

Chapter 4. Informalization

Authors: Sara Geenen and Boris Verbrugge

Abstract: This chapter starts with an assessment of existing causal explanations for informality in gold mining. In industrial gold mining, informality is mainly a product of outsourcing and subcontracting, which are often explained as part of a business strategy aimed at efficiency gains. In artisanal and small-scale gold mining (ASGM), informality is typically treated as a product of marginalization within existing regulatory frameworks. These causal explanations pay insufficient attention to how informality impacts the mining workforce. We advance an alternative explanation, which builds on structuralist approaches to informality. This approach reveals how the informalization of gold mining, and the increased reliance on cheap and flexible labor, can alternatively be seen as a systemic response to rising cost pressures.

Keywords: Informal economy; Informalization; Gold; Gold Mining; Artisanal and small-scale mining (ASM)

Chapter 3 detailed how, in response to increased global demand, gold mining has expanded outside its historical core, into a range of new gold mining destinations. It concluded by drawing attention to the fact that in many of these new gold mining destinations, industrial gold mining exists alongside a growing number of ASGM-activities. This chapter zooms in on a second structural trend in the global gold production system, namely the persistence –and arguably the growing importance– of informality. In line with dualist visions of the gold mining economy (which were outlined in the introduction), informality is usually associated with ASGM, which tends to operate largely or even entirely outside existing regulatory frameworks. Yet informality is by no means limited to ASGM, as trends towards outsourcing and subcontracting now contribute to rising informality in industrial gold mining as well.

In the first section of the chapter, we provide an empirical description of ‘informal realities’ in global gold production, considering informality in mineral tenure and in the workforce. In the second and third section we zoom in on possible causal explanations for informality in industrial gold mining and in ASGM, respectively. In the case of ASGM, informality is typically perceived as a product of exclusion from broader systems of mineral resource governance, or as a form of resistance against this exclusion. In industrial gold mining, it is widely treated as a business strategy to increase efficiency, to gain access to specialized services and skills, and/or to deal with fluctuations in commodity prices. In both cases, these explanations fail to fully account for realities on the ground. Hence, we advance an alternative explanation, which builds on structuralist approaches to ‘informalization’, and draws attention to how capital seeks cheap and flexible informal labor to overcome recurrent crises of accumulation (see chapter 2). Seen from this perspective, the (partial and geographically unequal) informalization of gold mining can be seen as a second response (alongside global expansion) to the systemic challenges facing the global gold production (which were identified in chapter 3). Finally, in the fourth section, we re-evaluate the growing number of functional linkages between ASGM and industrial gold mining in light of this trend towards informalization.

1. Informal realities in global gold production

1.1. Informal and ambiguous mineral tenure

It is now widely recognized that governments tend to prioritize industrial mining when granting mining concessions, because it provides them with easy access to mineral rents (Banchirigah & Hilson 2009; Emel and Huber 2008; Geenen 2015; Hilson et al 2019). Yet this does not automatically imply that concession boundaries and mining titles are clear and undisputed. Aside from the ubiquitous land disputes between local communities and companies, conflicts also arise as mining companies are illegally encroaching on protected areas (Phillips 2001; Romero et al. 2012) or, probably even worse, as concessions overlap with protected areas – both being established by one and the same government (Armendariz-Villegas et al. 2015).

While industrial mining often has privileged access to mining titles, most ASGM across the globe (some estimates suggest seventy or eighty percent, see IGF 2017) operates without a permit and is not recognized by the government. Over time, many countries have put in place standardized legal frameworks that aim to provide ASGM with titles and hence with security of mineral tenure (Geenen 2012: 322). These efforts to formalize ASGM typically result from a combination of international pressures of international pressures (e.g. UNITAR and UN Environment 2018, World Bank 2019) and domestic considerations, with governments being motivated by a desire to deal with the social and environmental impacts of ASGM (Hilson & Maconachie 2017) or, arguably more importantly, to gain control over part of the benefit streams (Geenen 2012). At the same time, several chapters in this book (notably those on Peru and Ghana) elaborate how governments periodically revert to repressive techniques and even violence to expel 'illegal' miners from the sites where they are working (see also Geenen 2012, Ayelazuno 2014).

The impact of formalization has been highly uneven across regions and countries. In some places, formalization had at least some success. A country like Guyana, for instance, has a long history of tenure security for ASGM operators (World Bank 2019: 41). In Tanzania, a growing number of ASGM-activities are now taking place in areas covered by Primary Mining Licences (IIED 2017). Another example is Mongolia, where regulations endow a wide variety of ASGM-activities with varying degrees of formality. This makes it much easier for 'unregistered' operators to make an entry in the formal economy (World Bank 2019: 29). Yet in many other countries, the large majority of ASGM operations, including extraction, processing and trade, continue to take place within the informal realm. Significantly, even in cases where formalization is successful, it often focuses one-sidedly on the recognition of mineral tenure rights through the issuance of mining licenses or -permits, while overlooking the persistence of informality in the workforce (Fisher 2007; Verbrugge & Besmanos 2016).

1.2. Informal and flexible mining labor

Historically, gold mining has always relied on cheap labor, and not seldom on forced labor or migrant labor, such as in the Spanish colonies in Latin America (Yeager, 1995) or Portuguese Brazil (Russell-Wood 1977). Mining technologies were relatively rudimentary, and most of the gold was produced by panning or by hydraulic pressure. Russell-Wood estimates that a couple of thousand slaves were working in Brazil's Minas Gerais' gold mines in the early eighteenth century (idem: 65).

Yet as noted in chapter three, it was in South Africa where gold mining was first 'scaled up' to industrial levels. Underground shaft mining, which first emerged on the Witwatersrand goldfields, required a high input of manual labor. By 1910, every year more than 200.000 unskilled black migrant workers were brought to the Witwatersrand (Jeeves 1985). Remarkably, 64.000 workers were even imported from China between 1904 and 1907 (Kynoch 2003). These migrant miners mainly worked for small

companies and independent contractors who recruited and organized their own workforce (Crush et al. 2001: 6). The most common form of subcontracting was 'gang subcontracting', whereby teams or 'gangs' of workers were assigned a particular mining shaft. The rapid accumulation of capital by larger companies, however, stimulated vertical integration, and by 1920 the mining industry had forced most contractors out of business. After 1920 labor recruitment became centrally organized, through the Employment Bureau of Africa (TEBA). Labor was directly controlled by the mining corporations, and typically lived on-site in mine-owned compounds and villages. Only very specialized tasks, such as shaft-sinking continued to be contracted out to specialized firms (idem).

Yet since the 1980s, South African mining has again reverted to sub-contracting, this time not only for core functions like drilling and processing, but also for a whole range of non-core functions such as cleaning, catering, security and payroll management (Kenny and Bezuidenhout 1999; Webster and Omar, 2003). The crisis of the 1990s, which forced the mining industry to shed about 50 percent of its workforce, gave further impetus to subcontracting (Crush et al. 2001: 8). The percentage of subcontracted labor rose from three to ten percent between 1987 and 1994 (Kenny and Bezuidenhout 1999). Yet the late 20th century system of subcontracting differed fundamentally from that of the late nineteenth century, in that there had been a shift from gang subcontracting to labor brokering. The main consequences of this shift are the prevalence of short-duration, casual contracts, and the introduction of a third party, which dilutes the employer-employee relationship.

In addition to the return of subcontracting, many gold shafts that were abandoned as a result of the crisis have been taken over by artisanal miners or *zama zama*, who gain access via old portals or ventilation shafts, or reprocess tailings (Nhlengetwa and Hein 2015). Just like their counterparts in the early twentieth century they operate as 'gangs', with a clear division of labor among gang members. However, their activities come with important risks, as *zama zama* typically mine without safety equipment in abandoned and potentially dangerous shafts, which may cause collapse and pollution. For these reasons, combined with the fact that according to South African law they cannot work in abandoned concessions, *zama zama* are actively hunted by some local governments (Mhlongo et al. 2019). Yet even in industrial gold mines that are still operational, mining teams may bend the formal rules and engage in informal work arrangements. More precisely, Phakathi (2019) describes how unforeseen circumstances such as material shortages, mechanical breakdowns, or labor shortages force workers to 'make a plan', which may include working in areas that are marked as unsafe in order to reach production targets and ensure production bonuses.

Moving beyond South Africa, subcontracting and outsourcing are now ubiquitous in the global mining industry¹. Baartogtokh et al. (2018) demonstrate how as a result, some of today's mining giants have transformed into loosely integrated, flexible networks of equipment and service suppliers. In the not so distant future, the situation in the mining industry could even evolve towards 'extreme outsourcing', whereby "all the productive and economic processes have been outsourced through the formation of a stable but flexible network with global dimensions" (idem: 185). This is already happening in industries such as oil and gas, and in the pharmaceutical industry. Mining companies, however, have long been reluctant to outsource high-value functions such as exploration and ore extraction, as their sheer scale enabled them to develop the necessary capabilities in-house. One of the key reasons for the current trend towards subcontracting and outsourcing is the increased importance of 'big data', which requires the expertise of highly specialized firms (Buia et al. 2017). For instance, technology specialists are already helping mining companies to track and improve productivity in their processing

¹ **Outsourcing** "entails a long term relationship between supplier and owner, with a high degree of risk sharing", while **subcontracting** or contracting out "refers to work assigned to an outside supplier on a job-by-job basis" (Baartogtokh et al, 2018: 184).

plants by using the internet of things. As these technology specialists work for different mining companies, they collect invaluable data and algorithms, which they can aggregate and sell on to other clients (Buia et al. 2017). These specialized firms typically recruit a highly skilled workforce, and may offer attractive contracts and work packages. A recent report on new trends in mining by Deloitte (2018: 17) reported that “in the not too distant future, mining organizations will be able to post available work shifts online and enable employees to use a mobile application to choose the shifts they prefer to work. In this way, mining companies could attract a more diverse workforce, while giving frontline workers greater freedom to manage their careers”.

Yet at the other end of the spectrum, such hyper-flexibility and the accompanying rhetoric about ‘freedom’ might conceal increasing precarity for particular groups of workers. Aside from their reliance on specialized firms with high-skilled workers, companies are also relying on small labor contractors to recruit semi-skilled or unskilled manual workers. These contractors can be flexibly mobilized when needs arise (e.g. during the construction of a mine), but they are also useful to control labor and to handle dismissals when workers become redundant. Nowadays, so-called local content requirements have become extremely popular as a way to ensure local spill-over effects from foreign mining investment through the creation of local employment (White 2018). However, such arrangements may turn out to benefit local political and economic elites, while creating jobs that are precarious and underpaid (Geenen 2019, Radley 2019). As will be demonstrated in the next section, this growing gap between high- and low-skilled-, and between permanent and casual labor, produces segmented labor markets.

1.3. Precarious work and segmented labor markets

Work in mining is increasingly precarious, meaning that workers lack stability, job security and social benefits. As will be elaborated below, the mining industry has historically been heavily unionized and has been a hotbed for worker mobilization and resistance. In several countries, mine workers were protected by labor legislation, social protection systems, and a range of union-sponsored mechanisms. Yet since the 1990s, this protection has been eroded, including in core countries such as Australia (Waring 2003, Bowden 2003), Canada (Roth et al 2016), where continuous cutbacks and restructuring have led to massive job losses, and an increased reliance on third party contractors. In the particular case of gold mining, we are faced with a wide variety of firms, including junior, mid-tier and major mining companies. Compared to major mining companies, which are being more closely monitored and have to adhere to international standards in terms of respect for human and labor rights, smaller and junior companies may be less inclined to do so (Dougherty 2015).

As a result of these trends, we have witnessed a segmentation of labor markets, with growing inequalities between permanent and contracted workers. This has been illustrated, among others, in the case of platinum mining in South Africa (Forrest 2015) and copper mining in Zambia (Kumwenda 2016), the DRC (Rubbers 2019) and Chile (Duran-Palma and Lopez 2009). Precarity is not restricted to contracted labor, but contracted labor is often more precarious than permanent labor. In many cases it offers lower pay, temporary contracts, unsafe working conditions, lower unionization and lower status (Kenny and Bezuidenhout 1999). Contract workers often do not receive fixed wages but bonuses calculated on the basis of measured output, which makes their earnings unpredictable (see also Crush et al 2001). Not only do wages and working conditions differ, contract and permanent workers are often also spatially segregated, with the former being perceived as ‘second class’ (Duran-Palma and Lopez 2009) or ‘a new underclass’ (Kumwenda 2016) (see chapter 2 on the valuation of labor). Kenny and Bezuidenhout (1999: 190) mention that they are housed in different hostels. In other cases permanent workers are offered housing in the company compound, while contracted workers commute from surrounding villages – this often being a result as well of requirements to recruit labor

locally (Geenen 2019). In many contexts, this segmentation between contract labor and permanent workers feeds into discontent and social mobilization (Manky 2014, Geenen 2019).

Precarity and inequality are by no means unique to industrial mining; they are also defining features of work in ASGM. In part, this precarity stems from the unpredictability of ASGM. Whether a mining project succeeds or not depends on a range of controllable (e.g., access to finance and technology) and non-controllable factors (e.g. climate conditions and geological characteristics), which instills in artisanal miners the sustained hope that one day they will strike it rich (Geenen 2018). The inevitable exhaustion of gold deposits, however, renders mining livelihoods precarious, although artisanal miners are also highly mobile and move along with new discoveries and ‘gold rushes’ (Bryceson and Geenen 2016). Work in gold mining can be dangerous, physically demanding, psychologically challenging, unhealthy and uncertain. Numerous reports – especially by NGOs and human rights organizations – have documented human rights violations, exploitative conditions and forced labour in artisanal mines, in the most extreme cases connected to brutal civil wars, like in Angola, Sierra Leone, Liberia and the DRC. At the same time, it is important to note that despite the slightly pessimistic undertone of many NGO-reports, ASGM also offers opportunities for social mobility and emancipation. Moreover, it is an activity that has low barriers to entry compared to many other livelihood activities (Bryceson and Geenen 2016). Yet like in industrial mining, inequalities are immense. While specific cases of labor organization are discussed in several chapters in the second part of this book, it is important to already highlight that there exists tremendous diversity within the ASGM-workforce, which translates into differences in working conditions and remuneration. Broadly speaking, the ASGM-workforce can be divided into a (in some cases higher-skilled) managerial class, (semi-skilled) mine workers, and (unskilled) site workers. The former include financiers and managers. Mine workers can perform specialized tasks, for instance in underground shafts or on dredges. Finally, site workers are often involved in the processing of ore or waste, or provide a broad range of services around the mining operation. This division of labor typically goes hand in hand with big differences in earnings. For instance, Geenen (2015) and Radley (2019) demonstrate how in the DRC, shaft managers may earn USD 900-1670 per month, while underground mine workers earn around USD 160, and ore crushers can hope to gain just USD 30-60.

Having empirically established that informality is ubiquitous not only in ASGM, but also in industrial gold mining, in the next section we turn to discussing possible causal explanations for these empirical realities.

2. The logic of informality in industrial gold mining

2.1. The dominant narrative: subcontracting and outsourcing as a business strategy

The preceding sections have demonstrated how, contrary to dualist images of the mining industry as a highly formalized sector, widespread tendencies towards subcontracting and outsourcing have blurred the distinction between formal and informal, notably in labor relations. As the example of South Africa made abundantly clear, this is by no means a new phenomenon. Yet since the 1980s, these trends have become more outspoken, to the extent that the mining industry as a whole has moved away from a vertically integrated-, towards a more network-like mode of mineral production. Mining companies now rely on a wide variety of specialized service providers and labor hire firms, to whom they subcontract specific tasks in the supply chain.

According to the business literature, motivations for subcontracting and outsourcing may range from gaining access to specialized services and skills, over cost efficiency, to the flexibility to adapt to seasonality and fluctuations in commodity prices. According to Baatartogtokh et al. (2018: 185), there has been a trend away from outsourcing as a pure cost-cutting strategy, over 'strategic outsourcing' of activities for which the company has no special capabilities, to 'transformational outsourcing', which is about building "flexible and adaptive" networks. As a result, mining companies concentrate on their 'core competencies' -however they decide to define them- while shedding off non-core activities to others. Some companies, for instance, find that exploration is part of their core business; while others decide to outsource this task and focus on management and financing only while leaving all exploration and mining work to contractors (Steenkamp and van der Lingen 2014).

2.2. An alternative explanation: informalization in industrial gold mining

In this section, we counteract this positive rhetoric about outsourcing and subcontracting as a matter of efficiency and flexibility. Instead, we advance an alternative explanation, seeing informalization as a structural response to the challenges outlined in chapter three. Specifically, outsourcing and subcontracting provide companies with access to cheap and flexible labor, and allows them to release labor control to more locally embedded actors and institutions.

2.2.1. Access to cheap and flexible labor

The expansion of informality in labor markets is certainly not limited to the mining industry, and mining companies have indeed been late adopters of flexible work arrangements. Moreover, there still exist opportunities for highly skilled and permanent positions with attractive working conditions in industrial gold mining. At the same time, the universal trend towards "precarious forms of work characterised by informal contractual arrangements for an increasingly casualised labor force" (Mezzadri 2010: 493) has undoubtedly reached the mining sector. It is the product of a deepening fragmentation of production along extensive supply chains, in which different types of firms – some operating on the brink of formality – intervene (Sassen 1997, Mezzadri 2010, Meagher et al. 2016).

Seen from this perspective, mining firms' increased reliance on third-party employment agencies and intermediaries to recruit labor is related to dilating disparities in labor demand: on the one hand there is a growing need for high-skilled workers with specific expertise; on the other hand there is demand for low-skilled, cheap and flexible labor that can be quickly mobilized and released as lead firms place their orders. As a consequence, there is less room for a labor market internal to the firm with on-the-job training, and less need for a permanent workforce. Most workers are hired on short term contracts and in part-time jobs, with employment agencies playing a crucial role in labor recruitment. In such a context, personal networks as well as institutions such as gender, ethnicity, age and caste become more important in facilitating access to jobs. This is clearly illustrated by Geenen's previous work on labor hire contractors in Ghanaese and Congolese gold mines (Geenen 2019).

2.2.2. Labor control and local embeddedness

Authors like Alessandra Mezzadri (2010) have shown that not only recruitment, but also labor control has shifted from the firm to the household, community or small production units. Mezzadri asserts that the logic of global outsourcing is not to strengthen control by the lead firm, as a mainstream Global Value Chain perspective would hold, but on the contrary to "release labor control altogether, and externalize the resolution of the 'problem' of labor control to production sites, increasingly located in developing countries" (idem: 497). She argues that the state plays an important role in condoning, or even encouraging such processes, so as to shed off its own responsibilities towards labor.

In line with this argument, critical scholars have indeed contended that outsourcing and subcontracting are primarily used as strategies to defy labor legislation and to dismantle the powerful position of

unions (Duran-Palma and Lopez 2009, Roth et al. 2016). Industrial mining labor has traditionally been heavily unionized, as was the case in Canada (Roth et al. 2016), the UK (Wallis et al. 2000) and South Africa (Klerck 1994, Crush et al. 2001). This has translated in robust collective agreements and relatively well-paid mineworkers. But despite a few cases of unions successfully resisting or renegotiating subcontracting arrangements (Cotton and Royle 2014 on coal in Colombia, Many 2014 on copper in Chile and Peru, Lee 2009 on Zambia), union membership is declining all over the world and the position of unions is increasingly threatened. Instead, labor control is shifted on to small production units operating at the margins of the law. In Colombia, small groups of five to 20 workers can create a 'cooperative' to carry out specific functions for companies. In 2007 there were an estimated 3000 such organisations in place, covering an estimated 400.000 workers (Cotton and Royle, 2014: 6). Because of their cooperative status, these organizations are not covered by the Labour Code, allowing for a downward pressure on wages, working conditions and labour rights. At the same time, such smaller units are often well embedded in local societies, which may grant them some legitimacy, and may provide workers and dependents with alternative social safety nets.

It is precisely this assumption that leads mining companies to pride themselves on their 'localization' and 'local content' policies, referring to the local recruitment of goods, services, and workers. This is commonly justified as a way to solidify industrial mining's positive impact on local development. Yet as argued before, in reality it opens up opportunities for elite capture, corruption and clientelism (Geenen 2019). Taking an arguably more sceptical view, local content may also be considered as a pure risk-mitigating strategy. Employing locals and contracting local suppliers may be one way to secure a social license to operate. In this sense it may provide an answer to the challenge of social resistance against industrial mining projects (see chapter three).

3. The logic of informality in ASGM

The unrelenting expansion of ASGM (illustrated in chapter 3) presents a challenge for policy-makers, development practitioners and scholars alike, not least because of its far-reaching impact on the environment and society. In this section, we will first summarize existing causal explanations for the expansion of ASGM as a predominantly informal activity, before pointing out their shortcomings and presenting an alternative explanation.

3.1. Three dominant narratives

3.1.1. Poverty-driven

While some of the initial scholarly work on ASGM set out to contest a romanticized 'get rich quick' narrative that depicts small-scale miners as adventurers and as opportunists that want to earn easy money, this idea is now largely redundant among experts. Instead, the get rich quick narrative has been replaced with a different narrative, which emphasizes the poverty-driven character of ASGM. Case studies from a growing number of countries –mainly but not exclusively in Sub-Saharan Africa– have demonstrated that agricultural poverty (Hilson & Garforth 2013) is pushing people into ASGM, whose "barriers to entry remain low enough that anybody with a strong back and the need for income can enter the labor force" (Siegel & Veiga 2010: 277). While the causes of this poverty are diverse, the ASGM-literature contains numerous references to the adverse impact of structural adjustment (Hilson & Potter 2005), and in some cases of armed conflict (see e.g. Perks 2011 on DRC; Hilson & Van Bockstael 2012 on Liberia), on rural livelihood systems.

This poverty-driven argument is reminiscent of longstanding dualist views of the informal economy, which treat the latter as a subsistence safety net in times of crisis, and as a refuge for those without meaningful formal sector employment. Similarly, ASGM has been described as an 'informal safety net'

(Aizawa 2016) for a growing army of unemployed “in a landscape devoid of formal sector job opportunities” (Hilson & Osei 2014: 83).

3.1.2. Legal exclusion

While the expansion of ASGM is thus widely perceived as a bottom-up response to poverty, persistent informality is seen as a product of flaws and imbalances in existing systems of mineral resource governance.

First, several observers have drawn attention to problems with existing formalization frameworks, which are often overly bureaucratic and expensive (Geenen 2012; Hilson 2013; Maconachie & Hilson 2011; Tschakert & Singha 2007; Van Bockstael 2014). The prevailing sentiment in many countries is captured by Banchirigah’s comments about the Ghanaian situation (2008: 29): “Although the government has long legalised ASM, requiring prospective applicants to follow a series of streamlined regulations to obtain a concession, ineffective policies and bureaucratic inefficiency have impeded formalisation, making illegal activity more appealing”.

Second, in addition to bureaucratic hurdles, concerns have been raised over elite capture of the formalization process, which often benefits those with the necessary financial capital and political connections. For instance, both in the Southern Philippines (Verbrugge & Besmanos 2016) and in the Eastern DRC (de Haan & Geenen 2016), the cooperatives that are at the heart of the formalization process are dominated by politically well-connected elites, rather than miners themselves.

Third, and more fundamentally, existing mining policies favor industrial mining over ASGM. As noted earlier, governments in many new gold mining destinations have put in place investor-friendly mining regimes as part of a broader agenda of neoliberal policy reform. In several of these countries, the formalization of ASGM was a ‘legislative afterthought’, introduced long after mining companies had succeeded in monopolizing formal mining rights (Banchirigah & Hilson 2009; Hilson 2016; Hilson et al. 2017). As Mutemeri et al. (2016: 654) correctly point out, the prevailing legislative paradigm for ASM is a narrow bureaucratic straitjacket of authorizations and permits. It applies a ‘scaling down logic’ by merely mirroring the provisions made for large-scale mining on a smaller scale: smaller areas and shorter validity of permits, limited depth of exploitation, and less rigorous health, environment and safety requirements (idem). Yet these regulations are often ill-fit to the contexts and the types of operations. As a result, ASGM often finds itself operating illegally inside company concessions, where it is constantly at risk of dispossession by rights-wielding companies and the state forces that are protecting these rights. In several cases, this situation has led to open conflicts between mining companies and ‘illegal miners’ (Carstens & Hilson 2009).

This narrative of legal exclusion is reminiscent of legalistic approaches to the informal economy (which were discussed in chapter 2), which emphasize how various fiscal and regulatory barriers prevent the entry of informal operators into the formal economy. In the particular case of gold mining, industrial mining companies also resemble De Soto’s ‘mercantilist’ elite, which uses the powers of the state to safeguard its economic interests.

3.1.3. Small is beautiful

A third narrative does not refute the two preceding narratives, but criticizes them for being overly deterministic, and for failing to account for the agency of ASGM-operators (Lahiri-Dutt 2018a). Rather than simply responding to poverty, it is argued that ASGM-operators are actively shaping their own environment. A clear example of this narrative is Lahiri-Dutt and Dondov’s (2016) description of the situation in Mongolia, where nomads are not only “(re)adjusting their livelihoods through informal mining to cope with the variety of transitions triggered off by processes put in place by state policies”,

but are also “stepping up to seek a share of the mineral resource wealth that the state is promising to the international investors”. Another illustration is Lahiri-Dutt’s earlier work on India, in which she describes informal mines as ‘people’s mines’ that “reflect the efforts of communities to re-establish rights over local natural resources” (Lahiri-Dutt 2004: 131). Commenting on the Ghanaian situation, Bush describes ‘illegal’ *Galamsey* mining as “a strategy of resistance to state mining policy and foreign company operations”, which provides “an alternative to commoditization of land and gold production and a greater distribution of the benefits from mining than is currently offered by state and corporate control of gold mining” (Bush 2009: 57).

This third narrative resonates with a tendency in post-colonial (urban) studies to treat informality as a form of subaltern politics; as a form of resistance against the post-colonial and neoliberal state (Kudva 2009; Varley 2013). It also bears a striking resemblance to agrarian populist narratives about smallholder agriculture. Indebted to the work of Soviet economist Alexander Chayanov (1966), agrarian populism emphasizes the moral superiority of peasant communities, which are structured around norms of reciprocity and social justice, and are said to provide an ideological antidote to the spread of capitalism (Scott 1976).

3.1.4. The shortcomings of existing causal explanations

All three narratives convey an important message about ASGM: just as there should be no doubt that the majority of those involved in ASGM are driven by poverty, there exists broad consensus that existing legal frameworks favor industrial mining over ASGM. And while global forces are undoubtedly constraining the agency of individuals involved in ASGM, it is important to recognize that they are still actively shaping their own lives. Yet all three narratives also have important shortcomings, and share a tendency to over-simplify the ASGM-phenomenon as the marginalized section of a dual gold mining economy (see introduction to this book). First, the chapters in the second part of this book make abundantly clear that many ASGM-activities have now moved (far) beyond subsistence level, and involve substantial investments that enable the use of modern technology. Secondly, as demonstrated by the chapters on the Philippines, Brazil and Ghana, among others, in a growing number of cases ASGM now operates with some form of (be it tacit and/or local) government recognition. Thirdly, these explanations fail to account for the persistence of informality in labor arrangements –even in cases where ASGM is fully formalized (Verbrugge & Besmanos, 2016).

The different causal explanations for ASGM-expansion outlined above were mostly developed on the basis of case studies of particular countries. In so far as global forces are taken into account, the emphasis tends to lie on how the detrimental impact of structural adjustment on rural livelihoods, combined with soaring gold prices, is driving people into ASGM. In this sense, Lahiri-Dutt has a point when she claims that ASGM-operators are often seen as passive victims of globalization. Overall, a picture emerges of ASGM as a residual phenomenon, located at the margins or even outside the global capitalist economy.

3.2. An alternative explanation: ASGM-expansion as informalization

What we argue here is that rather than being simply a bottom-up response to poverty or exclusion, the expansion of informal ASGM –just like outsourcing and subcontracting in industrial mining– can be seen as a systemic response to the systemic challenges facing global gold production that were identified in chapter 3. In what follows, we demonstrate how the expansion of ASGM responds to each of these challenges: scarcity, costs, and resistance.

3.2.1. Access to deposits that are unattractive for industrial mining

ASGM-activities often target deposits that are not interesting to industrial gold mining, because they are “too small, too ‘ribbonlike’, too scattered, too shallow or too remote for large-scale mechanised

operations” (Lahiri-Dutt 2018b: 12). This observation is confirmed by several of the chapters in the second part of the book. For instance, in his chapter on Zimbabwe, Mkodzongi (this volume) observes that compared to its bigger neighbor South Africa, Zimbabwean gold deposits are generally smaller and shallower, making them less attractive for industrial mining, but all the more attractive for ASGM. The fact that industrial mining and ASGM often target different types of deposits also helps to explain why in some cases, they are able to co-exist (Geenen 2015; Luning & Pijpers 2017). By tapping into gold deposits that would otherwise be left untainted, ASGM provides a partial and temporary response to the problem of scarcity.

3.2.2. Access to cheap and flexible labor

ASGM-expansion also provides a response to rising production costs. Due to the fact that ASGM operates largely or even entirely outside of existing regulatory frameworks, it avoids the costs associated with fiscal and environmental regulation. Arguably more importantly, ASGM relies on the use of flexible informal labor, and therefore does not have to adhere to existing labor regulations (Verbrugge 2015b). It typically operates through complex revenue-sharing arrangements that bring together workers and financiers, but in some cases also landowners, customary and/or statutory authorities, and various other rent seekers (e.g. Cleary 1990, Fisher 2007, Geenen 2015). These revenue-sharing arrangements are often seen as legitimate, and may well create opportunities for social mobility, which helps explain why ASGM is so appealing in a depressed rural environment (Bryceson & Geenen 2016). At the same time, they allow capital to outsource financial risk to the workforce (Godoy 1988).

Moreover, as discussed above, in addition to the semi-skilled workforce that forms part of these sharing arrangements, there is often a casual and unskilled workforce that is engaged in unrewarding, dangerous or unhealthy work (e.g. in carrying, crushing or processing gold ores). Significantly, several of the chapters in this book (notably those on Burkina-Guinea, Indonesia and the Philippines) indicate that the ongoing trend towards more capital-intensive and more technologically advanced ASGM often goes hand in hand with the emergence of more exploitative labor arrangements.

Seen from this perspective, ongoing formalization efforts that focus squarely on the issuance of mineral tenure rights to ASGM-operators miss a critical point about ASGM, namely that it relies on cheap and flexible informal labor. As a result, even where it is formalized, exploitative labor arrangements may remain intact, or may even become even more exploitative. In short, government efforts to formalize ASGM paradoxically respect the logic of informalization.

3.2.3. Local embeddedness

Finally, ASGM can more easily avoid the socio-political challenges that industrial mining faces. For one, its informal character makes ASGM less sensitive to regulatory volatility. While ASGM is not immune for government interference –as illustrated by the DRC’s and Ghana’s mining bans (Geenen 2012, Pijpers and Crawford & Botchway in this volume), or recent attempts by the Peruvian government (Cortés-McPherson, this volume) to forcefully eradicate ASGM– government control tends to be much more limited, and the impact of regulation is therefore undetermined (Côte & Korf 2018). This also helps to explain why even well-intentioned formalization efforts rarely reach their stated objectives.

At the same time, while there may well exist tensions between ASGM-operators and surrounding communities (Grätz 2004), opposition to ASGM tends to be less widespread. Instead, it often enjoys broad support from local residents, because it offers ample employment opportunities, and provides ample rent-seeking opportunities to local powerbrokers (Le Billon 2004). While in some cases –and in line with an influential argument in the literature on conflict minerals– this may lead to conflict over ASGM-rents, in other cases we have seen the emergence of ‘shadow networks’ composed of various

state and non-state actors that coalesce around informal mining (Duffy 2007; Verbrugge & Adam 2016). This also explains why even in cases where ASGM is purportedly 'illegal', state actors often implicitly or explicitly condone its presence, and may even engage in regulatory acts that legitimize its presence. And while ASGM often lacks formal mining rights, it tends to be much more in tune with existing land tenure arrangements (Geenen & Claessens 2013, Nyame & Blocher 2010, Verbrugge, Cuvelier & Van Bockstael 2015). In short, where industrial gold mining usually relies on the national government and its agent to gain and maintain access to gold deposits, ASGM tends to be deeply entangled with local socio-political institutions.

These observations about ASGM being less sensitive to government interference, and being better equipped to overcome local opposition, are confirmed by several chapters in this book. Both in Brazil (De Theije, this volume), Zimbabwe (Mkodzongi, this volume), and the DRC (Geenen and Marijsse, this volume) industrial gold mining struggles to gain a foothold, not only due to a challenging geology, but also due to a hostile political context. Meanwhile in all three countries, ASGM fits in with cultural repertoires concerning post-colonial liberation (Zimbabwe), hard-working self-made men (Brazil), and an ability to "fetch for oneself" (the DRC). In addition to this embeddedness in cultural repertoires, virtually all of the chapters in the second part of the book suggest that local elites become intimately involved in ASGM, providing them with clear incentives to tolerate or even support its further expansion.

4. Informalization through connectivity

So far, our empirical description of-, and our causal explanations for informality in gold mining have neatly distinguished between ASGM and industrial gold mining. Yet in a growing number of instances, as pinpointed in the introduction to this volume, this distinction is becoming increasingly difficult to uphold, either because companies are involved in 'ASGM-like' activities, or because of functional linkages that connect ASGM to mining companies. In Katanga province in the DRC, for instance, ASGM-cooperatives may be hired by companies, or companies hire ASGM-workers as day laborers through a labor broker (Rubbers 2019). In Colombia, companies are buying gold from ASGM through 'operation contracts' (Echavarría 2014). Similar arrangements are described in the chapters on Madagascar (Klein, this volume) and Zimbabwe (Mkodzongi, this volume), where we now find Chinese mining firms collecting tribute or buying gold from ASGM. In his chapter on the Philippines, Verbrugge (this volume) zooms in on the Acupan Contract Mining Project, which involves ASGM-contractors extracting gold that is subsequently processed and sold by a mining company. In all of these cases, the boundaries between industrial mining and ASGM, and between formal and informal gold mining, are becoming exceedingly blurred.

Just like the localization strategies mentioned above, such 'negotiated arrangements' (Verbrugge and Besmanos 2016) between industrial gold mining and ASGM can be perceived as part of the corporate social responsibility strategy of companies to deal with risks (Yakovleva and Vazquez-Brust 2018). They are even applauded by international institutions like the UN which, in 2009, published a guide entitled "Mining Together: Large-scale Mining meets Artisanal Mining". While this overly positive assessment of collaboration between ASGM and industrial gold mining is understandable in light of the long history of conflict, it conceals that it risks putting further pressures on the wages and working conditions of ordinary miners, by adding additional layers of rent-seekers (an essentially similar observation was made fifteen years ago by Chachage (1994) in the Tanzanian context). In the Acupan case in the Philippines for instance, workers are trapped in an exploitative and coercive labor regime, while their financiers, local elites, and particularly the mining company benefit disproportionately. In this way, negotiated arrangements between ASGM and industrial gold mining reflect, and arguably even extend, a logic of informalization in the global gold production system.

5. Conclusion

In chapter 3 we demonstrated that the gold production system responded to rising demand and increased scarcity by expanding into new gold mining destinations. In this chapter, we have drawn attention to a second systemic response: the informalization of gold mining. Contrary to reigning images of informality as a matter of flexibility (in the case of industrial gold mining) or exclusion (in the case of ASGM), it helps the global gold production system deal with rising scarcity, increased resistance, and most notably, with rising cost pressures. In line with trends in other sectors, the global gold production system is characterized by a persistent quest for cheap and flexible labor, while at the same time seeking to release labor control to local socially-embedded institutions.

While this chapter has focused on informality at the point of extraction, informality does obviously not end once gold leaves these sites. On the contrary, informality is a pervasive feature of all stages in the gold production network, which will be further documented in chapter 5. Looking at the gold production network as a whole, moreover, allows to see how gold 'flows in and out of formality' as it is sold and traded by small gold traders or big exporters, taken on commercial airplanes and sold to refiners or jewelers.

In many cases gold is traded through extensive networks of intermediaries, which may include officially registered as well as unregistered traders. Few academic studies - notable exceptions include Fold et al. (2014), Grätz (2004) and Geenen (2011, 2015) - have analyzed how the domestic trade in ASGM-gold is regulated, and how formal and informal spheres overlap. Even in cases where individual gold traders are licensed and pay official taxes, they often smuggle a considerable share of their traded gold illegally across the border. In the case of the DRC, for instance, 99.8 percent of gold is smuggled to neighbouring Burundi and Uganda. This can be explained by the way in which regional networks have historically grown, in combination with regulatory regimes that allow for lower taxes and consequent higher prices in these neighbouring countries (Geenen and Marijsse, this volume). In her chapter on Peru, Cortés-McPherson (this volume) zooms in on the shifting organization of the gold trade in Peru. For a long time, Peruvian gold was exported illegally from the country through commercial flights. When the Peruvian government intervened by imposing tougher airport controls, rather than a reduction in the illegal gold trade, we saw the emergence of clandestine cross-border trading networks within the Andean region, which were infiltrated by criminal elements. These observations are confirmed by reports that expose how the global trade in ASGM-gold intertwines with the drug trade (Miami Herald 2018), money laundering (Treanor 2019, Ebus & Kalkman 2019, and transnational organized crime (Global Initiative against Transnational Organized Crime 2016). Once gold is exported, while some of it will never reach official gold markets, research by civil society organizations (The Sentry 2018) and academics (Pieth 2019) has exposed highly sophisticated constructions that result in ASGM-gold ending up in major gold refineries, and being traded globally. We return to these observations in more depth in chapter 5.

References

- Aizawa, Y. (2016). Artisanal and small-scale mining as an informal safety net: Evidence from Tanzania. *Journal of International Development*, 28(7), 1029-1049.
- Armendariz-Villegas, E., Covarrubias-Garcia, M., Troyo-Diequez, E., Lagunes, E., Arreola-Lizarraga, A., Nieto-Garibay, A., Beltran-Morales, L. and Ortega-Rubio, A. (2015). Metal mining and natural protected areas in Mexico: Geographic overlaps and environmental implications. *Environmental Science and Policy*, 48, 9-19.

- Baartartogtokh, B., Dunbar, W.S. and van Zyl, D. (2018). The state of outsourcing in the Canadian mining industry. *Resources Policy*, 59, 184-191.
- Banchirigah, S. M. (2008). Challenges with eradicating illegal mining in Ghana: A perspective from the grassroots. *Resources policy*, 33(1), 29-38.
- Bowden, B. (2003). Regulating Outsourcing: The Use of Contractors on the Central Queensland Coalfields, 1974-2003. *Labor & Industry*, 14(1), 41-57.
- Bryceson, D. and Geenen, S. (2016). Artisanal frontier mining of gold in Africa: labour transformation in Tanzania and the Democratic Republic of Congo. *African Affairs*, 115(459), 296-317.
- Buia, C., Heyning, C. and Lander, F. (2017). *The risks and rewards of outsourcing*. McKinsey & Company.
- Bush, R. (2009). 'Soon there will be no-one left to take the corpses to the morgue': Accumulation and abjection in Ghana's mining communities. *Resources Policy*, 34(1-2), 57-63.
- Caballero, E. (1996). *Gold from the Gods: Traditional small-scale miners in the Philippines*. Quezon City: Giraffe Books.
- Carstens, J. and Hilson, G. (2009). Mining, grievance and conflict in rural Tanzania. *International Development Planning Review*, 31(3), 301-326.
- Chachage, C. (1995). The Meek Shall Inherit the Earth but not the Mining Rights: The Mining Industry and Accumulation in Tanzania. In P. Gibbon (Ed.) *Liberalised Development in Tanzania* (pp. 37–108). Uppsala: Nordiska Afrikainstitutet.
- Chayanov, A. (1966). *A.V. Chayanov on the Theory of Peasant Economy*. Madison: University of Wisconsin Press.
- Cleary, D. (1990). *Anatomy of the Amazon gold rush*. Berlin: Springer.
- Cordes, K.Y., Östensson, O. and Toledano, P. (2016). *Employment from Mining and Agricultural Investments: How Much Myth, How Much Reality?* Columbia Center on Sustainable Investment, Columbia University.
- Côte, M. and Korf, B. (2018). Making Concessions: Extractive Enclaves, Entangled Capitalism and Regulative Pluralism at the Gold Mining Frontier in Burkina Faso. *World Development* 101, 466-476.
- Cotton, E. and Royle, T. (2014). Transnational Organizing: A Case Study of Contract Workers in the Colombian Mining Industry. *British Journal of Industrial Relations*, 52(4), 705-724.
- Crush, J., Ulicki, T., Tseane, T. and Jansen van Veuren, E. (2001). The Rise of Sub-Contracting in South African Gold Mines. *Journal of Southern African Studies*, 27(1), 5-31.
- Damonte, G. H. (2016). The "Blind" State: Government Quest for formalization and Conflict with Small-Scale Miners in the Peruvian Amazon. *Antipode*, 48(4), 956-976.
- Dougherty, M. L. (2015). *By the gun or by the bribe: firm size, environmental governance and corruption among mining companies in Guatemala*. Chr. Michelsen Institute, U4 Issue Paper 2015:17.
- Duffy, R. (2007). Gemstone mining in Madagascar: transnational networks, criminalisation and global integration. *The Journal of Modern African Studies*, 45(2), 185-206.

- Duran-Palma, F. and Lopez, L. (2009). Contract labor mobilization in Chile's copper mining and forestry sector. *Employee Relations*, 31(3), 245-263.
- Ebus, B. and Kalkman, P. (2019) *Zo werden Curaçao en Aruba doorvoerhaven voor conflictgoud uit Venezuela*. De Correspondent. Retrieved 20/10/2019 from <https://decorrespondent.nl/9646/zo-werden-curacao-en-aruba-doorvoerhaven-voor-conflictgoud-uit-venezuela/4364915945390-86e763fd>.
- Echavarria, C. (2014). *What is legal? Formalising artisanal and small-scale mining in Colombia*. London: IIED, and Colombia: ARM.
- Emel, J. and Huber, M.T., (2008). A risky business: Mining, rent and the neoliberalization of 'risk'. *Geoforum* 39, 1393–1407.
- Fisher, E. (2007). Occupying the margins: labor integration and social exclusion in artisanal mining in Tanzania. *Development and change*, 38(4), 735-760.
- Fold, N., Jønsson, J. B. and Yankson, P. (2014). Buying into formalization? State institutions and interlocked markets in African small-scale gold mining. *Futures*, 62, 128-139.
- Forrest, K. (2015) Rustenburg's labor recruitment regime: shifts and new meanings. *Review of African Political Economy*, 42(146), 508-525.
- Geenen, S. (2012). A dangerous bet: The challenges of formalizing artisanal mining in the Democratic Republic of Congo. *Resources Policy*, 37(3), 322-330.
- Geenen, S. (2015). *African artisanal mining from the inside out. Access, norms and power in Congo's gold sector*. Routledge, Abingdon.
- Geenen, S. (2018). Underground dreams. Uncertainty, risk and anticipation in the gold production network. *Geoforum* (91), 30-38.
- Geenen, S. (2019). Gold and godfathers: local content, politics, and capitalism in extractive industries. *World Development*, 123. <https://doi.org/10.1016/j.worlddev.2019.06.028>
- Geenen, S., & Claessens K. (2013). Disputed access to the gold mines in Luhwindja, eastern DR Congo. *Journal of Modern African Studies*, 51(1): 85-108.
- Global Initiative against transnational organized crime (2016). *Organized crime and illegally mined gold in Latin America*. Retrieved 19/10/2019 from https://www.amazoniasocioambiental.org/wp-content/uploads/2016/04/2016_04_20_Global-Initiative-Organized-Crime-and-Illegally-Mined-Gold-in-Latin-America-April-2016-web_PDF.pdf.
- Godoy, R. A. (1988). Small-scale mining and agriculture among the Jukumani Indians, Northern Potosí, Bolivia. *The Journal of Development Studies*, 24(2), 177-196.
- Grätz, T. (2004). Les frontières de l'orpaillage en Afrique occidentale. *Autrepart*, (2), 135-150.
- de Haan, J., & Geenen, S. (2016). Mining cooperatives in Eastern DRC The interplay between historical power relations and formal institutions. *The Extractive Industries and Society*, 3(3), 823-831.
- Hilson, G. (2013). "Creating" Rural Informality: The Case of Artisanal Gold Mining in Sub-Saharan Africa. *SAIS Review of International Affairs*, 33(1), 51-64.

- Hilson, G. (2016). Farming, small-scale mining and rural livelihoods in Sub-Saharan Africa: A critical overview. *The Extractive Industries and Society*, 3(2), 547-563.
- Hilson, G. and Banchirigah, S. M. (2009). Are alternative livelihood projects alleviating poverty in mining communities? Experiences from Ghana. *The Journal of Development Studies*, 45(2), 172-196.
- Hilson, G. and Potter, C. (2005). Structural adjustment and subsistence industry: artisanal gold mining in Ghana. *Development and change*, 36(1), 103-131.
- Hilson, G. and Garforth, C. (2012). 'Agricultural poverty' and the expansion of artisanal mining in Sub-Saharan Africa: experiences from Southwest Mali and Southeast Ghana. *Population research and policy review*, 31(3), 435-464.
- Hilson, G., Hilson, A., Maconachie, R., McQuilken, J. and Goumandakoye, H. (2017). Artisanal and small-scale mining (ASM) in sub-Saharan Africa: Re-conceptualizing formalization and 'illegal' activity. *Geoforum*, 83, 80-90.
- Hilson, G. and Osei, L. (2014). Tackling youth unemployment in sub-Saharan Africa: Is there a role for artisanal and small-scale mining? *Futures*, 62, 83-94.
- Hilson, G. and Van Bockstael, S. (2012). Poverty and livelihood diversification in rural Liberia: exploring the linkages between artisanal diamond mining and smallholder rice production. *Journal of Development Studies*, 48(3), 413-428.
- IGF (2017). *Global trends in Artisanal and Small-scale Mining (ASM): A review of key numbers and issues*. Retrieved 5/10/2018 from <https://www.iisd.org/sites/default/files/publications/igf-asm-global-trends.pdf>.
- IIED (2017). *Artisanal and Small-scale Mining in Tanzania – Evidence to Inform an Action Dialogue*. Retrieved 7/5/2019 from <https://pubs.iied.org/pdfs/16641IIED.pdf>
- Jeeves, A. (1985) Migrant labor in South Africa's mining economy. The struggle for the gold mines' labor supply 1890-1920. Kingston and Montreal, McGill-Queen's University Press.
- Kenny, B. and Bezuidenhout, A. (1999). Contracting, complexity and control: An overview of the changing nature of subcontracting in the South African mining industry. *The Journal of The South African Institute of Mining and Metallurgy*, 185-192.
- Klerck, G. (1994). Industrial restructuring and the casualisation of labor: a case study of subcontracted labor in the process industries. *South African Sociological Review*, 7(1), 32-62.
- Kudva, N. (2009). The everyday and the episodic: the spatial and political impacts of urban informality. *Environment and Planning A*, 41(7), 1614-1628.
- Kumwenda, Y. (2016). *Casualisation of Labor in the Zambian mining industry with specific reference to Mopani Copper Mines Plc*. A research report submitted to the Faculty of Humanities, University of the Witwatersrand, in partial fulfilment of the requirements for the award of the of Masters of Arts Degree in Labor and Development, Economic Policy, Globalisation and Labor. Johannesburg, University of Witwatersrand.
- Lahiri-Dutt, K. (2004). Informality in mineral resource management in Asia: Raising questions relating to community economies and sustainable development. *Natural Resources Forum*, 28(2), 123-132).
- Lahiri-Dutt, K. (2018a). Extractive peasants: reframing informal artisanal and small-scale mining debates. *Third World Quarterly*, 39(8), 1561-1582.

- Lahiri-Dutt, K. (2018b). Reframing the debate on informal mining. In Lahiri-Dutt, K. (2018). *Between the Plough and the Pick: Informal, Artisanal and Small-scale Mining in the Contemporary World*. Acton: ANU press.
- Lahiri-Dutt, K. and Dondov, H. (2017). Informal mining in Mongolia: livelihood change and continuity in the rangelands. *Local Environment*, 22(1), 126-139.
- Le Billon, P. (2004). The geopolitical economy of 'resource wars'. *Geopolitics*, 9(1), 1-28.
- Lee, C.K. (2009). Raw Encounters: Chinese Managers, African Workers and the Politics of Casualization in Africa's Chinese Enclaves. *The China Quarterly*, 199, 647-666.
- Luning, S. (2014). The future of artisanal miners from a large-scale perspective: from valued pathfinders to disposable illegals? *Futures*, 62, 67-74.
- Luning, S. and Pijpers, R. J. (2017). Governing access to gold in Ghana: in-depth geopolitics on mining concessions. *Africa*, 87(4), 758-779.
- Mhlongo, S.E., Amponsah Dacosta, F., Muzerengi, C., Gitari, W.M. and Momoh, A. (2019). The impact of artisanal mining on rehabilitation efforts of abandoned mine shafts in Sutherland goldfield, South Africa. *Jàmbá: Journal of Disaster Risk Studies*, 11(2), 1-7.
- Miami Herald (2018). *Dirty gold, clean cash. A Miami Herald investigation*. Retrieved 19/10/2019 from <https://www.miamiherald.com/news/local/community/miami-dade/article194187699.html>.
- Nhlengetwa, K. and Hein, K. (2015). Zama-Zama mining in the Durban Deep/Roodepoort area of Johannesburg, South Africa: An invasive or alternative livelihood? *The Extractive Industries and Society*, 2, 1-3.
- Nyame, F. K. and Blocher, J. (2010). Influence of land tenure practices on artisanal mining activity in Ghana. *Resources Policy*, 35(1), 47-53.
- Okoh, G. A. (2014). Grievance and conflict in Ghana's gold mining industry: The case of Obuasi. *Futures*, 62, 51-57.
- Perks, R. (2011). 'Can I go?'—exiting the artisanal mining sector in the democratic republic of Congo. *Journal of International Development*, 23(8), 1115-1127.
- Phakathi, S. (2012). Worker agency in colonial, apartheid and postapartheid gold mining workplace regimes. *Review of African Political Economy*, 39(132), 279-294.
- Phakathi, S. (2019). *The Mining Teams' Tactic of Making a Plan: Advancing or Undermining Mining Capitalism?* Paper presented at the conference The Micropolitics of mining capitalism, University of Liège, 11-13 September 2019.
- Phillips, A. (2001). *Mining and protected areas. Mining, Minerals and Sustainable Development*. International Institute for Environment and Development.
- Pieth, M. (2019). *Gold laundering: the dirty secrets of the gold trade and how to clean up*. Sallis Verlag.
- Radley, B. (2019). The end of the African mining enclave? Corporate outsourcing, domestic firm marginalization and labour segmentation in the DRC. *Development and Change*, DOI: 10.1111/dech.12515.

- Radley, B. (2019). *Mining industrialization in the African periphery: disruption and dependency in South Kivu, DRC*. PhD Dissertation. The Hague: Institute for Social Studies.
- Romero, H., Mendez, M. and Smith, P. (2012). Mining, development and environmental justice in the Atacama desert of Northern Chile. *Environmental justice*, 5(2), 70-76.
- Roth, R., Steedman, M. and Condratto, S. (2016). *The Casualization of Work and the Rise of Precariousness in Sudbury's Nickel Mining Industry*. Labor Studies Program, School of Northern Development & Human Studies Program, Laurentian University, Sudbury, Ontario, Canada.
- Rubbers, B. (2019). Mining Boom, Labor Market Segmentation and Social Inequality in the Congolese Copperbelt. *Development and Change* 0(0): 1–24. DOI: 10.1111/dech.12531.
- Russell-Wood, A.J.R. (1977). Technology and Society: The Impact of Gold Mining on the Institution of Slavery in Portuguese America. *The Journal of Economic History*, 27(1), 59-83.
- Scott, J. C. (1976). *The moral economy of the peasant: Subsistence and rebellion in Southeast Asia*. New Haven: Yale UP.
- Seccatore, J., Veiga, M., Origliasso, C., Marin, T. and De Tomi, G. (2014). An estimation of the artisanal small-scale production of gold in the world. *Science of The Total Environment*, 496: 3–8.
- Siegel, S. and Veiga, M. M. (2009). Artisanal and small-scale mining as an extralegal economy: De Soto and the redefinition of “formalization”. *Resources policy*, 34(1-2), 51-56.
- Steenkamp, C.J.H. and van der Lingen, E. (2014). Outsourcing in the mining industry: decision-making framework and critical success factors. *The Journal of The Southern African Institute of Mining and Metallurgy*, 114, 845-854.
- The Sentry (2018). *The golden laundromat. The conflict gold trade from Eastern Congo to the United States and Europe*. Enough Project and Not On Our Watch (NOOW). Retrieved 18/10/2019 from https://cdn.thesentry.org/wp-content/uploads/2018/10/GoldenLaundromat_Sentry_Oct2018-final.pdf.
- Treanor, M. (2019). *Gold and money laundering*. *Money Laundering Watch*. Retrieved 18/10/2019 from <https://www.moneylaunderingnews.com/2019/04/gold-and-money-laundering/>.
- Tschakert, P. and Singha, K. (2007). Contaminated identities: Mercury and marginalization in Ghana's artisanal mining sector. *Geoforum*, 38(6), 1304-1321.
- Tubb, D. (2015). Muddy decisions: gold in the Chocó, Colombia. *The Extractive Industries and Society*, 2(4), 722-733.
- USGS (2012). *2012 Minerals Yearbook: Gold*. Retrieved 7/5/2019 from <https://s3-us-west-2.amazonaws.com/prd-wret/assets/palladium/production/mineral-pubs/gold/myb1-2012-gold.pdf>.
- Van Bockstael, S. (2014). The persistence of informality: Perspectives on the future of artisanal mining in Liberia. *Futures*, 62, 10-20.
- Varley, A. (2013). Postcolonialising informality? *Environment and Planning D: Society and Space*, 31(1), 4-22.
- Verbrugge, B. (2015a). The Economic Logic of Persistent Informality: Artisanal and Small-Scale Mining in the Southern Philippines. *Development and Change*, 46(5), 1023-1046.
- Verbrugge, B. (2015c). Undermining the state? Informal mining and trajectories of state formation in

Eastern Mindanao, Philippines. *Critical Asian Studies*, 47(2), 177-199.

Verbrugge, B. (2017) Towards a negotiated solution to conflicts between large-scale and small-scale miners? The Acupan contract mining project in the Philippines. *The Extractive Industries and Society*, 4 (2), 352-360.

Verbrugge, B. and Besmanos, B. (2016). Formalizing artisanal and small-scale mining: Whither the workforce? *Resources Policy*, 47, 134-141.

Verbrugge, B., Cuvelier, J. and Van Bockstael, S. (2015). Min(d)ing the land: The relationship between artisanal and small-scale mining and surface land arrangements in the southern Philippines, eastern DRC and Liberia. *Journal of Rural Studies*, 37, 50-60.

Wallis, E., Winterton, J. and Winterton, R. (2000). Subcontracting in the privatised coal industry. *Work, employment & society*, 14(4), 727-742.

Waring, P. (2003) The Nature and Consequences of Temporary and Contract Employment in the Australian Black Coal Mining Industry. *Labor & Industry: a journal of the social and economic relations of work*, 14(2), 83-96.

White, S. (2017). Regulating for local content: Limitations of legal and regulatory instruments in promoting small scale suppliers in extractive industries in developing economies. *The Extractive Industries and Society*, 4, 260–266.

Yeager, T. (1995). Encomienda or Slavery? The Spanish Crown's Choice of Labor Organization in Sixteenth-Century Spanish America. *The Journal of Economic History*, 55(4), 842-859.