with the country's development needs, the DRC must first move closer to the point at which it can be classified as a development state. In other words, the majority of the government must consciously prioritize the welfare of its constituents and be willing to undertake policies that result in social benefit. While total peace is not necessarily required, the government does have to have sufficient capacity to enforce its decisions, meaning at least definite control over its own military and a corruption level low enough to trust that law

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6 "The World Factbook: CONGO, DEMOCRATIC REPUBLIC OF THE." The CIA World Factbook.
7 The World Bank Group. Worldwide Governance Indicators 1996-2015.
8 Jones, Peter. "Out of Africa: British Tax Havens and Congo's Missing $1.5 Billion."
9 "Democratic Republic of Congo Overview." The World Bank.

enforcement and members of government will act lawfully and in the interest of the public. Only under these conditions can a mineral extraction policy framework have a significant positive impact on the DRC. Feasible implementation of the recommendations of this thesis will be contingent upon the country reaching this point.

According to the World Bank, the formal mining sector in the DRC accounts for approximately 12 percent of GDP,[10] meaning that although responsible development of this industry will have a powerful impact on those involved and can add some degree of economic prosperity to the country, mining is not this country's economic *deus ex machina*. Rather, mining presents an opportunity to both directly and indirectly affect the nation's poorest people by facilitating easier and more profitable artisanal mining and by concentrating the benefits of industrial mining into poorer communities while controlling for the negative side effects some industrial mines have had.

The primary minerals mined in the DRC are cobalt, copper, gold, coltan and diamonds (See Appendix A), although the mining industry is highly diverse. While yields are difficult to calculate given the informality of the sector and the prevalence of black market exports, the DRC is a major global producer of precious and industrial minerals. According to the United States Geological Survey, the DRC ranks fifth in the world for copper exports[11], and tenth in the world for tin production, even with the underreporting issue unaccounted for.

The mining sector in the DRC has traditionally been dominated by large-scale mining operations, limiting the government's interest in engaging with the artisanal

[10] "DRC Congo: Economic Growth Set to Reach An Unprecedented Seven Percent in 2013." World Bank.
[11] United States Geological Survey. "Copper." *Minerals Yearbook 2012*, 2012, 54-55.

mining sector.[12] However, with the ongoing conflict in the region, the productivity of large-scale mining and foreign investors' interest in operating in the country has declined, opening up space for artisanal miners to create illegally operated mines in order to survive.[13] A vast amount of gold mining and almost all diamond production now occurs at small-scale and artisanal sites.[14] As artisanal mining grows in economic importance, the post-conflict re-entry of large-scale mining companies will need to be handled sensitively to prevent conflict and the destruction of livelihoods.

The actual system of mining management, where minerals are not controlled by foreign corporations, is heavily driven by the influence of armed groups. After miners discover minerals, they usually pay a percentage of their find to the local authorities running the mine, generally an armed group, and then sell their ores to the *negociants* who pay porters to carry the minerals to a trading post at a nearby urban center. Because of the severe infrastructure deficit that exists in many mining regions, many porters must transport the heavy minerals by foot, usually around 40 miles.[15] At the trading posts, most middlemen, or *comptoirs,* operate illegally and without a license, due in part to the excessive expense of obtaining legal permission to export, which can be upwards of US$40,000 per year.[16] These *comptoirs* are usually connected to armed groups which then export the minerals out of the country, often taking advantage of neighboring

[12] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 14.
[13] Ibid.
[14] United States Geological Survey. "The Democratic republic of the Congo." *Minerals Yearbook 2012*, no. 11 (June 2012).
[15] Cox, Stan. *War, Murder, Rape... All for Your Cell Phone*.
[16] Hayes, K & Burge, R. (2003) Coltan Mining in the Democratic Republic of Congo: How tantalum-using industries can commit to the reconstruction of the DRC.

countries' lower export taxes to move the ore into processing facilities owned by foreign corporations, which process about 80 percent of exported Congolese minerals.[17]

Usually, these illegal exports exit through Rwanda.[18] Rwanda is a favorite of illegal exporters due to its lack of export taxes and a loophole whereby goods that have 30 percent of their value added through additional processing may be declared as officially produced domestically within Rwanda, allowing them to be officially certified under international mineral export agreements.[19]

Given the need for economic opportunity, there is a strong case for regulation and development of the mineral extraction industry in the DRC. The most important may be the opportunity for poverty alleviation. While the DRC is not resource rich in real terms, its mining industry is rich enough to be politically and economically significant and does present a major opportunity to bring revenue to the poorest members of society, if it is managed effectively.

For the majority citizens in the DRC who live on less than US $1.25 per day, entering into a profitable industry like mineral extraction would have huge benefits for their socioeconomic situations.[20] Already, over 500,000 people[21] in the DRC work

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[17] Ma, Tiffany. *China and Congo's Coltan Connection*.

[18] Coltan, Congo & Conflict. POLINARES CASE STUDY. The Hague Centre for Strategic Studies No 20 | 03 | 13

[19] Bleischwitz, Raimund, Monika Dittrich, and Chiara Pierdicca. 'Coltan from Central Africa,
International Trade and Implications for Any Certification.' Resources Policy 37, no. 1 (March
2012): 19–29.

[20] *The impact of mining in the Democratic Republic of Congo Performance to date and future challenges*. Oxford Policy Management & Synergy, October 2013.

[21] Pact, Promines Study. Artisanal mining in the Democratic Republic of Congo.

directly in artisanal mines and it is estimated that the artisanal mining sector supports upwards of 10 million people, largely in the Eastern Kivu provinces.[22]

Additionally, although mining is associated with a high degree of violence, human rights violations, and other illegal activity[23], building proper regulation of the industry and actively exploiting minerals for the benefit of the nation at large may actually prove an effective way of controlling the influence of militants on the mining sector. Ignoring the opportunity for mineral extraction will likely preserve the status quo of illegal and unregulated mining activities and continue the flow of profits into armed groups rather than subsistence mining communities.

Addressing the Human Rights Crisis

Perhaps the largest barrier to using the mining sector to propel the country out of poverty at the present is the ongoing conflict and human rights disaster dominating the lives of mining communities. While a post-conflict poverty alleviation strategy does not necessarily have to take full responsibility for addressing the causes of conflict and achieving peace, it does have to take into account the implications that years of war will have for the country's poorer communities and the scars it will leave on the mining industry in particular.

The most widely understood human rights atrocities committed in the Congo are often assumed to occur in mines under rebel control. There are, however, numerous other violations that are often overlooked and are, without intervention, likely to persist in the

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[22] Lamb et al. Rumours of Peace, Whispers of War.
[23] *The impact of mining in the Democratic Republic of Congo Performance to date and future challenges*.

post-conflict state. The role of the government and its affiliates, foreign corporations, and side effects of mining activities that affect Congolese citizens who do not work in the mines all contribute to the situation. One such side effect is the forced eviction of subsistence farmers and charcoal producers, as was the case in the town of Luisha. Originally a traditional rural village, it grew into an informal town when artisanal mining drew crowds into the region in the 1990's. According to a field report by Amnesty International published in 2013, many people were living in makeshift tents and,

> "According to those interviewed some 300 households were forcibly evicted when a Chinese company, Congo International Mining Corporation (CIMCO) was given the rights to the site in the centre of Luisha, where they had been living since 2007. CIMCO had been given the site to build a processing plant. When the community was told by a local administrative official, in about July 2011, that they would have to move from their homes because their land had been given to CIMCO they raised concerns with the local authorities. The official reportedly told them they did not have rights to the plots of land on which many had built brick houses, although most had paid CF25,000 to the local chief, in line with customary land use practices in the area.[24]

Following this dispute, the families were packed into trucks and relocated to a new site that reportedly lacked housing and other basic facilities, left to rebuild their lives unaided. Chinese companies are not the only perpetrators. In one instance, the entire

[24] Amnesty International. *Profits and Loss, 24.*

village of Kibisha was relocated to Kimfumpa to make way for the Luxembourgian Eurasian Resource Group's Frontier Mine.

Luisha is not a unique case, with as many as 3,400,000 Congolese people currently living as internally displaced persons due to mining-induced eviction or mining-related violence.[25] In addition to displacement, mining activities have crippled communities by restricting access to resources. As another report notes,

> "On 19 April 2012 COMILU, a Chinese-Congolese joint venture, accompanied by police, used bulldozers and diggers to excavate a deep trench about 3 metres wide, blocking off a rural road crossing near Luisha. Local people had used the road for decades to reach their fields and to access water. With this route closed off they had to spend considerably longer travelling to and from their fields and water source. When people protested about the trench, police fired live ammunition in the air and one man was killed by a stray bullet."[26]

These issues are particularly significant, as they are committed by privately owned mining operations working in tandem with the government of the DRC. While the torture, execution and massacre of civilians is likely to end once the government of the DRC reclaims firm control of its territory, these less documented abuses are likely to persist even after the conflict ends unless proactive measures are put in place to deter such violations of citizens' rights. An effective post-conflict mineral extraction policy

[25] Internal Displacement Monitoring Centre, *Democratic Republic of the Congo IDP Figures Analysis*.
[26] Amnesty International. *Chinese Mining Industry Contributes to Abuses in Democratic Republic of the Congo*.

will have to take into account the conduct it expects from foreign companies operating within its borders and determine the appropriate enforcement mechanisms that will protect its population from issues like forced relocation and limited resource access.

There are also hazards that arise from the lack of proper attention paid to safety in the mines. Landslides and mine collapses are a common cause of death among miners, and many more suffer chronic heart and lung problems as a result of their time in the mines. Additionally, tantalum, one of the country's most profitable mining yields, is considered a naturally-occurring radioactive material (NORM) due to its tendency to contain traces of uranium and thorium. Many miners in the DRC use their bare hands, or simple tools like spades and shovels to extract these minerals from the ground and rarely wear masks when milling it, meaning they risk exposure to radiation from handling the mineral and inhaling its dust. The calculated exposure to radiation is, according to the Journal of Radiological Protection, at levels concentrated enough to mandate strict regulation of tantalum mining and handling.[27]

The fact that many Congolese minerals are exported fraudulently for sale and refinement through other nations exacerbates this situation by making it more difficult for watchdog groups to estimate the real prevalence of Congolese conflict minerals on the global market, and creates a loophole for private multinational corporations seeking to publicly verify the social responsibility of their supply chains. For this reason, even tantalum that is certified "clean" at the time of purchase likely comes from conflict mines

[27] Mustapha et al. "Occupational Radiation Exposures of Artisans Mining Columbite–tantalite in the Eastern Democratic Republic of Congo."

in the DRC, making foreign domestic legislation against conflict mineral use in corporate supply chains difficult to universally enforce.

Mining and the Environment

More difficult-to-reach mineral deposits often lie underneath rainforests, which serve as a critical refuge for biodiversity, a habitat for endangered chimpanzee populations and other species, and important sources of extractive resources, in addition to the positive environmental externality they provide as a major carbon sink. Using satellite imaging, NASA's Earth Observatory division has estimated that between 2000 and 2010, the DRC lost approximately 3,711,800 of its 159,529,000 hectares of rainforest.[28] According to field research led by Greenpeace International personnel, the Congolese rainforest within the DRC is the only rainforest in the world that continues to see increasing rates of deforestation and destruction.[29] In addition to agriculture needs and charcoal acquisition, the mining of valuable minerals has played a major role in this process. The impact of mining on this process is both a direct and indirect one. On the one hand, artisanal and industrial mining operations clear vast swaths of land in order to dig mines. On the other hand, communities displaced by mining operations in and around their towns often seek refuge in resource-rich rainforest areas where they can survive, inevitably destroying or fragmenting the local forests and habitats with the necessary construction and agricultural activities.[30] Mining communities, too, often rely on

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[28] Potapov, P.V. et al. Quantifying forest cover loss in Democratic Republic of the Congo.
[29] Zhuravleva, I. et al. "Satellite-based Primary Forest Degradation Assessment in the Democratic Republic of the Congo, 2000–2010."
[30] Zimbalatti, Bella. "Coltan: The Link Between Chimpanzees and Your Cell Phone."

bushmeat and the need to feed the many miners rushing into these towns has led to severe over-hunting. Game ranger working within Kahuzi-Biega National Park (KBNP), a UNESCO World Heritage Site, estimate that nearly all of the park's 3,700 elephants and 3,700 gorillas have been killed, and the death toll has been expanding into areas still controlled by park officials.[31] Other national parks and World Heritage Sites have been suffering the same fate.

Tantalum in particular is acquired by digging in deep mines or streambeds and sifting and washing the sediment to sort out heavy particles, after which it is refined into tantalum powder by crushing the mineral in mills. Aside from the damage that clearing land for these activities can cause, the major environmental danger that arises during this process is from the tantalum itself leaking into nearby water supplies either directly through mining sites in river beds or from runoff in pit mines nearby. As a highly toxic mineral, tantalum has the potential to contaminate the rivers that serve as the safest sources of drinking water for many of the DRC's rural communities.

In the gold ore refining process, most artisanal mining operations rely heavily on mercury, leading to environmental contamination.[32] While equipment and strategies such as fume hoods and retorts exist to limit the amount of mercury being released into the environment, and are regularly in use in industrial mining operations, these are often difficult or expensive to implement in smaller sites.[33]

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[31] Astill, J. & McKie, R. (2001) Gorillas face doom at gunpoint. Observer. March 4.
[32] United Nations environmental Programme. "Environmental assessment of mercury pollution in two artisanal gold mining sites in eastern Democratic Republic of the Congo."
[33] Ibid.

Artisanal and Small-Scale Mining

Artisanal and small-scale mining are non-industrial mining activities that happen on a small-scale and local basis. Although policymakers typically draw a distinction between these activities and large-scale operations owned by foreign corporations, for the purposes of this thesis, the terms artisanal and small-scale mining will be used interchangeably. Small-scale mining typically involves a greater degree of organization and equipment use (See Appendix B) than artisanal mining, but the DRC currently draws no legal distinction between the two, and both are considered marginalized economic activities that will benefit from development aid.

Artisanal mining presents an important opportunity for impoverished citizens of the DRC to drastically increase their incomes. There is, however, an often overlooked downside to the injection of capital that the artisanal mineral trade can bring to the DRC. For one, profits from the mineral trade are rarely invested back into the community, even in artisanal mining operations. The profits also entice people, usually farmers and students, to change their professions, meaning the risk of youth dropping out of school for the promise of easy money becomes a major risk, with some communities reporting a drop-out rate of up to 30 percent. It also causes less profitable farming land to be repurposed into mining plots, putting the DRC at risk for even greater food scarcity.[34] At present, many rural families leave women in their village to maintain farming activities while sending men to larger cities like Goma to earn wages in small mines, which greatly reduces the productivity of remaining farm land and has already placed a heavy burden

[34] Tegera & Sofia. *The Coltan Phenomenon*.

on the region's agriculture production and driven food prices up. Most of these small-scale rural miners are still wage earners, and the risk of being paid unfairly or of losing their profits to high food prices and nights out is high, meaning that the real impact of the mineral trade on the poorest communities whose men perform the bulk of the labor is fairly low.

The health risks of artisanal mining are great, as workers often enter the industry for its low startup costs and high rewards, meaning there is little investment into or education on proper safety equipment and practices. Workers rarely have access to, or even understanding of, proper protective equipment, often resulting in injury and chronic illness.[35] These are generally the results of mineral dust inhalation and landslides within the mines, as well as radiation exposure.

Because many artisanal mining operations are illegal, the industry largely bypasses whatever health and environmental regulations do exist in the country where it takes place.[36] This puts artisanal miners at increased risk of suffering health concerns and causing environmental degradation to the surrounding areas, and contributes to a correlation between unregulated illegal mining and prevalent health issues in local communities.[37] The health issues associated with dust and blasting fumes may even have a greater impact on the women and children, often involved in processing and amalgamation or those who reside nearby the processing sites, than the men who work in the mines themselves, meaning the unregulated mining activity can have a powerful

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[35] Amnesty International. *This Is What We Die For*

[36] ILO (1999) Social and labour issues in small-scale mines: Report for discussion at the Tripartite Meeting on Social and Labour Issues in Small-scale Mines

[37] Ibid.

negative impact on both children and individuals who do not even engage in mining activities.[38]

Additionally, mining communities tend to have some of the highest rates of HIV/AIDS and other STIs across multiple African nations.[39] For example, in South Africa, up to half of the country's miners, including both artisanal and large-scale industrial operations, are infected with HIV/AIDS.[40] In Zambia, the infection rate is approximately 18 percent of copper miners, a massive industry which comprises about 75 percent of the nation's export earnings, and in Botswana, where the mineral extraction industry is incredibly robust and accounts for over half of government revenues, one third of miners are estimated to be HIV positive.[41] This may be due to the prolific prostitution industries that often rise up within the mining towns where miners spend much of their time away from their rural homes, coupled with the significant lack of access to health care that these more remote mining communities face.[42]

These associated health concerns make a strong case for formalization of the informal mining sector in countries where artisanal mining presents a valuable opportunity for poverty reduction. The first step to regulating and mitigating the negative effects of robust mining industries is formalizing the processes by which these activities are monitored and administrated in a way that maximizes real participation.

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[38] Ibid.
[39] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 27.
[40] Ibid.
[41] Ibid.
[42] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017. P 10.

Aside from health concerns, artisanal mining does have an additional benefit that large-scale mining generally does not achieve. In African countries in particular, artisanal mining operations tend to demand engagement from the whole workforce in order to maximize efficiency, with the majority of African nations seeing 50 percent or more of the artisanal mining work force composed of women.[43] Even where this may not be the case, statistics resoundingly show that women play a much greater role in artisanal mining, particularly in mineral processing and refining, than in large-scale mining operations. [44] Although gender roles still tend to dictate the type of labor performed, meaning that artisanal mining cannot be a perfect fix for all of the DRC's gender inequalities, women are able and encouraged to work and earn their own independent salaries in artisanal mining.[45] The benefits of this are clear. Women are often some of society's most vulnerable and disempowered individuals and the necessity of their involvement in artisanal mining provides a way to become economically self-sufficient without stigma, meaning that artisanal mining can actually disrupt parts of the actual societal structures that keep women disadvantages, in addition to benefitting society's most poor in general.

Small-scale mining operations also have the potential to create well-paying jobs at a very low investment rate. Because small-scale mining is typically performed with only

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[43] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. PDF. Singleton Park: Centre for Development Studies University of Wales Swansea , November 2004. p23.
[44] Drechsler, B (2001) 'Chapter 4 – Tanzania' and 'Chapter 6 – Zambia', MMSDSA: Research Topic 1, Small-scale mining and sustainable development in South Africa
[45] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. PDF. Singleton Park: Centre for Development Studies University of Wales Swansea , November 2004. p24.=

the most rudimentary tools, it tends to be highly labor intensive, but minimally capital intensive.[46] Investments into developing small-scale mines can be highly successful because the required investment per job is typically only 10-12 percent of the money required to create a job at an industrial plant.[47]

One of the biggest barriers standing in the way of this job creation is the limited access to capital in rural communities. Expanding ventures and creating small businesses does take some degree of investment and in rural communities, where there is little access to formal banking and therefore lines of credit, a lack of funds can prevent miners from lifting themselves out of subsistence living.[48] The DRC is one of the countries with the least access to banking in the world, even for a developing nation. As of 2014, about 14 percent of adults had access to formal banking, compared to 34 percent on average in Sub Saharan Africa and 54 percent on average in developing economies.[49] Currently, rural banking in the DRC generally relies upon trusted members of the community who are appointed money managers for several households but do not supply financial planning or access to lines of credit.[50]

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[46] Banchirigah, SM & Hilson, G 2010, 'De-agrarianization, re-agrarianization and local economic development: Re-orientating livelihoods in African artisanal mining communities', Policy Sciences, vol. 43, no. 2, pp. 157-80.
[47] Ibid.
[48] Cull, Robert, Xavier Gine, Sven Harten, and Anca Bogdana Rusu. "Agent Banking in a Highly Under-Developed Financial Sector: Evidence from the Democratic Republic of the Congo." *World Bank group Finance and Private Sector Development Team* Working Paper 1984 (February 2017). Accessed April 5, 2017.
[49] Ibid.
[50] Ibid.

The international community as partners in development

Recent approaches to limiting black market exports have focused on reducing the demand for illegally exported minerals. Certification schemes like the Kimberly Process and the Extractive Industries Transparency Initiative have supported efforts to require companies using potentially illegally-acquired minerals to verify that their supply chains are conflict free and have made strides in making the enforcement of export laws a matter of international responsibility.[51] These programs have seen some success, but do face struggles in implementation within both mineral-producing countries and foreign supply chains.

For example, minerals like tantalum are classified by countries like the United States and Venezuela as a strategic minerals, meaning that although they are often problematic to obtain, building stockpiles of these minerals is considered a necessity to the national security objectives of many nations.[52] The United States in particular is entirely import dependent in building its reserves of tantalum, receiving much of its supply from Central and Southern Africa.[53] This leads to a conflict of priorities between national security and human rights objectives and gives rise to a major transparency issue outside of the Congo itself. Although there is heavy American activism for the reduction of conflict mineral imports, namely with the passing of the Dodd-Frank Reform Act, gathering affordable stockpiles of tantalum through accessible means, even from conflict

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[51] "The Kimberley Process (KP)." The Kimberley Process (KP) | KimberleyProcess. Accessed April 21, 2017.
[52] Burgess. *Sustainability of Strategic Minerals in Southern Africa and Potential Conflicts and Partnerships*.
[53] Humphries. *China's Mineral Industry and U.S. Access to Strategic and Critical Minerals: Issues for Congress*.

regions, is a defense priority for many nations like the United States and China, which has major stakes in acquiring Congolese tantalum through its state owned enterprises.[54] Therefore, although private sector regulation plays a role in reducing the export of conflict minerals, major buyers are often state actors prioritizing their own national security. Therefore, in order to sustainably prevent the resurgence of violence, the Congolese government cannot rely entirely on the goodwill of foreign governments.

Building an effective policy framework:

Given the multifaceted nature of the issue, a successful mining policy that safely and responsibly promotes economic development within the DRC will need to be economically comprehensive and allow for multiple safeguards against against worsening the conflict. A successful mining policy for the DRC will accomplish the following goals:

1. Support the formalization of the artisanal mining sector to reduce black market exploitation and increase support for small-scale operations.
2. Protect both artisanal and industrial miners from exploitation by militants and foreign managing corporations and suppress the black market activities such as fraudulent exports that could continue to fund these groups.
3. Promote transparency and prevent corruption in the national mining industry and protect the government against the resumption of kleptocratic

[54] Burgess. *Sustainability of Strategic Minerals in Southern Africa and Potential Conflicts and Partnerships*.

practices by concentrating the profits and benefits of both large- and small-scale mining into poor rural communities.

4. Mitigate the negative environmental effects of mining and protect the health, welfare, and rights of miners, mining communities, and constituents living near mineral deposits both known and unknown.
5. Prevent the resurgence of conflict due to increased mining activities.
6. Defend the economy and livelihoods of miners against price volatility by diversifying industrial activities to promoting value adding activities such as mineral refinement.
7. Harmonize large-scale mining interests with the needs of local communities and capitalize on opportunities for mutual benefit.

Chapter 2: Mining Trends

The ongoing development of the mining sector in the DRC presents numerous lessons that can guide the discussion on further policymaking. First, the role of the mining industry in fueling and perpetuating violence cannot be ignored. However, the industry also presents opportunities to increase the DRC's dismal employment rates. There have also been ongoing efforts to resolve some of these issues that the DRC has already undertaken that will inform the prospects for future success of other initiatives.

Mining and Violent Instability

It must be noted first that natural resources are not the root cause of violence in the DRC. They do, however, escalate the conflict by providing essential funding to militias and increase the involvement of foreign militaries seeking to protect mineral interests. Understanding the structure of that violence is essential to preventing a resurgence of conflict with the expansion of the legal mineral extraction industry.

While most militias are small domestic groups numbering in the hundreds, several of the largest groups are foreign militias from Rwanda, Uganda and Burundi.[55] Factionalization within the Congolese military (the FARDC) itself has partly caused the high prevalence of small militias. After the defeated M83 rebellion there was incomplete assimilation of the rebel factions that had joined its ranks, resulting in several parallel chains of command that do not necessarily report to the FARDC.[56] These groups,

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[55] Amnesty International. *This Is What We Die For: Human Rights Abuses in the Democratic Republic of the Congo Power the Global Trade in Cobalt*. London.

[56] Amnesty International. *Profits and Loss: Mining and Human Rights in Katanga, Democratic Republic of the Congo*. London: Peter Benenson House, June 19, 2013.

although officially connected to the Congolese military, have a tendency to carry out violent and criminal activities to profit from the lack of organization in the DRC's mining industry, blurring the lines between state-sanctioned violence and illicit activity.[57] In order to prevent a resurgence of violence as the legal mineral trade develops, the government of the DRC will need to recognize the danger coming from within its own military and take steps to control incentives to factionalize. Other major groups operating in the region are branches of the Ugandan and Rwandan militaries, which run mines of their own in the East.

The United Nations Group of Experts (UNGoE) estimates that mineral mining brings rebel groups millions a year in income, largely from fraudulent exports into Uganda, Rwanda and Burundi.[58] Additionally, the International Peace Information Service (IPIS) estimates that over half of the mining sites in the eastern Kivu provinces nearest Rwanda are under the influence of these same militant groups.[59] These violent groups often do not act alone. In some cases, private corporations have armed and paid rebels to secure access to minerals.[60]

This has resulted in economic spillage as resources are cheaply smuggled out of the country by rebel groups and foreign companies, delivering a dual blow to the Congolese government. First, its citizens working in and around these mines have little

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57 Ibid.

58 UN GoE final report 2012, op. cit., §225; Interviews local researchers assigned by IPIS with miners, Mubi and Ndjingala, May 2013.

59 Cuvelier J., The complexity of resource governance in a context of state fragility: the case of eastern DRC, IPIS/International Alert, November 2010, see Chapter 4.

60 Amnesty International. *Chinese Mining Industry Contributes to Abuses in Democratic Republic of the Congo*. June 19, 2013

protection from the rampant human rights abuses these groups have been known to inflict, and second, it suffers the environmental and economic cost of unearthing and exporting its natural resources without gaining any financial benefit. The United Nations Panel of Experts assembled on the issue summarized the issue best when it noted "no coltan exits from the eastern Democratic Republic of Congo without benefiting either the rebel group or foreign armies."[61] This illegal trade will need to be closely monitored, as the chance that black market exports will continue is high unless the Congolese government take steps to protect known deposits from illicit exploitation.

Job Creation

The unemployment rate in the DRC is 73 percent, with 80 percent operating in the informal sector. This hits young professionals particularly hard, with only 100 out of 9,000 of the DRC's university graduates finding employment equivalent to their qualifications each year.[62] This unemployment issue is a serious barrier to economic development and needs to be resolved on both the poverty alleviation and economic development front. Mining reform, if undertaken strategically, can accomplish both of these. For poverty alleviation, an artisanal mining sector can help to sustain the country's poorest people and offer greater security and economic independence to those who are most marginalized, as noted above. However, industrial mining can create formal jobs that have a much greater impact on a local community because of the multiplier effect of large-scale industrial activities. The DRC's Chambres des Mines estimates that for every

[61] UN GoE final report 2012, op. cit., p. 236
[62] *The Democratic Republic of the Congo Mining Guide*. KPMG.

50,000 jobs a mining site creates through direct employment, 25,000 subcontracting jobs and 300,000 service and manufacturing jobs must develop to support this new industrial activity.[63] Although the required investment per job is typically higher than in small-scale mining operations, the sheer scale upon which jobs are created makes industrial mining an important step in lifting more people out of poverty.[64]

The DRC can look to industrial mining as a means of inducing greater economic vitality than small-scale mining can alone. The major barrier is in restructuring mining policies in order to more effectively entice foreign direct investment and ensure that industrial mining activities are carried out in such a way that the benefit for the local community is maximized and the detrimental effects of irresponsible corporate activities are eliminated. What policymakers must keep in mind is that the real benefit of a more robust mining industry is not necessarily the wealth created by exporting minerals but rather the rich business ecosystem that can, with proper aid and planning, develop around the mining sector.

Before mining jobs can become an even more important part of the DRC's economy, working and living conditions in areas where mining is the primary livelihood need to be examined. For example, in the towns around the Bisie mine in the Walikale province, a mine infamous for its rebel involvement, public infrastructure and services are practically non-existent.[65] While this is not an issue unique to mining areas, it creates

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[63] 2015 DRC Mining Industry Annual Report. Chambre Des Mines: Federation des Enterprises du Congo.

[64] Banchirigah, SM & Hilson, G 2010, 'De-agrarianization, re-agrarianization and local economic development: Re-orientating livelihoods in African artisanal mining communities', Policy Sciences, vol. 43, no. 2, pp. 157-80.

[65] Cuvelier J., The complexity of resource governance in a context of state fragility.

issues for those tasked with performing jobs normally aided by technology. Couriers, those who are hired to transport up to 50kg of minerals at a time to larger trading posts even occasionally die of exhaustion during their long journeys on foot through the forest.[66] Because the mining industry is largely unregulated and artisanal mining activity is informal, the government struggles to gain the information and tax revenue necessary to maintain state roads and other infrastructure, exacerbating the work hazards and barriers that many artisanal miners face. A part of building an effective policy framework will be ensuring that the mining industry is formal and regulated in order to give the government the information, and in the case of industrial regulation, financing, it needs to better serve rural communities.

Mining Policies in the DRC

The impact of mining on the economy of the DRC has been significant. As of 2013, mining accounted for 12 percent of the nation's GDP and, since scaling up its mining efforts, the nation has seen GDP increasing by up to 6 percent annually, compared to the deep recession the country found itself facing before its decision to pursue mining more heavily.[67] Additionally, mining brings the country up to 80 percent of its foreign direct investment revenue and, as of 2010, US$773 million in annual tax revenues, accounting for 10 percent of the estimated revenues the government received that year.[68] According to surveys conducted by the Fraser Institute, more than 50 percent of foreign

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[66] Pole Institute, Blood Minerals. The criminalisation of the mining industry in eastern DRC.
[67] *The impact of mining in the Democratic Republic of Congo Performance to date and future challenges*. Oxford Policy Management & Synergy, October 2013.
[68] Ibid.

investors view the DRC as a risky investment in practice, due largely to its unstable policy environment and the difficulty of operating within the country, compared to five percent of investors who viewed South Africa's and Tanzania's policy environments as a deterrent.[69] (See Appendix C)

In September 2010, in order to address the rampant black market exports and human rights violations in the mining sector, president Kabila announced a mining ban against coltan, wolframite and cassiterite, enforced by severe penalties in the case of continued mining activities.[70] While the moratorium on extraction was immediate, traders and exporters were given time to sell their stocks, resulting in widespread stockpiling and smuggling through neighboring countries. Additionally, the ban largely affected industrial and artisanal mines, and had little effect on those run by rebel groups who were already out of the state's control. Satellite images actually show that the nation's largest cassiterite mine expanded during this ban.[71] Not only does the legislation potentially fail to affect the real conflict actors, but artisanal miners and small-scale traders complain that it is hurting them instead. Researchers at the International Peace Information Service noted that,

> "In late 2010, before the presidential ban on artisanal mining, [the town of] Bisie was home to about 13,000 people. An estimated 3,000 artisanal miners were then digging for cassiterite in deplorable conditions at the mine. Mineral trade slowed down during the suspension but it did not

[69] Ibid.
[70] De Koning, Ruben. "The mining ban in the Democratic Republic of the Congo: will soldiers give up the habit?" SIPRI. June 25, 2009.
[71] Zingg Wimmer S. & Hilgert F., Bisie. A one-year snapshot of the DRC's principal cassiterite mine, IPIS, November 2011, pp. 2, 7-8. 55

> cease. Congolese state institutions lacked the capacity and will to enforce the ban, which was bypassed in different ways, and ironically allowed for the further consolidation of military control over the mining sector."[72]

The ban was a response to the Dodd-Frank Act, part of the international push to verify that corporate supply chains are conflict-free, which requires American companies to stop importing conflict minerals and prove through transparent reporting that their supply chains are conflict-free. Seeking to comply more effectively with these laws to maintain its exporting industry, the government of the DRC shut down the mining sector in order to certify the nation's exports as conflict-free. This ban, however, had disastrous effects on the nation's economy. What initially seemed to be a fairly straightforward verification process extended over months and years, causing foreign investment to stagnate and mineral prices to drop. As of 2014, only 25 mining sites had been verified as conflict free, leaving hundreds unable to restart operations. The stagnation of the mining industry has led to many ex-miners, frustrated with their reduced profits, to join local militias, exacerbating the violence.[73] More effective policies will focus on certification schemes and formalization efforts that allow miners to continue supporting themselves legally.

Local communities have also reported high levels of corruption, with authorities exploiting the ban in order to take possession of minerals. Miners also complain of exporters taking advantage of low prices and paying far less than the world market value

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[72] Matthysen, Ken, and Andrés Zaragoza Montejano. *'Conflict Minerals' initiatives in DR Congo: Perceptions of local mining communities*. Antwerp: Relief Web, November 2013.
[73] Raghavan, Sudarsan. "Obama's conflict minerals law has destroyed everything, say Congo miners." The Guardian.

for minerals. This depression in the mining industry has put a strain on local resource production capacity. As traders lose interest in Congolese minerals, trade traffic in the region stagnates, meaning that the essential resources normally brought in by traders are far more scarce and when they do arrive, they are often far more expensive compared to the lower price of minerals.[74] This trend has caused even greater economic strain upon the DRC's poorest communities.

Numerous NGOs and watchdog groups have also become involved in order to curb the expansion of the conflict minerals trade. The Extractive Industries Transparency Initiative (EITI) was created as a supply chain monitoring and advising mechanism and currently works to promote transparency and accountability among governments and the private sector. The DRC is currently one of 51 countries to have implemented the program.[75] The NGO Solutions for Hope aims to catalogue regional and issue-specific best practices for integrating regulation with supportive action to maintain the economic vitality of the supply chain once new policies are put in place and another NGO, The Enough Project, works with a team of forensic accountants and regional experts to identify cash flows related to the conflict mineral trade and freeze the assets of armed groups and their partners, building a degree of financial transparency that allows state actors to more easily impose smart sanctions upon conflict industries. Other countries outside of the United States have also developed their own certification schemes,

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[74] De Koning, Ruben. "The mining ban in the Democratic Republic of the Congo: will soldiers give up the habit?"

[75] "Who we are." Extractive Industries Transparency Initiative. Accessed February 26, 2017. https://eiti.org/who-we-are#implementing-countries.

including Germany's Certified Trading Chains (BGR) scheme, which specifically targeted the DRC and Rwanda.[76]

Other non-domestic efforts to limit the proliferation of conflict minerals have included international efforts undertaken by the International Conference of the Great Lakes Region. In June 2008, the group published the Protocol on the Fight Against the Illegal Exploitation of Natural Resources and later adopted the Regional Initiative on Natural Resources in 2010, both of which intended to put into place regional certification mechanisms for limiting the illegal extraction of minerals. The 2010 adoption summit in Lusaka also mentioned the importance of formalizing the artisanal mining sector as a top priority.[77] Due to these measures, supply chain audits and consultation-based certification procedures are already in place. These international efforts will need to be supported by better coordinated policy making within the country.

In 2009, the government of the DRC approved the Programme de Stabilisation et de Reconstruction des Zones Sortant des Conflits Armés (STAREC), or the Program for the Stabilisation and Reconstruction of Regions Coming out of Armed Conflict, a program designed to capitalize on the progress made against the dominance of armed groups in the Eastern provinces and begin stability-building measures.[78] Specific measures included a new code of conduct for members of the Congolese army, and state-run trading centers put in place in hopes that they could operate independently of the

[76] Africa's Resources in a Global Context, IPIS, August 2009, p. 54-55.
[77] Verbruggen et al. *Guide to Current Mining Reform Initiatives in Eastern DRC*. IPIS, April 2011.
[78] "Capacity-building of the Stabilization and Reconstruction Plan (STAREC) in eastern DRC." MONUSCO.

influence of armed groups, organizing the certification and taxation process.[79] These centers have struggled to gain traction.[80]

Bringing foreign money into the DRC in order to implement ambitious policies and projects has not been as big a barrier as one might think. In 2010, the DRC received US$50 million in aid from the World Bank Group, supplemented by a US$40 million grant from the British Department for International Development.[81] The project, named promines, was stalled due to the DRC's licensing policies, which caused canadian firm First Quantrum, owned in part by the International Finance Corporation, a subsidiary of the World Bank Group, to lose its rights to mine in the region.[82] The project has not yet been implemented due to the dispute. The difficulty that the DRC often has is not in securing funding but in project implementation and in keeping its investment climate amicable for international financiers.[83]

These reform activities are supported by MONUSCO, the UN Mission for the Stabilization of the DRC. The program replaced its predecessor, MUNOC and continues to operate across a diverse range of interest areas, including human rights, security reform, and stabilization strategy.[84] MONUSCO remains active in the DRC.

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[79] Verbruggen et al.
[80] Ibid.
[81] Étude PROMINES. Exploitation minière artisanale en République Démocratique du Congo, Pact, June 2010.
[82] "First Quantum starts legal action against ENRC." Reuters.
[83] Étude PROMINES. Exploitation minière artisanale en République Démocratique du Congo, Pact, June 2010.
[84] "Capacity-building of the Stabilization and Reconstruction Plan (STAREC) in eastern DRC." MONUSCO.

Although much of the mining in the DRC is artisanal and occurs in areas controlled by armed militias, there is a legitimate government contracting process in place that has been on a trajectory toward becoming more equitable. In 2008, public policy nonprofit the Carter Center oversaw a review of the mining contracts that had stood since Laurent Kabila, father of the current president, was in power. This process was a victory for government accountability and transparency, as the results of the review were published in full and numerous contracts were renegotiated to better favor the Congolese people.[85] So although the industrial mining sector is highly corrupt, there is hope for success with the proper transparency and oversight mechanisms.

Existing Reform Strategies in the DRC

Many of the existing policies in the DRC focus on allowing its minerals to compete on the international market by formalizing the mining process and certifying yields as conflict-free. In 2012, the government of the DRC attempted to set an expectation for corporate social responsibility by banning the two largest trading agencies operating within the Bisie mine and its surrounding villages. Both Chinese owned, the companies were under investigation for indirectly but knowingly financing armed groups through their trading activities. However, because the government failed to set up alternative options in advance, this decision actually caused the local mineral trade to collapse.[86] Attempts at verifying Bisie as a conflict-free zone and reigniting the mineral

[85] Ernst, Aaron. "D.R. Congo Reviews Mining Contracts Signed During Resource-Fueled War."
[86] Africa Mining Intelligence, Bisie conflict-free but still troubled.

trade have been slowed by the presence of FARDC in the region.[87] Although the two companies' suspensions were lifted in 2013, the two are still suspected of buying unverified minerals and reports state that FARDC officials are still implicated in the illicit smuggling of minerals, with police and army officials continuing to receive side payments to guarantee security.[88]

The mining ban in 2010 and the post-suspension price collapse had a significant impact on the miners who relied on the Bisie deposit for their livelihoods. In addition to the issues associated with reduced disposable income, like reduced access to education for children, working conditions for those who continued their mining activities deteriorated even further. Investment in basic mining equipment such as boots and torches declined and equipment needed for safety and environmental protection, including water pumps for drainage, became more infrequent. Overall, mining jobs became far more strenuous and dangerous as a result of the government's attempts to curtail the sale of uncertified minerals.[89]

In Rubaya, a village in North Kivu, mining has become increasingly important as a source of income.[90] There are numerous mines surrounding the town, many of which are known for being under the influence of rebel group CNDP.[91] Beginning in 2009, Rubaya became a pilot site for a joint effort between the Congolese government and

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87 Pöyhönen et al. Voices from the inside: Local views on mining reform in Eastern DR Congo.
88 Enough Project, Sourcing conflict-free minerals from the Kivus no longer a pipe dream, monitoring must follow.
89 UN GoE final report 2012, op. cit., §225.
90 UN GoE final report 2012, op. cit., §236
91 Stearns J., From CNDP to M23: The evolution of an armed movement in Eastern Congo,

MONUSCO to expedite the validation of conflict-free minerals. First, the government shut down the two private trading houses that had been operating in the area, which essentially suspended trade until alternatives were put in place.[92] A *centre de négocé* was then put in placed within Rubaya and tasked with processing minerals prepared within a 25 mile radius of the village.[93] While the measure has pleased villagers due to increased incomes, there are still frustrations with the inability of Rubaya's minerals to compete on the international market, given its association with CNDP.[94] The centers have also struggled from limited resources and insecure transportation routes.

The implementation of the *centre de négocé* did have secondary benefits. According to the United Nations Group of Experts, since these were put in place, the security situation in and around Rubaya has been dramatically improving, which provided the impetus for a new validation review.[95] Performed in 2011, validation teams composed of representatives of the DRC government, civil society, the private sector, and MONUSCO reassessed the status of militarization within the 25km radius around Rubaya.[96] This mission as well as documents collected by the government-sponsored *centre de négocé* were used in 2012 to verify 11 out of the 21 local mines as conflict-free through the DRC's Ministry of Mines, which legally allowed certified Rubayan minerals back on the international market.[97] The change in the security situation itself has been attributed to police presence at mine entrances.

[92] Johnson D., No Kivu, no conflict? The misguided struggle against 'conflict minerals' in the DRC, Pole Institute, April 2013, p. 54.
[93] Mattysen & Montejano 'Conflict Minerals' initiatives in DR Congo.
[94] Ibid.
[95] UN GoE midterm report 2012, op. cit., p. 37
[96] Ibid.
[97] Ibid.

Another measure adopted focused solely on the Maniema region. With a dependence on artisanal mining similar to that of the Kivu provinces, Maniema is unique in that its mineral trade has historically been, and remains, free of militant activity. Its exports have remained validated for sale on international markets.[98] Traditionally, Maniema's mineral trade centered upon the larger city of Goma as its central trade location, with regular flights carrying minerals from smaller villages delivering regular shipments into the city for processing and export. The issue with this lied in the fact that Goma lies within the Kivu region, where minerals have been largely banned from international export due to the presence of rebel groups.[99] To break this traditional cycle, the Congolese government banned the small flights into Goma, instead forcing minerals to be transported over land into the Katanga region, where they could be sold without causing fears of unverified mineral exports.[100] A major key to this plan was revitalizing state-owned infrastructure along the land route, which had been commonly used before the war.

Maniema is also interesting due to the coexistence of large-scale corporations and artisanal miners.[101] Most of the major deposits in Maniema are owned by *Société Aurifère du Kivu-Maniema* (Sakima), a large state-owned enterprise. However, although it is technically a large-scale mining company, Sakima lacks the resources to undertake fully industrialized mining ventures. Rather than relying upon its own extractive capabilities to profit, the company has chosen to allow artisanal miners to exploit its holdings and

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[98] Radio Okapi, Maniema : 5 tonnes de cassitérite saisies à Lubutu, 21 January 2013.
[99] Ibid.
[100] Radio Okapi, Katanga: 150 tonnes de cassitérite du Maniema exportées via le port de Kalemie.
[101] Ibid.

negotiate purchasing contracts with other companies interested in paying for the right to purchase and process conflict-free Congolese minerals. Because these companies pay hefty sums for these rights, Sakima is able to rely upon independent artisanal miners to produce major profits off of its mineral rights.[102] This sets a good precedent for partnerships between larger corporations and artisanal miners.

The DRC has also attempted to reform its tax laws in order to increase the impact that industrial mining can have on local economies. By putting in place a 14 percent tax on services provided by foreign suppliers, the government hopes to indirectly increase local procurement. It also increased its taxes on the remuneration of working expatriates from 10 to 50 percent for the first ten years of a project and to 100 percent for subsequent years. Although these measures have been a start, these indirect measures have not had a major benefit thus far. This is partially due to the unstable and often confusing business environment that the DRC can present to foreign companies. Having been ranked 182nd out of 183 in the International Finance Committee's "Doing Business" rankings, there is often a lack of clarity in the country's frequently changing laws that results in a disregard for rules.[103] Additionally, these laws and their consequences often become messy legal disputes. This is reflected in the average legal expenditures of extractive sector companies in the DRC, which often reach about US$5 million per year, compared with less than $500,000 in other developing nations with low ease of business rankings.[104]

[102] Ibid.
[103] Garrett, Nicholas & Lintzer, Marie (2010) Can Katanga's mining sector drive growth and development in the DRC?, Journal of Eastern African Studies, 4:3, 400-424
[104] Ibid.

One important aspect in building a thriving mineral extraction industry is transparency. The government of the DRC will have to build confidence in the safety of doing business within their borders and assure both potential business partners and small-scale miners alike that the decisions that will build the new mining landscape have been crafted in the best interest of the nation's economic well-being and not the party in power. One way that the DRC can tangibly begin to build transparency is by participating in the African Peer Review Mechanism. Designed to hold African nations accountable and reduce corruption in national governments without subjecting African Union member nations to the judgment of developed Western nations or the United Nations as a whole, the mechanism is a pre-existing means of auditing a potentially corrupt nation that allows African nations to peer review one another. It calls for regular reporting and status updates and has participation from other nations with large extractive industries, including Ghana, Kenya and Nigeria.[105] The mechanism has been determined to be largely successful in identifying problem areas from its first few rounds of reporting.[106]

One strategy for developing small-scale mining was a partnership with FINCA DRC, an international microfinance organization that ran a mobile banking project in the country.[107] In order to emulate the existing financial planning system, the company accepted applications for banking agents to engage clients in place of a physical bank branch. However, these agents were generally small business owners themselves whose top priorities were their own businesses and the company struggled to bring the network

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[105] Bing-Pappoe, Adotey. "Reviewing Africa's Peer Review Mechanism: A Seven Country Survey." *Partnership Africa Canada*, March 2010.
[106] Ibid.
[107] Cull et al. "Agent Banking in a Highly Under-Developed Financial Sector: Evidence from the Democratic Republic of the Congo."

of agents to more rural areas, instead serving largely the Kinshasa metropolitan area.[108] While it supported research that shows people in the DRC often prefer branchless banking through a trusted agent, the project ultimately failed to have sufficient reach to impact the poorest communities.[109]

While formalization and certification schemes that focus on empowering miners to sell their minerals legally and for fair prices have seen some success already and there has been a good precedent set for concession-sharing between industrial and artisanal miners, the DRC has a long way to go before its mining reform strategies can be considered robust enough to sustainably and peacefully develop the sector.

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[108] Ibid.
[109] Ibid.

Chapter 3: Case Studies

As more foreign companies begin to realize the financial opportunities that mineral extraction in Africa presents, and nations recognize the essential role of small scale mining in creating economic opportunity for the poor, managing a growing mining sector is a common problem throughout the continent. As such, there is a wealth of ideas and projects seeking to resolve the mining-associated issues of African nations. The following ten case studies will provide essential lessons for guiding the growth of the DRC's mining industry. Some have seen success that mirrors the more effective policies already attempted in the DRC, including Tanzania and Ghana, while some failed policies, including those of Zimbabwe and Ethiopia, support the lessons the DRC has learned in building decentralized formalization practices and the ineffectiveness of laws and regulations that stand on their own.

Tanzania: Formalization and Local Procurement

Mining industry strategies in Tanzania focused on increasing the capacity of local economies to provide the services that large-scale mining companies demanded at no loss of quality from foreign producers, and increasing the availability of skilled labor available in the Tanzanian workforce to increase the ability of local labor to compete with foreign employees.

In 2009, the government of Tanzania performed a complete review of its national mineral extraction policies, producing an updated Mineral Policy of 2009 that emphasized key issues such as local participation in the mineral economy, transparency, value adding activities, and human rights. It was a major change from the previous mining policy, which solely endorsed attracting foreign direct investment through its large-scale sector and took actual steps to benefit artisanal miners in addition to increasing the multiplier effect of large-scale operations.

Strategies for increasing the multiplier effect and creating jobs centered around increasing local procurement of goods and services and local content in the industrial workforce. First, the Tanzanian government passed policies that required minimum percentages for local procurement in order to ensure that the presence of industrial mining firms could maximize the benefit to the local community. Since 2001, the mining industry had shown an increasingly heavy preference for foreign-produced goods in the production supply chain, but with the Mineral Policy of 2009, the government reformed its internal auditing policies to discount foreign companies selling goods at domestic dealerships from when calculating local content.[110] Under this new review policy, it was discovered that previously, the local content of the mining industry was approximately 0-2 percent.[111] While the difference still remains at a pronounced US$200 million in favor of foreign procurement, the government's policies have had a significant impact on the amount of success data available and the real amount of local content in mining supply chains.[112] To do this, the government had to also increase the capacity of local small businesses to meet the demand for high quality goods and services that large-scale mining was creating to make it feasible for foreign companies to abide by local content regulations.

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[110] Kinyondo, Abel. "Local content in the Tanzanian mining sector." *Chr. Michelsen Institute* 15, no. 3 (2016).
[111] Ibid.
[112] Ibid.

In order to provide high quality goods and services within the local economy, the government maintained provisions for foreign quality control experts to legally work with large-scale companies and local small enterprises to ensure that products met the health and quality standards of the international firms.[113] This allowed Tanzanian-produced goods to become high-quality, low-cost substitutes for foreign-produced goods.

In order to make domestic skilled labor more available, the government partnered with large-scale companies to create the Integrated Mine Technical Training Program (IMTT) to train entry level mining staff.[114] Government bodies and foreign companies also created the Arusha Technical College (NECTA) and Moshi VETA College in 2009 as a joint venture to train highly skilled staff. As of March 2016, there have been over 500 graduates of IMTT alone, 95 percent of which have found employment in mining or mining-related industries.[115]

The supply chain regulations also saw some success. For example, one catering firm was able to establish contracts with four major industrial mining companies while maintaining about 98 percent local staff.[116] Infusing local businesses with quality-control experts from abroad made local options a cheap and high quality substitute for foreign companies while maintaining the maximum involvement of local staff. This maintenance of quality at low costs and the procurement plan requirements of the new mining policy

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[113] Columbia Center on Sustainable Investment. "Local Content: Tanzania Mining." *Columbia Center on Sustainable Investment*.
[114] Kinyondo, Abel. "Local content in the Tanzanian mining sector." *Chr. Michelsen Institute*.
[115] Ibid.
[116] Columbia Center on Sustainable Investment. "Local Content: Tanzania Mining." *Columbia Center on Sustainable Investment*.

made building local procurement in this industry an easy choice for most companies.[117] This case also provides a good example of indirect poverty alleviation from mining. Job creation associated with developing the mining sector does not necessarily have to focus solely on mining jobs, but rather can tap fully into the multiplying potential of the industry.

As the country began to see violence between industrial miners and local communities and conflicts between commercial operations, artisanal miners, and Tanzanian police escalated, the government took a highly inclusive approach to building a less violent business ecosystem.[118] First, the Tanzanian government utilized existing artisanal mining associations to more effectively engage those involved in the informal economy.[119] The Tanzanian government also utilized a multi-stakeholder partnership initiative (MSPI) to build cooperation between artisanal and industrial mining groups. With funding and support from the World Bank, the government of Tanzania required that corporations provide education and support for health, safety, and science and technology needs.[120]

The keys to Tanzania's victories in reforming its mineral extraction sector have been transparency, stakeholder engagement, and decentralization.[121] Through the MSPI, the government was able to force large mining companies and small mining organizations to work together on projects and facilitate the transfer of resources and expertise from

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[117] Ibid.
[118] "Innovative Small-Scale Mining Initiative Kicks Off in Tanzania." World Bank. November 24, 2014. Accessed February 11, 2017.
[119] Ibid.
[120] Ibid.
[121] "World Bank Initiative Supports Tanzania Gold Miners." TanzaniaInvest. April 06, 2016. Accessed March 11, 2017.

foreign corporations to local miners. Although not every nation will be able to replicate the exact project, especially given the heavy involvement of the World Bank Group and its funding mechanisms, the spirit of the program provides a good model for developing artisanal and industrial mining in tandem. Essentially, the initiative hinged upon corporations considering Tanzania's natural resources worth a marginal extra investment. At its core, an MSPI ensures that even where the government undertakes industrial mining to obtain greater tax and export revenues, the poor communities that rely on artisanal mining and can't afford to compete with larger mine sites still see some benefit from industrialization.[122] This cooperation and high participation rate was possible in part because of the transparency and confidence that the government worked to maintain through open channels of dialogue throughout project implementation, regular communication with the heads of local mining collectives, and tangible commitments to ensuring that artisanal miners did not get crowded out.[123] It is also worth noting that following the success these programs and the initial World Bank grant that funded the MSPI, Tanzania began to receive increased funding from the World Bank Group, including a US$3 million grant to be distributed among over a thousand artisanal miners, with specific attention paid to women in the industry.[124] That Tanzania's specific undertakings garnered increased grants from international development banks is another key takeaway from this success.

[122] Ibid.
[123] "Innovative Small-Scale Mining Initiative Kicks Off in Tanzania." World Bank. November 24, 2014. Accessed February 11, 2017.
[124] Ibid.

Following the implementation of this program Tanzania's rating in the Fraser Institute Policy Perception Index, a quantification of mining companies' comfort levels with doing business under a specific government's regulations, grew by over ten points from the 32.4 it held before the project began.[125] (See Appendix C) Total revenues in mining communities where the project was implemented als doubled when inflation and fluctuations in gold prices were taken into account.[126]

The Democratic Republic of the Congo could be a good candidate for similar programs given its similar history of conflict between police, industrial mining companies, and artisanal miners. This strategy for de-escalation could prove valuable for managing small-scale violence. Additionally, the Democratic Republic of the Congo has proven as recently as 2010 that it is a good candidate for receiving World Bank Group grants and loans. However, given the failure of the Promines project and the subsequent dispute with the International Finance Corporation, the World Bank Group may be wary of injecting more money into major mining projects in the DRC until the nation reforms and reorganizes its licensing and contract management policies.

Small forms of cooperation have also helped improve harmony between large and small-scale miners and have increased the degree of safety involved in artisanal mining.[127] Because the use of explosives is so prolific in Tanzania's mining industry, and many artisanal miners do not have facilities to safely store them, Tanzania undertook two

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[125] *Implementation Status and Results Tanzania Sustainable management of Resources*. The World Bank, November 3, 2014.
[126] Ibid.
[127] Barreto, Laura. *Analysis for stakeholders on formalization in the artisanal and small-scale gold mining sector based on experiences in Latin America, Africa, and Asia*. Alliance for Responsible Mining, September 2011.

policies to safety and formal participation. In one project, the Department of Mines manufactured mobile explosives storage boxes that could be sold to registered miners at a price just high enough to offset production costs. In another project, a limestone quarry managed by Tanzania's National Services, essentially the army, shared a deposit with a small community of artisanal miners.[128] In order to improve cooperation, the army contracted out a certified blast operator to safely conduct the explosives work in the artisanal mine, paid from the yields from the mine. In order to store small explosives and further improve safety, the army allowed artisanal miners to share their explosive storage facilities. This increased compliance with explosive regulations, empowered artisanal miners to operate under a greater degree of formal legality, and increased cooperation and goodwill between industrial and artisanal miners on the ground.[129]

In Tanzania, a major piece of the approach to harmonizing artisanal and industrial mining and concentrating mineral extraction profits within the poorest communities was formalizing the artisanal mining sector. By once again leveraging existing mining collectives, the government was able to effectively implement a new licensing system and effectively educate small-scale miners about the changes. Additionally, by distributing information about newly vacant plots of land and putting in place policies to limit the amount of time a foreign corporation can hold a title without developing the land, the government created strong incentives for miners to buy into the new system. As a result, Tanzania saw vastly increased, although not perfectly complete, participation in the newly formalized artisanal mining sector.

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[128] Ibid. 31.
[129] Ibid.

Formalization has not hurt participation in the artisanal mining sector in any statistically significant way.[130] Since the changes, trading outposts have become hubs for economic activity. In Kahama, a trading town previous lacking vitality, the population has more than tripled, with banks, gas stations and hospitality businesses filling the previously sleepy streets.[131]

Between 2007 and 2012, the overall poverty rate in Tanzania decreased by 6.2 percent.[132] While this cannot be attributed entirely to mining, as the sector composes only about 3.3 percent[133] of Tanzania's diverse economy as of 2013, research has shown that not only was artisanal mining an essential factor in poverty alleviation in those villages with mineral deposits nearby, but it also helped to reduce vulnerability, particularly for farmers, and in some instances even allowed women to become financially well-off independently of local men by entering the service industry that sprang up to support the miners.[134]

Côte d'Ivoire: Attracting Investment and Corporate Social Responsibility

While corporate social responsibility in Tanzania is still implemented on a site-by-site basis, within the Côte d'Ivoire, requirements for this and local procurement are written into its laws. Legally, first priority for construction, services, and supplies must

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130 "In praise of small miners." The Economist. May 07, 2016. Accessed February 08, 2017.
131 Ibid.
132 "Tanzania Mainland Poverty Assessment: A New Picture of Growth for Tanzania Emerges."
133 Statistical Abstract 2013, National Bureau of Statistics, Tanzania Ministry of Finance, July 2014, accessed 22 October 2016.
134 Fisher et al. "“The ladder that sends us to wealth”: Artisanal mining and poverty reduction in Tanzania." *Resources Policy* 34, no. 1-2 (March 2009).

be given to qualified Ivorian companies and first priority for jobs must be given to qualified Ivorian staff. In addition, any company seeking to hold a mining convention with the government must implement and finance a training program for local employees to increase their contributions to the mining sector and their ownership over the operations. The companies must also implement and finance training programs for local small businesses in order to increase the number of qualified Ivorian companies available to support the mining sector with goods and services. Finally, companies must work with employees of the government's mining administration to train engineers and geologists. All of these requirements have had little negative impact upon the growth of the Côte d'Ivoire's industrial mining sector, as companies continually seek to increase their holdings and investments. Burkina Faso has seen similar success with legislation like this, written with the express purpose of gradually replacing expatriate personnel with increasingly qualified local professionals.

The Côte d'Ivoire proves a good model for the DRC because of its history of internal violence. Much of the initial growth in the Côte d'Ivoire's mining sector occurred when the country was suffering from civil unrest and violence that cause the majority of the country's foreign investors to pull out, leaving its major industries largely lacking support from foreign capital.[135] Following the violence of the 2009 coup, the country made a commitment to diversify its agriculture-dependent economy and welcomed foreign mining companies into its borders, enjoying an explosion of foreign

[135] Szczesniak, Philip A. "The Mineral Industries of Côte d'Ivoire, Guinea, Liberia, and Sierra Leone." *U.S. Geological Survey Minerals Yearbook*, 2000. Accessed February 9, 2017.

and domestic investment.[136] Since these policies were implemented in 2012, the Côte d'Ivoire's Policy Perception Index has grown by 4 points as of 2015.[137] While this may seem like a negligible change, it is notable that the Côte d'Ivoire is one of the only nations to have seen an overall trend of positive change from between 2012 and 2015, as the majority of African nations that the survey pertained to saw net losses.[138] The vast majority of companies that found the Côte d'Ivoire's policies amenable to doing business reported feeling that its policies encouraged investment, rather than merely not discouraging them.[139] The biggest complaint that nations had about the policies in the Côte d'Ivoire that hurt its score was the length of time it takes to get permits approved, which companies saw as excessive. The Côte d'Ivoire also scores at about 50 percent on regular enforcement and punitive policies either encouraging or not discouraging investment, compared to just under 25 percent in Guinea.[140]

Guinea: Regulating Local Content

Mineral extraction accounts for approximately 17 percent of Guinea's GDP and over 50 percent of all of the country's exports, representing a significant portion of the economy.[141]

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[136] Ford, Tamasin. "Ivory Coast joins the African gold rush – but it's no quick fix for the economy." The Guardian. February 10, 2014. Accessed April 08, 2017.
[137] Jackson, Taylor, and Kenneth P. Green. "Survey of Mining Companies 2015." *Fraser Institute Annual*, 2015. Accessed March 8, 2017.
[138] Ibid.
[139] Ibid.
[140] Ibid.
[141] "Guinea". Natural Resource Governance Institute. 2015-04-23. Retrieved 2017-03-09.

Guinea also sets relatively stringent requirements for local content from industrial mining. The country's mining policy operates on a scaled system whereby quotas for local procurement increase with each successive year of operation. Sourcing requirements for goods and services peak at 30 percent from Guinean firms after the eleventh year of operation, while employment requirements cap at 90 percent for managerial staff and 100 percent for other staff for well-established mining operations. To better enforce these stringent requirements, the country also put into place a limit of visa duration for expatriate employees in order to enforce turnover and encourage the use of Guinean staff. It also requires that from the conception of a new project, a Guinean national be named deputy general manager, and after the fifth year of operation, a Guinean national must be named general manager. Finally, the government requires that companies finance training programs for recent graduates and maintain regular and transparent reporting on local procurement. Despite having the most stringent new mining policies on corporate social responsibility, Guinea, too, continues to see major growth in its mining sector, although the Côte d'Ivoire is expected to overtake it as the primary powerhouse within the region. Following the 2013 policy overhaul, Guinea's policy perception index grew by 16 points and although they remained above the levels seen before its chaotic 2011 policy review, companies have been rating it progressively lower by year.[142] While this does not tell the full story of whether Guinea's policies are a success, it is worth noting the changes in foreign investors' willingness to undertake or expand mining projects under the nation's policy regime. Guinea's labor regulations were specifically cited as the largest factor in the falling favorability of perceptions. A manager

[142] Ibid.

at a large-scale company doing business in Guinea called for less burden on private companies and reforms of the public-private benefit sharing models.

Ethiopia: Building the Beneficiation Economy

In Ethiopia, efforts to increase the poverty-alleviation impact of the minerals sector revolved around beneficiation, or the process of adding value to mining yields by processing, refining, cutting and polishing minerals and gemstones. Although mining comprises less than five percent of the agriculture-dominated economy,[143] with almost 100 million people living below the international poverty line, opportunities for the rural poor to increase their incomes are extremely important.[144] One such opportunity is the rich gemstone market. Ethiopia is the world's second largest exporter of opals, which account for over 90 percent of the country's gemstone exports. The multi-million-dollar opal industry is operated almost entirely by artisanal miners.[145]

However, despite the lack of competition with major industrial producers, the actual profits that miners receive are very low. In the sapphire trade, for example, the artisanal miner generally receives only about 5 percent of the cut stone's final value.[146] In contrast, buyers and exporting companies that set up outposts in rural areas see profits of

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[143] Tilahun, Abayneh. *Artisanal Mining Activities in Ethiopia: Challenges & Opportunities*. Ministry of Mines, Ethiopia, October 2012.
[144] *"World Bank Group. 2015. Ethiopia Poverty Assessment 2014. Washington, DC. © World Bank.*
[145] Kyngdon et al. "An Analysis of the Commercial Potential of Ethiopia's Coloured Gemstone Industry." *The World Bank Group: Energy and Extractives*, June 2016. Accessed January 12, 2017.
[146] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.

up to 39,000 percent of the original buying price.[147] This inequality is due largely to the oversupply of rough colored gemstones, unavailability of information regarding the true price of an uncut gemstone, and the poverty of miners that limits their power to negotiate.

In 2013, the Ethiopian government put in place a law banning the export of rough gemstones, believing that exporting uncut gems constituted a major economic loss for the country. This policy largely failed, and where it increased profits, these largely went to foreign exporters who employed foreign laborers, and did not benefit artisanal mining communities.[148] This was due largely to the fact that lapidary businesses demand a great degree of skill to operate, and demand a large amount of capital to start.[149] Ethiopia's relatively unskilled gem cutters could not compete on the international market, and the implementation of the law unaccompanied by measures to increase access to lapidary training and small business loans led many miners to resort to black market sales to protect their livelihoods.[150]

This law was then amended into one requiring that 40 percent of gemstone exports be cut domestically.[151] In order to ease the burden of meeting this goal, the government established seven lapidary colleges to train gem cutters in 2009, with particular emphasis on the inclusion of women.[152] These were embedded in local

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[147] Kyngdon et al. "An Analysis of the Commercial Potential of Ethiopia's Coloured Gemstone Industry." *The World Bank Group: Energy and Extractives*, June 2016. Accessed January 12, 2017.
[148] Ibid.
[149] Ibid.
[150] Ibid.
[151] Ibid.
[152] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.

polytechnic schools as separate departments. They offered a year-and-a-half-long full program with competitive selection, and, for students who were not admitted to the full program, a 30 day vocational training to provide points of entry into the labor market.[153] Only one such program remains operational and has graduated approximately 300 students.[154] The programs struggled from a general lack of return on investment for their students, which contributed to a difficulty in finding sustainable funding, and a shortage of qualified Ethiopian teachers with the necessary expertise.[155] Graduating students struggled to find the necessary capital to formalize their own businesses, despite demand for their work being more than sufficient.[156]

Additionally, in order to incentivize exporters to sell their stones close to the world price and pay miners a fair sum, and to ensure a good return on investment for those who sought out an education for highly skilled work, the government put in place a price floor on the export of uncut stones.[157]

Still, according to government figures, only about 4.8 percent of gemstones being produced and sold have been cut domestically, which supports data suggesting that over two thirds of opals produced in Ethiopia are being exported outside of official channels. This heavy black market activity is driven in part by the price floor, which was set too high for the majority of stones to be purchased.[158] Only the top one percent of yields, on

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153 Kyngdon et al. "An Analysis of the Commercial Potential of Ethiopia's Coloured Gemstone Industry." *The World Bank Group: Energy and Extractives*, June 2016. Accessed January 12, 2017.
154 Ibid.
155 Ibid.
156 Ibid.
157 Ibid.
158 Ibid.

average, were of high enough quality to purchase at the minimum export price, forcing the majority of product to be sold on the black market in order for miners to sustain their families.[159]

The low rate of compliance with the 40 percent rule is due to the combination of failed programs and policies that Ethiopia's government attempted. While the country's lapidary training programs failed to produce an adequate number of sufficiently skilled gem cutters and provide them with the capital required to start and maintain small businesses, the price floor and the resulting relative ease of using black market channels also provided an incentive for subsistence miners to bypass this rule. Even with these failures, however, Ethiopia's case is an important example of creating more robust livelihood options around mining. Where other alternative livelihoods like agriculture generally fail, value addition training was sufficiently compelling to attract aspiring small business owners to more profitable non-mining activities. Those who did graduate from the lapidary college found that demand for their work was high and miners and exporters were making a good faith effort to employ their services, the major barrier being the difficulty of securing loans to purchase the high grade equipment needed to cut gemstones with internationally competitive quality. Although the original total ban on exporting uncut gems came too suddenly and without sufficient government support for the industry to be successful, the partial ban was met much more amenably and saw a greater degree of good faith efforts to comply.[160]

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[159] Ibid.
[160] Ibid.

Zimbabwe: Formalization and Beneficiation

When Zimbabwe attempted to formalize its artisanal gold mining sector, the nation saw worsening standards of living for those affected by the new rules. As a result, the policies saw very little actual buy in and so, in reality, increased the amount of illicit, unregulated mining that occurred.[161] Zimbabwe's 2008 formalization strategy relied heavily on centralized power, relinquishing only a small degree of control to local government, a change from the decentralization strategy it undertook during the 1990's.[162] This occurred during a time of economic instability, when the party in power was already moving to consolidate authority over rural resource management on a larger scale. This process largely started with criminalizing unregulated mining and the arrest of 25,000 people, a move which, according to the Internal Displacement Monitoring Center, negatively impacted the livelihoods of over a million people.[163] As a result of the criminalization of informal mining and the resulting shut down of mining activities, artisanal mining output in the country dropped from 17 tonnes to 987 kg per year.[164]

One success for Zimbabwe came in encouraging cooperation between large and small-scale miners and compliance with explosives regulations. In the Shamva mine, a large industrial mining site that shares its deposit with a group of small-scale miners, the industrial miners shared their explosive storage facilities with the artisanal miners, allowing them to better comply with the legal requirements for safe mining and building

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[161] "Mapping and Assessing the Environmental and Health Impacts of Abandoned Mines in Sub-Saharan African Countries." *Capacity Building Workshop on Formalization of Artisanal and Small-Scale Mining in Eastern and Southern Africa.*
[162] Ibid.
[163] Ibid.
[164] Ibid.

cooperation between the two groups by allowing the presence of the large-scale mine to directly benefit the small-scale miners.[165]

In the same region, the government attempted a development project called the Shamva Mining Centre in 1989. While artisanal mining was a relatively common livelihood, miners struggled to find the capacity to refine minerals and increase their value before sale due to the heavy specialized equipment the process demanded.[166] At the time, the artisanal miners of Zimbabwe were well-organized in the Small-Scale Miners Association of Zimbabwe and the Government of Zimbabwe Ministry of Mines used assistance from the Intermediate Technology Development Group and funding from European Union-based NGOs and national governments to create a joint mining initiative with these small-scale miners.[167] The project's primary goals were to create jobs, share best practices information among miners, and to train miners in health and safety standards while opening up opportunities for small-scale miners to process and refine minerals.[168] By 1995, the facility was used by over 227 miners on a regular basis and employed 30 people, and average production had increased from nine tons per day in 1989 to 57 tons of ore per day. Use of the mill peaked at serving 400 miners.[169] And some miners' incomes increased by over 30 percent during the mill's peak operational

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[165] Barreto, Laura. *Analysis for stakeholders on formalization in the artisanal and small-scale gold mining sector based on experiences in Latin America, Africa, and Asia*. Alliance for Responsible Mining, September 2011. 31.
[166] Ibid. 49.
[167] Ibid.
[168] Ibid.
[169] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 28.

period.[170] However, the mill also began to encounter problems. As demand for the mill's resources and facilities increased, miners found themselves waiting up to six weeks to process their ores.[171] To combat this, the Small-Scale Miners Association placed a ten-ton floor on the amount of ore that could be brought in for processing at one time, effectively excluding the poorest, most small-scale artisanal miners from using the facility. [172]By January 2001, the center had been leased out for management by a local miner due to cash flow problems under the Small-Scale Miners Association's management and continued to operate well under capacity.[173]

Nigeria: Incentivizing Organization

In Nigeria, a country where industrial oil operations are heavily prioritized as the main formal mechanism of the extractive sector, 90 percent of solid minerals mining comes from artisanal and small-scale miners.[174] These miners have traditionally lacked both the capacity to grow their operations and the capital needed to make them more effective and efficient. Additionally, the government of Nigeria found their regulatory frameworks, such as the Mineral and Mining Act, difficult to enforce due to the highly informal nature of the sector.[175]

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[170] Hentschel et al. "Global Report on Artisanal & Small Scale Mining." *Mining, Minerals and Sustainable Development* 70 (January 2002). Accessed March 12, 2017.
[171] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 28.
[172] Barreto, Laura. *Analysis for stakeholders on formalization in the artisanal and small-scale gold mining sector based on experiences in Latin America, Africa, and Asia*. Alliance for Responsible Mining, September 2011. 31.
[173] Ibid.
[174] "Mapping and Assessing the Environmental and Health Impacts of Abandoned Mines in Sub-Saharan African Countries."
[175] Ibid.

In order to both aid and regulate the artisanal mining sector, the Nigerian government sought to facilitate some organization within the ASM community. In order to do so, legislators first performed a review of existing mining law and regulations to ensure that there were no major legal barriers to organization. Then, in order to incentivize organization, the government offered a series of micro grants distributed through well-organized and well-performing mining associations.[176] As a result, Nigeria now has over 600 registered cooperatives through which it can communicate with miners and regulate mining activities, which allows the government to effectively pursue job creation programs, environmental rehabilitation, and revenue collection.[177]

Ghana: Harmonizing Large-and Small-Scale Mining

By 2003, ASGM in Ghana was worth 79.8 million us and comprised 9.5 percent of total gold production in Ghana.[178] 60 percent of the country's mining labor force is employed at small-scale mines, according to the Minerals Commission and Ghana Chamber of Mines.[179]The sector accounted for 9.5 percent of gold production and 82 percent of diamond production in 2003.[180]

Because much of Ghana's mining economy is informal and occurs in poor, rural areas, access to banking resources is sparse. Ghana's 23-site banking network only

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[176] Ibid.
[177] Ibid.
[178] R.K. Amankwah, C. Anim-Sackey. Strategies for sustainable development of the small-scale gold and diamond mining industry of Ghana Resources Policy, 29 (3–4) (2003), pp. 131–138.
[179] Hentschel et al. "Global Report on Artisanal & Small Scale Mining."
[180] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 9.

reaching about 5 percent of households nationally and captures only 40 percent of the country's total money supply.[181] This lack of access to rural banking has significant impacts on artisanal and small-scale mining communities in that it limits the number of lines of credit available to miners who want to grow their operations and reduces the propensity to save and manage money.[182] This ultimately reduces the power of artisanal mining to lift communities out of subsistence working conditions. This gap in bank service also presents a major missed opportunity to incentivize miners to operate more formally.

In order to remedy this, the government worked with Barclays Bank of Ghana to create an official banking system that emulated traditional tribal practices. This came in the form of training and formal employment of Susu Collectors, trusted members of the community who hold and manage money on behalf of wage earners.[183] This network includes approximately 4,000 Susu who collect money from clients regularly and return it at the end of each month, increasing the degree of security in bankless money storage.[184] The program created accounts within the bank for Susu collectors to deposit funds, increasing the security of their finances, and trained them in credit management and risk

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[181] World Bank, Rural and Micro Finance Regulation in Ghana: Implications for Development of the Industry, World Bank, New York (2004)

[182] Asiama, Johnson P., and Victor Osei. "Microfinance in Ghana: an overview." Microfinance in Ghana: an overview. 2007

[183] Ibid.

[184] Quist-Ahesti, Kester. "The Role of Rural Banks in Providing Mobile Money Services to Rural Poor Communities: An effective integration approach of Rural Banks and existing mobile communications infrastructure." *International Conference on Mobile Money Uptake*, July 30, 2013.

and opened up microloan options that they could then lend on to their clients, increasing access to microcredit in the country.[185]

Leveraging the Susu network to provide financial planning advising and help these rural communities access to formal credit provided a powerful tool for increasing financial formality and stability. The program worked largely because of the personal relationships that community members built over time with their mobile banker, allowing them to make informed recommendations on the suitability of loan candidates and bridge the information and understanding gap between banks and rural communities.[186] By tying record keeping and transparency into access to loans and financial management, the Ghanaian banking system greatly incentivized honest self-reporting of livelihoods and business activities and allowed small business to grow in mining towns.[187] With access to credit and formal banking greatly increased for rural communities as a result of programs like this, the amount of money being loaned to rural communities in Ghana increased 28.6 percent between 2001 and 2002.[188]

This presents a powerful example of the importance of harmonizing development goals and official regulations with existing cultural practices to increase the ease of adoption when seeking formalization. Rather than expending development resources putting in place a new, centralized program shaped by the government, Ghana's policy

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185 Asiama, Johnson P., and Victor Osei. "Microfinance in Ghana: an overview."
186 Thulani et al. "Mobile Money as a Strategy for Financial Inclusion in Rural Communities."
187 Quist-Ahesti, Kester. "The Role of Rural Banks in Providing Mobile Money Services to Rural Poor Communities: An effective integration approach of Rural Banks and existing mobile communications infrastructure."
188 Asiama, Johnson P., and Victor Osei. "Microfinance in Ghana: an overview." Microfinance in Ghana: an overview.

makers were able to shape development policies around the organically-developed systems of financial management that were already in use throughout the country, empowering its agents to provide microcredit services while increasing the amount of the money supply passing through official and documented channels. The microfinance trainings also focused largely on lending to groups of people rather than individuals, a practice which reduced the individual burden of the loan and therefore the likelihood that the enterprise would fail to repay it.[189]

In 2006, the Ghanaian government began to take steps to harmonize its artisanal mining sector with large-scale industrial operations. Because at the time, 13.1 percent of the total land area of Ghana was under concession to mining and mineral exploration countries, including 70 percent of the land in the country's most mineral rich regions, there was little land available for artisanal miners to legally claim.[190] This issue was exacerbated by laws forbidding the transfer of mining titles once issued.[191] This presents a major challenge for mining land management, because while industrial mining companies must purchase the rights to large swaths of land in order to discover deposits that are rich enough to merit mining with heavy machinery, much of the land goes unused due to a lack of deposits or deposits that are too sparse to be mined industrially.[192] These

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[189] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.
[190] Banchirigah, SM & Hilson, G 2010, 'De-agrarianization, re-agrarianization and local economic development: Re-orientating livelihoods in African artisanal mining communities', Policy Sciences, vol. 43, no. 2, pp. 157-80.
[191] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.
[192] Ibid.

patches of land, however, are generally ideal for artisanal and small-scale miners who generally operate without machinery.[193]

In addition, the government made a commitment to formalizing its ASM associations further by creating District Mining Committees and undertook stakeholder inclusion practices on its Legal Frameworks on ASM.[194] Still, fully formalizing the mining sector in Ghana remains a major challenge. The Minerals Commission of Ghana and the Chamber of Mines estimates that in one region alone, over 6,000 illegal artisanal gold mines are in operation, compared to 117 registered ones[195]. Other research from the World Bank puts the estimated total number of artisanal miners operating illegally in Ghana at over one million as of 2006.[196] One reason for the low adoption rate of formalized mining is the historical difficulty of obtaining a mining licence, due to over allocation of land to industrial mining.

This, however, cannot account fully for the resistance to change. Artisanal mining is deeply tied to tribal tradition, meaning that older traditional rules are generally respected.[197] Not only are traditional community leaders who command a great degree of respect generally also leaders in mining operations, they are often a major part of permitting illegal mining. Many local chiefs receive fees to endorse a miner's claim to a

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[193] Ibid.

[194] "Mapping and Assessing the Environmental and Health Impacts of Abandoned Mines in Sub-Saharan African Countries."

[195] Hilson, Gavin. "A Contextual Review of the Ghanaian Small Scale Mining Industry." *Mining, Minerals and Sustainable Development*, no. 76

[196] Banchirigah, Sadia Mohammed. "Challenges with eradicating illegal mining in Ghana: A perspective from the grassroots." *Resources Policy* 33, no. 1

[197] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.

plot of land, and despite lacking any real legal standing to do so, the respect and traditional authority they command is usually enough for community members to also respect the claim.[198]

The Ghanaian government has also created competing disincentives to formalize through other programs. For example, in 1989, when artisanal mining was first legalized, the government created the Precious Minerals Marketing Association, a government-owned enterprise that buys minerals from artisanal miners and employs craftspeople to manufacture jewelry for export.[199] While the company itself has been helpful for ensuring that miners are paid fair prices and increasing employment, with over 700 buyers actively employed in addition to artisan staff, the company does not discriminate between legally and illegally mined minerals.[200] This lack of certification not only removes any incentive the company may be able to provide for formal participation, it also creates a conflict of interest in mining regulation, since the profits from the company obtained in part from selling illegally-obtained minerals go to fund the institutions that regulate the mining industry.[201] The company's prices also often cannot compete with those of illegal buyers, meaning that even artisanal miners legally operating officially-designated small-scale mines have an incentive to participate in the black market and those already operating illegal mines have no incentive to rejoin the formal system.[202]

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198 Ibid.
199 Ibid. 36.
200 Banchirigah, "Challenges with eradicating illegal mining in Ghana: A perspective from the grassroots."
201 Ibid.
202 Hilson, Gavin. "A Contextual Review of the Ghanaian Small Scale Mining Industry." *Mining, Minerals and Sustainable Development*, no. 76.

The reluctance of artisanal miners to follow official regulations has created conflict with large-scale mining companies. For example, in 2008 at the Obuasi Gold Mine, a large mining concession owned by AngloGold Ashanti, is at risk of closure due to the activities of artisanal miners seeking control of the site.[203] The small-scale miners have set fire to electrical cables, set of explosives underground, attacked equipment, and caused 30 mine employees to become trapped underground at a cost approaching US$5 million.[204] In an interview with local news outlets, John Owusu, General Manager of Corporate Affairs at AngloGold Ashanti, said of the incident,

> "[the miners] have literally not only taken over the streets and vital section of the Obuasi mine but have rendered security forces in Obuasi, especially the police matchless, thanks to their sheer numbers and the crude weapons they carry. They have become a terror and anybody who interferes in their nefarious activities is calmed down with violence."[205]

The conflicts have stemmed largely from the belief that local lands are owned by local communities, as was tradition. The presence of large-scale mining companies on land customarily controlled by regional chiefs presents a disrespect to the community and a gap in understanding between the government, rural communities, and industrial mining companies.[206] An interview conducted in 1996 following a similar incident

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[203] "OBUASI : Mines faces imminent closure." Ghanadistricts.com News Archive. February 20, 2008
[204] Ibid.
[205] Ibid.
[206] Aubynn, Anthony. "Sustainable solution or a marriage of inconvenience? The coexistence of large-scale mining and artisanal and small-scale mining on the Abosso Goldfields concession in Western Ghana."

revealed the miners' reasoning for combating the industrial operation: "This is our own land and we, and not anybody from anywhere, decides how to use it to our benefit. If we can farm on this land, why can't we mine the gold in it?"[207] Further interviews conducted after the Obuasi incident in 2008 revealed that 80 percent of miners still shared that opinion.[208]

Frustrated with the ongoing conflicts and the difficulty and expense they presented, AngloGold Ashanti partnered with the Ghana Chamber of Mines and Minerals Commission to improve its relations with the Obuasi Municipal Artisanal Miners Association, a 10,000-member, highly organized mining association that sought mining claims on AngloGold's concession.[209] The government identified areas upon the concession that would be well-suited for exploitation by artisanal miners, but inefficient for industrial operations and began a formal registration process for miners to access smaller sub-concessions.[210] This has ameliorated the conflict to some degree in the area, with mining association making significant steps toward restoring order among frustrated members and restore good faith and AngloGold honoring the concessions of the artisanal miners.[211]

A similar approach was adopted by Abosso Goldfields Limited through a policy named "live and let live," The initiative sought to accommodate artisanal miners who

[207] Ibid.
[208] Ibid.
[209] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field."
[210] Ibid.
[211] Okoh, Godfried Appiah. "Grievance and conflict in Ghana's gold mining industry: The case of Obuasi."

wished to mine upon its concession so long as they stayed within designated artisanal mining zones.[212] This was predicated upon two lines of thinking: one, that indigenous communities have long been artisanal miners and the industry holds significant cultural and social significance within the groups, and that organization and mutual respect would increase the safety and productivity of mining for both parties by reducing the associated violence and assuaging the suspicions that indigenous miners held about government intervention and large-scale mining companies.[213]

The policy suffered growing pains from the start. Almost 600 miners moved in to exploit the land, quickly encroaching upon the high-grade deposits officially reserved for industrial operations and leading to continued violence.[214] In response, a management committee composed of two miners from each of the five local groups, an assembly person from each community, local chiefs, and an officer from Ghana's national bureau of investigation was formed to formalize the rules and practices of sharing the site. The result was 740 artisanal miners registering with the company and receiving photo identification cards that allowed them to access designated sites. An official buyer was hired to periodically visit the sites and purchase the yields on behalf of the company.[215] After one year, this number had been reduced to 360 because the company had absorbed many of the locals into its own operation through employment programs, miners had discovered other profitable ventures that served the regional mining industry and started

[212] Aubynn, Anthony. "Sustainable solution or a marriage of inconvenience? The coexistence of large-scale mining and artisanal and small-scale mining on the Abosso Goldfields concession in Western Ghana."
[213] Ibid.
[214] Ibid.
[215] Hilson, Gavin. "A Contextual Review of the Ghanaian Small Scale Mining Industry." *Mining, Minerals and Sustainable Development*, no. 76

small enterprises of their own to contract with the larger company, or migrant workers who had failed to find permanent employment had left the region.[216]

Although this program was put in place during a time when gold prices were relatively low and mining low-grade deposits was fairly uneconomical,[217] reducing the company's incentive to mine all of its concession, the trend of companies recognizing the economic and social benefits of working with artisanal miners is promising. If stakeholder engagement occurs proactively and effectively, these policies can be achieved without the threat of violence that jump started the negotiation processes in Ghana. Additionally, following Abosso Goldfields' model of integrating artisanal miners into the industrial sector after establishing rapport through good faith negotiations can help combat the unsustainable nature of sharing limited mineral deposits with increasing numbers of artisanal miners, preventing future outbreaks of conflict when reserves become more scarce.

The key to this initiative's success was a willingness on both sides to recognize the opportunity for mutual benefit and overcome anger or distrust. The companies and communities alike need to be willing to negotiate and make concessions, but when they are it produces a relatively stable community of formal artisanal miners working in cooperation with the large-scale mining industry, resulting in economic growth and reduced tension.

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[216] Aubynn, Anthony. "Sustainable solution or a marriage of inconvenience? The coexistence of large-scale mining and artisanal and small-scale mining on the Abosso Goldfields concession in Western Ghana."
[217] Ibid.

Zambia: The Need for Capital Development and Conservation

In Zambia, economic difficulties and political instability caused the large-scale mining sector to scale back significantly[218], leading the government to turn back to artisanal mining as a key driver of economic growth, even including it as a major part of its official Poverty Reduction Strategy Paper.[219] This has allowed it to become a national priority and it is actively monitored by the national government and given priority access to aid funding from the European Union and the World Bank.[220] Copper is the dominant extractive mineral, followed by gemstones.[221] The mining industry, which is primarily artisanal, comprised approximately three percent of GDP during the 2010-2013 period.[222]

However, as a side effect of the growth of artisanal mining, Zambia began to suffer from increased illegal mining activities. Formalization efforts focused on decentralization, clarifying mineral rights allocations, collection of revenues, increased monitoring, and providing technical advising and assistance.[223] These decentralization efforts also came with extreme difficulties in cost management, though, with regional mining centers lacking a consistent ability to collect revenues.[224]

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[218] Kambani, Stephen M. "Small-scale mining and cleaner production issues in Zambia." *Journal of Cleaner Production* 11 (February 22, 2002): 141-46. Accessed March 15, 2017.
[219] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 13.
[220] Ibid. 16.
[221] *"IMF Country Report No. 15/153: Zambia." International Monetary Fund, June 2015. Accessed November 12, 2016.*
[222] Ibid.
[223] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 17.
[224] Ibid.

Much of the international community recognizes microloans as a means of injecting the capital needed to jumpstart small businesses in rural or poor areas. However, Zambia presents the counterexample to this. The mining center revolving fund was established to provide small loans to artisanal miners in order to increase capacity. This was combined with the Citizens' Empowerment Commission, a fund from the European Union used to fund the Zambia Development Assistance program, which provided capacity building workshops and exhibition booths, and a gemstone processing center to ease the sale and export of small-scale mining yields.[225] Despite this, the Mining Sector Revolving Fund was depleted after ten years in operation due to miners' inability to convert the loans into profits and repay them.[226] Although the gemstone processing center did increase the amount of value adding activities taking place, an important step toward converting an artisanal mining sector into an economically profitable part of the economy, the project was ultimately drained of funding.[227] In a talk given at the Capacity Building Workshop on Formalization of Artisanal and Small-Scale Mining in Eastern and Southern Africa, Gertrude Munda of the Federation of Small-scale Miners Association of Zambia asserted that this is due in part to the government's failure to commit fully to promoting artisanal mining on a policy level.[228]

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[225] "Mapping and Assessing the Environmental and Health Impacts of Abandoned Mines in Sub-Saharan African Countries." *Capacity Building Workshop on Formalization of Artisanal and Small-Scale Mining in Eastern and Southern Africa*, September 5, 2015. Accessed March 12, 2017.
[226] Ibid.
[227] Ibid.
[228] Ibid.

Lending on a larger scale also failed to meaningfully impact the capacities of Zambian miners.[229] Through the Mining Sector Diversification Programme, 16.5 million euros of aid money were set aside to be loaned out to mining companies and cooperatives.[230] However, interest rates in Zambia hovered at approximately 25-30 percent, meaning that many small-scale operations found it difficult to justify borrowing. Additionally, the access requirements were highly stringent.[231] According to the Ministry of Finance, by 2006, only three million euros of this money had been accessed, with only nine firms participating in the program during the 2003-2005 period.[232] Ultimately, lending-based capacity-building at the company and cooperative level failed due to a combination of high interest rates which created added risk for borrowing and stringent loan requirements. The lesson here is that while this program may have succeeded under different economic circumstances, when interest rates are high and increasing, it is an inopportune time to encourage the nation's poor to risk their financial security on a development loan without offering some sort of interest rate relief. Additionally, it is notable that the major barrier in accessing lines of credit for Zambian miners was not the availability of funds, but rather an inability to meaningfully mobilize them.

One additional challenge that the Zambian government faced in managing artisanal mining was protecting the Mwela Rock Art National Monument, a site that is

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[229] Barreto, Laura. *Analysis for stakeholders on formalization in the artisanal and small-scale gold mining sector based on experiences in Latin America, Africa, and Asia*. Alliance for Responsible Mining, September 2011.
[230] Ibid.
[231] Ibid.
[232] Ibid.

currently up for UNESCO World Heritage Site designation.[233] Mining activities in local communities put these paintings at risk of destruction, but rather than outlawing mining within a government-mandated perimeter around the site, Community Conservation Committees were formed. Composed of local leaders and miners, these committees met to designate "safe areas" around the monument where the community could agree to cease mining activities in order to preserve their own cultural heritage.[234] While there was some initial resistance from miners that did not wish to comply with the committee's decisions and miners largely rejected opportunities to sell artisan crafts at the monument as an alternate source of income, the project has ultimately seen success in reducing the degradation of the site. World Bank officials involved in the project noted that the process took a great degree of patience and negotiation.[235]

While the project initially overlooked the importance of establishing the importance of monument preservation itself before asking the community to take initiative, the project ultimately saw some success in making rural communities the regents of their own land. The high degree of community participation increased overall respect for the decisions of the committees and although outside prompting and oversight was necessary, the destruction of culturally important sites has been greatly reduced, if not entirely halted.

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[233] "Mwela Rock Paintings." Mwela Rock Paintings - UNESCO World Heritage Centre. Accessed April 1, 2017.

[234] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017. P. 55.

[235] Ibid. 66.

Uganda: Peer Learning and Sustainability

From 2003-2011, the Ugandan Government, in partnership with the World Bank, conducted the Uganda Sustainable Management of Mineral Resources project, a multi-part initiative that focused on information technology development and peer learning for sustainability.[236] The program was developed through a highly consultative process that involved miners from many different communities, large-scale mining industry executives, and government officials at both national and local levels.[237] The goals of the project were to address environmental degradation, social strains between mining operations and nearby communities, stakeholder disputes within the mining industry itself, and a general lack of information upon which to base policy decisions.[238] The program, although largely government-developed, was funded by the World Bank Group.[239]

In order to address rural miners, the committee developed training materials for mining management and sustainable practices that covered best practices for mining methods, contributed by actual artisanal and large-scale miners, advice for handling legal and regulatory issues and explanations of existing laws, occupational safety and health

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[236] Ibid. 23.
[237] Ibid.
[238] "Uganda: Mineral Resources Management and Capacity Building Project-Project Completion Report." *African Development Fund*, May 2013. Accessed March 3, 2017.
[239] Ibid.

for artisanal miners especially, and community development procedures.[240] Miners were also trained to better manage their capital and mineral resources.[241]

These training materials were delivered to over 200 local mining leaders, community leaders, NGO staff, and government officials. In addition, train the trainer sessions were hosted in which 180 community leaders, composed of both men and women, were taught to deliver the materials to their communities, resulting in over 1,000 people trained by the end of monitoring.[242] The program also used radio broadcasts to deliver the information to highly distributed communities with low literacy rates.[243]

Another part of the initiative involved improving geological survey information and access to information. The external financing from the World Bank helped the government to build high-resolution mapping information for 85 percent of the country's land area and improved the detail and efficiency of the mining registry, making policy information, miner's rights, plot status, and associated fees more clear and transparent for artisanal miners and foreign investors alike.[244] Delays in processing requests for geological information were reduced from 14 days to one day, on average.[245]

The increased access to information, transparency, and ongoing best practices trainings had a major impact on Uganda's mining industry, overall. The program directly led to the formation of over 50 artisanal mining associations, which increased

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[240] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.
[241] Ibid.
[242] Ibid.
[243] Ibid.
[244] "Uganda: Mineral Resources Management and Capacity Building Project-Project Completion Report." *African Development Fund*, May 2013. Accessed March 3, 2017.
[245] Ibid.

productivity and allowed for to be pooled into Village Savings and Loan Associations and reinvested back into small loans for housing and school fees and financial security funds to protect members against unforeseeable hardship such as fires.[246] Some of these organizations were so successful that they became joint ventures with international large-scale mining companies.[247] During the period of the program's operation, artisanal mining profits increased from US$3 per day to US$9 per day for precious metals, and from US$7.5 per day to US$20 per day for industrial metals.[248] After receiving the training, artisanal miners also began using timber shaft supports in pit mines, wearing dust masks, and practicing more stable quarry cutting techniques.[249]

Profits and investor relations in the industrial mining sector also improved. Royalties and license fees collected from large-scale mining companies increased from .63 million in 2004 to 5.28 million by the end of 2011, with 35 investors purchasing geological mapping data from the government.[250] Exploratory licenses sold increased from 190 in 2005 to 607 by the end of 2011.[251]

This project shows the impact of information availability on mining efficiency and profits. At the community level, conducting sustainable trainings that were designed

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[246] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.
[247] Ibid.
[248] "Uganda: Mineral Resources Management and Capacity Building Project-Project Completion Report." *African Development Fund*, May 2013. Accessed March 3, 2017.
[249] Collins, Nina, and Lynda Lawson. "Investigating Approaches to Working with Artisanal and Small-scale Miners: A Compendium of Strategies and Reports from the Field.", University of Queensland, July 2014. Accessed March 22, 2017.
[250] "Uganda: Mineral Resources Management and Capacity Building Project-Project Completion Report." *African Development Fund*, May 2013. Accessed March 3, 2017.
[251] Ibid.

to be passed from community member to community member empowered miners to undertake change of their own volition, increasing the voluntary adoption rates of safety regulations, and drastically increased mining profits and the propensity to save. By bundling comprehensive information on best practices and money management, the links between each topic and the incentive to adopt the techniques was clear, and multiple groups of miners were lifted out of the subsistence cycle. At the government level, income from mining increased dramatically, creating an availability of funds to pay back development loans and reinvest in domestic economic development. At the core of this success was the government's decision to invest development funding into information services.

Sierra Leone: Controlling the Peace-Spoiling Impacts of Subterranean Wealth

Sierra Leone is a country which, much like the DRC, has a high degree of ethnic diversity and has suffered a great deal of conflict and instability due in part to its subterranean wealth. Like the DRC, conflict has forced Sierra Leone to largely abandon industrial mining efforts and achieve most of its mining output through artisanal and small-scale mines. This, however, has been made difficult by the lack of formalized legal mining practices and the high degree of black market activity which perpetuates violence in mines.

After achieving independence, Sierra Leone had a bright economic and political future, with rich diamond deposits and a multi-party democratic government.[252] This

[252] Ducasse-Rogier, Marianne. "Working Paper 31: Resolving Intractable Conflicts in Africa: A Case Study of Sierra Leone." *Netherlands Institute of International Relations Working Paper Series*, September 2004. Accessed March 3, 2017. 15.

situation quickly devolved into conflict, however, after the death of the first Prime Minister. [253]Years of poor, inequitable governing led to the formation of rebel groups such as the Revolutionary United Front, which launched attacks around the nation's borders and in 1991 launched the decade long war that would define the country for years to come.[254] The cited reasons for this conflict include state failure due to corruption and mismanagement of state resources and the abundance of diamond deposits, which became major sites of conflict and have majorly contributed to financing the war.[255] In the peace talks that followed this violence, Sierra Leone presents several important lessons in maintaining peace even with the tempting presence of vast subterranean wealth.

In the Lomé peace accords, the warring parties agreed to a provision that the profits from diamonds and other extractive minerals would only be used for the greater benefit of the people of Sierra Leone, a provision that was amenable to both parties.[256] However, the person appointed to ensure that this was carried out was an officer of the Revolutionary United Front with a long record of predatory actions toward civilians and mineral management.[257] This, combined with the total pardoning of combatants from domestic or international prosecution, made it difficult for the people of Sierra Leone to

[253] Ibid.
[254] Ibid.
[255] Smilie, Gberie and Hazelton, *The Heart of the Matter*, section 4, pp. 43-45.
[256] Lome peace agreement between the government of Sierra Leone and the Revolutionary United Front of Sierra Leone. 7 July 1999.
[257] Ducasse-Rogier, Marianne. "Working Paper 31: Resolving Intractable Conflicts in Africa: A Case Study of Sierra Leone." *Netherlands Institute of International Relations Working Paper Series*, September 2004. Accessed March 3, 2017. 37.

accept the peace accords as legitimate and in their best interest, leading to perpetuated instability.[258]

When lasting peace was finally achieved, it was following a United Nations decision to recognize diamonds as one of the primary perpetuating forces in the conflict and an increased security focus in diamond-producing areas.[259] Although diamond embargoes were put in place to limit the financing of rebel groups and the illegal involvement of Liberia, these had only a minor real impact on the number of rough diamonds being sold.[260] According to the United Nations Panel of Experts on Sierra Leone and Liberia, these were largely effective only insofar as it showed that more powerful international actors were keeping an eye on the internal peace processes within Sierra Leone.[261] Government endorsement of and participation in the Kimberly Process's certificate of origin system has managed to significantly reduce the number of diamonds smuggled out of the country annually, but because by 2003 no system for legally converting diamonds into economic well-being on a large-scale through government licensing has been achieved, the illegal diamond market remained alive and well in Sierra Leone.[262]

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[258] Ibid.

[259] UN Security Council, *Security Council resolution 1313 (2000) [on the situation in Sierra Leone]*, 4 August 2000, S/RES/1313 (2000), available at: http://www.refworld.org/docid/3b00f25e10.html [accessed 9 April 2017]

[260] Ducasse-Rogier, Marianne. "Working Paper 31: Resolving Intractable Conflicts in Africa: A Case Study of Sierra Leone." *Netherlands Institute of International Relations Working Paper Series*, September 2004. Accessed March 3, 2017. 54.

[261] United Nations Security Council. Report of the Panel of Experts appointed pursuant to Security Council resolution 1306, paragraph 19. 20 December 2000.

[262] Ducasse-Rogier, Marianne. "Working Paper 31: Resolving Intractable Conflicts in Africa: A Case Study of Sierra Leone." *Netherlands Institute of International Relations Working Paper Series*, September 2004. Accessed March 3, 2017. 58.

The lessons to take away from this case are that even when peace is achieved, national policy planning must take into account the ability of subterranean wealth to spark a resurgence of violence. Transparent plans that the public can have faith in are essential for successful post-conflict fiscal planning and providing legal avenues through which miners can maintain their livelihoods is essential to controlling black market activities. Much like the DRC, Sierra Leone is not especially resource-rich in real terms. During the conflict period, diamond mines were estimated to produce approximately US $70 million per year, similar to the output of subsistence rice farming.[263] This money was enough to provide millions a year in financing for armed groups and add fuel to the civil war, but not enough to make Sierra Leone an especially rich country.[264] The real power of the diamond deposits comes as either a spoiler of peace or an economic opportunity for the poor.

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[263] Ibid.
[264] Ibid.

Chapter 4: Analysis of Lessons and Trends

The strategies by which the government can create a thriving, profitable and sustainable mining sector that concentrates its benefits into community living below the poverty line can be divided into six classifications:

- Increasing the multiplier effect of large-scale mining by concentrating the benefits of industrialization into local communities
- Formalization, which prevents miners from being exploited by black market activities and improves access to development resources,
- Beneficiation, which increases miners' profits by empowering them to undertake value adding activities and creates greater demand for skilled labor
- Capital resources development, which provides for the growth of small businesses,
- Harmonization and conflict control, which reduce violence-induced inefficiencies and prevent increased mining activities from spoiling peace agreements,
- Conservation and environmental safety, which increase the sustainability of artisanal mining

Large-Scale Mining and the Multiplier Effect

The cornerstone of beneficiation is increasing the local content of industrial mining, either by increasing the company's use of human capital in its own operations or by providing opportunities for local small business owners to sign large contracts with the company. Essential factors in building beneficiation policies are existing goodwill between companies and local communities and actual will on the part of the company. Lessons from Côte d'Ivoire and Guinea show that in cases where countries attempt to achieve local human capital content by passing laws and regulations, companies generally tend to judge the favorability of investing in the country outside of the context of corporate social responsibility requirements, basing their investment decisions instead upon other factors such as the ease of obtaining an exploration permit or concession or the availability of detailed information to support their operations.

Nevertheless, these laws are often difficult to enforce, as evidenced by the low (less than 50 percent) enforcement rates across Africa. Where possible, many companies will still attempt to work around them, and although investment continued, industrial mining administrators operating in Guinea cited the stringent beneficiation laws as a major pain point of the operation. The major determining factor in whether or not a country can demand compliance with extra regulations, other than voluntary buy in from companies, is most likely the availability of other options for mining equally rich deposits in countries that have less stringent regulations, which dictates the terms of bargaining in signing a concession.

One essential factor for success in considering such regulations is the availability of local services and labor that companies can use to satisfy their contracting needs. Tanzania succeeded in this by jointly creating educational programs with large mining firms. Because they were funded in part from ongoing industrial mining activities, they did not suffer from the scarcity of funding and technical experts that Ethiopia's similar programs did and because the training was highly job-specific and informed by the needs of the companies helping to fund it, the graduates had a high rate of unemployment and job success.

Another important lesson from Tanzania is quality control. The local small businesses that signed contracts with large corporations were able to do so because they operated at a low cost while maintaining the level of quality one might find in a foreign provider. This is especially important for sectors like catering and construction materials.

While one of the issues the DRC is facing is abuse and exploitation of miners by foreign companies, negotiation for social responsibility and local content may not be a lost cause. For one, the DRC has major contracts with companies that other countries have succeeded in negotiating with before, including AngloGold Ashanti, which sets a good precedent for at least some of the mining companies operating in the DRC to make good faith efforts to comply with regulations for local benefit to the best of their ability. Additionally, renegotiation of mining contracts to be more equitable to local communities has already happened in the DRC's recent history. Following the contract audit conducted by the Carter Center, a number of contracts were successfully renegotiated and enforced. While it remains to be seen how these precedents translate directly into local benefit outcomes within the DRC and contract negotiations, like other regulatory options, cannot exist in a vacuum, creating the legal framework upon which the country can build future policies that benefit the poor is an essential step toward long term sustainability.

Also important for increasing the impact of large-scale mining is improving the investment climate of the country to attract foreign capital. The DRC has had significant issues in the past, with the Promines project specifically, in maintaining good relations with its foreign investors. In part, this is due to its complicated licensing rules and a lack of clear information available. The Uganda case has shown the impact that directing development financing into information services and geological surveying can have on investor relations and artisanal mining alike, and should the DRC follow suit in developing these resources, it is likely to have a significant impact on large-scale mining, the ease of acquiring artisanal mining licenses, and the likelihood that formalization efforts will succeed.

Formalization of Artisanal Mining

Lessons from Sierra Leone and Ethiopia show that creating outlets for legal artisanal mining activities is an important step in reducing black market activities and increasing regulation within the industry to prevent violence, environmental degradation, and exploitation of workers. Conversely, Zimbabwe shows the importance of building a formalization process that empowers, rather than criminalizes miners so that individuals will actually buy into the system.

In the case of both Tanzania and Nigeria, a major piece of formalization was the creation of mining associations, which then became the government's mechanism for communication with and regulation of the sector. The important caveat to this is that in both cases, these organizations were allowed to form organically. Their composition was not decided arbitrarily or simply by proximity through any form of government regulation. Rather, they were formed of miners who actually chose to work harmoniously with one another in order to achieve incentives like micro grants, mutual protection and capacity-building. This natural organization of miners is particularly important to countries like the DRC that have a strong cultural history of tribalism combined with years of severe internal displacement that could result in a lack of harmony and cooperation should the government attempt to force miners to organize by geography alone. This is supported by additional evidence from Zimbabwe, where the highly centralized government and lack of regional input to regulatory policies resulted in a formalization process that was rejected by most of those involved in the informal mining sector. The cases of Ghana and Zambia also support the assertion that in order for formalization to have a high rate of buy in, the legal system needs to fit into traditional community practices, rather than attempting to regulate away the existing system, unless there is a significant incentive to change. In building out formalized artisanal mining policies, the actual structure of the licensing system, as long as it is transparent and relatively easy to use, is far less important than the means and degree of community involvement throughout the development and implementation process.

Along with formalization comes the necessity for certification schemes and incentives that put pressure on miners to turn their backs on the black market. In Sierra Leone, for example, the adoption of the Kimberly process had a major impact on the number of miners using more formal channels, despite there being insufficient resources to allow them to operate legally. Conversely, in Ghana, where no certification scheme was adopted for the government-owned mineral export company, and no real financial incentive to turn away from illegal exporting was provided, the black market remained the dominant exporter despite robust formalization and sector development policies. However, formalization and certification schemes cannot solve the issue alone, as the DRC learned with its attempts to enforce the mining ban in the Bisie region. They can, however, begin to see limited success if they empower miners to receive better prices for their minerals, as with the *centre de négocé* system in Rubaya.

Beneficiation

Once a country has a formal artisanal mining sector, development efforts need to be constructed to engage it. Ethiopia's case shows the danger in constructing policies in a vacuum, without a support scaffolding to help miners respond to new rules and regulations. Policy, training and skill development efforts, and projects that increase the availability of capital in developing communities need to work in tandem to address the needs of stakeholders across government and artisanal mining communities.

Nonetheless, the DRC may need to undertake policy solutions to encourage value-adding activities to take place domestically. Because so much of the country's mineral wealth is smuggled and processed in Rwanda, a significant opportunity for increased profits and job creation is being lost. By providing miners with the incentives and the capabilities to produce more valuable products themselves, the government can reduce the amount of spillage leaving its borders.

One fairly popular means of further developing the mining industry is encouraging domestic markets to undertake value adding activities like mineral processing and refining, gemstone cutting, and jewelry production. This not only increases the export value of mining yields, but increases the multiplier effect associated with the mining industry by creating demand for increasingly skilled labor. This new demand can be achieved artificially, as it was in Ethiopia, but only if a government is certain that there is sufficient skilled labor to meet the newly increased demand and that artisans are skilled enough to produce goods that can compete on the international market.

Governments can also respond to existing interest in value adding operations by providing artisanal miners with access to the heavy machinery and specialized equipment that mineral refinement and processing already demands. These facilities clearly increase miners' profits and employment, but can suffer from over demand and a lack of funding. In Zambia, Zimbabwe, and Ethiopia alike, the government failed to continue regularly funding processing facilities and skill acquisition programs after the original development project ended, preventing them from having a significant ongoing benefit. Still, this too presents an opportunity for improvement. Because artisanal gemstone producers in the DRC face almost no domestic competition from large-scale companies, there is great potential for producing high end products for export and growing the gemstone economy without being out-competed by industrial operations, which is particularly important in a quality-conscious gemstone market. These strategies have the added benefit of allowing miners to access the equipment needed to safely employ mercury and handle other possibly dangerous minerals while limiting environmental contamination.

The sustainability of programs like these can be increased by implementing "train the trainer" programs like those that were used in Uganda. By channelling development funding into programs that teach community leaders how to show their peers to perform highly skilled or necessary activities, the government can create an impact that far exceeds the number of people benefitting from a direct training program. In Uganda's case, community peers proved highly effective teachers.

Development of Capital Resources

This logic can also be applied to capital resources development. Providing access to lines of credit is another essential step without which efforts to lift miners out of subsistence cycles are likely to fail, but microloans alone tend to have high failure and low impact rates. However, Ghana's rural banking projects presents a good example of low-risk financial resource development. By integrating the program into existing structures of financial management and empowering Susus, who already commanded a high degree of trust among rural miners, to teach financial skills and administer loans, the government created a highly sustainable development practice with a high degree of buy in. This community-oriented approach to credit avoided the issues that other nations, including Zambia, saw with larger scale microfinance organizations suffering from high interest rates and low repayment rates.

Rural banking in the DRC is similarly dependent on highly trusted community members that are appointed money managers on behalf of many different households. Although branchless banking that was reliant upon agents who applied to become financial managers and work under a microfinance company failed to adequately adapt to sparsely populated areas, the model used in Ghana is promising in that it focuses on supporting existing financial managers in rural communities and using them as access points to extend banking and microfinance services well outside the range of physical branches. Although financing for micro loans and proper training for these financial managers is crucial, they do serve the purpose of lessening the burden of making contact with rural community members on an individual basis and extend the impact of existing microloan programs.

The same logic applied in the Uganda case. By providing educational resources that were supported by the increased availability of small grants, the government was able to allow rural miners to convert the trainings into entrepreneurial success. While microfinance in and of itself is often a highly flawed policy rather than the magic bullet for sustainable development, the lack of capital resources available to miners is a major barrier to converting other programs into real development and needs to be addressed as a part of a robust mining sector development initiative.

Harmonization and Conflict Control

The DRC's ability to control for the resurgence of violence over control of subterranean wealth will largely determine whether lasting peace and a thriving mineral extraction sector are simultaneously feasible for the country. Two primary types of violence have the possibility to spoil the peace. For one, conflict between artisanal and large-scale miners has the potential to inhibit poverty-reduction and industry development efforts greatly, not to mention cause millions of dollars of damage and the loss of human life, which is other cases has nearly forced industrial mines to shut down. Additionally, if post-conflict mineral management strategies are not handled with the utmost care it could bring about another round of armed conflict and rebellion.

As was evident in the case of Sierra Leone, post-conflict peace treaties with armed rebels are precarious at best and present a lot of opportunities for rejection. While pacifying rebels is necessary, there is a serious danger in giving too much ground or making arbitrary decisions without public consultation. The most important factors then in determining whether mineral wealth is allowed to spoil whatever peace is achieved will be transparency with the public and appointing trustworthy and popular trustees of public policy and funding. Once again, stakeholder inclusion is a necessary part of this process.

To prevent violence between artisanal miners and foreign companies, governments need to carefully consider the pain points of local communities and work to harmonize globalization and industrialization with traditional mining and land management practices. Currently, conflict management efforts in the DRC focus largely on apprehending and arresting artisanal miners protesting at industrial mines, but if sustainable cooperation is to be built and the issue of forcing rural communities to relocate for industrial mines is to be resolved in actual practice, the actual relationship between artisanal and large-scale miners must be repaired. “Live and let live” policies like those used in Ghana have the potential to both provide a practical solution for land and resource sharing that allows artisanal miners to maintain their livelihoods, and a means of building trust, cooperation and communication between large-scale and small-scale miners. While a willingness to share on the part of the company is necessary, in Ghana’s case, the strategy not only reduced violence but ultimately contributed to formalization and local content acquisition in the industrial sector. Once again, the essential factor in success was persistent stakeholder engagement. Artisanal miners understandably distrusted initial attempts at cooperation and it was only through shows of good faith and the creation of a highly inclusive steering committee that was conscious of demographic representation that the artisanal mines were brought into the partnership. Evidence from Tanzania also supports the potential for cooperation between large and small-scale miners through project cooperation and inclusion within industrial operations.

There are also harmonization efforts that can actually make the presence of large-scale companies in rural areas into a tangible benefit for local communities at very low or negligible cost to the company. While corporate social responsibility initiatives like the creation of colleges and training programs can be costly and do not necessarily support miners who continue in small-scale operations, harmonization efforts like those used in Tanzania and Zimbabwe rely upon the company's willingness to cooperate, rather than the availability of funding for community benefit programs. Not only did these initiatives address the practical concerns of safely storing and managing the use of explosives in small-scale mining, they created regular communication and cooperation between the industrial operation and the artisanal miners and created a noticeable service that the presence of large-scale mines provided to artisanal operations, helping to remedy the distrust that pervaded many of the negotiations.

Conservation and Environmental safety

Cooperation with industrial mines can also contribute to efforts to mitigate the negative environmental impacts of mining. For example, sharing storage and reclamation facilities for explosives and dangerous chemicals like mercury can lessen the burden on artisanal miners. Mercury control technologies already exist, the major issue is in the expense and difficulty of distributing them to small mines. By using large-scale mining facilities as an access point, the government can greatly reduce the burden of delivery. The state-funded processing centers seen in Zambia and Zimbabwe can also present a good model for delivering access to mercury control technologies and heavy equipment that can increase efficiency.

With regards to conservation and deforestation or pollution management, Zambia has shown that community trusteeship is a good starting point. If local miners are brought into the conservation process as active stakeholders through thorough engagement and education about the importance of conservation itself, they do have the knowledge and ability to draw and enforce safe zones around important ecological or spiritual areas. Programs like these can be extended to begin the process of protecting forests and rivers. Communities do not always possess an existing will to protect these features, especially when their profit margins are so thin, but thorough engagement and an understanding that conservation is a process rather than a project can help to preserve even sites with little clear economic value, like the Mwela Rock Paintings.

Although the conservation situation in the DRC is nowhere near dire at this time, building a sense of responsibility over natural resources in mining communities early on will lay the foundation for much more smooth future engagement with trusteeship-based conservation efforts.

Chapter 5: Conclusion

The trends in these policy options reflect a change in the traditional positioning of stakeholders in development reform. In order to properly implement these plans, the government needs to be thought of, both on the part of international financing and oversight bodies and by its own agents, as a mediator, in addition to its role as a policymaker. Because successful implementation of regulatory mechanisms so heavily depends on stakeholder engagement, voluntary buy-in, and harmonization with existing informal structures, governments need to assume the role of partner and unbiased third party when managing artisanal mining land and contested industrial concessions. But rather than hindering the government as a lawmaking body, as one might assume, this re-envisioned role and emphasis on stakeholder engagement can empower the government to be a representative of its constituents' will by ensuring that policy decisions are reflective of public opinion in affected and traditionally underrepresented areas rather than centralized decisions imposed upon them.

Likewise, the role of the private corporation in mining sector development must also change. Where previously, multinational corporations have been considered the problem, the aggressor and the exploiter in developing nations, successful mining sector reform under this strategy demands that private corporations become benefactors and regulators, stewards of a country's natural resources and the communities that rely on them. From taking on the role of facilitator in creating formal artisanal mining schemes to providing for workers' safety and environmental protection in small-scale mines, private corporations must take on an obligation that goes beyond simple social responsibility. This goodwill can, of course, be mandated in part by the government, but it also must come from an internal impetus, whether this be altruistic or in recognition of the economic benefits of harmonization. Under this development scheme, these companies are not so much regulated as entrusted.

By the same token, the mentality of engagement with local leaders in traditionally underrepresented communities, like rural mining ones, must change. Whereas traditionally these people are governed and imposed upon, in many circumstances local leaders who have a track record of respect among mining communities and are understanding of minority needs must become the guiding voices of reform, the ones who decide which traditions must be upheld and respected in policy reform in order to maximize public buy-in. Certainly, they can be engaged and educated, convinced of better options, but ultimately it will be they who decide what concessions are acceptable to them. This input will also be particularly important given the impacts of violence. As the country heals and moves forward in tandem with rebuilding its economy, the voices of the communities most affected by the conflict will help shape the recovery process so that positive impact can be maximized. In a way, these communities become the policymakers who envision the future shape of the country's peacetime structure and mining economy.

Additionally, a common lesson throughout the case studies was that a major source of failure, even for well-constructed programs with high community uptake, can fail due to unsustainable funding or management. This requires a change in the way that development initiatives are viewed. Traditionally, these are seen as projects to be implemented using foreign development funding with a limited period of oversight before being left to either function independently for a time or shut down. Often, these projects end or greatly decline in impact once foreign capital no longer sustains them. Instead, these initiatives need to be viewed as processes, ongoing programs in which foreign development funding is merely the seed to build necessary infrastructure before the project can achieve sustainability. This is particularly important in beneficiation and higher education projects that have a limited number of individuals they can serve at one time. Increasing the longevity of the program allows the impact to increase drastically.

Essentially, mining sector development boils down to a willingness to direct industrial mining profits back into small-scale mining communities, whether by placing responsibility on the shoulders of the company to increase its positive social impact or by government program creation, the most direct route toward sustainably funding mining programs is by using a portion of the country's mining income to ensure longevity and efficiency.

With this in mind, the great limiting factor in achieving a comprehensive policy plan in the DRC is, of course, funding. Many of the projects these policy plans are modeled upon relied on funding from external organizations like the World Bank Group and the European Union. While the DRC has proven in the past that it has a strong bid to receive such aid, acquiring the necessary funds to implement all of these policies at once is unlikely. Because of this, it is important to prioritize the most sustainable solutions. These arguably come in the harmonization and multiplier-effect-enhancing efforts that allow small-scale miners to benefit from independently-funded large-scale operations. Not only do these bring in large amounts of government revenue that can, if managed properly, be effectively repurposed into other mining sector development projects, but because industrial mining often involves value-adding capabilities of its own and has a proven tendency to assimilate cooperative local miners, it presents a good opportunity to organically develop the industry. There is also another important reason to undertake harmonization and assimilation first: concession-sharing agreements, while definite breakthroughs in peacebuilding, are unsustainable due to the limited nature of subterranean resources. As seen in Ghana's case, as mineral prices increase and yields become increasingly scarce, the profitability of using industrial equipment to mine low-grade deposits traditionally only economical for small-scale operations will increase. While this does not necessarily make artisanal mining within industrial concessions impractical in the present, it does create a natural expiration date on the foreign companies' willingness to cooperate. Where possible, the government of the DRC should encourage this cooperation in the present because of the tendency that other similar programs have shown to encourage small-scale mining organizations to assimilate into the larger company and to encourage miners to seek out more profitable livelihoods as small business contractors supporting the maintenance of the larger business in industries like catering, cleaning, or supply chain maintenance, allowing the integration of small-scale mining and large-scale mining to happen more organically. Undertaking these harmonization and assimilation efforts early will ease the inevitable transition into an increasingly industrialized mining sector and lay a foundation for future beneficiation, conservation, and formalization work.

Still, other programs cannot be perfectly separated into stages. Capital development, beneficiation, and education cannot generally be successful independently of one another, as numerous case studies have shown. The best way to purposefully mobilize limited funding is by gradually rolling out regional pilot projects that address and generously fund all three, rather than national development plans that spread funds out on a much broader scale. These programs can then also be planned with the utmost attention to local needs and limitations to ease implementation.

While the situation in the DRC is dire, the opportunities for post-conflict change are impressive. Not only can successful implementation of a new mining policy improve the quality of life for those living below the international poverty line, but success in the DRC can set an international precedent for poverty alleviation and economic development. Ineffective use of subterranean mineral resources and improper handling of artisanal mining has hindered the development of many nations worldwide and prevented many individuals from lifting themselves out of poverty. If successful, the DRC will become an important case study for comprehensive mineral extraction management and economic development that can be applied to other nations that are also at critical moments for economic development.

Appendix A

Reported Aggregate Mineral Production*[265]

Mineral	DRC Output as of 2005 (metric tons unless specified otherwise)
Cobalt	51,000
Niobium and Tantalum	380
Copper	660,000
Gold (kg)	14,000
Silver (kg)	12,342
Germanium (kg)	18,000
Tin	5,700
Tungsten	185
Zinc	10,319
Diamond (total) (thousand carats)	20,900
Diamond (artisanal	20,157
Diamond (large scale)	740
Crude steel	110,000

*Much mineral production was unreported and smuggled out through Uganda and Burundi, especially in the case of gold

[265] United States Geological Survey. "The Democratic republic of the Congo." *Minerals Yearbook 2012*, no. 11 (June 2012)

Appendix B

Legal definitions of differences between artisanal and small scale mines[266]

Country	Means of Classification
Ghana	Level of Mechanization
Burkina Faso	Level of Mechanization
Ghana	Size of Concession
Zambia	Size of Concession
Zimbabwe	Size of Concession
South Africa	Degree of Capital Investment
Senegal	Production Levels

[266] *Livelihoods and Policy in the Artisanal and Small-Scale Mining Sector - An Overview*. 5.

Appendix C

Policy Perception Index Scores for Selected Countries[267]

Country	2015 Investment Attractiveness Index (out of 100)
British Columbia	75.71
Alaska	83.96
Western Australia	87.35
Burkina Faso	71.88
Democratic Republic of the Congo	59.37
Ethiopia	64.11
Ghana	71.27
Guinea	38.28
Côte d'Ivoire	67.99
South Africa	58.04
Tanzania	57.46
Zambia	57.48
Zimbabwe	41.45
China	58.48
Chile	79.81

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