

**SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS OF SMALL-SCALE  
MINING IN THE SARAH BAARTMAN DISTRICT**

**BY**

**MULAUDZI AZWIHANGWISI**

**SUBMITTED IN FULFILMENT/PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE  
OF MASTERS IN DEVELOPMENT STUDIES TO BE AWARDED AT THE NELSON MANDELA  
METROPOLITAN UNIVERSITY**

**DECEMBER 2017**

**SUPERVISOR: Dr GWENDOLYN WELLMANN**

## **DECLARATION**

I, Azwihangwisi Mulaudzi, declare that the work presented in this treatise is my own work and has not been submitted by me for evaluation at any other university. Where information has been derived from other sources, I confirm that this has been indicated in the treatise.

.....

**Azwihangwisi Mulaudzi**

## **ACKNOWLEDGEMENTS**

The successful completion of the research would have been impossible without the support, advice, assistance and encouragement of others. I would like to express my sincere thanks and appreciation to the following:

God for giving me the ability to complete my Masters of Arts in Development Studies

My supervisor, Dr G Wellmann, for the professional manner in which she guided me through this study. Without her motivation and encouragement this research would not have been possible.

My children, Tshifhiwa and Rendani, who remained content at times when it was difficult for them to understand why I had to spend such long hours with my studies.

My family and friends for their support.

## **ABSTRACT**

The purpose of this study was to assess, on a limited scale, the socio-economic and environmental impact of small-scale mining in the Sarah Baartman District Municipality, a municipality that is predominantly rural in nature and also stricken by poverty. The topic of legal and illegal small-scale mining has received considerable attention from both the government and communities in recent years. At the heart of small-scale mining is enshrined the goals of creating employment and promoting the economic growth and development of the district. This study investigates the results of both a legal and an illegal mining operation in the district municipality.

## Table of Contents

List of acronyms.....	8
CHAPTER 1.....	9
INTRODUCTION AND CONTEXT .....	9
1.1 INTRODUCTION .....	9
1.2 BACKGROUND .....	9
1.3 JUSTIFICATION OF THE RESEARCH .....	11
1.4 STATEMENT OF THE RESEARCH PROBLEM.....	12
1.5 RESEARCH QUESTIONS .....	12
1.6 RESEARCH AIMS AND OBJECTIVES .....	12
1.7 RESEARCH HYPOTHESIS .....	13
1.8 OVERVIEW OF THE CHAPTERS .....	14
1.9. CONCLUSION.....	14
CHAPTER 2.....	15
LITERATURE REVIEW .....	15
2.1 INTRODUCTION .....	15
2.2 BACKGROUND .....	17
2.3 POLICY FRAMEWORK APPLICABLE FOR REGULATING SMALL-SCALE MINING ..	20
2.4. INTERNATIONAL PERSPECTIVES ON SSM .....	23
2.5. MINING PERSPECTIVE IN EASTERN CAPE PROVINCE .....	32
2.6. THE STUDY AREA (SARAH BAARTMAN DISTRICT MUNICIPALITY – SBDM) ..	32
2.7. BENEFITS IDENTIFIED FOR THE SMALL-SCALE MINING ACTIVITY .....	35
2.8. PROBLEMS AND CHALLENGES ASSOCIATED WITH SSM .....	35
2.9. MINING METHODS AND COMMODITIES IN SSM .....	43
2.10. ILLEGAL MINING .....	44
2.11. INTEGRATED MINE CLOSURE PLANNING .....	46
2.12. SOCIO-ECONOMIC ASPECTS RELATED TO MINE CLOSURE .....	47
2.13. CONCLUSION .....	48

**Master's: Azwihangwisi Mulaudzi**

CHAPTER 3.....	49
RESEARCH METHODOLOGY .....	49
3.1 INTRODUCTION .....	49
3.2 RESEARCH DESIGN AND METHODOLOGY .....	49
3.3 QUALITATIVE RESEARCH .....	50
3.4 SAMPLING .....	52
3.5 DATA COLLECTION .....	52
3.6 ETHICAL CONSIDERATIONS .....	55
3.7 CONCLUSION .....	56
CHAPTER 4.....	57
RESEARCH FINDINGS .....	57
4.1 INTRODUCTION .....	57
4.2 RESEARCH FINDINGS .....	57
4.3 CONCLUSION .....	73
CHAPTER 5.....	74
RECOMMENDATIONS AND CONCLUSIONS.....	74
5.1 INTRODUCTION .....	74
5.2 RECOMMENDATIONS .....	74
5.3. CONCLUSION .....	76
REFERENCES.....	78
Appendix A: Interview guide.....	82

**Tables**

Table 1: An overview of participants.....	57
Table 2: Demographic Information.....	58
Table 3: Number of Mining Applications received in 2014 per Province...	60
Table 4: Differences between a Mining Permit and a Mining Right.....	61
Table 5: Mining Rights and Mining Permit applications in Eastern Cape prior and post NEMA.....	61

**Master's: Azwihangwisi Mulaudzi**

**Photographs**

Photograph 1: illegal mining..... 65

Photograph 2: illegal mining..... 65

Photograph 3: illegal mining..... 66

Photograph 4: illegal mining..... 66

Photograph 5: illegal mining..... 67

Photograph 6: illegal mining..... 67

Photograph 7: illegal mining..... 68

Photograph 8: legal mining..... 69

Photograph 9: legal mining..... 70

Photograph 10: legal mining..... 70

Photograph 11: legal mining..... 71

Photograph 12: legal mining..... 71

## List of acronyms

SSM	Small Scale Mining
MPRDA	Mineral and Petroleum Resources Development Act
SBDM	Sarah Baartman District Municipality
NEMA	National Environmental Management Act
NWA	National Water Act
MHS	Mine Health and Safety
DMR	Department of Mineral Resources
SLP	Social and Labour Plan
DWS	Department of Water and Sanitation
DEA	Department of Environmental Affairs
EA	Environmental Authority
IWULA	Integrated Water Use License
NGO	Non-Governmental Organization
EIA	Environmental Impact Assessment
EAP	Environmental Assessment Practitioner
BAR	Basic Assessment Report
PAR	Performance Assessment Report
SAMRAD	South African Mineral and Administration System



# CHAPTER 1

## *INTRODUCTION AND CONTEXT*

### 1.1 INTRODUCTION

Small-scale mining (SSM) is defined as the small-scale exploitation of minerals which, due to its size, can be mined economically by simple means and techniques (such as artisan and individual person). Mineral and Petroleum Resources Development Act (49 of 2008) (MPRDA) classify the SSM in terms of size as a maximum of five hectares, which can be permitted by mining permit. A small-scale miner can range from someone who works alone as a subsistence miner (also called an artisanal miner) to someone who runs a small operation that employs less than 50 people. A small-scale miner uses mainly hand tools or basic equipment like a truck, frontend loader or a mechanical pan or mechanical washer. Another definition of a small-scale miner is someone who moves less than 600 000 tons of material per year. The SSM has always been a major contributor in the local, provincial and national economy of South Africa, in particular Eastern Cape's Sarah Baartman District Municipality (SBDM). The mining activities in this district have been dominated by sand mining, clay (kaolin), limestone and aggregate stone mining. Despite its significance in economic development, small-scale mining has caused some major socio-economic and environmental impacts, such as land degradation, land instability, water contamination and effects to human health (<http://www.dmr.gov.za/>).

### 1.2 BACKGROUND

Mining of sand and stone aggregate extraction are essential for modern construction, particularly in paving, road construction and building houses. It should, however, be recognized that the process of extraction, concentrating, refining and transporting, minerals (stone aggregate, clay (kaolin) and sand) has significant potential impact for disrupting the environment and the community. The illegal miner operates without approved rehabilitation plans or financial provision for rehabilitation, resulting in un-rehabilitated pits and derelict mines. Children tend to swim in the un-rehabilitated burrow pits and often

end up drowning. Illegal SSM (also known in South Africa as Zama Zama) will not make any corporate social investment (CSI) as a priority and not pay surface rental or royalty to the state (Benjamin and Aryee, 2003).

Small-scale mining tends to operate legally or illegally, but in most cases they operate illegally. The illegal operations are normally conducted outside of the legal framework, causing major impact (Rabie *et.al*, 1994).

Damage to natural resources such as habitat destruction, soil erosion due to water channelling, water pollution, land degradation and other problems of illegal operations can be controlled by means of regulatory measures. Inappropriate and lack of environmental understanding, together with inadequate capitalization and very restricted income, results in scant attention being paid to environmental protection during the process of mining. The result is that the rehabilitation of illegally mined out areas is rare in South Africa and particularly in the Sarah Baartman District Municipality (<http://www.dwaf.pwv.gov.za/>).

Small-scale mining, if not managed, can cause damage to rivers, riverine vegetation, river flow regimes and ground water levels. All this can harm the environment and our health and make it more difficult for people nearby to get clean and safe water. Yet the SSM sector has, in the past few years, been formally recognized as the sector that may offer new employment opportunities, rural development and economic growth. Legislation has now opened up opportunities for aspirant SSM entrepreneurs to operate within the formal economy. The crux of the matter is how small-scale miners will utilise these opportunities created to generate socio-economic growth and at the same time ensure sustainable development.

Small-scale mining is a great importance and contribution to South Africa Economy. Despite its significance in the economy of South Africa, it tends to have some impacts on the environment. South Africa after 1994 promulgated many environmental and developmental legislations such as Mineral and Petroleum Resources Development Act (28, 2002) as amended (49, 2008) and National Environmental Management Act (107, 1998). These pieces of legislation have been passed to manage development such as Small-

scale mining. Small-scale mining has always been associated with negative environmental and social impacts, in particular at Sarah Baartman District Municipality.

### 1.3 JUSTIFICATION OF THE RESEARCH

Unregulated mining of sand, clay and stone aggregate are degrading the environment at an alarming rate. There are many projects pertaining to the mining of sand and stone, aggregate within the Sarah Baartman District Municipality which need to be assessed in order to avoid rendering the land degraded. None, or very few crushing and quarry operations, are based in the Sarah Baartman District Municipality because the main operations in this area are focused on clay and aggregate stone.

The mining activities, primarily clay mining, stone aggregate and sand mining, are having significant impacts such as pollution, environmental degradation and loss of revenue for the community on the actual site of the project but operating companies are not taking any measures to prevent and/or mitigate such impacts. Furthermore, it was discovered on a limestone mining project that, despite extensive soil erosion flowing into the water bodies, nothing has been done to monitor the effects on the rivers or to the river course or to assess the socio-economic impacts on the community.

The research will provide the affected communities' insight and a better understanding of the current environmental legislation that governs SSM operations. This will also bring into focus the balance between mining rights, environmental rights and social rights, and demonstrate the importance of the environmental legislation relevant to mining which was often ignored in the past.

In conclusion, the research will convey an understanding of the extent of illegal mining practices in the geographical research area and the consequences of this practice and the impact that is experienced when environmental legislation is not applied.

#### **1.4 STATEMENT OF THE RESEARCH PROBLEM**

As indicated above, there is a crucial need for research into the impacts of SSM, whether legal or illegal, on water, health and the environment in the area of operation. The research problem is two-pronged in that it investigates the impact of SSM, but also investigates the process of implementing mining legislation relevant to SSM.

#### **1.5 RESEARCH QUESTIONS**

The key research question will highlight the extent and consequences of practicing illegal mining and create an understanding of the SSM's challenges and the socio-economic consequences for the Sarah Baartman District Municipality, within the mining legislative framework.

The key research questions are as follows:

- 1) How effective has the previous mining legislation and regulation been to address the impacts of SSM?
- 2) How will the current or new legislation address such impacts?
- 3) What are the challenges facing communities in the Sarah Baartman District Municipality with regard to small-scale mining?
- 4) What are the current challenges that the small-scale operators facing which result in them not legalising their operations and not being environmentally responsible?
- 5) What are local people's views about small-scale mining in the area?
- 6) What are the socio-economic impacts of the small-scale mining in the district?

#### **1.6 RESEARCH AIMS AND OBJECTIVES**

The aim of the research is to highlight, through its findings, the need to address the impact of SSM and bring that need to the attention of government department responsible for regulating SSM. The research further aims to critically investigate the process of implementing mining legislation on the SSM. The research will evaluate the effectiveness of existing relevant legislation on the environment such as Mineral and Petroleum

Resources Development Act (49, 2008), National Environmental Management Act (107, 1998) and National Water Act (36, 1998).

#### General Objective

- To investigate the implementation of environmental legislation and socio-economic and environmental impacts with respect to the mining of sand, clay, limestone and aggregate in the Sarah Baartman District Municipality.

#### Specific Objective

- To assess the status of the implementation of environmental legislation on the identified mining operations.
- To understand how nearby communities are linked to this parameter and how they are affected (social consequences).
- To assess the effectiveness of environmental legislation on both projects of mining operations.

The overall aim of this research project is to gather information on the impact of SSM in the Sarah Baartman District Municipality in order to inform the authorities about the negative and positive impacts of these activities. It also anticipated that the results of this research will help to reduce future environmental impacts, secure ecological sustainable development and assist in the sustainable use of the natural resources. This will also protect the environment and ensure sustainable development for the present and future generations. Lastly, the aim of the research would also be to find ways to utilize the potential of SSM to improve the socio-economic conditions of the affected community.

### 1.7 RESEARCH HYPOTHESIS

The research will indicate how expensive and difficult it is for the small-scale miner to obtain the mining permit and environmental authorization. It will show in terms of the various legislations how much capital one is expected to have to commence mining. It will demonstrate how long one is expected to wait (application process) to obtain the mining permit license. This process ends up in creating zama zama or illegal mining. The research

will show the negative impact on the environment due to formal and informal mining activities such as water pollution, land degradation and many other negative environmental impacts. The research will also show the loss of potential revenue that should be accrued to the community.

## **1.8 OVERVIEW OF THE CHAPTERS**

The research process is captured in the chapters of this treatise. The content of each chapter is as described below:

### **Chapter 2: Literature review**

This chapter focuses on the theoretical review from different scholars, books, journals, articles, government documents and the internet about the topic of research.

### **Chapter 3: Research methodology**

Chapter three takes us through the research methods used in arriving at the findings. The chapter includes the research approach, the research design, data collection, sampling and the data analysis methods.

### **Chapter 4: Presentation of findings**

This chapter focuses on the presentation of the results from the respondents by means of questionnaires, observation, document analysis and interview. It also discusses interprets and synthesizes the findings obtained during data collection.

### **Chapter 5: Conclusions and recommendations**

The main aim of this chapter is to report on the findings and to make recommendations. It also links the main findings with the objectives of the study.

## **1.9. CONCLUSION**

This chapter explained the rationale and justification of the research. The following chapter will provide a comprehensive review of the literature related to small-scale mining and its effect on the local environment and socio-economic conditions, and as well as the relevant legislation and regulations that cover the small-scale mining economic sector.

## CHAPTER 2

### *LITERATURE REVIEW*

#### 2.1 INTRODUCTION

Small-scale mining (SSM) activities are mushrooming in South Africa, as in other developing countries; the opening up of the government to local communities to share in the country's mineral wealth with a view to alleviating poverty has made it possible for artisanal miners of clay, sand and sandstone to participate in the mining economy. However, such opportunities have been accompanied by unsafe mining practices to the detriment of water resources. Effluents from these generally unregulated practices are often disposed of in neighbouring water resources (Mulaba-Bafubiandi and Mamba, 2009).

In many countries across the world, mining of diamond and other minerals has made an important socio-economic contribution. Small-scale mining in particular, can make a significant contribution to a country's development though it is often overlooked. Contrary to large scale mining, SSM requires minimum reserves, moderate skills and infrastructure, while the employment per unit output is high. For example, in India the current contribution of SSM to global production is high in certain minerals such as antimony, clay and others (Mulaba-Bafubiandi and Mamba, 2009).

Other benefits for SSM are firstly, the ability to operate in remote areas with little infrastructure and a high degree of flexibility because of low overheads; secondly, SSM fits in well with the social structure, particularly if seasonal operations are required because of agricultural production in the same area. Another advantage of this type of mining is that it generates employment, income and entrepreneurial skills in the rural areas and this can act as a restraint to urban migration (Mulaba-Bafubiandi and Mamba, 2009).

In spite of all the above-mentioned advantages, SSM can be a liability with poor working conditions, problems of safety and health and can cause harm to the environment. Environmentally, many countries in certain regions of Africa (Southern Africa, West Africa and East Africa) have fallen victim to excessive pollution and incomplete reclamation of

land. This has resulted in substantial damage to a number of landscapes. Policies and laws have been put in place to try and improve environmental conditions of the mining industry in those regions. However, up to now the overall impact of these activities has not been formally addressed (Mulaba-Bafubiandi and Mamba, 2009).

In South Africa, mining operations, particularly SSM activities, contribute to the improvement of socio-economic status of the communities (e.g. Ekurhuleni, Mpumalanga and Rustenburg). Despite these operations promoting the economic sustainability of communities, they do not meet accepted international environmentally stringent standards. It is documented that water sources present in the areas around the mining sites have been polluted and contaminated by effluents from the mining operations within their vicinity, for instance, drinking water quality in the natural spring around Chrissie Lake, in Mpumalanga Lake District and surrounding rivers (the Vaal, Komati and Olifant) is compromised by illegal and unregulated SSM of coal according to the water research commission issued in 2009. This causes pollution of the adjacent water resources, thus affecting the water quality (Mulaba-Bafubiandi and Mamba, 2009).

Small-scale mining is of great importance and contributes to the South Africa economy. Despite its significance in the economy of South Africa, it tends to have some impact on the environment. Mining is by nature a non-sustainable activity and cannot support development in the long term. Small-scale mining has caused major environmental damage and pollution in many parts of the country. In addition small-scale mining practices, also known as zama zama, have squandered scarce resources, particularly water and land, and caused severe environmental health problems for surrounding communities.

This researcher will also undertake a literature review on international mining perspectives regarding SSM in China, India and sub-Saharan Africa and other parts of Africa and how they deal with SSM.



## 2.2 BACKGROUND

Mining activities are generally categorized as large operation, medium operation, small-scale operations and artisanal mining operations. Small-scale mining is an important subject in the mining fraternity and appeals to local communities, due to the magnitude of the country's mineral reserves and resources, the market price of the final products produced and the favourable exchange rates on mineral sales as well as the need for cost curtailment in this highly competitive business. The drive by the South African mineral policies, as outlined in the Mineral and Petroleum Resources Development Act 28, 2002 (MPRDA) seeks to extend the mining opportunities to the historically deprived South Africans to ensure equitable access to the country's rich mineral wealth. The small-scale mining activities are on the rise in South Africa, as is typical of many developing countries, and is a result of government policies that encourage local communities to share in the country's mineral wealth in order to alleviate poverty (Mulaba-Bafubiandi and Mamba, 2009).

Small-scale mining activities in South Africa are characterized by lack of long term mine planning or control. They may be legal or illegal and in other cases either formal or informal. Such activities, for example, may come in the form of individual operations employing thousands of people. Small-scale mining plays a pivotal role in alleviating poverty in the developing world and contributes significantly to the national revenues and foreign earnings. However SSM has many variables and hazards, including poor ground conditions and poor housekeeping (Mulaba-Bafubiandi and Mamba, 2009).

There are currently as many definitions of SSM as there are authors on the topic. However, many researchers and organization involved in the subject agree regarding the understanding of the subject as it generally refers to small diggings (Mulaba-Bafubiandi and Mamba, 2009).

Although several definitions have emerged, SSM is now considered as an all-encompassing label for the limited mechanised, labour intensive activities of the mining sector. Its operations and management techniques make it unique. Unlike its large-scale counterparts which commonly feature state of the art machinery and skilled workers, small-scale mines

are usually rudimentary in design, and are characterized by highly manual processes (Mulaba-Bafubiandi and Mamba, 2009).

Although the Sarah Baartman District Municipality (Eastern Cape) is not endowed with significant mineral resources, there is potential and opportunity to exploit a number of mineral deposits such as the sand, aggregate, clay (kaolin) and limestone and there are current studies underway with respect to the shale gas project in the Karoo. However, these resource areas also happen to fall within the main 'hotspot' areas in mining in the Eastern Cape, which can be identified as those that can cause either significant environmental damage or community dissatisfaction and complaint.

The increase in construction activities for low-cost housing has led to a dramatic increase in uncontrolled and unauthorized sand mining activities, particularly along the east coast area. These illegal mining operations appear small and localized, but the cumulative impact can be significant and the current legal compliance and enforcement mechanisms do not have the capacity to provide a sufficient deterrent.

The identified mineral resources, if developed in a sustainable manner, can contribute significant amounts of revenue to the area and provide employment opportunities. However, the required public participation processes and environmental authorisations must be followed, community concerns must be addressed and community participation must focus on the long term sustainability of the projects. Illegal sand mining is a major concern and the compliance and enforcement sections need to be further capacitated.

Small-scale mining (SSM) has had unprecedented growth in Zambia during the past decade. The sector now produces a variety of commodities, especially gemstones, building and industrial minerals. From a structural and technical perspective, SSM is conducted on a very rudimentary level using basic tools such as picks and shovel and, occasionally, mechanized equipment. The environmental degradation caused by SSM is also growing with the intensification of activities in the country. Meanwhile institutions responsible for managing the environment are unable to effectively carry out regulatory and monitoring mandates due to inadequate resources. Although current legislation appears to be adequate in many respects the time has now come to amend the Mines and Minerals Act (1995) so

*Master's: Azwihangwisi Mulaudzi*

that it becomes mandatory for all mining activities, including small-scale mines, to submit environmental impact assessment reports before a license to mine or explore can be granted. Strategies to eliminate illegal mining enhancement of miners' technical skills and mine responsibly must also be placed high on the agenda (Kambani, 2000).

While aiming to achieve rapid economic growth, macroeconomic stabilization and wide-reaching poverty alleviation (Awudi, 2002) it is also important for developing countries to concurrently pursue robust policy and regulatory measures to ensure that economic activities do not endanger the livelihood of future generations. In the context of the minerals sector, not only is an effective regulatory framework needed to create the right incentives for boosting foreign direct investment, but also for minimizing the detrimental effect of mining activities on land degradation and biodiversity conservation.

The highest percentage of women in SSM is in Africa, where women form up to 50% of the labour force. African women engage in the SSM sector to a greater extent than their global counterparts, principally due to comparatively higher unemployment. For example, an estimated 74% of small-scale miners in Guinea are female as is 50% of the ASM workforce in Madagascar, Mali and Zimbabwe. It has been noted that female participation in SSM can be either direct (i.e. primary engagement in mining operations) or indirect (i.e. servicing the mine sites). Women are panners, cooks, mining operators, nightclub entertainers, sex workers, and merchants, among other professions. While some women work marginal jobs, occasionally in conditions resembling debt servitude, others are powerful managers of multiple mining teams. Women occupy a distinctly marginal role in the management of small-scale mining operations worldwide. They are rarely identified as miners in their own right and only sporadically attain the same decision-making positions as their male counterparts, including concession owners, mine operators, dealers and buying agents and equipment owners (Hilson, 2002).

## 2.3 POLICY FRAMEWORK APPLICABLE FOR REGULATING SMALL-SCALE MINING

### 2.3.1. Constitution

In the Bill of Rights (Section 24 (a) and (b) (i-iii)) in the South African Constitution everyone has the right to an environment that is not harmful to their health or wellbeing. This right includes having the environment protected for the benefit of the present and future generations, through reasonable legislation and other measures. Sections (i)-(iii) focus on preventing pollution and ecological degradation, promoting conservation and securing ecologically sustainable development and the use of natural resources while promoting economic and social development. All these aim at protecting the environment and human, hence the SSM must be consistent with the Bill of Rights.

### 2.3.2. Mineral and Petroleum Resources Development Act (MPRDA) 28 of 2002 as amended 49 of 2008

Historically the various pieces of environmental legislation have largely been regulated separately. Mining activities were regulated separately from other sectors such as construction and any other development. This sector was mainly regulated by the Mineral and Petroleum Resources Development Act 28 of 2002. The promulgation of MPRDA also resulted in the mining charter and the implementation of social and labour plans (SLP) as required in terms of regulation 46 of the Act.

The main purpose of the MPRDA is, amongst others, to transform the mining industry in South Africa. In order to ensure effective transformation in this regard, the Act requires the submission of the social and labour plan as a pre-requisite for the granting of a mining right (license). The SLP requires applicants for a mining right to develop and implement comprehensive Human Resources Development Programmes, Mine Community Development Plan, Housing and Living Conditions Plan, Employment Equity Plan and process to save jobs and manage downscaling and or closure. This document, called the SLP, is also known as the social license for the community (South Africa. Department of Mineral Resources, 2002).

### **2.3.3 National Environmental Management Act 107 of 1998 (NEMA) as amended by No 65 of 2008**

Many of the laws that were in place when the Constitution was adopted were outdated and did not adequately give effect to the requirement of environmental rights. After 1994, the government embarked on an environmental law reform process to bring environmental legislation in line with the requirement of environmental rights in particular and constitutional requirements in general. The principles set out in Section 2 of the National Environmental Management Act (107 of 1998) apply to all applications for prospecting and mining operations as the case may be and any matter relating to such operation and serves as guidelines for the interpretation, administration and implementation of the environmental requirements of this Act. Any prospecting or mining operation must be conducted in accordance with a generally accepted principle of sustainable development by integrating social, economic and environmental factors into the planning and implementation of the prospecting and mining projects to ensure that exploitation of mineral resources serve present and future generations.

The National Environmental Management Act, the Mineral and Petroleum Resources Development Act and the National Water Act was amended to cater for One Environmental Management System. It was agreed in a memorandum between the three government departments (Department of Environmental Affairs (DEA), Mineral Resources (DMR) and Water and Sanitation (DWS)) that the approach to regulating the environmental impacts of mining should be the same as for other sectors. The basis of agreement to implement the so-called One Environmental Management System is now set out in Section 50A (2) of the amended NEMA. The Minister of Environmental Affairs will be the appeal authority and is also responsible for policy formulation in consultation with the Minister of Mineral Resources. The three departments also agreed to streamline the process of Environmental Authorization (EA) and Integrated Water Use License within 300 days from the 08<sup>th</sup> of December 2014 (South Africa, Department of Environmental Affairs, 2014).

### **2.3.4 National Water Act 36 of 1998 (NWA)**

The general principles for regulating water use are captured in Chapter 4 of the National Water Act (36 of 1998). The water use including taking and storing water, activities which reduce stream flow, waste discharge and disposal, controlled activities, altering a water course, removing water found underground for a certain purpose and recreation of specific relevance to river sand mining and gravel extraction operation, while Section 21 (c) regulates impeding or diverting the flow of water, such as for example when water flow in a stream or river needs to be blocked or changed to allow a new road to be built. Section 21 (i) allows for altering the bed, banks or course of a watercourse, such as when a river or stream is turned into a canal, or when sand is mined from the banks or bed of the river to be used in construction. The NWA provides that the applicant for a mining permit/right also has to lodge a water use license or integrated water use license (IWULA) with the Department of Water and Sanitation. This applies to all mining operations including large, medium and Small-scale operations. If the authority decides to grant the license it will be issued subject to a range of conditions. Some of these are imposed specifically by the authority whereas others can be found in the Act itself. Water is used by industry and mines in their daily activities, such as making paper, household appliances, processing food, producing gold and other minerals, and in the production of many other products (South Africa, Department of Water and Sanitation, 2008).

### **2.3.5 National Environment Conservation Act (1998)**

Section 2, subsections 2, 3 and 4(p) of this Act states that the following should happen: Environmental Management must place people and their needs at the forefront of its concern, and serve their physical, psychological, developmental and social interest equitably. Development must be socially, environmentally, and economically sustainable. The cost of preventing, minimizing and remedying pollution and environmental degradation shall be paid by those responsible for harming the environment (South Africa, Department of Environmental Affairs, 2014).

### **2.3.6 Mine Health and Safety Act 29 of 1996 (MHSA)**

The main objectives of this Act are to provide for the protection of health and safety of employees and other persons at mines. The holder of the mining licence must promote the culture of health and safety within the mining area. This Act contains many sections that are relevant to gravel extraction and sand mining. The Mine Health and Safety is also applicable to the small-scale mining operations; however is not easy to apply this Act to illegal mining. It also looks at the exposure of employees and the surrounding community and their properties in case of damage by blasting (South Africa, Department of Mineral Resources. 2002).

### **2.3.7 Summary of legislations**

The key issue in South Africa is that the route to sustainable development is directed by government policy and legislative and regulatory authorities play an extremely important role in ensuring that development (SSM) adheres to the policies and law. Small-scale mining is no exception as they have to follow the legal framework of environmental and social legislation. All the above-mentioned legislation is applicable to SSM and need to be adhered to by the small-scale miners.

## **2.4. INTERNATIONAL PERSPECTIVES ON SSM**

### **2.4.1. Small-scale mining in China**

In China, SSM contributes significantly to the supply and full utilization of resources, market competition in the resource sector reducing transportation bottle necks, leading to rural socio-economic and in some cases ecological improvement. Legal small-scale mines continue to be an important supplementary source of coal and minerals for China's economy. Small-scale mining in China has experienced rapid development in the past and has contributed significantly to the development of the economy. For the medium term at least it is certain that SSM will continue to play a crucial role in China's mining industry. As with the international experience, the SSM industry in China cannot be expected to

Master's: Azwihangwisi Mulaudzi

effectively regulate itself and mitigate its own negative impacts. However regulating SSM does not mean destroying it. Governments and international agencies need to build a sound and sustainable small-scale mining environment (Simson, 2000).

The size and importance of SSM in China developed a school of its own. In 2006 China's SSM sector employed more than 5 million people and produced over half its mineral production. Small-scale mining in China might be considered to make unique contributions to rural economic development. It could employ millions of people in often remote areas, and often invests income in other local industry promoting diversification and provides mineral and energy raw materials to areas where transportation problems might otherwise make local industry prohibitively expensive. China's SSM, however, has also had a staggering health and environmental impact. For example, small-scale coal mines in China alone experience thousands of deaths from accidents each year. They might degrade surface and ground water, soil, air, and could destroy valuable deposits through poor practice. As a result SSM in China is often thought to be illegal, employing migrant workers and contributing to smuggling and other negative social impacts (Simson, 2000).

These negative impacts resulted in capriciously strict policies and regulations on SSM in China. The development of SSM in China is coming to a crossroad where SSM can either occur in an orderly manner along the current consolidation strategy or it can develop illegally. The role of government is to set up effective practical policies and a clear legal system. Past SSM regulations in China had many deficiencies and left several unresolved issues. The main challenges currently facing SSM in China are reducing frequent safety incidents and adapting to the state's resource consolidation strategy.

Small-scale coal mines have played an important role in China's economy because of the need for coal as an energy source and the promotion of rural development. However, the pressures from coal oversupply over many years and the concerns about environmental pollution and resource damage from the SSMs have forced the central government to adjust its coal policy. As a result, wide debates have arisen on whether the current policy on the SSMs has been effectively implemented in China. Some argued that the policy has achieved great progress since the reduction in coal oversupply has become obvious (Simson, 2000).

Master's: Azwihangwisi Mulaudzi



## **2.4.2. Small-scale Mining in India**

India is among the top ten mineral producers in the world and its economy depends on the value of the minerals produced. Small-scale mining is more prevalent in India. Although mineral production has increased significantly since the country's independence, the contribution of resident small-scale mines to the national mineral output continues to be overlooked. Approximately 90% of India's mines are operating on a Small-scale, employing some half a million people. It provides a wealth of socioeconomic benefit to the rural inhabitants. However, because of their rudimentary and highly migratory nature, these operations feature poor environmental management and safety conditions (Anon, 2000).

Small-scale mining has been the subject of intensive international debate. The socioeconomic significance of operations is often overlooked because, when compared to large-scale setups, requirements in terms of reserves, implementation time and initial investment are minimal, infrastructural requirements are moderate and employment per unit output is high. However, minimal resources requirements and a short construction period are advantageous in any economic environment and, because activities require minimal capital skills, infrastructure and labour to flourish, small-scale mining has become an important industry in many developing countries, providing thousands of people with employment and contributing positively to national output (Ghose and Sen, 2001).

Small-scale mining contributes towards the improvement in the social environment of the locality, provided this sector is given some attention in the interest of the state and the workforce engaged in operations. Small-scale mining is still considered an unorganized industrial sector with regard to the industrial status.

Small-scale mining is considered to be an environmental degrading activity. Environmental law in India is not confined to the apportionment of rights and duties and adjudication of disputes that arise. More importantly, environmental law is a policy instrument designed to manage natural resources intelligently with a view to moderating its use for sustainability. Development involves environmental cost, therefore the role of the law is to see how and where to absorb these costs to keep damages to a minimum. Although recently introduced environmental regulations do concern the mines, most have been poorly implemented

further underscoring India's reputation for being notoriously soft in this regard. Corruption and a lack of political will also play a role in non-performance of these and related pollution control measures. The most promising development in India has been the increased constitutionality of environmental actions based on human rights approaches (Charkraborty, 2002).

### **2.4.3. Small-scale mining in Acupan (Philippines)**

Small-scale mining refers to the economic activity that involves individual miners or small groups of miners, as opposed to the enterprise of a large-scale corporate mining. A small-scale mining group usually consists of kinfolk and in other instances, a number of non-kin members. A small group may include four to six individuals. Small-scale mining encompasses basically two forms: pocket mining and gold panning. Pocket mining is so called owing to the method in which miners trace gold veins by entering holes or pockets in the earth. It is also known in the Benguet Province and larger Cordillera region as camote mining in reference to digging for camote (sweet potato). Gold panning, on the other hand, is usually carried out by individual household members and not necessarily groups of miners and involves collecting some naturally occurring gold from alluvial deposits along riverbanks (Chaloping, 2008).

As was the case with Antamok, Acupan and Balatoc were mentioned frequently in Spanish accounts as sites of gold diggings and sources of fine gold that the highlanders traded with lowlanders in Luzon. Acupan-Balatoc became a huge mine camp by the 1970s, populated by mine workers who had been recruited by Benuet Corporation to meet workforce requirement for the mine camp. Throughout the many decades of the Acupan mine's operations, employment with the mine had been the major source of income for thousands of people. By the late 1970s, small-scale mining started as a supplementary economic activity in the locality. However, people could not carry it out openly. The company prohibited both gold panning along the river and pocket mining on the hills. Throughout the 1970s, there were only two pocket mining tunnels within Acupan. By the end of 1983, small-scale mining spread to more areas within the Acupan mine camp as the price of gold in the international market surged. More and more portals opened as scores of small-scale

miners continued their activities clandestinely. Between 1986 and 1987, the number of small-scale miners multiplied to the tens of hundreds. This also reflected the country's difficult economic situation as more families could barely afford consumer goods due to soaring prices. Driven by economic difficulties, thousands of people chose to undertake Small-scale mining. Scores of tunnelling sites opened up in several vicinities within Acupan. As if rising prices of basic commodities were not enough, thousands of mine employees had lost jobs as the company reduced its workforce (Chaloping, 2008).

In 1991, a new law governing small-scale mining was enacted, the Republic Act 7076 (People's Small-Scale Mining Act of 1991). A significant introduction in this law is its creation of the Provincial/City Mining Regulatory Board (PMRB) as the government's arm to regulate and issue permits to small-scale mining activities in Philippines. As the legalisation of Small-scale mining continues to be debated, small-scale miners carry on with their activities in areas where it is possible and during times when they can. They consider the requirements for acquiring a permit onerous. The requirement includes the consent of the claim owners for small-scale miners to work on a site. The expenses and time to prepare documents are another matter (Chaloping, 2008).

#### **2.4.4. Farming, artisanal and small-scale mining and rural livelihood in sub-Saharan Africa**

Few economic activities are as poorly understood as artisanal and small-scale mining. These are the low tech, labour intensive mineral extraction and processing found scattered throughout the developing world. Its superficial treatment in policy over the years has led to its exclusion from the mainstream international development debate and dialogue. Artisanal and small-scale mining in sub-Sahara Africa today provides direct employment to millions of men, women and children and many millions more in downstream industries (Hilson, 2011).

Prolonged neglect of artisanal and small-scale mining has confined the vast majority of the region's operators to an informal sector existence. A combination of bureaucratic and costly registration fees, lengthy delays on decision on applications for permits and an acute shortage of mineralized land prevents people from securing licenses and formalizing their

activities. The issue of contention here is the nature and orientation of donor strategy and the development policies it spawns. The private sector, donor and NGOs frequently criticise government for failing to devote the necessary finances, time and human resources to formalize artisan and small-scale mining. Whilst in Sub-Saharan Africa this criticism is often warranted, the problem runs deeper. The specific problem in the region concerns the policy foundation laid over the past four decades that is ill-equipped to embrace and maximise the impact of a dynamic economic activity such as artisanal and small-scale mining (Hilson, 2011).

A link exists between subsistence agriculture and artisanal and small-scale mining low-tech mineral extraction and processing in sub-Saharan Africa. It focuses specifically on the economic impact of this symbiosis on the region's rural households and the policy treatment of this very important phenomenon. Artisanal small-scale mining has long been perceived as a nuisance and a sector populated mostly by rogue entrepreneurs. Therefore since small-scale mining is not seen to be particularly integral to the regional economic development and poverty alleviation plans/strategies, donors and policymaker have, understandably, been reluctant to embrace this idea completely. Artisanal mining is now closely interconnected with subsistence agriculture. Artisanal mining has become the primary income earning activity and hundreds of thousands of rural families therefore strike a balance between this farming activity and artisan scale mining (Hilson, 2011).

There is evidence from all corners of Sub-Saharan African which points to miners having grown frustrated with the licensing process. It must be simplified, unnecessary cost eliminated and the awarding of licenses adequately decentralized. There is merit, for example, in following the lead of a country such as Tanzania and many other countries that have empowered its local Ministry of Minerals and Energy offices to make decisions on applications. In other countries the decision still lies with the President. In sub-Saharan Africa, artisan small-scale mining is in the state it is; environmentally degrading, unpredictable in its growth and associated with social ills because of policy. Its perpetual informality is a response to stifling regulatory frameworks. It is against this background that the recommendations which follow have been formulated. It may be exceedingly

challenging to reorient development policy entirely, which is why supporting artisan and small-scale mining with a vision of sustaining local livelihoods is important (Hilson, 2010).

The vast majority of individuals who have moved into artisanal and small-scale mining in sub-Saharan Africa over the past 10-15 years have done so because of hardship. Studies by Hilson and Potter (2006) reveal that a large number of these individuals are educated and skilled or are victims of purges in other sectors under structural adjustment. But it seems that the vast majority who have branched out into artisanal and small-scale mining are indeed subsistence farmers.

In several studies carried out on the subsector in Zimbabwe, nearly all of the miners cited harsh economic conditions resulting from the retrenchment of workers from paid employment and high unemployment levels as the main reasons for going into illegal or artisanal and small-scale mining. The situation has been further aggravated by poor agriculture yields due to erratic rainfall patterns. The small-scale mining, and gold mining in particular, is seen as a panacea for survival in such harsh living conditions.

Over a decade ago an observation was made by Maponga and Ngorima (2003) about Zimbabwe specifically that proceeds from gold sales were reportedly used to purchase fertilizers. In certain areas of the country it was reported that alluvial gold panning had transformed into a full-time economic activity supporting the livelihood of over half a million Zimbabweans both directly and indirectly. In neighbouring Mozambique, for example, Dondeyne and Ndungunu (2014) report that in the locality of Chazuka proceeds from small-scale gold mining have proved to be a tonic for stagnating agriculture, putting individuals in a position to acquire fertilizers and other crucial farm inputs.

#### **2.4.5. Small-scale mining in Democratic Republic of Congo (DRC)**

Despite the recognition of the potential of artisanal and small-scale mining (ASM) for economic development and poverty reduction, a consensus exists that ASM has so far generated few benefits for both governments and artisanal and small-scale miners. The key problem, so it is argued, is the fact that these artisanal activities operate outside the regulatory framework of the state in an 'illegal' or 'informal' sphere. Hence the sector needs to be formalized or embodied in a standardized legal framework that is registered in

and governed by a central state system. The basic condition for formalisation according to many is property or the fact that artisanal miners are given full legal and transferable mining titles to their claims. This accounts for the broad consensus among policy-makers and researchers (Siegel and Veiga, 2009). But on which assumptions is this consensus based? Why is it argued that a formalised sector will have a more positive impact on national development and local livelihoods and, if this is the case, how should policy makers proceed to implement formalisation.

The DRC serves as a casebook example of the resource curse in the sense that mineral exploitation has impeded long-term economic development (Ross, 2003). The revenues generated by the country's mining sector have not contributed to national development nor have they improved the livelihoods of the Congolese population. Generally this curse is attributed to bad governance (World Bank, 2008). According to World Bank estimates, the gap between officially recorded taxes (\$26.7 million) and expected fiscal receipts (based on hypothetical growth scenarios in 2008 of \$185 million for 2008–2012 and \$619 for 2013–2017) is due to non-declaration, smuggling and lack of capacity.

The policy measures that have been proposed in the DRC by both the government and the international donors seem to have been too technical and narrow thereby neglecting broader socio-economic and political issues. In a context like the DRC, where the security situation is still volatile, the government does not control its territory and does not have the capacity to perform other state functions and where almost 100% of the population is employed in the informal sector, it is an illusion to think that a formalisation policy can be implemented top-down and at short notice. As we have witnessed in other contexts, formalisation risks confirming and reinforcing the rights of the stronger parties such as large-scale mining companies to the detriment of small-scale actors who base their property rights in customary laws and conventions. These laws are either not acknowledged or are rejected on efficiency grounds implying that only large-scale projects can contribute to economic growth and development. In the first place, artisanal miners should be assisted in technical and financial terms and trained in artisanal mining techniques in order to improve their welfare and working conditions. Hilson and Potter (2005) argue that many artisanal miners are keen on acquiring a license, if only because they fear prosecution. The problem

is not the unwillingness of the miners but rather the inappropriateness of the policy measures to their situations. The same is true in the DRC. Almost all the actors concerned have committed themselves to the project of formalisation.

#### **2.4.6. Small-scale mining in Ghana**

The adverse environmental and social impacts of illegal artisanal mining in sub-Saharan Africa are well documented, particularly in Ghana where the industry has experienced unprecedented and chaotic growth in recent years, bringing about many problems that the authorities have struggled to address (Hilson and Potter, 2005). The country's community leaders often argue, in explaining the recent upsurge of artisanal and small-scale mining activities in sub-Saharan Africa, that despite the adverse impacts these activities have long been the lifeblood of rural regions, since well before the arrival of large foreign mining companies. This implies that alluvial and near-surface mineral extraction continues to be a vital economic activity, and that operators have deep ancestral ties to mining lands.

It can be argued that the inability of the government to regulate and reduce illegal artisanal mining activity is strongly associated with the absence and proper implementation of defined policies to guide operations. On the one hand, the Ghanaian Government has formalised Small-scale gold mining in a bid to reduce illegal activity and its associated negative impacts, while on the other hand critics argue that these policies have been ineffective and there is insufficient land available for registration to prospective miners (Hilson and Potter, 2003).

One recent argument (Hilson, 2006) is that a poor understanding of target SSM populations has led to the design and implementation of inappropriate technologies and support services. This may explain why governments have generally failed to reduce illegal mining, too often viewing its participants as having similar backgrounds, skill levels, and educational training and demands. The three main approaches taken to combat the problem in Ghana have been formalisation, military intervention and alternative livelihood projects.

## **2.5. MINING PERSPECTIVE IN EASTERN CAPE PROVINCE**

Although the Eastern Cape is not endowed with significant mineral resources, there is the potential and opportunity to exploit a number of mineral deposits such as the coal deposits in Indwe and Aliwal North, the titanium and molybdenum deposits in Pondoland (Xolobeni) and the uranium deposits in Aberdeen (Graaf-Reinet) together with the current studies underway with respect to the shale gas project in the Karoo. However, these resource areas also happen to fall within the main ‘hotspot’ areas in mining in the Eastern Cape, which can be identified as those that can cause either significant environmental damage or community dissatisfaction and complaint. The increase in construction activities for low-cost housing has led to a drastic increase in uncontrolled and unauthorized small-scale sand mining activities, particularly along the east coast area. These illegal mining operations appear small and localized, but the cumulative impact can be significant and the current legal compliance and enforcement mechanisms do not have the capacity to provide a sufficient deterrent.

The identified mineral resources, if developed in a sustainable manner, can contribute significant amounts of revenue to the area and provide employment opportunities. However, the required public participation processes and environmental authorizations must be obtained, community concerns must be addressed and community participation must focus on the long term sustainability of the projects. Illegal sand mining is a major concern and the compliance and enforcement sections need to be further capacitated (South Africa, Department of Mineral Resources. Annual report, 2016).

## **2.6. THE STUDY AREA (SARAH BAARTMAN DISTRICT MUNICIPALITY - SBDM)**

Since the inception of the Mineral and Petroleum Resources Development Act (28, 2002) in 2004 a total of 45 licenses have been issued in the Sarah Baartman District Municipality, comprising 20 Mining Rights, 25 Mining Permits and 30 borrow pits from exempted organs of states. However, all the issued licenses are mainly for industrial minerals such as sand, stone aggregate, gravel, clay (kaolin), gypsum, dimension stone and limestone. The department also received a few complaints of illegal mining activities within the Sarah



Baartman District Municipality (South Africa, Department of Mineral Resources, Annual report, 2016).

Despite having 20 mining rights and 25 mining permits issued in the SBDM areas, the SBDM Integrated Development Plan (IDP) is silent on mining issues; this shows a lack of a proper plan that will have all the authority of the district. The IDP only talks about tourism and agriculture.

During the 1990s, the concept of integrated planning was adapted in South Africa from strengthening international trends towards holistic and sustainable development and was seen locally as an appropriate method to address the deficiencies and injustices of apartheid planning. The Integrated Development Plan is a process through which municipalities prepare a strategic development plan for a five year period. The SBDM came up with the plan for the district that covers municipality priorities.

The Sarah Baartman District Municipality is the largest (58 243 km<sup>2</sup>) of the six district municipalities in the Eastern Cape Province. The District is situated in the western portion of the Province bordering the Western Cape, Northern Cape and two other District Municipalities in the Eastern Cape, namely Chris Hani District Municipality and Amathole District Municipality. The District consists of nine local municipalities, namely Camdeboo, Blue Crane Route, Ikhezi, Makana, Ndlambe, Bavianaans, Kouga, Kou Kamma and Sunday River Valley (Sarah Baartman District Municipality IDP, 2015).

The Sarah Baartman District Municipality relies on the South African National census 2011 (StatsSA) data information on official population figures assisting it to make informed decisions relating to population challenges faced by the district. The census determined Sarah Baartman's District population to be 450 584 (Sarah Baartman District Municipality IDP, 2015).

The Sarah Baartman District covers approximately one third of the Eastern Cape's land area however it only houses 6.8% of the provinces' population, with the lowest average distribution of eight people per square kilometre in the Eastern Cape. Only 22% of houses are informal, and 2/3 of households have potable water and a flush toilet or pit latrine on

Master's: Azwihangwisi Mulaudzi

site. Conditions are worse in the small towns of the interior where poverty can be severe compounded by isolation from the mainstream economy. It must however be noted that poverty is defined not only by levels of unemployment but also characterized by a lack of access to, for instance, education, health care, and basic services including water and sanitation (Sarah Baartman District Municipality IDP, 2015).

Due to the high unemployment rate, a significant portion of the population is dependent on social grants. The predominant type of grant is for child support followed by old age and permanent disability. There has been a gradual increase in social grant expenditure in the Sarah Baartman District Municipality. They also depend on agriculture and tourism for job creation (Sarah Baartman District Municipality 2015).

The diversity of the District's vegetation is reflected in the highly variable mosaic of geomorphology, topography, soil types, climate and rainfall that occurs in the region. The Sarah Baartman District Municipality includes elements of six biomes, i.e. the Fynbos, Subtropical Thicket, Forest, Succulent Karoo, Savannah and Grassland, which occur along with coastal vegetation, wetlands, pans and riverine vegetation types. Large contiguous patches of fynbos occur in the central mountainous areas and western coastal forelands of the region. Smaller isolated patches of coastal afro-montane and thorn veldt forests, Alexandria grassland, Thorn veldt, Karoo and broken veldt are widely distributed through the District. The biomes represented in the District contain a biodiversity of high global and national significance. Three of these fall within globally recognized biodiversity hotspots, namely the Cape Floristic Region, the Succulent Karoo Hotspot and the Maputaland-Pondoland-Albany Hotspot (Sarah Baartman District Municipality IDP, 2015).

The Sarah Baartman District Municipal area includes a wide range of formally protected areas that vary considerably in size and geography. These protected areas range from national parks (Camdeboo, Tsitsikamma and Addo), provincial reserves (e.g. Baviaanskloof (which is also a world heritage site), Groendal, parts of the Great Fish River Reserve complex, and a number of smaller reserves, including Waters Meeting 1 & 2 and Thomas Baines and numerous municipal reserves, e.g. Kap River, Loerie Dam, Gamtoos Coastal, Huisklip and Great Fish River Wetland. These reserves all contribute significantly

to the protected area estate of the District and the Province (Sarah Baartman District Municipality IDP, 2015).

## **2.7. BENEFITS IDENTIFIED FOR THE SMALL-SCALE MINING ACTIVITY**

Small-scale mining has become an indispensable part of the socioeconomic fabric of the developing world. The industry has not only traditionally provided a wealth of employment opportunities to rural inhabitants, but has also contributed significantly to a number of countries' mineral export bases and foreign exchange earnings. Small-scale mining provides employment income to millions of rural and urban inhabitants. It has the ability to operate in remote areas with minimal infrastructure, thus enabling the exploration of otherwise uneconomic resources. It provides tax revenue in remote rural regions with few economic alternatives. It has ability to be self-financed, therefore does not require large investments in geological exploration, infrastructure, production and living facilities.

Considering the above benefits, it is abundantly clear that SSM plays a pivotal role in the welfare and wellbeing of a country, particularly a developing one. High unemployment in the Sarah Baartman District Municipality, Eastern Cape Province is the reason why this area becomes so important in so far as SSM is concerned. The revival of Sarah Baartman District and its economic vibrancy can be achieved through strategic and well thought out SSM interventions and investments in this area.

## **2.8. PROBLEMS AND CHALLENGES ASSOCIATED WITH SSM**

The environmental degradation caused by SSM is a growing concern, as a result of intensification of the mining activities. Common concerns expressed by many researchers include environmental issues (water pollution, land degradation and river diversion), health and safety issues, social impacts and finance and technical issues.

## **2.8.1. Environmental issues**

### **2.8.1.1. Water pollution**

Mining has a long history in South Africa, which has resulted in large quantities of mine waste. In 1996 a total of 377 million tons of mine waste was produced, accounting for 81% of the total waste stream in South Africa. The presence of these mine dumps resulted in large-scale pollution of the subsurface, affecting an area of approximately 180 km<sup>2</sup>. This poses a potential threat to the scarce water resources of South Africa and is cause for serious concern with respect to land development of sites where tailings dams have been reclaimed. In view of this problem the water pollution is an increasingly important socio-economic issue in South Africa (Rosner et al., 2001).

Mining releases hazardous substances and environmentally unfriendly toxic species into the topsoil and rivers, thus causing pollution. Tailings from SSM bring about siltation, the process whereby fine particles build up on the bed of a river resulting in excessive piles and suspended solid in the river. The problem is that these tailings are quite unstable and are therefore blown away by winds when dry and are also eroded by heavy rains. This subsequently introduces these suspended particles in the nearby river system. Artisan gold miners process alluvial sand and residues from old tailings dams using gravity concentration techniques (Mulaba-Bafubiandi and Mamba, 2009).

Small-scale mining also caused bank erosion and sedimentation in the rivers. Many small-scale miners are involved in sand winning. They take sand from a riverbed or from the area next to the river and usually sieve it, dry it and sell it to building contractors. Sometimes they have their own trucks to take it to a storage and sales area, or sometimes people come to the site with their own trucks. Sand wining becomes easier if the river can be blocked off or diverted with a berm. However, blocking off or diverting a river causes problems. When soil next to a river or sand in a river is disturbed, the river banks can collapse into the water, fine (clay) particles can be washed into the river and water can become muddy. Muddy water can kill fish, sunlight is less able to shine through the water, and many plants will die. This can reduce the amount of oxygen in the water and can make water unhealthy, smelly, taste sandy and be unsafe for human consumption (Hill & Kleynhans, 1999).

*Master's: Azwihangwisi Mulaudzi*

When sediments are washed into a river, they flow downstream for distance and then are deposited in the riverbed when the river flows down. The sandy particles and larger stones and rocks are deposited in the riverbed which then fills up. Eventually, instead of a flowing river of water we end up with a river with more sand than the water in it. If it happens more and more, we will steadily make our country a drier place, where water is more difficult to find.

A healthy river normally has clean water in it and can support many kinds of plant life and animal life. A healthy river is important for people too, because they can harvest things like reeds, catch fish and, most importantly, they can get water. A river that is in bad condition can run out of water much sooner than a healthy river and we need to look after our natural resources so that not only we but also our children can live well after we are gone (Hill & Kleynhans, 1999).

Riparian vegetation is there mainly because of the extra water near the river and because there is usually deep, fertile soil along a river. Riparian vegetation is very important because it holds the soil with its roots and prevents soil from being washed away. It also slows down the rainwater that runs into the river. This protects the soil and holds back some floodwater so that floods are less severe. The water that is held back can then flow slowly into the river and feed it for a longer time allowing the river to flow for longer periods before it stops running in the dry season (Hill & Kleynhans, 1999).

All of this helps people because they can get water from the river, even during the dry season, and when it floods it is less dangerous. When the fertile soil alongside rivers is washed away, people living there can no longer use that area for growing crops. Sometimes riparian vegetation includes some very valuable or rare plants. Removing this vegetation can reduce the variety of plants in the world. Plants that try to re-grow in the spaces that miners have cleared are often alien plants (plants that are not from South Africa). The loss of variety and the growth of alien plants are both major problems that we should try to avoid. Can only one small-scale miner really cause so much damage? These factors show that one person, on his or her own, does not cause very much damage to the environment. But when many people do the same they cause major destruction known as the cumulative effect (Hill & Kleynhans, 1999).

Master's: Azwihangwisi Mulaudzi

Ponds are holes in the ground that have filled up with water. There are many causes such as digging holes to put waste in or miners can wash minerals out of the material they have mined. Ponds can be dangerous because people, especially children, and animals can fall into them and drown. An area that had pits dug into it and material left in the piles looks very unattractive. Sometimes at a distance below the surface of the ground, the soil or rock is wet. While they are mining they have to pump the water out, but when they leave it fills up the hole. Usually mines produce some form of waste from the camp. When there are ponds, this waste can be washed into the water from there it can soak into the ground and pollute the groundwater. Fish and other fresh water animals can get stuck in ponds without being able to get back to the river or dam where they came from. They cannot breed in these ponds and usually die. People nearby who use shallow wells or boreholes might find that their drinking water becomes dangerous to use (Hill & Kleynhans, 1999).

The riparian zone includes stream banks, riparian vegetation and vegetation cover. These normally serve as the buffer to pollutants entering a stream from runoff, control erosion, and provide habitat and nutrient input into the stream. Destruction of the riparian zone during the mining of alluvial sand or gravel extraction operations can have multiple deleterious effects on the stream habitat. Damaging any one of these elements can cause stream bank destabilization, resulting in increased erosion, sediment and nutrient inputs, and reduced shading and bank cover leading to increased stream temperature (Khariivhe, 2002).

Mining has severe consequences for benthic invertebrates in small streams worldwide. The effects of mining on macro invertebrates in small streams are caused by acid mine drainage, sediments or burial of the streams themselves. Acid mine drainage and associated problems of heavy metal contamination usually result in a reduction of the number of sensitive taxa in the order of Ephemeroptera (particularly those of the family heptageniidae), Plecoptera, Trichoptera, Megaloptera, Odonata, and Diptera and an overall decline in species diversity. Some studies have shown that functional measures of benthic invertebrates such as drift and community respiration are also negatively affected by mining impacts. In recent years, the practice of mountain top removal and valley fill mining has resulted in the filling and permanent burial of at least 1450km of small streams

in the Appalachian Mountains. The burial of multiple small streams destroys all aquatic life in these streams and results in a decline in sensitive invertebrate taxa immediately below the valley fills (Likens, 2010).

Many unique fauna are found in small stream, unfortunately invertebrate fauna in these stream are under assault by anthropogenic and natural disturbances such as invasive species, agriculture, development, logging, mining, recreational activities, global climate change and wild fires. Macro invertebrate communities and productivity can be altered, which can affect higher trophic levels (Likens, 2010).

Natural systems are likely to be the most water-stressed during summer when humans have the greatest need of water for irrigation, mining and other demands. Over-abstraction could lead to severe shrinkage of systems. Some land owners and mining companies abstract all of the flow in a stream system. This results in the total destruction of aquatic communities and affects the capacity of the river to recover from impacts such as pollution. Wetlands and their associated vegetation provide many benefits for example, through uptake and absorption of nutrients, trapping of sediment, reduction in erosion of stream channels and flood attenuation (Karen, 2014).

#### ***2.8.1.2. Land Degradation***

Land degradation leads to deforestation, loss of fertile soil, decrease of agricultural productivity and development of dangerous pits and trenches near homesteads, which also destroy the scenery and prime land for future development. Mining scars, sometimes of great length and depth, are problematic in urban areas, such as is the case in and around Johannesburg at present. Deforestation reduces plant and animal biodiversity decreases in the availability of medicinal plants used by local herbalists for treatment of a variety of ailments. Moreover, a major problem since most African people depend on the subsistence farming for their basic nutritional needs is the special loss of fertile land to these mining activities, as well as the associated pollution and soil erosion. The blasting vibration from mines can also cause damage to land and housing structures. In South Africa, the Department of Mineral Resources is inundated with blasting and vibration related complaints by communities located near quarries (Mulaba-Bafubiandi and Mamba, 2009).

*Master's: Azwihangwisi Mulaudzi*

Mining has often led to a greater increase in fresh water particularly than other human activities such as tree felling. Consequently deforestation which involves road construction, mining infrastructure can increase freshwater particulates to a certain extent, dependent on the care taken with road layout and construction. Deforestation has had variable effects on freshwater particulate loads. Many studies have quantified the effects of deforestation on freshwater sediment and particulate loads, but very few have quantified the effect on nutrient loads in particulate form (Likens, 2010).

Mining has resulted in significant wetland loss through draining, dredging, stockpile and removal of vegetation and soil. Even if wetlands are not completely eliminated, mining fragments them with road construction and other infrastructure, which impairs wetland ecosystem functions by altering the hydrologic regime, increasing the input of nutrients and toxins and the introduction exotic species (Likens, 2010).

Often the required land is situated close to the operational mines or on sites of previous mining and mineral processing activities such as tailings dams. Hence, some degree of rehabilitation for contaminated land would be required after complete reclamation has taken place. Rehabilitation is primarily aimed at ensuring the protection of human health (risk reduction), conservation of the environment and land development. Soil contaminated with toxic substances can have a direct influence on human health if houses are built and gardens are established on land affected by mine tailings. This not only applies to land where mine residue deposits have been reclaimed, but also to land that is affected by the deposition of wind-blown tailings material. Particles of soil or tailings handled or ingested by adults or children may carry irritants, poisonous and/or radioactive substances. The inhalation of such particles or vapours from the pollutants provides another adsorption route. Vegetable gardens or agricultural areas situated on polluted land may produce crops contaminated by the direct uptake of toxic substances or deposition of contaminated particles on the growing plants (Rosner et al., 2001).

### ***2.8.1.3. River vegetation***

River vegetation, being part of the natural heritage of creation, is of ethical and intrinsic conservation value. It creates a habitat for river animals. It is an important component of



the carbon and nitrogen cycle and purifies water and soil, and is the most important way fresh water is cleaned naturally. Loss of vegetation ultimately means loss of fauna. Species immediately dependent on living plants, particularly specific ones, are lost together with the loss of those plants. However, many animals including some coarse fish, invertebrates and others can live well without macrophytic vegetation, surviving on debris, incoming organic matter from effluents and such-like and the detritivores that eat these. Mining activities, especially of alluvial sand mining, mostly cause serious negative impacts on the life of this species (Haslam, 2008).

### ***2.8.2. Health and safety issues***

The digging of land to excavate minerals leaves pits which later become filled with water during the rainy season. This standing water provides a breeding ground for the Anopheles mosquitos that are the vector transmitters for malaria in African countries. Abandoned tailings dams pose a serious environmental problem in SSM, because of the threat of contamination, particularly when located in close proximity to residential areas. In South Africa this problem is very common in the East Rand and West Rand, where shacks are built literally on the tailings dams. Many people in these silica pregnant areas suffer from a condition called silicosis or pneumoconiosis, a lung disease caused by prolonged inhalation of dust containing silica and marked by the development of fibrous tissue in the lungs leading to chronic shortness of breath (Mulaba-Bafubiandi & Mamba, 2009).

The dangerous pits and trenches are normally not filled and these become death traps since vegetation grows over them and they become invisible to people living around that area. Safety is a state of mind in which a person, with reasonable justification, believes and feels secure from any physical harm. It is a situation in which any possibility of harm is negligibly small or literally non-existent. Safety is one aspect of SSM that is neglected by participants in SSM activities. The diggings for the removal of the precious minerals are usually operated without support; people (miners) just crawl in and out of these dangerous excavations characterized by unstable walls, quite often to their detriment. Equipment maintenance is virtually non-existent because of a lack of funds; operators usually work with sub-serviced equipment until such equipment fails beyond repair. By the time the

equipment reaches these levels, many operators could have been maimed or even killed. Abandoned excavations that have been barricaded or closed off often become a serious threat to human and animal life as there is a risk of falling into this excavation or drowning (Mulaba-Bafubiandi & Mamba, 2009).

The most potent health risk in small-scale mining is exposure to mercury, which is used in final stages of gold extraction. Mercury is highly toxic and poses a health hazard to humans and animals through direct exposure or via the food chain. Since galamsey (artisanal) miners employ unsafe methods of gold extraction, such as open burning of amalgam, everyone at the site could be exposed to mercury vapours and mercury in water which is released during washing and panning due to a lack of knowledge concerning the health hazards associated with mercury and an overall absence of environmentally safe technologies and methods for recovering gold. The health authorities consulted linked the increasing number of respiratory diseases in children of the district with the effects of mercury from gold mines (Hilson et al., 2007).

### ***2.8.3. Social impacts***

A wide range of social impacts, such as prostitution and migratory labour at mines in African countries including South Africa, have been identified as factors responsible for the spread of HIV/AIDS. The negative social impact of mining on women has also been identified as a challenge in India. Mining in India has brought about displacement and loss of land. Women displaced as a result of mining lose the ability to cultivate traditional crops due to deforestation and are unable to collect forest produce for sale and consumption (Mulaba-Bafubiandi and Mamba, 2009).

### ***2.8.4. Finance and technical factors***

Finance and technical factors are the factors that inhibit implementation of improved environmental practices in the SSM sector. Firstly, a lack of self-generated funding as well as difficulties in securing credit facilities inhibit miners from implementing sound environmental management options. This acute shortage of finance in turn leads to reliance on cheap, haphazard and environmentally unfriendly operational methods.

Some of the solutions to the financial problems would be the manipulation of market forces to ensure that funding is made available to meet the cost of environmental sustainability. Raising such funds or determining who bears the burden of cost may be addressed through direct taxes or levies to be charged to producers. Investment in SSM should be such that the activity provides assistance to small-scale miners to improve their operations (Aryee et al., 2003).

Many SSM operations do not follow any systematic exploration in areas where SSM takes place. As a result, due to inadequate geological information concerning mineralized areas within their concessions, small-scale miners operate on a trial and error basis, a practice that again impacts negatively on the environment. This problem can be curbed by providing information and educating the small-scale miners. Moral persuasion, which should include using educational, publicity and social pressure, could bring about a positive change in behaviour and major challenge to SSM, especially in South Africa where there is high level of illiteracy. Research on the management and regulation of SSM in particular at Osizweni (Newcastle, Kwazulu Natal) was conducted by Moholo (2001), who reported that the low level of education among small-scale miners is an inhibiting factor in the development of this sector from being a mere survivalist business concern to being an efficiently run business skill and regulation (Aryee et al., 2003).

## **2.9. MINING METHODS AND COMMODITIES IN SSM**

The type of mineral, its particle size, depth below surface and the surrounding geology of the area have a great influence on the choice of mining and extraction methods. Shallow alluvial mining techniques which are called dig and wash are used to mine shallow alluvial deposit usually found in valleys or low lying areas. The SSM activity is predominantly along the Orange River banks, as well as along the west coast of the African continent (Oelofse, 2008).

In the case of gold digging an elementary mining approach is adopted. These deposits have depths of up to three metres. Vegetation is usually cleared and the soil excavated until the gold-rich layer is reached. The mineralized material is removed and processed in small rotary mills, concentrated (using mercury) and then heated using cutting torches or other heating processes to recover the gold. Alternatively, the mineralized material is removed and transported to nearby streams for sluicing to remove gold. It should be noted that in view of the relative ease of reaching these deposits and treating such ores, a significant proportion of the industry operations are of this type of mining. For similar reasons, illegal workings fall predominantly into this category. Areas where this type of practice is very common include Barberton, Giyani, Pilgrims Rest, Welkom, the East Rand and West Rand in Gauteng as well as Klerksdorp in the North West Province (Aryee et al., 2003).

Coal mining requires the disturbances of large areas since surface mining is the predominant practice and this raises a number of environmental challenges such as water pollution. The environmental impacts, especially on water resources, due to poorly managed SSM activities in South Africa have been documented. Acid mine drainage (AMD) is one of the major problems which results from the uncontrolled discharge of contaminated water from abandoned mines. This type of water pollution is characterized by a low pH, high salinity levels, elevated levels of sulphate, iron, manganese and aluminium. Raised levels of heavy metals such as cadmium, cobalt, copper, molybdenum and zinc and possibly radionuclides are characteristic of AMD. Basically, AMD is metal rich water formed from the chemical reaction between water and rocks containing sulphur bearing material. The water runoff is acidic and comes from areas where ore or coal mining activities have exposed rocks containing pyrite. This pyrite reacts with air to form sulphuric acid. The acidic run off dissolves heavy metals such as copper, lead and mercury (Oelofse, 2008).

## 2.10. ILLEGAL MINING

Finally, illegal small-scale miners operating on the concession of large-scale mining companies also cause a significant amount of environmental damage.

For instance, a number of large-scale mining companies, after acquiring prospecting rights, find themselves in an awkward position of not being able to prospect for some time due to financial constraints or other technical hindrance. The concessions are left to the mercy of illegal miners since no security is in place to prevent encroachment. Even mining areas where concessions have been granted and are actively operated by large-scale mining companies and areas not being immediately worked on have been known to be under siege by small-scale miners, including illegal operators (Aryee et al., 2003).

Illegal mining can also be brought about by the unpredictability in the revenues that the small-scale miner earns. Therefore SSMs resorted to illicit mining outside areas set for legal mining. This poses a danger to the environment since miners would mine in places not allocated to them, hence compromising the environment (Aryee et al., 2003).

In the Eastern Cape, sand from the estuaries and coastal lands is a valuable resource. However, with the increase in construction activities for low-cost housing and other building activities, there is a drastic increase in uncontrolled and unauthorized sand mining activities in the rivers, valleys and estuaries. The illegal miners extract sand from the beaches and inland sand dunes or from the river beds, using bull dozers to clear the area and a front-end loader to remove the material and load the sand onto trucks. In the process, important stabilizing riparian and dune vegetation is removed. The illegal miners are also constantly on the move, leaving behind unproductive and un-rehabilitated land.

Although the illegal mining operations appear small and localized, the cumulative impact is significant. The current legal compliance and enforcement mechanisms currently do not deter illegal mining activities as there is a dire lack of financial and human resources to handle the situation. There is an urgent need for the advertising and rollout of the filling of posts to attend to enforcement. The physical presence and visibility of enforcement must be recognized and be an instrument of deterrence, which can only be achieved through increasing capacity. The system is also fraught with legislative and structural challenges such as the role played by many traditional leaders who continue to issue illegal authorizations even after awareness workshops have been conducted by the DMR.

However, EMRI officials are visiting all illegal mining sites that are reported, and are issuing warning and s24G notices.

### 2.11. INTEGRATED MINE CLOSURE PLANNING

The responsibility of the South African Government in relation to mine closure was summarized by Swart, (2003) as follows: the guardian of the environment to act as a responsible mechanism to serve the public and taxpayer's interest to ensure a safe and healthy environment that is not detrimental to the health and well-being of citizen, to promote sustainable development, the final inheritor of the remaining problems and mine legacies and the regulator of the mining industry. Despite these responsibilities there are approximately 6000 abandoned, derelict and ownerless mines in South Africa, including known hazardous sites such as former asbestos sites.

All countries in the eastern and southern regions of Africa require some form of Environmental Impact Assessment (EIA) to be carried out for major projects prior to their commencement. The relevant impacts covered by EIA include any change, potential or actual, to the physical, natural, social, cultural and economic environment resulting from business activity or proposal (Swart, 2003).

South African legislation implies that a large-scale mining operation will have a corporate and legislative obligation to consider local communities and also artisan small-scale mining for their mines, particularly after large-scale mine closure when their EIA processes could usefully integrate and manage the sector. To what extent this happens will depend on the assumptions that large-scale mining practices apply during the mine's life would either enhance or reduce the ease with which artisan small-scale mining can be carried out and also its value as a livelihood. This might provide sufficient scope for large producers to either minimize artisan small-scale mining activity or to enhance the total value of SSM after large scale mining activities when it can form part of an economic diversification strategy that uses the historical resilience and sustainability of SSM as a potential rural livelihood.

The concept of mine closure itself is under examination and indeed mine closure is seemingly a theoretical definition in many regions until a greater economic development

Master's: Azwihangwisi Mulaudzi

opportunity arises for those engaged in SSM activities. There is value in ensuring that the governance obligations for large scale mining companies to directly cater for the known SSM activities that are likely to arise. Such a focus could be directed toward mitigating negative consequences while seeking to maximize the local socio-economic development benefits that SSM can create; all of these can be managed through EIA processes (Marais, 2009).

## 2.12. SOCIO-ECONOMIC ASPECTS RELATED TO MINE CLOSURE

Mine closure can have a severe impact on surrounding communities, as mines generally represent a significant, if not the single significant, local source of employment and other economic activity. Regional mine closure strategies therefore also need to take note of and be integrated with local integrated development plans (IDP), local economic development (LED) initiatives and other local and regional development planning process. This is a major gap and urgent attention needs to be given to the integration of mining and mine closure into these local initiatives. The use of small-scale mining as the initiatives of rehabilitation or mine closure is being used in South Africa to create employment. From a biological viewpoint, mining can have a devastating impact on the environment within which it occurs and on downstream and downwind environment. These need to be addressed in the process of mine closure to ensure that impacts are mitigated to an acceptable level of risk. The determination of this level of risk and of the end-state and land use on current and former mining land cannot be done without the full involvement of all stakeholders, including the industry, the local community, local and regional government and all regulators (Choshi, 2001).

In South Africa with its level of unemployment, it is a major challenge to create an economy and provide jobs for retrenched mine workers, who mostly come from the Eastern Cape as the labour producing areas for mining companies. There is the need for major financial investment and senior management's commitment to company programmes for assisting retrenched miners (Cooke and Limpitlaw, 2003). It is often difficult to identify alternative opportunities for retrenched people in dispersed rural areas. Small-scale mining has been identified as an alternative for the retrenched miners due to the skills that they

have gained while working in the large mines. Many large mining companies are providing financial help for social and economic community projects, but it remains to be seen whether many of these initiatives are sustainable (Choshi, 2001).

### 2.13. CONCLUSION

Successful mining started with prospecting for ores and was the first step in the process of indigenous mining and metallurgy. It was important in producing the critical raw material ores for extractive metallurgy. Depending on the nature of the geology, different methods of mining were used. These include surface collecting, open and underground mining. Indigenous mining and metallurgy in Africa is closely linked to African economic, political and social development. It is also linked to the story of how the continent was linked to other parts of the world such as Europe and Asia from two thousand years ago. The connections between the different parts of the world as we know them today are therefore an age old phenomenon, beginning even before ancient Ghana in West Africa and Mapungubwe in Southern Africa (Shadreck, 2010).

Small-scale mining is an important economic activity for any developing country, South Africa included. However, government support in term of funds, manpower resources and development is a crucial ingredient for the success of this activity. A tripartite strategy of monitoring by government structures, donor bodies and the entrepreneurs in this activity should be encouraged and promoted. Increased attention to skills provision, training, environmental sustainability, occupational health and safety and financial services support will help to ensure the success of SSM wherever this is practiced. This would assist in the reducing the extent to which water resources are polluted.



## CHAPTER 3

### *RESEARCH METHODOLOGY*

#### 3.1 INTRODUCTION

The term “research” reflects a human activity based on intellectual investigation and aimed at discovering, interpreting and revising human knowledge on different aspects of the world. Research can be used as an all-encompassing term that refers to all the measuring instruments, techniques and procedures adopted in a research project in order to collect, analyse and interpret research data, whereby research findings can be deduced (Maree, 2007). According to Denzin (2000), research is a systematic examination intended to discover new information and to expand or verify existing knowledge in an attempt to solve a problem. The researcher uncovers facts and then formulates a generalisation based on the interpretation of those facts.

This chapter seeks to explain the research design and methodology to be employed in conducting the study. The subsequent sections within this chapter will further discuss research design and methodology, the settling of the study, the data collection process as well as the ethical considerations.

The main purpose of the study is to examine the impact of small-scale mining on socio-economic and environmental factors in the Sarah Baartman District Municipality in the Eastern Cape. The research focus is on the implementation and effectiveness of SSM legislations in the area.

#### 3.2 RESEARCH DESIGN AND METHODOLOGY

A research design is a plan that indicates how the researcher intends to investigate the research problem (Denzin and Lincoln, 2003). The design also refers to the procedures and methods of collecting the information needed during research. Its function is to ensure that evidence is obtained which will be instrumental in answering the research question as unambiguously and accurately as possible (De Vaus, 2001). What follows below is an

explanation of the research design used in this study. For the purposes of this study the qualitative research approach is employed.

### 3.3 QUALITATIVE RESEARCH

The qualitative research method has been identified as the appropriate method for conducting this study. The term 'qualitative research' refers, in the broadest sense, to research that is descriptive in the nature and it is often preferred in the human sciences (Frankel and Wallen, 1990). Creswell (2003) states that the qualitative approach is one in which the inquirer often makes knowledge claims based on constructivist perspectives (i.e. the multiple meanings of individual experiences, meanings socially and historically constructed, with the aim of developing a theory or pattern). Creswell further affirms that the researcher seeks to understand the context or setting of participants through visiting this context and gathering information personally. In respect of general aims, qualitative research examines various social and cultural settings as well as individuals who dwell in these settings, thereby learning about their experiences, beliefs, properties, values, needs or characteristics as well as understanding in depth their 'behaviours' (Du Plooy, 2001).

Henning (2004) states that the qualitative research wants to discover how human interactions take place, and why these interactions happen in the manner in which they do in certain situations. She further argues that the researcher examines the qualities, characteristics, or properties of a phenomenon in order to grasp, comprehend and explain their world. Leedy and Ormond (2005) argue that the qualitative researcher seeks an in-depth understanding of phenomena as they occur naturally and that no attempt is made to manipulate the situation.

To obtain an in-depth understanding of the experiences of people, one needs to adopt a qualitative approach to research, which will assist the researcher to report on the findings. The intention is to understand the views of participants on a specific phenomenon and, as such, the phenomenon can be understood from the perspective of participants (Creswell and Plano Clark, 2007).

The data collection tools/techniques and instruments used in this study are mainly observation, questionnaire, document analysis and interviews. These tools are described below in detail. Frankel and Wallen (1990) state that “qualitative data are collected in the form of words or pictures rather than numbers.” This quotation confirms the fact that qualitative research produces descriptive data i.e. reflecting people’s own written or spoken and observable behaviour. Qualitative researchers develop concepts, insight and understanding from patterns in the data, rather than collecting data to assess preconceived models and theories. The process of qualitative research is largely inductive, with the inquirer generating meaning from the data collected in the field (Creswell, 2003).

According to Hughes (2006), the main reason for choosing qualitative research is that in qualitative research events can only be understood adequately if they are seen in context. When the researcher starts conducting the research, he or she must be part of the subjects being researched and therefore numbers cannot assist in understanding the problem under investigation. Hughes (2006) believes that qualitative researchers want those who are being studied to speak for themselves and express their perspectives in words and other actions. Consequently, the researcher is able to ask more probing questions as and when the need arises instead of coming back for more explanations on issues raised. Qualitative research also introduces new views regarding the subject and does not just legitimize pre-conceived attitudes.

### **3.3.1 The inductive approach**

Since qualitative research is exploratory in nature, it seeks to understand and zoom in on the quality of social life and thereby builds theory from the ground up (Leedy and Ormond, 2005). The inductive approach commences with the gathering of data without preconceived notions, from which themes or categories emerge and are identified (Struwig and Stead, 2001). This implies that the raw data that have been gathered from the field must be inductively analysed. The researcher thus makes sense of the data gathered by inductively examining them (Struwig and Stead, 2001)

### 3.4 SAMPLING

The researcher used purposive sampling. De Vos et al., (2005) define purposive sampling as “a sample, purposefully selected by the researcher and made up of those elements that are most representative of the population, is readily available for research”. The reason for choosing purposive sampling is that the researcher is interested in a specific group or individuals that are directly involved in small-scale mining. People who are not involved in the SSM are not deemed suitable for this sampling. Through the use of purposive sampling the study gathered information from the right people with experience of the matter at hand.

Data were gathered through interviews from key informants from a section of the Department of Mineral Resources, Mine Environmental Management head of section and Social and Labour Plan section. Two officials from each section were interviewed. Interviews were also conducted with an official from the Sarah Baartman District Municipality’s local economic section as well as other key informants.

Due to the size of the study, resulting in a treatise which forms part of a broader Master degree, only two mining companies were sampled: one illegal and legal operator. In order to identify the legal mining company, a list of mining companies were sourced from the Department of Mineral Resources. Another criterion which was used during sampling, was the mineral mined, in this case, sand. A representative from each of the mining companies selected were interviewed.

In total, 17 people were interviewed, including community members affected by both the legal and illegal mining, as well as a local government councillor.

### 3.5 DATA COLLECTION

The study requires hybrid data consisting of interviews and a case study in order to give a balanced view of the evidence (Mouton, 2001). Semi-structured face-to-face interviews is used to record more than the verbal responses of interviewees, which are often superficial. This is because when people communicate directly with each other more information is communicated between them. The communication is not only confined to verbal

expressions. The researcher can also read the nature of words spoken as well as the facial expressions and body language of interviewees, all of which communicate what they mean.

Open-ended questionnaires were used for conducting the face-to-face interviews. Since open-ended questions are less structured, they encourage the participants to express themselves freely without restraining themselves to any fixed responses. Moreover, the researcher was able to get more information from respondents by making allowance for follow-up questions. Additionally open-ended questions deepen the understanding of certain variables which are under investigation.

### **3.5.1 METHODS OF DATA COLLECTION**

Data present a collection of facts assembled for a particular purpose (Denzin, 2000). Maree (2007) states that data can be obtained by making use of a questionnaire, by personal interviewing, observation of events as they happen, abstraction where the sources of information are documents and postal questionnaires if the targeted geographical area or number of respondents is large. For the purpose of this research, the data collection tools/techniques and instruments that were used were the following:

#### ***Questionnaire***

Strydom et al. (2005) define a questionnaire as a set of questions on a form that is completed by the respondent in respect of a research project. Babbie and Mouton (2001) mention that although the term 'questionnaire' suggests a collection of questions, a typical questionnaire will probably contain as many statements as questions, especially if the researcher is interested in determining the extent to which respondent holds a particular perspective. Strydom et al. (2005) further affirm that the basic object of a questionnaire is to obtain facts and opinions about a phenomenon from people who are informed on the particular issue. In this study, the main reason for using a questionnaire was to ascertain the residents' perspective on the impact of SSM including the legal and illegal socio-economic and environmental impact of SSM. Careful consideration was given to the structure and design of the questionnaire to ensure that accurate and desired information was obtained. The questionnaire incorporated the issues of participant anonymity and confidentiality.

According to Maree (2007), in scientific research personal beliefs and conditions should not be used to favour certain desired outcomes as this constitutes bias. Personal perceptions should never influence research outcomes. Questions should therefore be constructed in such a manner that they do not intentionally or unintentionally lead to bias. Respondents should be given enough room to exercise their own judgment. Failure to accomplish this may lead to distorted data and results.

Open-ended questionnaires were used for conducting the face-to-face interviews. Since open-ended questions are less structured, they encourage the participants to express themselves freely without restraining themselves to any fixed responses. Moreover, the researcher is able to get more information from respondents by making allowance for follow-up questions. Additionally, open-ended questions deepen the understanding of certain variables that are under investigation. In this study, open ended questions enabled respondents, who represent the communities in and around Sarah Baartman District Municipality, to provide information on the phenomenon.

### ***Observation***

The researcher also used observation as a means of collecting data in this study area. An arrangement was made with the Head of Mine Environmental Management section in the Department of Mineral Resources in the Eastern Cape for the researcher to join them during their routine inspections; the researcher was just there to observe the activities. The observation form was also used to collect information on all the activities that were observed and photographs were taken to record all activities observed. Both illegal and legal mining activities were observed by the researcher.

### ***Interviews***

Allison et al. (1996) claim that an interview is a good way to gain insight into the meanings interpretation, values and experience of the interviewee and his or her world. Gubrium and Holstein (1999) also declare that interviews are dynamic conversation where meanings are "cooperatively built up" by both interviewees and interviewers, conveyed by the interviewees and received, interpreted and recorded by the interviewers. Individual face-to-

face structure interviews were conducted in this study. For the purpose of this investigation, the sequence of the interview questions was determined in advance. The aim of the interviews was to obtain information from the legal and illegal miners and the community with regard to the impacts of SSM.

The researcher interviewed the Head of Mine Environmental Section in the Eastern Cape and the Head of Social Labour Plan in the Department of Mineral Resources. The researcher also consulted existing documents on SSM policies and the legislation in order to evaluate the extent to which these had been implemented. Such documents included the MPRDA, NEMA, NWA, Journal articles, online publication, research reports and photographs,

### 3.6 ETHICAL CONSIDERATIONS

Prior to the commencement of the study, all participants were provided with an information sheet (invitation to participate) about the study and the consent forms to sign. According to Gravetter and Forzano (2003), the point of informed consent is that human participants should be given complete information about the research and their role in it. Babbie (2007) indicates that a basic rule in social research is that participation should be voluntary. Participation in the study was voluntary and it was explained that refusal to participate would not hold any negative consequences. The researcher made an effort to convince potential respondents who were reluctant to participate. The researcher also sought to illustrate how the participants, as residents of Sarah Baartman District Municipality, would benefit from the study. Subsequent to respondents consenting to participate in the study, interviews were conducted in a private and safe place in order to allow participants to freely express themselves. Confidentiality was emphasised and participants were given an opportunity to ask question and receive clarity where necessary. Babbie (2007) explains that social researchers have many ways to guard against harming people and need to be careful to respect the privacy of the participants.

Interviews were conducted over a two-week period in August 2016 with each interview taking an estimated 20 minutes. Due consideration was given to the timing of the

interviews by looking at the daily schedule, seasonal activities and work habits of the respondents.

Before commencing with the interviews the researcher introduced himself to the participants stating the aim of the study, what he anticipated the outcomes of the study would be and how the data would be used. Participants were also told that there would be no financial benefits from participating in the study.

### **3.7 CONCLUSION**

This chapter discussed the research procedures that were employed in conducting this study. The chosen research method was the qualitative approach. Data were collected through observation, questionnaires, interviews and relevant literature. The following chapter will present the analysis and interpretation of the research results.



## CHAPTER 4

### *RESEARCH FINDINGS*

#### 4.1 INTRODUCTION

This chapter presents the research findings of the study of the socio-economic and environmental impact of small-scale mining in the Sarah Baartman District Municipality. It will provide a qualitative interpretation of the results based on the interviews that were carried out with key representatives from the Department of Mineral Resources, municipal officials, local government councillors, illegal and legal mine operators and community members.

#### 4.2 RESEARCH FINDINGS

This section deals with the interpretation of the research findings. It is divided into two sections: (a) results from the questionnaires that were administered and interviews undertaken and (b) observations.

### **PARTICIPANT PROFILE**

This sub-section provides an overview of the sample which was used in the study. The sample consisted of 17 participants as illustrated in the Table 1 below.

**Table 1: An overview of participants**

<b>TYPE OF RESPONDENT</b>	<b>WORKPLACE</b>	<b>TOOLS</b>	<b>NUMBER</b>
Mine Environmental Management: Manager	Department of Mineral Resources	Interviews	1
Social and Labour Plan: Manager	Department of Mineral Resources	Interviews	1
Economic Development: Manager (LED)	Sarah Baartman District Municipality	Interviews	1
Legal Mine Operator (SSM)	Humansdorp	Interviews	1
Illegal Mine Operator (SSM)	Paterson Community	Interviews	1

Master's: Azwihangwisi Mulaudzi

Ward Councillor	Paterson Community	Interviews	1
Ward Councillor	Humansdorp Community	Interviews	1
Five Community members	Paterson Community	Interviews	5
Five Community members	Humansdorp Community	Interviews	5

Table 2 below indicates the age, marital status, highest educational qualification achieved and employment status by economic sector of the respondents.

**Table 2: Demographic Information**

DEMOGRAPHIC INFORMATION	
<b>Age</b>	
Range	20 to 60 years
Average Participants age	44.9 years
Male average age	47.8 years
Female average age	41.9 years
<b>Marital status</b>	
Married	7 participants
Single	10 participants
Divorced	0 participants
<b>Highest educational level achieved</b>	
No Matric	6 participants
Matric	7 participants
Tertiary education	4 participants
<b>Employment status by sector</b>	
Public	6 participants
Private	3 participants
Not employed	8 participants

The above table shows that the average male and female ages were 48 years and 42 years respectively. More than half (59%) of participants were single compared to only 41% who

were married. Approximately 35% of respondents had no grade 12 and 41% had grade 12 and the remaining 24% had a tertiary education. Six of the total of 17 respondents were from the public sector, while three were from private sector and eight were unemployed.

## **KNOWLEDGE OF SMALL-SCALE MINING REGULATIONS**

The results indicate that female and male participants showed the same understanding and knowledge of small-scale mining (SSM) regulations. However the understanding of participants who had a post-matric or tertiary qualification is very high compared to those who do not have a post-matric qualification. This could indicate that a possibility exists that the subject of mining could be too technical or that information on SSM is not available to the broader public, including local participants in SSM activities and municipal councillors.

Despite the different experience and knowledge of respondents regarding small-scale mining, each respondent was asked to define small-scale mining according to their understanding of it. The Mine Environmental Management division of the Department of Mineral Resources (DMR) understand the correct definition of small-scale mining and all the requirements thereof. As a key informant, the head of this division who is the regulator also properly understands all the attributes of illegal and legal operations.

## **MINING APPLICATIONS**

The responding DMR officials indicated that on average 130 mining rights and mining permit applications were received per annum in the Eastern Cape, with few of these for the Sarah Baartman District Municipality. The respondents also indicated that in recent years there has been decline in the number of applications.

This decline and the low number of applications submitted to legalize mining activities have been attributed to a number of reasons, including funding. Banks are not willing to fund such projects without a full business plan. The result is that the small-scale miner becomes trapped in a vicious circle, where the legislative requirements far exceed the small-scale miner's financial strength and available funding, or the technical expertise that the small-scale miner can obtain for the authorization of their mining activities. The end result is that the small-scale miner resorts to illegal mining activities. Unaffordable

technical expertise is another contributing factor. It is clear that since the implementation of the National Environmental Management Act (NEMA), the number of applications lodged with the DMR has dropped significantly, and this is due to the requirement for the application to be submitted by an independent Environmental Assessment Practitioner (EAP). The statistic in terms of number of application is shown on the Table 3.

**Table 3: Number of Mining Applications received in 2014 per Province**

<b>Eastern Cape</b>	<b>Mpumalanga</b>	<b>Gauteng</b>
148	1431	219

*Source: DMR Annual Report*

The consequence of the NEMA requirement is high consultations fees, which escalate substantially with the requirement to submit the Basic Assessment Report (BAR) or alternatively a full Environmental Impact Assessment report (EIA). The effect of the implementation of NEMA is that the small-scale miner is forced to comply with the same standard as the multinational businesses, both are required to submit the same types of environmental reports when submitting to environmental authorization (EA) applications. Taking into account the application fees alone, EA applications that trigger Listing Notice 1 require a Basic Assessment Report with an accompanying application fee of R2000.00 (two thousand rand). A Basic Assessment Report is triggered by activities with less significant impact on the environment.

The Listing Notice 2 is applicable to activities with a more significant impact on the environment. For activities triggering Listing Notice 2, a full EIA and Environmental Management Programme will be required with an associated fee of R10 000 (ten thousand rand) and should a Waste License be required this fee is R3000.00 (three thousand rand).

The process of the EA application is simultaneously lodged on the South African Mineral Administration System (SAMRAD) system together with the Mining Permit application (fee of one hundred rand) or Mining Right application (fee of one thousand rand). The SAMRAD is the online system that is currently being used to lodge the application to DMR. The Mining Permit is applied for when the mining area in question does not exceed

five hectares in extent and the permit is issued for two years, and may be renewed for three periods each of which may not exceed one year. The Mining Right is applicable in any large area exceeding five hectares and is valid for period specified in the right, which period may not exceed 30 years and may be renewed for further periods, each of which may not exceed 30 years at a time. A Mining Right application must be accompanied by a social and labour plan (SLP).

**Table 4: Differences between a Mining Permit and a Mining Right**

<b>Mining Permit</b>	<b>Mining right</b>
No Social Labour Plan	Social Labour Plan is required
Five hectares or less	More than five hectares
Application fees R100 in terms of MPRDA	Application fees R1000 in terms of MPRDA
Application fees R2000 in terms of NEMA	Application fees R10,000 in terms of NEMA
Validity period two years and renewable for one year three times	Validity period 30 years and renewable for further periods for 30 years

**Table 5: Mining Rights and Mining Permit applications in Eastern Cape prior and post NEMA**

Pre NEMA (for period: 08/12/2013-07/12/14)	After NEMA (for period: 08/12/2014-07/12/2015)
148	49

*Source: DMR SAMRAD System*

The outcome of the implementation of NEMA was that fewer EA and Mining Permit applications were submitted, which leads to the increase in illegal mining activities. Another limitation was the timeframes. Should the SSM lodge an application for a mining permit and the accompanying environmental authorization application, the authorization process takes six months or less to process. The mining permit is awarded to the applicant for a period of two years, and is then renewable for a period of three years, on an annual basis. The renewal of the mining permit is not confirmed until such time as the performance assessment report (PAR) and the upgrade of financial provision (FP) has been submitted to ensure compliance with the BAR and Environmental Management Plan, only

Master's: Azwihangwisi Mulaudzi

an environmental assessment practitioner may compile the PAR at a high cost to the SSM before renewal will be considered. In addition, as the NEMA legislation currently stands, should the SSM want to conduct any primary processing on the site, such as sieving, sorting, crushing, and so forth, the SSM must apply for a full Scoping and EIA, and the timeframe for processing this application increases to 12 months. The NEMA approach of 'one size fits all' in terms of entry/application requirements automatically deters SSM from applying for a mining permit with the result that they move on to illegal mining.

Once the application is accepted, the SSM is required to submit a BAR which details the measures that will be implemented to ensure that the area is rehabilitated after mining has ceased and that no liabilities will be left for Government to clean up and that the proposed mining concern does not add to the list of abandoned mines. This BAR must include comprehensive consultation with all interested and affected parties. If it is deemed that all requirements are met by the applicant (SSM), then the applicant must still submit the required financial provision for rehabilitation (FP). It has been found that this process is a significantly lengthy process for an ordinary SSM and by the time the authorization is due to be issued, the SSM could have already mined and moved on.

In the regions that are richly endowed with precious mineral deposits such as diamonds, gold, platinum and so forth, these regions have to deal with the zama-zamas. Zama zamas are people or miners that go to existing or abandoned mines and access their shafts to mine the pillars or the left-overs underground. Sometimes they can stay for months underground mining illegally.

This study found that the negative impact of illegal mining in the Sarah Baartman District Municipality is mainly on the environment. However, in the Eastern Cape, most of the SSMs mine sand and this mainly occurs within the river floodplain, riverbanks or the coastal dune systems causing problems related to abandoned mines and dangerous pits, destroying indigenous vegetation, destroying river banks and riparian vegetation, and polluting water downstream of the mine area.

In addition to the environmental concerns that result from illegal mining, the interviews with the DMR officials indicated that the department suffers from a lack of capacity to

monitor both the legal and illegal mining activities. The Eastern Cape office simply does not have the capacity to deal with the monitoring and enforcement issues with the current staff quota, taking into account the vast spatial extent of the province and the long distances that need to be travelled to access the illegal mining sites once a tip-off is received. Recently, the Enforcement Section of the DMR was launched. However, presently, this section is not capacitated to handle illegal mining activities, particularly those that are spiralling out of control in the Sarah Baartman District Municipality. It was also indicated that the current punitive measures for non-compliance are not effective in controlling illegal mining. There is evidence that once DMR officials have instructed the SSM to cease all illegal mining activities, this instruction is obeyed only as long as the officials are in the area. As soon as the officials have moved on to the next town, the illegal mining activities either re-commence, or the SSM starts mining activities at a new site, leaving the old site abandoned or un-rehabilitated.

The respondents working at the Social and Labour Plan (SLP) division of the DMR understand the plight of the small-scale miner and explained that the SLP document is not relevant or applicable to SSM or the mining permit application. The SLP is a pre-requisite for the granting of mining right to develop and implement comprehensive human resources development programmes, a mine community development plan, housing and living conditions plan, employment equity plan, and processes to save jobs and manage downscaling and/or closure. It was also explained that while the SLP is viewed as the tool for transformation in the mining sector, it is applicable for mining rights holders only. The official from the DMR also mentioned that due to fewer mining right applications in the district in recent years, there are minimal noticeable contributions to socio-economic development of the Sarah Baartman District Municipality, which can be attributed to mining. Most applications received are for mining permits because most SSM opt for a shorter and easier process. The only noticeable contribution made by both legal and illegal SSM is a limited number of people who are employed to fill the trucks with sand through manual labour.

## **ILLEGAL MINING AT PATERSON**

None of the respondents in Paterson had an understanding of the legislative requirements that must be met by SSM. It was evident that the community was not aware of which government department is responsible for issuing the SSM permit, nor the process that must be followed in order to be granted a mining permit and EA. Members of the community also indicated that they do not and have not participated in any consultative process with respect to the illegal activities in the area. They also indicated that they have no role in the process and they just see trucks filled with sand coming and going. Community respondents indicated that the operation operated on a 24 hour basis and caused a lot of noise. Community members also reported that they were reluctant to report illegal mining activities due to intimidation. While the resulting environmental degradation is evident, the illegal mining activity has created secondary business opportunities through the establishment of brick making concerns (although the sand is sourced illegally), and convenience and cost-saving to the local community in that most of the sand is also sold to members of the community for domestic use, such as the building of houses. A few jobs, mainly for men, were also created through the mining activity.

They also indicated that the mining legislation and the municipal by-laws are not effective in curbing or eliminating the illegal mining activities. The respondent indicated that the co-operative governance between organs of state such as DMR, DEA, DWS and local government (municipality) is failing the community by not working together to advance the interests of the communities.

Respondents working as illegal miners indicated that most of the illegal mining operators are not aware of the cost of the mining permit or mining authorization applications, nor the process that must be followed. However, the SSM are aware that the mining activities that they are undertaking are illegal and know the consequences thereof. Some of the owners of the illegal mining operations are not South African, but the researcher could not establish whether they were legally in the country.



**Photograph 1: illegal mining**



**Photograph 2: illegal mining**



**Master's: Azwihangwisi Mulaudzi**

**Photograph 3: illegal mining**



**Photograph 4: illegal mining**



**Master's: Azwihangwisi Mulaudzi**

**Photograph 5: illegal mining**



**Photograph 6: illegal mining**



**Photograph 7: illegal mining**



The illegal mining site covered an area of approximately four and half hectares. It was also found that the activities were not properly managed, with mining conducted haphazardly over the mine area with no mine plan or rehabilitation plan being executed. The mine area was also not properly demarcated nor was it fenced. The illegal mining site was closed to the community, approximately 600 meters from the community and the railway tracks. The above photographs were taken at this illegal mining activity.

### **LEGAL MINING AT HUMANSDORP COMMUNITY**

The mining activity on this five hectare area is legal and mining permit holders operate within the ambit of the relevant legislation (MPRDA (28 of 2002) and the NEMA EIA (2014) Regulations. Concurrent rehabilitation was taking place. The stockpile of topsoil for back filling and dispersion for seeding had been properly stored and in accordance with the approved environmental management plan. The approved mining permit was also on site with all other required authorisation in terms of other relevant legislation. The mine manager indicated that the appointment of an EAP in terms of the NEMA process was very

costly. During observation it was also found that the mining equipment and the mining area were very neat, with good housekeeping on site. The mine area was demarcated properly and fenced off accordingly. The closest community was around one kilometre from the operation. The mine area is 600 meters from the Kromme River which is acceptable in terms of the 100 meters flood line regulations. The photographs below are from this legal SSM operation in Humansdorp.

**Photograph 8: legal mining**



Photograph 9: legal mining



Photograph 10: legal mining



Photograph 11: legal mining



Photograph 12: legal mining



Master's: Azwihangwisi Mulaudzi

The Humansdorp municipal councillor interviewed was knowledgeable about the process that needed to be followed to authorized mining activities. Although the SSM activity in the Humansdorp area is legal, most respondents indicated that consultation is not properly conducted with respect to the community public participation process. This was confirmed by a variety of members of the community. Very little information was provided to the community members with respect to the SSM activities.

All material produced from this mine was sold to the municipality for their road construction projects in the area. The local employees included one security guard, one truck driver and one machine operator. There were a few other visible economic spin offs, such as women selling food to the workers employed by both the mine and the construction company.

## **OTHER FINDINGS**

The findings of the study indicated that government must develop policies that are specifically designed for SSM since the 'one size fits all' formula is not working and is not encouraging the SSM to apply for the authorization of their mining activities. The SSM indicated that, due to the lack of funding, they are unable to compete with larger multinational companies such as Larfage Pty Ltd and Pretoria Portland Cement (PPC) that have a significant amount of financial resources at their disposal.

All 17 participants in the study agreed that the DMR and the Sarah Baartman District Municipality are not well resourced and therefore need to be capacitated to deal with both the legal mining concerns as well as the illegal mining activities undertaken, and must ensure that compliance and enforcement are undertaken. In addition, the division that deals with the processing of the applications and educating the community about the mining application process must also be capacitated.

The research also shows that the SSMs have the capacity to create jobs in the Sarah Baartman District Municipality if the SSM concerns are legalised, properly managed and comply with the relevant legislation in terms of compliance. This can have a positive impact on socio-economic development of the area, as for example in Humansdorp where jobs are created and the products mined are used locally for infrastructure development

*Master's: Azwihangwisi Mulaudzi*



### 4.3 CONCLUSION

Sarah Baartman District Municipality is a predominately rural area and as such it needs more economic activity to uplift the community through development. Small-scale mining can form part of this much needed economic activity. Since employment opportunities are scarce, any initiatives that will create employment, even if this is of a short-term duration, are eagerly sought out by the unemployed. The research indicated that the role of legal SSM in developing and promoting Sarah Baartman District Municipality was highly appreciated by those in the municipality.

This chapter has presented the results of the study. It has also covered the views and the perceptions of the respondents regarding the socio-economic and environmental impact of SSM in the Sarah Baartman District Municipality. The next chapter will focus on the general conclusion of the study and recommendations.

## CHAPTER 5

### RECOMMENDATIONS AND CONCLUSIONS

#### 5.1 INTRODUCTION

The study sought to assess on a limited scale the socio-economic and environmental impact of small-scale sand mining in the Sarah Baartman District Municipality. This chapter lists recommendations based on findings.

#### 5.2 RECOMMENDATIONS

In the light of the findings derived from the study, the research makes the following recommendations.

##### **Small-scale Mining Legislation**

The small-scale mining industry is grossly under-serviced by the DMR and it is not well defined in South African mining legislation, raising a need for this subsection of the industry to be better defined in policy and legislation. A first step would be for government to develop, through consultation with all key stakeholders, a strategic framework to not only define the SSM sector but also to assist in development of the sector.

A second step would be to address the unique needs of the SSM sector in both the MPRDA and the NEMA. It is recommended that amendments to NEMA be done to address the unaffordability of the application fees and the strict rules that demand that the environmental application be compiled by an EAP. The prioritizing of the framework and amendment of the legislation will unlock the potential and market of the SSM sector.

##### **Access to funding and technical support**

Lack of funding and credit is one of the major challenges faced by local SSM in Sarah Baartman District Municipality and across the many localities. It is recommended that the sector should be provided with financial and technical assistance by government. Access to funding for the SSM sector will make it possible for this sector to reach its full potential,

*Master's: Azwihangwisi Mulaudzi*

and contribute to the reduction of unemployment and the alleviation of poverty within the country. It is also recommended that funding state-owned entities (SOEs) such as the Industrial Development Cooperation (IDC) and others, be given a mandate to fund SSM operations. Assistance to funding will allow more SSMs to apply for mining permits and to mine legally, while at the same time encourage health, safety and environmental compliance in the sector.

While funding is important to improve the sector's compliance to legislation, technical support is just as important. It is recommended that SSMs be assisted by the Mine Health and Safety Council to comply with the Mine Health and Safety Act (Act 29 of 1996) to not only improve their health and safety standards within the mine, but also to minimise the dangers to areas outside the immediate environs of the mine site, for example noise pollution.

### **Monitoring and Compliance**

Currently there is a lack of manpower to monitor and enforce mining legislation, especially for small-scale mining. It is thus recommended that the DMR fast track the implementation of its proposed new Compliance and Enforcement division, and that a sufficient number of officials will be employed to monitor both legal and illegal mining activities. This could assist in putting a stop to illegal activities in the Eastern Cape and Sarah Baartman District Municipality. It is also recommended that Sarah Baartman District Municipality be capacitated with knowledge and manpower to be involved in the monitoring. The municipality's involvement is critical as it holds benefits should the SSM sector comply with regulations and also when jobs and other economic opportunities result from the mining activities. The involvement of municipality should include the relevant training for all involved in the SSM sector, including municipality, DMR, DEAT and DWS officials.

### **Legalising illegal mining**

Small-scale mining activities in the Sarah Baartman District have a significant potential to contribute towards sustained local economic development and assist in poverty alleviation. This was clear from the research that found that both legal and illegal SSM activities

generate income for the broader community, but that legal SSM is able to contribute in a more sustainable manner. Based on this, it is recommended that the DMR develop a strategy to legalise illegal mining activities, while also developing a legislative environment that is conducive to SSM sector development, including relevant skills within the sector to allow for it to grow and have the possibility to explore global markets.

### **Cooperative governance**

As indicated above it is recommended that DMR finds ways to collaborate with other departments to maximize efficiency in the process of legalising this sector as well as the monitoring of compliance. In doing so, it might want to establish a mining forum together with relevant provincial and local government to deal with all mining issues in the Eastern Cape, and to establish a framework through which SSM can be a significant actor in a fight against the province's unemployment and poverty scourges.

There is also a need to raise public awareness, and a public outreach programme, implemented by both the DMR and the local and district municipalities, should be established. It is further recommended that regular information sharing workshops are conducted with the community to educate them about mining and the process and legislation involved. These workshops should also aim to enhance public participation on the matter of small-scale mining. Besides the fact that this is a constitutional and legislative requirement, it is also one of the important principles of good corporate governance.

### **5.3. CONCLUSION**

The South African mining legislation and policy does not support the small-scale mining sector, and while these documents refer to poverty alleviation, they are not effective in achieving this aim due to their inability to lure illegal miners into the legal realm and harvesting the vast potential for sustained local economy development and poverty alleviation that resides in this sector.

The above recommendations recognise that the SSM sector has a vital role to play as a tool to promote economic development and poverty alleviation in the Sarah Baartman District

in the Eastern Cape and in the country as a whole, but that some strategic and urgent actions need to be taken to enhance and harvest this potential.

## REFERENCES

- Alistar C, and Peter M, (2004), Environmentally Responsible Mining (water management for small scale mining), Water Research Commission, Pretoria.
- Allison, B., O'sullivan, T., Owen, A., Rice, J, Rothwell, A. and Saunders, C. (1996). Research Skills for Students. London: Kogan Page.
- Anger, E.D, Komerlik, J.R, Smith B.F and Smith J.R (1986), Environmental Science: the study of interrelationship WMC, and Brown Dubuque.
- Anon (2001) Statistics profile of minerals, Indian Bureau of Mines, Nagpur, India.
- Antoine F, Bhekie B, (2009) Investigation into the relative impact of small scale mining operations on contamination of water resources, Water Research Commission, Pretoria.
- Aryee BNA, Ntibery BK and Evans Atorkui, Journal of Cleaner Production, Volume 11, Issue 2, (March 2003), page 131-140. *Trends in the Small-scale mining of minerals in Ghana: A perspective on its environmental impacts.*
- Awudi G (2002) The Role of foreign direct investment in the mining sector of Ghana and the environment, Accra Ghana.
- Babbie E (2007). The Practice of Social Research. South Africa, Cape Town: Oxford University Press
- Banister S, Heath R, Moffett M, (2004) Water related impacts of Small Scale Mining, Water Research Commission, and Pretoria.
- Blignaut P.E, Fatti, L.P, Rabie, M.A., (1994). Mountains. In: Fuggle, R.F. & M.A. Rabie (eds). Environmental Management in South Africa. South Africa: Juta.
- Chakraborty M.K, (2002). Issues and problems of Indian Small-scale Mines, national seminar on policies statutes and legislation CMRI, Dhanbad, India.
- Chaloping M.M, (2008). Towards Sustainability of household well-being: Labor Allocation Between gold panning, unpublished, Philippines, Baguio.
- Choshi, S (2001) Mining and society-Local Development, MMSD SA regional research, Africa Institute of Corporate Citizen, Johannesburg.

- Creswell J.W. (2003) *Research Design: Qualitative, Quantitative and Mixed Methods Approaches*. 2<sup>nd</sup> edition. London: Sage Publications.
- Creswell, J.W. and Plano Clark, V.L. (2007). *Designing and conducting Mixed Methods Research*. Thousand Oaks: Sage.
- Cooke, J.A. and Limpit law, D. (2003) *Post mining regeneration. Review of good practice in South Africa*.
- Denzin N.K, (2000) *Handbook of Qualitative Research*. Thousand Oaks: Sage publications.
- Denzin N.K. and Lincoln Y.S. (2003). *The Landscape of Qualitative Research: Theories and issues*. Thousand Oaks: Sage.
- De Vaus D. (2001) *Research Design in Social Research*. London: Sage.
- De Vos, A.S, Strydom H, Fouche C.B. and Delport C.S.L (2005). *Research at Grass Roots for the Social sciences and human science professions*. 2<sup>nd</sup> ed. Pretoria: Van Schaik.
- Dondeyne, S. and Ndunguru E (2014). *Artisanal gold mining and rural development policies in Mozambique: perspective for the future*.
- Du Plooy, G.M. (2001) *Communication Research: Techniques, Methods and Applications*. Lansdowne:Juta.
- Fraenkel J. R and Wallen N.E. (1990) *How to Design and Evaluate Research in Education*. New York: Mc Graw-Hill.
- Ghose M.K and Sen P.K (2001) *Characteristics of iron ore tailings slimes in India*.
- Gravetter, F.J & Forzano L. B, (2003) *Research Methods for the Behavioral Science*. 3<sup>rd</sup> ed. Belmont, Ca.:Wadsworth/Thomson Learning.
- Leedy, P.D. and Ormrod, J.E. (2005) *Practical Research: Planning and Design*. 8<sup>th</sup> edition New Jersey: Pearson Merrill Prentice Hall.
- Likens G. E, (2010), *River Ecosystem Ecology*, Academic Press, USA.
- Easton J, Howie D, Pulles W, Otto D, (1995) *Manual on mine water treatment and management in South Africa*, Water Research Commission, Pretoria.
- Haslam S.M, (2008), *the riverscape and the river*, Cambridge, UK.
- Henning E, (2004). *Finding your way in Qualitative Research*. Pretoria:Van Schaik.

Hill L, & Kleynhans, C.J, March (1999), Preliminary Guidance document For Authorisation and Licensing of Sand mining/ Gravel extraction in terms of impacts on instream and Riparian Habitats. <http://www-dwaf.pwv.gov.za/iwqs/water law/discuss/sand/sand fin.htm>

Hilson G, (2011) Artisanal Mining, smallholder farming and livelihood diversification in rural sub-Saharan Africa.

Hilson G, (2010) Once a miner, always a miner: poverty and livelihood diversification in Akwatia, Ghana.

Hilson G (2006) Abatement of mercury pollution in the small scale gold mining industry: Restructuring the policy and research agenda.

Hilson G and Potter C, (2005) Structural adjustment and subsistence industry: artisanal gold mining in Ghana

Hilson G and Potter C, (2003) Why is illegal gold mining activity to ubiquitous throughout rural Ghana: Africa documentation review.

Howard M, Pulles W, Heath R, (1996), Manual to assess and manage the impact of Gold Mining Operations on the Surface Water Environment, Water Research Commission, Pretoria.

Hughes C.L. (2006). Qualitative and Quantitative Approaches to Social Research. United Kingdom: Department of Sociology, University of Warwick, Coventry.

Kambani S, (2000) Policy and Strategy options for SSM development in Zambia: Minerals and Energy raw material report.

Karen J. E, Shirley M. P, Charl de Villiers (2014), Fynbos Ecology and Management, BRIZA, Pretoria.

Kharivhe A.K. (2002), the study of human activities and their impacts along the riparian Zones of Mutshindudzi and Mazhou River, Limpopo Province unpublished report.

Maponga O and Ngorima C.F, (2003) Overcoming environmental problems in the gold panning sector through legislation and education: Zimbabwe experience.

Marais H, (1998) South Africa Limit to change, London: Zed Books.

Marais M, (2009) practical implications of legislation pertaining to remediation and mine closure, North West University, SA.

Maree, K. (2007) First steps in Research. Pretoria: Van Schaik Publishers.

Mouton, (2001) How to Succeed in your Master and Doctoral Studies. Pretoria: Van Schaik Publishers.

Oelofse SHH (2008) Mine water pollution-acid mine decant, <http://soer.dea.gov.za/>



Roos M (2003) The natural resources curse: World Bank, Washington.

Rosner T, Pulles W (2001) A preliminary Assessment of pollution contained, Water Research Commission, Pretoria.

Siegel S and Veiga M.M. (2009) Artisanal and small scale mining as extralegal economy.

Shadreck C. (2010) Indigenous Mining and Metallurgy in Africa, Cambridge.

Simpson J. (2000) Environmental aspects of small scale mining, University of Dundee.

Struwig F.W. and Stead, G.B. (2001) Planning, Designing and Reporting Research. Cape Town: Pearson Education.

Strydom, H., Fouche, C.B and Delport, C.S.L. (2005). Research at Grass Roots for the Social and Human Services Professions third edition. Pretoria: Van Schaik Publishers.

The South African Constitution, Act 108 of 1996 <http://www.Acts.co.za> Mineral and Petroleum Resources Development Act 28 of 2002 <http://www.dmr.gov.za/>

Swart E. (2009) The South African legislative framework for mine closure

World Bank (2008) Democratic Republic of Congo, Growth with governance in the mining sector: World Bank, Washington.

## **Appendix A: Interview guide**

### **Face to face interview schedule**

Sample: Two Official's one from Mine Environmental Management: Deputy Director and one from Social and labour plan: Assistant Director (Department of Mineral Resources), five Peterson community members (illegal operator), five from Humansdorp community members (legal operator) and one official from Local Economic Development section in Sarah Baartman District Municipality. One mine representative from legal operator and one mine representative from illegal operator.

### **Interview Discussion Guide.**

Interview will be conducted separately with each individual.

I will introduce myself and clarify to each participant, the reason for conducting the interview.

I will inform them that our discussion will be confidential

I will inform them that I would like to record their interview/ discussion and request their permission to use tape recorder or any other audio recording instrument

I will inform the participant that they may withdraw from the interview at any point should they wish to do so.

I will obtain each participants verbal and written consent for participation.

I will explain the consent form to them and let them sign it.

### **Questions for the face-to face interviews:**

#### **Municipal Officials Questions**

1. What is your role within the district?
2. What is your understanding of small scale mining?
3. What is the value of small scale mining to the municipality?
4. What is the contribution of SSM in LED for district?
5. What is the impact of SSM on environment?
6. What is the socio-economic impact of SSM?
7. Do you have any by-laws that deals with mining activities?
8. How effective is the municipal by-laws in the district with regard to SSM?

**Master's: Azwihangwisi Mulaudzi**

9. What is your experience with regard to illegal mining?
10. What is your understanding of the SSM permitting process?
11. At what stage do you get involved in the process?
12. How often do you get consulted about SSM in the district?
13. What does the consultation generally involve?

**DMR official Questions (Mine Environmental Section).**

1. How many SSM applications do you get per year?
2. How long does it take to process a single SSM application?
3. What does the process for permitting entail?
4. How much does it cost to apply for a SSM application?
5. Approximately what percentages of applications are rejected per year?
6. Which mineral/commodity has most application per year?
7. What is the impact of SSM on the environment?
8. How do you deal with illegal mining activities?
9. How effective is the current punitive measures for non-compliance?
10. How many officials are responsible for monitoring illegal and legal mining in the district or in the province?
11. How often does this inspectors/ officials visit the mining activities for inspection?

**DMR official questions (Social and Labour Plan)**

1. What is the contribution of SSM in the local economic development?
2. What is the impact of SSM on socio-economic of SBDM?
3. What is the relationship between SSM and SLP?

**Community Members Questions.**

1. What is your understanding of SSM?
2. What is your role in the SSM activities?
3. At what stage do you get to involved in the SSM activities?
4. What are the impact of this SSM in your community?
5. Since the mining started here, do you think there is more money in the community? Are some people working on the mine? Is there some people who are renting rooms/shacks to miners? Are

- there small businesses (e.g. selling food, cutting hair, mechanics, etc) who are making some money from mine?
6. How many mines operating in this area?
  7. Do you know which ones are legal and which ones are illegal/ does it matter to you if a mine is illegal? Why do you say so?
  8. How informed are you with regard to the process of SSM applications?
  9. How effective is the mining legislations (and the implementation of it) according to your understanding?
  10. How is the communication with SSM operators, DMR and the community?
  11. Have you ever complained to the mine about noise, dust, water (and other) pollution? If yes, what response did you get?
  12. Have you ever complained to the DMR or the municipality or police about the mine, about noise, dust, water and other pollution? If yes, what response did you get?
  13. Has any child or animal has been hurt on the site? If so, how was this resolved (e.g. who took care of the cost involved)? How often does it happen? Has any of the workers been hurt/ if so, how often does that happen, and if so, was this resolved?

#### **Mine representative Questions**

1. How long have you been mining? Did you only start mining once you got a permit, or did you already start mining before you got a permit?
2. What is your experience with regards to SSM application process in general
3. What is your experience in dealing with public participation process? How did you do it? Who (in the community) participate?
4. According to your understanding what is the impact of SSM in the community?
5. How many jobs do you provide? Are they full-time jobs? If not, how many part-time and how many full time?
6. Are you from this district? If not, are you from this province, another province?
7. Did you bring any workers with you from another area? Or are they all from this community? If you brought workers into the community, where do they stay? If they stay within the community, are they renting?
8. Where do you buy the products that you need for mining? And your daily needs (e.g. food, etc.)?
9. To whom do you sell your products? Are buyers within the district or do you sell further away (within province, or even further away nationally)?
10. Do you understand the consequences of not complying with the mining legislations?

**Master's: Azwihangwisi Mulaudzi**

11. How often does the DMR do inspection on your mine?
12. What type of machinery do you use?
13. What type of environment protection measures have you got in place? E.g. for dust, or noise, or protecting of water sources, what do you do with your rubbish? Etc.
14. Has anyone from the community complained about the mine? About it being here, about the dust, or noise, pollution, etc.? If so, how did you respond to the complained?
15. Has any animal or child or adult been injured on your site? If so, how was it resolved? And did you put any measures in place to prevent it from happening again?

#### **Questions for illegal mining operator**

1. How long have you been mining in this spot?
2. Why did you decide to mine without permit?
3. Did you try to apply for a permit?
4. Do you understand the consequences of mining illegally?
5. How long have you being mining?
6. Before you come here, were you mining somewhere? If yes, why did you leave there? What mineral/commodity were you mining there?
7. Are you from this district/ if not, are you from the province, another province?
8. According to your understanding, what is the impact of SSM on the community?
9. How many jobs do you provide? Full time and part-time?
10. Did you bring any workers with you from another area? Or are they from this community? If you brought workers into the community, where do they stay/ if they stay within the community, are they renting?
11. Where do you buy the products that you need for mining? And your daily products (e.g. food, etc.)
12. To whom do you sell your products? Are buyers within the district or do you sell further away (within province, or even further away nationally)?
13. What type of machinery do you use?
14. What type of environmental protection measures have you got in place? E.g. for dust, or noise, or protecting of water sources, what do you do with your rubbish? etc.
15. Has any animal or child or adult been injured on your site? If so, how was it resolved? And did you put any measures in place to prevent it from happening again?

**Research Consent form**

**Socio-economic and environmental impacts of small -scale mining in the Sarah Baartman District Municipality in the Eastern Cape.**

**Consent form for participating in the study.**

I hereby consent to participate in the research study. The purpose and procedures of the study have been explained to me. I understand that my participation is voluntary and that I may refuse to answer any particular question or may withdraw from the study at any time without any negative consequences. I also understand that, upon my request feedback of the results will be communicated to me by the researcher. I understand that my responses will be kept confidential.

**Name of participant:**.....

**Signature:**.....

**Date:**.....

I .....have explained the procedures, purpose and conditions of the study to my participants. I have explained to them the rights in taking part in the study as well as given an assurance on confidentiality. I have also offered to give feedback of the results to the participants at their request. I agree with the above mentioned conditions and I will adhere to them.

**Name of the researcher**.....

**Signature**.....

**Date**.....

ETHICS CLEARANCE FOR TREATISES/DISSERTATIONS/THESES

Please type or complete in black ink

FACULTY: Business and Economic Sciences

SCHOOL/DEPARTMENT: Development studies

I, (surname and initials of supervisor) Dr G. Wellmann

the supervisor for (surname and initials of candidate) MULAUDZI A

(student number) 215372271

a candidate for the degree of MA (Development Studies)

with a treatise/dissertation/thesis entitled (full title of treatise/dissertation/thesis):

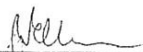
Socio-economic and Environmental impact of small scale mining in the Sarah Beyerman district in the Eastern Cape.

considered the following ethics criteria (please tick the appropriate block):

	YES	NO
1. Is there any risk of harm, embarrassment or offence, however slight or temporary, to the participant, third parties or to the communities at large?		X
2. Is the study based on a research population defined as 'vulnerable' in terms of age, physical characteristics and/or disease status?		X
2.1 Are subjects/participants/respondents of your study:		
(a) Children under the age of 18?		X
(b) NMMU staff?		X
(c) NMMU students?		X
(d) The elderly/persons over the age of 60?		X
(e) A sample from an institution (e.g. hospital/school)?		X
(f) Handicapped (e.g. mentally or physically)?		X

3. Does the data that will be collected require consent of an institutional authority for this study? (An institutional authority refers to an organisation that is established by government to protect vulnerable people)		X
3.1 Are you intending to access participant data from an existing, stored repository (e.g. school, institutional or university records)?		X
4. Will the participant's privacy, anonymity or confidentiality be compromised?		X
4.1 Are you administering a questionnaire/survey that:		
(a) Collects sensitive/identifiable data from participants?		X
(b) Does not guarantee the anonymity of the participant?		X
(c) Does not guarantee the confidentiality of the participant and the data?		X
(d) Will offer an incentive to respondents to participate, i.e. a lucky draw or any other prize?		X
(e) Will create doubt whether sample control measures are in place?		X
(f) Will be distributed electronically via email (and requesting an email response)?		
Note:		
• If your questionnaire DOES NOT request respondents' identification, is distributed electronically and you request respondents to return it <i>manually</i> (print out and deliver/mail); AND respondent anonymity can be guaranteed, your answer will be NO.		X
• If your questionnaire DOES NOT request respondents' identification, is distributed via an email link and works through a web response system (e.g. the university survey system); AND respondent anonymity can be guaranteed, your answer will be NO.		
Please note that if ANY of the questions above have been answered in the affirmative (YES) the student will need to complete the full ethics clearance form (REC-H application) and submit it with the relevant documentation to the Faculty RECH (Ethics) representative.		

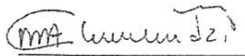
and hereby certify that the student has given his/her research ethical consideration and full ethics approval is not required.

  
SUPERVISOR(S)

29/3/2016  
DATE

  
HEAD OF DEPARTMENT

29/11/2016  
DATE

  
STUDENT(S)

23/02/2016  
DATE

Student(s) contact details (e.g. telephone number and email address):

082 465 3460 Sams.mulaudzi@gmail.com

Please ensure that the research methodology section from the proposal is attached to this form.





• PO Box 77000 • Nelson Mandela Metropolitan University  
• Port Elizabeth • 6031 • South Africa • www.nmmu.ac.za

**Prof Janet Cherry**  
Department of Development Studies  
School of Economics and Development  
Studies  
Nelson Mandela Metropolitan University  
Summerstrand Campus  
Port Elizabeth 6031  
South Africa

Tel: +27(0)41 504 2483  
Fax: +27(0)41 504 2826  
E-mail: Janet.Cherry@nmmu.ac.za

8 July 2016

To whom it may concern

re: **Mr A Mulaudzi: Ethics Clearance for Research**

Dear Sir/Madam

Mr Mulaudzi (student number 215372271) is registered for MA Development Studies and is conducting a research project with the title

"Socio-economic and environmental impact of small-scale mining in the Sarah Baartman district of the Eastern Cape"

He has obtained Ethics Clearance for this treatise from the Faculty of Business and Economic Sciences on 23 February 2016.

Please do not hesitate to contact me if you require any further information.

Yours sincerely

Prof JM Cherry  
Department of Development Studies



**mineral resources**

Department:  
Mineral Resources  
REPUBLIC OF SOUTH AFRICA

Private Bag 59, Mineral Resources, Trevenna Campus, Pretoria, 0001  
Tel No: 012 444 3977  
Enq: Office of the Deputy Director-General: Mineral Regulation

The Research Coordinator  
Nelson Mandela Metropolitan University  
Summerstrand Campus  
Port Elizabeth  
6031

Dear Sir/Madam

**RE: PERMISSION TO CONDUCT ACADEMIC RESEARCH AND USE OF THE DEPARTMENTAL DATA BASE AND INFORMATION.**

This letter serve to confirm the approval to grant Mr A. Mulaudzi (Student No. 215372271) permission to conduct academic research as a requirement for his Master's Programme in the Development Studies. Approval is given with conditions that the student will share the findings of his research with the Department of Mineral Resources after completing the programme

The research topic: **Socio-Economic and Environmental Impacts of Small Scale Mining in the Sarah Baartman District Municipality in the Eastern Cape Province.** It would be very useful for such prospects to be thoroughly investigated so that it can assist as we are currently in the process of amending our Mineral and Petroleum Resources Development (Act 28 of 2002) as well as the implementation of the National Environment Management Act (107 1998)

---

Your co-operation will be appreciated



JM RAPHELA  
DEPUTY DIRECTOR GENERAL  
MINERAL REGULATION

---

24 Justin Road  
Broadwood  
Port Elizabeth 6070

**TO WHOM IT MAY CONCERN**

I, Aileen Gail Klopper, declare that I have, to the best of my ability, proof read and edited the treatise written by Mr A Mulaudzi (S215372271) with the title:

SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS OF SMALL-SCALE  
MINING IN THE SARAH BAARTMAN DISTRICT MUNICIPALITY

in the Department of Development Studies, Faculty of Economic and Business Sciences at the Nelson Mandela Metropolitan University.

Any queries related to the editing of this treatise can be directed to me at 074 3209463.

Signed at Port Elizabeth on 14 November 2016.

---



Ms AG Klopper  
Associate: Professional Editors Guild



**Turnitin Originality Report**

Final research for Mulaudzi A EDS 504 by Azwihangwisi Mulaudzi

From Turnitin Final - Part 1 (Moodle 47364375) (EDS504: Guided Research Report (Moodle 12227982))

Similarity Index	Similarity by Source	
4%	Internet Sources:	0%
	Publications:	0%
	Student Papers:	4%

Processed on 05-Dec-2016 16:09 SAST  
ID: 747838246  
Word Count: 23445

**sources:**

- 1 4% match (student papers from 24-Jan-2013)  
Submitted to North West University on 2013-01-24

**paper text:**

SOCIO-ECONOMIC AND ENVIRONMENTAL IMPACTS OF SMALL-SCALE MINING IN THE SARAH BAARTMAN DISTRICT MUNICIPALITY By: Mulaudzi Azwihangwisi 215372271 RESEARCH SUBMITTED TO THE DEPARTMENT OF DEVELOPMENT STUDIES, FACULTY OF ECONOMIC AND BUSINESS SCIENCES NMMU SUPERVISOR: Dr Gwendolyn Wellmann 2016 DECLARATION I, Azwihangwisi Mulaudzi, declare that the work presented in this treatise is my own work and has not been submitted by me for evaluation at any other university. Where information has been derived from other sources, I confirm that this has been indicated in the treatise. .... Azwihangwisi Mulaudzi

ACKNOWLEDGEMENTS The successful completion of the research would have been impossible without the support, advice, assistance and encouragement of others. I could like to express my sincere thanks and appreciation to the following: God for giving me the ability to compete my Masters of Arts in Development Studies My supervisor, Dr G Wellmann, for the professional manner in which she guided me through this study. Without her motivation and encouragement this research would not have been possible. My children, Tshifhiwa and Rendani, who remained content at times when it was difficult for them to understand why I had to spend such long hours with my studies. My family and friends for their support. ABSTRACT The purpose of this study was to assess, on a limited scale, the socio-economic and environmental impact of small scale mining in the Sarah Baartman District Municipality, a municipality that is predominantly rural in nature and also stricken by poverty. The topic of legal and illegal small scale mining has received considerable attention from both the government and communities in recent years. At the heart of small scale mining is enshrined the goals of creating employment and promoting the economic growth and development of the district. This study investigates the results of both a legal and an illegal mining operation in the district municipality. Table of Contents List of acronyms..... 10

CHAPTER 1..... 11 INTRODUCTION AND CONTEXT ..... 11 1.1 INTRODUCTION ..... 11 1.2 BACKGROUND ..... 11 1.3 JUSTIFICATION OF THE RESEARCH ..... 13 1.4 STATEMENT OF THE RESEARCH PROBLEM..... 14 1.5 RESEARCH QUESTIONS ..... 14 1.6 RESEARCH AIMS AND OBJECTIVES ..... 14 1.7 RESEARCH HYPOTHESIS ..... 15 1.8 OVERVIEW OF THE CHAPTERS ..... 16 1.9. CONCLUSION..... 17 CHAPTER 2..... 18 LITERATURE REVIEW ..... 18 2.1 INTRODUCTION ..... 18 2.2 BACKGROUND .....

[https://api.turnitin.com/newreport\\_printview.asp?eq=1&eb=1&esm=-3&oid=747838...](https://api.turnitin.com/newreport_printview.asp?eq=1&eb=1&esm=-3&oid=747838...) 2016-12-08