



AN ETHNOGRAPHY OF INFORMAL ARTISANAL GOLD MINING IN JOHANNESBURG

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Executive summary

Informal artisanal gold mining (ASM) in Johannesburg occurs at the edge of the city; in material, physical and legal ways; rooted in the city's history and a product of its contemporary socio-economic complexities. This report provides an in-depth discussion of ASM in Johannesburg. Based on previous research conducted in 2013 by the ACMS, three months of ethnographic research in 2016, and dozens of interviews with miners, their families, mining communities and others involved in this sector of work; the main findings of the report are threefold: first that ASM is an important – but high-risk – livelihood strategy of the urban poor, especially cross-border migrants, and is wrought with legal and social restrictions that further compound the dangers that miners face in their work. Second, there are significant health, safety and wellbeing-related outcomes and conditions associated with ASM that are poorly understood. In particular, the rise of informal settlements in mining communities, the lack of adequate protection to workers in the sector, the criminalisation of ASM, and the disregard of environmental rehabilitation of mines collude to create a risky and dangerous environment for those living and working in and around the sector. Third, ASM is rooted in long-held beliefs and rituals that bring into question the ownership of natural resources, the structure of work teams and the organisation of labour. This anthropological aspect of ASM is poorly understood in both popular and academic discourse.

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1. Introduction

Artisanal small-scale mining (ASM) refers to the work of individuals and groups who mine for minerals using basic equipment, organised in small groups (ILO 2005). Informal ASM includes the absence of any permit to undertake mining, minimal use of safety equipment, and the selling of minerals informally. There is no firm data that allows us to quantify the extent of ASM (especially in South Africa), or to determine the profile of miners. Anecdotal data suggests that internal and international migrants may be involved in ASM in SA, that it constitutes an important livelihood activity for the urban poor, and that there are serious legal, safety, health risks associated with it (Jinnah and Munakamwe, forthcoming).

This report presents the findings of a collaborative pilot study between the ACMS and University of Edinburgh on informal artisanal mining in Johannesburg undertaken in 2016. Animated by the historical and local contexts of urban livelihoods, wellbeing and mobility, the study aimed to explore the lived experiences of informal miners in Johannesburg and place their narratives within broader political, social, economic and historical contexts, which shape the emergence and persistence of this form of livelihoods. In particular, the study investigates the following questions:

- What is the relationship between informal artisanal gold mining and health and wellbeing at an individual and community level?
- What are the work structure and labour conditions (types of tasks, hours of work, wages, risks) of miners in the study?
- What are the risks and responses associated with engaging in a livelihood activity that is both physically dangerous and legally criminalised?

- What is the relationship between migration and informal artisanal mining?

This report is structured into four sections. After this introduction, we present the conceptual and theoretical framework for the study. This is followed by a discussion of our methods, and the research sites. Finally, section four consists of the main findings of informal mining, organised around four key themes, namely: work structure; social realities; health; and mythology and beliefs on mining. We begin, however, with some brief context of gold mining in South Africa and ASM in general.

Gold mining

Gold deposits in Johannesburg form part of the Witwatersrand Basin, a geological basin stretching around 400 km from the Free State Province in the central interior of the country, to Gauteng and the North West in the north, and reaching 4000m in depth, making South African gold mines some of the longest and deepest in the world (CoM 2002). This area has been heavily mined over the last century, but gold reserves remain on the reef in significant deposits in both working and closed mines, some of which have been abandoned or are ownerless after gold mining companies closed operations.

Over the last decade, there has been a lowering of the international gold price and global demand, coupled with rising national labour costs, making gold mining less profitable in the country. In 1987, there were 65 active gold mines in the country; this dropped to 15 in 2015 (Geocouncil 2016). The issue of abandoned and ownerless mines is a sensitive one, where technically, government is responsible for securing and rehabilitating these mines, but has lacked the capacity to do so. It currently has contracted the council for geoscience and Mintek to compile a database of these mines before any further action can be taken. In practice, therefore, abandoned and ownerless mines remain just that: accessible to the public, and thus a risk to the health and safety of communities who live alongside

and on the mines. There is no clear authority tasked with securing the mines, and little resources to effectively enforce the necessary regulations on rehabilitation and safety.

Artisanal mining

Artisanal mining is an important source of livelihoods for the poor. It is estimated that globally, around 13 million people work directly in the artisanal mining sector, with a further 80 million who rely on it for income support (ILO 2015). The majority of artisanal mining occurs in the global South, where the availability of mineral resources, coupled with high unemployment and poverty, push many into this source of livelihood. Artisanal mining is associated with several challenges, including death and disability for miners who work under poor and risky conditions, with poor health outcomes, as a result of limited protection and awareness, a low level of regulation and labour protection, and environmental degradation.

In South Africa, industrial gold mining has been a significant source of employment and livelihood to thousands of regional households. Throughout the twentieth century, at least 40 percent of workers employed on South African mines originated from outside the country (Wetzel & Tlabela 2006). Due to significant transformation of the sector since the 1980s, and the introduction of the Mining Charter in 2004, in 2012, that figure has dropped to around 20% (TEBA 2012; Budlender 2013). Today mining continues to be a source of employment, where gold mining accounts for 124 000 direct jobs (QES 2014), with a further 800 000 estimated indirectly (Chamber of Mines 2013), contributing to around seven percent of the country's Gross Domestic Product (GDP) (Stats SA 2015).

Although these statistics are significant, there is a deeper narrative at play here. A parallel, and at times intersecting economy of informal mining has existed for decades across the world, (see for instance Summer's 1966 document on informal artisanal mining in Zimbabwe). Yet, little attention in South Africa has been paid to the historical and global connections of informal artisanal mining. Moreover, little attempt has been made to situate it within its contemporary economic and

political contexts. Instead, the overarching discourse on artisanal mining has been to criminalise it, with little understanding of the multifaceted dynamics of the sector, its role as a source of livelihoods, and its relation to social exclusion and labour market choice.

2. Conceptual framework and literature review

There is no globally accepted definition of ASM. Definitions, and therefore regulations, differ at the national level. We depart from this definition (MMSD 2002 315):

Artisanal and small-scale mining refers to mining by individuals, groups, families or cooperatives with minimal or no mechanization [sic], often in the informal (illegal) sector of the market.

Several definitions of artisanal mining highlight the following characteristics of work and workers in this sector (MMSD 2002:315), where it:

- is the mining of marginal or small reserves of minerals;
- is undertaken with rudimentary tools;
- operates in the grey economy;
- is labour intensive;
- involves miners have poor access to markets and support services; and
- involves minimal or adverse health and safety conditions.

For this study, we theoretically position artisanal mining within two frameworks, namely informal economy, and social exclusion. Chen's definition of the

informal economy resonates strongly with the form of artisanal mining we found. She identifies informality (2002: 4) as:

All forms of 'informal employment'—that is, employment without labour or social protection—both inside and outside informal enterprises, including both self-employment in unregistered enterprises and waged employment in unprotected jobs.

Thus, informal artisanal mining involves all activities related to prospecting, mining and sale of minerals, occurring in abandoned or closed mines, in the absence of licenses to prospect or mine for minerals; which occur outside of registered and formal processes of regulation; and is undertaken by people who work with limited access or a lack of access to safety mechanisms, as well as to labour and social protection.

We expand this definition by turning to social exclusion theory, which is defined as 'a process and a state that prevents individuals or groups from full participation in social, economic and political life and from asserting their rights; it derives from exclusionary relationships' (Beall and Piron, 2005: 8). This approach helps to contextualise artisanal mining as a livelihood strategy as a response to legal and social marginalisation of migrants in post-apartheid South Africa (Jinnah 2016; Landau 2016).

We distinguish artisanal (informal) mining from illegal mining based on four factors, again drawing on Chen (2002). First, we note the distinction between illegal goods and services, and illegal systems and processes. In this case, artisanal mining consists of producing goods that are legal, but the production of which is undertaken outside of legal frameworks. Second, it is not possible to determine whether those engaging in this activity are doing so with the intention of avoiding the costs associated with legality. In other words, we do not have evidence to suggest that informal miners are operating outside of regulation, with the *intention* of avoiding taxes or other statutory obligations. In fact, our data suggests the opposite, namely that many informal miners are more than eager to acquire registration and have

their activities recognised as work, and are ready to pay taxes. In many instances, remaining informal and the precarity that accompanies it – including physical injury and death, arrest, the payment of bribes to police and poor working conditions with no access to social security – is more costly to the worker than are the obligations associated with being registered. Third, the ‘illegality’ of informal mining stems from a lack of effective regulatory provisions for small-scale mining, rather than overt criminal intent on the part of those engaged in it; we argue that the process of obtaining legal permits to mine as a small scale artisanal miner is overly bureaucratic, expensive and administratively inaccessible (see LRC 2015). Finally, global evidence suggests that the type of activities undertaken by respondents as a livelihood is more likely to be classified as informal or artisanal mining than it is illegal mining.

Thus, we observe the economic and social context of South Africa: a country with a 25 percent official unemployment rate, a three per cent urbanisation rate and a city, Johannesburg, which has a sizeable migrant population, consisting of 30 percent internal migrants and seven percent cross-border migrants. Within this economic landscape, we regard informal mining as a critical, legitimate, but poorly protected and highly stigmatised strategy for the marginalised and urban poor to survive.

Literature overview (section written by Sam Spiegel)

Context - approaching mining, health and migrant populations in urban areas

Recent global health literature has stressed a need for new evidence-based approaches for addressing the well-being challenges facing migrant populations involved in the extractive sector. Carney and Gushulak (2016) discuss the need to pay closer attention to the neglected rights of migrant and mobile populations in remote locations, making a case for broadening health agendas in relation to patterns of mobility and changing social dynamics in mineral economies. Smith et al.

(2016) argue that globally, health literature regarding artisanal and small-scale mining (ASM) – a sector providing livelihoods to more than 100 million people, often involving rudimentary methods of mineral extraction and high levels of poverty – has tended to focus on toxic exposure issues, while overlooking a spectrum of other pressing health issues. They call for widening health agendas, urging for “more holistic” and regional approaches that engage a range of tools for understanding risks and concerns in ASM communities. Compelling calls for widening extractive sector health agendas are also exemplified in a recent review article in *Global Public Health*, where Mactaggert et al. (2016) discuss health in relation to variable employment conditions in rural mining economies, along with the socio-political factors that shape livelihoods. However, as with this review, and indeed much of the literature calling for new health promotion agendas in the mining sector, the focus has been on health in *rural*, remote locations, not *urban* contexts of mining. As we discuss, addressing health inequities in urban ASM contexts in Johannesburg requires not only recognising that mining activities in urban/peri-urban settings can have a range of health implications, but also, fundamentally, that social determinants of health can be shaped in important ways by the (non-)provision of urban public services and dynamic urban political processes.

Literature overview (section written by Sam Spiegel)

Our approach builds on a burgeoning body of literature addressing the risks of top-down and non-participative modes of regulation and health promotion in countries where ASM is a significant economic sector. Across Africa, recent literature on ASM has examined the negative impacts of aggressive policing and heavy-handed governance approaches to eradicate what is perceived by authorities as “illegal” gold mining – for example in Zimbabwe (Spiegel, 2015) and Ghana (Bush, 2009). Although there has been a shift globally in the last two decades towards increased regional policy rhetoric and donor country rhetoric regarding context-sensitive service delivery and health promotion in small-scale gold mining communities in Africa, in some cases recognising the deep local significance of transitory mining (Nyame and Grant, 2014), the literature points to deep patterns of marginalisation, whereby

those who are most vulnerable to severe health risks from mining are often not those who receive assistance and support (Spiegel, 2009; Hilson and McQuilken, 2014). In part, problems of poor access to health and social services (e.g. technology support, medicines, preventative care, local planning initiatives, etc.) have persisted, as a result of protracted struggles over criminalisation and lack of ‘legal’ status, lack of trust between government authorities and mining communities, and a poor understanding of the sector’s labour dynamics. In South Africa, the past few years have witnessed increasing critical debate about the treatment by authorities of artisanal mining in the country – referred to as “*zama-zama* mining” – as simply illegal, and even criminal. News media have tended to focus on problems of illegality in this sector rather than on the experiences of marginalisation the sector constitutes for those working within it, while governance response to ASM have received criticism for being unresponsive to local needs (Nhlengetwa, K., & Hein, 2015; Thornton, 2014).

Ambivalence in public health research and policy communities also exists when framing the linkages between migration, mining and health. There is a longstanding body of scientific health literature addressing the correlations between the mining sector’s labour dynamics in South Africa, and HIV-AIDS and tuberculosis (Campbell, 1997). Yet, the conceptualisation of health (problems and/or benefits) in relation to migration and mobility varies. While some health scientists may be tempted to immediately link miners’ migration with HIV-AIDS and TB, positioning migration in strictly negative terms can itself mask other relationships; migration and mobility can have other sets of health implications, including the creation of opportunities for poverty alleviation and the creation of remittances that can support the health of families. Far from being a negative influence on health, mobility and migration from one mining location to another can fulfil an important role in surviving in an economy that has made job prospects profoundly difficult. Our approach thus aims to contribute to debate about how an interdisciplinary mixed-methods approaches could inform health promotion efforts, as well as the

generation of more adaptive approaches to address the diverse conditions and actors who work in ASM, and the diverse processes that shape the social determinants of health. Whereas past literature calls for improvement in addressing the socioeconomic constraints and risks facing those living and working in ASM communities (Heemskerk, 2005), there are numerous cases in the past where scientific surveys were used to try to ‘capture’ data in artisanal mining communities (data of a health, environmental, socioeconomic and sociological nature), but where critical questions emerged as to whether data collection approaches indeed served to build *trust* with mining communities and support meaningful social change (Heemskerk, 2005). This article is part of a larger effort at building collaborations that seek to counter the stigmatisation of “illegal” gold mining, and to inform health promotion agendas that can better engage social organisational practices within the ASM sector, a sector that has provided income to populations in peri-urban settings in Johannesburg that have received only minimal scrutiny to date. Recognising that artisanal and small-scale mining practices can vary considerably with a range of implications for poverty alleviation (Gamun et al., 2014), we pay attention to the social dynamics and organisational practices in specific locales in Johannesburg, before returning to the wider question of what animates and supports effective public health responses to this sector.

3. Methodology

This study began from previous research on informal mining undertaken in 2012. We were keen to revisit an area of Johannesburg and a site of work that we had previously explored.¹ Our research is concentrated in the West of Johannesburg,

¹ Three independent projects formed the basis of this enquiry: from 2011-2013 the MiWORC project on labour migration included a small exploratory case study on informal mining, as well as the PhD fieldwork and activist work of Janet Munakamwe from 2012 which is ongoing.

in an area called Roodepoort, which is the site of a number of abandoned, closed and continuing gold mining operations.

The area has a barren topography and mixed development consisting of residential and commercial properties. Housing includes formal and informal. On the west is an informal settlement we coded 'M', on the east a golf course, on the Northeast RDP houses and directly north a second informal settlement, which we coded 'J'.



Figure 1: Map of Roodepoort. Source: Google Earth™



Figure 2: Map of Roodepoort looking North. Source: Google Earth™

Researching informal mining is sensitive for a number of reasons. We first sought and obtained ethics clearance from the University of the Witwatersrand. Then we entered the research sites and found multiple sensitivities: the spaces that miners occupy; work in and move between are physical and imagined places of invisibility; risk, and marginalisation.

Although mining dumps loom large on the Johannesburg landscape, the entrances to informal mining shafts are hidden from public view in verges and mine dumps, and located in informal areas that are associated with violent crime, including rape, murder and robberies. Miners walk along rough pathways cut into the Highveld grass, alongside and across the main public roads that run West, South and North of the city, to access shafts or to connect to the public minibus taxis that will take them to and from work.

Mining shafts are themselves associated with danger, a place in which gangs prowl, where criminals can pounce, and where rockfalls and death are realities of everyday life. Moreover, given the criminal nature of informal mining, and that many miners in our sample were non-nationals, those involved in this activity are wary of police, who will harass, raid, arrest and even detain them.

Given this context, that is, the **multiple and intersecting sensitivities that surround and define this area of work, the places in which it is carried out, and the people undertake it**, we adopted an ethnographic approach to our research. This consisted of identifying key physical spaces, and actors in the sector, and developing a schematic representation of the various components of informal mining. This was done based on existing knowledge of the sector from previous research in 2013, several key informant interviews, and an advance visit to various mining areas.

We identified four key localities in the West Rand of Johannesburg in which informal mining was prevalent. These were all informal settlements dotted by existing and old gold mines and mine dumps. The areas differ in size, but are generally characterised by mixed housing; predominantly informal housing, but also low cost government housing known as RDP houses;² and converted hostels, which were initially built for the gold mines in the area in the early 20th century, but which have since been abandoned and occupied by the urban poor. Two of the areas have tap water within the area, whilst the other two have a tap located on the periphery of the area.

Although statistical data at the Ward-level is not highly credible, previous studies and our own fieldwork highlight a number of interconnected socio-political issues in each area. These include the absence of basic services, such as electricity, roads, weak delivery of water, health and safety and security, education and recreation; this is alongside significant informal nodes of governance characterised by corruption by police and elected ward councillors, power exercised by unelected local elites such as community and business leaders; high unemployment, informal employment, and grinding poverty.

We identified a number of actors who are either directly or indirectly involved in, affected by, or shape informal mining. This includes the Department of Mineral Resources' small scale mining directorate; non-governmental organisations such as Mining Affected Communities in United Action (MACUAA), Action Aid South Africa, which has a programme on extractive minerals, and Partnership Africa Canada, which specialises in global mineral extraction.

Based on initial interviews with the actors mentioned above, as well as observation at the sites, we identified the following structures and components of informal mining in Johannesburg: miners who go underground, surface workers, buyers, and sponsors. Associated actors include family who support miners, who will

² Refers to low-cost houses built under the Reconstruction and Development Programme of 1994-6.

be responsible for rescue and recovery operations, the criminal justice and law enforcement systems, such as lawyers and police, healthcare facilities such as mobile clinics, primary healthcare clinics, and hospitals. We map, discuss and analyse these in the following sections.

In total, 135 interviews were conducted over a three-month period (September 5- November 30, 2016). This included interviews with:

- 43 underground miners (male and female)
- 64 surface workers
- 2 security guards
- 10 key informants
- 4 buyers
- 12 family members

An embedded ethnographic approach was used. This included informal conversations, narratives, inquisitive observation, non-probability samples and in-depth interviews.

Inquisitive Observations and Informal Conversations

Since participant observation as an ethnographic method is a process that takes some time to develop, and was not entirely suitable due to the nature of the research, inquisitive observations seemed a viable alternative. Inquisitive observations involve what Bester (1995) refers to as “parachuting”, that is, dropping into the midst of a situation from multiple points; tacit observations and interviews; the ability to ask questions, thereby becoming established as a bona fide researcher by being seen interviewing, taking notes and being present in the space. We did this at all four sites: two mine shaft entrances, two court rooms, one public hospital, and several taxi ranks for a period of three months with a core team of four and a further ancillary team of two.

Given the sensitive nature of the study, the research team internalised the questions and were wary of producing any paper whilst at the research sites. The

team then memorised as much information as possible, and transcribed it elsewhere. Notes were only jotted down when interviews were conducted at some pre-arranged places. The informal conversations were also done in the pre-research period, whereby the researcher visited the research area and struck up informal conversations with key informants and people in informal places. The aim was to harness networks and contacts to elicit people's perceptions and feelings on the subject under study without provoking a sense of anxiety amongst respondents with regards to their personal safety.

Non-probability sampling

Snowball sampling

Snowball sampling was conducted to locate one or more key individuals engaged in ASM. The method relied on social sponsorship (Bester 1995), in getting introductions and referrals to participants and key participants. This sampling method enables one to trace a network of participants.

Purposive sampling

By locating key participants and a probable community, purposive sampling served the purpose that fits the criteria set out in the research aims and objectives. As researchers went along in the field, they obtained information about work structure and teams that guided the identification of possible respondents.

In-depth interviews

Being naturalistic, autobiographical, in-depth, narrative and non-directive, the informal interview is modelled on the conversation, as a social event that enables people to talk about sensitive topics, where they disclose more about themselves (Holland and Ramazanoglu 1994: 135). The in-depth interviews were conducted with miners involved in ASM. They were centred on understanding the dynamics of relationships; the reasons they are in such a vocation; and the way in which authorities and the community regard their work.

Focus Group Discussions

Fifteen focus groups of men and women of various ages, as well as different ethnicities and nationalities, were conducted. The aim was to elicit responses and conversations on the wide-ranging issues pertaining to ASM.

Data Analysis

The data analysis was influenced by the nature of the data collected. This led to a search for an explanation and understanding of concepts and theories, which will be advanced, considered or developed.

Grounded Theory Approach

The grounded theory approach (Abramson and Mizrahi 1994) involves coding and classification of field notes in terms of key concepts, which are mainly developed through the research work itself. By building on the cyclical and spiral perception of the research process, concept development, data collection and data analysis took place in close conjunction.

4. Findings

This section presents the main empirical findings of the study. Using a grounded theory approach, we identify four key themes and organise the discussion around these.

4.1 Definitions and regulations

Miners refer to their work not as informal, illegal or even artisanal, but as 'work' or 'business'. The common words used to describe their activities included: *korokoza* ('we are doing business' or 'we are trying to earn an income' in Shona).³ Men who are engaged in artisanal mining are known as *Gweja* and women as *Gwejeleni*. The plural used extensively in the report is *magweja* or the more well-known *zama-zama*, meaning we are hustling or trying. Both are used interchangeably.

³Shona is one of Zimbabwe's official languages. Zimbabwe is South Africa's neighbour to the North, from which the majority of *zama-zama* we interviewed originated; followed by Mozambicans, Basotho, and locals.

The issue of legality and illegality permeates ASM in Johannesburg. There are narrow provisions for legal artisanal small-scale mining in South Africa, which favour capital investors who can negotiate the bureaucracy needed to obtain the necessary permit to mine. The majority of small-scale miners have neither the monetary, nor, at times, the legal capacity required to obtain permits. Many are migrants, some of whom are undocumented, while many more are South Africans who worked in the informal economy, or who were internal migrants with little formal education.

A prevailing discourse and practice of criminalisation and security strongly shapes how miners view themselves in relation to others. When asked what they do, a common first response is, 'we are not stealing'.

Miners engaged with authorities, both the public police force as well as private security guards, who control, and regulate the site of mining in multiple and strategic ways. These include the payment of bribes for access to sites, or to evade arrest, or using networks to create a warning system if police are nearby. Despite this, we had witnessed many raids and arrests, and were aware that part of work in this sector involved adopting strategies of survival in the face of the criminality associated with ASM in South Africa.

4.2. Work Structures and Arrangements

At the four research sites, we found an expansive network of employment and business practices involving a proportional number of men and women. This includes: underground mining; surface work; supporting economies of food; childcare; supply of materials and services such as transport; buyers; and sponsors. A report by the Chamber of Mines identifies five tiers of operations in informal mining, at the bottom of which are the miners or, *magweja*,ⁱ who are central to the functioning of informal mining economies as explained below. The remaining levels of operation identified in the report are:

- Tier 2: surface buyers, known in our study as ‘sponsors’, who ‘provide equipment and material support to miners’
- Tier 3: ‘bulk buyers who have licenses to trade in minerals in terms of the Precious Metals Act’
- Tier 4: ‘national distributors who operate through front companies’
- Tier 5: ‘international receivers and distributors through international refineries’

Underground work

Underground mining is the principal component of artisanal informal mining. The presence of a long and well-established industrial mining sector in the city has resulted in the presence of a significant network of underground tunnels that stretch for kilometres throughout Johannesburg. Miners informed us that it is possible to enter a shaft in the west or central part of the city, walk several days underground, and emerge in the eastern or southern shafts. At times, a miner walks for three days (or up to four kilometres) and at depths of 4000m metres, or, as one respondent informed us, to a level ‘where you can pile 20 buses on top of each other’, to get to gold bearing reefs, and works there for three to four days before returning to the surface. Although many follow tunnels that exist underground, at times miners bore and drill new tunnels.

The majority of the *magweja* we interviewed were Zimbabwean, although we also came across South African, Malawian, Mozambican and Basutho miners. Some of the respondents had worked previously in industrial mining in South Africa or Zimbabwe; others had a history of informal and low-skilled employment. Amongst the former, geological knowledge of the rock is an important resource. Miners stated that they look for ‘solid rock, which has money’. To know if a rock contains gold, miners undertake testing, by chiselling a portion of it into a plate and sieving it. The idea is to look for a “belt” which is said to be a stretch of rock rich in gold deposits.

To loosen rock and create passageways miners use dynamite known as *hoora*. This process can take several days, as conditions are difficult. As one *magweja* puts it, “it’s us who are the real soldiers”, referring to the bravery and hard work that informal mining demands.

Miners work in narrow ridges, with little light or ventilation, in temperatures up to 50 degrees centigrade. To survive, miners strip down into trousers or underpants only, and use headlamps to see. In areas where ventilation is poor, or oxygen supply limited, miners have developed a system using hosepipes to breathe. Working in small groups of four to six, some miners will stay in higher shafts where oxygen supply is good, holding onto a hosepipe. Other miners will carry the alternate end of the hosepipe with them as they descend further, and use it to breathe once they reach lower depths where they will work. Once rocks are chipped off a belt and broken into pieces that are easier to handle, they are loaded into makeshift sacks and backpacks and carried back to the surface. To survive underground, a similar economy exists, which supplies food, usually pap and soft drinks, at highly inflated prices.

On the surface, miners walk or take public minibus taxis to reach the surface operations. During our research, we met many miners who were entering or leaving shafts, the latter covered in dust as they emerge into daylight after days underground. At the entrance of a shaft, miners will wash using plastic bottles that are discarded, batteries from headlamps are dotted across the entrance, and packages carrying rocks are covered and rearranged. At the same time, others are beginning their work. Using holes cut in fences, or rough pathways across the open grassland, miners wearing dark clothes and caps huddle at the entrance as they prepare their equipment before disappearing into the shaft: head torches, chisels, dynamite, and some water and food.

It is difficult to estimate earnings from the *magweja*. However, there is agreement that ‘striking it big’ by discovering a significant gold bearing rock can yield

as much as R50 000 or more. A typical week's worth of mining usually can bring R 10 000, when sold to buyers.

Surface work

Surface work consists of three tasks: grinding or crushing, draining and mercury. At the four sites of our research, surface work is done in various spaces. At the site we coded 'M', there is in a long stretch of open land behind a line of informal housing (shacks). The *zama-zama* rent the space from local landlords and pay on average R400 a month. That area is their workspace, and they live behind in the informal settlement. At the site we coded 'B' and 'J' respectively, work is done in a more secluded thicket, which used to be a mine compound, and which has since been demolished. At the site we coded 'D', the sites themselves are located in a bush hidden from view from a major road, which lies 200 meters away, with some of the activities occurring in the backyards of houses nearby.

The miners use concrete slabs, which were once the foundations of building and houses, for grinding. The flat and tough surface is ideal to grind and crush rocks in the required manner, although it results in chapped hands and knees, as women work on all fours, and the white of the concrete reflects a harsh glare under the sun. Drainage, which consists of washing the ground sand several times, is done on structures that are especially built for that purpose. Typically, a drainage site involves several pipes, wash areas and sieves, set up over a stretch of land.

Surface work is structured according to shifts typically from 6am to 2pm. Some don't work on Sundays if they are churchgoers. On the face of it, the *zama-zama* are organised in what they call syndicates, a group of between two and 10 people, usually women. Anyone bringing work, that is – rocks to be ground, crushed or washed – is called a "customer." Syndicate members may comprise of close kin, ethnic and national compatriots, but could also consist of a group of unrelated strangers, who may have merely met amongst the mining communities. The syndicate is overseen by a surface leader, who is responsible for work arrangements;

maintaining a storeroom where work equipment – such as iron balls and *maphenduka* (gas cylinders, known as *maphenduka* because of the rolling action they perform in crushing the stones) – are kept, and liaising with customers.

Syndicate members are grouped as a network, where each member either specialises in certain aspects of work. For example, some work as grinders, some in drainage, and others in burning the gold, or in multiple positions. Syndicate members are not considered employees, but equal partners in a complex and sophisticated work arrangement. Newcomers, especially women, start off as grinders, “working” for either *magweja* or syndicate leaders, and are paid per 20-litre bucket of soil that they grind. The leader pays the syndicate members a wage that varies; a typical amount reported to us is R600 a week, but this depends on the amount of work done. Members are also paid in kind, by keeping the leftover gold-bearing soil known as *mavovo*, which can be further refined and sold directly by members to buyers.

The amount earned differs. For some women grinding rocks, a 20 litre bucket takes a day, and earns R100, in addition to the remaining sand, which is further refined. A 20 litre bucket of rock can yield about five or six grams of gold, which is sold at slightly below the market price.

Buyers

After processing on the surface, the gold is sold to buyers at a price determined by the international market. During our research, gold was sold to buyers for between R480 to R510 a gram. Once sold to a buyer, the gold then enters the formal market either directly to traders who have permits and shops that deal in gold, or indirectly through other buyers who will resell to the traders. This constitutes Tier 3, as outlined by the Chamber of Mines. Amongst surface and underground workers, this tier is referred to as the “market”, made up of those places in central Johannesburg or Roodepoort that trade in gold.

We witnessed a few transactions and interviewed four buyers. These arrive in the informal settlement in middle- to upper-range cars, waiting under a tree with engine running, and call a contact, who will hustle over to the car to converse through a rolled-down window. The two then emerge and go to an informal house, where goods and money are exchanged. Some of the buyers measure the gold on scales that they bring along, although miners sometimes complain that these scales are not accurate. As the entire transaction is in cash, and involves sums up to R100 000, buyers take precautions to ensure their protection, bringing body guards, and carrying arms. The majority of the buyers do not live in the mining communities, but in suburbs, although they do employ assistants who live locally, who will act as middlemen for the buyers. For buyers, there are other risks too: trading without a license is illegal, and buyers are wary of the police, who they say are more likely to confiscate their money and/or gold, rather than to arrest them.

4.3. Social realities and every-day life in mining communities

Although the mining communities each have their own characteristics (in terms of housing structures, population sizes etc.), they share certain characteristics. The drive west of Johannesburg is a bleak one, on a flat and barren patch of land dotted with industrial sites and crossing railway lines hewn into the road. To access one of the communities, we turn sharply from the main and busy road onto a narrow strip, and duck behind a row of trees to find a steep bank, where about 100 people are milling around, working and sitting on paint tins under trees. A mine dump lurks ahead of us, and we can hear the cars whizz by, on the busy road nearby. The first sense of the place, and one that lingers, is that of deprivation and urgency. Informal housing, dusty roads, children playing in asphalt, broken glass everywhere; yet people working rapidly, organising structures set up to facilitate drainage, grinding, men walking across the field with sacks of rock, women carrying buckets of water to and fro, whilst others stoke a wood fire on the ground, preparing to cook. It is barely 10am and already the place is heaving with life, productivity and energy, all amidst the poverty and informality.

The desperation we find here is echoed in the story of a man we meet. Armindo is from Mozambique, and he tells about his brother, who was killed a short while ago in the same area in which we sit, by other Mozambicans after being accused of sleeping with another man's wife. We are told there is no trust in the police here, and indeed the police are known infamously here for their common raids, arrests and requests for gold. There is little faith in a government that is ostensibly far removed from this area. No proper services of housing, healthcare, water, education or sanitation are to be found. The 2011 census notes that there are 744 people living in an eight-square kilometre area, which is clearly a massive undercount, even to our untrained eyes. Censuses are severely limited below ward level, but regardless of this, the absence of any clear data on the area from authorities or any physical government services is a stark reminder of the invisibility of government in this community, and the resultant alternate nodes of power and regulation that exists.

Extra-marital affairs and '*jolling*' (partying), as its referred to, are reported to be common. The reason we were told, is because of the compound life, where people are living in close proximity to each other, and where unemployment is widespread, which means that many young and older men spend the day sitting outside, and drinking. Poverty is another cause, as miners have money, which they are happy to spend on and share with partners, leading many to engage in multiple relationships.

Some male *zama-zama* enter into relationships with local woman who own a low-cost government house, the so-called 'RDP' house, which litter the area. In return for accommodation, he provides groceries and pays school fees. If he shirks this responsibility, the relationship ends and he is ejected from the house, or as respondents told us, "the woman spits him out". He then "remembers the family he had forgotten," until he strikes it rich again in mining and takes up with a new woman.

One local *mastaand*, or landowner, told us about a neighbour whose sons and lodgers had an altercation. Police were called in because it began to circulate that the house would be petrol bombed. It emerged that a lodger had died at the house some time ago, and no rituals of cleansing were done, which is why the house always experienced “trouble”. The *mastaand* said she tells her lodgers she doesn’t want any police in her yard, because, at a neighbour’s house, the police came, parked their vehicle behind her house, rented uniforms to someone who posed as an officer, and went to collect gold, containing soil from a *zama-zama*.

Gender

Women mainly work on the surface grinding, draining or running market stalls where they sell food and wares to miners. Many have partners who work underground, who will supply them with rocks. Others engage in transactional relationships, including sex, to ensure a supply of work.

There are strong beliefs and social norms governing gender. Women are not permitted to go underground, as this will anger the spirits, and result in death or injury. An incident retold on the surface is of a case where a woman attempted to enter a mine, resulting in a rockfall that killed twenty-eight people. Alongside this, there are other dangers too. Participants mentioned that women who go underground risk being raped, which led one woman to resort to going underground only with her male cousins as her bodyguards.

Women in informal mining have been increasingly asserting their independence. Some are syndicate leaders and employ men whom they pay at regular intervals. A young woman told us that she has employed her former teacher. Some like MaNcane from Zimbabwe started working at sixteen and today she has built a home and bought several cows. Normally, she goes home twice a year. Some are buying residential stands back home, and erecting imposing houses. One female syndicate leader told us she was the first to brew tea in M, where others followed. She could, on a good day, make about R1500.

Women usually begin as grinders. They may also engage in peripheral activities, known as a support economy, viz. selling food, drinks or alcohol. One female buyer, after starting as a grinder, used her savings amounting to R10 000 to shift tiers to become a buyer.

There are also many female dealers who supply miners with dynamite, an important resource needed to blast rock underground. They told us that they deal with “hot” items, a colloquial name usually used for stolen goods, used to evade police. Dynamite dealers operate in high levels of secrecy. Unlike other miners who work as a team, the dynamite trade is a solitary one, which doesn’t require any involvement of others. Since dynamite is illegal, and a license is needed to buy and sell it, many buy it from Zimbabwe, and smuggle it across the border. One participant was once arrested at Beit Bridge Border Post in possession of dynamite, but was bailed out after a month, because she had a valid passport with visa, as well as a fixed abode. She paid a lawyer R12 000 and a fine of R50 000 to gain release. Once in South Africa, dynamite is stored in ‘safe places’ which we were shown. In order to trade, some women have informal trading stalls, which sell legitimate goods, such as food. Dynamite is often bought on credit, and dealers risk non-payment.

Other risks also lurk: dynamite is used extensively in organised crime in South Africa in the banking sector, especially for ATM robberies. Thus, being arrested for the possession of dynamite can lead to suspicion of involvement in organised crime networks. All the dealers we met, however, said that they only supply dynamite to miners.

Demand was low during our fieldwork, due to the mass arrests of *zama-zama* a short while earlier. There was confiscation of goods by police, and the numerous dealers who had entered the trade. The dealers also complained of snitching, which is rife, given rise by jealousy amongst dealers.

Women in the mining communities are particularly vulnerable to crime. Rape and gang rape are reported to have spiked. Criminal gangs break into the houses, drag the woman out to the bush, and rape her until dawn. For this reason, some women enter into relationships of convenience with men who have not paid *lobola*, for protection and security, and to bring an air of “respectability” to the home. This may not be enough. Criminals may rape the woman or take her hostage even in the presence of a man. Women can in turn be lured by criminals on the pretext of work, and get raped once isolated beyond earshot.

Incidents of domestic abuse were reported to us. One woman was severely beaten by her live-in male partner, and hospitalised. Staff there urged her to open a domestic abuse case against him, but she refused, citing her love for her partner.

Finally, women bear the major responsibility of childcare. There are no registered early childcare facilities in any of the three of the areas we visited. In the fourth, a crèche was found to be severely overcrowded. Many mothers felt that crèches were unsafe, as there were not adequate qualified staff, and, as one mother put it, “all they do is play - they learn nothing”. As a result, many women work with young children alongside them, some on their backs, as they grind and crush. For schoolchildren, there are other problems: undocumented migrants, including children could not able to access government schooling, and many send their children home to Zimbabwe to be cared for by extended family. Split families were therefore the norm amongst our sample. Home visits are, furthermore, irregular, and may sometimes only be twice a year.

Networks and economies of affinity

There is a strong shared perception on gold amongst miners, who hold that “gold lasts forever”. This represents the ‘value chain’ of informal mining, whereby one bucket of gold can bring about income, and sustain the livelihoods of many people, from underground workers to buyers and end users; a process which is cyclical. As one respondent noted:

The *magweja* bring gold containing rocks, give them to grinders or they lend the *maphenduka*, the payment is residues of the soil, *mavovo*. The *maphenduka* owner or grinders or drainage owners processes the *mavovo*, leave them for others and so on. The *mavovo* can be recycled for close to a decade, and the processor still gets something from them. Thus, for *zama-zama*, gold lasts forever’.

Despite the deprivation of the informal settlements in which mining occurs, respondents agree that mining is profitable, or as one said, ‘no one starves’. Of all the sites, M, which is the most dense in terms of population and dangerous in terms of crime, is said to be the richest, as it has the most access to shafts.

However, alongside the presence of profits lurk several challenges. The amount of money made depends on the price of gold, the quality and quantity of gold recovered, and the absence of any policy raid or criminal activity on the business. Alongside this, competition within the sector is stiff. Between 2012 and 2016, two new surface sites emerged in the areas in which we conducted research, where respondents say that new members join the sector every day. One Zimbabwean participant told us he is considering returning home to start a farming and livestock business once he raises enough capital, as his profits have diminished. Nonetheless, we encountered as well as heard tell of *zama-zama* who have prospered from informal mining. We saw miners driving expensive vehicles, and others who had moved up the supply chain to become influential buyers. Those *zama-zama* who have accumulated capital are known amongst the surface and underground miners as “big shots”, who can afford to buy larger amounts of mercury, cyanide, electric blasters, and dynamite. This enables them to become “sponsors,” that is, they can finance *magweja* to go underground. The more capital that is invested, in terms of equipment or labour, the greater the return.

Miner attitudes to money earned from gold is, taken generally, complex. Despite the significant amount of cash trading hands each day, miners appear to

spend money as quickly as they earn it. Part of this stems from a belief articulated by several respondents that money earned from gold must be spent and enjoyed, and not save, where to do so would be bad luck. Rather, there is a shared belief that spending money leads to more money being earned. There are other reasons too: many said that they do not know how to budget, that money flowing in regularly doesn't require them to save, and that most don't have bank accounts, due to a lack of documentation which results in cash being both kept and spent easily. Almost all the respondents stated that spending large sums of money quickly was the norm, and that contingency simply meant one could earn more if needed. This reaffirms the earlier sentiment expressed by those we interviewed who spoke of gold as a manner of infinite resource.

Consequently, many are severely indebted to informal loan sharks or *mashonisa*. The interest attached to the loan ranges from fifty percent to seventy-five percent. Some *mashonisa* follow clients who no longer need a loan, and persuade them into borrowing by saying, "my friend, did we fight that you no longer come to me?" Miners refer to *mashonisa* loans as "an albatross around our necks". Participants recounted that *mashonisa* loans keep one in perpetual debt, and that failure to honour loans has dire consequences, including physical harm by the *mashonisa* or their bodyguards, or the destruction of their property.

Social Relationships in Mining Communities

Zama-zama enter informal mining through a network of connections. For migrants, entry into South Africa begins with work in low-skilled or informal employment, such as domestic work, construction, in small shops or security, where wages are low, typically around R2000-R3000 a month, where hours are long and exploitation by employers is rife.

Gradually many become dissatisfied, especially as they realise the high cost of living in Johannesburg. Through word of mouth, from friends, kin, and compatriots, many of our respondents turn to informal mining, where wages and income are better. Some begin the work part-time, going into shafts on the weekend

or during lulls in their part time employment, but soon realise they can make more money in informal mining. As one participant related, once he had in only one weekend made the equivalent to his monthly pay as a security guard, he decided to become a fulltime *zama-zama*. Since many of our respondents were undocumented or didn't have work permits, they faced limited labour market options.

For locals, high unemployment in urban and rural areas drives many to seek employment and opportunity in Johannesburg. Amongst South African respondents, there were those who worked informally, trading at street corners and doing construction, before moving to ASM for the same financial reasons as migrants. Others (including three non-nationals) had been involved in industrial mining for decades, where, once retrenched, they took up ASM.

All the respondents agreed that informal mining offers a greater degree of control over hours of work and income level. A significant number come with no idea about the intricacies of mining and mining economies. Skills and knowledge is freely shared, where the recipients become experts and in turn share what they know with newcomers.

The knowledge economies of informal mining are therefore organic and collective. Informal mining relies heavily on teamwork, collaboration and cooperation. For example, at a drainage owned by a Shangani man from Mozambique, there are Shangani from Mozambique, South Africa and Zimbabwe. In some work spaces, there are a mixture of people from different areas and countries, and they share both knowledge and proceeds.

But this is despite the very real challenges that exist. In one site there is a dense concentration of people in a small area. The mining communities are multi-ethnic and multi-national. Participants described it as a "compound where different kinds of people live". Within this space there is an abundance of alcohol, flowing freely at all hours of the day, leading to squabbles, fights and more violent forms of confrontation, which can end in death. Alongside this, the vast amounts of money that flow through the area also creates strong rivalries, tensions and jealousies.

Under these conditions nonetheless, networks of solidarity and affinity permeate. We talked to a man with a scar on his face, a result of an underground accident. He spent almost a year in hospital as a result, and when we asked how he survived economically during that time, he waved his hand around and said, “all these people helped me.”

Police

Police brutality and harassment were recurrent themes in the conversations we held with the participants. Police accuse the *zama-zama* of stealing the country’s mineral resources, an allegation *zama-zama* counter, because they believe the gold is in abandoned shafts mined by their own hard work, and that the money is used locally, where it necessarily boosts local economies. They argue too that former criminals have recourse to an honest living in the decision to become *zama-zama*.

If caught, police demand bribes ranging from R20-R1000, which means it is necessary to always carry money to bribe the police, a miner tells us. Police are said to break into storerooms and confiscate equipment, personal belongings, and even the soil which they sell to other miners. Some police are even said to, on their off duty days, enter the shafts to mine gold themselves. Participants say the police have come to realise that the soil itself contains lots of money. In this way too, the police are entangled into the mining economies, with some said to resist transfer to police stations far away from the mining communities for fear of the loss of attendant opportunity.

Confiscation of equipment is a huge setback for the miners, who have to start afresh. Thus, it is necessary for one to have savings somewhere. When police see tools like nylon towels used in drainages, chisels, hammers and *maperengende* (rags used as work wear by *magweja*) they take them and accuse the owners of being illegal miners. When police see a ‘dirty-looking’ person, they ask them for an ID/passport and lay a charge of illegal mining, even if there is no tangible evidence of such. The social life of clothing, *maperengende*, is instructive here. It is enough

reason for one to be arbitrarily stopped and searched by police. Drainage workers buy nylon towels from shops in Roodepoort, and the shop owners as well as the itinerant sellers prefer anonymity to avoid the police.

The police also confiscate soil, which they then sell to grinders from which to profit. When they stop and search people, they take personal belongings like cash and cell phones, or whatever is on the person. The victims have no recourse and cannot report it because they are undocumented. At police stations, the police demand documentation when the miners are reporting a crime. In one incident, a police member had taken R5000 from a storeroom, which he claimed was from proceeds of illegal mining. One participant told us that a policeman took her cell phone and tablet; when she reported the matter with her documentation, she was told to bring a witness. This underscores the sense of voicelessness that the *zama-zama* attest to, where, since they are considered illegal and criminal, they have nowhere to report their grievances.

Those arrested for illegal mining activities face legal challenges, because many have no documents to prove a permanent address. This complicates efforts at a bail application, where for example, we followed the story of three miners who stayed six months in prison before receiving a bail hearing.

A South African house owner related an incident where the *amabherete* (members of Tactical Response Team) were investigating possession of an illegal firearm at a house across the street. The police took R800 from a cabinet in the house. One woman photographed them as they were doing so, at which they remanded her phone, only to break it. There is a perception that police are exploiting people in the area, especially the informal miners. Relations between the police and the community are tense as a result.

Relationships

There are complex relationships within mining communities, a combination of transactional sex, inequality, patriarchy, abuse, agency and a response to the prevailing socioeconomic vulnerability that communities face.

Participants stated that migrant men who come to South Africa alone always find a partner in the community. When their spouses follow, they find the man in a relationship with another, leading to hostility, physical altercations, and violence. We attended a court hearing of an arrested miner in central Johannesburg. A small group of friends and family had gathered outside the courtroom as they waited for the matter to be scheduled. It then emerged that the arrested miner had two wives, neither of whom had known about the other, leading to loud shouts and arguments between the two women at the courthouse. The first wife was a dynamite supplier, who had considerable money of her own, and had hired a lawyer to represent her husband. We were told it was women like these who were “too independent” and “no longer respected their men”.

Nevertheless, at all the research sites we visited, there were more women visible at all hours than men. Together with the money that miners make, the protection a man can provide, and the resultant access to gold that surface workers can tap into, there is fierce competition amongst women for relationships with men. After yet another police raid in one site, which included the confiscation of soil, we witnessed the increased competition among surface workers for work. Some women provided sexual favours to *magweja*, which allowed them to be the first to receive the soil, since the *magweja* prefer to give the soil to their girlfriends.

The woman enters a relationship with a man even if she knows he has multiple sexual partners, or is “diseased”, which is the colloquial word used to discuss a person living with HIV or AIDS. One female participant told us people in mining communities live as if a “film” life, where female *zama-zama* sleep with different kinds of men at a frequent rate, so that they could supplement their

income. The exposure to disease rotating in a sexual network, which is also an economic work network, is estimated to be high, and additional research is needed to understand the extent of HIV in the community.

Relations between South Africans and non-nationals

Participants say xenophobia is almost non-existent in the areas we researched. The reason is mainly because non-nationals have come to play a crucial economic role in these communities, which survive from the spin-offs of mining. For example, a *mastaand* in one area earns up to R5000 a month in rentals to migrants; this is lucrative, and many have or are extending backyard shacks to provide further housing. Another factor is that miners are physically tough, which provides a measure of potential security. One participant said the miners are “heroes”, who are fearless and have the physical capacity to fight back against criminals. However, one female dynamite dealer told us that she had concealed her occupation from her landlord, and that few Zimbabwean compatriots who were jealous of her, subsequently informed the landlord, who promptly increased her rent.

We spoke with one South African *mastaand* who has lived in M for twenty years. She has six lodgers from Zimbabwe, Malawi and South Africa who live as “brothers and sisters” and prefer to rent to migrants, as they pay rent on time. Migrants are perceived to be diligent, and are seen to be assisting in local livelihoods, so the *mastaand* always strive to protect them from the police. Thus, if any outsiders including the police attack migrant miners, the community rallies behind them.

A similar sentiment emerges amongst taxi drivers. Miners said that a few years ago, they would find it difficult to get into a taxi as people and drivers complained of their appearance, which was understandably dishevelled and dirty, after days underground. This changed as miners began to pay more for taxi fares, causing drivers to begin to compete for the lucrative opportunity of fetching the *magweja* from the shafts.

Through close living arrangements, an integrated local economy, a shared fear and risk of crime, police and poverty, and inter-marriages and relationships, non-nationals are seen as kin, in-laws and family, so South Africans tolerate and even openly accept them. During conversations with locals, the term *amaborder* was used, which refers to non-nationals who temporarily stay in others' houses, a designation that harks back to the more established tradition of rural lodgers that have characterised the informal settlements and townships across South Africa. This was an affinity of sorts to migrants, and is welcome respite from the hostile and derogatory South African term *mkwerekwere* (a term of uncertain etymology).

In these ways, life grinds by, marked by spikes of wealth and the “high life” a miner made who now “drives a Hummer and lives in town”, of loose relationships built on the surface and deeper bonds of trust forged underground, and of networks of affinity and convenience. There is as mentioned, the constant threat of police brutality, of jealousy and opportunistically spurred crime, of family and friends who socialise and argue, of family responsibility at home and here. There are partnerships and sexual encounters as if “from the films” of flashy cars, the omnipresence of loan sharks once gold is found, and of course, all balanced on the ever-presence of danger for the miner who goes underground and who might indeed not come back up.

4.4. Health, Wellbeing and Hazards

Informal mining is highly hazardous – from underground digging to surface work. The risks not only emanate from the nature of the work, but also from factors surrounding the work, where the accrual of money itself attracts risk.

Respondents furthermore reported a range of illnesses with which they were burdened, including: STD's, TB, and HIV/AIDS, rashes, allergies and chest pains.

On the one hand, there are injuries caused by the work itself. On the other hand, there are risks linked with and to the occupation. Thus, we see an

interconnection between work and the social and legal environment in which it is undertaken, including for example, crime, unfair treatment at health centres, and arrests in hospitals.

Underground work is highly dangerous. Although *magweja* wear protective gear like helmets, overalls and gloves, they sometimes neglect safety measures because it leads to police to be able to identify them as *zama-zama*. Given the narrow tunnels they have to navigate underground, some crawl on their stomachs for great lengths until their bodies are scratched and bleeding. There are then some people who cook underground using primus stoves, which release a toxic gas and many come out coughing. There is a place at the end of the tunnel called *phelamoya*, meaning there is no air or oxygen in that particular area. Underground water is also dirty. Although the *magweja* believe this area is rich in gold deposits, it is also dangerous. They send one of their teams to do the digging, while others pump air using a pipe and plastic bag.

Concerns about safety underground lie somewhere between myth, belief, the real and the pragmatic; in other words, between the sacred and the profane. While mining companies left support pillars in the tunnels they constructed, some *magweja* are said to just dig and take rocks or soil without fixing the pillars that hold back loose rocks, so vigilance is always required. Since there is little order underground between teams, some *zama-zama* do digging that endangers others. If there is an accident underground, tools are downed, and the injured or dead are brought to the surface, after which no-one is allowed to continue working until rituals are performed to cleanse the shaft.

Above ground, there are a number of factors that make the work difficult. Inclement weather, especially during the rainy season, affects the work of processing what is brought up by the miners for sale. Surface workers, like grinders, also work with no masks, exposing them to large amounts of dust inhalation. On being asked why they don't wear masks, participants said they are not used to them, or explain that when there are police raids, the masks identify them to police as targets.

Grinders complain of chest pains, back aches and painful joints. The *magweja* are susceptible to TB as well, because of underground dust. They report their saliva to be darkened by the dust they inhale while working. Participants told us they offset the effects by drinking fresh milk, which they believe cleans the body. When female grinders fall pregnant, their work becomes all the more difficult, but most continue working, which increases the risks to their unborn children, including miscarriage. Female participants say there are no clinics nearby at which to seek out assistance, and that they get contraceptives from Zimbabwe, which they prefer to local ones. Sanitary pads are meanwhile sold by the hawkers who do business in the area. In one of the sites, a mobile public health care facility is available once a month, which provides HIV testing, and health care advice.

Participants complain about the unfair treatment they receive when able to attend health centres elsewhere. Non-nationals report spending many hours before they are helped. When one goes to hospital, they don't give their address in the mining communities, because the nurses discriminate against them, saying "*zama-zama* are a problem". When an artisanal miner is injured underground and is taken to a hospital, they are obliged to say that they were injured doing contract work, as there have been reports of police arresting injured miners even from within the confines of the hospital. Nurses are said to be rude to them, for example accusing non-nationals of having too many children and burdening the hospital. A participant told us that a woman was once stabbed and then taken to the hospital by her *mastaand*, and wasn't attended to until the following morning, where she was stitched up without anaesthetic, merely told by nurses to clench her teeth through the ordeal. Non-nationals are, we were told, made to pay R310-R900 for women delivering babies. In addition, documentation is demanded before any treatment is provided, even in emergencies.

To counter this, respondents turn to a range of alternative healthcare solutions. Some participants, Zimbabwean doctors in particular, prefer private medical practitioners. One female participant told us that she "googles symptoms and signs of disease". Others consult traditional healers.

4.5. Myths, Mythologies, Belief Systems and Pragmatic Realities

A *sangoma* we spoke to called NaZinhle, told us that, since gold is associated with spirits, when one comes into money, one is obliged to do a ritual of thanksgiving – sprinkling snuff and offering beer – and should then let the money ‘sleep over’, before using it.

Beliefs and myths are strongly embedded in perception of informal miners and the practices of informal mining in Johannesburg. Many miners seek the assistance and intervention of *sangomas*, traditional healers, and/or apostolic churches to receive prayers for health and good fortune.

This belief and its accompanying rituals is driven by an underlying understanding of the ownership over mineral resources. Miners, and those living in the four research communities, all shared the conviction that gold is associated with spirits, and owned and controlled by water spirits, called *nzuzu*. The *nzuzu* emanate from deep water pools, and enter the mines, controlling all that it contains. The *nzuzu* move through the labyrinth of the underground mine followed by water, which explains the flooding in the tunnels that miners often encounter.

These spirits manifest in different forms, like the so-called *missus*, or as white women or chickens, and other mystical forms, although the most common are the snakes, or *amalinda*. These control the wealth of the mines. Particular rituals have to be conducted to appease the snakes, including making offerings of food, and abiding by certain norms to avoid ill fortune, injury or death. When *magweja* abandon injured or dead colleagues underground, this angers the *amalinda*, who are said to consider it heartless, who administer their punishment through rockfalls and other disasters, that lead to accidents underground.

Mining for gold is strongly associated with purity; one should not be “dirty” when going underground and one should have a “pure heart” because the *nzuzu*

spirits insist on cleanliness. Those who enter shafts in possession of *muti* are said to jeopardise others. Certain rules and regulations like refraining from pap or meat, wearing charms, and not sleeping with a woman, need to be observed in order for the artisanal miner to be 'pure' when entering the mines. Furthermore, snuff needs to be placed at the entrance of each tunnel and silver coins thrown on the floor as an offering to the spirits.

We were told a story of huge snake called Mandela, whose head or tail cannot be seen due to its enormous length. Mandela crosses the tunnels at particular times. Once underground, one has to wait for it to pass. The area that it leaves behind is rich with gold. Four people are known to have benefitted from this knowledge.

The *sangoma* NaZinhle insists that the snake will, when upset or angered, release an asphyxiating gas, known as *phelamoya*, which causes rocks to fall, and that the snake hurls rocks at miners, or even breathes fire. Miners know the smell of the gas and when they sense it, they know the snake is nearby. They thus adjust their work plans and journeys accordingly.

However, a few of our respondents reported that at times it is not possible to retreat or move away safely when the gas is smelt. The gas causes them to become weak, lethargic, and affects their breathing. Some said that to counter this, water must be taken, but others say that most tend to panic and, in a haste to escape, are in danger of smashing their heads against low-hanging rocks.

Zama-zama believe that "striking it rich" is dependent purely on luck and that fortunes are not granted equally. Some people use charms and *muti* like one old man, who, if positioned at the front of the line underground, will get all the gold, where those who follow find nothing. The *magweja* have resolved that he should always be the last in the queue. Malawians are forbidden underground, because the Zimbabwean *magweja*, in particular, believe Malawians possess potent charms, which lead others not to be able to find anything when they mine. All the Malawian male respondents we talked to work on the surface as grinders. The compulsion for

magweja to return underground despite the risks, is driven by the belief that further riches await them. This is not dissimilar to the early pioneering spirit which drove mining exploration in the country a century and a half ago.

Some participants told us that during the time of industrial mining operations, the snakes would write an amount of money on the back of a miner, and the mine management was obliged to award that miner that amount of money. He would then leave the mines. If one is favoured by the spirits, a white woman appears in the shaft, takes their hand, and shows them a place rich with gold deposits. A failure to act collectively, by hastening to get all the gold for oneself, leads to accidents, and miners are not allowed to take it all, but instead are obliged to leave some behind, since greed is a source of provocation to the *amalinda*.

Times of bad fortune, whether due to increased police patrols and harassment, or a lack of buyers, are attributed to *mamhepo/bhadi*. This requires the miners to cleanse themselves by going to Masowe, or *sangoma*, or getting cleansed in their home country. Underground accidents happen especially when *magweja* strike a belt and get greedy, or when people enter the shafts with forbidden material like drugs, bottles, weapons and guns. The *amalinda* do not like smoke underground, and retaliate by letting off their own smoke, which, however, is sometimes is harmless.

Miners live under the constant threat of falling rocks. In this case, rituals like sprinkling snuff on the ground and pouring traditional beer are necessary to avert calamities. Some *zama-zama* sprinkle snuff on the ground, offer coins and talk with their ancestors and the spirits of the mines for protection and good fortune. We were told some days were off-limits in mines when rituals were conducted. Participants who had worked in industrial mining, such as the white managers of the mining companies, understood the necessity of rituals. The mining companies used to send young virgins draped in white dustcoats underground with offerings of trunks of money to the snakes that would eat them, and continue to give gold. For three days, the mines would be closed. This was usually done in September and October.

NaZinhle, who offers spiritual services to the mining communities, said *amalinda* sometimes close the shafts in demand of sacrifices, such as a goat, money and beer, which are then undertaken in appeasement. Not just any ordinary *sangoma* can do the ceremonies; their *dlozi* or spirit, has to be in spiritual resonance with the *nzuzu* spirit. The *sangoma* can predict danger and warn the miners, but if they don't heed the warning, tragic incidents happen. NaZinhle told us she once told the miners to sacrifice a white goat, but they didn't listen. Shortly afterwards, the Langlaagte incident happened in September 2016, in which at least two miners were killed, while three remained trapped underground for two weeks, and eventually, three were arrested.

Following the Langlaagte incident, there was a clampdown on *zama-zama*. We visited the shaft early one morning, when only a *zama-zama* security guard, a gentle old man from KwaZulu-Natal, stood at the entrance. The area is accessed through a public park that is now in a state of dilapidation. It is strewn with litter and used condoms, discarded battery packs, shoes from miners, and the air is heavy with a sense of death. A few men from the police department and mine rescue services were also around, distributing a poorly-written notice, stating that the shaft would be sealed in a week's time. They made a great show of escorting us out, threatening to arrest a Zimbabwean colleague for asking too many questions, and locking the gate behind us. As the men drove away in their off-road vehicles, we lingered near the entrance. Gradually, the security opened a small gate on the side, *zama-zama* emerged from the bushes, and jumped over the half-broken wall, and we followed them inside toward the shaft. The authorities closed the mine in an effort to curb informal mining activities. But the *zama-zama* allege that when a shaft is closed, it suffocates the underground network, because the mine spirits need to breathe. Failure to open a shaft can lead to it exploding, or caving in. Within a week, the shaft was sealed, amidst much medial attention. The DMR, mine rescue services, and police congratulated each other on a job well done. Down the road, less than 100 metres away, tucked behind a dump, another shaft had already been opened and underground activity commenced, as their fanfare continued on the surface.

5. Conclusion

Artisanal small-scale mining in Johannesburg is a complex web of relations, danger, and risk, operating within and response to extreme conditions of poverty and unemployment, of urban marginality, a sophisticated economy that provides opportunity; a criminalised activity with strong threads of illegality and informality weaving through workers, suppliers, buyers, and goods. This report has explored the surface of the sector, where, through personal narratives and extensive ethnographic fieldwork, it has merely begun to capture a small part of this complex economy and the communities which constitute and surround it, and are sustained by it. Whilst in no way conclusive or declaratory, a few tentative assessments can be made here.

First, ASM is poorly understood in policy frameworks, amongst stakeholders and in the broader public discourse in South Africa. At its heart, the work done by miners in the research is an informal livelihood, undertaken at enormous risk to themselves. It is in response to limited employment opportunities, a restrictive regulatory environment, and economic need. In this light, the informal economy as defined by Chen (2006) can be found to strongly resonate with the nature of the work, the ways in which and conditions under which it is undertaken (viz. with basic equipment outside of regulatory framework, with no access to social security, banking or financial services, and with direct and indirect health and safety risks), and is evidenced furthermore by the stigma attached to it.

Second, as an informal and largely individualised economic activity, there exists strong structures, systems, organisations, and collective action which are intriguing from labour relations, collective bargaining, and organisational systems perspectives. Embedded in these processes are social and cultural norms of gender, nationality, work ethics and trust. For labour scholars, this provides a fascinating insight into how modes of production in the informal economy are developed,

negotiated and maintained under conditions of extreme stress, and completely outside of legal or organisational frameworks.

Third, there is the longer and broader geography of ASM, which stretches the immediate physical areas in which it is done, and the contemporary period. This is reflected in the supply chains of labour and goods, the knowledge passed down by generations of industrial and small-scale miners, and the onward production and sale of mined gold. Yet, it also reflects the relationship and perceptions miners have of gold, as much as the environment in which gold is mined and sold. This approaches an almost Kantian approach to the analysis of ASM, as it describes and interprets peoples' relationships with the physical environment and with one another, in which there exists a moral geography of norms and unequal relations in the form of mental maps.

Fourth, ASM as a contemporary urban activity is rooted in long-held beliefs and traditions that govern its operations. Here, the role of mythology, of traditional healers, and of spirits' needs are understood in their contexts, as part of the everyday reality of miners. In this sense, the beliefs, and rituals associated with ASM can be explained as a sort of cultural materialism, that make sense to those who engage in it, and which can be rationalised by examining the underlying causes of the rituals and beliefs (Harris 1968).

In summary, the people, power, economies, places, practices and perceptions we found in this study, relating to wealth, employment, natural resources, policing, gender, social norms, violence, opportunity and risk are, we argue, a microcosm of life on the urban periphery in post-apartheid South Africa. Facing multiple levels of exclusion and precarity at social, physical, and legal levels, constrained by an economy that stubbornly fails to keep track of a burgeoning urban population, living in a space that often falls off the government radar for services, the miners, their families and the community in which they live are using ASM as a tool to cling on and survive.

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ⁱ Shona slang for plural male informal gold panners or miners (singular *gweja*) (Mareva 2014:180).

List of maps and figures:

Map of Mining activities in Johannesburg. Source: Chamber of Mines South Africa 2017

