ETHE IMPACT OF MINE CLOSURES/DOWNSCALING ON SMALL-TOWN ECONOMIES:

AN ANALYSIS OF THE KOFFIEFONTEIN MINE

Submitted in fulfilment of the requirements in respect of the Master's Degree of Development Studies in the Centre for Development Support in the Faculty of Economic and Management Science at the University of the Free State, Bloemfontein.

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DECLARATION

I, Oupa Abraham Kale, declare the thesis "**THE IMPACT OF MINE CLOSURES/DOWNSCALING ON SMALL TOWN ECONOMIES: AN ANALYSIS OF THE KOFFIEFONTEIN MINE"**, hereby submitted for the MASTER'S DEGREE QUALIFICATION IN Development Studies at the University of the Free State, is my independent work, and I have not previously submitted similar work for qualification at another institution of higher education.

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ABSTRACT

Over the past 20 years, the South African mining industry has been characterised by mine closure and downscaling. Not only in South Africa, but also in many other countries, local communities, mineworkers, as well as local economies are severely affected by such closures and downscaling. This study looks specifically at the context of the Koffiefontein mine in the Free State province of South Africa and focuses on the effects of unemployment following mine closure. In order to discuss the implication of mine closure in this specific context, the researcher conducted semi-structured interviews with former Koffiefontein mineworkers, municipal officials from the area, as well as the broader community.

Snowball sampling was employed to recruit interviewees, who were asked to comment on their lived experience post mine closure, specifically as it relates to their employment. The study shows that mining activities account for this area's main economic activities. Further, the research indicates that in addition to jeopardising the local community and former mineworkers' livelihoods, the closure of the mine contributes to family disintegration, an increase in crime, psychological distress, income loss, and high levels of migration. Based on these and other related social issues discussed in this study, the researcher recommends that programmes be implemented to increase skills transfer and capacity building. This will allow for labour mobility post mine closure.

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LIST OF ACRONYMS

ADB	Asian Development Bank
B-BBEE	Broad-based Black Socio-Economic Empowerment Charter (2018)
BEE	Black Economic Empowerment
BCEA	Basic Conditions of Employment Act No. 75 of 1997
CDS	Centre for Development Support
CMN	Namibia Chamber of Mines
CSR	Corporate Social Responsibility
DITR	Department of Industry, Tourism and Resources
DGCIS	Department of Government Communication and Information System
DME	Department of Minerals and Energy
DMR	Department of Mineral Resources
DMRE	Draft National Mine Closure Strategy (2021)
DRC	Democratic Republic of Congo
EBRD	European Bank for Reconstruction and Development
EIA	Environmental Impact Assessment
EMA	Environmental Management Act No. 107 of 1998
EMP	Environmental Management Programme
ESI	Environmental Security Initiative
GDP	Gross Domestic Product
HDI	Historically Disadvantaged Individuals
ICMM	International Council on Mining and Metals
IDP	Integrated Development Planning
IFC	International Finance Corporation
LED	Local Economic Development
LRA	Labour Relations Act No. 66 of 1995
MCF	Mine Closure Framework
MPRDA	Mineral and Petroleum Resources Development Act No. 28 of 2002
NDP	National Development Plan
NEMA	National Environmental Management Act No. 107 of 1998
NGP	New Growth Path
RDP	Reconstruction and Development Programme
SLPG	Social Labour Plan Guidelines (2010)

CHAPTER ONE: INTRODUCTION

1.1. INTRODUCTION

A global surge in mine closures has dire impacts on local communities. Recently, countries have closed mines due to declining production and climate policies designed to reduce environmental degradation and water scarcity. Historically, mining companies do not conform to the complete minimum requirements and often shift the responsibility for the impacts of mine closure to the government. This reputation affected the mining industry's image (Swart, 2003) and, consequently, has led to an upsurge in the creation of legal frameworks, rules, and practical strategies to govern the effects of mine closure.

Mines, in general, do not have infinite lifespans. As Hockley and Hockley (2015:2) mention, "mine closure is a historical phenomenon which in the United States, between the 1870 and 1980 period", and is restricted by disputes on mining impacts to the environment, development of the state and mine closure legislation. Stacey *et al*., (2010) argue that mining operations are concerned with a finite mineral resource; mine closure, as part of the mining life cycle, results in economic, environmental, and social issues. As a result, social characteristics need to be considered as part of the mine lifecycle. This is evident when analysing international and national mine closure experiences.

Various reasons contribute to mine closure. For example, the international literature highlights economic factors as a significant cause of mining closure; other causes of decline include conditions of labour and mining casualties (Wu and Rii, 2017). Similarly, mine closure resulted in downscaling of workers and affected mine communities and livelihoods. This study identifies the impact of mine closures in the Koffiefontein mine. According to Stewart (2003), many South African communities face substantial economic, social, and environmental challenges, as early mining legislature was mostly concerned with surface rehabilitation. However, since the enactment of the Minerals Act 50 of 1991, and the National Environmental Management Act 107 of 1998, significant progress has been made in respect of control measures concerning environmental consequences of mining, as well as mine rehabilitation, in South Africa (Swart, 2003). Generally, mining companies must obey the Constitution of the Republic of South Africa (1996), as well as relevant legislative frameworks that promote meaningful closure and socio-economic objectives.

Mine closure is interpreted to mean the same meaning as downscaling, despite the characteristics under which the closure happened. Mine closure occurs when a mine permanently ceases to operate either because the owners are insolvent, or when the company has abandoned the mine without carrying out their rehabilitation and environmental management obligations to an acceptable standard (Swart 2003). Vivoda, Kemp, and Owen (2019) agree that a mine is considered to have closed operations when issued with a closure certificate as provided by Section 12 of the Minerals Act 50 of 1991. When considering prior legislature, Regulation 2.11 applied when the designated government department issued a

certificate clearing the operators from all liabilities, including operating a mine, and accountabilities linked to the mine's social, environmental, and economic impacts.

1.2. PROBLEM STATEMENT

In South African host mining communities, the closure of mines contributes to family disruption or disintegration, apprehension, and anxiety. Most South African mines, posit Prinsloo and Marais (2014), will close within the coming 25 years. The closure of mines leads to downscaling, which implies that unemployment levels increase in both areas labourers migrate from and the local areas surrounding the mine. For example, the sudden June 1982 Koffiefontein mine closure caused 1 200 job losses (Pelser, Marais, Botes, Redelinghuys, and Benseler, 2005). In 1987, the mine reopened; after closing in 1982, during this time, Koffiefontein experienced an increase in population, but in 2006, substantial downscaling took place. De Beers' mining in the area ceased when the mine's old order mining right elapsed, and as few as 405 employees were employed based on site maintenance and care. Petra completed the acquisition in July 2007 but could only re-employ 524 permanent employees and provide employment for additional 200 people through mining contracts.

The mine also contributed substantially to the local economy through salaries, rates, levies, and taxes. The mine was also actively involved in development within the local community. This included the donation of classrooms to the Department of Education, donation of land to local government, involvement in the enhancement of education, developing and assisting in maintaining recreational facilities and, through a joint venture with the local and provincial government, securing an emergency water supply to the town.

The Koffiefontein mine has been reopened and closed repeatedly over the years. All the previous closures had multifaceted impacts, ranging from out-migration, decreased revenue streams for the local municipality (Centre for Development Support, 2005) and high unemployment rates. Of all the consequences of min closure, a dearth of employment is possibly the most enduring and noteworthy, with locals still deeply affected years after the downscaling. Mine closure/downscaling inevitably results in income loss as well as declining living standards (Marais, Van Rooyen, Nel, and Lenka, 2017).

Furthermore, although the processes regarding the closure of mines are legislated in South Africa, whether mining concerns implement plans to allay the resultant socio-economic effects is their choice. This lack of performance has created a situation where mining companies have ignored developing closure plans. This situation continues despite stricter regulatory controls and greater public scrutiny over mine closures and the collective environmental-, economic-, and social outcomes of the mining process. However, there has also been a general lack of attention and negligence by the mining industry to the potential consequences of closure for mining communities (Digby, 2016). These consequences

include a heritage of pollution, open mines, and abandoned towns (Ackermann, Botha, & Van der Waldt, 2018).

Extant research indicates that small South African towns experience economic decline after mine closure (Marais and Atkinson 2002). Similarly, the downscaling and closure of the Koffiefontein mine have left an economic vacuum and a distressed community. Mine closure affects immediate families, the business community and mineworkers who lose their jobs. Communities experience dire consequences when downscaling happens. This study addresses research questions related to the socio-economic effects of closure or downscaling of mines downscaling and/or closure and its implications on ex-miners and communities' livelihoods.

1.3. AIMS OF THE STUDY

In this treatise, the researcher seeks to explore the socio-economic consequences of the Koffiefontein mine closure. The pertinent research objectives inherent in this study are.

- To examine global and national literature on mine closure;
- To evaluate mine policy and regulation on mine closure in South Africa;
- To understand how the Koffiefontein community perceives socio-economic development and mine downscaling in the vicinity;
- To assess the influence of the Koffiefontein mine downscaling and closure and how closure affected the community of Koffiefontein;
- To assess what coping mechanism the Koffiefontein community has put in place to allay the socio-economic challenges following the mine's closure; and
- To make recommendations regarding the diversification and sustainability of the local economy resulting from the closure of the mine.

1.4. KEY CONCEPTS

The researcher draws on the following concepts for this research.

- **Downscaling**: While depletion of natural resources is often the primary impetus behind the downscaling or closure of a mine (Marais & Atkinson, 2006), this study operationalises downscaling to the shedding of jobs by mining companies, as well as the stage of deterioration results in the closure of a mine (Ndeleki, 2018).
- **Ex-mineworkers** refers to workers who worked in the mine and lost their jobs due to closure or downscaling. According to the World Bank (2014: 3), "[t]hese are any persons previously classified as mineworkers but not currently employed as mineworkers".
- **Family disintegration** is defined as the disbanding of marriages as well as the presence of strife and conflict in a household. This phenomenon, according to Oka-Jaja (2020), threatens sustainable community development, as it "encourages a lack of respect for human life and

distortion of values", contributes to the prevalence of gangsterism and violence, and results in the "collapse of traditional family life" (Oka-Jaja, 2020: 360).

- **Labour-sending areas** refer to areas mineworkers are recruited from.
- **Livelihood** is defined as "a means of living with related activities, assets, and capabilities" (Krantz, 2001).
- **Mining**: The term refers to actual operations, occupations and sectors involved in mineral resource explorations. Mining includes extracting minerals from underground.
- **Mine lifecycle**: This term describes the potential extraction process of minerals and ores from a mine and encompasses the process from when mining activities commence up to the point of mine closure (Robertson & Blackwell 2014).
- **Mining town**: Littlewood (2014) recognises an overlap in what is defined as a mining town, a company town, and a resource town. Some towns where mining occurs are still considered company towns, where the mining company owns the bulk of the housing and stores while also being the primary source of employment. Resource towns refer to isolated communities that spring up in areas surrounding industrial activities based on resource extraction (Stelter & Artibise, 2021). For the purpose of the current research, the term mining town is employed to refer to communities which can be affected, either directly or indirectly, by mining activities, which would be severely affected by mine closure (ICMM, 2019).
- **Closed mine**: A stage where mining stops, and the owner takes responsibility and complies with closure regulations (ICMM, 2019). Vivoda, Kemp, and Owen (2019) agree that a mine is considered closed when it has been issued with a closure certificate.

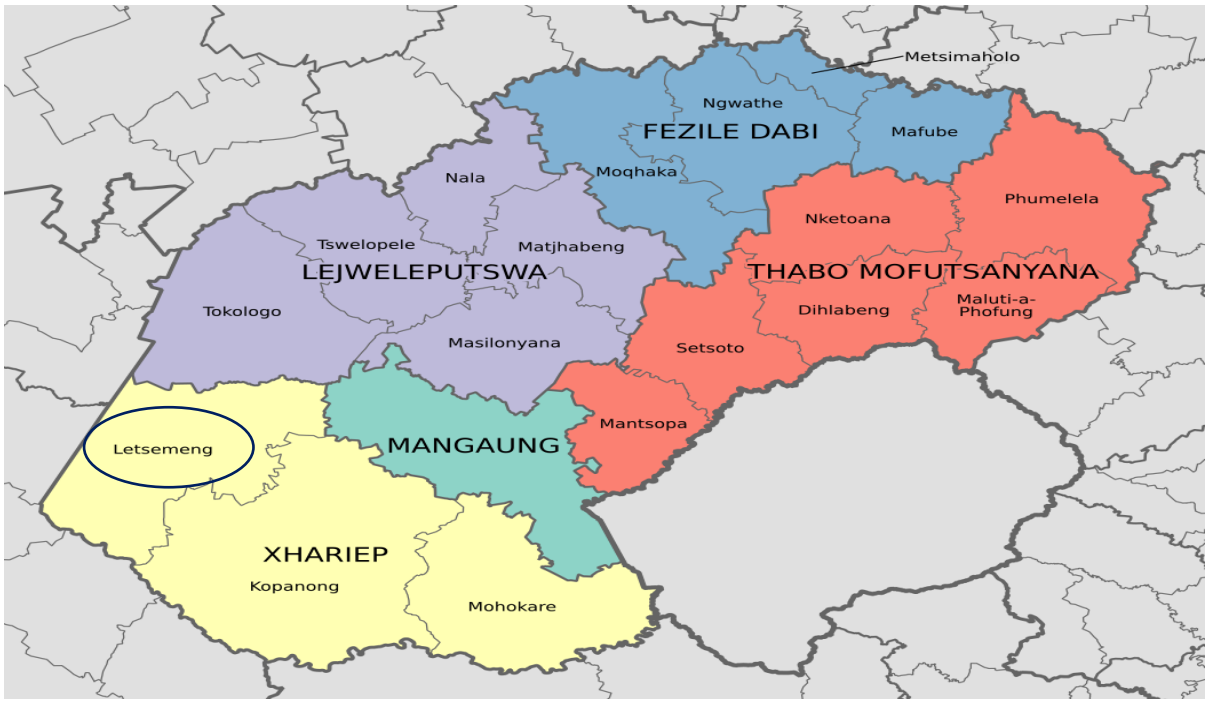
1.5. RESEARCH METHODOLOGY

This section describes the methodological design employed in conducting the current study. The discussion focuses on the data collection methods, data analysis approaches, and how the data is analysed so as to ensure that the study's aims and objectives are met. Furthermore, this section elaborates on the limitations of the research as well as data collection challenges before stating the ethical aspects considered for this study.

1.5.1. Research study area

According to Gaigher (2016), Koffiefontein is a rural town in Letsemeng Municipality, one of the 18 towns in the Xhariep District and situated in the Southern part of the Free State. Mining operations started under the De Beers Consolidated Mines. Like any operation, the mine experienced closure for various reasons. The Koffiefontein mine has been one of the world's top-producing kimberlite diamonds and was the leading diamond mine operating in the Free State. The mine is well-known for its high-value diamonds. Despite the high quality of its diamonds, the mine has had a complex history, characterised by fluctuating operating conditions and even closure.

Figure 1.1: Map of municipalities in the Free State



Source: Wikipedia (2022)

Koffiefontein is a rural town. Agriculture is the main source of social- and economic development. Employment in the area is also created by the diamond mining industry in the town. The area also has mining activities, with diamonds being the primary natural resource that helps with employment creation. However, mine closure effects cannot be ignored. Less buying power affects business activities, unemployment levels increase, and the municipality's tax base is reduced, especially where the mines subsidised workers by paying for their municipal services, like in Koffiefontein (Marais & Atkinson, 2006). Municipal resources are overstretched, and service delivery is compromised.

1.5.2. Research approach

Bryman (2016) explains that qualitative research design is a study method that does not employ numbers or statistics, but rather words, in the gathering and analysis of data. A significant feature of qualitative research is its fundamental focus on delineating characteristics of events, traits, interactions and meaning, as well as experiences and cultures. Hence, qualitative researchers are not concerned about the numerical description of things and their relationships (Tewksbury, 2009). The qualitative method is preferred because the research is conducted naturally to understand participants' experiences after the mine closure. Instead of using artificial or fabricated environments, the researcher aims to conduct research in everyday settings and situations. Further, qualitative research emphasises the interpretation of people's views.

1.5.3. Case study design

In order to address the questions posed by this research, a case study design was followed to thoroughly examine the issues relevant to the topic and capture the views and personal experiences after closure or

downscaling. According to Bryman (2012), the basic case study entails a single case being analysed intensively and in detail, where 'case' is linked to a location (such as an organisation or specific community). Therefore, the Koffiefontein community is suitable for performing a case study.

Case study design entails a thorough analysis of single or multiple cases. This type of design, posit Ishak and Bakar (2014), enables researchers to focus on one particular case, unless the selected case represents a distinctive scenario similar to the research. Likewise, Bhattacherjee (2012) confirms and describes this research method as a tool to exhaustively interrogate a phenomenon, spanning a specific period of time, in its natural setting comprising one or more sites. This design is useful for the Koffiefontein study because of its flexibility in working with multiple variables. Babbie and Mouton (2010) state that "the interaction of the unit of study with its context is a significant part of the investigation". Finally, the case study design enables the researcher to analyse the area under investigation in an intensive and detailed manner. The in-depth case study descriptions also help readers experience and understand the personal feelings and views of the research participants (Neuman, 2012).

1.5.4. Data collection methods

Key informants were approached for conducting semi-structured interviews; such informants include ex-mineworkers, community leaders, municipal officials, and business owners, to gather the necessary data. This data collection method is appropriate for working with small samples and valuable for studying specific situations, such as the effects that the downscaling or closures of mines might potentially have on mining communities. Semi-structured interviews with key informant are essential to supplement and validate information derived from other sources. Through semi-structured interviews, informants shared ideas and views, effectively gaining insight into problems that are not immediately observable but are a cause for concern in specific population segments (Neuman, 2012).

This study analyses the effect of mine closure on the small-town economy of Koffiefontein. Therefore, to guide the interview process, a list of questions was prepared in advance. The researcher met the participants in person and used a mobile phone to record discussions with interviewees. Consent was sought before any recording occurred, and the reason was provided to participants before the interviews. All recordings were transcribed and were helpful when analysing data.

i. Target population

Interviews were conducted with several stakeholders. This was done in an effort to evaluate their concerns and ability to manage the effects of mine closure. To cover all sectors in the area, participants from local- and provincial government, the mining company, as well as the surrounding community were involved.

The target population includes the following groups of people who are essential in providing the information crucial to this case study:

- Ex-mineworkers;
- Local municipal officials (for example, local economic development (LED) officers and the municipal manager);
- Business owners;
- Community members; and
- Community leaders.

The groups were identified because of their background regarding the case and their knowledge that would assist the researcher with first-hand information on socio-economic development issues and mine downscaling and closure in Koffiefontein.

1.5.5. Sampling design

The researcher utilises a non-probability sampling technique in this treatise, as it is impractical to interview all ex-mineworkers or the community. Marlow (2011) states that this sampling technique comprises participant selection, where participants meet the research question's essential requirements. In essence, human judgment will affect the selection technique; certain sample population members are more liable to be selected than others. Based on the challenge of gaining access to the entire population of Koffiefontein – a process that would take several years and incur significant financial costs –the researcher interviewed 13 individuals as participants. Indeed, states Bryman (2012:55), "limitation of sampling size is likely to be profoundly affected by matters of time and cost". This is a sentiment echoed by Forster (2001), who notes that non-probability sampling allows for ease of data collection as well as lower costs.

Despite critiques of this sampling method stating that it lacks the statistical underpinnings of probability sampling techniques, the fact that it can be used in targeting particular population sections renders it imminently useful. Galloway (2005) notes that a well-structured study that employs non-probability sampling can render a great deal of pertinent conclusions, as the percentage of the sampling population involved is "truly representative of the population as a whole" (2005:860).

1.6. DATA ANALYSIS

After completion of the in-depth interviews, each interview was transcribed. The transcriptions were done meticulously so as not to omit any details from the readable transcript, which could compromise not only the study itself, but also the quality of the study's findings. The recording and transcripts could only be accessed by the researcher, and were kept in a safe location.

Once the transcripts were formatted in such a way that they could be analysed, the researcher categorised and coded substantial sections of the transcripts that related specifically to the aforementioned research questions; these pertain mainly to the effects of mine closure and/or downscaling on socio-economic development. The transcripts were read one at a time and later again

as a cohesive unit in order to conduct a thematic analysis. This analysis aids in identifying emerging and recurring themes in the qualitative data. This process involves the coding of the interviews, which Sutton and Austin (2015:226) describe as "the identification of topics, issues, similarities, and differences", which become evident in the interviewees' responses, and which the researcher then interprets, a definition echoed by Oplatka (2001). This allows for the grouping of codes from transcripts to coherently and meaningfully present qualitative research (Sutton & Austin, 2015). Nowell, Norris, White, and Moules (2017) agree that the qualitative thematic analysis technique aids in summarising the significant features present in a broad data set. As part of this process, the researcher did not read through extant literature beforehand to identify common themes, but rather allowed the questions and responses thereto to guide the coding process. After the literature survey (Chapter 2) was conducted, these codes were reclassified in order to facilitate discussions of themes already identified in prior research, and new themes not present in prior research were added as additional discussion points. The codes were first grouped by question so as to ascertain participants' similar or differing views on the same issues. While reading through the transcripts, the researcher also identified quotes from respondents relevant to the themes identified. Then, the codes were collapsed to amalgamate them under the broader themes of the economic impact of mine closure on single-economy mining towns, investment and market penetration, dependency, and interdependence, as well as infrastructure breakdown (*cf.* Chapter 4).

The thematic analysis the researcher undertook in this study aimed to find common themes identified by the study's target population regarding the effects of Koffiefontein's mine closure. By analysing the interviewees' responses through the coding process, themes were classified under the headings of economic impact, investments and market penetration, infrastructure breakdown, and social issues (such as crime, migration, teenage pregnancy, etc.). These are discussed in a later chapter.

This study used various techniques (field notes and transcriptions) to record observations consistently. Since confirmability aims to ensure both the researcher and data interpretation are objective, the researcher ensured that his biases, interests, and motivations do not influence the research results.

1.7. ETHICS

Organised research is regarded as a practice of human conduct; therefore, the procedure must comply with the ethical standards of academic research (Mouton 2016). Bryman (2016) agree that research that may cause harm to groups of people or individuals is unacceptable. Therefore, the researcher applied for and received ethical clearance approval from the General Human Research Ethics Committee (GHREC) of the University of the Free State (UFS – HSD2020/2004/2201). Likewise, the ethical committee and guidelines protect the researcher from conducting harmful research, participants from unethical behaviour and the instruction's reputation.

1.7.1. Informed Consent

Consent comprises informing participants of the scope, aims, objectives, and research protocols for the study, and to obtain their buy-in in the research study. In this way, participants are able make informed decisions relating to their study participation (Bryman 2016). For this study, participants were assured that their involvement was voluntary. This implies that participants may refuse participation without any recourse or blame from the researcher. Some participants opted to give written responses during the interviews instead of undergoing a physical interview process.

Before interviews could start, participants were asked to complete consent forms. These forms included the researcher's information, research study, the study's purpose, and nature, as well as the interview process. The consent form is attached as an addendum to this study.

1.7.2. Harm

During this study, participants were safeguarded from any harm that might potentially be incurred.

1.7.3. Confidentiality and anonymity

Before the interview, participants were guaranteed privacy and identity protection and the information they provide remain anonymous and confidential. Likewise, to protect the respondents' identities, numbers were assigned to replace their names during the data analysis.

1.8. VALUE OF THE RESEARCH

Although interest in mine closure and mine downscaling have increased over the past two decades, this study will contribute towards understanding not only the economic, but also the social impact of mine downscaling in a small town.

1.9. CHAPTER OUTLINE

This study comprises five chapters, which are outlined below.

Chapter two provides an overview of international scholarly work related to mine closure and which pertains to the aims and objectives of this study. The two chief focal points of this chapter are literature pertaining to mine closure across the globe, as well as in the South African context. Mine's economic contributions are scrutinised from an international perspective, focusing specifically on mine closures' impact on socio-economic effects on the surrounding communities, usually evident as the mine lifecycle nears completion.

Chapter three focuses on mine closure policy in South Africa by investigating mine closure policies and mining legislation in the country. January and Lee (2019) note that such statutory frameworks are effected in order to address the effects of mine closure and abandoned mines in the socio-economic and environmental contexts. Other relevant and secondary legislation pertinent to the regulation of mine closure and its impact on environmental and socio-economic sustainability are also considered.

Chapter four presents research findings and analysis following the researcher's extensive data analysis, while the final chapter presents and identifies the research's main findings, emphasises key recommendations and research limitations, and identifies future study recommendations.

1.10. RESEARCH LIMITATIONS

This study is important because little research has been done to evaluate the impact of the CDS report's (UFS, 2005) findings and recommendations regarding the Koffiefontein mining development project and its impact on the town's sustainability. However, there are limitations to this study. Firstly, the mine was bought by Petra Diamonds in 2007, which can make it difficult to determine the progress made in the implementation of the report's findings. Secondly, it is 15 years since the findings were presented, which implies that these may be outdated or no longer applicable.

One challenge encountered during the study includes the unavailability of representatives and key stakeholders, such as the Department of Mineral Resources and Energy (DMRE's) and Petra Mine's general managers for face-to-face interviews. Though this could influence the research outcome, these parties were unwilling to confide their views to the researcher.

The one major limitation of the study is the sample size: out of 25 targeted participants, only 13 finally took part in the interviews. It was quite challenging to interview the government department, the district municipality, as well as the DMRE; some sample population members were not comfortable being interviewed, while others were too busy or had no mandate to share company information.

CHAPTER TWO: LITERATURE REVIEW

2.1. INTRODUCTION

This section discusses literature related to mine closure and outlines closure activities during the mine lifecycle. Since the first mining activities started more than three centuries ago, the world's landscape has been marked by its effects, "generally as the ancient regions of excavation or web sites of metallic working" (Clark & Clark, 2005:67). Literature on mining towns reveals that such towns have been in existence since the 19th century (Littlewood, 2014). The formation of company towns (*cf.* Chapter 1) is intrinsically connected to the industrial revolution of the 1800s, when prospecting companies were established and company towns were used as control towns (Marais, Haslam-McKenzie, Deacon, Nel, *et al*., 2018), named as such because the workforce could be managed and controlled (Rubbers, 2019).

As long as mining has existed, mine closure has been a reality. Mines have finite lifespans, not only due to the limited amount of minerals to be extracted, but also due to the nature of mining capitalism and its development. Further, mine closures are considered the result of "political rationalities that stem from mining companies' adaptation to local circumstances" (Rubbers, 2019:88). Mine closure is further complicated by physical mine waste resulting from mining activities and the residual environmental effects thereof. However, some governments have passed appropriate policies and laws for mine closure (Clark & Clark, 2005). Vivoda, Kemp, and Owen (2019:6) view the state's role in mine closures as taking responsibility for ensuring that "mining companies have sufficiently prepared for closure, that mine closure is implemented following the law, and to the affected communities' satisfaction".

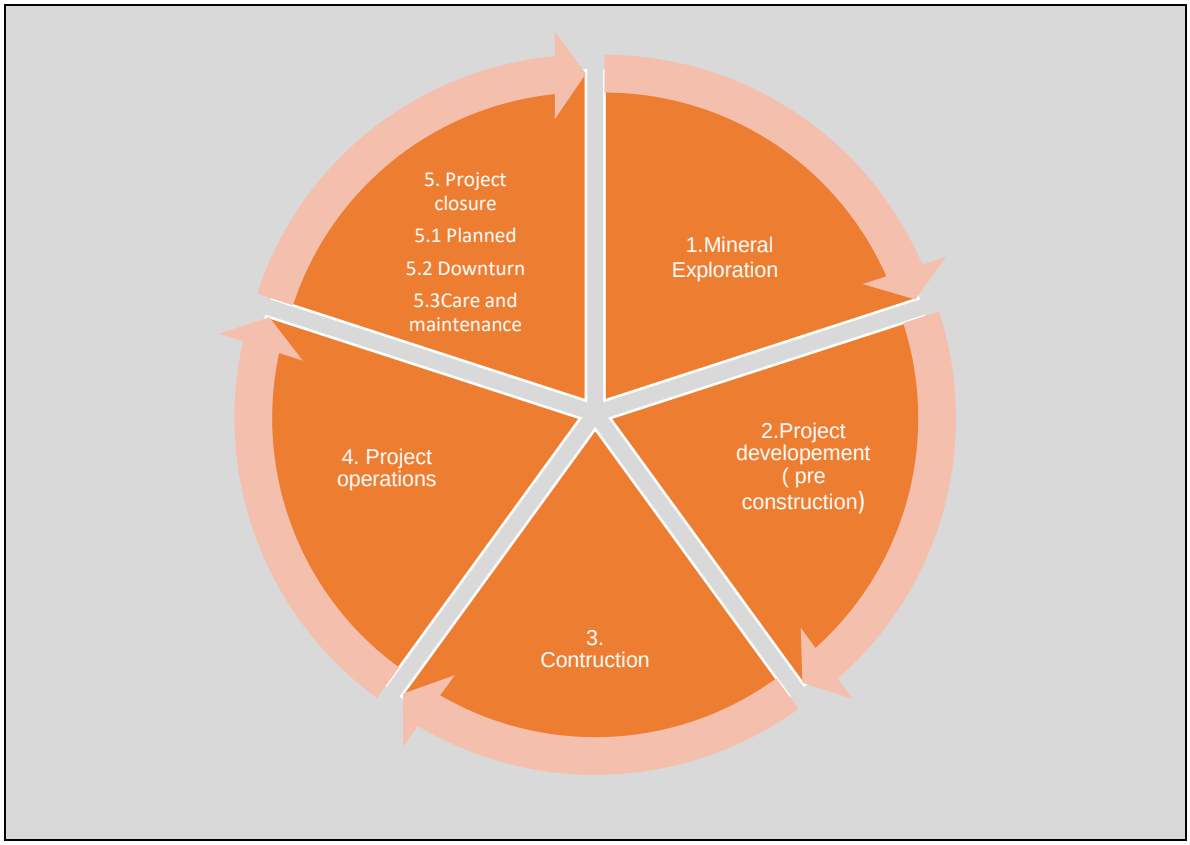
This chapter provides a review of international literature regarding mine closure. It further offers a general outlook on the mining lifecycle and explains each stage's activities and the extent to which each step affects the environment. The specific focus is on the mine closure stage. While mine closure characteristics and consequences are discussed, the chapter also touches on both the international and local legal frameworks regarding mine closure in different countries. Likewise, matters of mine closure as it relates to social aspects are considered in order to demonstrate the adverse effects on the local economy and its contribution to poverty and unemployment. Finally, the chapter provides reasons for mine closures and concludes by discussing evidence of the impact of mine closure on mining towns.

2.2. THE MINE LIFECYCLE

Mining is an important economic sector in countries around the globe. Due to its significance, understanding the mine lifecycle is of importance. In the context of this study, this lifecycle is equally important, as it is "critical to developing enduring value from mining for remote communities" (Robertson and Blackwell, 2014:1). These authors define the mine lifecycle as a process that involves the possible extraction of ores/minerals from the inception of mining operations until mine closure (2014).

There are five stages to consider in the lifecycle of a mine, as depicted in Figure 2.1 below. The mine lifecycle is divided into five stages, namely "exploration and prospecting, site design and construction, mine operations, final closure and decommissioning, and post-closure" (Blackwell and Fordham, 2018: 99).

Figure 2.1: Mine lifecycle



Source: Blackwell and Fordham (2018: 99)

2.2.1. Exploration Stage

Exploration is the departure stage for any mining project that aims to unlock benefits for communities. During this phase, companies employ geologists to prospect in specific areas where the presence of mineral deposits is suspected. The purpose of this phase is twofold. Firstly, prospectors gather information about the area. Secondly, the value of any mineral deposits present need to be evaluated. Many countries around the globe require discrete environmental impact assessments (EIAs) during the exploratory phase. These assessments are done for various reasons. Firstly, citizens are able to take part in the decision-making processes of the mine. Secondly, both the environment and the community may be on the receiving end of extensive disruptions. Finally, should no prime natural ore deposits be found during the exploration stage, subsequent mining stages cannot proceed (Environmental Law Alliance Worldwide, 2010).

In Canada, two phases are enacted in respect of exploration, namely an initial and an advanced investigation phase. In the initial phase, methods such as geochemical and geophysical surveys are used for geological mapping. The viability of a mine is determined by the outcomes of the advanced phase. The chief aims of the advanced stage are to "describe the quantity and quality of potential ore and the geometry of the deposit and determine the most appropriate mining and processing methods" (Environmental Canada, 2009:26).

Before companies can commence the prospecting process, says GlobalMine (2015), prospecting and reconnaissance rights should be obtained. Mining practice in the Democratic Republic of Congo (DRC), for example, adheres to two kinds of mining rights, namely research or exploration rights, and exploitation or operation rights. The country's mining policy provides details regarding the information required for exploration applications. The KPMG Global Mining Institute (2014) notes that mining permits providing exclusive exploration rights need to be used within six months of their issue by companies they are issued to. The exploration stage can take between seven and ten years to complete.

2.2.2. Planning Stage

This stage occurs only after exploration when results obtained during the exploration stage confirm the availability of the resource to be exploited. During the planning stage, consultations and engagements between the mining company, government, and communities take place. This is a crucial stage, as poor planning and management may affect the community as well as the environment (Mauric, McCullough, Wilson-Clark, Witcomb, *et al*., 2012). In this stage, the technical, fiscal, and ecological viability of a project are outlined. Furthermore, mining companies must develop mine closure plans during this stage; these should stipulate the actions these companies will take to minimise concerns related to their processes before mining commences (Skousen and Zipper, 2014). The stage is often lengthy for big mining projects, and could last between two and ten years. For example, Sonogan (2015) states that Newcrest initiated a study during the planning stage of the Wafi-Golpu gold project in Papua New Guinea in 2009. Construction for the project could only commence six years later, with production only estimated to commence in early 2020.

2.2.3. Construction

The construction process can only start after research has been completed, and when permits and licenses have been approved. The construction of mining sites comprises establishing infrastructure for the entire mining operation, and includes the development of location infrastructure, ore processing facilities, waste management areas, and so on (Environment Canada, 2009). Other critical components that need to be constructed are roads, processing amenities, and environmental management systems (Sonogan, 2015). Furthermore, mining support facilities like employee accommodation, offices, laboratories, and workshops have to be established before operations commence.

The primary activity during this stage is the construction of mine workings either above or below the surface to access the available minerals. This may result in land-use changes, which can adversely affect the environment. Harmful effects include soil profile alteration, water system pollution, high volumes of dust and noise emissions, deforestation, and subsequent erosion, etc. (Haddaway, Cooke, Lesser, Macira, Nilsson, Taylor, and Raito 2019). During this stage, mines are also at risk of closure due to insufficient funding and economic instability. Often, mines that cannot afford mine construction enter into joint ventures or seek international investors (DME, 1998).

2.2.4. Production

Mining comprises extracting minerals from under the ground's surface. The production stage may include the adjustment of systems, ore exploration activities, and expansions (Sánchez, Silva-Sánchez, and Neri, 2014). As mining progresses, exploration and development are likely to continue and possibly extend the lifespan of the mine, which has additional cost implications. The most common mining techniques are surface- and underground operations. The choices depend on the features of the mineral deposits to be extracted and the limitations of safety and technology, as well as environmental and economic concerns. The production stage can take between five and 30 years to complete.

The aforementioned elements are applicable in determining the most suitable mining techniques. For example, underground mining is complicated and costly; it also necessitates exhaustive preparation for the protection and comfort of employees (McLellan, Corder, Giurco, and Green, 2009). In underground mines, mining is conducted by using shafts or tunnels while the rock overlying the mine remains intact (Tagne, 2018); surface mining involves open-pit mining, quarrying, and stripping in order to get rid of the soil and the rock overlying the overburden (Zendehboudi and Bahadori, 2017).

2.2.5. Closure, decommissioning, and reclamation

Mining is a highly disruptive action, frequently causing significant environmental changes. Mining refers to the provisional use of the land – no mine can function indefinitely. Once mining activities are exhausted, the process of closing starts. The closure stage marks the completion of mine decommissioning activities. Decommissioning starts before production ends and is concluded when all unusable facilities and infrastructure are eradicated. Steps are taken to certify the location as safe and stable, including reclamation and social programmes (Sánchez *et al*., 2014:9).

Where mining activities will cease in the near future, or where mining operations have already stopped and mines have closed, social programmes should be instituted as part of these processes. These programmes are essential in areas in which communities are heavily dependent on the mining industry, and should consider several factors, including education, sustainability after mine closure, and job creation. Therefore, most countries' mining legislation stipulates that mining companies should restore

the environment to its natural state as far as possible to render it accessible for other uses (Mining Matters, 2016).

Clark and Clark (2005:68) note that "the most discussed types of mine closures are abandonment and terminal closure; the latter occurring when an orebody is mined out and a company, following reclamation and rehabilitation permanently cease operations". During this reclamation process, opened areas should be filled with waste rock, sand, or concrete. The process further involves the demolition of buildings and disassembly of facilities, as well as covering up any shafts. The aim of environmental reclamation is to mitigate the harmful impact of mining on water and air sources, as well as soil, in areas surrounding mines. To restore the environment to a functional level, the landscape should be developed and conserved, and soil quality should be brought back to its pre-mining levels (World Bank, 2018:44).

Therefore, post-mining land use and project development should not be considered in isolation. Vivoda and Fulcher (2017) confirm that, before a permit that allows mining to proceed is issued (usually a primary element of the EIA process), guidelines for mine closure and environmental reclamation must be in place. Likewise, closure plans are commonly considered in feasibility studies conducted on the issuing of a mining license (World Bank, 2018), and mining companies are further expected to leave the environmental areas surrounding the mine area in the same condition as before mining activities commenced. However, in practice, mining companies are often exonerated from "environmental damages and liabilities and responsibilities related to the mine's economic, environmental and social impacts" (Vivoda *et al*., 2019:4). This observation implies that mines often escape the reclamation and rehabilitation processes, but also escape liability for the socio-economic consequences of mine closure.

2.2.6. Post-closure stage

This stage of the lifecycle follows the complete execution of decommissioning activities, namely "care, maintenance, and social programs towards achieving closure objectives" (Sánchez *et al*., 2014:10). Thus, the post-closure stage comprises a "permanent care scenario" that could last for several years; it aims to aid companies in realising relevant activities to attain their closure goals. This is accompanied by a temporary plan comprising task monitoring, inspections, and other activities that characteristically require once-off measures (Sánchez *et al*., 2014). This implies stakeholder engagement during the post-closure stage, which can be a protracted process (Sánchez *et al*., 2014). During this stage, constant engagement with affected communities is vital, emphasising monitoring, land use, and information sharing about projects and programmes.

In brief, the mine lifecycle – prospecting, exploration, construction, operation, maintenance, expansion, abandonment, and decommissioning – influences both social and environmental systems positively and negatively, as well as directly and indirectly.

2.3. AN INTERNATIONAL OVERVIEW OF MINE CLOSURE

Mines across the world have a finite life span; consequently, mines are forced to close down after operating for a certain amount of time. Mine closure is the final stage of diminishing mining operations, and occurs after processing and production come to a complete halt with no further mining prospects (Vivoda *et al*., 2019). The most common closure types are abandonment and terminal closure. Terminal closure happens during the production process when companies, following reclamation and rehabilitation, permanently cease operations (Clark and Clark, 2005). Mine abandonment was, in the past, the most accessible option for companies wishing to discontinue mining (Buck & Gerard, 2001). During this period, mines are abandoned for a variety of reasons. Firstly, mines may be abandoned because the commodity has become uneconomical. Canada, for example, declares a mine closed when the minerals are uneconomical or depleted (Mining Matters, 2016). Secondly, mines are sometimes abandoned because they constitute a hazard to human health and environmental security due to the contamination of water systems with heavy metals and other lethal (by)products resulting from the mining process, including arsenic, mercury, etc. (Hufty, 2019). Thirdly, as is the case in Australia, mines can be abandoned under a continuous state of "care and maintenance" (DFAT, 2016:2).

Currently, of 380 operating mines worldwide, 155 (roughly 41%) are expected to close down between 2019 and 2030. Pressure to put an end to thermal mining for coal, and to stop the utilisation of coal-dependent power plants, is growing; and both companies and governments are under pressure to comply, as failing to do so will cause global warming temperatures to exceed 2 °C (Vivoda *et al*., 2019).

Premature or unplanned mine closure occurs before the commodity is depleted (Lèbre, Owen, Stringer, Kemp, *et al*., 2021). Unexpected closure could occur due to political interference, lack of markets, or technical-, environmental-, or social reasons; some mines never recover from these challenges to resume mining. Other causes include technical problems, geotechnical and geological issues, resource exhaustion, or equipment failure and mechanical failure, which all contribute to an increase in mining expenses (Laurence, 2006). In the DRC, for instance, mining is severely inhibited due to conflict in the East of the country. This is a critical mining region marred by political instability, infrastructure shortages, and unreliable electricity supply, all contributing to mining difficulties in the areas (KPMG Global Mining Institute, 2014).

It is not an unfounded notion that the above-mentioned challenges could and do occur in many of the world's countries. Countries such as the United States of America, Canada, England, Wales, and Australia have successfully implemented mine rehabilitation, reclamation, and closure plans (Clark and Clark, 2005). Because of the circumstance under which mining closure takes place, comprehensive renewal may be impossible. However, positive redress, recovery, and rehabilitation outcomes are achievable (Vivoda and Fulcher, 2017). The government's role in realising these outcomes is to pass and enact suitable mine closure policies and legislation.

2.3.1. The global legal framework for mine closure

The focus of this section is to interrogate how and why policymaking is essential for mine closure. With the global landscape marked with the remnants of mining operations that started more than 3 000 years ago, Clark and Clark (2005:67) remark that "[g]overnments need to ensure comprehensive mine closure occurs within the broader social, economic equality and sustainable development context". According to Vivoda *et al*. (2019:7), "mine closure is an acute subject for governments, and many rules, laws, and regulations, exist to control or govern behaviour effectively and logically". These various laws and regulations function as tools to define policy and resolve inequalities on the economic- and market scales, as well as in the social sphere.

According to Lupalezwi (2014), the mineral extraction sector in Namibia is guided by several laws passed since 1991 that help in these regards. The most important are

- The Minerals (Prospecting and Mining) Act No. 33 of 1992, which lies at the core of Namibian policies related to mining. The objective of this policy is to attract investors by producing an environment conducive to mining activities; this Act aims to ensure optimal financial gain for the country's citizens. The policy further provides for the advancement and encouragement of investment in exploration and mineral extractions, promoting an environment conducive for the industry, advocating for local people's participation in mining and exploration, and ensuring socio-economic empowerment by implementing necessary measures (Lupalezwi, 2014);
- The Environmental Management Act (EMA) No. 7 of 2007, which addresses the implementation of closure plans for rehabilitation (Lupalezwi, 2014); and
- The Namibia Mine Closure Framework (CMN, 2010), a framework that aims to guide the mining industry regarding the development of closure plans that are cost-effective, practicable, and applicable. Mine closure is central to this document, which recommends that all appropriate financial-, knowledge-, and skills resources be made available at the implementation stage of a closure plan (Lupalezwi, 2014).

In Canada, various sets of laws regulate mine closure (Mining Matters, 2016). Although the processes of mine closure or downscaling regulations apply to several countries globally, the capacity to implement rules remains a challenge despite applicable closure regulations (Kung, Everingham, & Vivoda, 2020; Morrison-Saunders, McHenry, Sequeira, Gorey, *et al*., 2016). In Ghana, for example, despite the country having a general and well-recognised regulatory framework for the mining sector, illegal mining is conducted through large-scale mechanised operations by non-Ghanaians, while citizens of the country hamper closure planning (Morrison-Saunders *et al*., 2016:124). Bermúdez-Lugo (2014) points out that the illegitimate artisanal extraction of gold is a problem for the Ghanaian government. If this issue is not dealt with, it may result in economic implications due to such operations disturbing legitimate mining companies and polluting water sources.

In some countries, the state administers mining. However, each jurisdiction has its own endorsement process, and the acquisition of a mining license demands the existence of a mine closure plan. For example, the Chilean government requires compliance with legislative provisions, including the formulation of a closure plan, as a precondition for obtaining a mining license (Clark and Clark, 2005). Available closure plans offer regulators acceptable related examples of standards; however, regulations differ from one jurisdiction to the next and fluctuate over time, restricting these plans' purpose (Manero, Standish, and Young, 2021).

Mining operations take place within the formal restrictions and regulations of the state. In some countries, mining operations can only proceed after a closure agreement has been reached and the social impact conditions have been assessed (Vivoda *et al*., 2019). Vivoda *et al.* (2019) contend that many authorities have globally passed and applied regulations and legislation pertaining to mine closure. In addition, international bodies like the Environmental Security Initiative (ESI), the Asian Development Bank (ADB), the International Council on Mining and Metals (ICMM), the International Finance Corporation (IFC), and the World Bank have developed guidelines to promote mine closure practices globally in order to safeguard mining sustainability and growth (Collins, 2015; Bainton & Holcombe, 2018).

Even though, in most countries, overarching national laws and regulations regarding mine closure have been effected, Canada enacted specific legislation that makes provision for reclamation and abandonment, which requires that an EIA be in place before the closure of the mine (Clark and Clark, 2005). Similarly, European countries apply a comprehensive approach in dealing with mine closure (see Table 2.1). The World Bank (2018:28) confirms this by pointing out that "the impacts of coal mine closure were more effectively and efficiently addressed when countries adopted comprehensive reform programs".

Countries like Australia, Brazil, Canada, and New Zealand have constitutional environmental administration requirements that need to be complied with when care and maintenance operations are in effect. However, these are temporary measures; during the period they are in place, the mining company is expected to submit a closure plan to respective mining authorities detailing what will happen should the mine close (Kung *et al*., 2020). The mine closure policies illustrated in the tables below show the general mining laws and related regulations in countries worldwide (see Table 2.1).

Table 2.1: Statutory requirements for mine closure in specific states in the USA, and in Canadian, European, and Canadian provinces or territories

Country, state, or province	Specific provisions for reclamation	EIA required before lease	Bonding procedure	Provisions for abandonment	Provision for non-compliance
Asia					
Japan	Yes	Yes	Yes	Yes	Yes
Australia					
New South Wales	Yes	Yes	Yes	No	Yes
Northern Territory	Yes	Yes	Yes	No	Yes
Queensland	Yes	Yes	Yes	Yes	Yes
South Australia	Yes	Yes	Yes	Yes	Yes
Victoria	Yes	Yes	Yes	Yes	Yes
Western Australia	Yes	Yes	Yes	Yes	Yes
Canada					
British Columbia	Yes	No	Yes	Yes	Yes
Manitoba	Yes	Yes	Yes	No	Yes
New Brunswick	Yes	Yes	Yes	No	No
Northwest Territories	Yes	Yes	Yes	No	X
Nova Scotia	Yes	Yes	Yes	Yes	Yes
Ontario	Yes	Yes	Yes	Yes	Yes
Quebec	Yes	Yes	No	No	No
Saskatchewan	Yes	Yes	No	No	No
Yukon Territory	Yes	Yes	Yes	No	Yes

Europe					
Germany	Yes	Yes	Yes	No	Yes
Ireland	Yes	Yes	Yes	Yes	Yes
United Kingdom	Yes	Yes	Yes	Yes	Yes
Wales	Yes	Yes	Yes	Yes	Yes
United States					
Alaska	Yes	Yes	Yes	No	Yes
Arizona	Yes	Yes	No	No	Yes
California	Yes	Yes	No	Yes	Yes
Montana	Yes	Yes	Yes	No	Yes
Nevada	Yes	Yes	Yes	No	No
New Mexico	Yes	Yes	No	No	Yes
Utah	Yes	Yes	No	Yes	Yes
Washington	Yes	Yes	No	No	Yes
Wyoming	Yes	Yes	No	Yes	Yes

Source: Clark & Clark (2005:71)

So far, countries with long mining histories, like Australia and Ghana, have incorporated mine closure mechanisms and tools together with plans for mine closure, risk management, and economic provision with risk management, mine closure plans, and financial provisions for managing mine closure-related issues (Tagne, 2018:26).

Table 2.2: Rules, regulations, and provisions in mining legislation in Africa, Asia, Latin South America, Middle East, and Pacific Islands countries

Country	Closure Negotiation	Required EIA	Require SIA	Require Rec/Rehab	Require Bonding
Africa					
Burkina Faso	No	Yes	Yes	Yes	Yes
Botswana	Yes	Yes	No	Yes	No
Cote d'Ivoire	No	Yes	No	Yes	Yes
Ghana	No	Yes	No	Yes	No
Mali	No	Yes	No	Yes	Yes
Namibia	No	Yes	No	Yes	No
Tanzania	Yes	Yes	No	Yes	No
Zambia	No	Yes	Yes	Yes	Yes
Zimbabwe	No	No	No	No	No
Asia					
Bhutan	No	Yes	Yes	Yes	No
Brunei Darussalam	No	No	No	Yes	No
Cambodia	No	Yes	-	Yes	Yes
China	Yes	No	No	Yes	No
Democratic People's Republic of Korea	No	No	No	Yes	No

Indonesia	Yes	Yes	No	Yes	No
India	Yes	No	No	Yes	No
Kazakhstan	No	Yes	No	Yes	No
Kyrgyzstan	Yes	Yes	No	Yes	No
Lao People's Democratic Republic	No	Yes	Yes	Yes	No
Malaysia	Yes	Yes	No	Yes	Yes
Mongolia	No	Yes	No	Yes	No
Myanmar	No	No	No	No	Yes
Philippines	No	Yes	Yes	Yes	No
Republic of Korea	No	No	No	No	Yes
Sri Lanka	Yes	Yes	No	Yes	No
Tajikistan	No	No	No	No	No
Thailand	Yes	Yes	No	No	No
Uzbekistan	Yes	No	No	Yes	No
Viet Nam	No	Yes	No	Yes	Yes
Latin South America					
Chile	No	No	No	No	No
Costa Rica	Yes	Yes	No	Yes	No
Ecuador	No	Yes	No	No	No
Guyana	Yes	No	No	No	Yes
Mexico	Yes	Yes	No	Yes	No
Peru	No	Yes	Yes	Yes	No
Venezuela	Yes	Yes	No	No	No
Middle East					
Islamic Republic of Iran	Yes	Yes	No	Yes	No
Saudi Arabia	Yes	No	No	Yes	No
Pacific Islands					
Fiji	No	Yes	Yes	Yes	Yes
Papua New Guinea	Yes	Yes	No	No	No
Solomon Islands	No	No	No	Yes	Yes
Vanuatu	Yes	Yes	No	Yes	Yes

Source: Clark & Clark (2005: 72)

The information presented in the tables above indicates that most countries have developed wide-ranging national guidelines and legislature that affect mine closure, but that governments will also apply and enact several laws given the history of mining. In Canada, specifically in Nova Scotia, provision was made for reclamation and abandonment. For example, an EIA is required before mine closure, bonding procedure, and for all mines that will have a significant impact on the environment (Clark and Clark, 2005). The evidence shows that Europe applied a comprehensive approach in dealing with mine closure. The World Bank confirms this by pointing out that “countries that received World Bank loans

were more effectively and efficiently addressed when countries adopted comprehensive reform programs" (World Bank, 2018:28).

2.3.2. The consequences of mine closure

Mine closure affects many stakeholders, like environmentalists, investors, mineworkers, and communities (Hockley and Hockley, 2015). This section is premised on the supposition that mining communities are reliant on mining activities for employment, delivery of services, and producing an environment conducive to sustainable local financial development (Stacey, Naudé, Hermanus, and Frankel, 2010). Mine closure moves beyond practical aspects of the mine lifecycle. The importance of socio-economic wellbeing is included in the mine closure framework. Beyond the mine's working life, host communities must adjust their lifestyles and struggle to survive post-mine closure (Bainton and Holcombe 2018).

Brock, Weeks, and Heyes (2019) define mine closure as an active and all-inclusive procedure that spans the mining lifecycle; thus, it needs to consider economic, social, and environmental spheres throughput the entire cycle Vivoda *et al*. (2019) observe that, globally, social aspects receive inadequate coverage from industry, policymakers, and scholars. Further, legislation undervalues the social aspects of their complexity and significance compared to environmental, economic, and technical issues. The social aspects are indicated below (see Table 2.3), and thereafter discussed in turn.

Table 2.3: Social aspects of mine closure

Social aspect	Indicators
Economic	Local economic activity (diversity and dependence)
	Household income
	Local living standards
Business	Local business development opportunities in the mining sector
	Business opportunities in other sectors
Employment	Local employment opportunities in the mining sector
	Local employment opportunities in other sectors
	Local employment stability/volatility
Security, education, and training infrastructure	Social order and safety (e.g. tensions, crime, and violence)
	Local skills development in mining and other sectors
	Access to quality education and training
	Local transport (e.g. public buses, roads, and airports)
	Critical infrastructure (food supply, power supply, water supply, telecommunications)
Amenities	Local aesthetic and recreational resources (e.g. heritage sites, parks and recreation areas, communal areas)
	Local culture, arts, and sports (including facilities)
Livelihoods	Local livelihoods (e.g. access to land, food, water, and shelter that affect livelihoods)
Land	Local land access, ownership, and use

Social aspect	Indicators
	Recognition of traditional, customary ownership
Housing and health	Local housing quality, availability, and affordability
	Community health and wellbeing
	Access to quality health and social services
Environment	Environmental aspects that affect social conditions (e.g. quality of air, water, land, ecosystem)
Demography	Local population dynamics (e.g. growth/decline, migration, ageing, gender balance)
Participation	Stakeholder participation in closure planning and closure and post-closure processes (including decision-making)
Inclusion	Inclusive stakeholder engagement, including vulnerable and otherwise marginalised groups (e.g. indigenous peoples, women, ethnic minorities, disabled, elderly, young) in closure planning and closure and post-closure processes (including decision-making)
Social (general)	General socio-economic considerations
	Social considerations in financial assurance mechanisms

Source: Vivoda et al. (2019: 8)

i. Social concerns

The social effects of mine closure can be complex and far-reaching. Essentially, social aspects include the impact of mining actions and related land use on the traditions of a society where citizens live, work, and organise to satisfy their basic needs and generally survive as a society (Vivoda *et al*., 2019). Similarly, mine closure adversely affects local economies, leads to increased poverty, incites deterioration of essential services, and is an impetus behind immigration (Bainton & Holcombe, 2018). Vivoda *et al*., (2019:8) confirm that community health services are affected when companies withdraw their support in an affected area, which may impact the community's health and wellbeing.

The social impacts of mines are managed from the inception of the mining process. The International Social Impact Assessment is a multi-faceted process that analyses, monitors, and manages mining interventions' social impacts – both unintended and intended – throughout the mine's lifecycle (Vanclay, Esteves, Aucamp, and Franks, 2015:10). Social intervention involves a commitment to diminish the adverse effects of mining on communities, while also aiming to improve and/or maintain affected communities' wellbeing and social sustainability (DITR, 2006).

ii. Environmental issues

In Australia's New South Wales territory, mining is regulated under the Mining Act of 1992 (NSWL, 2022). Under this Act, rehabilitation and environmental performance conditions apply to all mining leases. The government must legislate environmental laws to assist mining countries in dealing with mine closure issues, while simultaneously ensuring that mining companies prepare thoroughly for

closure, and abide by and implement the regulations to the satisfaction of the affected communities (Vivoda *et al.,* 2019). An example of such affected communities is the Sami traditional people who inhabit a region covering northern Finland, Norway, Russia, and Sweden (Haddaway *et al.,* 2019). Haddaway *et al.,* (2019) note that mining activities in these regions threaten the Sami's nomadic way of life, obstructing their travelling routes and preventing them from herding reindeer, which they rely on for their livelihood. These mining activities also infringe on their land rights and how this relates to the extraction of resources. This is but one example of why mining companies should be obliged to implement regulations to protect communities in areas surrounding mines.

Other environmental issues relate to mining pertain to water and soil quality. Krause and Snyman (2015) classify these effects as river system issues, pollution of water systems above and below the surface due metals-radioactivity, acid mine drainage, and damages to wetlands. Mining and water are inseparable, given that techniques used for mining require large amounts of water for operations. Equally, mines compete with surrounding communities for water usage. The impact of mining on land and water resources can have long-term effects and cause upset regarding the prospect of land repurposing (Vivoda *et al.,* 2019). Water pollution is an ever-present threat where mining is concerned. For example, coal mining in Europe and the Appalachian region of the United States releases "firedamp" (essentially methane), a hydrocarbon that contaminates groundwater after mine closure (Hufty, 2019). Soil quality after mine closure is another concern. In Western Australia, say Kabir, Rabbi, Chowdhury, and Akbar (2015), issues such as soil quality degradation, depositing of acid mine drainage, and the effect of these elements on land available for agricultural projects are worrisome.

iii. Loss of economic opportunities

As Sánchez *et al*. (2014) indicate, mining is a risky enterprise: economic dynamics may not generate the expected return on investment. Universally, mines cease operation due to resource depletion (Owen & Kemp 2018; Stacey *et al.,* 2010). Strambo, Aung, and Atteridge (2019) identify loss of economic competitiveness as the most common cause of mine decline or closure. From a financial perspective, mine closure affects and changes communities' livelihoods, leading to breadwinners being unable to provide for their families or meet their other financial obligations. Local businesses are, therefore, also affected because of reduced consumer buying power.

When mines are no longer economically viable, the social wellbeing of communities is affected. Hence, the government's role in attracting investors should not be underestimated. As Vivoda *et al.,* (2019) point out, in such situations, "the state introduces incentive schemes like tax exemptions to appeal to and attract investors for resource development". The benefit of such a decision may lead to the improved economic performance of the state, increased employment, and wealth creation.

iv. Stakeholder engagements and consultation

The interest of stakeholders in mining operations is substantial, and is influenced by interests in mining projects. It is precisely the diversity of these interests that influences environmental and social disputes. Stakeholders' engagement at every stage of the mine closure process is vital for three main reasons, says McCullough (2016). Firstly, a stakeholder engagement plan is required for transparency, as it demonstrates that companies meet their commitments, performance standards, and action plans as part of the venture plan. Secondly, poor understanding of the key stakeholders' (including unions, local communities and -authorities, etc.) concerns can affect the project schedule and lead to the withdrawal of project operating licenses. Furthermore, stakeholder interests and views can change at any stage of the mine's lifecycle, and may influence the mine's intended trajectory; such changing views my often result from mines being significant socio-economic role players in their surrounding areas (McCullough, 2016).

Since mining is a process that starts with the original mine plan and carries on through the mine's lifecycle, mines must inform affected mining communities of mine closure in good time. The intention is to prepare stakeholders for the envisioned closure period, and the workforce can start looking for job opportunities. On the other hand, the community could also benefit from mining activities for sustainable projects (World Bank, 2018). Regular stakeholder engagement from an early operational stage is crucial in this regard; additionally, it may help negate future mining project disruptions (EBRD, 2012). Stakeholder acceptance – referring mainly to NGOs – can assist in managing unrealistic demands. For example, consulting interest groups on issues of interest, such as job creation, air pollution, and local economic initiatives through social investment projects aimed at improving livelihoods and infrastructure development, create a sense of belonging (Chuhan-Pole, Dabalen, and Land, 2017). Planning for the mine closure of the Mt. McClure gold project in Western Australia emphasises how crucial good planning and stakeholder involvement are in creating a first-rate closure process. The mine management understood that successful mine closure could only happen when shareholders were actively involved and capacitated to participate in the closure process (Mining Matters, 2006).

In many respects, mining happens in areas where people live. In some areas, the land belongs to traditional owners. Often when mining occurs in such areas, leaders prioritise employment both during current operations and post-closure. In addition to mine laws and regulations, traditional landowners are concerned with environmental standards and the right to hunting and fishing (Fourie and Tibbett, 2016). Therefore, mine closure relies on all stakeholders' positive support and involvement to help plan for successful closure to attain common goals and targets.

v. Closure impact on mining towns

As stated in the previous chapter, mining towns have existed for centuries, and differ from company towns. Whereas mining towns' economies are dominated by mineral extraction, processing, and linked activities, company towns are company-owned and managed by an employer in the industry. The company owns these towns, including housing, business premises, social-, education-, and health facilities, in addition to all infrastructure (Marais *et al.*, 2018). To an extent, the company provides municipal services at a reduced rate to residents and businesses. Even after mine closures, company towns often remain sustainable, such as in the case of Kimberley in South Africa's Northern Cape province (Cole and Broadhurst, 2022). However, in places such as Namibia, West Africa, and even certain South African locations, mining towns are more common than company towns. Upon mine closure, the future of these towns is precarious. In Namibia, says Littlewood (2014), many mining towns were completely abandoned, leading to the formation of ghost towns in the country (Littlewood, 2014). Knierzinger and Sopelle (2018) note that mining communities in Western Africa are left without water and electricity supply post-mine closure, as the mines, but not the surrounding areas, are tapped into the national water and electricity grids. In South Africa's West Wits Goldfield, mine closure has resulted in surrounding communities being deprived and subject to inequality, with food insecurity, low education levels, and high unemployment rates contributing to the vulnerability of the affected area (Cole and Broadhurst, 2022).

In an effort to address such issues, the Namibian Mine Closure Framework (MCF) (CMN, 2010) outlines various mine closure aspects of mine closure, and also provides best practice suggestions and recommendations for mine closure. While some mining companies ensured to availability of quality private health and education amenities in some communities, this has not been true in all cases. Concerns relating to health and education remains, says Littlewood (2014: 34), and the absence of a general plan for incorporating mining towns into the more comprehensive health and education systems beyond mine closure remains a challenge.

Closure of mining operations has long-lasting adverse effects on communities. Accordingly, mining is often far from principal populations and economic hubs, wherein alternative employment opportunities exist. Consequently, "mono-industry" coal towns and regions face increasing and undesirable outcomes from mine closure (World Bank, 2018:9). The El Chifón del Diablo gold mine in Lota, Chile, which operated between 1857 and 1997, is a classic example of a mining town that depended solely on mining. A decade after closure, the once bustling city of Lota is now characterised by high levels of poverty and unemployment, as well as a flagging economy. A report by the Asian-Pacific Economic Cooperation (2018) further states that, 20 years after the closure of the mine, attempts were made to recreate the legacy of the city's mining history as a tourist destination; however, "[d]espite these efforts, the impacts of the mine closure persist" (APEC, 2018:60).

Even so, mine closures are not always detrimental to surrounding communities. The Island Copper Mine in Canada was operational for 25 years. The mine's closure was thorough, with mine management specifically considering the sustainability of Port Hardy, a nearby community. The community endorsed alternative uses of the mine site after the mine's closure, including aquaculture and the processing of wood. As a result, the workforce profited from reskilling opportunities; this led to fruitful working changes for numerous labourers (APEC, 2018).

2.3.3. International best practices of mine closure

Inherent in the mining industry's rich history are critical lessons. Sheldon, Strongman, and Weber-Fahr (2002) say that a general disparity exists between mine closure guidelines and mining's technical constraints, integration, and social consultation. Globally, this is characterised by inadequate mine closure or mine abandonment (APEC, 2018). Following mine closure, land could be repurposed to reinforce the area's economy by, for example, agricultural, development, or tourism endeavours. The term 'repurposing' refers to activities that can generate income from closure activities. A case in point is the old Newmont gold mine site in Indonesia. Newmont surrendered the site to a third party to be turned into a botanical garden (APEC, 2018), creating employment for former mineworkers, and rehabilitating the natural environment.

Morrison-Saunders *et al*. (2016) state that, globally, sector enterprises, investors, and specialists expect that closure plans should be an inherent component of the complete mining lifecycle, spanning all stages from preliminary layout to implementation, decommissioning, and up to eventual closure and rehabilitation. In response, Australia has developed policies, principles, and guidance for mine closure at national level (Morrison-Saunders *et al.*, 2016). Likewise, in 2012, the Western Australia Government passed the Mining Rehabilitation Fund Act, with the purpose of introducing an annual levy on dwellings covered under the country's Mining Act 1978 based on the location of disturbed land (Vivoda and Fulcher, 2017). As a developed mining nation, Australia has advanced mine closure planning guidelines, such as ANZMEC/MCA (2000) and the DMP/EPA of 2011 (Mauric *et al*., 2012). In addition, the International Financial Council (IFC), International Council of Mining and Metals (ICMM), and World Bank developed mine closure guidelines as a result of these expectations. The table below explains some of these guidelines (see Table 2.4).

Table 2.4: References to existing mine closure documents and industry guidelines

Guideline/Standard	Reference/Requirement
Leading Practice Sustainable Development Program for the Mining Industry (Principle 4) (DITR, 2006)	Calls on interested and affected parties to identify, assess, and manage all significant social, health, safety, environmental, and economic impacts of mining activities (Element 4.1).

	Informs potentially affected parties of significant risks from mining, minerals, and metals operations and the measures taken to manage the potential risks (Element 4.3) effectively.
Minerals Council of Australia's (MCA) Enduring Value Framework (MCA, 2004)	Contributes to community development from project design through to closure in collaboration with host communities and their representatives.
International Finance Corporation (IFC)/World Bank Group's Environmental, Health and Safety Guidelines for Mining	Sustainable funding sources are identified for the implementation of the plan. Closure and post-closure activities should be considered as early in the planning and design stages as possible. As a result, the mine closure plan ensures future public health and safety are not compromised. The after-use of the site is beneficial and sustainable to the affected communities in the long term, adverse socio-economic impacts are minimised, and socio-economic benefits are maximised.
International Council on Mining and Metals' Planning for Integrated Mine Closure Toolkit	The closure should begin at the earliest opportunity. The earlier risks and unknowns associated with closure are identified, the greater the potential for meeting specific closure objectives. Closure plans should evolve as more information becomes available.

Source: Lamb & Coakes (2012)

The global mining conglomerate Anglo American has, at an operational level, developed a toolkit to achieve mine closure. The document outlines values and methods in preparing a closure plan (Anglo American, 2013). The document stipulates that the closure plan must prove that the financial-, administrative-, biological-, social-, and physical-, and social circumstances of nearby mines can be attained frequently with fixed goals, targets, and outcomes related to closure; further, the closure plan has to include shareholders, and must summarise the preconditions for all current consultation concepts (Anglo American, 2013). In addition, the government of British Columbia state the following in their document on closure plan development:

- Mining companies should conduct a Rapid Strategic Environmental Assessment as a formula for scenario planning;
- Mining companies ought to recognise all views, hopes, and ambitions of stakeholders and communities to draw appropriate conclusions;
- Mining houses must safeguard the development of operations so as not to destroy the business and cause social-, environmental-, and economic burdens after closure. As a precaution, companies can embrace environmental compliance best practice, healthcare and community development, as well as sustainable urban land use in their plans;

- Mining companies must include monitoring and evaluation programme plans, which should ultimately be aligned with the host country's statutes and sustainable development standards, to cater for environmental and socio-economic issues; and
- Mining companies must update closure plans, taking into account the outcomes of the steps. The Columbian government forces the sector to review and improve the closure plan every five years (British Columbia, 2017).

For two decades, says the European Bank for Reconstruction and Development (EBRD), mine closure planning has received considerable interest from governments and authorities in the western world (2012). In the same vein, mining companies must comply with regulations. Therefore, these companies should approve closure plans and reserve enough funds for the ultimate decommissioning, closure, and long-term maintenance of the mine site. The Brazilian government, for example, calls for mining companies to provide financial and economic inducements to the affected communities to ensure their wellbeing post closure (Kahn, Franceschi, Curi, and Vale, 2001), which cover insurance systems, traditional performance bonds, and flexible performance. These incentives are aimed at restoring both environmental damage cause by the mining process, and social and economic damage which may result after mine closure. According to Tagne (2018), Canada and the United States of America (USA) use governmental funding in finance land restoration and reclamation efforts.

Vivoda and Fulcher (2017) argue that best practice legislation regarding mine closure includes that regulators be obliged to ensure financial security as an assurance that all funds needed for the closure of the mine will be accessible should the mining company be incapable of seeing the closure through as envisioned. This fund's purpose is to cover the cost associated with the total cost of mine clean-up. In addition, mining companies should identify potential hindrances that could threaten mine closure outcomes by making use of tools such as risk management, project management, and concurrent engineering in an effort to mitigate potential threats after mineral extraction (Laurence, 2006). Hitherto, the discourse on mine closure in Western Australia, Canada, the USA, Australia, Ghana, and South Africa shows that these countries integrate mine closure instruments, risk management tools, closure plans, and financial provisions in their mining laws (Tagne, 2018).

Jones and Salmon (2012) submit that closure plans do not always proceed as intended and have unintended consequences. Their research shows that, in some instances, mine closure techniques and processes, legal limitations, and societal expectations can lead to negative long-term effects for both the community and the environment. This emphasises, once again, the vital importance of proper mine closure planning, discussed in the following section.

2.3.4. Significance of planning for mine closure

Mining is a risky business, and closure can take many different shapes. Therefore, planning for mine closure should be a continuous process throughout the mine's operational lifecycle. When preparing for closure, the emphasis should be on creating a long-term vision; the mine's final processing years should be used to help local communities to become independent after mining operations stop so as to benefit from sustainable projects (Mauric *et al*., 2012). Vivoda et al. (2019:6) mentions that states and governments "[have] the responsibility to ensure that mining companies have sufficiently prepared for closure, that mine closure is implemented following the law, and to the satisfaction of the affected communities". Mine closure plans are usually applicable to specific mines. Closure plans contain details on how the company will end mining, how environmental risks will be mitigated, and how the environment will be rehabilitated and renewed for re-use (Mining Matters, 2016; Mauric *et al.*, 2012).

Unexpected mine shutdowns pose extreme outcomes for both the environment and surrounding communities (Nehring and Cheng, 2016). Sánchez et al. (2014) stipulate the following points for consideration when planning for mine closure.

- Firstly, mining brings excitement and opportunities to the host community, and could result in significant socio-economic status changes, both positive and negative. While citizens will likely gain employment, some factors, such as unexpected shutdowns or mine closure, can have adverse socio-economic effects, like unemployment. The challenge lies in organising these opportunities to provide continuing community assistance after closure.
- Despite being a temporary occurrence, all mine operations change the environment significantly. It should be considered that the decommissioning and reclamation process will commence when mining ceases to prepare the site for other uses or to be repurposed by the mine for other services.
- Should mine closure result in the sale of the mine, the liabilities of the selling company will likely to be transferred to the receiving company.
- Mine closure involves costs that the company's financial officers and government agencies should know about in the early stages of exploration; as such, closure planning mandates company directors to plan for cost-effective closure processes.
- Closure involves risk-taking for both communities and mining companies. Mishandling this crucial stage could harm the enterprise's popularity and incur higher costs than when a plan is adequately carried out; thus, preparing plans for closure helps recognise and control the residual risks of closure actions (Sánchez *et al.*, 2014).

Further, planning for closure cannot happen without considering EIA provisions. Vivoda and Fulcher (2017) cite closure plans as an element of the environmental impact assessment system, and these two cannot be seen in isolation. The involvement of the community involvement in planning for mine

closure planning stage is also unnegotiable (DMRE, 2021). Land use after mining cessation, as well as other social targets of mine closure, needs careful consideration and planning. Mine closure plans are intermittently revised to ensure that communities' environmental-, socio-political-, and developmental needs are considered (DMRE, 2021).

2.4. CONCLUSION

The literature review suggests that mine closure occurs across the globe mainly due to economic reasons, such as low commodity prices or high production costs. This leads to high instances of unplanned mine closures due to companies' voluntary sequestration. Such closures, as well as planned mine closures, often lead to socio-economic precarity in the form of unemployment and job losses in the surrounding communities. The review also focuses on effective government policy interventions, such as the MCF for mine closures employed by the Namibian the Chamber of Mines (CMN, 2010). The general assessment is that mines worldwide cease operations due to political instability, loss of markets, or technical-, environmental-, or social motives. Some companies never recover from such setbacks to resume mining activities.

Evidence from global research indicates that mining plays a central role in developing communities where mining is the only source of economic development. However, mine closures lead to social and economic disruption in such communities, leaving governments, companies, mineworkers, and communities to deal with the effects. The resultant unemployment, crumbling economy, as well as poor service delivery and living conditions, often strain and overwhelm governmental social systems and existing infrastructure.

The literature also reflected on mining towns and the opportunities for these towns inherent in mining operations due to subsidies for social services, infrastructure development, and local economic growth. Unfortunately, when mines stop operations, all benefits stop, and some towns become ghost towns. Moreover, mine closure encourages an increase in artisanal and illegal mining. In order to understand the specific impact on one such a mining town, the researcher gathered relevant data from the Koffiefontein mining community to understand the impact of mine closure on small-town economies. The next chapter will deal with the mining policy for the collection of data and analysis.

CHAPTER THREE: MINING POLICY IN SOUTH AFRICA

3.1. INTRODUCTION

South Africa's mining history spans several centuries. The industry dates to the 1860s, with the discovery of diamonds and gold in several locations in the country (Watson and Olalde, 2019). The mining sector is dominant in six of the nine South Africa provinces, namely the Free State, Northern Cape, North West, Limpopo, Gauteng, and Mpumalanga. South Africa uses mining to generate wealth, grow economic development, build infrastructure, and create jobs (Swart, 2003; Marais, 2013).

Governmental support of the mining industry results from the industry's significant contribution to revenue (ICC, 2014; Sánchez *et al*., 2014). For example, in South Africa, mines employ close to half a million people (Leeuw and Mhenga, 2018). In this country and elsewhere, the mining sector generates wealth, grows the economy, builds infrastructure, and creates jobs. However, in the absence of much needed legislative and regulatory bodies, the above benefits are difficult to achieve (Linde, Matti, and Jagers, 2012; Crawford, 2015; Gankhuyag and Gregoire, 2018). What is also evident is that the dearth of such bodies leads to exploitation, with mine closures creating ghost towns with no or little development; in some instances, mining companies do not employ local people, but 'import' cheap labour from other areas. When mines close operations, the economies of nearby towns suffer significantly (Laurence, 2006), with retrenched employees and those indirectly dependent on mining struggle to survive (Marais, 2023). Mine closure problems include social problems such as increased instances of domestic violence, a decline in living standards, and an increase in artisanal and illegal mining because of loss of income (Sesele, Marais, and Van Rooyen, 2021). Mine closure could disrupt the stability ensured by homeownership in an economically stable community (Marais and Nel, 2016; Marais *et al*., 2017; Marais, 2023).

The chapter discusses specifically South African national legislation and policies related to mine closure. Closure preparation has been a condition since the Minerals Act 50 of 1991 came into effect. South Africa emphasises the submission of environmental management programs (EMPs), rehabilitation, and financial provision for a closure certificate (Swart, 2003). The legislation and guidelines considered in this chapter are:

- A Minerals and Mining Policy for South Africa (White Paper, 1998);
- The South African Labour Relations Act 66 of 1995 (LRA);
- The Basic Conditions of Employment Act 75 of 1997 (BCEA);
- The National Environmental Management Act 107 of 1998 (NEMA);
- The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA);
- The Broad-Based Black Socio-Economic Empowerment (B-BBEE) Charter for the South African Mining and Minerals Industry (referred to as the Mining Charter) (2018);
- The Draft National Mine Closure Strategy of 2021 (DMRE); and

- The Department of Mineral Resources and Energy's Social Labour and Plans Guidelines (SLPG) of 2010.

3.2. MINE CLOSURE POLICIES AND LEGISLATION

Legislation governing mining in the Republic of South Africa has long been in existence and has undergone many reviews and amendments. However, Perkins, Cooper, Scholtz, and Mulaudzi (2020) argue that mine closure policy and legislation are not fully implemented, and that systemic issues disturb mine closure and rehabilitation. The Constitution of the Republic of South Africa (Act 108 of 1996) supersedes legislation and policies related to mine closure, by enshrining, protecting, and promoting the basic human rights of all South African citizens. In complying with the constitutional imperatives and common law, mines ought to consider the rights of citizens and conduct their corporate and closure activities with due diligence. Section 24(a) of The Bill of Rights (1996) enshrines environmental rights, and states that citizens have "the right to an environment that is not harmful to their health or wellbeing". It expresses principles of environmental justice, intergenerational equity, and sustainable development, and obliges the legislature and its executives to take action to realise the right "to have the environment protected, to serve the present and future generations, through legislative and different measures" (Bill of Rights, 1996). Section 24(b) of the Bill states that citizens also have the right to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that

i. prevent pollution and ecological degradation.
ii. promote conservation; and
iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (Bill of Rights, 1996).

The Constitution guarantees a healthy environment to all citizens and mandates the state to protect and enforce compliance with this right. It is against this background that I will discuss the current policies and legislation.

3.2.1. A Minerals and Mining Policy for South Africa (White Paper, 1998)

During the colonial and apartheid eras, South African mines mainly operated without concerns for the environment and the need for environmental or social rehabilitation after mine closure (Swart, 2003). Guidelines regarding the closure of mines that did exist were limited. South Africa's post-apartheid policy reform resulted from fluctuating commodity prices as well as labour and environment challenges (DME, 1998). According to Ferraz (2016), the early 1990s saw mining regulations, for this first time, including aspects related to sustainable development. The democratic government reviewed apartheid mining legislation, and the White Paper on Minerals and Mining (1998) was legislated to provide efficient regulation of the mining sector. The White Paper (RSA, 1998) outlined a new vision for mining, and comprised six themes, namely

- Promoting policy that facilitates investment through mineral development and business climate, incorporating prospecting information and a mineral rights section, both of which address mineral rights access and the mobility thereof;
- Addressing inequality, racial and otherwise, through a section on participation in ownership and management;
- "People issues" relating to the safety and wellbeing of people involved in mining, including the need for housing, industrial relations, migratory workers, as well as downscaling;
- Management of the environment, as the effect of mining on the environment was previously not considered in policy, and, according to Tagne (2018), mining, whether on a large or small scale, harms the physical environment during mining and after the closure (Tagne 2018);
- Cooperation between mining regions; and
- Mining governance (DME, 1998:2).

Mineral resources are a national asset, which the state must avail to all citizens. The White Paper is, however, not explicit on mine closure; as such, this section will focus on people and environmental issues related to mine closure. Of the six points listed above, only two will be discussed, namely people issues and environmental management. People issues include the development of human resources, the health and safety of employees as well as their housing needs, the migration of labour, industrial relations, and downscaling. Ackerman *et al*., (2018) contend that mine closure affects the livelihoods of communities. When mines close, communities experience dire consequences. Gold mining production peaked in South Africa in 1988, a period when as many as 180 000 mineworkers worked in the Free State Goldfields (Marais *et al*., 2017). However, when the mines closed in the early nineties, thousands of jobs were lost, leaving devastation and distressed communities (Mabayani, 2019). Strambo, Aung and Atteridge (2019) argue that mine closure creates an economic void in surrounding communities. This lacuna is the result of the loss of subsidies for essential services, after which communities are left to provide for themselves.

From the first to the second quarter of 2021, the South African unemployment rate rose from 32.6% to 34.4% (Stats SA, 2021). The White Paper recognises the dilemma of workers who face unemployment due to mine closure and emphasises the importance of engagement with workers or their unions before downscaling. This ensures that workers who lost their jobs are assisted in finding alternative placements, are trained, and are provided with counselling services (Sesele, Marais, and Van Rooyen 2021). Often, workers struggle to find suitable placement after mine closure because their skills are confined to the niche area of mining.

The White Paper (1998) affirms that plans are to be put in place to secure mining jobs in a way that is both economically viable and socially desirable. Likewise, the state will put in place guiding principles for addressing restructuring and job losses where needed, and determine whether mines faced with downscaling require public assistance. Moreover, the government must involve affected communities

and municipalities to deal with mine downscaling and closure challenges. Organised labour unions have suggested targeted assistance from the state to extend the lives of marginal mines and a government agency to manage and co-ordinate procedures associated with mine downscaling, to protect the interests of workers and communities affected by forces as a result of downscaling (DME, 1998).

In order to realise the critical role played by mining in terms of investment growth, gross domestic product (GDP), task advent, and exports, the South African government of South Africa legislated the National Development Plan (NDP) and the New Growth Path (NGP) (DGCIS, 2015). Similar to the White Paper under discussion, these plans advocate that municipalities, through the Integrated Development Planning (IDP) and Local Economic Development (LED) process, take steps to lessen the destructive effects of rationalisation and job losses in the mining industry. By participating in the IDP or LED drafting process, communities could identify income-generating projects to stimulate economic activity. According to Sesele *et al*., (2021), the White Paper indicates the government's response to downscaling and closure, by suggesting the implementation of a social plan fund to address and redress the social consequences of mining. Social labour plans (SLPs) in mining communities could be used to fund such economic initiatives (DME, 1998).

Regarding accommodation and homeownership, mining rights holders need to adapt mine hostels to suitably accommodate families, ensure that there is one occupant to a room, and work closely together with unions in order to prioritise homeownership for employees (Deloitte, 2018). According to Marais (2023), the White paper suggests that the government should ensure that equitable and humane accommodation for mineworkers adhere to specific norms and standards, and refers specifically to the number of workers to be housed in a single room. Mine companies, says Marais (2023), must conform to housing standards based on suitable housing and living conditions principles, namely decent, affordable housing units, delivery of homeownership, and tenure security. Further, housing should facilitate economic, social, and physical incorporation of human settlements.

Despite various companies' housing or living allowances, some miners still prefer to live in informal settlements or hostels, or to rent a room. Mineworkers sometimes opt to stay in informal settlements, and to use their subsidies for asset acquisition – procuring vehicles or furniture – rather than make use of mine housing. This also enables them to return to their home countries and provinces more easily should a mine close or downscale. The consequence of informal settlements is that municipalities must provide inhabitants with traditional Reconstruction and Development Programme (RDP) houses as a second home. Other mineworkers live in various structures such as rented houses, towns, houses, rented flats rented from companies, and backrooms in townships (Bezuidenhout & Buhlungu, 2011).

Environmental and social impacts will be felt long after the mine closed. Pertaining to environmental management, the effects of mining-related activities harm the quality of life of communities. The White Paper identifies the following primary policy and regulatory areas:

- The effects that exploration has on the environment;
- The effects of the mine lifecycle on the environment, including the closure of a mine and the subsequent site rehabilitation; and
- The sustainment of site rehabilitation after mine closure (DME, 1998).

Section 4.4(1) of the White Paper advocates for achieving cohesive and all-inclusive environmental management that complies with South Africa's environmental policy, as well as management inside a framework of cooperative governance framework. When a mine is closed, the extant infrastructure should continue to be usable and available at every opportunity. Further, the White Paper (1998) promotes extensive discussion between mining companies, mineworkers, and labour unions in cases where mine closure is imminent. In addition, the White Paper requires the formation of a social labour plan fund to assist for the duration of the implementation of interventions and projects determined between the company and the workers who undergo systematic job losses because of mine closes (DME, 1998).

3.2.2. The South African Labour Relations Act 66 of 1995 (LRA)

The Labour Relations Act 66 of 1995 (LRA) concerns itself with, amongst other matters, legalising the formation of trade unions, which aids in promoting and enabling collective bargaining in the workplace. The Act makes clear the process to be followed for dispute resolution, where such matters, their arbitration, as well as resultant conciliation, is the legal purview of the Labour Court, as well as the Labour Appeals Court. Further, it encourages workers' participation in decision-making processes in the workplace. Section 1(a) of the LRA takes as its purpose the advancement of economic development, the regulation of social justice, and ensuring safe and peaceful workplaces , which is achieved through fulfilling the Act's principal objective: to give effect to and promote fundamental rights as enshrined in the Constitution (RSA, 1995).

The mandate stipulated in Section 185 of the LRA states employers should institute fair labour practices for employees. Therefore, employees are safeguarded against termination of work or dismissal resulting from unfair labour relations or employment practices. Section 84(1)(c) of this Act further requires that, should an operation, plant, or business face partial or complete closure, the employer has to consult its workforce; this includes instances of retrenchment or job loss due to operational requirements (RSA, 1995). The Basic Conditions of Employment Act 75 of 1997 (discussed in the next section) define operational requirements as the employer's technical, fiscal, or other related needs.

Due to the finite nature of mines, retrenchments in the mining sector are expected. The LRA provides for this in Section 189, requiring a retrenchment process that is transparent and fair. Furthermore, specifically in relation to the mining sector, workers affected by mine closure should be granted a 60-day notice period, during which they may consult their labour unions regarding the proposed dismissal (RSA, 1995). However, Karolia-Hussain and Fourie (2021) argue that a 60-day period is insufficient

for meaningful discussions related to possible job loss; the understanding is that the mine will employ mineworkers until they retire, and workers plan their lives based on their service contracts in expectation thereof.

3.2.3. The Basic Conditions of Employment Act 75 of 1997 (BCEA)

Similar to the LRA, the Basic Conditions of Employment Act 75 of 1997 (BCEA) also regulates employment relationships in a workplace. The BCEA advances economic development, social justice, and promotes the right to fair labour practice as defined under Section 23(1) of the Constitution in the Bill of Rights (Chapter 2), *viz*. "everyone has the right to fair labour practices" (RSA, 1996). Furthermore, this Act is concerned with how basic employment conditions are regulated; in so doing, the BCEA aligns with South Africa's commitments in the country's role as member of the International Labour Organization (ILO).

According to the BCEA, operational requirements (defined in the previous section) could result in employers terminating their employees' contracts. However, five years before a company can initiate downscaling, it should formulate and submit to authorities a closure plan in advance of the approval and implementation of decommissioning activities. The Draft Mine Closure Strategy (DMRE, 2021) similarly states that closure plans should be in place when mining ceases, whether due to fiscal or operational requirements, or should mineral reserves be exhausted (also see Section 3.2.7.).

In the event of mine closure and downscaling, employees qualify for compensation equivalent to at least one week's remuneration for each year of continuous service, provided for in Section 41(2) of the BCEA (RSA, 1997). Similarly, workers with fewer years of service will qualify for less than their counterparts who have more years of service. Bainton and Holcombe (2018) posit that retrenchment and abrupt mine closure affect not only mineworkers, but also their families and dependents. The retrenchment process could lead to social issues like family disintegration and drug abuse because retrenched workers cannot meet their obligations. Therefore, mine closures can significantly affect local economies, contribute to destitution, trigger the loss of critical services, and lead to out-migration (Bainton & Holcombe, 2018). The BCEA (RSA, 1997) has as its aim to, at least in part, alleviate these effects by ensuring a measure of financial compensation after retrenchment or job loss.

3.2.4. The National Environmental Management Act 107 of 1998 (NEMA)

The environmental concerns relating to mine closure must promote environmental rights. In Sections 24(a) and (b) of the South African Constitution's Bill of Rights (Chapter 2), it is noted that

> Everyone has the right
> a. to an environment that is not harmful to their health or well-being; and
> b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that
> i. prevent pollution and ecological degradation

ii. promote conservation; and

iii. secure ecologically sustainable development and use of natural resources while promoting justifiable economic and social development (RSA, 1996).

In addition, the Mineral and Petroleum Resources Development Act No. 28 of 2002 (MRPDA) (RSA, 2002) fulfils the constitutional mandates outlined in the sections above and certifies that South Africa's mineral resources should be accessed and used in a manner that is both accurate and environmentally sustainable, which will also ensure socio-economic growth. According to Muswaka (2017), the Constitution outlines mining and environmental laws. However, most mines avoid the environmental consequences and the socio-economic impacts by abandoning the mine or declaring bankruptcy (Van Eeden, Liefferink and Durand, 2009). In such cases, where the mining sector violates Sections 24(a) and (b), it is the equivalent of denying citizens of their fundamental right of access to clean, sufficient water (Section 27(1)(b)).

The National Environmental Management Act 107 of 1998, or NEMA, provides general principles, standards, and procedures for environmental management (RSA, 1998). As amended, this Act holds mines liable for mining operation damages, thus dealing incisively with possible non-compliance during and after closure. NEMA also stipulates that applications for mining rights or permits require environmental authorisation, comprising environmental assessment, a management- and closure plan, as well as economic guarantees to fund restoration and closure (Watson and Olalde, 2019).

NEMA specifies how mining rights owners and holders must contribute financially toward rehabilitating the environmental dangers affected by their operations. Section 41 of the Act prescribes that financial measures should be availed by mines to aid in prospecting post-closure, exploration, mining operations, mine closure, as well as subsequent restoration (RSA, 1998). Not only do the guidelines outlined in NEMA emphasise that mines must account for environmental destruction, but also that they should apply best management principles in all mining operations, and that they should account for rehabilitation of the environment once the mine closes. Therefore, the act imposes financial provisions on mining companies in an effort to cover post-closure rehabilitation activities, and to redress any residual or underlying environmental effects of mining (January and Lee, 2019). According to Watson and Olalde (2019), the Minister responsible for mineral legislation is authorised to keep a percentage of the financial provision for addressing any such latent and/or residual impacts.

To evade legal action during mine closure, Section 34 of NEMA requires mining companies to be in possession of closure certificates (RSA, 1998). Such a certificate ensures that the mining company cannot be held accountable for any previous damages caused by mining activities (Van Eeden et al., 2009). In addition, the certificates evidence the end of the closure process, and indicate that the mine has no residual duty towards either the government or the community (Stacey *et al.,* 2010). However, following a specific set requirements, mining rights allow holders to rehabilitate the mining area (Watson and Olalde, 2019).

A certificate of closure works in the favour of a mining company. After a certificate is issued, mines can no longer be held liable for any social and environmental harm, which includes post-mining obligations related to environmental damage. According to Swart (2003), an environmental management plan (EMP), which should be based on an Environmental Impact Assessment (EIA), ought to be presented in the preparation stage of mine closure. It should serve as the primary rehabilitation and environmental rehabilitation precondition inherent in the closing of a mine.

To ensure proper rehabilitation of the mine during or after the closure stage, Section 41 of NEMA requires companies to financially contribute to the government to provide for closure (RSA, 1998). The closure certificate safeguards mining companies from legal responsibilities and repercussions, and transfers the duty of mine rehabilitation to the Department of Mineral Resources, or DMR (Fourie and Brent, 2005). Swart (2003) contends that a closure certificate becomes valid after an environmental risk report complements the application and closure plan.

Mine closure is a primary dilemma in the country. The inability to secure closure certificates has resulted in no less than 5 000 ownerless mines, of which some are abandoned, while others are on a "care and maintenance plan" (Milaras, Ahmed, and McKay, 2014:1). Watson and Olalde (2019) submit that the rehabilitation of large mines is complex, as evidenced by insufficient requests for mine closure, as well as the high rate of unsuccessful applications received by the DMRE. Likewise, mines do not make sufficient provisions to address their financial obligations. Perkins *et al*., (2020) argue that mine closure procedures are often not fully implemented, and that systemic issues hinder the rehabilitation and closure of mines. Amongst these issues are that such mines are often placed under "care and maintenance" plans. Such plans entail the orderly and safe suspension of mining activities, meeting environmental requirements throughout the mining lifecycle, but especially after closure, consult with labour unions as well as mine employees regarding the closure process, retrenchment, and job losses, and adhering to prescribed health and safety regulations (Gilbert and Tobin, 2020). This is a small price to pay compared to the actual cost of achieving closure. Therefore, the undetermined care and maintenance or the sale of a mine are acceptable and cost-effective to avoid closing (Watson and Olalde, 2019); however, state the authors, these processes occur under minimal legislative regulation.

NEMA is the principal legislative framework for environmental dilemmas. The Act details how mining waste disposal practices can damage future water resources (RSA, 1998). A major element of this rule pertains to land use, which could either positively or negatively affect the host community's livelihood after closure. Environmental challenges, which include air-, water-, and wetlands pollution, as well as acid mine drainage, are more often than not disregarded by mining companies; this affects residents' safety and wellbeing (Jhariya, Khan, and Thakur, 2016; Sánchez *et al.*, 2014; Gankhuyag and Gregoire, 2018). The issue of water pollution does not only severely impact the environment but also infringes on communities' basic human rights. Owen and Kemp (2018) submit that mines must avoid water contamination at all costs. Mining activities and their consequences can potentially expose communities

to health risks; for example, Cornelissen et al. (2019) report an incidence of a silicosis breakout in a South African mining town due to polluted water sources.

The environment determines, to a large extent, citizens' livelihood, whether indirectly or directly – the same environment so adversely affected by mineral mining activities through water-, air-, and soil pollution. Soil and water are primary natural resources needed for both agricultural and mining operations, and mining activities can cause extensive harm to these resources (Eta, Idiku, and Dan, 2019), which has further socio-economic impacts on communities surrounding mines. Heavy metals resulting from the mining process, disposed of when a mine closes, are likely to seep into rivers, which invariably contaminates agricultural water used for irrigation (Hilson, 2002; Mayers, Johanson, Potter, and Jarvis, 2009).

3.2.5. The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA)

The now repealed South African Minerals Act 50 of 1991 (RSA, 1991) provided legislative requirements to, amongst others, protect the environment, manage environmental impacts, and rehabilitate environmentally affected mine sites (Swart 2003). The Mineral and Petroleum Resources Development Act 28 of 2002 (MPRDA) replaced the repealed Act, and provides stringent measures for environmental rehabilitation and mine closure. Morrison-Saunders et al. (2016) argue that the MPRDA replaces the Minerals Act's insufficient closure and mine site rehabilitation guidelines. Consequently, the MPRDA changes the industry's ownership structure and regulates how companies may mine resources. The Act's preamble addresses many specific objectives, with the following points most pertinently related to this study:

- All citizens should have equitable access to South Africa's mineral resources;
- Petroleum and mineral resources must be used in an environmentally sustainable way to protect the environment not only for future generations, but also for the current ones; and
- Socio-economic empowerment and development should be a main concern for mining companies (RSA, 2002).

The MPRDA further promotes economic growth. There is also an emphasis on employment opportunities for the historically disadvantaged, like women and black people, and protecting the environment. In addition, the MPRDA aims to ensure that those who hold mining rights fund socio-economic growth initiatives both in host communities and in areas where labourers may migrate from. Its ambit also states that mining activities should not harm the environment (RSA, 2002).

Section 37 of the MPRDA points to adopting sustainable development concepts as specified by Section 2 of the National Environment Management Act (107 of 1998), discussed earlier. Sustainable development is aimed at integrating environmental, economic, and social factors in mines' planning, implementation, and decision-making stages. This is prescribed in order to ensure that minerals and petroleum resources development serve present and future generations, as echoed in the Draft Mine

Closure Strategy (DMRE, 2021). According to Clark and Clark (1999), the onus is on governments to define and provide inclusive mine closure strategies within the broader context of socio-economic equality and sustainable development goals.

The Department of Mineral Resources and Energy (DMRE) enforces mine closure laws in South Africa. Accordingly, Section 38(1)(d) of the MPRDA permit holders are liable for any damages, pollution, or destruction resulting from mining activities (RSA, 2002). Van Eeden *et al.*, (2009) state that mineral rights holders should be held accountable for the rehabilitation of mine areas post closure, as well as for adhering to sustainable development practices. In addition to rehabilitation, mine housing should be constructed with efficient and reasonable land rehabilitation processes in mind, both throughout mine operations and post mine closure. For example, mine housing could be repurposed after mine closure to house members of the surrounding community, which renders such housing sustainable. However, according to Stacey *et al.*, (2010), the absence of detailed requirements and stipulations in the relevant legislation remains an encumbrance that hinders both environmental and socio-economic rehabilitation once a mine is closed.

Section 89 of the MPRDA forces rights holders to put funds aside so that they may meet their post-closure rehabilitation obligations. The purpose of such funds is to ensure that financial resources are available should the mine fail to rehabilitate or remedy any environmental damage resulting from mining in the event of closure (RSA, 2002). However, according to Muswaka (2017), even after the cessation of mining operations, and with adherence to closure tactics, the environmental impact of mining can appear when least anticipated, such as when a mine collapses years after closure, or when droughts cause dependence on polluted underground water resources. Says Muswaka, such consequences "are borne by the public and the environment, rather than by the companies whose activities occasion them" (2017:2).

In Section 39 of the Act under discussion, permit holders or applicants are directed to perform both an environmental impact assessment (EIA) and environmental management plan EMP to discover, ease, and manage the ecological effects of mining operations. Due to the far-reaching environmental consequences inherent to mining, mining companies are accordingly obliged to oversee an environmental evaluation, and to assess "the effects on socio-economic aspects and cultural heritage as mandated by mining rights" (DEA, 2014). The DEA (2014) underscores that the amended 2014 EIA regulations outline a closure plan without referring to social closure. In addition, the EIA regulations are specific on the liability of mining companies, including environmental damage and pollution. EMPs provide for mine closure targets, and the Act states that, before an EMP can be approved, land use goals for the mining and closure estimations are to be made public (DEA, 2014). To mitigate the impact of mining, Section 39(1) of the MPRDA notes that operationalising the EMP should include plans to achieve the following objectives:

- The closure of mines;
- The supervision of acknowledged environmental impact originating from the proposed mining operation;
- Social and economic circumstances covered in the social labour plan (SLP); and
- Cultural and historical characteristics (RSA, 2002).

Moreover, Section 41(5) of the Act includes financial provisions for the remediation of environmental harm resulting from mining. Furthermore, this section requires mining right holders to guarantee that the SLP's socio-economic development contributions spread to labour sending areas (RSA, 2002). Finally, Morrison-Saunders et al. (2016) affirm the MPRDA must correct mine closure and site rehabilitation inadequacies of the Minerals Act 50 of 1991.

The MPRDA (2002) states that mine closure requirements include applying for a closure certificate and meeting the prescribed financial obligation for rehabilitation; however, before a closure certificate is issued, a mining company must conform to the following MPRDA requirements (RSA, 2002):

- Companies should agree to the primary "valuation process, expansion of the valuation report, the environmental management plan report (EMPRDA), and closure plan";
- License applicants and mining permit holders must submit a budget; and
- Applicants are expected to observe the EIA regulations of 2014 and contribute financially before a closure certificate is issued.

The Department of Mineral Resources' (DMR's) role is to enforce mine closure laws. Furthermore, Section 43 of the MPRDA (2002) prescribes circumstances under which mining companies may submit applications for a closure certificate when their mining rights end or when they wish to do away with a section in their operations for mining and shutdown activities. In addition, this section mandates the Minister of Minerals Resources and Energy to issue closure certificates and assign environmental liabilities to a capable individual. The ecological risk report accompanying the mine closure application is a condition that must be satisfied. The mine closure supporting regulations require access to the mine's closure principles and applications, requests to transfer environmental liabilities to a proficient individual, the incumbent's qualifications, as well as an overview of themes for an ecological risk report and range plan for closure (RSA, 2002). As Krause and Snyman (2015) explain, awarding a closure certificate signifies the end of the company's obligations for financial assurances. Therefore, mining companies can close and rehabilitate a mine site, but should ensure that the site remains usable and sustainable. Only then can a closure certificate be issued as a regulatory instrument to safeguard the mine site so that permit holders do not abandon the mine before remediating damages to the surroundings. Furthermore, the MPRDA prescribes regulations to acquire a closure certificate. For example, regulation 57 states that an "application for mine closure must accompany a closure plan and an environmental risk report" (RSA, 2002). In addition, the closure plan (according to regulation 62) is

an essential component of the EMP and must comprise extenuation- or management plans related to the management, mitigation, or avoidance of latent or residual effects. Mines must develop a sustainable strategy for socio-economic development after mine closure (RSA, 2002).

The 2021 Draft Mine National Mine Closure Strategy (DMNCS; *cf.* Section 3.2.7) argues that the MPRDA and NEMA do not proactively make provision for allaying the economic effects on the mining community post-mining. It further contends, though comprehensive policies in regulations regarding mine site rehabilitation and remediation exist, these are not vocally enforced, and also do not comprehensively cover the social and economic impact of mine closure and the development of a post-mining economy (DMRE, 2021).

Although the MPRDA's guidelines focus on the environment and say little about the social aspects of mine closure, it provides for the development of SLPs to address the social aspects of mine closure to promote socio-economic development. The SLP's commitments include providing sustainable income-generating projects and enterprise development, and to equip workers with transferrable skills through training. The formation of a forum to manage impending downscaling and retrenchment is also advocated for by the SLP. As Cawood (2004) puts it, "the most considerable difference between this act and its predecessors is its incorporation of social components". In addition, mines play a social upliftment role in local and rural communities affected by mining. The redress of past racial discrimination practices is also prominent in the Act.

In Section 38(1)(d) of the MPRDA, mine permit holders are ordered to take responsibility for rehabilitating mine land and restoring it to its natural state; as far as reasonably practicable, they should also comply with the principle of sustainable development. According to Ackerman et al. (2018), the MPRDA and the Mining Charter (RSA, 2018) exacts pressure on mines to act responsibly and work towards upholding the concept of sustainable improvement in their regions of operation (RSA, 2002).

In conclusion, while the Minerals Act 50 of 1991 is less concerned with social aspects than with the environmental effects resulting from mine closure, the MPRDA (RSA, 2002) makes more provision for social aspects related to mine closure. As amended, the Act has stringent requirements for those who hold mining rights (Humby, 2014). For instance, section 100 of the MPRDA requires that mining rights be awarded by the state when the applicant conforms with the mining industry charter and submits SLPs.

3.2.6. The Broad-Based Black Socio-Economic Empowerment Charter for South African Mining and Minerals Industry (The Mining Charter) of 2018

The first South African mining charter was released in 2002 and the DMR reviewed it in 2010 (DME, 2002; DMR, 2010b). Government released a new charter in 2017, which was finalised in 2018 (Marais, 2023). The 2018 Broad-Based Black Socio-Economic Empowerment Charter for South Africa Mining and Minerals Industry (hereafter referred to as the Mining Charter) introduces a mining structure and

different related segments to achieve transformation objectives. The Mining Charter directs and monitors the mining sector's transformation (Marais, 2023). Furthermore, it ensures meaningful economic contribution of historically marginalised people in the mining sector and expects existing and new mining rights holders to observe specific standards (Marais *et al*., 2017).

Though the Charter is quiet on the aspect of mine closure, it emphasises the following fundamentals:

- Ownership;
- Mineral beneficiation;
- Procurement, supplier, and enterprise development;
- Human resources and mine community development;
- Employment equity;
- Principles for housing and living condition standards; and
- Sustainable growth, including the transformation of the mining sector (RSA, 2018).

In addition, the Mining Charter (2018) promotes skills development to capacitate ex-employees to be absorbed by other mining companies post closure. The mining charter further "promotes sustainable growth and development of mining towns" (RSA, 2018). It seeks to influence the equality clause (Section 9) of the Constitution of the Republic and Section 100(2)(a) of the MPRDA (DMR, 2018; RSA, 2018).

Under the apartheid regime, Black people were discriminated against in many ways, also by mine companies. Accommodation provided by the mines in company towns was exclusively for white employees. White workers enjoyed the benefits of a "living-out allowance" and could provide their housing or take a company house. In contrast, their Black counterparts were housed in single-sex hostels with poor living conditions. The accommodation was used to control the black labour force (Marais, 2023). Homeownership was thus the purview of the white workforce, and Black workers were left to rent accommodation or stay in informal settlements near their workplace. Furthermore, the legislation of the time did not allow Blacks to urbanise; instead, they had to reside in designated enclaves and keep their rural roots alive by occasionally visiting their homelands. Post-apartheid, policies have done away with the single-sex hostel, and homeownership became available to Black people in the mid-1980s, aiding in wealth creation. This replaced rental housing as the primary housing tenure approach (Marais, 2023). Although this is a good development, the problem is that beneficiaries struggled to repay their bonds; consequently, they used their pay-outs to settle these bonds.

The goods supplied to mines must meet the proportionally prescribed ratio of products produced in South Africa. At least 60% of the inputs or content must be locally manufactured, as certified by the South African Bureau of Standards or another entity selected by the Minister (SABS, 2021). For services, mines must source a minimum of 80% of services locally, and such services ought to benefit

Historically Disadvantaged Individuals' (HDI) enterprises and economic entities that are BEE compliant (Deloitte, 2018).

Mineworkers depend on their employment contracts and benefits; their lives can only improve if they are still employed by the operating mine, which ensures access to housing or living allowances. Marais and Nel (2016) argue that mineworkers are unlikely to be employed in other fields, as their skills are limited to the niche area of mining. Should a mine then close, most employees are faced with unemployment unless they can secure work at another mine. In an effort to address this, the Mining Charter (2018) promotes skills development to increase employment opportunities for mineworkers post mine closure. However, skills acquired during training programmes are worthless in the absence of employment options in the work environment, which is a major issue in the country (*cf.* Section 3.2.1).

Human resources are a critical component of any company. Capacitating human capital in the workplace is vital. Employers must conduct skills audits to harness and develop workers' skills to inform their comprehensive skills development strategy. The Skills Development Levies Act 9 of 1999 requires companies in South Africa to invest 5% of their payroll into the Skills Levy for Human and Skill Development (RSA, 1999). The skills levy is calculated as the "total amount of remuneration, payable, deemed to have been paid, by the employer to employees during any month" (RSA, 1999). As the mining environment requires people with skills and knowledge, skills development is essential. The Mining Charter (2018) affirms that the aforementioned levy should be applied in order to

- Produce a skilful, qualified, and distinct workforce to satisfy the needs of the industry;
- Develop skills that improve workers' productivity and increase employment opportunities for HDPs; and
- Enhance entrepreneurial skills that will augment people's livelihoods through mining diversification (RSA, 2018).

Sections 4.5(1.1) of the Charter provides for a minimum of 26% mining beneficiation on diamonds and precious metals for Historically Disadvantaged Persons (RSA, 2018). In the MPRDA (2002), beneficiation is defined as "transformation, value addition or downstream processing of a mineral or mineral product […] to a higher value product […] which can either be consumed locally or exported" (RSA, 2002). Therefore, beneficiation forms part of ownership when seen in the light of the aforementioned 26% shareholding prescribed in the 2018 Charter. Regarding ownership, the 2018 Charter requires that the right holder comply with the 30% Black Economic Empowerment (BEE) shareholding target, which implies that 30% of stakeholders should consist of host communities, qualifying employees, and entrepreneurs (Deloitte, 2018). The conditions are set to afford HDI's the opportunity to participate meaningfully in the economy and the mineral resources industry. Furthermore, the 30% stakeholder target becomes more achievable by giving HDIs preferential

procurement supplier status in providing capital goods and services, and by encouraging cooperatives to empower small enterprises through their supplier development programmes (RSA, 2018).

3.2.7. The Draft National Mine Closure Strategy (DNMCS) of 2021

The government drafted the first Mine Closure Strategy in 2008 to respond to the previously discussed socio-economic and environmental challenges linked to cessation of mining. However, states Liefferink (2022), "The 2008 Regional Mine Closure Strategy […] was not published, and this delay has had some undesirable impacts" (cited in Mackay, 2022: para 3). Liefferink noted that a new closure strategy would be implemented. Former South African Department of Minerals and Energy (DME) acting deputy director for environment, Lebeau Labuschagne, noted that the 2008 Mine Closure Strategy focused specifically on mines in the Witwatersrand, and that it essentially addressed regional mine closures (cited in Van der Merwe, 2008). Regional mine closure strategies differ from mine closure plans it consider broad intergrade issues relevant to mine closure and strategies that fit into each mine's closure plan (Anglo American, 2013). These strategies must prevent long term negative environmental and socio-economic impacts and create a sustainable ecosystem. However, even in the re-drafted 2021 Mine Closure Strategy, that attempted to move away from region-specific closures, several loopholes exist. These, say Liefferink, include, a lack of articulation among the closure requirements in the MPRDA and the process for closing companies, set out in Chapter 14 of the Companies Act (1973). The MPRDA also places no specific obligation on the court to determine whether a company applying for liquidation has applied for a closure certification; ensured the transfer of environmental liabilities, such as water management; or actually compensated for any shortfall of funds. Further, the duties and potential liability of the business rescue practitioner (BRP) and liquidators are unclear; this lack of clarity pertains to whether the liquidator is obligated to apply for a closure certificate (cited in Mackay, 2022: para 7-9).

In addition, proposed strategies set standard operation systems for mines and align individual mine plans and requirements for application for closure (Anglo American, 2013). The objectives of these strategies are, according to Stacey *et al*., (2010):

- To provide for post-closure stewardship and socio-economic sustainability, so as to continue monitoring the implementation of both individual and regional mine closure plans;
- To intergrade environmental management and related closure activities with socio-economic interventions and align these with the post-closure economy by reducing duplications of efforts and spending and aggregating funding for regional projects;
- To manage mine closure of demarcated areas in a sustainable manner;
- To ensure that mines do not negatively impact the livelihoods of other adjacent mines; and
- To promote and develop a post-closure mine water strategy (*cf.* RSA, 2021).

The strategy intends to hold all mines in a specific region responsible for the cumulative impacts of mine closure, while also minimising the occurrence and maximising control of abandoned mines, which

often become a source of illegal mining. In South Africa, this phenomenon has become a social-, economic-, and legal problem. According to DNMCS (2021), illegal mining is estimated to be worth R14 billion per annum.

The publication of the aforementioned Strategy (DMR, 2021) has highlighted the importance of considering the cumulative impact of mine closure. Such an approach will include environmental-, safety-, health-, social-, and economic impacts. The strategy proposes economic succession planning and a post-mining economy. A critical narrative advanced is the holistic interconnectedness, integration, and alignment of the mining closure process.

3.2.8. Social Labour Plans Guidelines (SLPGs) of 2010

The Department of Mineral Resources and Energy (DMRE) regulates and enforces mining laws and plays a crucial role in overseeing the social labour plan (SLP) process when a company applies for permission to mine. In South Africa, the MPRDA obliges mining companies to produce SLPs to address local developmental concerns as a pre-condition to obtaining mining rights (RSA, 2002).

An SLP is one mechanism government uses to mitigate the long history of inequality between mineworkers, mining communities, mine management, investors, and shareholders (Corruption Watch, 2017). Marais (2013) argues that social- and labour plans are meant to address the socio-economic problems related to mining and mine closure, and to assist the municipalities and mines with integrated planning. The objectives of the DMRE's social- and labour plan are to

(a) Promote economic growth and mineral and petroleum resources development in the Republic (Section 2 (e) of the (MPRDA);
(b) Promote employment and advance the social and economic welfare of all South Africans (Section 2 (f) of the MPRDA);
(c) Ensure that holders of mining or production rights contribute towards the socioeconomic development of the areas in which they are operating as well as the areas from which the majority of the workforce is sourced (Section 2 (i) of the MPRDA, and the Charter); and
(d) To utilize and expand the existing skills base for the empowerment of HDSA and to serve the community (DMRE, 2010: 5).

The MPRDA (RSA, 2002) expects mines to submit SLPs as part of their application for mining rights. Likewise, mining companies can only obtain a mining license after the DMRE has approved the SLPs (Van der Watt and Marais, 2021). The Draft Strategy on Mine Closure (RSA, 2021) suggests that a mine closure plan should become a precondition for granting a mining license as part of a mine's EMP or EIA (also see Section 3.2.5).

SLPs must be aligned with local IDP strategy (Matebesi & Marais 2018) so as to solve social problems and expose communities to mining opportunities during and post mine operations. In addition, the SLP must specify community projects and ensure mining companies implement the plans and use the

allocated budget for each identified project. Once approved and aligned with the relevant municipality's integrated development plan, the SLP is binding, valid for five years, and reviewed periodically with new commitments until the end of the mining cycle (CALS, 2017). In practice, however, SLP promises are not adhered to. There are no monitoring and evaluation systems to ensure that SLP commitments are met; additionally, some mining companies do not comply with SLP implementation, whilst others take advantage of community ignorance and choose not to fund SLP projects (Thobejane and Sekome, 2018). In South Africa, says Ndeleki (2018), many mining organisations pay attention to social effects only when faced with the threat of losing their social license to operate, or with reputational risk arising from uprisings. As such, it is a prevalent practice that companies consider social closure aspects in selecting local economic development (LED) projects for fear of losing their operating rights.

The Centre for Applied Legal Studies (2017) notes that the lack of monitoring and evaluation regarding SLPs is cause for concern. Community leaders are often contracted and paid by mining companies and are then referred to as transactional leaders. Therefore, they are indebted to the company rather than the community; the absence of monitoring SLP execution then becomes inconsistent with the people's needs. Consequently, the SLP does not address its intended purposes and could lead to corruption. SLPs are intended for communities and mineworkers. However, there is a general deficiency of transparency in accessing the documents (CALS, 2017). According to Matebesi and Marais (2018), the MPRDA is not explicitly clear on whether SLPs are public documents; therefore, weak IDPs yield worthless social- and labour plans. In addition, social and work programmes often do not take into account the long-term consequences of mine closure.

The Mining Charter (RSA, 2018) provides guidelines necessary for developing SLPs, and requires mining companies to support socio-economic development in mining, including labour sending areas. In line with sections 23(1)(e) and 84 (1)(g) of this Charter, a mining right applicant must contribute financially towards the development and implementation of the social and labour plan (RSA, 2018). The Department of Minerals Resources (DMR), moreover, developed guidelines for SLP document submission as obligated by regulation 46 of the MPRDA (RSA, 2002). The Centre for Applied Legal Studies (2017) confirms that applicants who wish to obtain prospecting or mining rights must submit a detailed social- and labour plan including details as to how the mine will benefit communities.

SLPs count on mines to develop a human resource improvement- and community development plans, housing and living situation plans, and employment fairness plans. Further, the Mining Charter (RSA, 2018) requires the implementation of systems to mitigate downscaling retrenchments, and that financial provisions are made to implement the social labour plan. These aspects are respectively outlined below.

i. Social labour plans and integrated development plans

Local economic development (LED) programmes form part of the SLP. The LED section in the Social Labour Plans Guidelines (RSA, 2010) stipulates that mines contribute economically to mining

communities and labour sending towns. LED projects should focus on infrastructure development, where essential services like road maintenance, water- and sanitation supply, and housing are provided by mining companies in addition to what the government renders. In addition, the scope of the projects should include a specific focus on poverty eradication in respect of how local businesses can be supported through mining companies' procurement of services and goods. This will also help companies align with the local production targets outlined in the Mining Charter (2018) and regulated by the SABS (2021). Mines can also launch LED projects relating to technological transfer and training, funding, supplier development programmes, while also creating procurement opportunities for small to medium-sized businesses (SMMEs). More importantly, infrastructure and poverty eradication interventions must be aligned with the objectives stipulated in the companies' integrated development plans (IDPS) (RSA, 2010). According to Van der Watt and Marais (2021), mines and the local municipalities must cooperate and align social- and labour plans with their IDPs.

In order to mitigate poverty in the surrounding community, rural development plans as well as mining community plans are required. The projects envisioned in these plans have to be sustainable in nature, and should contribute to the continuing betterment of the community's livelihoods. However, mining companies should cooperate with local government to realise their IDPs. In order to decrease the chances of ghost towns, the sustainability of these IDP-aligned projects is crucial (RSA, 2010). For mines to successfully implement IDP projects, they must conduct social-economic due diligence to address community expectations and reduce poverty.

Moreover, SLPs must add value to host communities. Mines are required to submit SLPs as part of their application for mining rights (RSA, 2010); as such, mining rights holders must participate in the SLP process. Failure to do so will result in permission for mining not being granted – mining companies can only obtain the mining license after the DMR has approved the SLPs (Van der Watt and Marais, 2021). The SLPG (RSA, 2010) further states that, after operating, the mining company is expected to submit an annual report commenting on the implementation of the envisioned SLP to the DMR. In these reports, SLPs must be aligned with local economic strategy. The aim is to solve social problems and expose communities to mining opportunities during and after completion of mine operations. The SLP must detail poverty eradication projects and infrastructure development initiatives aligned with the mining area's IDP, which the mining rights holder will support (CALS, 2017).

ii. Human resource development programmes

The SLPG (RSA, 2010) outlines how mines should anticipate improving both workers' and communities' skills. The skills include those relevant to mining, as well as portable skills utilised in other sectors. Examples of human resource development programmes include basic training and education for adults, leadership development, artisan training, bursaries, and other vocational training initiatives for the community. In addition, the MPRDA regulates that the employment equity of the

mine should include a ratio comprising women participating in mining (10%), and HDIs, who must occupy 40% of management positions within five years from the time an operating license is issued (RSA, 2002).

iii. Managing downscaling and retrenchment

Under Section 52(1) of the MPRDA (RSA, 2002), regulations set out strategies to secure employment and avoid job losses. The section stipulates that mines must apply alternate solutions and methods to protect jobs where job losses are inevitable. Applying these strategies will reduce the socio-economic effect of mine downscaling on individuals and communities in instances where downscaling and mine closure are unavoidable since mineral resources are finite (Sesele *et al.,* 2021). SLPs promote employment, increase social- and economic welfare, contribute to the mining industry's transformation, and ensure that mining companies develop the areas of operation. It additionally integrates and manipulates the socio-economic and environmental impacts of mining through all mine lifecycle stages up to the closure, circumvents redundancy, and mitigates socio-economic consequences on individuals should a mine be closed (RSA, 2010).

Mines must develop an inclusive training plan to enhance employees' skills and empower self-employment, especially for those who face retrenchment and without skills needed in other sectors. SLPs' primary objective is to promote the MPRDA, as well as the goals of the Mining Charter. SLPs spell out plans to address the social- and human resource development needs of miners and their communities. The guidelines define these needs in order to create and ensure sustainable economies after mine operations cease. In terms of Section 43 of the MPRDA, the SLP document operation is valid until a mine's closure certificate is issued (RSA, 2002; RSA, 2010; RSA, 2018).

iv. Housing and living condition plan.

It is a requirement of SLPs that mining companies "found ways to improve the standard of housing, including upgrading hostels, converting hostels to family units […] the objective is to promote homeownership options for mine employees" (RSA, 2018). Marais and Cloete (2013) argue that although living conditions in hostels can be inhumane, they offer better housing options than other alternatives, as dwellers have no intention of staying on in the mining town after downscaling. In addition, mineworkers who own property find it difficult to sell during mine closure (Ackermann et al., 2018).

The SLPGs provide a "housing and living conditions plan" (RSA, 2010). The intention is to align SLPs with municipal human settlements in an effort to address mine worker housing challenges; it also aims to protect and reduce mineworkers and their families' vulnerability after mine closure. Furthermore, SLPs mandates mine to put together a five-year living improvement strategy with a clear target for

workers. One of the SLPs' main objectives is to provide a housing and living conditions plan to address the issues outlined above (RSA, 2010).

v. Mine community development plan

The Mining Charter (RSA, 2018) and SLPs are driven by the MPRDA (RSA, 2002) as change agents to better the lives of mineworkers and the community in general (RSA, 2010). The aims of a mine community development plan are to allay post-closure social effects, decrease community dependence on mining and its economic benefits, and leave a sustainable and stable social legacy (DMR, 2010). Community development plans hinge on programmes being established to cultivate alternative opportunities to empower communities to survive during the mine closure period.

vi. The process to manage downscaling and retrenchments.

Retrenchments due to mine downscaling are inescapable, as mineral resources are finite. Therefore, mines must implement strategies to achieve operational requirements before retrenching employees. The SLPGs require mines to develop a standard procedure for downscaling and retrenchments under Section 52 (1) of the MPRDA (RSA, 2002) and Section 189 of the LRA (RSA, 1995). Thus, mines should have turnaround strategies in place to save jobs, quell unemployment, and reduce downscaling. Additionally, mining companies must develop comprehensive training programmes, including portable skills development plans for self-employment and re-employment purposes (*cf.* Section v above). Mining companies must further outline and set aside projects for retrenched workers. The proposals mentioned above must be reported to the DMR two years before starting the downscaling process (RSA, 2010).

The SLPGs (RSA, 2010) accelerate change and put into effect procedures to improve the living circumstances of mineworkers, host communities, and areas from which labour is recruited. They further identify employees and community projects and detail when the mines ought to implement the projects according to budget allocation for each programme. Prospective socio-economic initiatives should include and support local small and informal businesses. According to Marias and Nel (2016), not all ex-mine employees are absorbed back into the labour market following mine downscaling or mine closure, as their acquired niche skills are not suitable for the job market in other sectors. The skills shortage precludes ex-mineworkers from entering the job market in sectors other than the mining industry.

Finally, programmes aimed at accomplishing social- and human resource development of mineworkers and the host community are outlined in the SLPGs (RSA, 2010). The guidelines further articulate the need to create and safeguard a sustainable economy after the mine's lifespan runs its course. According to Section 43 of the MPRDA, an SLP is effective until a closure certificate is issued (RSA, 2002).

3.3. CONCLUSION

This chapter discussed mine closure legislation in South Africa relevant to the current study. Mine closure is unavoidable and has become crucial in order for government to regulate mine closure and downscaling. The absence of appropriate mine closure interventions has excessive effects on communities, the environment, individuals' health, and the economy. To control the impact of mine closure, the national government has developed standards and guidelines to deal with mine closure issues. As the country's supreme law, the Constitution of the Republic of South Africa (1996) shapes different legislations and policies to achieve sustainable mine closure.

In this chapter, an overview of institutional-, cultural-, socio-economic, and political factors of mine closure often experienced at the end of the mine project life cycle is provided. The planning- and management process vital to mitigate post-mining effects comes at the end of the project cycle. The effects of mine closure are extensive; consequently, strategies to differentiate the economy to other sectors must be exploited, an area mines seem to address inadequately.

The social aspects of mine closure are often not sufficiently understood, and what ensues is either avoidance or suspension of the development and implementation of sustainable social closure strategies. However, social aspects of mine closure are addressed in legislative provisions that govern mining, as discussed in this chapter. For example, the Mining Charter (RSA, 2018) and MPRDA (RSA, 2002) regulate the number of mining companies that must participate in infrastructure development, as mining companies should implement developmental projects aligned with IDPs. When a mine applies for an operating license, an SLP must accompany such an application. The SLP must outline how mining companies will implement community development projects and is a binding document that is reviewable and valid for five years. To strengthen the social-economic welfare of South Africans through ownership, SLPGs aim to encourage the development of mineral- and petroleum resources, as to advance financial growth in order to create an environment for job creation (RSA, 2010). With the development of new legislation that governs mining operations, the MPRDA addresses "the environmental and socio-economic consequences experienced by the mining-affected communities" (RSA, 2002).

The White Paper compels employers to inform employees of pending job insecurity in an effort to prepare them for occurrences of downscaling and mine closure. The preparations stipulated in the White Paper (RSA, 1998) aim to mitigate the consequences of mine closure. The preparations must begin during employer-employee engagement. Therefore, mines must notify employees of possible job losses. The employee must also be capacitated with skills development to prepare for employment after closure, with specific focus on teaching transferrable skills not necessarily relating to the mining industry. The MPRDA (RSA, 2002), LRA (RSA, 1995), and the BCEA (RSA, 1997) require employers to serve employees with 60 days' notice of intent if their redundancy is likely due to mine closure.

Lastly, January and Lee (2019) conclude that the ownership of the mines, development of the mining community, human resource development, preferred procurement processes, and growth and sustainable development are parts of the Mining Charter (RSA, 2018) related to mine closure. The Mining Charter prescribes 30% mine ownership for HIDs. The ownership formation includes an 8% allocation for employee share and mining communities respectively, and 14% for Black-owned enterprises. Mining companies must contribute 1% of their annual turnover to Black shareholders (RSA, 2018).

CHAPTER FOUR: RESEARCH FINDINGS AND ANALYSIS

4.1. INTRODUCTION

Chapter 1 of this dissertation provided an overview of the various phases of mine closures and opening. Chapter 2 discussed the international literature on mine closure, while Chapter 3 focused on South African mining policy and mine closure guidelines. This chapter presents the qualitative data obtained during fieldwork. Mining is a temporary event, and closure is inevitable. The secret 1982 closure of the Koffiefontein mine frustrated employees and left a scar on the community (*cf.* Section 1.2). There was an outflow of people, unemployment in the formal and informal sectors rose, and businesses closed down. During the interviews conducted with respondents, it emerged that Petra Mining wants to sell the Koffiefontein mine. Interviewees exhibited confusion during interviews on whether to refer to historical mine closure, possible mine closure, or general problems in the area. An attempt was made to contextualise the responses appropriately. The following key points should be kept in mind:

- The sudden mine closure in June 1982 caused 1 200 job losses (Marais *et al*., 2005).
- In 1987, the mine reopened, and Koffiefontein's population subsequently increased;
- In 2006, substantial downscaling took place. With the expiration of De Beers' mining rights for Koffiefontein, Petra started operating the mine in July 2006, but only under care and maintenance conditions. In July 2007, Petra's acquisition was finalised. They are later able to initiate the process of diamond recoveries by using the plant to process the stockpile; and
- According to current indications in Petra Diamonds' Koffiefontein report, Petra is "exploring options for a responsible exit", since the mine is expected to reach its end in 2025. The company has started the process of "right-sizing" the mine, which involves layoffs (PD, 2022: para 6).

This chapter includes interpreting and analysing findings to identify trends, relationships, and themes. Themes identified include the effects of mine downscaling on socio-economic development, consequences of mine closure, and mining. Further thematic elements include local development, community involvement in the mitigation plans for mine closure, the role of the local and provincial government, the views of mineworkers, as well as the views of DMRE. Efforts to contact officials from the district municipality did not materialise. It was in the researcher's interest to have face-to-face interactions with DMRE and the mining company, but no responses were received from these parties.

4.2. LONG-TERM CONSEQUENCES OF MINE CLOSURE AND DOWNSCALING: SOCIAL ISSUES

The purpose of this study is to evaluate the impact of mine downscaling on the Koffiefontein mine since 2006. Over the past 140 years, mining played a significant role in creating employment

opportunities and economic development and growth of Koffiefontein (PD, 2022). The mine also provided social amenities like sports facilities, clinics, and supported schools in the area.

4.2.1. Social disruption after mine downscaling

Job losses experiences during the downscaling or closure of mines is a cause of stress to mineworkers, and also affects their families. Many respondents expressed that finding new employment was difficult, especially as many of these ex-mineworkers were quite old. With their employment skills confined to the niche area of mining, they could not find work elsewhere. Employers prefer young people with diverse skills. Below, I discuss the effects of social disruptions due to mine closure as identified by the interviewees.

i. Education

During the interviews, participants expressed frustration and shared the hardships they had already experienced due to the Koffiefontein mine's downscaling. Saliently, respondents comment not only on the current downscaling process, but also to the previous closure of the mine by De Beers in 1982. This indicates that mine closure has repercussions even decades after it occurs, and affects current and future generations. For example, parental unemployment resulted in children dropping out of school due to unpaid fees. The quote below (Participant 12 and KCM) illustrates the link between education and losing a job due to mine closure:

> "The mine helped with education as well. I think some bursaries came from the mining side to schools. Then De Beers assisted with tuition. When De Beers left, parents, even those employed by the company, had to apply for credit to get somewhere" (Participant KCM).

> "One could just imagine that a lot of children who depended on these workers who during those periods had to travel for education elsewhere outside the region, would find it difficult to actually get to school, at high school level. Indeed, the mine had bursaries available for children of workers who would then pursue further studies at the tertiary institutions then immediately with the closure that opportunity also had to be stopped". (Participant 5).

The comment demonstrates the contribution De Beers made towards the education of mineworkers' children. Though De Beers' intentions may have been honourable, they succeeded in creating dependency, exacerbating the education problem when the mine closed. When mining companies withdraw subsidies from the surrounding community, one of the effects is that schools in the area may close due to lack of funding. Apart from the fact that a large cohort of South African mineworkers already have limited basic education, with less than 40% having completed Grade 12 (Cole and Broadhurst, 2022), their children are also adversely affected. This perpetuates a cycle of illiteracy and a resultant skills shortage (Cole and Broadhurst, 2022) which further contributes to South Africa's high unemployment levels.

Low skills levels are reported by Cole and Broadhurst (2022), as well as others, to be a concern expressed by mining companies. With mine closures or downscaling, this problem grows exponentially. Supporting this statement, participants identify the lack of training facilities in the town as a major problem. Participants feel that lack of training contributed to crime, drug abuse, and unemployment, and suggested that the TVET college in the area should include more courses relevant to mining. The municipality is currently in talks with the Department of Education to convert the Motheo satellite campus in Koffiefontein into a college.

Violent protests in Koffiefontein and surrounds in 2018 were based, in part, on a lack of access to education and training opportunities (Molebatsi, 2018). Thandiwe Reachable, the executive mayor of the Letsemeng local municipality, stated that disgruntled workers were "misguided" and "ill-informed" (Molebatsi, 2018: para 1). The mayor further went on to say that interns from local FET institutions were being appointed as interns; however, the concern from the local community was that they themselves did not have funds to obtain further training at such educational institutions, and that the mining company did not necessarily make training freely available to its employees. The mayor responded that youth skills development was a main concern, and that 120 youths had been enrolled in apprenticeships programmes. However, in a town with more than 10 000 residents, and where more than 57% of the population lives below the poverty line (MSA, 2022), these efforts barely make a dent in the overarching problem of lack of funding for and access to education.

ii. Unemployment

Unemployment emerged as one of the main themes during the interviews. Being unemployed has been a major consequence of mine downscaling since 2006. This was the case even years after downscaling the local workforce. Although unemployment started immediately, the severance packages paid to mineworkers provided a temporary buffer.

> "When the De Beers closed, people got money, and no one wanted to know the reasons for mine closure; there were four and eight hundred thousand, and everybody was happy" (Participant KCM).

The comment demonstrates the excitement in the town because of the money received from retrenchment packages. However, it also shows how communities are in denial about mine closure. Participants said that many mineworkers wasted their packages on luxuries and did not consider saving. They believed the mine would re-employ them and solve their financial problems, ignorant of the long-term unemployment implications of the mine's closure. Respondents note that Koffiefontein consequently experienced increased instances of alcohol abuse and family violence after the severance packages were paid.

Another issue raised during the interviews was the lack of job opportunities for the youth, which links to Cole and Broadhurst's (2022) observation that as much as 49% of youths in South African mining

towns are unemployed. Participants attributed youth unemployment and lack of job opportunities to limited career planning within the mining sector. One respondent said,

> "Petra mine hired certain people; certain people get tenders and have their people. They don't look after the matriculants; we can take them from there when the year ends. They can't say they don't know the matric results. The youth who are finished with school are still at home" (Participant KCM).

Though ex-mineworkers do sometimes receive training related to mining and its processes, specifically aimed at training for downscaling and mine closure, participants indicated that the traits acquired never achieved their intended objectives; they never had the opportunity to apply the skills, thus hampering efforts towards economic development. The following responses point to this problem.

> "Those training courses are not accredited. Because you will not work with that paper in other companies" (Participant KCM).

> "Where do you go with those training courses, those courses don't help" (KCM).

Since there is a TVET satellite campus in the area, respondents alluded to the unavailability of an appropriate curriculum as a contributing factor to unemployment and outmigration, because there are no job opportunities in the area. The following summarises the concerns raised by the KCM respondents:

> "The mine has career use like artisans, geologists, boilermakers, and electricians. Therefore if such additional courses can be available, the youth take children out of the streets and open opportunities."

The South African schooling system does not prepare young people with the requisite skills to enter the job market. Morsy and Mukasa (2019) comment that South African youth unemployment is not only the result of a lack of absorptive capacity in the country's labour market, but also due to the quality and nature of education provided; Mncayi (2021) notes a 50% skills mismatch in the country, with the schooling system focusing on STEM subject education and not on the development of skills. Van Broekhuizen (2015) further notes that "access to quality education is still inequitably distributed along the lines of race and socio-economic background", which supports the respondents' claims that access to education in the Koffiefontein area contributes to unemployment. The quote also shows no opportunities exist for unskilled and inexperienced youth in Koffiefontein.

iii. Family disintegration

Participants reported incidents of family disintegration with high divorce rates. Being unemployed brings tensions in the household, and, says one respondent, "your wife could disrespect you". Two of the participants said the following:

> "That's when the family starts disintegrating; children are left alone. Parents are looking for work elsewhere, or one of the parents is not there, and so on. And these tend to bring on board social ills, and families may experience divorce or families where parents cannot care for their children. In these cases, where parents are not available, you can imagine how children will start experimenting with many other things, whether alcohol or drugs and so on" (Participants 5).

> "The divorce rate went up because there was no more income and alcoholism became very high. People started using drugs. There are many social impacts, including lawlessness, people becoming alcoholics, the divorce rate skyrocketing, and some people committing suicide. Belongings like cars and properties bought through the banks were repossessed" (Participant 13).

These quotes confirm several social problems associated with mine downscaling. Although severance packages create a temporary buffer against loss of income, they do not last forever. The ensuing poverty due to severance package depletion and downscaling lead to social disruption such as alcohol abuse and family disintegration. This further indicates that mine downscaling can have a psychological effect on mineworkers and their families. Loss of employment is compounded by not finding alternative sources of income. Unemployment can lead to loss of status, self-identity, apathy, demotivation, and the fragmentation of households (Farré, Fasani, and Mueller, 2018). One respondent said:

> "The other thing was when the mine closed, many fathers left their homes to look for work elsewhere and had to support their families from a distance; you see, the order/discipline in the homes went down, and many things happened" (Participant KCM).

Increased instances of teenage pregnancy, absence or premature exit from school, as well as juvenile delinquency are some of the social ills attributable to the fragmentation of households (Farré *et al*., 2018). Comments like the respondent's above speaks to a common concern voiced by many of the interviewees, specifically the aspects of the father leaving the home, leading to a loss of discipline. Inevitably, sustainable jobs promote family preservation, while job loss can cause separation in families.

iv. Outmigration

Another significant impact of the closure is on people's outmigration, leading to population decline in Koffiefontein. As employment opportunities decline, people leave the area to search for better employment elsewhere. The following quotations express these views:

> "Finch mine took them to individuals with certificates, diplomas, and men who were skilled workers. But elders over 60 could not look for employment because age was not on their side" (Participant 10).

> "I think the unintended consequences of mine closures, one that comes to mind is you lose a lot of skilled people, skilled personnel, people with skills would immediately leave. And this would be people who probably were professionals in the mine and immediately would have to go and look for work elsewhere, you know" (Participant 5).

> "There was a lot of people leaving, like your artisans, your miners, but your unskilled guys were given portable skills. They remained in Koffiefontein, and the new company employed some" (Participant 1).

The above quote indicates that it is not just a matter of outmigration. More problematic is the fact that it is skilled people who leave Koffiefontein. Though some ex-mineworkers acquired skills they could employ outside the mining industry, which meant that they stay in the area, the loss of skilled workers is a blow to the community. The population decline resulted in the closure of many businesses at Koffiefontein, further exacerbating job losses and economic collapse.

v. Increase in sex work and teenage pregnancy.

Another pertinent theme stemming from the interview's points to an increase in the sex work trade following mine closure. This can also be related to family disintegration, with young sex workers, often minors, leaving home, or marriages collapsing due to infidelity. Using funds set aside of families' basic needs to pay for sex work is another issue, which speaks to the problem of the already tenuous economic situations of many families in the town.

> "In particular, girl children and those who work but cannot make ends meet. They use their bodies as a source of income, and where does this happen?" (Participant KCM).

> "Because there is no work, and they have needs and expectations, you find girls have a relationship with married people for money to survive" (Participant KCM).

> "I often heard mothers crying or complaining about the situation to say father take money to give to young girls" (Participant KCM).

During the interviews, participants contended that young girls have children only to benefit from the state's child support grant. The South African makes available an amount of R480 per month – barely enough for one person to survive on – to parents' wo earn less than a specific amount annually (RSA, 2022). For many young women, this measly income is their only way of survival after mine collapse and its resultant increase in school dropouts and unemployment. This perpetuates a cycle of sex work (and an increase in incidences of sexually transmitted diseases) and teenage pregnancy, which has the adverse effect of creating more mouths to feed with a pittance allocated by the state. This practice has

become common practice in the area due to unemployment associated with mine closure; Sesele *et al.* (2021) report similar patterns in other mining towns in the Free State Goldfields.

vi. Crime

Mine closure can increase crime. As previously discussed, when operations in Koffiefontein ceased, unemployment rose, and children left school. This results in high levels of crime and drug abuse. The participants raised concerns regarding increased criminal activities, claiming that the town is not as safe anymore. The following comments demonstrate these points.

> "When the mine closes, it becomes a problem because, for example, in a household, if I am the father and I am the breadwinner, and I lose my job, number one respect is gone in the house because I cannot cater for my family. The house order is no longer there because the father has lost respect. He cannot sustain or maintain the house. So, the children become vulnerable, and they start using substances. "They start doing all the wrong things, and when there is no income, my children drop out, where crime comes in" (Participant KCM).

> "Yoo, the social ills, is an issue; because of unemployment, you will have social issues, a lot of drinking happening, people have enough time to mess up because they are not employed. So, your crime rate goes up" (Participant 1).

Participants reported that finding a job after downscaling was difficult. Most hoped that, when Petra Diamonds took over, people who lost their jobs would be the first to be re-employed when the mine reopened; instead, only a few were reabsorbed. The two participants above are amongst many who relate increased crime to unemployment and family disintegration. Table 4.2 (see below) provides the actual crime rates in Koffiefontein.

Figure 4.1: Crime in Koffiefontein (FS) Crime as a result of mine closure: for April 2005 to March 2012

Crime category	April 2004 To March 2005	April 2006 to March 2007	April 2007 to March 2008	April 2008 to March 2009	April 2009 to March 2010	April 2010 to March 2011	April 2011 to March 2012
CONTACT CRIMES(CRIMES AGAINST THE PERSON							
Murder	7	4	1	2	1	4	0
Total sexual crimes	29	23	32	27	39	30	31
Attempted murder	6	6	4	0	1	3	2
Assault with intent to inflict grievous bodily harm	92	132	177	126	138	132	118
Common Assault	140	106	122	140	94	91	84
Common robbery	16	8	11	8	5	17	8
Robbery with aggravating circumstances	3	7	0	2	6	1	6
SEXUAL OFFENCES							
Rape	0	0	0	0	30	20	21
Sexual Assault	0	0	0	0	4	6	6
Attempted Sexual Offences	0	0	0	0	2	3	2
Contact Sexual Offence	0	0	0	0	3	1	2
CONTACT-RELATED CRIMES							
Arson	1	2	4	1	4	1	2
Malicious damage to property	53	71	73	56	64	57	42
PROPERTY-RELATED CRIMES							
Burglary at non-residential premises	34	25	18	35	30	8	30
Burglary at residential premises	117	118	107	124	84	66	92
Theft of motor vehicle and motorcycle	1	3	4	2	2	3	1
Theft out of or from motor vehicle	8	10	10	12	18	13	9
Stock theft	72	56	56	84	59	55	64
CRIMES HEAVILY DEPENDENT ON POLICE ACTION FROM DETECTION							
Illegal possession of firearms and ammunition	1	2	0	0	0	1	1
Drug related crime	6	11	11	15	12	9	26
Driving under the influence of alcohol or drugs	10	9	13	7	7	12	4
OTHER SERIOUS CRIMES							
All theft not mentioned elsewhere	134	116	98	100	77	75	83
Commercial crime	5	9	2	3	7	5	4
Shoplifting	19	19	25	28	29	7	8
Robbery at non-residential premises		0	0	0	2	1	6
OTHER CRIME CATEGORIES							
Culpable homicide	7	3	3	3	3	3	4
Public Violence	0	0	0	0	1	2	0
Crimea injuria	11	25	33	36	24	31	26
Neglect and ill-treatment of children	2	4	10	7	3	1	0
kidnapping	2	0	0	0	0	2	0

Source: Stats SA (2011), SAPS & Online https://www.crimestatssa.com/.

The statistics above shows crime as a result of mine closure. The notable changes are between the mine closure period of 2006 and 2007. Based information, common assault cases with intent to inflict

grievous bodily harm are common in Koffiefontein. Statistics show between April 2006 to March 2007, the towns experienced and increased of 74,5 % between March 2007 and March 2008. Other crime that experience an increase during the same period include malicious damage to property, burglary at residential premises and Crimea injuria. The increase in crimes could partly be due, to unemployment drug or alcohol abuse, leading to public violence. Similarly, businesses and the former municipal official responses indicate that investors are not attracted to the area because of the 'unstable' environment due to criminal activity in Koffiefontein, as well as poor infrastructure (discussed later).

One participant expressed concern about how the area has become unsafe, stating that the community lives in fear because of the level of crime:

> "When the mine closure, one would expect an increase in the crime rate and in what we have seen even in recent times. There have been attacks of private individuals from the situation that would have been as a result of unemployment which then gave rise to the increase in crime. But you also, if one has been following the news, not very long ago, there was an attack on the police station where on-duty police officers were murdered. So that shows you how crime has ravaged that small town" (Participant 5).

This response speaks to increased community concerns about the high poverty rate because of the mine closure and the consequent increase in crime. One respondent said:

> "There were a lot of problems in Koffiefontein, and crime increased, robberies, there were a lot of things that we went through from 2006" (Participant KCM).

Although it is impossible to conclusively relate the crimes to mine closure, the evidence points to a high likelihood in this respect.

4.2.2. LINK BETWEEN MINE CLOSURE AND LOCAL ECONOMIC COLLAPSE

Koffiefontein is a typical small mining town. Since the mine downscaled, the town's economy, population, and employment have declined. The town's infrastructure collapsed, road conditions deteriorated, and the railway line was discontinued. Like all mining towns, in the Goldfields and elsewhere, local business was affected by mine downscaling to the point where they were not viable and had to close down. Local buying power also declines because of people's outmigration and lack of income. Participants expressed several challenges due ongoing downscaling of the mine. One of the participants said:

> "So, the mine closed, but what happened when the mine closed? A lot of businesses that were supplying the mine suddenly lost a lot of contracts. Despite that, when the mine close, people generally just lost their jobs because the mine closed. The mine has played a role in promoting and supporting small and medium enterprises in the town" (Participant 12).

This response draws both direct and indirect links between the closure of the mine and a lack of economic development. Mine closure is detrimental to local businesses with subcontract agreements to the mine. The indirect link is visible when fewer mine employees spend their money in town. Participants claimed that a variety of shops used to provide services to the community. Since the mine downscaled, however, many of these shops have closed. This reality has made goods and products unaffordable, not only because community members have less disposable income, but also because they have to travel significant distances to access retailers in Kimberley or Bloemfontein. The additional travel costs are a further encumbrance to the community's financial wellbeing.

Participants described the local economy status as challenging after the mine closure. Some respondents described it as "money […] going through the bridge" (Respondent 10), resulting in a loss of potential income:

> "When you wanted to do proper shopping, you went to Koffiefontein. Today, the difference ballgame altogether. The economic activity of Letsemeng is concentrated in Jacobsdal because of the property development and agricultural economic activity happening in that area. Where mines have closed, the communities are deserted. A once vibrant economic, vibrant community suddenly that community has to rely heavily on government" (Participant 10).

The mines provide economic opportunities to individuals' and families' livelihoods. Although the mine supports businesses and employs people from the community, the area is characterised by poverty.

i. The economic impact and single economy-town

Mine downscaling has a devastating effect on single-economy towns such as Koffiefontein and local communities. The adverse closure impact is felt by local businesses as well because the mine closure in Koffiefontein was seen as the end of an important economic driver, which led to the subsequent collapse of the local economy. When a mine closes or downscales, it affects the value chains in a small town. The quotes below indicate respondents' perception of this issue.

> "During the De Beers time, all services and retail businesses and furniture shops, liquor stores and banking services were booming in Koffiefontein. However, this changed after mine closure. Participants claimed this was due to downscaling and decline in population, as people have started to move out of the town" (Participant 13).

> "To tell you the truth, the busy times is when the mining payment is paid to the workers so that time you can see the people have money and they are buying food, and the business is busy for say three or four days and then after that is not as busy as it is when the mine people get money. So, it must carry on, and if it closes, I don't think business will close because there is no business" (Participant 12).

> "Two commercial banks had to close due to the closure of the mine the second time, and people had to go to Jagersfontein for banking services. So, it affected even the natural growth of the town in terms of bringing in maybe bigger stores and bigger franchises to Koffiefontein because of the continuous closure of the mine" (Participant 13).

Closure of the mine led, as mentioned above, to the eventual closure of these businesses, which incurred further job losses. Further, companies still in operation had to downscale their employee numbers.

The community at large believes that the local mine has not done enough to build local businesses' financial capacity and create an environment that would sustain businesses beyond mine closure. Many participants fear that Koffiefontein will become a ghost town. One participant says:

> "So, we need to diversify the economy from the SLP so that we don't have ghost towns. The discontinued economic activity in the area is continued and secure job creation in the area" (Participant 13).

When mining stopped, the effect one Koffiefontein's economy was devastating, including people's social and economic conditions. Moreover, the fact that most of the town's economic activity centred around mining increased the community's dependency and threatened the existence of the mine. For example, the 2018 Koffiefontein unrest made the mine vulnerable to demands, where the community demanded, they be allowed to mine the dumps.

ii. Investment and market penetration

When asked about the consequences of mine closure in the vicinity, most interviewees gave negative responses. They claim that the current downscaling and the decreasing populace scared investors. The respondents feel that, if the mine continues its current trend and ceases operations, Koffiefontein will become a ghost town due to the over-dependence on the mine as the primary source of income and attraction of people.

> "The decline for goods and service was due to employee's migration to other mines in the Northern Cape. So basically, the town was left as a ghost town, and those shops never again opened" (Participant 13)

> "The third closure of the mine-affected those particular stores (furniture and clothing) and had a greater impact. In the past, we had a very big cheese factory in a huge one which even supplied cheese, cheddar, and mozzarella to overseas markets, but when the mine closed the second time, it closed. It closes forever in terms of the elderly in stores because obviously, the demand for furniture, goods, and services decreased" (Participant 13).

> "I think legislation that enforces certain percentages of the mine total profits to be reinvested within the mining town needs to be introduced. I could have imagined if by then, De Beers

investments some money or some capital into the development of a certain type, whether it's a Mall or whatever, and it would have sustained the town" (Participant 13).

Mining communities depend on infrastructure and facilities that are made available and maintained by local mines. Some of these services, like educational facilities, transportation systems, and banking services, are available because of mining operations. The quotes above indicate the impact of mine closure on businesses, individuals, and the people employed by the company when the demand for goods and services decreases or is no longer needed. They emphasise the need for businesses in the area, specifically shopping malls, as the providers of the current good are outside Koffiefontein and are expensive with limited stock. According to the respondents, this contributes to the high cost of living and is disadvantageous to the town's development.

iii. Dependency and interdependence

The previous section examined the economic impact of mine closure; however, there are also consequences associated with how other organisations have become dependent on the mines. The Koffiefontein local municipality, for example, depended on support from the mine. The mine would deduct rates and taxes from the salaries of workers using the De Beers home ownership plan and use that income to pay for services. When mine employees lost their source of income, De Beers terminated the housing subsidy, and employees had to find an alternative way to pay for services, or had to use their retrenchment packages (DEAT, 2005: 175).

The mine also assisted with maintaining local infrastructure, such as upgrading the water purification plant and sewage system, echoed in the responses below;

> "The mine assisted the municipality with the infrastructure maintenance and contributed towards the municipal revenue" (Participants KCM 10 and13).

> "The municipality suffered a huge impact because the revenue base of the municipality during the times of De Beers was very healthy" (Participant 10).

The job losses did not only affect the mining workforce and their families, but also affected existing businesses, which had consequences for municipal revenue; this revenue, for example, declined when the mines closed because former miners defaulted on paying for services. Furthermore, the number of indigent people and instances of non-payment increased. Consequently, the municipality failed to maintain the infrastructure.

iv. Breakdown of infrastructure

Mines have a finite life span, making it challenging to endure income and improve livelihoods after mine closure. Before the amalgamation of municipalities in 2000, De Beers mine supported the municipality. During the interviews, it was reported that the mine would assist the municipality on matters that either hamper or enhance service delivery. Participant 5 said:

> "In the past, the mine was responsible and supported the municipality to keep projects [referring to infrastructure] alive. With closure for several reasons, the investments that the mine used to have for that area were stopped, and there's very little the municipality can do." [Participant 5].

This interviewee's response shows the sentiment also voiced by other interviewees that mining communities depend on infrastructure and facilities that are made available and maintained by local mines. In some instances, mines enter into agreements with local municipalities to provide or assist with service delivery and maintenance of local road infrastructure. However, when mines stop caring for these services, the infrastructure collapses, and poor service delivery affects people's living standards.

Most roads in and around Koffiefontein need rehabilitation. Although the municipality is patching some streets, they are in a deplorable state of repair. The condition varies from fair to poor, and erosion is common. The surfaced roads have potholes and have deteriorated. A business owner remarked, "You just feel that the road are not right".

Another concern noted by the participants is the absence of infrastructure and land for development to attract investment in the area. Participants reported that the town's infrastructure is insufficient, referring to housing, sports facilities, healthcare facilities, schools, and poor roads in the middle of and entrance to the town. However, the participants agreed that no significant infrastructural development had occurred since De Beers left.

> "And you can see the disaster after De Beers left. Look at the town. The town had never looked like this before. Koffiefontein is a beautiful place, but when De Beers left, and not only individuals but the town was also nearly a ghost town. You can say it is a ghost town because the roads are in a bad state, and the parks are not clean. All that De Beers did is vandalised, and maintenance is not done like before De Beers was here. In other words, De Beers left devastation until now" (Participant KCM, 10 and 13.).

> "The swimming pool at Diamanthoogte school. After De Beers left, those were destroyed and vandalised because they were not serviced as they were during De Beers' time" (Participant KCM).

The condition of the kettle at the entrance of the town (a symbol related to the town's name, which literally translates to 'coffee fountain'), as well as the conditions of the roads, indicate the challenges the area faces. The question is whether these conditions result from mine closure, or whether it stems from the municipality's lack of planning. It can be argued that it cannot be the responsibility of mining companies to take care of the communities and other sectors within the community. Considering roads, one respondent said:

> "Did you see the bridge? Did you see what it looks like? I didn't want to know how it looked underneath. But it was not the municipality, is the Department Road. The quality of the road

affects me. If I must go to the location, for example, and I hit a pothole, there goes my tyre or other things in the car, so it does affect me in a way because I have to go fix it, I have to pay for my tyre" (Participant 12).

The road connecting Koffiefontein with Kimberley and Bloemfontein do not run through the town. This road is outside and isolate Koffiefontein from potential economic opportunities. Redirecting the main route through the town critical. However, it is also crucial that roads running through small towns are in good condition, as they often supply such towns with an economic injection (Van Staden and Marais, 2005). Suggestions were made for a public-private partnership between the provincial government and the mining company to explore the possibility of constructing a road that will direct traffic into the town to increase buying power for the shops on the town's main road. However, the plans have not been fully canvassed.

4.3. COMMUNITY REACTIONS AFTER MINE DOWNSCALING/CLOSURE (2006)

This theme speaks to the participants' struggles to process their emotions follows the loss of their jobs. Mine downscaling generally has a unique social impact on mining communities. A combination of emotional states experienced by retrenched employees, and expressed by the interviewees, includes shock, tension, loss of trust, grief, anger, despondence, and frustration.

During the interviews, it became apparent that the Department of Mineral Resources and Energy failed to perform its oversight role and ensure the implementation of social and labour plans in the area.

> "The mine did not benefit everyone but only a few in the community" (Participant KCM).
>
> "DMRE must change from inside because the DMRE, like, for instance, mine they have SLP, but in reality, those SLPs are just on paper" (Participant KCM).
>
> "So, the Government must guard against this, and the DMRE must be policed because is like DMRE is in the pockets of these mines" (Participant KCM).

Another aspect was the passive role of the municipality in stimulating economic growth. Participants also raised concerns about the municipality's involvement in SLP-related matters. According to most participants, the municipality was a barrier to implementing SLP initiatives, as it wanted direct control of the projects. It was evident during the interviews that soliciting IDP inputs from Koffiefontein was not completed because the community and the municipality do not agree on SLP priorities and projects. Participant 5 commented as follows:

> "SLP means nothing to us because it's very little of what you are making regarding profit margins and the like. Instead, we want to tap into who are the actual beneficiaries from your day-to-day SCM procurement". (Participant 10)

As this response shows, the SLP projects, if any, do not resolve challenges and mine closure-related impact issues, because the focus is on sustaining the municipality rather than the communities. In addition, Koffiefontein community feel that De Beers owes the town more than the R10 million provided after the mine closed. The assertion is that the previous allocation could not be accounted for, and the belief is that the mine withheld that money. Upon probing the respondents further, it became clear that no tangible SLP projects were initiated, with allegations that the funds could have been used for municipal obligations rather than community development.

The local community-based organisation (KCM) believes that there is no plan in place to address the various socio-economic issues resulting from the mine's closure. One member commented:

> "It is basically the same; there is no backup plan. The mine does not think to put something on the table so that when the mine closes, then KCM can at least assist the community to have something in their pockets, and Koffiefontein can be developed. So, we are all looking up to the mine and nothing else. So, therefore, Petra must see what they can do to help should the mine close down; the KCM can continue. They must help us there so that we can continue" .

On the other hand, an official from the municipality reported that the municipality does not have any closure plans in place and cannot launch these unless the municipality mobilises support from other provincial departments, such as the Department of Economic Development in the Free State.

The respondent's statement quoted above indicates the problematic nature of past and current mine closure planning. Firstly, it shows that the issue of mine closure planning did not receive adequate attention as required by mining legislation and principles of good mining. Secondly, this perhaps explains why the municipality did not plan for life after the closure or downscaling – after all, the assumption is that the mining companies have the legally required closure plans in place. This is also indicative of a lack of communication between the mining company and the local municipality. Thirdly, no closure was expected, and evidence from the interviews suggest that small-scale miners want to work. However, instead of using labour-intensive methods to prolong the project life span, they want access to machines and equipment to operate the dumps. The challenge with this approach is the appetite of investors to provide the necessary tools, and, according to the respondent quoted below, labourers' desire to work in a way that would effectively exploit the small-scale mining opportunities available.

> "What issues in legislation have been difficult to comply with? I think this handing over of that form part because we had the Deputy Minister of Mineral Resources Godfrey Olifant. He was here, so what the company did? They handed the dumps to the community. I don't think the community is doing anything about it. There is a lot of work there because you're not supposed to use machinery; you need hard labour, and they don't want that. I think there is an issue currently brewing, and the guys want to use machinery" (Participant 1).

At the local level, as indicated in Chapter 3, integrated IDPs and SLPs for Koffiefontein should exist. Mining companies collaboratively plan, support, and develop social and labour plans when mining starts in communities. However, some participants felt the process is only completed to ensure legislative compliance, because the delivery of projects is not consistently implemented as promised and benefits host communities. Consequently, mine's investments choices are not always in the best interest of the long-term sustainability and mitigating impacts of the closure. Therefore, stakeholders in Koffiefontein should have learned from previous mine closures to follow through on non-implementation or frustration by local politicians, and to monitor progress.

4.4. STRATEGY SUGGESTIONS FOR MITIGATING MINE CLOSURE EFFECTS

The question posed to the local community, business community and mining officials, local authority, and the DMRE centred on issues of plans, projects, and strategies to mitigate the closure. The interview schedule also targeted questions towards the coping mechanisms the community has put in place to mitigate mine closure.

The Koffiefontein mine had closed three times prior to the one being investigated, each time because of financial constraints due to poor performance of the diamond market, and the last time due to the imminent expiry of De Beers' mining license. On one occasion, employees were not informed of the closure. During this period, De Beers had options to downscale or implement measures to prolong operations beyond 2007 so as to ensure job security:

> "De Beers opted for the so-called 'blue-sky scenario', meaning mine all mineable resources" (Participant 1).

> "Due to the nature of the tailings facilities that can still be re-mined, the mine closure strategy was focused on removing alien vegetation and general surface rehabilitation the removal of secondary structures" (Participant 1).

Later, De Beers sold the plant to Petra Diamonds that, after becoming owners, focused their approach on empowering women, local economic development, and funding infrastructure projects identified by the community. This is an indication of good faith on the part of the mine, implying that they will remain in the town rather than comply with the SLP, in order to build good relations with the municipality.

In addition to development challenges in the community after the mine's closure, the standard of living became unaffordable because of limited economic activity in the areas. Agriculture and government (through public services) are two sectors that contribute to the growth of Koffiefontein. The mine was the most significant contributor to the Koffiefontein economy as a provider of sustainable jobs. Currently, the area's economy is dominated by three sectors, which include agriculture, mining, and government services.

Mining plays a vital role in sustaining communities in mining towns. However, career path was mentioned as a barrier to entering the job market and accessing skilled opportunities provided, as expressed by this respondent, who summarises the community's views:

> "The mine must provide the community with mining-related skills training, among other things artisan, boilermakers and electrician currently used in the mine" (Participant KCM).

One member stated:

> "I think, when the mine is still busy mining in a town, they must have sustainable projects in place to create jobs for the people whilst they are mining, so that when time goes, and they are no more mining there will be jobs for the people" (Participant KCM).
>
> "But I think one of the biggest mistakes that we committed together with DMR was not to prepare for life after the closure of the mine" (Participant KCM).

Mining can lead to the creation of communities and, to those that are already established, it can bring wealth; however, mining can also incur substantial disruption. During the interview, participants acknowledged their mistake of not preparing for life after mine closure (*cf.* Section 4.2.2). The following section will investigate measures that can be taken to mitigate the negative socio-economic effects of mine closure.

4.4.1. Small-scale mining

As mentioned earlier, the reduction of underground minerals and the hostile Rand/Dollar exchange rate decided the fate of the Koffiefontein Mine. Participants expressed their views regarding these specific reasons for the mine's closure as follows:

> "In the past, in the early 70s and 80s, the mine closed twice, in fact, not because there were no diamond deposits, but I think it was because the world prices of commodities used to be very high and because the diamonds in this area, are high-value diamonds they are not what is commonly known as alluvial diamonds" (Participant 13).
>
> "The basic reason we got is that production has gone down, and as a result, De Beers, a big mining company, didn't see any value proposition in proceeding with mining in the area" (Participant 10).

According to Participant 1, De Beers explored several alternatives to mine closure intended to prolong the lifespan of the mine. Despite these plans, De Beers closed and sold the mine. Given the above, participants are now convinced that the mine dumps in Koffiefontein can still produce diamonds, as De Beers used now outdated methods to extract the minerals. Participant 13 qualified their statement, and mentioned that

> "Some guys they did and mined, they found two or three tiny deposits, but it needs crusher because most of the stones and the soil needs to be crushed so that the deposit could be found" (Participant 13).

During the interviews, it was reported that a measure small-scale mining does take place in Koffiefontein. According to Participant 8, "small scale mining is supporting individuals". The interviews further revealed how municipal officials thought the Koffiefontein mine had a much longer lifespan, inadvertently creating dependency. The community's expectation is that government should facilitate the handover of the dumps to open the opportunity to "start the process of re-working the dumps" (Participant KCM). The quotes below confirm these considerations.

> "Our mine is going to work for a long time. Is just that things are hidden from us" (Participant KCM).

> "The life span is too much because there are two pits alongside each other, its blue and yellow pipeline, so the whole pipeline is an open cast, so there is a lot of work. The government must give the dumps to the community so that we can be the ones who process when the mine close; there are still a lot of diamonds" (Participant KCM).

Most participants also contend that the unmined Ebenhaezer pipe is a viable diamond source that could carry the mine for years and create much-needed jobs and economic influx.

Participant 13's proposed intervention of re-working of the mine dumps with a finer crusher, is necessary for Koffiefontein. Small-scale mining can be an alternative remedy for unemployment and a source to generate income for unemployed skilled mineworkers. However, these opportunities are limited because the average grade of the dumps is not high, and the environmental impact must be considered when small-scale mining activity occurs.

One potential hinderance to small-scale mining operations is the issue of ownership:

> "There's a little misunderstanding in terms of that particular mining dump. The mining dump never belongs to De Beers. The mining belongs to Eskom, and we do not understand how, and De Beers never gave that mining dump to the community. It was only given to the community now recently. It had to be bought by the Department of Minerals from Eskom and given to the community […] We need to form a mining cooperative or form small mining companies" (Participant 12).

During the interviews regarding the current status, it was observed that respondents were unclear on the rightful owner of the dumps is further, the community group is not a registered owner. Therefore, having registered entities will not serve the community's interests, but rather the owners'. Until the

ownership issue is resolved and the government intervenes, the dispute between the community and the mine will remain unresolved, and the small-scale project will not materialise.

4.4.2. Industries and factories

According to Letsemeng district municipality's draft 2021/2022 IDP document, "while there are small vacant plots in Koffiefontein, two large tracts of land are available for development" (2021: 72). The first is a site owned by the South African agriculture company SenWes. If the land is to be used for urban development. They have agreed to transfer the land to the municipality because it will be used for urban expansion, SenWes will transfer the land to the municipality, but not if the land will in any way be used for agricultural purposes. The other available tract belongs to Transnet, the South African railway company. The municipality is in talks with the railway company in an attempt to negotiate access to the land (LDM, 2021). Both new sites are well-located for higher-density residential and mixed-use development in Koffiefontein.

Despite, the rift between the municipality and the community that led to the 2018 unrest, the general view of participants is that municipal support is needed for the expansion of industries such as brickmaking, tilemaking, and crusher plants. The respondents are convinced that such interventions would promote entrepreneurship and lead to exporting locally produced goods and products. The quotes below indicate that both projects can be viable beyond mine closure.

> "They can set up a brick plant where they use this ground. They dig out of the mine to make some bricks for the infrastructure in Koffiefontein" (Participant KCM).
>
> "The brickmaking factory and the tilemaking factory from the slimes from the mine" (Participant 10).
>
> "Those projects could have sustained Koffiefontein; those should be the positives. Because your crusher plant you could supply stone to the surrounding areas and the bricks you could also supply bricks to the surrounding area" (Participant1 and 13).

These three responses confirm the findings of studies run to investigate alternative social and economic opportunities to replace mining (Cornelissen *et al*., 2019; Ferraz, 2016; Gankhuyag and Gregoire, 2018). However, the problem with these interventions and why they were not implemented is that Petra mines is not the landowner and did not commission the DEAT's SIA report (2005). Therefore, these projects may not come to fruition. Likewise, there is little housing construction in the area, thus limiting the opportunity for the initiatives. One issue the municipality faces is the lack of a land register and audit, resulting in the municipality being unsure which pieces of land belonging to them.

Participants are proud of the best-quality diamonds extracted in Koffiefontein. However, no participants voiced mine beneficiation as another potential option to create more jobs. Since the

polishing and cutting of diamonds are not conducted in Koffiefontein, this was also not suggested as a potential revenue stream.

4.4.3. Renewable energy

Investors should be approached to make available and promote renewable energy sources, to support the electricity municipal electricity supply, and to provide services to those in need. These projects must be sensitively placed so as not to negatively affect the surrounding urban, agricultural, or natural environment. Participants referring to the wind power plant in Jacobsdal contend that a similar renewable energy initiative could boost the economy of Koffiefontein. Business and KCM also call for investments in renewable energy to help create sustainable job opportunities, *viz*.:

> "Seeing that we struggle with electricity, I propose to let them put up a power plant with government assistance for the whole of Letsemeng" (Participant KCM).

The role of renewables in the economy cannot be overstated. Renewable energy does not only attract investment, but the programme could also contribute to socio-economic development and enterprise development beyond mine closure for Koffiefontein. But most importantly, participants felt that it is crucial to establish an eco-green image because of the burden of CO_2 emissions brought about by mining. The participants are convinced the strategic location of the farm in question presents an opportunity for the project to succeed and benefit the town. Surplus power can also be exported to other towns in Letsemeng Municipality. While renewable energy-related initiatives have good outcomes, they do not create many job opportunities.

4.4.4. Agriculture and Agro processing

Koffiefontein is a semi-arid region with summer rainfall. Participants believe agriculture would be one of the economic drivers given the available land and accessibility to the major water source of the Orange River. The agricultural business in the area is divergent. The irrigation scheme around the area is a source to yield crops such as potatoes, wheat, grapes, maize, sunflowers, and corn. One participant was confident that fresh produce could be processed locally.

> "Letsemeng is landlocked with farms; for example, in Petrusburg, we've got potatoes and sunflowers. But Simba Chips are coming from Durban, and the sunflower oil is coming from somewhere. We want to manufacture our product in Letsemeng" [Participant KCM].

Koffiefontein is the leading business and administrative hub of the Letsemeng municipality. Therefore, the participants' ideals to manufacture, grow, and sell local products and produce has merit. However, the manufacturing sector in the area is relatively underdeveloped because most of the products are exported as raw materials. Since Koffiefontein is an agricultural and mining area, growth can be achieved by producing value-added food products, packaging, and animal feed.

4.5. CONCLUSION

This chapter presented the empirical findings of the study. It offers an account of the respondents' lived experience based on the semi-structured interviews conducted with key informants. These include member of mine unions, government officials, NGOs, mine stakeholders and -management, as well as members of the local community. Due to the variety of participants, the data obtained shows a variety of perceptions, which we captured verbatim. The data analysis was presented according to themes related to the research questions- and objectives outlined in the first chapter.

The analysis reveals that, despite legislation and regulations making adequate provisions for planned mining closure, the mine, municipality, and various other stakeholders did not plan accordingly. The municipality, in particular, made no contingency plans; as a result, this created dependency in the community and the district municipality. In addition, the municipality could not absorb the services previously provided by the mine or maintain public facilities that the mine had maintained for years, resulting in a loss of service delivery, business closures, and crime. As a result, the mass unemployment following the mine downscaling in Koffiefontein created several socio-economic challenges for the community. This study shows that contingency planning for mine downscaling or closure is not only the responsibility of the mine or the municipality, but also that of dependent communities.

CHAPTER 5: DISCUSSIONS, CONCLUSIONS, AND RECOMMENDATIONS

5.1. INTRODUCTION

At its core, this study is concerned with how the cessation of mining activities, as well as the downscaling of operations, have affected the socio-economic circumstances of the Koffiefontein community. Post-mine closure, and without the mining company's contributions to education access and funding, creation, and upkeep of infrastructure, as well salaries paid to mineworkers, both economic and social problems have contributed to Koffiefontein fast becoming a ghost town. In order to uncover the perceived causes and effects of the socio-economic challenges, the researcher employed a qualitative research design to interview ex-mineworkers as well as other mine stakeholders in the area. The respondents were chosen through purposive sampling, selected deliberately and strategically to answer the research questions. In Chapter 4, empirical evidence from the responses gathered from 12 interviewees are discussed.

The study also put forward a survey of local and international literature related, firstly, to the lifecycle of mines and what each stage entails, paying particular attention to the processes and planning involved in the downscaling and closure phases. Secondly, the review drew on global scholarship to investigate local and international trends in research related to mine closure and the often-devastating effects of this process on surrounding mining communities. In so doing, aspects of international mining legislation that regulates mine closure, best practices in mining which may promote positive outcomes post-closure, as well as the importance of proper closure planning, we reviewed.

In the third chapter, a comprehensive review of South African legislation that pertains specifically to the closure of mines was advanced. The legislation discuss pertains to the extraction of mineral resources, labour and employment practices, the environmental consequences of mining, including post-closure rehabilitation of the natural setting, and the preservation and access to mineral resources in the country. Further considerations included legislation concerned with ownership, shareholding, the treatment, and inclusion of PDIs, national strategies for mine closure planning and procedures, and well as the creation an implementation of social labour plans to be instituted both during the mine downscaling and after the mine closure process.

This chapter presents a summary of the researcher's findings based on an integration of the reviewed literature and legislature with the responses garnered from the interviewees. The findings are discussed based on the themes extrapolated during the coding of the transcribed interviews. The researcher then moves to make specific recommendations based on the research findings, and also discusses the limitations of the current studies. Further avenues of potential research are then discussed.

Table 5.1 below capture the main themes based on the coding and thematic analysis of the interviewees' responses, along with each theme's relevant sub-themes.

Table 5.1: Themes and sub-themes from interviews

THEME	SUB-THEMES
Long-term consequences of mine closure and downscaling: social issues	Social disruptions in Koffiefontein Education Unemployment Family disintegration Migration, Sex work and teenage pregnancy Crime and lawlessness
Link between mine closure and local economic collapse	Economic impact and single economy town Investment and market penetration Dependency and interdependency Breakdown of infrastructure
Community reactions after mine downscaling/closure (2006)	Emotional/psychological distress Loss of confidence in local and national government Distrust of mining companies Non-implementation of SLPs Lack of mine planning follow-through
Strategy suggestions for mitigating mine closure effects	Small-scale mining projects Industries and factories Renewable energy Agriculture and agro processing

5.2. MAIN FINDINGS OF THE STUDY

As I discuss these themes and their sub-themes, I will relate the findings based on the interview data to the literature and legislature surveyed in chapters 2 and 3, so as to provide an integrated overview of concepts that will inform the study's recommendations.

5.2.1. Long-term consequences of mine closure and downscaling create social concerns.

Chapter 4 emphasises the problem of unemployment as a result of mine closure and downscaling. In Chapter 3, the researcher reflected on the Mining Charter (RSA, 2018), the 1998 White Paper, and the LRA (RSA, 1995), which all stipulate the requirement that employees be treated fairly. These laws and policies also note that labourers should be equipped with appropriate skills and training to secure job opportunities post-mine closure. However, the interviewees' responses indicate that the mine has limited skills transfer programs; further, employees only receive training regarding one related apprenticeship, which does not equip the with portable skills that aid in finding employment outside of the mining sector. Therefore, though South African legislation makes provision for further training, the mining companies do not comply with the stipulations.

A large cohort of interviewees indicate that their economic livelihood was severely encumbered by the mine's closure, as well as the downscaling process. This is a common side-effect of mine closure identified by Vivoda *et al*. (2019). Some respondents state the they have not been successful in finding new employment, blaming this, in part, on a lack of access to and funding for education. Though some

respondents mention that the current mine owner has made attempts at equipping community members with portable skills, it is the effect of the mine's previous closure that still affects the current community and their offspring. Interviewees lament their children's lack of access to sufficient education as well as FET learning and training opportunities. When the mine was closed by De Beers, funding and bursaries extended to the children of mineworkers and to mineworkers themselves were abruptly halted. This incurred a lack of skills development on the FET level, a drop in education standards and school closures, as well as a high level of premature school dropouts. In turn, this perpetuates cycles of sub-par education, poverty, and unemployment. Knierzinger and Sopelle's (2018) research supports this, by stating the mine closure leads to communities being suddenly cut off from access to health services and educational institutions, echoed by Littlewood (2014) as well as Siyongwana and Shabalala (2018). This is also an indication that the SLPGs (RSA, 2010) are poorly employed by mining companies.

Though mineworkers received severance packages, interview data indicate that lack of financial training when severance packages were paid. As these monies could have lasted for many households, but the lack of financial literacy resulted in spending on luxury items and led to quick depletion of these reserves. The commonly held belief amongst those who lost their jobs during the closure that the new mining company, Petra Diamonds, would re-appoint them, was also unfounded. Respondents felt unprepared and ill-equipped to deal with the economic repercussions and employment challenges following closure. Literature indicates that part of mine closure planning should include the establishment of a sustainable and stable social legacy (DMR, 2010). This can be ensured, in part, by mining companies taking responsibility for not only environmental, but also socio-economic rehabilitation in the surrounding areas (Stacey et al., 2020). The MPRDA (RSA, 2002) legislates that mining companies must make funds available to ensure that communities are financially secure following the closure of a mine, while the Draft National Mine Closure Strategy (DMRE, 2021) dictates than such companies need to consider the cumulative effects of mine closure, which includes social and economic concerns.

i. Job loss and re-employment: laws prevail, but companies fail.

Unemployment is one consequence of the mine closure (Vivoda *et al*., 2019), and the Koffiefontein community has not recovered from this challenge many years after the mine closed. Respondents specifically refer to job losses after the unexpected closure of the mine in 1982, as the mine was closed abruptly and without a transparent closure plan. This finding is consistent with Digby's (2016) and Ackermann *et al.,* (2018) research, which indicate prevalent negligence and lack of attention to the potential devastating consequences of mine closure for mining communities. Furthermore, it relates to Stacey *et al*., (2010) claim that many mines do not take responsibility for the socio-economic rehabilitation they should undertake during and after mine closure, resulting in an economic vacuum in the surrounding community (Strambo *et al.,* 2019).

The White Paper on Minerals and Mining (DME, 1998) requires employers, employees, unions, and the government to prepare for mine closure. However, this study concludes that, though plans may have been in place for the retrenchment of mineworkers at the Koffiefontein mine, the downscaling process was either not properly understood or implemented by the mining company. Even though the mining company conferred with workers' unions, the company had already decided what they would do. Despite comprehensive legislation to regulate mine closure processes, with the SLPGs (RSA, 2010) and the MPRDA (RSA, 2002) echoing the White Paper's prescriptions, it is evident that mining companies seldom seem to follow the rules governing mine downscaling or closure, specifically in the case of Koffiefontein.

The study further finds that, to make ends meet, ex-mineworkers survive by taking on temporary employment. Others indicate that their advanced age precludes them from finding employment. In addition, they reiterate the problem of the lack of access to, and lack of quality and unsuitability of, the skills development available to them. Therefore, they were not prepared for and capacitated with skills for jobs in other sectors (Ackerman *et al.,* 2018:440; RSA, 2002). It appears that the skills training provided is inadequate and irrelevant, with such programmes created merely to tick a box on the list of requirements for mine closure plans. Ackerman et al. (2018a) further support the idea by maintaining that, although the MPRDA proposed plans for skills development and job creation, miners affected by closure poorly benefited from these interventions. Likewise, because mine closure issue is inescapable, skills development interventions should not wait until workers are affected by the closure. This is therefore an area in which legislation should be more specific in terms of what is expected and what the outcomes should be. The Centre for Development Support regards mineworkers' skills shortage as an encumbrance to labour mobility (cited in Marais, 2006; Mncayi, 2021; Morsy and Musaka, 2019). With the White Paper (DME, 1998), the Mining Charter (RSA, 2018), as well as the MPRDA (RSA, 2002) and SLPGs (RSA, 2010) stipulating that mining companies are responsible to help mineworkers secure employment post-mine closure, this again seems to be a case of the company's non-compliance with legislation. This also highlights another issue, namely that there are no processes in place to ensure that mining companies apply these laws; it is necessary for a regulatory body to enforce the mining company's application of SLPs.

ii. Family disintegration is evident.

Mine closure often results in the destruction of the family unit, as posited by Vivoda *et al.,* (2019). When interviewed about consequences of mine closure, some participants disclosed that they experienced family disintegration where partners separated; as men had to migrate in search of other job opportunities, many marriages did not remain intact. Bainton and Holcombe (2018) note that migration is a factor that often contributes to family disintegration post-mine closure. Mine closure resulted in substantial financial loss for households of retrenched mineworkers . As a result, there was pressure to change life styles to suit the current situation. Additionally, the mining sector is known for

encouraging/institutionalising migrant labour, despite the fact that the White Paper (DME, 1998) states that eligible local residents should be appointed before migrants are employed. However, migrants are still employed in great numbers, and respondents indicate that being jobless reinforces separation.

The inevitability of unemployment post-mine closure also contributes to a rise in substance abuse, gender-based violence, and a reliance on sex work to make money. Some interviewees commented on the fact that many young women and girls become involved in sex work not only in an effort to gain an income, but also with the hopes to fall pregnant in order to qualify for the South African child care grant, an amount of R 450,00 per month. Farré *et al.,* (2018) indicates that unemployment (which results, in this case, from mine closure) increases the risk of sex work prevalence and teenage pregnancy.

iii. Mine closure is linked to higher crime rates.

The social ill related to this sub-theme includes lawlessness, theft and safety and security in the community. Participants reported that, after the mine's closure, the crime level increased, which is shown in Table 4.2 (Chapter 4). Furthermore, participants raised concerns that the town is not as safe as it used to be because of increased criminal activities. The increase in crime is potentially influenced by drug or alcohol abuse, leading to public violence and crime like burglary at residential premises. Two participants (1 and 5) raised issues of the high crime rate because of income loss due to unemployment. The former notes that unemployment has caused a surge in crimes, and pertinently stated that this includes violent attacks on community members. The latter recounts and incident where a police station was breached and two on duty police officers were murdered, noting that "crime has ravaged that small town" (Participant 5). The UFS (2005) similarly indicates that violent crime, such as gender-based violence and child abuse, is on the increase. Their report attributes the increase in violence not only to unemployment, but also to the psycho-social effects of mine closure on the community, namely "deprivation, fatalism and negativity"; if these effects are extensive, as is the case in Koffiefontein, "the social fabric of the entire community is jeopardised", leading to an increase in "social ills, violence […] and crime" (2005: 210). Subsequently, law enforcement in the area becomes overstretched. South African activist and politician, Dr Mamphela Ramphele, says that escalating crime is the "painful result[s] of successive governments' failures to hold the mining industry accountable for ensuring closure of mines and rehabilitation of the land" (2002, para 3), despite the MPRDA's stipulations (RSA, 2002).

iv. Dependency and interdependence remain problematic post-mine closure.

Being dependent on mining is a socially and economically fraught position. From the interviews, it is clear that the Koffiefontein community's severe economic disruption is mainly due to its over-dependence on the mining company. The workers' certainty that they would we absorbed back into the mine's labour force after Petra Diamonds acquired the mine was unfounded, as noted by

interviewees' accounts of their life experiences of working in the mine and how they lived after losing their jobs. For many, this resulted in the expedited depletion of their severance packages. Subsequently, belongings like cars and properties bought through the banks were repossessed. APEC (2018) as well as the World Bank (2018) comment on the adverse effects of communities' over-dependence on the mining industry. This dependence also has further consequences for the larger business community. Suppliers, whose income depended on delivery contracts they had with the mining companies, were forced to retrench employees and, ultimately, close down, resulting in further unemployment. Jones and Salmon (2014) note that mining companies often overlook the extended socio-economic effects – beyond those suffered by their employees – during mine closure, especially where those effects are felt by businesses, communities, and individuals who depend on the mining company for their survival.

5.2.2. Mine closure and economic collapse are related.

Possibly the most significant portion of the findings relate the Koffiefontein's economic activities and collapse after the closure of the mine (*cf.* Sections 4.2.2.). While respondents acknowledge the supportive role De Beers played in the town's social and economic development initially, they comment and the sudden withdrawal and gradual decrease in support after 2006. It also became evident that De Beers' mine closure planning and procedure were not transparent and were not discussed with relevant stakeholders, such as is prescribed by the Draft Mine Closure Strategy (DMRE, 2021) and the MPRDA (RSA, 2002). McCullough (2016) states that it is crucial for mining companies to engage with stakeholders during downscaling or closure planning and implementation, a sentiment echoed by Chuhan-Pole *et al*., (2017). The World Bank (2018) notes that, in the absence of transparency and engagement regarding these planning stages and processes, communities are not empowered to achieve sustainable socio-economic development once the mine closes down. Linked to this is the respondents' comments that they are not aware of the mining company's precise role in uplifting their living standards. According to the Mining Charter (2018) as well as the White Paper on Minerals and Mining (2018), the company should oversee the creation of suitable and sustainable accommodation in the mining community, ensure sustainable economic development that can continue post-mine closure, and should empower not only their employees and the surrounding community.

It is also apparent that mining operations in Koffiefontein are not the sole drivers of the local economy. Alternative opportunities, such as the creation of a stone crusher plant, or a brick- and tilemaking factory, were mentioned. One respondent also voiced the possibility that local agricultural endeavours could ensure an economic injection, as locally sourced products could help labourers acquire service contracts with the mine, who has to source a certain percentage of their acquisitions from local businesses or could be sold elsewhere.

The respondents regard current economic operations in the area as inadequate, commenting that their standard of living has plummeted after the mine closed. Downscaling by the mine and the resultant unemployment and outmigration caused many businesses to close down, including larger chain businesses and banks. The decrease in population, increase in crime resulting from unemployment, and lack of business footprints in the area have also made investors weary of financially investing in the town. Once again, this links to the mining company reneging on Laurence's (2006) as well as Vivoda and Fulcher's (2017) observations that mines should identify elements that might contribute to economic collapse and should ensure sustainable financial security and independence post-mine closure.

Mining often provides local communities with jobs. According to interviewees' responses provided in Chapter 4, the community members' main concerns are loss of income, inability to pay for services, and the reduction of buying power. Skills shortage was also highlighted as one of the respondents' main worries. Community members, specifically the business community, reiterate that unrelenting loss of revenue will significantly compromise their security and stability. Respondents believe that the downscaling accelerates out-migration from the area, thus the reduction the population size. The conclusion is that, although mining can bring about some degree of stability to the local economy, downscaling and closure impose burdens on communities. This is also echoed in the literature, as previously stated (Littlewood, 204; Morrison-Saunders *et al*., 2016; Mauric *et al.*, 2012).

Finally, a lack of the mining company's economic- and social investments, as well as dearth of development in the town, are highlighted as problematic. Regarding the former, respondents perceive that Koffiefontein's economic transformation is hindered by minimal economic diversification, further increasing the community's dependence on the mine for their survival. There seems to be little transformation that allows transition from a mining-driven economy to one that also involves other business sectors. As previously mentioned, outside investors are not keen to invest either economically or socially in the town, which is necessary to create an environment conducive to growth. The latter aspect involves the need to promote and develop entrepreneurial skills to help establish and improve SMMEs. This will curb community-mine dependency and contribute to social- and economic growth (*cf.* Sánchez *et al*., 2014; McCullough, 2016; Chuhan-Pole *et al.*, 2017).

i. Infrastructure collapse is commonplace.

From an infrastructure perspective, proper planning is essential to the mining industry (Anglo American, 2013; British Columbia, 2013; EBRD, 2012). When mining commences early in the mining lifecycle, population growth is evident, and the need for infrastructure increases exponentially. However, once mining operations cease, a decrease in maintenance and the expansion of services is commonplace (Vivoda *et al.*, 2019; Laurence, 2006; Jones and Salmon, 2014). The collapse of infrastructure in Koffiefontein after the mine's closure is another hindrance voiced by respondents,

and is one they believe affects the economy of Koffiefontein. While De Beers constructed houses for miners and also transferred ownership of some houses to pass on some kind of secure tenure to mine workers. However, De Beers' withdrawal of financial support for homeowners, as well as lack of upkeep re housing and recreational facilities, has seen the town and community suffering from infrastructure collapse. The UFS (2005) notes that the "[d]eterioration of recreational facilities […] [d]ecrease in property values [and] [v]acancy of a large number of properties" in Koffiefontein due to infrastructure deterioration all have a negative impact on the town's socio-economic wellbeing; without mitigation, the significance of these effects are rated as moderate to high.

Mine housing subsidy is expected in almost all mining communities. Likewise, mines collaborate with local municipalities to provide infrastructure (Marais *et al.*, 2005). However , the withdrawal or closure of mining generally leads to a decline in living standards and affects people's living standards (Siyongwana and Shabalala, 2018), and mine closure leads to people losing the benefits that come with mining. This research has found the mine played a pivotal role in supporting schools and health facilities, thus demonstrating that mine closure has direct negative impacts on these institutions as well.

ii. Business closures become more frequent.

Mining operations play an essential role in the town's economy through employment opportunities and the circulation of capital. From the interviews, it is apparent that mine closure has affected businesses in Koffiefontein; a decline in buying power and out-migration caused many businesses to close, and national companies and banks to withdraw from the town. Citizens note that they now have to travel long distances to access goods and services, an effect commonplace after mine closures when local businesses either close or cannot address the community's basic needs (Siyongwana and Shabalala, 2018). The finding is in line with Marais and Atkinson's (2006:4) position that it is critical to acknowledge the indirect impacts of mine downscaling on local enterprises (also see Laurence, 2006; Sánchez *et al.*, 2014).

5.2.3. Community reacts negatively after 2006 downscaling/closure.

In a community heavily dependent on the mining industry, such as Koffiefontein, the effects of mine closure is possibly the most dramatic when compared to the closure of other businesses or industries. As Respondent 10 notes, "closing the mine often meant closing the town as well", echoed by Respondents 7 and 13. The interviewees' voice, in general, negative views on mine closure. They experience the adverse socio-economic condition effects at a grassroots level, even many years after the initial mine closure. Their disappointment and anger is not unfounded; respondents from all sectors note that mine closure severely affects the community's livelihoods due to their lack of resources to cope with the negative effects should the current operations stop. Not only does mine closure have socio-economic repercussion, but the literature indicates that ex-mineworkers report increased

struggles with their mental health (Farré *et al.*, 2018). The fact that the community has limited or no access to mental health services, either due to closure of medical facilities or lack of funds, continues to have repercussions. The UFS (2005: vi) reports the negative effects on the community's' socio-psychological wellbeing, noting that mine closure has led to the community's isolation and a loss of community cohesion and -identity, a marked decline in community members' quality of life, as well as higher instances of "deprivation, fatalism and negativity", which all carry a moderate to high risk of exacerbating the community's decline without intervention. In addition, the White Paper (2018) notes that mental health services should be made available to ex-employees following mine closure, which is clearly not the case in Koffiefontein.

The main concern emphasised by the respondents is the fear of poverty and the town's future sustainability. Interviewees comment on their fear that the downscaling and looming mine closure will have adverse effects on the local economy, the community, and their living standards, resulting in Koffiefontein becoming a ghost town. Respondents also mention their fear in relation to the short time remaining before the projected mine lifespan ends operations in 2026. They propose that mining ought to begin consultations with the community and involve them in the crafting and implementation of mine closure plans and create awareness of deliberate downscaling and closure before any job losses arise. This is also required by legislation, such as the Mining Charter (RSA, 2018), the DMCS (DMRE, 2021), and the MPRDA (RSA, 2002).

5.2.4. Community suggests strategies for mitigating mine closure effects.

Marais (2013b: 503) states that "[t]he expectation of local efforts to address mine downscaling alone is unrealistic, as the magnitude of such downscaling is too vast". Based on interviewees' responses noted in Section 4.4 of this thesis, there are apparent opportunities that, if pursued in the Koffiefontein area, could significantly change both the economic development and the sustainability of the local economy. However, the timeline for the implementation is urgent so as to entice investment and grow the economy. These opportunities include exploiting the agricultural potential of the area in order to yield fresh produce. This produce could then be sold in local or national markets or could help secure agricultural enterprises delivery contracts with the mining companies. Inherent in agricultural activities is also the possibility of job creation. Additionally, as Koffiefontein forms part of the wine route in the Free State and Northern Cape provinces, there is potential to tap into the tourism industry, and exploit the town's rich history in the development of tourist attractions. To succeed in this endeavour, it is incumbent upon the LED to see the initiatives' implementation through to avoid failure, and also to secure capital investment to aid in the execution of these plans. Therefore, the local municipality also needs to support local tourism initiatives to reimburse for the loss experienced due to the declining retail sector. Further, such developments should be considered in the mining company's closure plans and SLPs, as it is the mine's responsibility to ensure economic growth and

empowerment in the community (RSA, 2002), ensure sustainability and local economic development (RSA, 2018; DMR, 2010), and institute training plan developments (RSA 2002; 2010; 2018).

Respondents further propose that existing, but no longer active, local infrastructure can be used to set up a tilemaking and/or brickmaking factory, as well as a stone crusher plant. In these scenarios, mining waste products, such as contents of the slime dams or processed ore, can be utilised to further economic development. This speaks not only to sustainability of the economy and natural resources (RSA, 2018; Vivoda and Fulcher, 2017, amongst others), but also to possible avenues that can be explored as SLP initiatives. Though the danger exists that this may exacerbate the community's dependence on the mine, exploitation of other local resources would ensure that these businesses can be sustained beyond mine closure.

Another endeavour that could pursued is small-scale mining activities; however, respondents identify three main challenges in this regard. Firstly, the aspect of who the mine dump that would be used in these activities belongs to, makes this an uncertain option. Though the Mining Charter (2018) advocates for equitable mine ownership, the uncertainty as to whether the dump belongs to Eskom, the mine, or the municipality hampers this revenue-creation opportunity. Secondly, those respondents who voiced small-scale mining as an economic opportunity note that equipment and machinery would be needed; however, access to said technology is limited, as are skills necessary to operate this equipment.

5.3. MAIN RECOMMENDATIONS

What follows are the recommendations based on the study's findings. These are grouped according to targeted participant responses.

5.3.1. Increased sector collaboration is needed.

The study recommends improved collaboration between the business community, the municipality, and the private sector, including the mine, to provide technical support and capacity building through supplier development programmes to retrenched employees. The study recommends the need for the local authority as champions of LED, to ensure projects and programmes led by the mining industry are anchored in collaboration with other partners, including the private sector, to ensure sustainable growth.

In addition, innovation should be encouraged to develop the area in respects exclusive of mining investments, so as to decrease the high level of mine dependence in the community. The mine needs to work with the local municipality, government departments, and the community to gain mileage in the communities in which they operate. The roles of the stakeholders, consisting of the local community and NGOs, must be clearly defined in the scope of the town's economic growth. This

would also promote the development of critical skills, small enterprise development, and communication skills.

5.3.2. Companies should focus on community engagement and communication.

The relationship between the mining company and the community is fraught with tension and anger. Therefore, the mining company must improve communication to create awareness of issues that affect the community. Such interactions can be in the form of scheduled meetings, workshops on current progress, and future mining operations or downscaling. It is especially crucial that the community be involved in the mine closure planning stage to ensure transparency and fairness.

5.3.3. Government and legislature should tighten the implementation of policy and legislation.

At national- and local government level, suitable institutional mechanisms should be implemented to drive a post-mine closure economy. Strategies should be instituted to enhance the technical- and institutional reach of local government level for at least four years pre-mine closure. Government involvement in policymaking is critical in ensuring that mining wealth remains in the host community to advance social and economic growth. Such a policy framework would address the procurement rule stipulating the 30% of business ventures in the area should be employed by the mining company for procurement purposes, while also ensuring economic development.

In a related recommendation, the study advises that stricter measures be put in place to ensure that all aspects of current mine legislature be regulated and enforced. Areas that need specific regulation are community involvement in the planning and implementation of the mine closure or downscaling procedures, along with the issues related to SLPs. Currently, SLPs are both inadequate and poorly applied, if at all. The socio-economic rehabilitation of the mining community post-closure would improve significantly if SLPs, integrated with LED plans, could empower, and equip communities with skills to ensure sustainability. Establishing a local trust for development programmes is highly recommended.

5.3.4. Community capacity building and infrastructure is of utmost importance.

The mine should prioritise building community capacity in the remaining period before the envisioned mine closure. Mine closures leave communities with restrained capacity and abilities; consequently, communities struggle to recover form hardship and to integrate into other sectors in the economic system. Collaboration between LEDs and local stakeholders like NGOs is crucial in this regard. The mine must formulate achievable short- and long-term local economic strategies to guide development. Similarly, officials must be adequately skilled and be allowed to function without undue political pressure and interference.

Inadequate infrastructure is a contributor to the declining economy and community dissatisfaction in Koffiefontein. Poor roads conditions and building infrastructure are cited as deterring investors from investing the town. The municipality must prioritise residential and business infrastructure so as to unlock the town's economic potential; basic access to, accommodation and facilities in, and poor aesthetics currently preclude the development of tourism and other sources of economic growth.

5.4. LIMITATIONS

The current study investigates the effects of mine downscaling on the socio-economic growth of the mining town of Koffiefontein. The study was hampered by the transfer of ownership from De Beers to Petra Diamonds; thus, participants, from time to time, refer to future closure and not closure during De Beers' time. This study concentrated in Koffiefontein, whereas the impact of closure also affects labour-sending areas in the Letsemeng district municipality and elsewhere in the country. Therefore, it was not possible to fully plumb the depths of the socio-economic effects of mine downscaling and closure of operations as it extends to ex-mineworkers who come from other areas. The findings of this research can thus not be generalised to other communities but does provide insight into problems experienced by the host community. The literature review shows that these problems are internationally recognised; as such, these insights may be applicable to other contexts.

5.5. FURTHER RESEARCH

Based on the chief aim of this study – to investigate potential effects of mine closure on small-town economies, with specific focus on the Koffiefontein mining town – the researcher makes the following recommendations for further research.

- Respondents identified two main encumbrances to economic growth: a lack of availability of and upkeep to suitable infrastructure, as well as a lack of investment from outside companies. Future research could investigate community suggestions for implementations that could alleviate these effects following mine closure, including small-scale mining opportunities, infrastructure development, and skills training, amongst others.
- A further avenue of further research could focus on the inclusion of SLPs in mine closure planning, as well as the importance of community engagement in establishing these plans. This necessitates investigating mining companies' poor adherence to extant legislation and their poor application of their SLP promises.
- It would be interesting to investigate the community's opinions on environmental rehabilitation, the possibilities for socio-economic development inherent therein, as well as their views on the effect of mining operations on their basic human rights to an unpolluted living environment.
- In addition, the influence of the mining, if any, on traditional land ownership, bears investigating.

5.6. CONCLUDING REMARKS

To the Koffiefontein community, diamonds are more than beautiful, rare, and precious stones: they are the backbone of the Koffiefontein economy. The community takes pride in the high quality of the diamonds mined here. Mine closure has affected the sense of community pride and -cohesion and has left in increase in mental health problems in its wake. As the mine is also the main provider of essential services, mine closure leaves a devasted community as far as healthcare, housing, and access to service delivery is concerned.

Through this study's investigation of the socio-economic impact of mine downscaling and closure in Koffiefontein, the consequences of mine downscaling are explored by considering perceptions of mines' contribution to growth, socio-economic development risks and threats of mine downscaling in a mining-led economy area, and the responsibility of mines to take agency in ensuring a measure of socio-economic sustainability post-mine closure. Furthermore, the current decline in mining operations threatens the future survival of this small-town post-mine closure. Findings indicate that the ongoing mine downscaling and the possible mine closure will negatively affect the Koffiefontein community. However, with the right intervention instituted, the economy has the potential to improve; hard work and commitment are required, as well as the community's renewed interest in joining other sectors of the economy. Likewise, the mining company must have implementable plans in place for socio-economic growth beyond the mine's lifespan.

The study concludes that mine downscaling contributes mainly negatively to the local economy in Koffiefontein. Haney and Shkaratan (2003) describe mining towns, especially in areas dominated by this economic sector, as dying towns. To preclude Koffiefontein, already a seemingly dying town, from becoming a ghost town, the effects of the mine's closure or significant downscaling should be urgently addressed.

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ADDENDUM A: QUESTIONNAIRE

RESEACH STUDY INFORMATION UNIVERSTITY OF THE FREE STATE

RESEARCH STUDY INFORMATION LEAFLET AND CONSENT FORM

Research Project title – Social Aspects of mine closure in South Africa.

SEMI-STRUCTURED INTERVIEWS: NATIONAL GOVERNMENT (DME, DALRRD, AND HUMAN SETTLEMENTS)

1. What are specific issues that your department finds difficult to implement w.r.t. mine closure?
2. What are mines doing that makes mine closure easy or difficult?
3. To what degree do you think does current legislation make provision for the social and economic aspects of mine closure?
4. How does legislation consider the social and economic aspects of closure?
5. Has the department tried to calculate the long term cost of mine closure, care and maintenance? How and what are the results?
6. How does your department think about addressing mine closure?
7. What is your department funding to address the consequences of mine closure? Why? What is the rationale?
8. Are there human right concerns that accompany mine closures?
9. What are the additional costs on municipal finance of mine closure?

ADDENDUM B: CONSENT FORM

UNIVERSITY OF THE FREE STATE
UNIVERSITEIT VAN DIE VRYSTAAT
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UFS UV

RESEARCH STUDY INFORMATION LEAFLET AND CONSENT FORM

DATE

2021

TITLE OF THE RESEARCH PROJECT

Social aspects of mine closure in South Africa

PRINCIPLE INVESTIGATOR:

Prof Lochner Marais MaraisJGL@ufs.ac.za 051 4013599

FACULTY AND DEPARTMENT:

Faculty of Economic and Management Sciences
Centre for Development Support

WHAT IS THE AIM OF THE STUDY?

To investigate the consequences of mine closure and downscaling in eight case studies.

1. West Rand
2. Richtersveld land claim
3. Koffiefontein
4. Tshikondeni Mine
5. Rustenburg
6. Matjhabeng
7. Kleinzee
8. Emalahleni

WHO IS DOING THE RESEARCH?

We are a diverse team consisting of researchers from varied fields across several universities, our students, and leading international experts in mining and communities.

HAS THE STUDY RECEIVED ETHICAL APPROVAL?

This study has received approval from the General Human Research Ethics Committee Of the I-IFS. On request, the researcher can provide a letter.

WHY ARE WE INVITING YOU TO TAKE PART IN THIS RESEARCH PROJECT?

We will be talking to representatives from companies; government at local, district, provincial, and national level; and, non-profit organisations in (or responsible for) the affected communities. We believe that you have information that is valuable to our project.

WHAT IS THE NATURE OF YOUR PARTICIPATION IN THIS STUDY?

Your participation will consist of an interview between 30 and 60 minutes. We will interview you at your convenience, and likely, over the phone. If you consent, we will record the interview, solely to ensure that we accurately capture the discussion.

CAN YOU WITHDRAW FROM THE STUDY?

Your participation is voluntary and that there is no penalty or loss of benefit for non-participation. Being in this study is voluntary, and you are under no obligation to consent to participation. You are free to withdraw at any time and without giving a reason.

WHAT ARE THE POTENTIAL BENEFITS OF TAKING PART IN THIS STUDY?

While there are no direct benefits (and no payments or rewards) to you, your organisation, or your community, the information collected will help our understanding of the impacts of mining, mine downscaling, and mine closure on communities. The information will help inform policy and planning in communities, the country, and internationally.

WHAT IS THE ANTICIPATED INCONVENIENCE OF TAKING PART IN THIS STUDY?

We do not foresee any potential risks in participating in this research.

WILL WE KEEP WHAT YOU SAY CONFIDENTIAL?

Any information you share will be confidential. We will not record your name, and no one will be able to connect you to the answers you give. We will give your answers a pseudonym, and you will be referred to in this way in the data, any publications, or other research reporting methods such as conference proceedings. People responsible for making sure that research is done properly, including the transcriber, external coder, and members of the Research Ethics Committee may review your data. However, they are all bound by the principles of research ethics and respect for the participant. Otherwise, records that identify you will be available only to people working on the study, unless you give permission for other people to see the records. Information that identifies you will be destroyed two years after the research has been concluded. We may use your anonymous

data in future for other purposes, such as research report, student submissions, journal articles, and conference presentation.

HOW WILL WE INFORM THE PARTICIPANT OF THE FINDINGS OF THE STUDY?

If you would like us to inform you of the final research findings, if you require any further information, or if you have concerns about how the research has been conducted, you may contact the principal researcher listed on the cover. A seminar on all the case studies will be held at the end of 2021.

Thank you for participating in this study.

CONSENT TO PARTICIPATE IN THIS STUDY

I, _____(participant name), confirm that the person asking my consent to take part in this research has told me about the nature, procedure, potential benefits and anticipated inconvenience of participation.

I have read (or had explained to me) and understood the study as explained in the information sheet. I have had sufficient opportunity to ask questions and am prepared to participate in the study. I understand that my participation is voluntary and that I am free to withdraw at any time without penalty. I am aware that the findings of this study will be anonymously processed into a research report, journal publications and/or conference proceedings.

I agree to the recording of the interview.

I have received a signed copy of the informed consent agreement.

Full Name of Participant:

_____

Signature of Participant: _____ Date:

_____

Full Name(s) of Researcher(s):

_____

Signature of Researcher: _____ Date:

ADDENDUM C: TURNITIN SIMILARITY REPORT

Final document

ORIGINALITY REPORT

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HANTA HENNING
0824482726
HENNINGJG@UFS.AC.ZA

DECLARATION: 23 NOVEMBER 2022

Hereby I, Johanna Gertruida (Hanta) Henning, declare that I completed editing of the research dissertation titled *The impact of mine closures/downscaling on small-town economies: An analysis of the Koffiefontein mine* by Oupa A. Kale, submitted in fulfilment of the requirements in respect of the Master's Degree of Development Studies (EDMS7900)in the Centre for Development Support in the Faculty of Economic and Management Science at the University of the Free State, Bloemfontein.

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