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Insights from a
representative survey
among artisanal miners in
Kamituga, South-Kivu

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ABSTRACT

The gold mining site of Kamituga in South-Kivu, is characterized by a tense co-existence between Banro, a Canadian mining company, and a large number of artisanal miners who operate in the company's concessions. This co-existence will be put to the test as Banro further develops its activities. To assess what the future may bring, we study the profile of artisanal miners and their coping mechanisms. Relying on a structured survey among a representative sample of artisanal miners, we address three specific questions:

- Are artisanal miners willing to relocate their mining activities?
- Can they reorient towards other economic activities?
- To what extent may the tension between both modes of production give rise to (violent) confrontations?

EXECUTIVE SUMMARY

The province of South-Kivu, located in the East of the Democratic Republic of Congo, holds important deposits of gold. In the colonial period these gold deposits were mined industrially, but artisanal mining gradually developed from the 1960's onward. During the two Congo wars, industrial mining came to a standstill, while artisanal mining became an important livelihood strategy. Banro, a Canadian gold mining company, was the first to return to South-Kivu after the wars. In 2002 it acquired the right to exploit minerals in the gold concessions of Kamituga, Lugushwa, and Twangiza.

Previous research by Geenen (2014, 2013, 2012) has shown that Banro's development of the Twangiza mine led to the displacement of local communities, and left artisanal miners with few alternative livelihoods. Also at Banro's other concessions, negotiations with local communities are expected to pose a huge challenge. With close to 190,000 inhabitants, Kamituga is now the third largest city of South-Kivu. The town and its surrounding mining sites are entirely located on three exploitation permits owned by Banro. Since 2011, the company is in the exploration phase, hoping to move to the production phase in the (near) future. Between 13,000 and 15,000 artisanal miners are however (illegally) operating in its concessions, creating a palpable tension between both modes of production.

Using data from a structured survey, implemented at the mining site of Kamituga, this report studies the current situation of artisanal miners and their options for the future. We designed a three-step sampling procedure in order to reach a representative sample. In total, 469 artisanal miners were surveyed in the period April-May 2015. To the best of our knowledge, this study provides the first data analysis based on a representative sample of artisanal miners at a mining site in Eastern DRC. The analysis further draws on two rounds of qualitative fieldwork in the mining sites of Kamituga and Twangiza.

As a first step, we look into the profile of artisanal miners and what drives them to be engaged in artisanal mining. Next, we analyse miners' attitudes with respect to three different coping strategies in the face of industrial mining development: relocation, reorientation, and confrontation.

The miners in our sample are on average 33 years old and have about 11 years of experience in artisanal mining. More than half of the miners were born in Kamituga, and the large majority has invested in housing, which they share with their family. For the majority of miners (81%), mining is the only source of income and, on average, it contributes about 83% to household revenue. Miners are primarily drawn to the activity because of a lack of other options and the hope to find a large quantity of gold. Nevertheless, they indicate that it is a hard and dangerous profession, which involves deadly risks. With respect to conflict history, we find that nearly all miners in our sample have been exposed to violent conflict events, and an estimated 3% to 6% has participated themselves in the activities of armed groups.

Are artisanal miners willing to relocate their mining activities if they have access to Artisanal Exploitation Zones? Nearly half of the miners strongly opposes migration and is not willing to move outside the chefferie of Wamuzimu¹. On the other hand, about a fifth of the miners indicates to be highly mobile, willing to move even outside the province of South-Kivu. We find that 'stationary' miners are more likely to have strong roots in Kamituga (i.e. their father or mother was born in Kamituga). 'Mobile' miners are significantly more likely to indicate that they

[1] Kamituga is located in the territory of Mwenga, and the Chefferie (or Chiefdom) of Wamuzimu. A territory is the geographic unit below a province, while a Chefferie is one geographic unit lower.

don't expect Banro's industrial mining development to offer opportunities for them.

Are artisanal miners willing and able to reorient towards other income generating activities? Miners indicate to be most interested in reorienting towards small-scale commercial activities, to sell various goods at the market or in a small shop. Almost a third of the miners considers working for Banro a very interesting alternative to artisanal mining. These miners are, on average, higher educated and more likely to already have a secondary source of income, besides mining. Technical activities, such as welding, construction works and working as a mechanic are also considered interesting options. Miners' reservation wage – the minimum wage necessary to make them switch to an alternative activity – on average lies between \$5 and \$10 per day.

Can the tension between both modes of production give rise to (re)new(ed) conflict? The majority of miners in our sample believes that violent confrontations will take place, should Banro move to the production phase while leaving artisanal miners without a perspective for relocation or reorientation. In such a scenario, a significant share of miners indicates the intention to personally engage in violent actions against the company's property and employees. These self-reported reactions to a hypothetical situation should be taken with a grain of salt, the more so because they may be coloured by strategic considerations. On the other hand, they should not be taken lightly. Industrial mining does pose a serious threat to the principal livelihood strategy of many young men, with families to support. Moreover, some artisanal miners have a history of participation in violent conflict, and others have indicated that joining a rebel group would be an interesting alternative should artisanal mining no longer be possible in Kamituga.

A violent confrontation can be prevented if Banro's move to the production phase is accompanied with adequate measures to compensate both the local community and artisanal miners for their losses. The miners in our sample clearly prefer solutions that would allow them to remain in Kamituga: either by being offered wage employment by Banro or by being allowed to continue artisanal mining in selected mining sites of Kamituga. Only a minority prefers to reorient towards other economic activities, and follow reorientation programs organized by Banro to that end. Leaving Kamituga's mining sites in order to continue artisanal mining in an Artisanal Exploitation Zone is the least preferred solution, even if the alternative zone is located close to Kamituga.

Accommodating Kamituga's population and its large number of artisanal miners largely surpasses the capacity and responsibility of a private company. The Congolese government has so-far remained largely absent from the mediation of socio-economic relationships between the companies and the artisanal miners living and operating in these concessions, thus failing to take up state-like functions, such as the negotiation of social peace and service provision. Their involvement is, however, key. Although state capacity is extremely low, the involvement of state-actors is crucial to counter the already visible "retreat of the state".

In order to make a contribution to sustainable (local) development, the Mining Code's neglect of artisanal miners and its vagueness about the sector's developmental potential should be addressed. The DRC government should therefore quickly re-engage with industry and civil society stakeholders. This report offers a timely contribution to the policy debate given that the transition from the labour intensive artisanal mining to the capital intensive large-scale mining still is in a relatively early phase.

Note: This report is intended to offer a first broad overview of the collected data and offers preliminary analyses. Our follow-up research will offer a more in depth-analysis of specific research themes.

LIST OF ACRONYMS

- **AEZ:** Artisanal Exploitation Zone – according to the DRC Mining Code, artisanal mining may only take place within the boundaries of such a designated zone;
- **ASM:** Artisanal and Small-scale Mining, in this context mostly used to refer to artisanal mining only;
- **COKA:** Comité des Orpailleurs de Kamituga – a committee of artisanal miners in Kamituga;
- **CRC:** Comité de Renaissance du Calvaire – a committee of artisanal miners in Kamituga;
- **FARDC:** Forces Armées de la République Démocratique du Congo – the Armed Forces of the Democratic Republic of Congo, the Congolese state army;
- **LSM:** Large scale or industrial mining;
- **MGL:** Minière des Grands Lacs Africains – a Belgian mining company that started commercial gold exploitation in Kamituga in the 1930's;
- **PDG:** Président Directeur Général – in this context, a pit manager of an artisanal mining pit;
- **SAESSCAM:** Services d'Assistance et d'Encadrement de Small-Scale Mining – the Congolese public Service for Assistance to Artisanal and Small-Scale Mining;
- **SOMINKI:** Société Minière et Industrielle du Kivu – a mining company that operated in Kamituga in the 1970's-1990's.

1. INTRODUCTION

Despite its large stocks of mineral resource wealth, the Democratic Republic of Congo (DRC) is one of the poorest and most conflict-affected regions in the world. Overt armed conflict is concentrated in the country's mineral rich East, where the point-source natural resources seem to sustain rebellions.² While the mining sector in eastern DRC is often associated with violence and conflict, it also offers opportunities for employment creation and economic development, and could therefore contribute to post-conflict reconstruction.

In recent years, mining has been the main driver of GDP growth in DRC (African Economic Outlook, 2014). In 2013, mineral rents accounted for an estimated 18,6% of GDP, up from 6,5% in 2006 and 0,2% in 2002 (World Bank, 2016). This growing share results from increased private investments in the mining sector which were spurred by a stabilization of the security situation in eastern DRC, the growing world demand for minerals and the new Mining Code in 2002.³ The 2002 Mining Code aimed to attract large flows of Foreign Direct Investment (FDI), among others by offering an advantageous fiscal regime to private companies (Mazalto, 2005). As a result, FDI to DRC increased from 1.6% of GDP in 2002 to 11% in 2007 (World Bank, 2016). Concurrently, government revenue from the minerals sector increased, reaching a record high of US\$1.4 billion in 2011, corresponding to about 10% of government revenue (EITI, 2014).

FDI flows to DRC's mining sector have the potential to contribute to aggregate growth and indirect poverty reduction by improving the balance of the current account, the capital account and the government budget. This potential is however not fully realized, among others because of a liberal fiscal regime that allows for huge profit repatriations, and because of various forms of corrupt practices that erode the contribution of mining revenues to the government budget (Cassimon et al. 2016). As such, profit expatriation amounted to US\$1,200 million in 2012, pushing net FDI flows below zero (IMF, 2014; World Bank, 2016). Africa's Progress Panel further estimates that "between 2010 and 2012, the DRC lost at least US\$1.36 billion in revenues from the under-pricing of mining assets that were sold to offshore companies" (Africa Progress Panel, 2013: p.56).⁴

The 2002 Mining Code has also been criticized for remaining extremely vague on the use of mineral revenues, by the government or private companies, and on how these revenues should benefit the Congolese population. Although the accompanying Mining Regulations mention that companies should "improve the well-being of the local population"⁵, this objective is not further detailed by any standards or criteria, giving companies large room for manoeuvre (Mazalto, 2009).

Furthermore, in its search to maximize fiscal revenue for the State, the Code has prioritized large-scale mining (LSM) to the detriment of the sector's artisanal- and small-scale

[2] See e.g. the reports by the UN Panel of Experts on the Illegal Exploitation of Natural Resources and Other Forms of Wealth of the Democratic Republic of the Congo. Established in June 2000, the Expert Panel's main goal was to investigate the connection between resource exploitation and the continuing conflict in the DRC. The Panel submitted its final report in 2002 (UN panel of experts, 2002).

[3] The 2002 Mining Code revised the 1981 code, and was designed to restore DRC's reputation in terms of business environment after the debacle of the nationalizations of mining companies by Mobutu in the 1970s.

[4] The lack of revenue transparency led to sanctions, e.g. in 2013, the IMF halted its lending program in DRC, and the Extractive Industries Transparency Initiative (EITI) suspended DRC. At its meeting in Mexico City, on July 2, 2014, the EITI welcomed DRC again as a full member, because "the country has a basic and functioning process to ensure that a well-informed debate is taking place" (<http://eiti.org/news/dr-congo-becomes-full-member-eiti>).

[5] Translation of : "améliorer le bien-être des populations locales" (DRC Mining Regulations 2003, Title 18, Chapter 5, Article 452).

mining (ASM) segment.⁶ Although the Mining Code recognizes ASM as a valid production mode, it specifies that artisanal activities should take place in clearly demarcated Artisanal Exploitation Zones (AEZ). In practice, very few AEZ were created and they cover only very small areas (cf. *infra*). Moreover, the existing AEZ have not been subject to geological studies to determine their mineral reserves and suitability for artisanal mining, and some are hard to reach due to poor infrastructure and security issues (Geenen and Radley, 2014). Finally, should these zones prove to be productive, the Mining Code provides the opportunity to close them down in favour of LSM if “*a new deposit which does not lend itself to artisanal mining has been discovered*”.⁷

The *de jure* neglect of ASM in the 2002 Mining code has created a huge *de facto* problem, because ASM is among the most important livelihood strategies in the DRC. The World Bank, DRC’s main partner in establishing the 2002 Mining Code, acknowledges the ‘problem’ of artisanal miners. In their 2008 report on ‘Growth with Governance’ in DRC’s Mining sector, they state that: “*The social problem is a major one and the government together with the mining companies will have to take positive action in order to liberate the ore deposits from these artisanal miners.*” (World Bank, 2008: p.97). A (gu)estimate in the same report puts employment in the artisanal mining sector in the range of 0.8 to 2 million, and – using an average of four to five dependents for each miner – argues that “*there are an estimated 10 million people, 16 percent of DRC’s population, who either mine directly or are dependent on artisanal mining for their livelihood*” (World Bank, 2008: p.7). At the same time, the report portrays artisanal miners as invaders engaged in ‘illegal activities’: “*The NE Congo as well as the Kivu-Maniema provinces experienced a drastic invasion of ‘orpailleurs’ not only mining the alluvial deposits but also digging holes in the gold-rich quartz veins. Licensed companies are facing huge social problems because these ‘artisans’ are reluctant to leave their only source of revenue. Clashes between them and the mine ‘policemen’ are frequent. Exploration and development programs are often delayed by these illegal activities.*” (World Bank, 2008: p.125).

What is perceived as a problem to international policymakers, the state and private mining companies, is a solution for making ends meet for hundreds of thousands individuals and families. Miners will therefore only willingly leave the companies’ concessions if they can access productive mining zones elsewhere, or develop attractive alternative livelihoods outside the mining sector. Currently these outside options are largely absent, and there is a tense co-existence between both modes of production as several mining sites in DRC are transitioning from the labour-intensive ASM to the capital-intensive LSM. This transition takes place in a post-conflict setting: the large majority of artisanal miners have been exposed to violent conflict in the past and some have themselves participated in the activities of armed groups.

In the following sections we use data from a representative structured survey, conducted at the mining site of Kamituga, to analyse what the future may bring. Are artisanal miners willing and able to relocate their mining activities, or to reorient towards other economic activities? And, to what extent may the tension between both modes of production give rise to (re)new(ed) conflict? To the best of our knowledge, this report provides the first such analysis based on a representative sample of artisanal miners at a mining site in Eastern DRC.

This report offers a timely contribution to the policy debate given that (1) the transition from ASM to LSM is still in a relatively early phase and (2) there is an ongoing policy discussion on the ‘right’ mining policy for the DRC. Very recently (on February 10, 2016) the DRC

[6] According to the (World Bank, 2008: p.56), artisanal miners have largely escaped taxation in the past: “when compared to official statistics of gold production [...], it would appear that more than half of DRC gold production is smuggled out of the country.”

[7] DRC Mining Code 2002, Title 4, Chapter 1, Article 110.

government announced it will uphold the 2002 Mining Code, thereby putting an end to the revision process which was initiated in 2012 – despite protests by Congolese civil society and international organizations.⁸ The planned revisions worried private investors as they were primarily aimed at increasing taxes on mining firms and giving more leverage to the Congolese state (Africa Mining Intelligence, 2013; Bahamin, 2013). A recent blog post by the Natural Resource Governance Institute argues, however, that there is room for compromise on fiscal issues and that the DRC government should quickly re-engage with industry and civil society stakeholders (Shafaie, 2016). Such a re-engagement could also provide an opportunity to revise the Mining Code’s view on ASM.

In what follows, we first provide background information on mining in South-Kivu and Kamituga. In Section 3 we present our research design. In Section 4 we offer a brief overview of population characteristics: who are the miners in Kamituga, and why are they engaged in ASM? In Sections 5, 6 and 7 we analyse miners’ attitudes with respect to three different coping strategies in the face of LSM expansion: relocation, reorientation and confrontation. Section 8 discusses miner’s preferences with respect to these coping strategies. Section 9 offers a discussion and concludes.

2. RESEARCH CONTEXT

2.1. Mining in South-Kivu

The province of South-Kivu – located in eastern DR Congo and bordering Rwanda and Burundi – holds important deposits of gold. In the colonial period, these gold deposits were mined industrially (Geenen, 2014; Kyanga Wasso, 2013; Vlassenroot and Raeymaekers, 2004). Artisanal mining gradually developed from the 1960s onward and accelerated after 1982, when Mobutu liberalized the exploitation and trade in minerals.⁹ This liberalization occurred within a context of economic and financial crisis – triggered by Mobutu’s “Zairianisation” and “Radicalisation” measures – and was presented as a way for Congolese nationals to benefit from their country’s natural resources. As a consequence, an increasing number of artisanal miners started extracting minerals using simple hand tools such as hammers and picks. During the two Congo wars (1996–1997 and 1998–2003), LSM came to a standstill while ASM continued to expand.

Banro, a Canadian gold mining company, was the first to return to South-Kivu after the wars. In 2002 they acquired the right to exploit minerals in the gold concessions of Kamituga, Lugushwa, and Twangiza¹⁰; in 2007 they acquired an additional 14 exploration permits. Banro first focused its exploration activities on Twangiza, where they entered the production phase in October 2011 (Banro, 2014a). Exploration activities are still ongoing in both Lugushwa and Kamituga.

Geenen (2014, 2013, 2012) and Geenen and Claessens (2013) describe how Banro’s development of the Twangiza mine has led to the displacement of local communities, and left artisanal miners with few alternative livelihoods. Although Banro set up a community forum – to discuss issues of resettlement and compensation – and organized training and employment

[8] See e.g. <http://www.radiookapi.net/2016/02/11/actualite/economie/rdc-le-gouvernement-renonce-reviser-le-code-minier>; <http://www.reuters.com/article/africa-mining-congodemocratic-idUSL8N15P4QB>, and <http://www.resourcegovernance.org/blog/low-commodity-prices-and-law-rescuing-drc-mining-code-reforms>

[9] Law n°82/039 of November 5th 1982.

[10] Figure 1 shows the location of Kamituga, Lugushwa and Twangiza. At the same time, Banro also gained the right to exploit minerals in the gold mining concession of Namoya which is located in Maniema province, just across the border with South-Kivu.

programs, Geenen (2013) and Geenen and Claessens (2013) argue that these measures have only benefitted a relatively small part of the affected population and are unlikely to bring relief in the long run. Lacking alternative livelihood options, artisanal miners have resisted the dispossession, both in words and actions. For instance, 500–900 artisanal miners reoccupied sites within the Twangiza concession in April 2011 (Geenen, 2013). The miners currently still occupy the sites, and will persist until a sustainable solution is found (Geenen and Radley, 2014).

Also at Banro's other concessions, negotiations with local communities are expected to pose a huge challenge. In its 2013–2014 Annual Information Form, Banro describes this challenge as follows: *“Some or all of the Company's properties are inhabited by artisanal miners. These conditions may interfere with work on the Company's properties and present a potential security threat to the Company's employees. There is a risk that operations of the Company may be delayed or interfered with, due to the conditions of political instability, violence and the inhabitation of the properties by artisanal miners. The Company uses its best efforts to maintain good relations with the local communities in order to minimize such risks.”* (Banro, 2014c: p. 16).

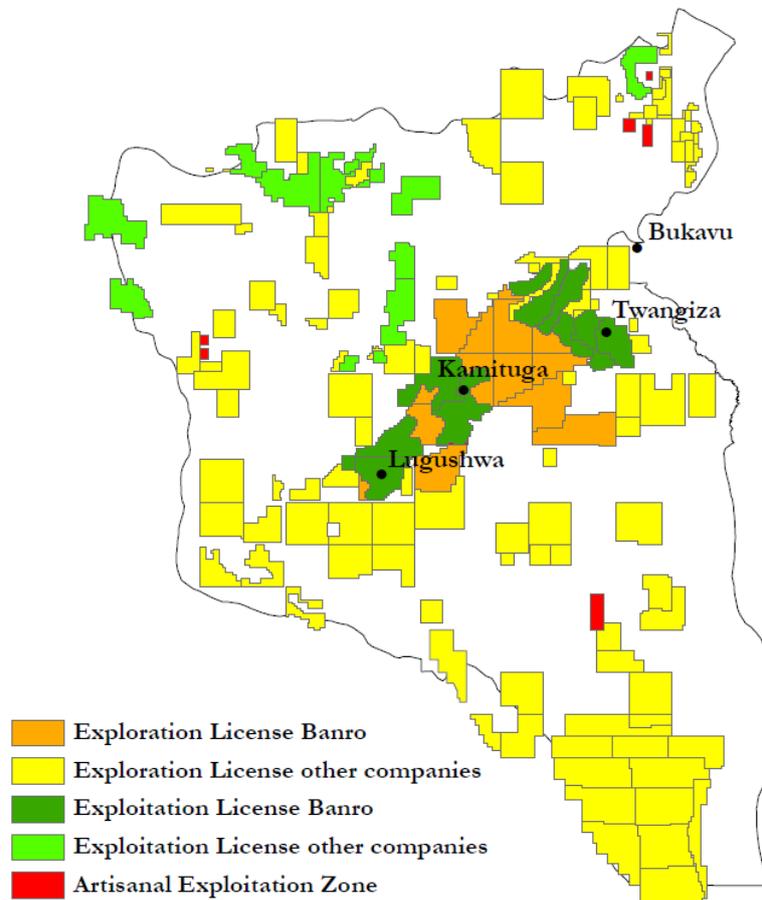
As the concessions of Kamituga, Lugushwa and Twangiza are granted to Banro, most artisanal miners are de jure invaders engaged in illegal activities. The miners, on their part, take recourse to customary rules and traditional rights in order to legitimize their claims to the land (Geenen, 2013; Geenen and Claessens, 2013). These land claims cannot be easily dismissed in practise, the more so given the unrealistic provisions in the 2002 Mining Code: as Figure 1 shows there are only very few AEZ in South-Kivu, and they cover only very small areas, especially relative to the size of concessions granted to LSM.

Besides being crowded out by LSM, artisanal mining is also affected by international calls for formalization and certification, mainly in response to concerns about so-called “conflict minerals”. Autesserre (2012), describes how advocacy groups such as ‘Global Witness’ were the first to put forth the narrative that conflicts in the DRC mainly centre around the illegal exploitation of minerals. The conflict minerals narrative gained further momentum through reports written by the UN panel of experts and campaigns by advocacy groups such as ‘Enough project’ (Autesserre, 2012; Seay, 2012). In order to end the ongoing violence and conflict in the great lakes region, it was deemed necessary to end the illegal trade in natural resources. In this spirit, section 1502 of the Dodd-Frank Act was passed in US legislation in July 2010. It requires all companies listed on the US stock market to determine the exact origin of minerals sourced from conflict areas and to reveal their supply chains to the US Securities and Exchange Commission. The act identifies four conflict minerals: tin, tantalum, tungsten – often referred to as the 3Ts – and gold (RCS, 2011). In February 2012, the DRC government also adopted the OECD due diligence guidelines for responsible supply chains of minerals from conflict-affected and high-risk areas.

Although well-intended, many scholars have argued that the ‘conflict minerals’ initiatives create a de-facto embargo on minerals from the DRC, with severe consequences for local communities and artisanal miners (see e.g. Autesserre (2012); Geenen and Radley (2014); Parker and Vadheim (2014); Seay (2012)). Moreover, the ‘conflict minerals’ legislation has done little to improve the security situation in Eastern DRC. Armed groups have looked for alternative sources of income, including the trade in charcoal, cannabis and palm oil (Seay, 2012). Certification and traceability initiatives such as the Conflict-Free Smelter program have also played a role in the recent shift of artisanal mining activities from the 3Ts to gold, which is easier to smuggle (IPIS, 2014, 2013; Seay, 2012). Parker and Vadheim (2014: p.2) further find evidence that “the [Dodd-

Frank] legislation increased the incidence of violence against civilians in and near mining territories, and the incidence of militia battles near gold mining sites”.

Figure 1: Mining exploration and exploitation permits in South-Kivu

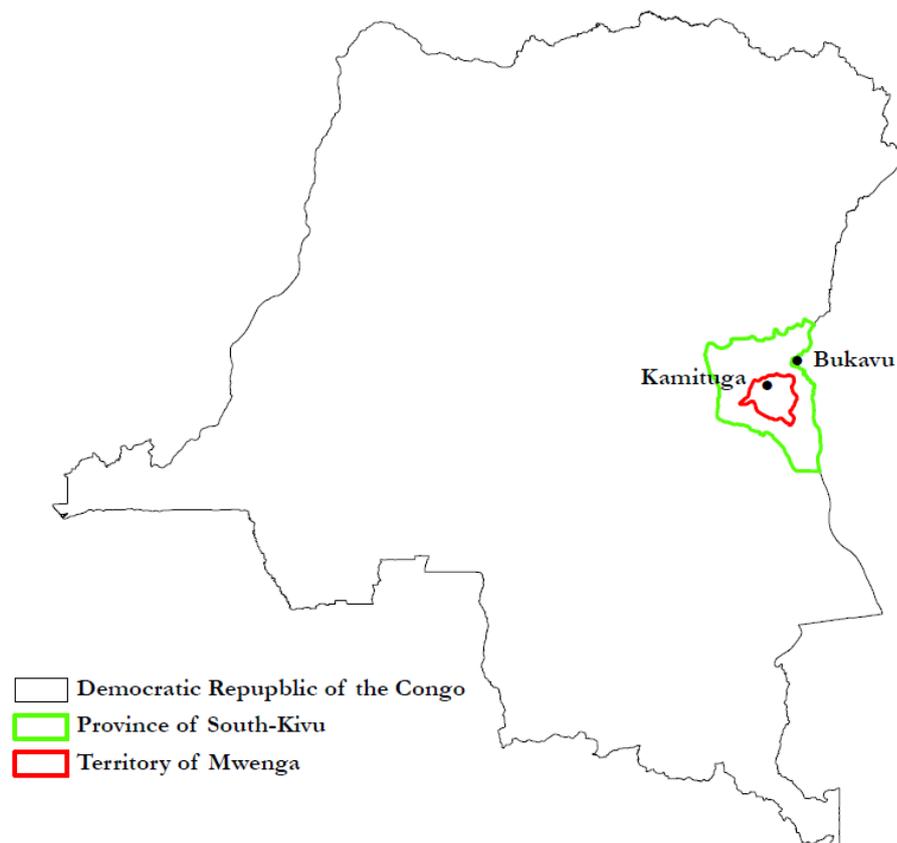


Notes: This Figure offers a graphical representation of mineral concessions in South-Kivu. The green, yellow and orange zones represent large-scale mining concessions with an exploration or exploitation license. Artisanal Exploitation Zones are depicted in red. At the time of our research, only seven such zones were created in South-Kivu, covering a total surface area of 219 km². In contrast, nearly half of South-Kivu's surface area has been granted to LSM companies; Banro's concessions with exploration and exploitation licenses alone cover more than 5,000 km². Source: own calculations and geographic compilation based on data from the Congolese Mining Cadaster (CAMI).

2.2. Mining in Kamituga

Kamituga is located about 180 kilometres south-west of Bukavu, in the territory of Mwenga (see Figure 2). Gold deposits were discovered in the 1920s and the Belgian company 'Minière des Grands Lacs Africains' (MGL) started commercial gold exploitation in the 1930s (Geenen, 2014; Kyanga Wasso, 2013; Vlassenroot and Raeymaekers, 2004). By the end of the 1960s, a combination of Mobutu's disastrous economic policies and the instability of world mineral prices led to a persistent economic crisis which forced mining companies to restructure. In 1976, MGL merged into SOMINKI with eight other mining companies (Vlassenroot and Raeymaekers, 2004). SOMINKI invested considerably in Kamituga, employing about 2,000-3,000 workers, constructing local infrastructure and providing social services (Geenen, 2014; Vlassenroot and Raeymaekers, 2004).

Figure 2: Location of Kamituga in the DRC



Source: Own compilation.

From the 1960s onwards, artisanal mining and informal trade networks gradually developed in Kamituga. During the two Congo wars (1996-1997 and 1998-2003) industrial production came to a standstill, while artisanal mining continued to expand. A sense of relative security and the hope to find economic opportunities in the informal mineral trade intensified the migration from rural areas to Kamituga, which saw its population more than double over the course of the wars (Geenen, 2014; Vlassenroot and Raeymaekers, 2004).¹¹

In these years of turmoil, Kamituga was occupied by several armed groups. During the first Congo war, the RPF (*Rwandan Patriotic Front*) and the AFDL (*Alliance de Forces Démocratiques pour la libération du Congo*) occupied Kamituga; during the second Congo war, Kamituga witnessed confrontations between the RCD (*Rassemblement Congolais pour la Démocratie*), various Mayi-Mayi groups and the FDLR (*Forces Démocratiques pour la Libération du Rwanda*) (Geenen, 2014: p.114-118; UN, 2010a; Vlassenroot and Raeymaekers, 2004). The armed actors benefitted from the informal mineral sector by setting up systems of taxation for artisanal miners and traders: e.g. the AFDL demanded miners to pay an entrance fee to work in the mines, an RCD

[11] Although the centre of Kamituga was considered to be a relatively safe place during the two Congo wars, the UN has documented several atrocities committed by different armed actors: “In October or November 1996, Burundian Hutu armed units from the FDD (*Forces de défense de la démocratie*) publicly executed between 12 and 20 Banyamulenge/Tutsis in the village of Kamituga” (UN, 2010a: p.76); “Over the course of November 1996, FDD and FAZ [*Forces Armées Zaïroises*] units killed around fifty Tutsi civilians by Zalya River, a few kilometres from Kamituga-Centre.” (UN, 2010a: p.76); “On 5 March 1999, elements of the ANC [*Armée Nationale Congolaise*] killed more than 100 people in the town of Kamituga” (UN, 2010a: p.179); “In Kamituga and Walungu (South Kivu), the [Mayi-Mayi] militia allegedly cut off women’s breasts and forced them to eat them before executing them as punishment for their alleged support of the RCD-G or their refusal to undertake forced labour.” (UN, 2010a: p.305).

commander forced miners to hand over half of their daily production (he was known locally as ‘Divisé-par-deux’) and the RCD was known to tax mineral traders in exchange for physical protection (Geenen, 2014: p. 114-118; Vlassenroot and Raeymaekers, 2004).

Also after the Congo wars, armed actors have continued to benefit from Kamituga’s artisanal mining sector. The Congolese national army, the FARDC (*Forces Armées de la République Démocratique du Congo*) reportedly took over the existing taxation-systems¹², while the FDLR remained active in Kamituga’s surroundings setting up “tax barriers” and relying on ambush attacks against mineral traders (Geenen, 2014: p.114-118; IPIS, 2014; UN, 2010b: p.57-61).

With close to 190,000 inhabitants¹³, Kamituga is now the third largest city of South-Kivu, after Bukavu and Uvira. The town and its surrounding mining sites are entirely located on three exploitation permits owned by Banro. Since 2011, the company is in the exploration phase, hoping to move to the production phase in the (near) future. Between 13,000 and 15,000 artisanal miners¹⁴ are however (illegally) operating in its concessions. Kilosho et al. (2016) give an overview of the ASM-LSM tension in Kamituga and the positions taken by different actors. During the current exploration phase, Banro tolerates ASM within its concession as long as artisanal miners abide by a number of rules. First, certain research areas are now off limits. Second, miners are not allowed to open new pits (at the start of the exploration phase Banro conducted a census of existing mining pits). Third, the exploration of existing pits is limited to ‘artisanal’ mining; i.e. there is a prohibition on anything that makes ASM more productive, such as the use of dynamite, crushing mills¹⁵ and electricity. Especially this last rule has proven to be contentious. To enforce the rules, Banro relies mainly on the Mining Police, who have a base in Kamituga, and at times also on the FARDC.

The enforcement of these rules often leads to friction, incidents and a subsequent revision of the rules. For instance, as completely banning crushing mills would have led to social unrest, Banro decided to allow their use in one mining zone (Calvaire) and to prohibit the transportation of rocks from other mining zones to Calvaire. In September 2013, about 100 crushing mills were, however, still used in mining zones other than Calvaire. Banro filed a complaint and called for the mining police and the FARDC to remove the mills. About 40 mills were confiscated and taken to Bukavu, the remaining 60 were allegedly hidden by artisanal miners before the police arrived.

In April 2015, Banro asked the Mining Police to close down 10 mining pits. These

[12] When discussing the patron-client relationships in mineral-rich areas, the UN Security Council writes “*The position of brigade commander in Kamituga seems to be a sought-after deployment within FARDC. According to several FARDC sources and mineral traders, to secure this posting army officers often make arrangements with higher-ranking commanders, promising to return to them a significant percentage of their local earnings*” (UN, 2010b: p.58). In the most recent analysis of their interactive map of artisanal mining sites, IPIS further reports that “*the FARDC have installed various systems of illegal taxation at mining sites in the territory of Mwenga, South-Kivu*” which “*affects at least 6.000 artisanal miners around the gold mining centre of Kamituga alone*”. (IPIS, 2014: p.9).

[13] Geenen (2014: p.100) estimates the number of inhabitants at 100,000 based on 2012 data from the health zone of Kamituga. According to the local administrator of Kamituga, the latest population census estimates the number of inhabitants at 187.000 (Personal interview, 2015).

[14] Although it is hard to accurately estimate the total number of artisanal miners, the available estimates seem to corroborate each other. Geenen (2013: p.6) estimates the number of artisanal miners between 10,000 and 15,000. During our fieldwork in 2015, the representatives of several local mining committees communicated that a census undertaken in 2013 counted 13,600 artisanal miners. We counted 15,250 artisanal miners on the combined membership lists of two local committees of artisanal miners (COKA and CRC). Finally, when combining the most recently available IPIS estimates (2013-2015) for the number of artisanal miners for all mining sites located on the concessions of Banro Kamituga Mining we count 14,695 artisanal miners.

[15] Crushing mills are used by miners to crush large rocks containing ore into a fine gold powder. Without access to crushing mills, this job requires hard manual labour.

pits were supposedly created after the census conducted by Banro and thus violated the prohibition on opening new pits. Miners who tried to enter the pits would be arrested by the Mining Police. In May 2015, a tent occupied by Banro guards was set on fire. The circumstances under which this happened are unclear, as is the exact motive. As a repercussion, Banro closed down three mining pits in the vicinity of the tent.

Also in May 2015, Banro cut the access to electricity for five mining sites. The main issue is that artisanal miners use electricity to operate pumps, which makes ASM significantly more productive and allows artisanal miners to dig deeper tunnels. The pumps are useful for two main reasons: to pump water out of the pits and to bring oxygen in. Without access to electricity, miners can still operate the pumps using fuel-powered generators. This comes however with two large disadvantages. First, it is much more expensive. Second, it is not uncommon that (deadly) accidents occur when diesel-fumes are mixed with the oxygen that flows into the pit, causing carbon monoxide poisoning. Representatives of Banro Kamituga Mining assert that access to electricity allows artisanal miners to operate in a semi-industrial way, which they cannot tolerate on their concession. Moreover, they argue that artisanal miners are legally not allowed to dig their tunnels deeper than 30 meters¹⁶ (Personal Communication, 2015).

Finally, during individual interviews conducted in May 2015, representatives of Banro Kamituga Mining have signalled an increased intrusion of artisanal miners in Banro's dedicated 'research zones' between October 2014 and May 2015. This may be related to an often heard observation by artisanal miners that it is becoming increasingly difficult to attain gold in the existing pits, without access to more advanced equipment (i.e. tools to dig and support deeper tunnels, pumps, electricity, ...).

3. RESEARCH DESIGN

In order to make recommendations for the 'right' mining policy, it is important to have a clear idea of artisanal miners' profile and to understand what drives them to be engaged in the ASM sector. Gathering such information at a representative scale is however not an easy task: lists of artisanal miners are hardly available, up-to-date or reliable in Eastern DRC. For mining companies and government institutions it is also difficult to collect such data, as artisanal miners tend to mistrust them. For instance, Geenen and Claessens (2013) describe how Banro collaborated with SAESSCAM¹⁷ in an attempt to identify and register all artisanal miners working in the Twangiza concession. The census was aimed at registering so-called 'project-affected parties', in order to devise potential compensation mechanisms. Being suspicious about SAESSCAM and their intentions, many artisanal miners refrained from registering, and others only did so after SAESSCAM had organized several visits (Geenen and Claessens, 2013).

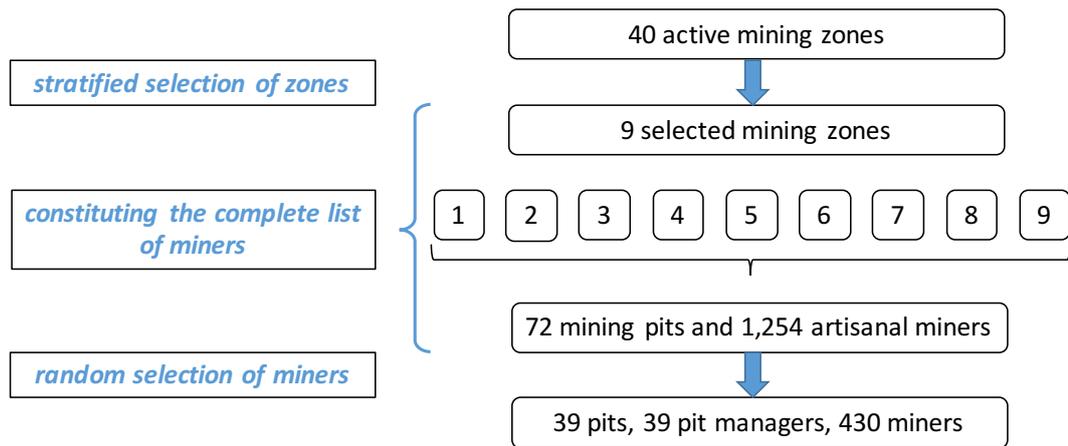
To the best of our knowledge, this report provides the first data analysis based on a representative sample of artisanal miners at a mining site in Eastern DRC. The quantitative data were obtained from a structured survey among 469 artisanal miners, implemented in the period April-May 2015 in the mining site of Kamituga. Prior to the implementation of the actual survey, we conducted two rounds of exploratory fieldwork in the mining sites of Kamituga and

[16] This is indeed specified in the 2002 Mining Code (Title 4, Chapter 1, Article 109) and the 2003 Mining Regulations (Annex 5, Article 9).

[17] SAESSCAM is the public Service for Assistance to Artisanal and Small-Scale mining. It is supposed to govern artisanal mining at the local level by making sure that miners adhere to the mining code, but also by supporting artisanal miners in their activities and by helping them in the creation of cooperatives (SAESSCAM, 2014). In reality, SAESSCAM lacks the financial, material and human resources to take up its tasks and hardly delivers any services to artisanal miners. Among miners, SAESSCAM is therefore mainly considered as an extractive body that collects taxes without offering anything in return (Geenen, 2014; SARW, 2012).

Twangiza. Specifically, in June and December 2014, we held focus group discussions with artisanal miners and we organized in-depth interviews with different stakeholders. Both exploratory rounds of fieldwork allowed us to get a good understanding of the research context and the perspective of the different stakeholders involved. In doing so, we could build on the extensive local network of our colleague Sara Geenen, who had been working with artisanal miners in the area for over five years (see e.g. Geenen, 2014, 2013, 2012, 2011; Geenen and Claessens, 2013; Geenen and Radley, 2014). Combined with our repeated visits, this allowed us to create the necessary trust and network to implement a representative structured survey.

Figure 3: Selection of mining zones, pits and miners



Our sampling procedure is visualized in Figure 3. We proceeded in three steps, selecting first the mining zones, then the pits, and then the miners. This step-by-step approach mimics the hierarchical structure of the mining site which is divided in different zones (headed by ‘zone managers’ or ‘*Chefs de colline*’), that consist of several mining pits (supervised by ‘pit managers’ or ‘*Présidents Directeur Général- PDG*’) who have a number of artisanal miners working with them.

In the first step, we constituted a list of all active mining zones within the Kamituga site, in collaboration with two local committees of artisanal miners: COKA (*Comité des Orpailleurs de Kamituga*) and CRC (*Comité de Renaissance de Calvaire*). From the resulting list of forty mining zones, we selected nine zones using the principle of maximum variance, i.e. seeking variation in terms of geographical location, distance from the centre of Kamituga, the approximate number of artisanal miners and the presence of Banro.

For steps two and three, we asked the zone managers in each of the nine selected mining zones to provide us with a list of all pit managers, who then provided us with a list of all artisanal miners working with them. The complete list for the nine mining zones consisted of 1,254 artisanal miners, working in 72 different pits. In each zone, we randomly selected half of the pits from the list. For each selected pit, we randomly selected ten miners to be included in the survey. The pit managers of selected pits were also included.¹⁸ Our final sample comprises 430 artisanal miners and 39 pit managers. All selected miners were individually interviewed with a structured survey.

[18] The average pit on the list counts 17 miners. For selected pits with more than 30 miners, we randomly selected 15 instead of 10 miners. When a pit with less than 10 miners was selected, we randomly selected an additional pit in the same mining zone.

The survey team was drawn from a large pool of potential candidates with extensive experience in conducting surveys in Eastern DRC. Fifteen potential enumerators were selected and took part in a three-week training program. Based on their performance during the training program and a pilot-test of the survey, we selected twelve enumerators for the actual fieldwork. The survey was conducted using tablets and CAPI-software (Computer Assisted Personal Interviewing) and contained a variety of modules gathering information on household characteristics, economic activities and conflict history. Several detailed modules focussed on artisanal mining and the ongoing transition from ASM to LSM.

4. POPULATION CHARACTERISTICS

We look at the profile of artisanal miners and what drives them to be engaged in artisanal mining.

4.1. Profile of artisanal miners

4.1.1. Demographics

The miners in our sample are on average 33 years old, with ages ranging from 16 to 65 years.¹⁹ A miner in our sample has on average 11 years of experience in the ASM sector, indicating a long-term engagement with the activity. Some of the older miners started out as SOMINKI employees and have spent their whole career in the mining sector. Pit managers are significantly older than artisanal miners (44 compared to 32 years) and have significantly more working experience in ASM (21 compared to 11 years) (see Table 1).

Nearly all miners (97%) and their parents (96%) were born in the province of South-Kivu. Moreover, the large majority of miners (84%) and their parents (82%) were born in the territory of Mwenga and just over half of the miners (52%) was born in Kamituga. As expected, based on their province and territory of origin, the large majority of miners (84%) and their parents belong to the 'Lega' ethnic group. Most miners report to be Catholic (48%) or Protestant (35%), while 9% indicates not adhering to any religion (see Table 1). Nearly half of the miners (40%) is married and 31% lives together with his partner without being married. Only about 15% indicates to be single. Most miners (75%) have children and about half of them has three or more children. The miners in our sample have also invested in housing. The large majority lives in a house with wooden walls, while about 14% has invested in brick walls. About half of the houses has a cement floor and nearly all roofs consist of metal sheets. The long history of mining in Kamituga, and the fact that the town has grown to become one of South-Kivu's largest cities is thus reflected in the profile of artisanal miners. In contrast with smaller artisanal mining sites, which sometimes consist of provisory camps, the majority of miners in our sample grew up in Kamituga and have invested in a house, which they now share with their family.

In terms of schooling: 19% of the miners did not finish primary school while for another 15% primary school is the highest educational level attained. The majority of miners (54%) quit school somewhere during high school. Of the 11% that finished high school, 2% went on

[19] As our survey focused on pit mining (by far the most important mode of artisanal mining in Kamituga) children and women are not included in the sample. Although children are also engaged in ASM, they are much more likely to be engaged in alluvial mining. Also women are usually not present in mining pits. On the one hand their presence is believed to bring bad luck (e.g. it may cause the gold reserves to disappear) and on the other hand, the strenuous physical conditions of pit mining make the work less suited for women. In the artisanal mining sector of Kamituga, women mostly work as 'mamans twangaises' - crushing auriferous rocks to a fine powder in a mortar. This powder is then washed in order to separate the gold concentrate from sand and other waste. Both women and children may buy this sand, or collect other waste material that was spilled while crushing, washing or transporting auriferous rocks, in order to extract any remaining gold (Geenen, 2014).

to university. The majority of miners thus finished primary school, and attended some years of high school. The quality of education seems to be poor however: among respondents for whom primary school is the highest educational level attained, only 29% is able to read and only 26% is able to write.

Table 1: Profile of artisanal miners

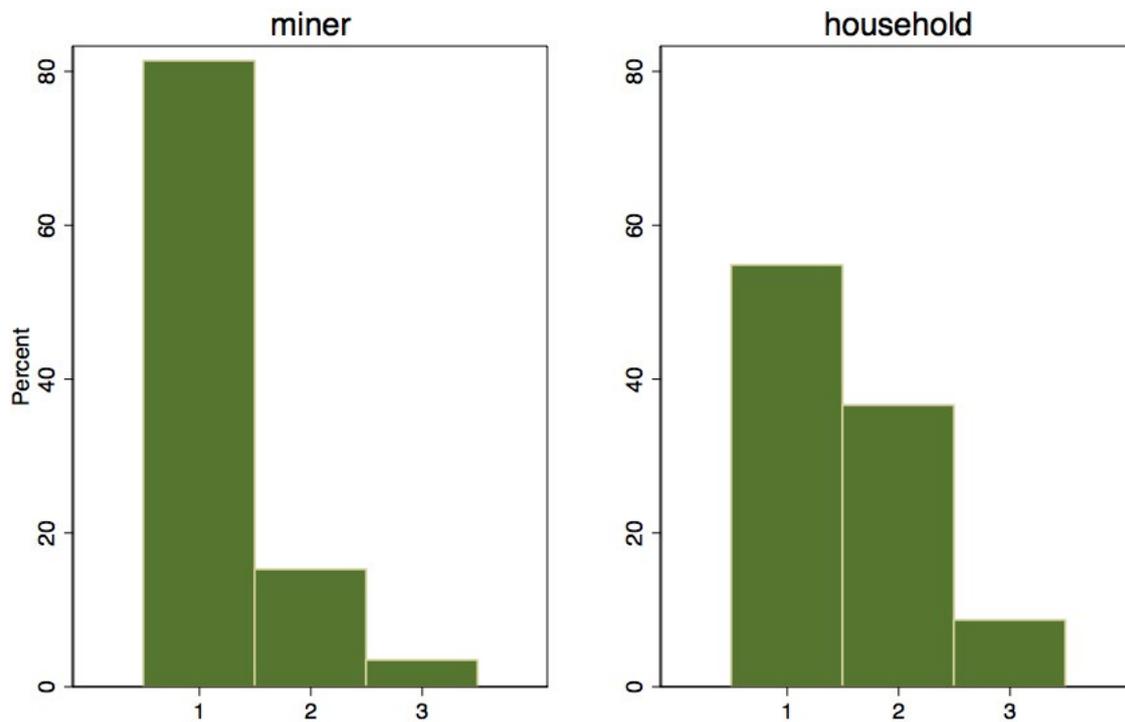
	pit manager	other miners	
age	44,3	32,3	***
years of experience in ASM	21,3	10,7	***
	miner	father	mother
place of birth			
province of South-Kivu	97,2%	96,0%	95,8%
territory of Mwenga	84,2%	82,8%	80,9%
chefferie of Wamuzimu	67,6%	44,8%	46,1%
Kamituga	52,2%	19,4%	23,9%
religion			
catholic	47,6%	59,9%	60,8%
protestant	35,0%	29,0%	32,6%
other religion	8,1%	8,1%	6,0%
no religion	9,4%	3,0%	0,6%
ethnicity			
Lega	84,0%	82,1%	83,4%
Shi	7,3%	9,6%	7,7%
Nyindu	2,4%	2,1%	2,4%
other ethnicities	6,4%	6,2%	6,6%

Notes: The above summary statistics are based on our full sample of artisanal miners (430) and pit managers (39); the coefficients in the upper part of the Table represent mean values calculated in a t-test; *** p<0.01

4.1.2. Income sources

For the majority of miners (81%), mining is the only source of income. About 15% has two income sources while 4% has more than two income sources. When taking into account the economic activities of all household members, we find that a bit over half of the miners' households (55%) depend fully on the income generated by artisanal mining activities. About 37% of the households relies on the income from two separate activities, while 9% relies on three separate income generating activities (see Figure 4). Alternative economic activities mainly consist of small commercial activities (small traders and small shop owners) and agriculture (the cultivation of various crops, livestock keeping, fish farming). Other occupations include construction workers, carpenters, barbers, restaurant owners and taxi-moto drivers.

Figure 4: Number of revenue sources



4.1.3. Estimated revenues

Estimating revenues for artisanal miners is very difficult, because their earnings are extremely volatile. Moreover, the production phase of a mining pit is preceded by a preparatory period, also called ‘*période de souffrance*’ because little is being earned. This period may last from a couple of months up to several years. In our sample, 57% of the miners worked in a pit that was in the preparatory period at the time of the survey, while 43% worked in a pit that was producing gold.

We first asked miners to report the revenue they earned *in the week before they were surveyed*. Based on their answers, we calculate average earnings for preparatory and production periods. The Pit Managers in our sample on average earn \$56 per week in preparatory periods and \$203 during the production phase²⁰ (see Panel A of Table 2). Next in the hierarchical structure of a mining pit are the “conducteur”, who directs the work of the team based on his extensive experience and geological indications, and the “capita”, who supervises the team on a daily basis. On average, they earned \$40 per week in preparatory periods and \$93 during the production phase. Other artisanal miners earn significantly less, \$21 in preparatory periods and \$51 during the production phase.²¹

[20] This revenue should not be considered a pure profit. Pit managers generally make large investments during the preparatory period, for which they often have to borrow large sums of money. They aim to recuperate these costs once the pit starts producing gold.

[21] The estimated revenues for artisanal miners (excluding Pit Managers, conducteurs and capitas) correspond roughly to what others have found. Recent research by IPIS (2014) indicates that gold miners in Eastern DRC may earn on average between US\$ 70 and 105 per month. Geenen (2014) estimates that gold miners in her sample in South Kivu earn between US\$ 36 and 118 per month during preparatory periods, and between US\$ 128 and 195 during periods of high production.

Table 2: Estimated earnings from ASM (in US\$), by mining function

Panel A: Based on revenues reported for the week preceding the survey

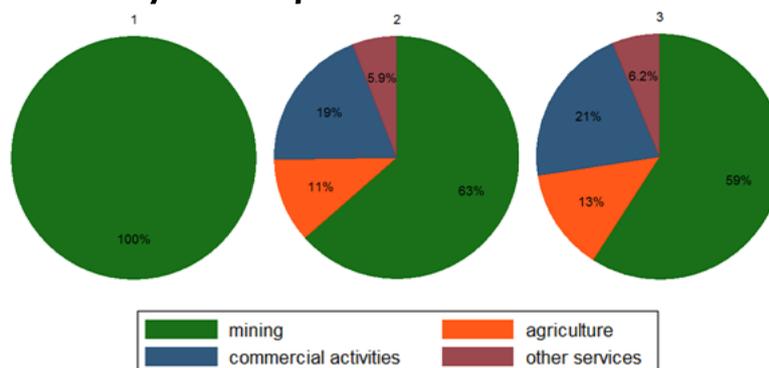
	preparatory period	production phase
Pit Manager	56	203
Conducteur / Capita	40	93
Miner	21	51

Panel B: Based on miners' estimates for an average week in the production phase

	average week
Pit Manager	178
Conducteur / Capita	73
Miner	36

Second, we asked miners to estimate how much revenue *each of their income sources* yields in *an average week*. Based on the reported numbers, artisanal miners earn about \$36 per week when their pit is in the production phase (compared to \$51 according to the first method). For pit managers this average is significantly higher at \$178 per week (compared to \$203 according to the first method), while conducteurs and capitas report to earn about \$73 (compared to \$93 according to the first method) (see Panel B of Table 2).²² Other activities are reported to contribute much less to household revenue, with agriculture, commercial activities and other services yielding on average \$34, \$36 and \$42 per active household member per week. Figure 5 graphically presents each economic sector's contribution to household revenue. Also for households that rely on two or three income sources, artisanal mining remains the largest source of revenue, contributing respectively 63% and 59% to household revenue in an average week.

Figure 5: Economic sector's contribution to household revenue, by number of household revenue sources



When looking at the activities of artisanal miners' parents, we find that 40% of the

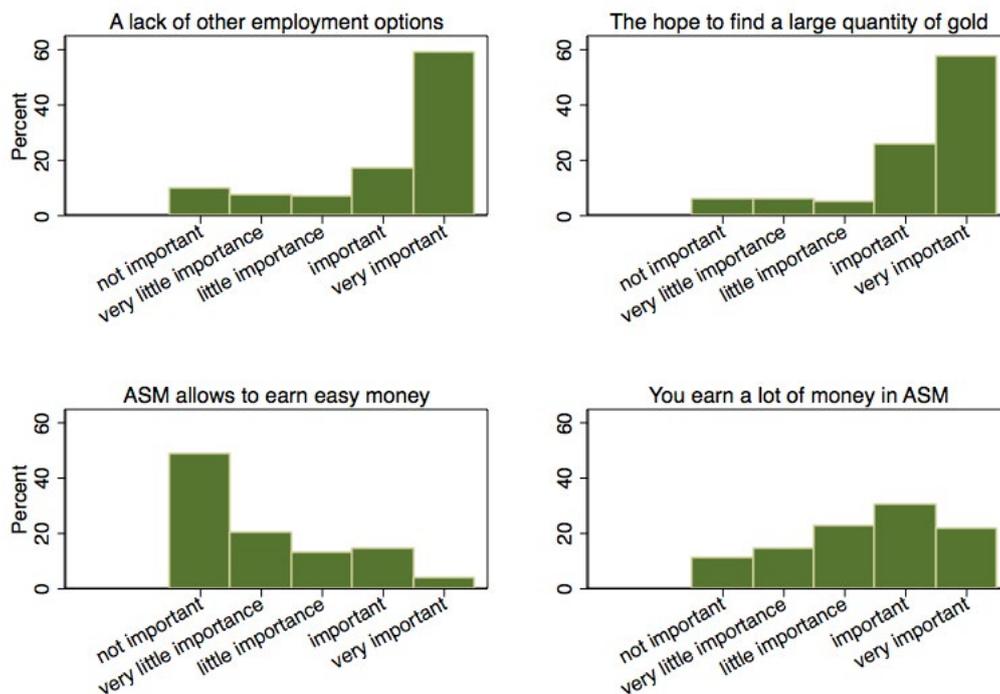
[22] During the production phase, also called "Muzamio", the gold production in a pit is usually shared according to a "two-meter principle". Although this principle may differ from pit to pit, in general the rocks extracted from the first two meters of the tunnel are reserved for the Pit Manager, the next two meters are shared by conducteur and capita, while the following two meters are shared among the other miners - after which the cycle restarts. The speed at which the two meters are dug may vary from a couple of days to a week, and depends on many factors including the hardness of the rock, the depth of the tunnel and the presence of water in the pit. We asked miners to estimate the average earnings from their two meters of production. To take into account that every actor only earns a revenue about one third of the time, we divided these earnings by three to get to a rough estimate for an average week's earnings during the production period (these are reported in Panel B of Table 2).

fathers were engaged in artisanal mining, while this was the case for 4% of the mothers (who mostly worked as ‘mamans twangaises’). A third of fathers (30%) and the majority of mothers (68%) were engaged in agricultural activities. A quarter of mothers (24%) engaged in small commercial activities, while a quarter of fathers (24%) was active in other services (e.g. operating as a construction worker or mechanic) or took up a public function. At the time of our survey, 32% of fathers and 44% of mothers were still economically active.

4.2. Why work as an artisanal miner?

What motivates young men to take up artisanal mining? We presented the miners in our sample with the following four statements and asked them to what extent these were important reasons to start mining: ‘a lack of other employment options’; ‘the hope to find a large quantity of gold’; ‘you earn a lot of money in ASM’ and ‘ASM allows to earn easy money’. Answer categories ranged from (1) not important to (5) very important.

Figure 6: What motivates artisanal miners to enter the ASM-sector?



These statements were inspired by the literature on artisanal mining, that identifies both push and pull factors as motivating factors (see Geenen, 2013 and Hilson, 2009 for an overview): young men are pushed into artisanal mining because of a lack of other livelihood options, or they are pulled into it because of its potentially high economic gains. Both push and pull factors appear to be important for the miners in our sample: ‘the lack of other employment options’ and ‘the hope to find a large quantity of gold’ were mentioned as important to very important stimuli by 76% and 83% of the miners (see Figure 6). The answers are more mixed with respect to the statement ‘you may earn a lot of money in ASM’, while the large majority of miners (69%) disagrees with the statement that ‘ASM allows to earn easy money’ – giving a first indication that artisanal mining is not an easy profession.

This observation was further corroborated when we asked miners (with at least one child) if they considered ASM to be an interesting future profession for their children. Nearly all

miners (94%) state that it is not. In an open question, we invited them to motivate their answer. About half of the miners mention that artisanal mining requires a lot of hard work and suffering compared to the little amount of money that is earned (44%) and that it is a dangerous profession, which involves deadly risks (45%). About one third (35%) mentions that they encourage their children to study in the hope that a good education will later provide them with access to better professions and opportunities. Some miners further mention that there are no guarantees or stability in artisanal mining, due to strong income fluctuations related to the nature of mining (4%), while others fear that ASM will not be possible much longer due to the transition towards LSM (4%). Among the very few miners who do indicate that ASM is an interesting profession for their children (6%), pit managers are over-represented.²³ The majority of these respondents (87%) indicate that ASM is a good profession which allows you to earn a lot of money. Nevertheless, push factors also play a role here: about 22% mentions that mining will likely be the only option for their children, as they have not received education and hence will have limited access to other income generating activities.

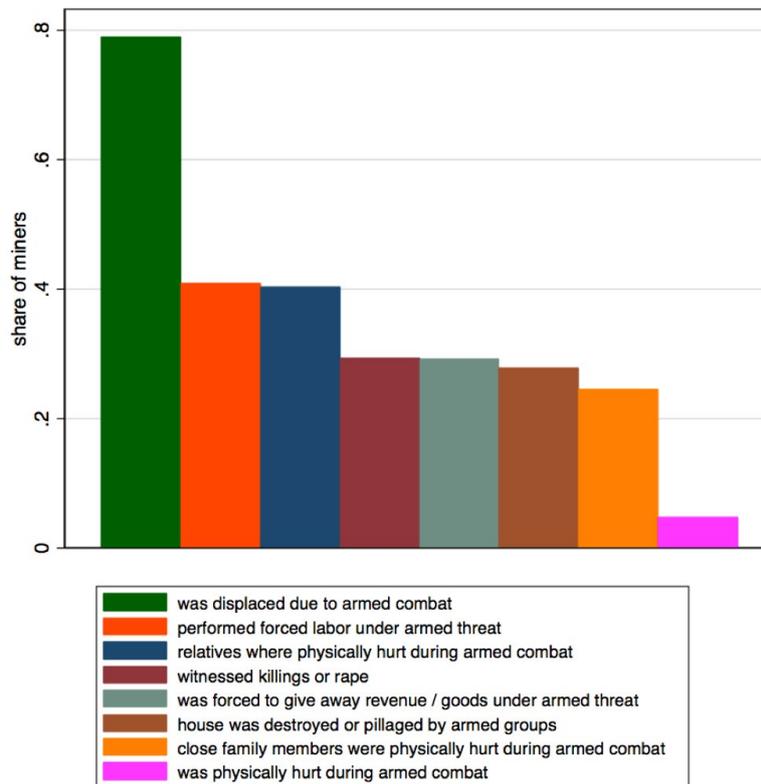
Apart from the above statements, respondents could also mention other reasons for their engagement in ASM. Of the 96 miners that did so, the large majority mentioned push factors: poverty and the need to find financial means to support their family (41%) or a lack of outside options due to a poor level of education (31%). About 28% mention that they started artisanal mining because it is the main economic activity in Kamituga and they followed the example of their friends and family (mainly their father and brothers). One artisanal miner phrased it nicely, saying “La mine, c’est le champ des gens de Kamituga”.

4.3- Exposure to armed conflict

Nearly all miners in our sample have been exposed to violent conflict events (see Figure 7). The large majority of miners (78%) were at a certain point internally displaced due to armed combat. Four out of ten were forced to perform labour under armed threat (41%), or have relatives who were physically hurt during armed combat (40%). About one third of the miners witnessed killings or rape (29%), were forced to give away revenue under armed threat (29%), or had their house pillaged by an armed group (28%). About 24% have close family members who were physically hurt during armed combat and about 5% were physically hurt themselves. A mere 7% of the miners in our sample were not exposed to any of these events, while only 35% of miners were not exposed to the most extreme forms of these events (i.e. having close family members or relatives who were physically hurt during armed combat, being physically hurt themselves, or having witnessed killings or rape).

[23] While pit managers represent 10% of the total sample with at least one child, they represent 22% of those who find ASM an interesting profession for their children.

Figure 7: Exposure to armed conflict



The majority of these events took place in Kamituga or elsewhere within the Chefferie of Wamuzimu, mostly between 1996 and 2004, i.e. during the two Congo wars (see Figure 8). However, miners also indicated some occurrences of each of these events in much more recent times. This is especially true for cases where people were forced to give away revenue or goods under armed threat (see Figure 9). On the one hand, this observation may relate to the growing insecurity on the road between Kamituga and Bukavu.²⁴ On the other hand, it may relate to the presence of the FARDC in Kamituga’s mining sites. According to interviews we conducted with several artisanal miners, pit managers and representatives of mining cooperatives the Congolese army is levying a tax of up to 50\$ per month on each active mining pit in Kamituga.²⁵

[24] In the period of our last round of fieldwork (April-May 2015), there were almost daily ambush attacks on the RN2 (Route Nationale 2) which connects Bukavu and Kamituga. While during our previous rounds of fieldwork (in June and December 2014) the road was guarded by FARDC soldiers at regular postings along the way, all posts were now abandoned. Reportedly, the soldiers were engaged in the campaign to root out the FDLR, launched in January 2015 by MONUSCO and the FARDC (see e.g. <http://www.reuters.com/article/us-congodemocratic-rebels-un-idUSKBN0KH23P20150109>). We spoke to an agent of the ANR (Agence National de Renseignements, the National Intelligence Agency) in Kamituga, who blamed the FDLR for the attacks, pointing out that they use the same ‘modus operandi’: i.e. cars were ambushed by armed men, who would take everything that was being transported, including food and regularly also the passenger’s clothes, leaving them naked by their vehicle. Supposedly, this would point to the FDLR as they needed food and clothes to sustain their stay in the forest. Others argued that the FARDC was likely behind the attacks. The perpetrators further seemed to act with prior knowledge, targeting vehicles that were more likely to transport gold from Kamituga to Bukavu.

[25] The tax is nicknamed ‘Ravitaillement Militaire’ or ‘Refueling the Army’ and is presented as a financial compensation for the protection offered by the army. As indicated in section 2.2, the FARDC has repeatedly been reported to engage in illegal taxation of artisanal miners and traders in Kamituga.

Figure 8: Where did you last experience the following conflict events?

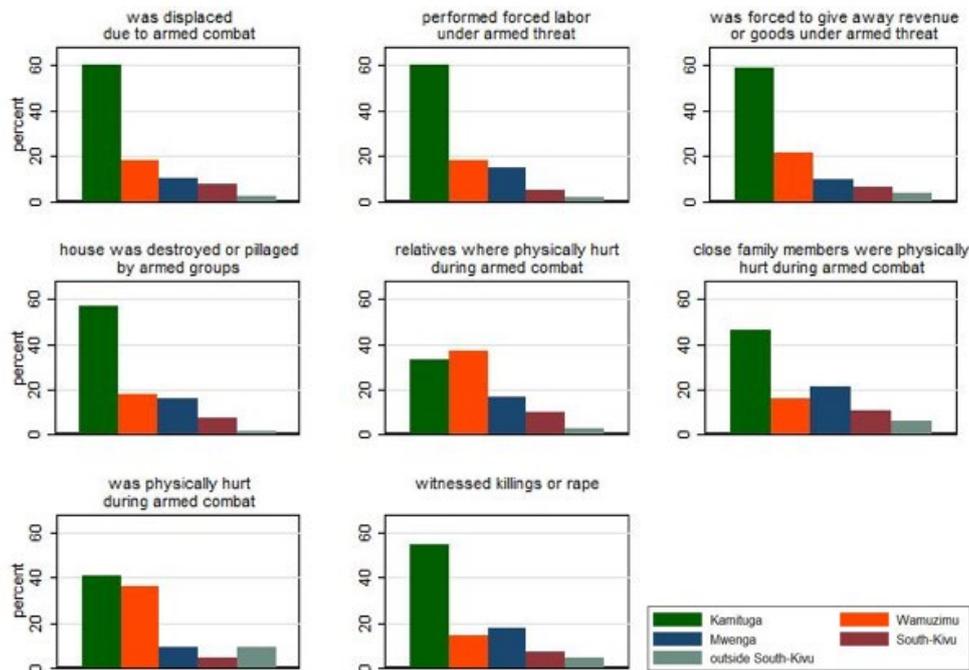
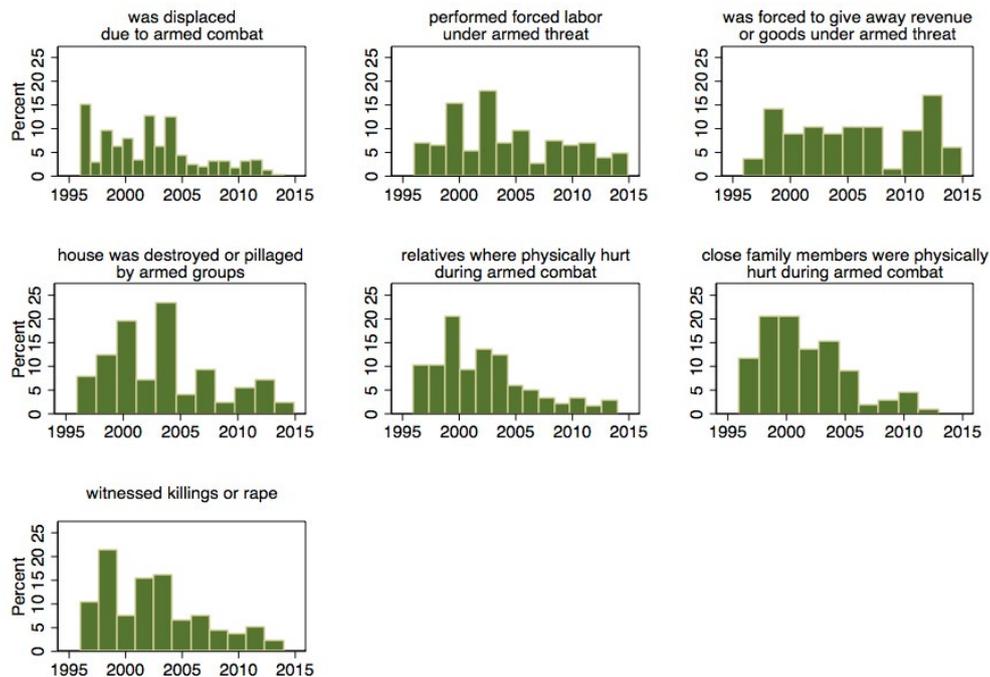


Figure 9: When did you last experience the following conflict events?



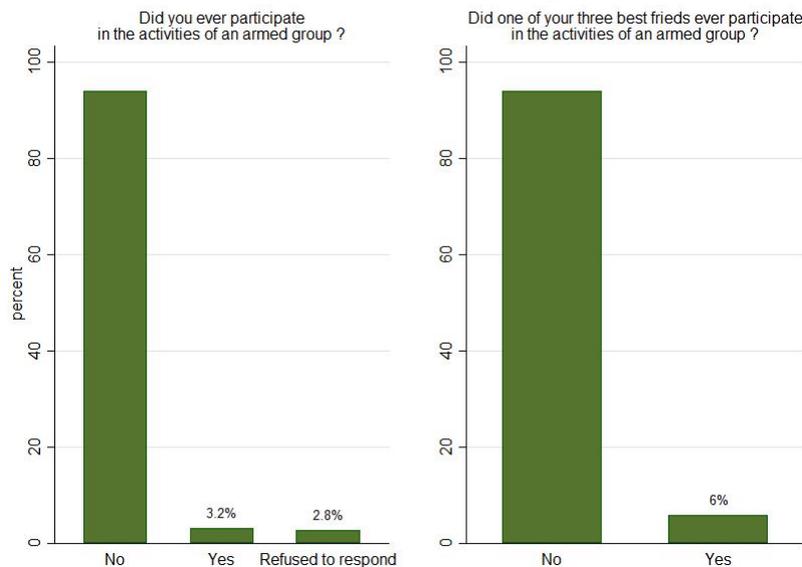
4.4. Participation in armed conflict

Apart from exposure to violent conflict events, we were also interested in finding out what share of artisanal miners can be classified as ex-combatants. As a first measure, we directly asked miners if they had ever participated in the activities of an armed group: 3% of the miners indicated they had, while another 3% refused to respond to the question (see Figure 10).²⁶

[26] We initially planned to ask this potentially sensitive question using a so-called 'list experiment' (see e.g. Blair and Imai, 2012; Glynn, 2013; Kramon and Weghorst, 2012). During the exploratory rounds of fieldwork, we noticed however that the question appeared to be much less sensitive than expected. Overall, people seemed to talk freely

As a second measure, in another section of the survey, we asked miners to answer a number of questions about their three best friends. Here, 6% of the miners indicated having a close friend who had participated in the activities of an armed group (see Figure 10). These two measures suggest that somewhere between 3% to 6% of the artisanal miners in Kamituga has a history as an armed combatant. When extrapolating from our sample, these percentages correspond to a range of 420 to 840 ex-combatants that are currently engaged in artisanal mining in Kamituga.²⁷

Figure 10: Did you or one of your best friends ever participate in the activities of an armed group?

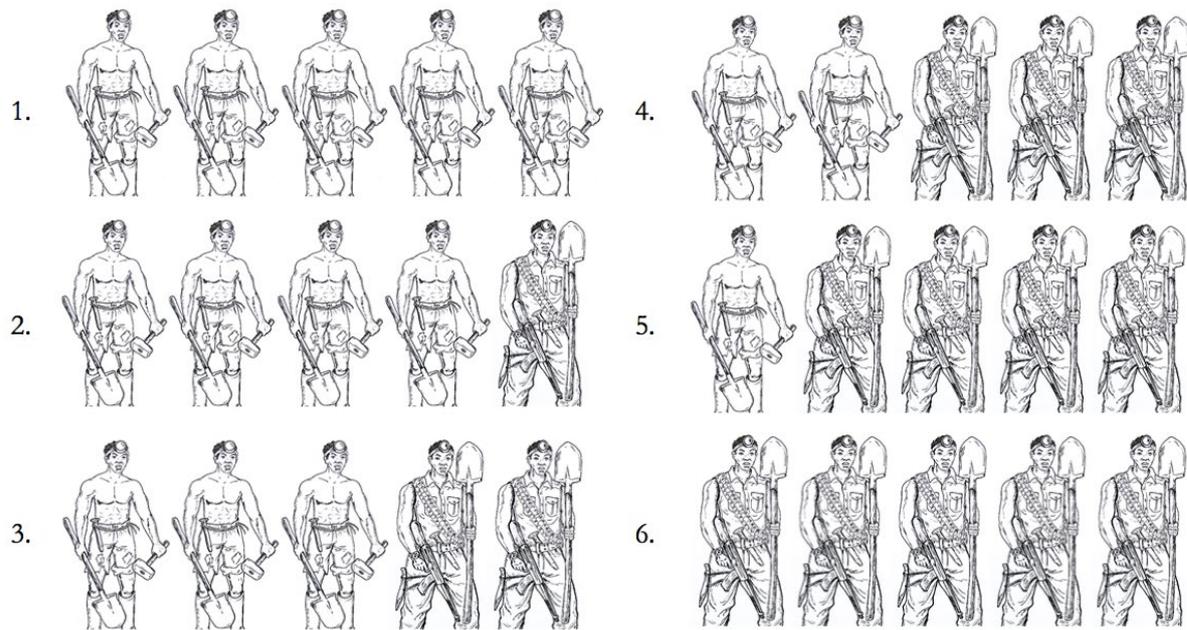


This estimated range is in line with information we received from the director of PIAP (*Pain aux Indigents et Appui à l'auto-Promotion*, a non-governmental organization based in Kamituga), who told us that 800 ex-combatants were reintegrated in the territory of Mwenga within the framework of the DDR program (the United Nations program on Disarmament, Demobilization and Reintegration). Of these 800 ex-combatants, 600 were supposedly reintegrated in Kamituga, where PIAP was in charge of paying them a monthly wage (which they were to receive for a period of 12 months). According to the representative, the ex-combatants were to be employed by an agricultural project which was never implemented due to the embezzlement of funds. The majority of these ex-combatants reportedly stayed in Kamituga and are now engaged in artisanal mining.

about their exposure to and participation in violent conflict events. In order not to needlessly complicate matters, we decided to ask the question directly, and try to corroborate the results using a number of more indirect measures.

[27] This may be an underestimate if miners tend to underreport involvement in the activities of armed groups (either by themselves or their close friends). Moreover, artisanal miners make up only about 8% of the entire population of Kamituga (14,000 / 180,000). Although ex-combatants are likely over-represented among artisanal miners, the total number of ex-combatants in Kamituga may well exceed these rough estimates.

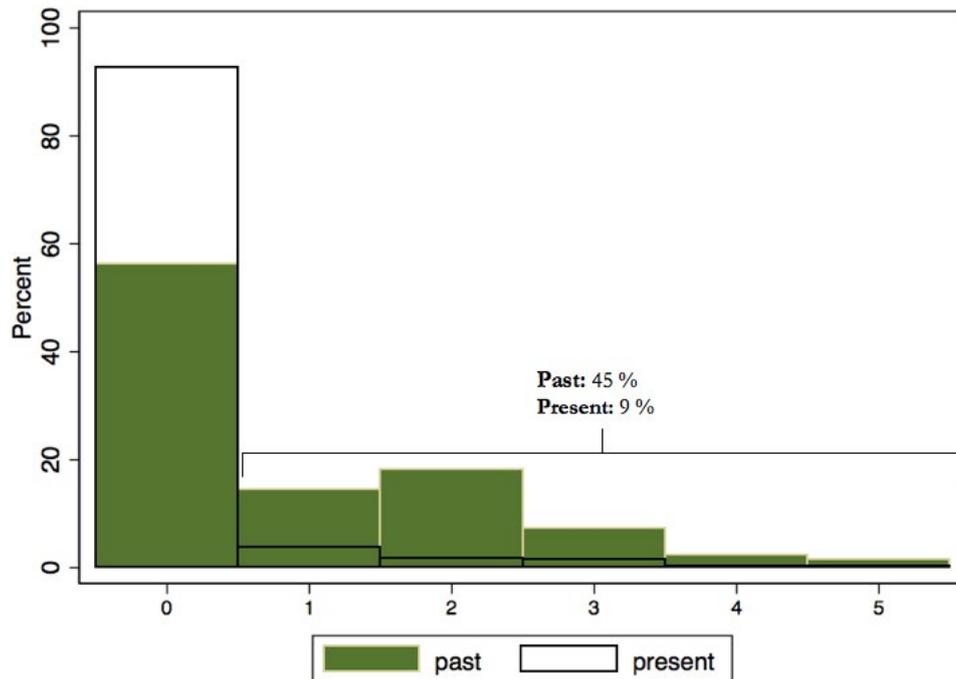
Figure 11: Six possible representations of the population of artisanal miners



In a third approach, we asked miners about the level of participation in armed conflict among the other miners in their mining site. This approach is thus less personal, compared to the first and second (that ask about themselves and their close friends). It is also the most abstract measure, and thus the most difficult to estimate. To help respondents to reach a concrete estimate, we showed them six images of five miners. The images differed only in the number of miners which are holding a gun (with their number ranging from zero to five), indicating that the miner had participated in the activities of an armed group (see Figure 11). Respondents were told that “Some people in Kamituga may have participated in the activities of an armed group in the past, others are perhaps still related to such groups. The following images are possible representations of the population of miners in your mining site”. We then asked them to indicate the image which best represents the population of artisanal miners in their mining site, in the past and today. Regarding the past, nearly half (45%) of the miners indicated an image that features at least one armed actor, while almost a third of the sample (29%) indicated an image with more than one armed actor among five miners in their mining site. When considering the present, the share of miners choosing an image with at least one armed miner decreases to 9% (see Figure 12). These data should be taken with the caveat that ‘one in five’ cannot be interpreted as 20%, since it is the smallest possible number to indicate that at least some miners took part in the activities of an armed group. On the other hand, a considerable share of miners (29%) responded at least ‘two in five’ (with respect to the past).

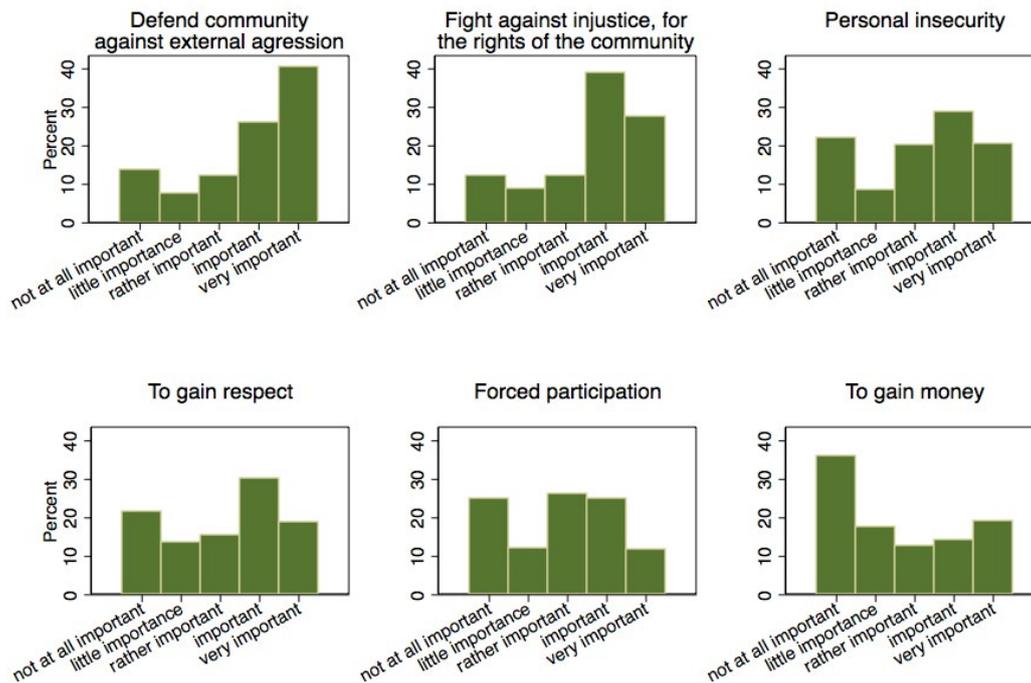
Although it is very hard to get an accurate estimate, these three approaches combined suggest that at least between 3%-6% of the artisanal miners in Kamituga have participated in the activities of an armed group in the past, while it is much less likely that this many artisanal miners are currently still participating in the activities of such groups.

Figure 12: How many of five representative miners in your mining site (have) participate(d) in the activities of an armed group?



To get an idea of why people engage in armed conflict, we presented the following six potential motivations and asked the miners in our sample to indicate the importance of each: ‘defend the community against external aggression’, ‘fight against injustice, for the rights of the community’, ‘personal insecurity’, ‘to gain respect’, ‘forced participation’, and ‘to gain money’. Answer categories ranged from (1) not important, to (5) very important. Figure 13 shows that all six motivations are important, but ‘fighting against injustice and for the rights of the community’ and ‘defending the community against external aggression’ are most widely shared as being important, respectively by 67% and 66% of the miners. About half (49%) finds ‘personal insecurity’ and ‘gaining respect’ important incentives, while 37% indicates that ‘forced participation’ is important as well. Finally, 33% mentions that ‘gaining money’ is an important motivation to join an armed group, while 54% indicates that it is not.

Figure 13: Potential motivations to participate in the activities of an armed group



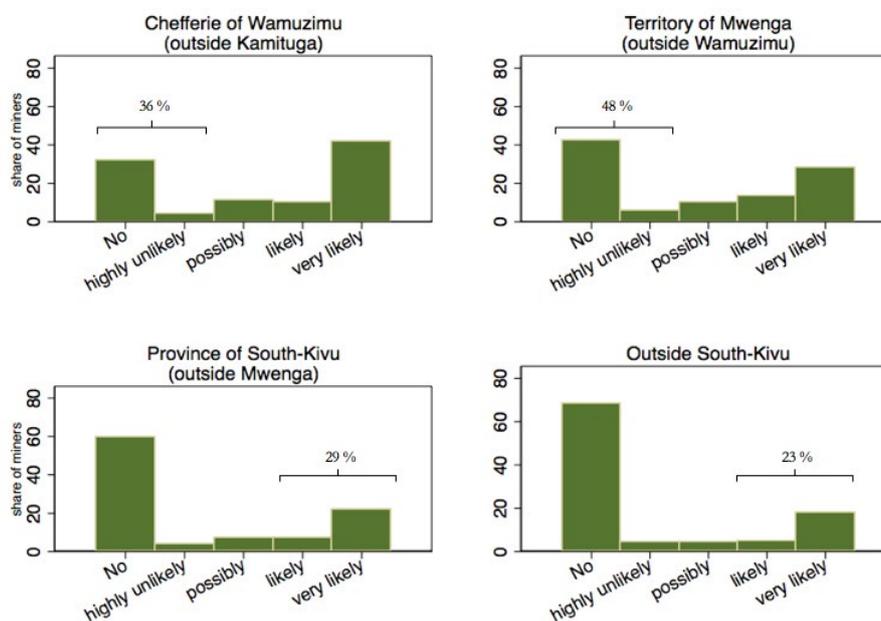
Respondents were given the opportunity to mention other motivations, and 131 miners did so. The majority of them (65%) mention ‘revenge’ as a strong motivation; e.g. joining an armed group in order to take revenge on other armed groups for killing a family member or relative. About 20% further describes armed groups as a ‘safe haven’ for criminals: those who risk being convicted may flee to join an armed group and escape a prison sentence. Finally, 15% indicates that people may join an armed group when there is a lack of employment and they face little other livelihood options.

5. RELOCATION OF ASM ACTIVITIES?

5.1. Survey question

We asked miners about their willingness to migrate a certain distance in order to continue their ASM activities: “Should artisanal mining no longer be possible in Kamituga, would you consider migrating towards an AEZ to continue ASM if the AEZ is located (i) in the chefferie of Wamuzimu, (ii) outside Wamuzimu, but in the territory of Mwenga, (iii) outside Mwenga, but in the province of South-Kivu, (iv) outside the province of South-Kivu?”. The answer categories ranged from (1) No, to (5) Very likely.

Figure 14: Should artisanal mining no longer be possible in Kamituga, would you be willing to move to an AEZ if the AEZ is located in the ... ?



5.2. Responses

Figure 14 shows the distribution of responses. On the one hand, there is a relatively large group of miners that strongly opposes migration: 36% of miners would not consider migrating even if the AEZ is located within the *chefferie* of Wamuzimu. Nearly half (48%) of the miners would not consider moving outside the chefferie. On the other hand, nearly a third of the miners indicates to be relatively mobile, willing to move outside the territory of Mwenga (29%) or even outside South-Kivu (23%).

Table 3: Comparing the characteristics of ‘stationary’ vs ‘mobile’ miners

	stationary n=150	mobile n=85	
Demographic information			
age	33	34	
has children < 10 years old living at home	70%	70%	
not single (married, engaged or living together with partner)	77%	81%	
respondent was born in Kamituga	53%	47%	
respondent's father was born in Kamituga	21%	12%	**
respondent's mother was born in Kamituga	28%	20%	*
education > first two years of high school	46%	36%	*
Economic variables			
asset quintile	3,0	2,7	*
years of experience in ASM	11,2	13,5	**
respondent is a pit manager	8%	12%	
respondent has an income source outside mining	13%	11%	
farming activities contribute to household revenue	11%	9%	
reservation wage is higher than 10 dollars	41%	55%	**
mining revenue in an average week	161,3	215,3	*
ASM-LSM opinions and exposure to conflict			
considers a lack of other options' an important / very important reason to be engaged in ASM	73%	64%	*
respondent indicates that Banro offers no opportunities for him	70%	86%	***
frequency of Banro visits to the respondent's mining site in the month prior to interview	2,8	2,9	
exposure to violent conflict events	89%	98%	***
exposure to extreme forms of violent conflict events	63%	81%	***

Notes: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; 'stationary' miners indicated not to be willing to move to a AEZ outside Kamituga (not even within the chefferie of Wamuzimu), while 'mobile' miners indicated to be willing to move to a AEZ outside the province of South-Kivu; the coefficients represent mean values for each subgroup, calculated using a t-test; the asset quintiles were calculated from an asset index that was derived in a principal component analysis including a number of household assets (i.e. the number of rooms in the house, the material of the walls and floor, as well as the number of mattresses, television sets and radios owned by the household).

5-3. Further analysis

In Table 3, we compare some basic characteristics of stationary and mobile miners.²⁸ A miner is labelled ‘stationary’ when he indicates that he is not at all willing to move to an AEZ outside Kamituga, not even within the chefferie of Wamuzimu (32% of miners). We label a

[28] It is important to note that this Table (and the following Tables in the sections ‘further analysis’) offer simple descriptive statistics only, and by no means try to establish or imply causal relationships. This report is intended to offer a first, broad, overview of the collected data and provide a preliminary analysis. In our follow-up research we will provide more in-depth analyses of specific research themes.

miner as ‘highly mobile’ when he indicates that he would very likely be willing to move to an AEZ outside the province of South-Kivu (18% of miners). The coefficients in the table represent mean values for each subgroup. The stars in the third column indicate whether the difference in means calculated by a t-test is significantly different from zero.

In terms of demographic characteristics, stationary and mobile miners are quite alike. Surprisingly, miners who live together with their partner or who have children younger than ten years old living at home are not significantly more likely to be stationary. We do see that stationary miners are more likely to have strong roots in Kamituga (i.e. their father or mother was born in Kamituga), while mobile miners are, on average, less educated. Mobile miners also have slightly more experience in ASM, and report a higher mining revenue and reservation wage²⁹. There is a strongly significant difference in terms of expectations from the LSM development in Kamituga: 86% of mobile miners indicate that Banro’s activities offer no opportunities for them, while this is the case for 70% of stationary miners. Finally, we find that mobile miners are more likely to have been exposed to violent conflict events, especially in its more extreme forms, compared to stationary miners.

6. REORIENTATION TOWARDS OTHER ECONOMIC ACTIVITIES?

6.1. Survey question

Besides relocating, miners may cope with the expansion of LSM by reorienting towards other income generating activities. During the first two exploratory rounds of fieldwork, we asked miners in interviews and focus group discussions about potential alternative economic activities, should ASM no longer be possible in Kamituga. Based on their answers, we assembled a list of 19 activities: *opening a small shop; selling goods at the market; working as a mechanic; working for Banro; driving a taxi-moto; farming; working in construction; going back to school; carpentry; welding; opening a restaurant; fish farming; working as a barber; working as a tailor; becoming a street vendor; making charcoal; joining an armed (defence) group; transporting various goods using manual labour (“porte-faits”); and repairing shoes.*

In order to facilitate the discussion during the survey, we collaborated with a local artist to create drawings of each activity (see Figure 15). For each activity, miners were asked to indicate if they were ‘very interested’, ‘interested’, ‘not at all interested’ or ‘rather indifferent’ to conducting the activity as an alternative to ASM. A maximum of three ‘very interesting’ activities could be indicated.

[29] The reservation wage is defined as the minimum wage needed to make an artisanal miner switch from artisanal mining to another economic activity. See section 6 for detailed information on how we calculated this measure.

Figure 15: Drawings of economic activities



Notes: This Figure offers some examples the drawings we used in the survey; drawings of all economic activities are available upon request to the authors. The drawings were created by Francesco Nyamo (who can be contacted at franc.mutkiv@gmail.com)

At what wage would miners in our sample be willing to switch from artisanal mining to these alternative activities? In economics jargon: what is their ‘reservation wage’? In order to get an idea of the reservation wage, we asked miners if they would be willing to quit ASM and take up an alternative activity, while varying the daily wage associated with the alternative activity.

6.2. Responses

Figure 16 shows that miners are most interested in small-scale commercial activities: selling various goods in a small shop or on the market. Working as a mechanic is also considered a very interesting alternative to ASM. Almost a third of the miners (28%) includes working for Banro in the ‘very interesting’ category, while only 16% of the sample mentions farming in this category. Figure 17 indicates that miners are further interested in opening a small restaurant as well as conducting technical activities such as welding and construction works.³⁰

[30] The graph representing activities that were found ‘not at all interesting’ is practically the mirror image of Figure 16 and is hence not reported.

Figure 16: Activities considered to be “very interesting” alternatives to ASM

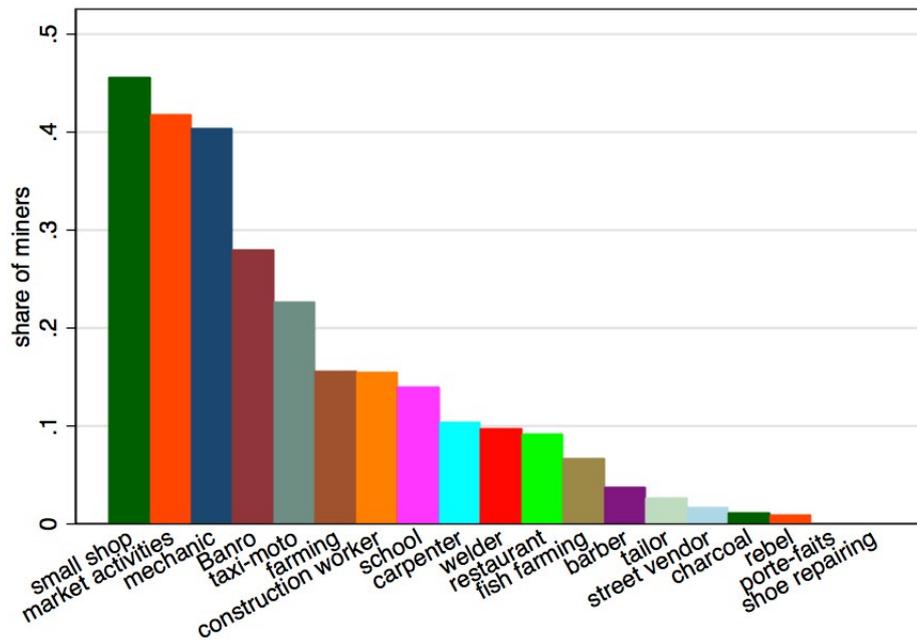
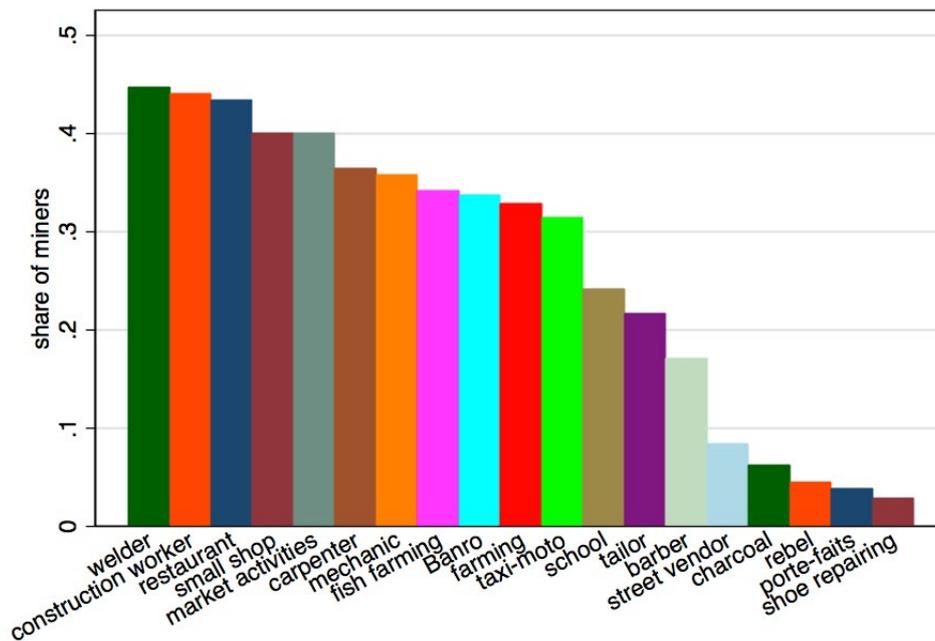
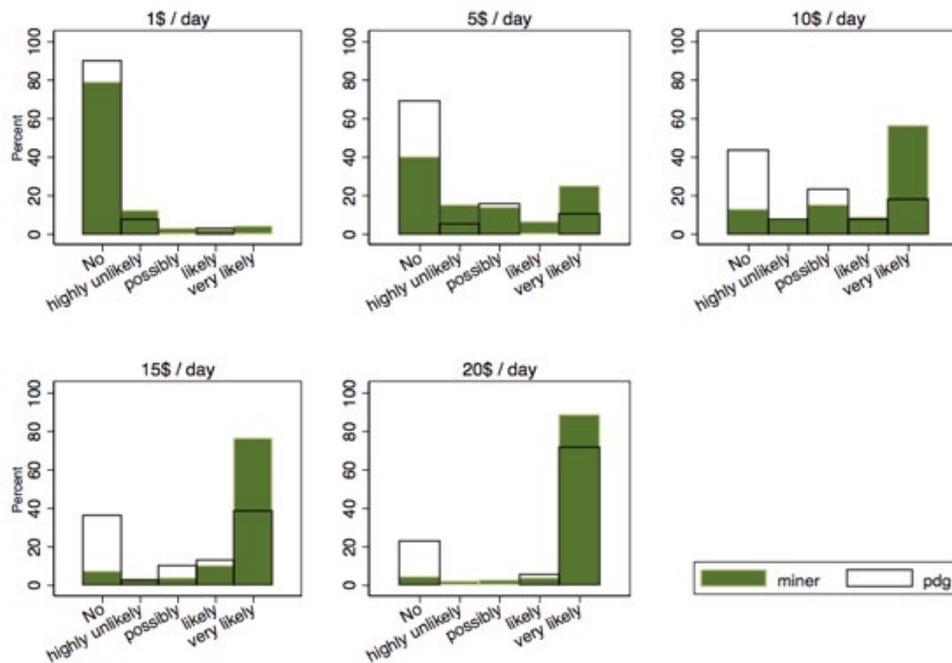


Figure 17: Activities considered to be “interesting” alternatives to ASM



The results on the reservation wage clearly indicate that pit managers have a higher reservation wage compared to other miners (see Figure 18). Starting low, we find that the large majority of miners (79%) and pit managers (90%) would not consider quitting ASM for another activity that yields only 1\$ per day. Increasing the daily wage of the alternative activity to 5\$ per day, about a third (31%) of miners indicate they would likely or very likely quit ASM, while this is only the case for 10% of the pit managers. When further raising the wage of the alternative activity to 10\$ per day, the majority of miners (65%) indicate they would likely quit ASM, while only a quarter of pit managers (26%) would do so. Nearly all miners (87%) would quit ASM for an activity that yields 15\$ or more on a daily basis, while 23% of pit managers indicates they would not quit ASM even for an activity that yields 20\$ per day.

Figure 18: Miner’s reservation wage. ‘Would you be willing to quit ASM if you have the option to start another activity with a daily wage of ...?’

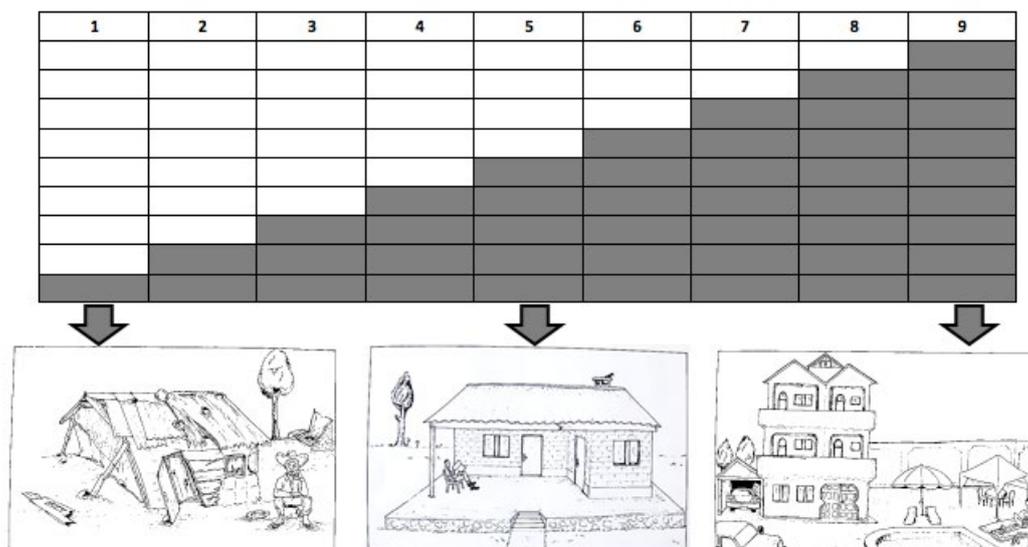


6.3. Further analysis

6.3.1. Ladder of life

To better understand how miners perceive their standard of living relative to the standard of living and earning potential of other economic activities, we presented the respondents with a ‘ladder of life’. The ladder visualizes 9 standards of living, ranging from the poorest in Kamituga (level 1) to the richest (level 9) (see Figure 19).

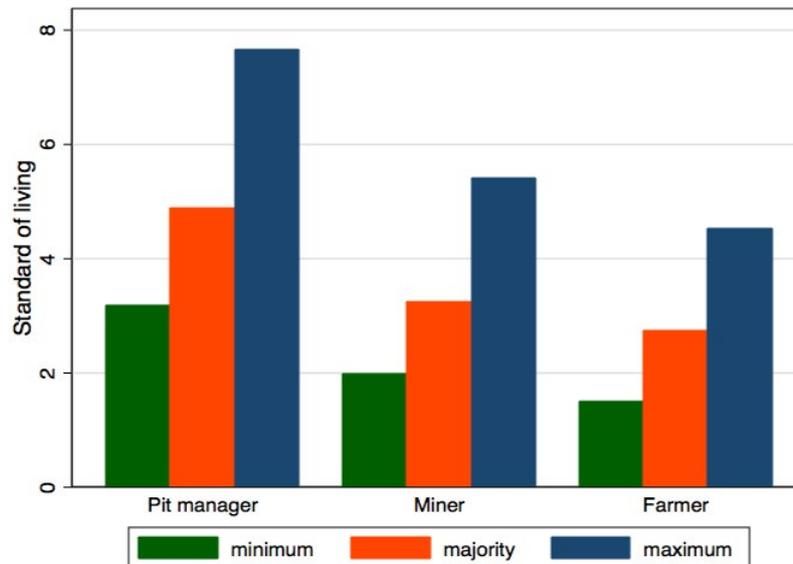
Figure 19: Ladder of life



Respondents were asked to indicate the minimum and maximum standard of living they associated with a certain economic activity, as well as the level at which the majority of people engaged in that activity could be located, i.e. the median standard of living. All 469

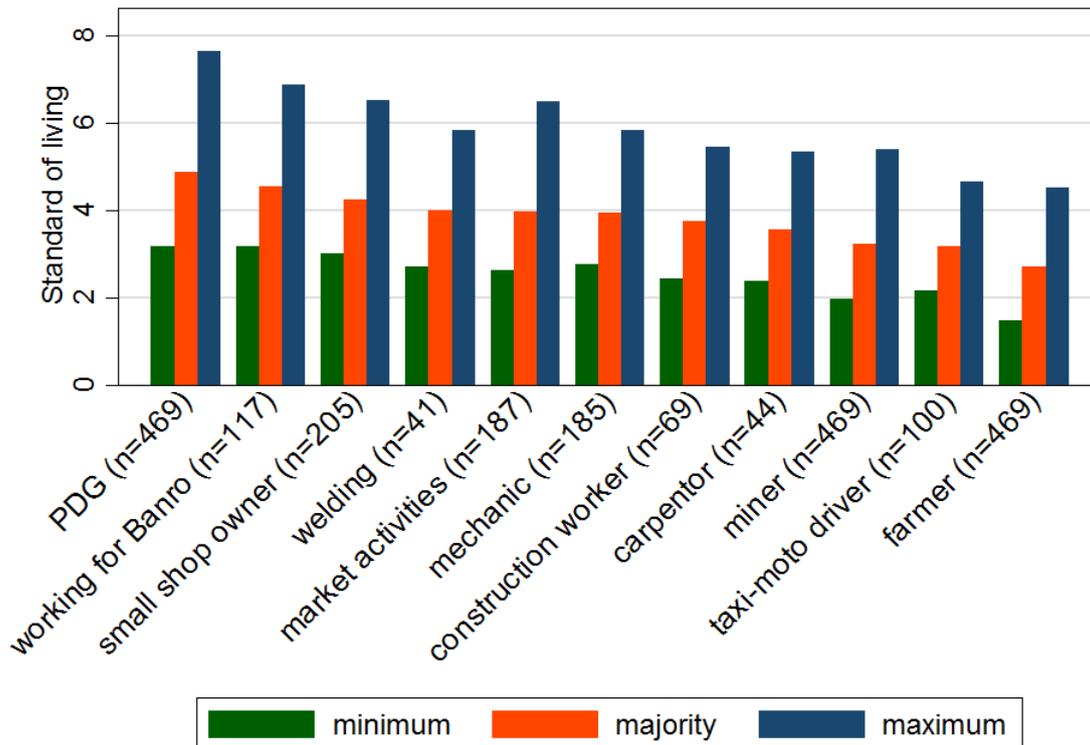
respondents were asked to do so for the economic activities of pit manager, miner and farmer. Figure 20 clearly indicates that on average pit managers are considered to have the highest standard of living (4.8), while farmers have the lowest (2.7) and miners are located somewhere in between (3.2). At their maximum earning potential, pit managers are on average believed to be able to reach level 7.7 on the ladder of life. By contrast, the upper limit for miners and farmers is situated at level 5.4 and 4.5 respectively.

Figure 20: The ladder of life: Standard of living of pit managers, miners and farmers (496 obs.)



Respondents were asked to repeat this exercise for all the activities that they indicated as 'very interesting' alternatives to ASM. Figure 21 compares the perceived standard of living for eleven activities which were ranked as very interesting alternatives to ASM by at least 40 miners. Pit managers are still perceived to have the highest standard of living, especially when looking at the maximum standard achievable. Working for Banro is also considered to be profitable, with the majority of Banro workers perceived to attain level 4.6. Next in the list are small commercial activities: owning a small shop (4.2) and selling various goods at the market (4.0). The majority of those who are engaged in technical activities (such as welding, mechanics construction works or carpentry) are also situated between level 3.6 and 4 on the ladder of life. Farmers are still rated lowest, while also miners are situated at the bottom of the distribution.

Figure 21: The ladder of life: Standard of living of various activities (with at least 40 observations)



6.3.2. Contrasting profiles

In Table 4, we zoom in on the characteristics of miners who have strong preferences for specific activities. In the first two columns, we compare miners who indicate that working for Banro would be a ‘very interesting’ alternative to ASM (18% of the sample), with miners who indicate that they find it ‘not at all interesting’ (25% of the sample). Miners who would like to work for Banro are, on average, higher educated and more likely to have a secondary income source outside mining. They are also more likely to state that they are engaged in ASM because of a lack of other options, and more likely to believe that Banro’s LSM development offers opportunities for them.

Table 4: Comparing the characteristics of miners with specific reorientation preferences

	work for Banro		taxi-moto		join an armed group				
	very interesting	not at all interesting	very interesting	not at all interesting	interesting or indifferent	not at all interesting			
	n=84	n=117	n=100	n=119	n=135	n=295			
Demographic information									
age	33	34	30	37	***	32	34	*	
has children < 10 years old living in same household	86%	85%	74%	92%	***	81%	85%		
not single (married, engaged or living together with partner)	79%	81%	70%	88%	***	11%	81%		
respondent was born in Kamituga	48%	44%	53%	55%		49%	54%		
respondent's father was born in Kamituga	22%	14%	*	23%	12%	**	19%	20%	
respondent's mother was born in Kamituga	27%	21%		27%	13%	***	24%	24%	
education > first two years of high school	51%	36%	**	35%	47%	**	44%	39%	
Economic variables									
asset quintile	3,1	3,1		2,7	3,2	***	2,8	3,1	**
years of experience in ASM	11,2	13,0	*	10,0	14,0	***	11,2	11,8	
respondent is a pit manager	12%	12%		3%	15%	***	10%	7%	
respondent has an income source outside mining	22%	10%	***	10%	14%		14%	17%	
farming activities contribute to household revenue	10%	8%		9%	9%		9%	14%	**
reservation wage is higher than 10 dollars	56%	49%		34%	46%	**	38%	53%	***
mining revenue in an average week	202,3	162,1		131,0	217,0	**	154,4	188,9	*
ASM-LSM opinions and exposure to conflict									
considers a lack of other options' an important / very important reason to be engaged in ASM	84%	73%	**	74%	72%		72%	78%	*
respondent indicates that Banro offers no opportunities for him	35%	92%	***	68%	68%		74%	66%	**
frequency of Banro visits to the respondent's mining site in the month prior to interview	2,9	3,1		3,1	2,8		2,6	3,0	
exposure to violent conflict	94%	93%		94%	94%		93%	94%	
exposure to extreme forms of violent conflict	63%	68%		68%	59%	*	74%	59%	***

Notes: *** p<0.01, ** p<0.05, * p<0.1

Two other alternative activities about which miners have strong preferences are driving a taxi-moto and joining an armed group. About 21% of miners indicate that driving a taxi-moto very much appeals to them, while this is not at all the case for 25% of miners. These two groups appear to be quite different in several respects. On average, those who are pro taxi-moto tend to be younger; are less likely to have young children; are less likely to have a partner; are more likely to have strong roots in Kamituga (i.e. one of the parents was born in Kamituga); and are less educated. They also appear to have less assets, a lower mining revenue, a lower reservation wage, and slightly less experience in ASM. Pit managers are much less likely to be interested in driving a taxi-moto as an alternative activity to ASM.

Finally, 63% of miners indicates that joining an armed group is ‘not at all’ an interesting alternative to ASM; 5.4% of miners find it an interesting to very interesting alternative, while 32% indicates to feel rather indifferent about the option. In the last two columns of Table 4, we compare miners who are not at all attracted by joining an armed group to the other miners in the sample. Miners who are not attracted by joining an armed group are, on average, slightly older, have more assets, are more likely to be engaged in farming activities, have a higher income from mining and a significantly higher reservation wage. Furthermore, they are more likely to agree with the statement that Banro’s LSM development can offer opportunities for them and they have been significantly less exposed to the more extreme forms of violent conflict events.

7- CONFRONTATION WITH BANRO?

As the development of LSM threatens an important livelihood strategy of many young men, with families to support, it is important to analyse to what extent, and through which mechanism, the tension between both modes of production may give rise to (re)new(ed) conflict.³¹ As such, a loss of employment may decrease the opportunity cost to engage in the activities of an armed (defence) group; or, miners may rebel because they may feel that their traditional rights to work the land are violated. In this section we analyse the likelihood of future (violent) confrontations.

7.1. Survey question

How likely is it that a conflict between ASM- and LSM-actors will ensue and what form might it take? We asked each miner in our sample to imagine the following realistic scenario for Kamituga’s (near) future, and comment on how he and his peers would react to the scenario: *“Imagine a situation where Banro moves to the production phase in Kamituga. Imagine that they organize professional training programs and authorize some artisanal miners to continue operating in selected mining sites of Kamituga. However, their budget is not sufficiently large to accommodate all miners in the training programs, and the selected mining sites are not sufficiently large to accommodate all artisanal miners”.*

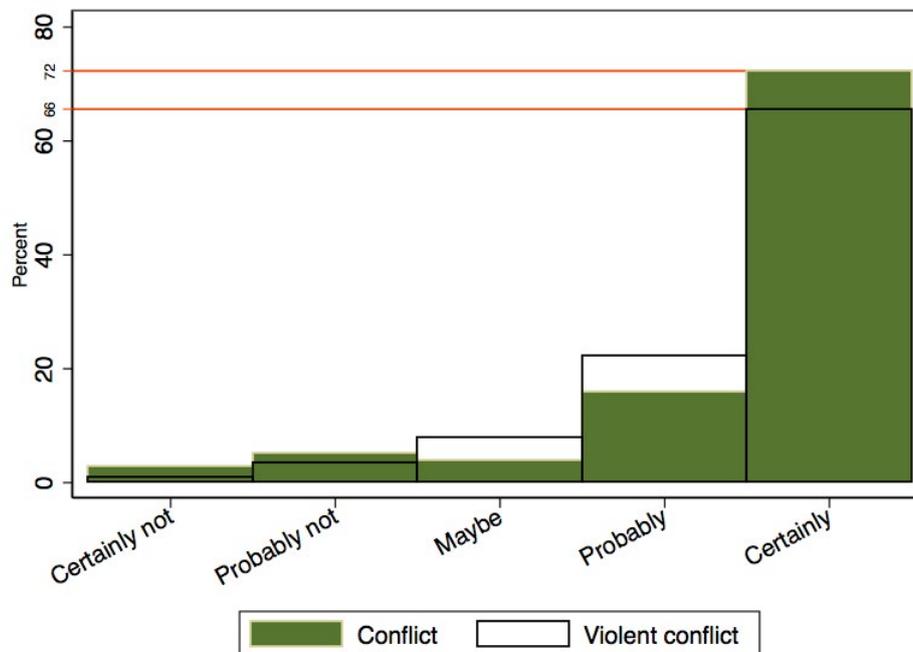
7.2. Responses

Figure 22 shows that 72% of artisanal miners believes that such a scenario would certainly lead to a conflict between ASM and LSM actors, while 66% believes the conflict would

[31] Studies on individuals’ incentives to engage in conflict, suggest an important role for economic motives. Humphreys and Weinstein (2008), for instance, find that poverty and the promise of material rewards are strongly correlated with participation in armed groups in Sierra Leone. Recently, Blattman and Annan (2015) experimentally evaluated a program of agricultural training, capital inputs, and counselling directed at ex-fighters in Liberia who were engaged in illegal mining or occupied rubber plantations. The men included in the program were found to shift labor away from illicit activities to farm work, and agricultural profits increased. Moreover, program participants showed reduced interest to engage in mercenary activities in neighboring Côte d’Ivoire.

be violent. For instance, a significant share of miners indicate that in such a scenario some miners would certainly: destroy Banro property (53%), physically attack Banro employees (43%), use fire arms (36%) and join or revitalise an armed (defence) group (32%)³². When asked if miners would personally engage in these violent acts, 32% indicates they would destroy Banro property, 26% would physically attack Banro employees, 18% would resort to using fire arms and 11% indicates they would join an armed (defence) group (see Figure 23).

Figure 22: How likely is it that such a scenario will lead to a (violent) conflict?



7-3. Further analysis

7-3-1. Strategic behaviour

These self-reported reactions to a hypothetical situation should be taken with a grain of salt, the more so because they may be coloured by strategic considerations (e.g. miners may act on the belief that a credible threat of a violent confrontation increases their bargaining power). On the other hand, the responses of miners should not be taken lightly because of three reasons. First, LSM development does pose a serious threat to the principal livelihood strategy of a large group of young men, who depend on ASM to support their families (see section 4.1 and 4.2), who are not very interested in reorienting towards other economic activities (see section 8) and who are reluctant to migrate (see sections 5 and 8). Second, some artisanal miners have a history of participation in violent conflict (see section 4.4), and section 6.3 shows that 5.4% of the miners indicated that joining a rebel group would be an interesting or very interesting alternative activity if ASM would no longer be possible in Kamituga. Third, the qualitative field work presented in Section 2.2. has shown that the tension between ASM and LSM actors is on

[32] In the focus group discussions that we held during the exploratory rounds of fieldwork, miners said that although they ranked taking up arms as an option of last resort, they considered it a likely outcome in case they would be forced to quit ASM while little alternative options are available. In relation to this, they referred to the 2010 ban on artisanal mining. During this period of low ASM activities, the armed group Mayi-Mayi Shikito attracted many young men. Allegedly the group was created by the vice-president of CEPACAM (a committee of artisanal miners in Kamituga) and consisted mainly of artisanal miners from Kamituga. Most of the members are said to have returned to mining activities, but reportedly still have their arms at home and could pick them up when necessary. One miner said: "If you take about 100 miners today, you may find 3-5 who were part of Shikito. But if we are all chased away in the future and Banro does not leave us with any alternative, everyone could join".

the rise.

Furthermore, as mentioned above, the development of Banro's Twangiza mine was also associated with strong resistance by artisanal miners. Lacking alternative livelihood options, 500–900 artisanal miners forcibly reoccupied mining sites within the Twangiza concession in April 2011 (Geenen, 2013). Also in words, the artisanal miners showed clear commitment to resistance: “[...] We have no prospect of work. So our only option is to reoccupy this concession. They threatened us with policemen and dogs. We told them that whatever they did, but would never die of hunger! [...] We would rather be killed by bullets than starve to death.” (Geenen, 2013: p.6)

The impact of LSM development will arguably be even larger in Kamituga, because of its size (up to 190,000 inhabitants) and large number of artisanal miners (up to 15,000). Another factor that complicates the transition to industrial mining in Kamituga is the location of its most promising gold reserves: Kibukila mountain.³³ A significant part of these gold reserves are located underneath the city. Industrial exploitation of Kibukila would therefore entail the dispossession and displacement of a large number of people. It is thus clear that LSM development and its repercussions in terms of dispossession and displacement should be accompanied by a clear strategy for compensation measures.

7.3.2. Contrasting profiles

17% of miners indicate that they would certainly not participate in any of the four violent actions (destroying Banro property, attacking Banro employees, using arms or joining an armed group). By contrast, 40% of miners indicate that they would certainly participate in at least one of these actions. In Table 5, we compare the characteristics across these two groups. The ‘violent’ miners are, on average, slightly younger and less likely to be born in Kamituga. They are also less likely to be engaged in agriculture and have a higher reservation wage. The most significant difference, however, lies in their exposure to and opinion about Banro. First, miners who indicate that they would participate in violent actions are significantly more likely to work in mining sites that are more frequented by Banro.³⁴ Moreover, they are much more likely to state that Banro's LSM development offers no opportunities for them.

[33] Kibukila mountain hosts Mobale mine, the largest underground mine in the era of MGL and SOMINKI. At the end of the 1990s, in a context of growing insecurity, the director of SOMINKI ordered the flooding of Mobale mine in order to preserve it for industrial exploitation in the future (Geenen, 2014). The deepest levels of the mine have remained inaccessible to artisanal miners, since they don't have machines which are powerful enough to pump out the water. According to representatives of local mining committees, Banro counts on the mining zones located at Kibukila mountain to cover their investments when they decide to move to the production phase. In a recent presentation for Banro's investors, the president and CEO of Banro Corporation also mentioned that “exploration drilling has confirmed the potential of a number of targets including Kibukila, Filon 20 and G22” (Clarke, 2014).

[34] Banro's presence in a mining site was measured by asking artisanal miner's how often Banro representatives had visited their mining site in the four weeks prior to the survey. A stronger presence of Banro in a mining site likely indicates that the ASM activities have been more affected by Banro's LSM presence.

Table 5: Comparing the characteristics of 'violent' vs 'non-violent' miners

	participation in violent actions		join armed (defence) group			
	certainly not	certainly (for at least one)	certainly not	all others		
	n=80	n=188	n=239	n=230		
Demographic information						
age	35	33	*	34	33	
has children < 10 years old living in same household	84%	83%		85%	81%	
not single (married, engaged or living together with partner)	81%	79%		79%	80%	
respondent was born in Kamituga	60%	51%	*	53%	50%	
respondent's father was born in Kamituga	16%	19%		17%	24%	**
respondent's mother was born in Kamituga	21%	26%		23%	26%	
education > first two years of high school	38%	43%		40%	42%	
Economic variables						
asset quintile	3,1	3,0		3,0	3,0	
number of years experience in ASM	12,2	11,9		11,7	11,3	
respondent is a pit manager	13%	9%		7%	10%	
respondent has an income source outside mining	23%	11%		18%	11%	**
farming activities contribute to household revenue	18%	10%	**	14%	8%	**
reservation wage is higher than 10 dollars	38%	49%	**	46%	48%	
mining revenue in an average week	192,7	216,0		164,0	199,3	*
ASM-LSM opinions and exposure to conflict						
considers a lack of other options' an important / very important reason to be engaged in ASM	73%	79%		77%	73%	
respondent indicates that Banro offers no opportunities for him	55%	85%	***	62%	84%	***
frequency of Banro visits to the respondent's mining site in the month prior to interview	1,7	3,7	***	2,6	3,4	**
exposure to violent conflict	91%	94%		93%	95%	
exposure to extreme forms of violent conflict	64%	66%		59%	76%	***

Notes: *** p<0.01, ** p<0.05, * p<0.1

Finally, 51% of miners said that they would certainly not join an armed (defence) group should the above mentioned scenario take place, and 15% indicates that they probably wouldn't. By contrast, 11% of miners indicate that they certainly would, 7% would probably do so, 11% says maybe while 4% refused to respond to the question (see Figure 23). Miners who indicate that they would certainly/probably not join an armed group are, on average, more likely to have an income source outside of mining and more likely to be engaged in agriculture. Moreover, they are less likely to work in a mining site that is often frequented by Banro and they are more likely to believe that Banro's LSM development offers opportunities for them. Finally, they have significantly been less exposed to the more extreme forms of violent conflict.

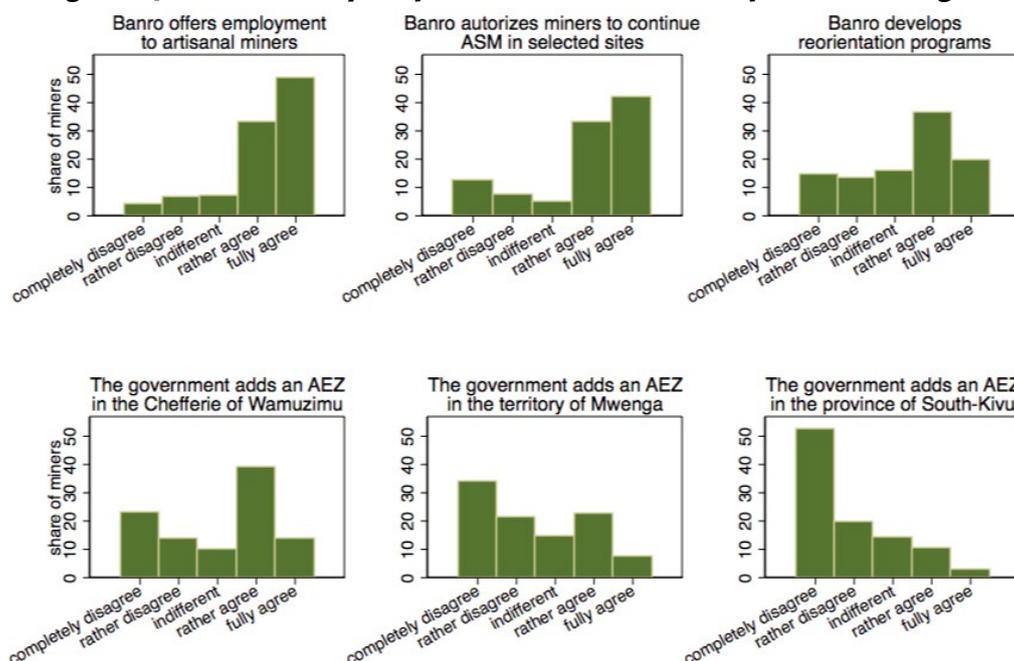
8. PREFERRED SOLUTIONS

During our exploratory focus group interviews and in more informal conversations, artisanal miners often indicated that the tensions between ASM and LSM in Kamituga have the potential to escalate into a violent conflict. The miners indicated however, that this would be a solution of 'last resort', only occurring when they are faced with little or no other livelihood options. In the survey, we therefore asked miners to indicate their level of agreement with a number of ways to compensate artisanal miners and prevent a conflict situation in Kamituga in the case of LSM development. We included the following options:

- (1) Banro offers employment to artisanal miners;
- (2) Banro authorizes artisanal miners to continue ASM in selected mining sites;
- (3) Banro develops reorientation programs to train miners in other economic activities;
- (4) the government adds an AEZ in the Chefferie of Wamuzimu;
- (5) the government adds an AEZ in the territory of Mwenga; and
- (6) the government adds an AEZ in the province of South-Kivu.

The answer categories ranged from (1) completely disagree, to (5) fully agree.

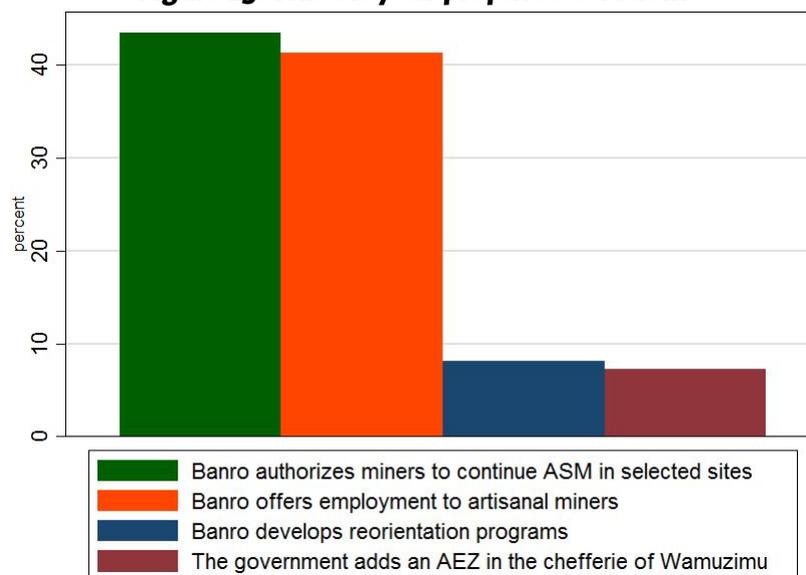
Figure 24: Potential ways to prevent an ASM-LSM conflict in Kamituga ?



Miners clearly prefer solutions that would allow them to remain in Kamituga: either by being offered wage employment by Banro (82% agrees); by being allowed to continue ASM in selected mining sites of Kamituga (75% agrees); or by reorienting towards other economic activities, and following reorientation programs organized by Banro to that end (57% agrees) (see Figure 24). Leaving Kamituga’s mining sites in order to continue ASM activities in an AEZ is only considered an acceptable compensation to the extent that the AEZ is located close to Kamituga, i.e. within the chefferie of Wamuzimu (53% agrees). If the AEZ is located elsewhere in the territory of Mwenga, only 30% agrees with the solution; while only 13% agrees if the AEZ is located elsewhere in the province of South-Kivu.

When asked to indicate their preferred solution, about 43% indicates that Banro should authorize the artisanal miners to continue ASM in selected mining sites, while 41% would prefer to get the opportunity to start working for Banro. Only 8% prefers to engage in other economic activities, and would like Banro to develop reorientation programs. Yet, a reorientation towards other economic activities is still considered slightly more attractive than migrating towards an AEZ to continue ASM, even when the AEZ is located within the Chefferie of Wamuzimu – which is the preferred solution for only 7% of the miners (see Figure 25).

Figure 25: What is your preferred solution?



Miners could also suggest other solutions, and 108 did so. About a third of them indicate that they would be willing to work for Banro, but only if the company offers a decent wage (they argue that those employed by Banro in Kamituga at the moment earn little). The other suggested solutions indicate that some miners’ expectations are unrealistically high: about a third suggests that Banro should leave Kamituga entirely, and 20% indicates that Banro should reimburse all pit managers and miners for the full amount of financial debts they have accumulated over the years. These miners often also mention that Banro should take care of their families, and offer free health care and schooling (thereby frequently referring to SOMINKI, who used to provide such public services to its employees in Kamituga). Finally, about 20% indicates that they would want to work on an AEZ or an ‘ASM tolerated zone’ within the boundaries of Kamituga’s concession. These miners indicate that there should be a clear separation between the designated ASM and LSM zones, and that Banro should not interfere with the management of the ASM zones.

9. DISCUSSION

The Democratic Republic of the Congo needs to turn its resource curse into a blessing. Only then can the \$24 trillion untapped mineral deposits³⁵ raise the income of ordinary Congolese (from an average of \$712 in 2014³⁶), reduce their poverty (from a headcount of 72.5%³⁷), and improve human development (now at the bottom of the world ranking, with an HDI score of 0.433³⁸). Making such a U-turn is however hardly straightforward.

Which Mining Policy can increase the chances of success? A first road that can be taken is the one of Large Scale Mining. With its capital-intensive production process, LSM can be highly productive, thus quickly turning mineral deposits into cash. Although LSM production cannot directly contribute much to poverty reduction through employment creation, it can do so indirectly, through forward and backward linkages with other economic activities. In addition, the cash generated can be taxed by the government, and contribute to its public poverty-reducing expenditures, be it in the area of health and education, or infrastructure. In theory, LSM can thus be poverty-reducing, and because of its high levels of productivity, it is often considered as the first-best road to take.

In practice, it is however very difficult to realize this poverty-reducing potential. This is so for various reasons. First, LSM does not easily give rise to forward and backward linkages in a context of overall low development and poor infrastructure. Second, in a context of poor governance, the contribution of LSM to government revenue may remain modest; not only because of corruption and mismanagement by public officials, but also because an advantageous fiscal regime needs to be offered to private companies to compensate for the uncertainties that such a context implies. Thirdly, the natural resource rents that reach the government budget are notoriously volatile (among others because of fluctuating world market prices), such that the burden to balance the budget falls on public expenditures. This situation is far from ideal in a country with a huge immediate need for education, health, and basic infrastructure to reduce poverty and diversify its economy.

It is therefore highly uncertain if LSM will contribute to poverty reduction in DRC. Moreover, given that LSM crowds out artisanal mining – thereby destroying far more jobs than it creates – it may even increase poverty, certainly in the short run and in local mining communities. Compared to LSM, ASM has a much lower productivity, and is more difficult to be taxed by the central government; it scores far better on direct poverty-reduction however. To maximize the chances of turning its resource curse into a blessing, the DRC should stop sidelining ASM, but instead address its weaknesses (low productivity and tax evasion) and promote its strengths (poverty reduction). This can be done for instance by formalizing ASM, and providing support to its actors, e.g. in terms of infrastructure but also in terms of access to saving devices.³⁹

[35] DRC's untapped deposits of raw minerals are estimated to be worth US\$24 trillion, or the equivalent of the combined annual GDP of Europe and the United States (UNEP, 2011).

[36] WDI, 2015; PPP, constant 2011 international \$

[37] UNDP, 2015, <http://hdr.undp.org/en/countries/profiles/COD>

[38] UNDP, 2015, <http://hdr.undp.org/en/countries/profiles/COD>: the DRC is ranked 176 out of 188 countries.

[39] The current Mining Code envisages such a formalization process by requiring artisanal miners to form cooperatives, which can apply for research and exploration permits in AEZs, and should allow for a transition towards small-scale mining (which differentiates itself from ASM in that it requires a minimum of fixed installations and relies on a semi-industrial production process (2002 Mining Code, Title 1, Chapter 1, Article1)). The accompanying Mining Regulations further specify rules which are supposed to deal with ASM's other weaknesses (e.g. poor working conditions, health risks and environmental issues). The creation of such cooperatives is however hindered by financial and bureaucratic hurdles (Geenen and Radley, 2014). Moreover, for such a reform to work, artisanal miners should be incentivized to join cooperatives, e.g. by making it easier for cooperatives to obtain access to credit or receive material and technical assistance for instance, measures which are currently absent. Geenen (2012) and Geenen and Radley (2014) have further argued that, rather than creating new top-down imposed structures, a governance reform of ASM should be based on locally-developed governance systems – building for example on the existing trust network and credit relationships between pit managers and mineral traders.

Concurrently, the DRC should keep accommodating LSM because of its strengths (high productivity and fiscal potential), but address its weaknesses (profit repatriation, disconnectedness from the local economy, and high-level corruption). This can be done for instance by adhering to the highest (international) transparency standards, designing a clever and mutually acceptable fiscal regime (see e.g. Shafaie, 2016), and by actively promoting forward and backward linkages.

Before ASM- and LSM- specific policies can be optimized, the DRC first has to strike the right balance between the two modes of production. The transition from ASM to LSM is still in a relatively early phase. DRC's government should therefore quickly re-engage with artisanal miners, LSM companies and civil society, to define a mining policy that can lead to a mutually satisfactory co-existence between both production modes. This report offered an analysis that can inform such a policy discussion, because it gives insight into the profile of artisanal miners and the ways they may or may not cope with the rise of LSM. To the best of our knowledge, our analysis is the first of its kind that is based on a representative sample of artisanal miners at a mining site in Eastern DRC.

We looked at the case of Kamituga, a mining site that is entirely located on three exploitation permits owned by the Canadian mining company Banro. The company is currently in the exploration phase, hoping to move to the production phase in the (near) future. Between 13,000 – 15,000 artisanal miners are however (illegally) operating in its concessions. Based on a structured survey we analysed the profile of the miners and investigated what drives them to be engaged in ASM. We further investigated their coping mechanisms in the face of LSM development: relocation, reorientation and confrontation.

Regarding the profile of miners, our findings indicate that a typical miner in Kamituga is in his thirties, has about 10 years of experience in mining, and has invested in housing, which he shares with a partner and children. For the majority of miners, mining is the only source of income. The lack of other options as well as the hope to find a large quantity of gold are most often mentioned as reasons to take up mining. Almost none of the miners wishes his children to follow in his footsteps, because mining is a hard and dangerous profession, and lucky strikes are rare. Nearly all miners in our sample have been exposed to violent conflict events, and an estimated 3% to 6% has participated themselves in the activities of armed groups.

Regarding the first coping mechanism – relocation – we find that the majority of miners in Kamituga are highly reluctant to migrate, and only willing to do so if they can remain within the same Chefferie. Such a relocation is however constrained, because legal access to productive Artisanal Exploitation Zones is quasi non-existent. Regarding reorientation, about a third of the miners indicates that working for Banro would be an attractive alternative. Others find small-scale commercial activities and technical professions more appealing. To qualify as attractive alternatives, the return on these activities should exceed miners' reservation wage, which on average lies somewhere between \$5 and \$10 per day. This may not be straightforward. Most of the miners are poorly educated, and have little or no professional experience outside of mining. In addition, a frequently mentioned concern by miners is that "everyone in Kamituga is a gold digger", making them wonder who will be able to pay for their non-mining services if the gold from artisanal mining is no longer fuelling the local economy. Finally, regarding a potential (violent) confrontation between ASM and LSM, our findings indicate that – if miners are faced with little alternative options – the tensions between ASM and LSM may give rise to (re)new(ed) conflict situations. We draw this conclusion based on the self-reported answers of miners, but also based on the observation that LSM threatens an important livelihood strategy of many

young men, who have families to support, and who have been exposed to violence in the past (mostly at victims, but also as actors).

Given these coping mechanisms, and their limitations, what is the scope for policy measures?

Regarding relocation, more AEZs need to be created, ideally in the near vicinity of locations where currently large numbers of artisanal miners operate. AEZs that are located further away will attract only a particular subset of miners. Furthermore, geological research should assure the AEZs' viability for artisanal mining.

Two options to create additional space for ASM are currently being explored. First, civil society organizations are lobbying with the Mining Registry to recuperate “dormant titles”. According to the Mining Code, an exploration permit is “dormant” if the holder has not started exploration activities within four years or if the license has not been renewed. When a dormant title is renewed, the holder automatically relinquishes 50% of the perimeter.⁴⁰ The hope is to convert some of these “dormant areas” into AEZ, but so far this hope has not materialized. A second, more interesting option from the point-of-view of artisanal miners, is to create “ASM-tolerated” zones within mining concessions of LSM companies. As industrial and artisanal mining typically target different deposits, it can be possible to identify areas that are less suitable for industrial mining but still interesting for ASM: e.g. while it may be uneconomical for LSM companies to exploit areas with lower grade minerals, it may be profitable for artisanal miners who face lower operating costs and overhead (World Bank, 2010). At the mining site of Luntukulu (located in the territory of Walungu – South-Kivu), for example, two cooperatives of artisanal tin and tungsten miners are operating in another set of Banro’s exploitation permits. The current Mining Code, however, does not allow ASM and LSM to take place within the same concession.⁴¹ Yet, for about 43% of miners, being allowed to continue artisanal mining in selected mining sites of Kamituga is the preferred solution to relieve ASM-LSM tensions. At its Twangiza concession, Banro recently stated the will to free up gold deposits in order to reposition artisanal miners who are resisting to leave zones which are interesting for LSM development. The repositioning is, however, “*subject to addressing certain legal requirements that arise in the context of small scale and industrial mining taking place on the same mining permits*” (Banro, 2014a).⁴²

Regarding reorientation, the task is daunting and a concerted effort of private and public partners is needed; not only to provide miners (and their family members) with start-up capital and training, but also to make sure that actions are coordinated and that complementary investments are made to increase the return on individual economic activities in the non-mining sector. In our interviews, miners have expressed that they expect Banro to organize professional- and business training, as well as provide financial assistance during the start-up phase of a new activity. In addition, it is expected that Banro invests in public goods such as schooling, healthcare and infrastructure. These expectations may be unrealistically high: accommodating Kamituga’s population and its large number of artisanal miners largely surpasses the capacity and responsibility of a private company. Realizing this, Banro has teamed-up with a large donor (USAID) to address the challenge. Specifically, their partnership will be “*designed to support economic opportunities for artisanal miners and community residents and*

[40] DRC Mining Code 2002, Title 3, Chapter 1, 61-62.

[41] DRC Mining Code 2002, Title 2, Chapter 2, Article 30.

[42] In April-May 2014, the Congolese Ministry of Mines and BGR conducted an audit of the artisanal mining cooperatives at Luntukulu within the framework of CTC certification (Certified Trading Chains). One of the critical reasons not to award the cooperatives with certification was the fact that they don’t have any legal basis to operate in Banro’s concession (Teschner, 2014).

to help reposition artisanal miners in sustainable mining activities or alternative livelihoods” (Banro, 2014a).⁴³ Given the daunting task, and the importance of the overall socio-economic climate for the reorientation to succeed, it would be opportune to involve the local, provincial and national governments in this public-private partnership initiated by USAID and Banro. The current Mining Code requires a retrocession of mining royalties to the local (15%), provincial (25%) and national governments (60%).⁴⁴ If effectively paid, such royalties and taxes could imply considerable injections of cash, which – if managed properly – could provide communities with the necessary financial leverage to promote alternative livelihoods, not only for miners, but also for their family members and dependents. The latter is a strategy put forward by OGP (Observatoire Gouvernance et Paix, a local NGO) after observing that many miners are reluctant to quit their mining activities. Promoting non-mining activities of their family members is an alternative way of supporting coping mechanisms for miners’ households.

Taking positive action to enable miners’ successful relocation and reorientation will come a long way in avoiding violent confrontations between ASM and LSM. But, the process will not be easy, and will require considerable planning, mediation and negotiation, which should not entirely be left to non-state actors. As the introduction pointed out, the Congolese government is eager to sell LSM companies the rights to exploit mining concessions. Yet, they have so-far remained largely absent from the mediation of socio-economic relationships between the companies and the artisanal miners living and operating in these concessions. Their involvement is, however, key. Although state capacity is extremely low, the involvement of state-actors is crucial to counter the already visible “retreat of the state”, and to make sure that the state effectively takes up its roles – now and in the future – of negotiating social peace and providing services to its population.

[43] Although the partnership was announced on December 17, 2013 (see <https://www.usaid.gov/news-information/press-releases/dec-17-2013-us-government-and-banro-corporation-partnership-responsible-minerals-trade>), nothing seems to have materialized so far.

[44] For precious metals, such as gold, the mining royalties are set at 2,5% of the sales value minus a number of deductible costs (DRC mining code 2002, Title 4, Chapter 3, Articles 240-242). As mentioned earlier, the Congolese government was trying to use the revision of the Mining Code as a leverage to increase its stake in industrial mining projects.

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