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**FACULTY OF ARTS**

**DEPARTMENT OF DEVELOPMENT STUDIES**

**EFFECTS OF ARTISANAL SMALL SCALE GOLD MINING ON THE ENVIRONMENT AND LIVELIHOODS: A CASE STUDY OF SHURUGWI.**

**BY**

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**THIS DISSERTATION IS SUBMITTED IN PARTIAL FULLFILMENT OF THE BACHELOR OF ARTS IN DEVELOPMENT STUDIES HOUNOURS DEGREE.**

**MAY 2016**

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#### APPROVAL FORM

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**Effects of Artisanal small scale gold mining activities on the environment and livelihoods: A case study for Shurugwi.** Submitted in partial fulfilment of the requirements of the Bachelor of Arts in Development Studies Honours degree.

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## **DEDICATION**

*I dedicate this research project to my brother Gilbert and Sister Grace Gwenero and to my unborn child.*

## ACKNOWLEDGEMENTS

I express my heartfelt appreciation and gratitude to the following people without their support I will not have made it this far.

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## **ABSTRACT**

*This research focuses mainly on the effects of artisanal small scale gold mining activities on the environment and livelihoods in Shurugwi. It also looks at the negative effects of ASM and the dangers they cause to the environment and livelihoods. Artisanal small scale gold mining has become the backbone of the economy, due to unemployment and the closure of many companies, so many people are now being involved in gold panning activities. The International Labour Organisation (ILO) acknowledges gold mining by itinerant miners as the means of livelihood for more than 13 million people in the developing world. Although there are many potential socio-economic benefits of artisanal small scale gold mining, there are numerous negative impacts from these small and inefficient operations as a result of wasteful extraction and processing techniques. The artisanal small scale gold mining activities pose a very high negative risk on the environment and livelihoods and some of these effects include land degradation, siltation, deforestation, water pollution, and loss of biodiversity. If these effects are not mitigated this will cause much harm in the near future. Also on the effects of artisanal small scale gold mining activities on livelihoods include loss of life, loss of property through theft, the spread of HIV/AIDS only to mention but a few. The study used qualitative research, which involved conducting some interviews, distribution of questionnaire and observation was also used to gather data on the effects of artisanal small scale gold mining activities. Some recommendations were also given to the Government, Shurugwi City council, people from the community and other stakeholders in order to mitigate the effects of ASM's activities and these recommendations include land rehabilitation, implementation of mining policies, training of the ASM, licencing and giving them permanent claims at a lower cost and also carrying out some awareness campaigns on HIV/AIDS programs, distribution of condoms in order to mitigate the effects of ASM activities on the environment and livelihoods.*

*Keywords: Environment, livelihood, Artisanal small scale gold mining*

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## **List of Abbreviation and Acronyms**

AIDS	Acquired Immune Deficiency Syndrome
ASM	Artisanal Small Scale Gold mining
EMA	Environmental Management Act
HIV	Human Immunodeficiency Virus
ILO	International Labour Organisation
SLA	Sustainable livelihood Approach
SLF	Sustainable Livelihood Framework
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
ZNWA	Zimbabwe National Water Authority

## **PROBLEM AND ITS SETTINGS**

### **Introduction**

This research focuses on the effects of Artisanal small scale gold miners activities on the environment and livelihoods. According to Chanje 2000 mineral extraction is the most destructive industry to the environment and Artisanal Small Scale Mining (ASM) plays a major role in contributing to this destruction. The definition of Artisanal small scale mining varies from country to country (Africa 2002). However the term artisanal and small scale mining refers to informal mining activities carried out using low technology or with minimal machinery. It is often estimated that more than 100 million people rely on this sector for income, mainly in developing nations. (miningfacts.org). This research however defines Artisanal small scale mining as an activity that encompasses small medium, informal legal and illegal miners who use rudimentary methods and processes to extract mineral resources. These miners are unskilled, underequipped and not knowledgeable and have little appreciation of the environment they operate from. Taylor (1998) notes that Artisanal mining is perceived by many Africans as one of the few copying strategies by people to master, tolerate or minimize the adverse effects and economic hardships. ASM therefore serves as a source of livelihood and income as it has become the major source of cash income. Hence it is the duty of this chapter to give detailed information on ASM and its effects to the environment.

### **1.1 Background of the study**

The mining town of Shurugwi is located in Midlands Province, Southern Zimbabwe. It is the hub for gold and chrome mining and is located about 30 kilometres from the Midlands, Gweru. Over the years, Shurugwi have experienced a lot of mining activities especially after the discovery of platinum at Unki which lies a few kilometres just after the Wolfshall Pass (Boterekwa). It also has numerous illegal miners along the Boterekwa Range miners operating. This has seen the establishment of a large mining complex by Implats (Impala Platinum) and the revamping of houses which used to belong to the old Zimasco employees. The origin of Shurugwi town was largely occupied by the Karanga ethnic people who formed the majority of the population but in the recent years incorporated more minority groups like

Shona, Ndebele speaking people in the Rockford small scale farms and the Dlodlo area. Other ethnic people are the few remaining former employees of Zimasco who are principally Malawian by origin.

Shurugwi encompasses much of the rural areas of Nhema, Tokwe, Gweno, Hanke, Tongogara and including some parts of Chivi. With the evolving of new rural settlements from land reform programme in year 2000 to 2012 saw Shurugwi rural extending its borders and accommodating more people. The region lies along the Great Dyke with a lot of minerals such as gold, chrome, the platinum group of metals and asbestos with much of the rural communities made up of poor sandy soils which support only subsistence agriculture. Illegal gold panning is one of the popular day to day business for the communities in Shurugwi district which has made it difficult for many scholars to come up with realistic or statistical data specifying the number of small scale miners involved in panning since the digging is at will as long as an area is suspected to have gold deposits digging can start at any location any time, this has led to panning moving as extremely inside Shurugwi town with some panning holes destroying roads and bridges around the district.

The small mining town has become a home to many illegal gold panners popularly known as “Makorokoza” who dig for the precious mineral for survival and mainly compose of highly impoverished men and women of various age groups who earn their living from gold panning and these people will be coming from different parts of the country. Furthermore mining companies operating in Shurugwi have very limited staff and the probability of getting a job at Zimasco, Unki or Falcon is fruitless and based on qualifications thus the youth and most Zimbabwe people lack adequate education to meet the standards of getting a job thus they end up being engaged in artisanal mining.

Blooming trees, thick bushes, valleys and evergreen grasslands that is how Shurugwi used to look like, the long winding Boterekwa River and wonderful scenery made the area a hit with tourists from all over the world. This beauty has long been destroyed by artisanal miners' activities which left tracks of destruction as panners who irresponsibly chase for gold deposits in the area, all the scenic views have been destroyed.

Zvamatenga, Donga and Svika resettlement areas fall under the jurisdiction of Chief Nhema in Shurugwi which is located in the mineral-rich Great Dyke belt 33km outside Gweru. Minerals such as gold, chromite, nickel and platinum are mined around the town. These

minerals attract people from across the country with the infamous makorokoza who have turned the area into a scavenging ground despite hysterical efforts by the police to stop them. They leave behind a trace of destruction; devastated fields and forests, mud-choked rivers, and mercury-contaminated water. (By David Chidende, 2016)

Gold panning in Shurugwi increased in the year 2004 from the rising poverty levels with many people losing jobs and some earning less and others not being paid for so many months thus ended up becoming artisanal miners. Also it has been difficult for individuals to acquire mining licences for their proposed sites as they are expensive and difficult to get a proper licence from the mines ministry as an individual with a lot of processes that has to go through before being granted an Exclusive Prospecting Order (EPO) for one to own a mine, (Ministry of Mines Act Chapter 21:05) 2013 version. The majority of these people with mining licenses are not from Shurugwi and require a percentage on gold panners who wish to mine for them and the percentage is rather too high for the panners and they resort to unrestrained mine dumps where they mine at will thus destroying the aesthetic value of the environment.

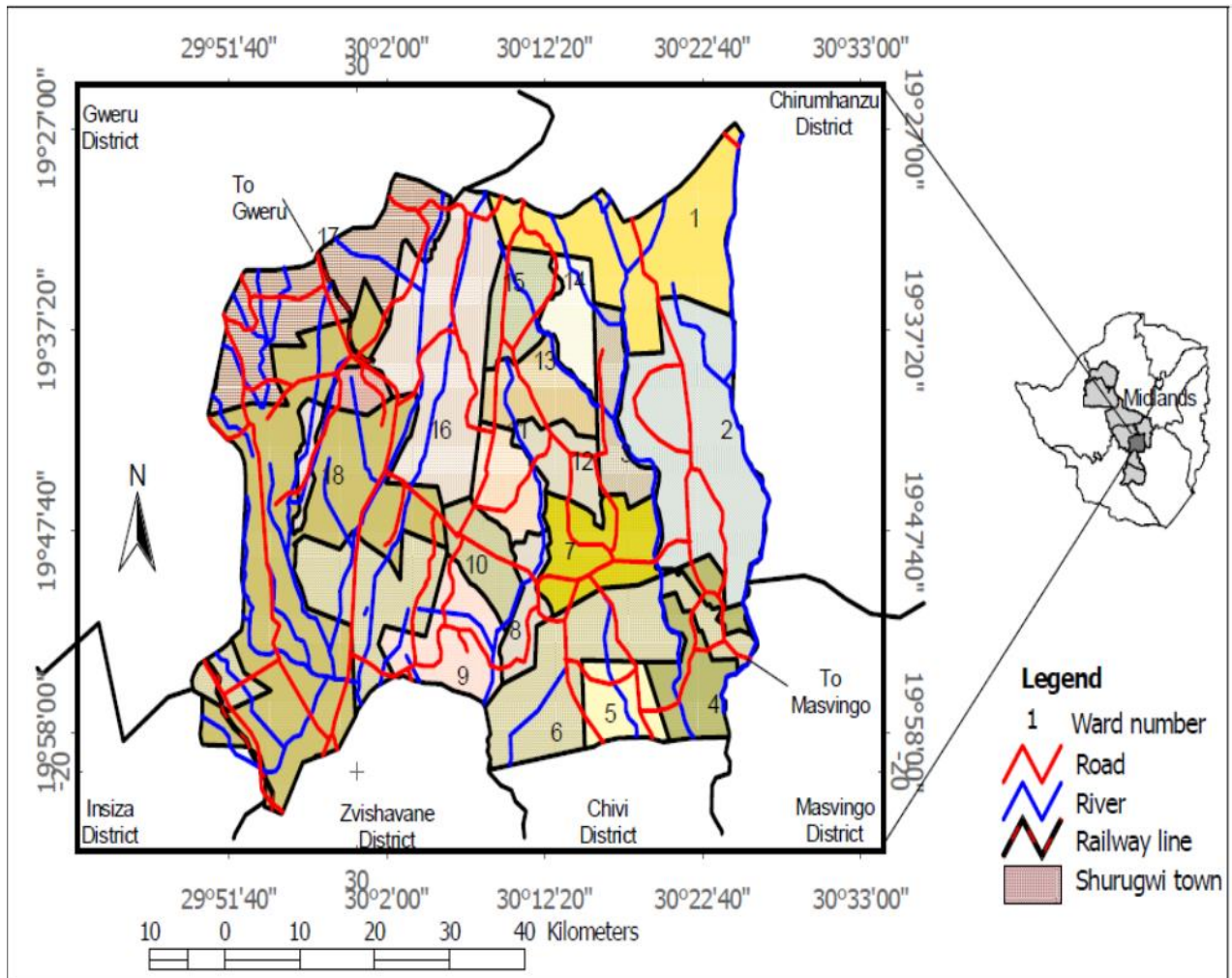
Almost every place along the Great Dyke within Shurugwi has been destroyed by the illegal gold panners. Gold panning comes with disturbing effects because huge tracts of grazing area are lost due to digging everywhere as well as veld fires caused by panners, what makes the situation worse is that we have gold mills sprinkled around Boterekwa that endlessly spill cyanide and other substances onto the land as well as into Muterekwi and Manzimudhaka rivers.

Artisanal small scale gold mining in Shurugwi will, if conducted correctly generate significant benefits. However the poor health and safety record and use of environmentally destructive mining and processing practices have drawn much negativity and criticism to the sector, (Noestaller 1987). It is against this background that this research focuses on the level of the effects of artisanal mining on the environment and livelihoods in Shurugwi. The research identifies and lists the problems caused by artisanal mining on the environment and livelihoods risk accumulation that worsens disaster conditions.

This research provides an overview of artisanal small scale mining in general and its impact outlining the ecological problems which include loss of biodiversity, pollution, siltation, mercury poisoning, formation of sinkholes, contamination of soil and ground water, surface water by chemicals from mining processes and deforestation. Hence if these problems

remains unsolved they are likely to cause droughts, desertification, increased death and health problems on both human and animals. On the issue of health we have the spread of HIV/AIDS which has endangered the lives of people in Shurugwi.

**Fig 1.0: Map of Shurugwi**



Source: Ministry of Lands, 2004

## 1.2 Statement of the problem

Artisanal mining is a wide spread problem in Zimbabwe. This problem has been due to the need for income, food, employment, asset possession and decent living conditions. River siltation and land degradation are some of the major problems that are associated with the illegal gold panning activities. The problem has brought about high costs in dam rehabilitation and water shortages after siltation and a good example is water shortages in the central town of Shurugwi and Gweru city who get their supply of water from Gwenhoro dam

where the catchments have a lot of open casts and there is no meaningful flow of water to the dam.

It is for this reason that the researcher has found it important to research on the effects of artisanal mining on the environment and livelihoods and challenges communities face from gold panning activities and raise awareness of the urgent need to address these effects. Zimbabwe has an agricultural and mineral backed economy. This dangerous activity has been done without any professional regulation leading to other problems such as death of people trapped underground and use of dangerous metals like mercury in the rivers and other related serious health disasters associated with unprofessional operations. Leakage of respiratory poisons into the rivers creates other potential disasters such as death of animals in the rivers.

One other problem which gold panning has created is the siltation and contamination of rivers which has limited the availability of water for animals and people in many areas. The general physical geographical outlook has been seriously deformed due to the illegal operations in the areas. Whilst this is a local problem, it is one with very clear regional links as some of our rivers are also taking water to our neighbours. In the current study, the researcher seeks to find out the limitations of the current strategies and also find out what needs to be done to alleviate the effects of artisanal mining.

### **1.3 Objectives**

1. To assess the environmental effects of artisanal small scale gold mining disasters on the lives of the people in and around the affected communities.
2. To assess the effectiveness of measures being taken to address the problem associated with artisanal mining.
3. To identify and list the environment aspects which are being damaged by ASM

### **1.4 Definition of terms**

**Artisanal small scale gold mining:** artisanal small scale mining is an activity that includes small, medium, informal, legal and illegal miners who use simple methods and processes to extract mineral resources. These miners are unskilled, underequipped and not well-informed



and have little gratitude towards the environment. Such miners are individual enterprises or small family owned companies not allied to multinational companies as well as gold panners.

**Environment:** The environment refers to those surroundings that surrounds living beings from all sides and affect their lives. It consists of atmosphere, hydrosphere, lithosphere and biosphere. Its chief components are soil, water, air, organisms and solar energy

**Livelihoods:** A livelihood is a means of making a living. It encompasses people's capabilities, assets, income and activities required to secure the necessities of life. A livelihood is sustainable when it enables people to cope with and recover from shocks and stresses (such as natural disasters and economic or social upheavals) and enhance their well-being and that of future generations without undermining the natural environment or resource base.

### **1.5 Theoretical Framework**

To offer understanding of the relationship between mining activities and livelihoods, the Sustainable Livelihoods Approach was adopted to guide the study. Many livelihoods studies have adopted and applied the Sustainable Livelihoods Approach giving ground for the Development Studies thinking and Research. This framework came into being as a result of debates and discussions on the Sustainable livelihood, poverty reduction and assets. Boundtland Commission on Environment and Development in 1987 was the first to put sustainable livelihood notion forward, the concept of sustainable livelihood was the expanded by the 1992 United Nations conference on environment and Development which advocated for the achievement of sustainable livelihoods as a goal for poverty eradication. The SLF focuses on people and their livelihoods and how people can use their assets to realise their basic needs of life and reduce poverty.

The Sustainable livelihood Framework has five main components, vulnerability context ( in terms of stress, shocks and seasonality), livelihood assets, transforming structures and process, livelihood strategies, and livelihood outcomes. The variables in the framework show the linkage between the components and reflect how each component affects the other. The SLF shows that sustainable livelihoods are achieved through access to variety of livelihood sources such as natural capital land that are combined together pursuit of livelihood strategies to realize livelihood outcomes. Livelihood strategies consist of a range of combination of activities and choices that people decide or undertake to achieve their livelihood goals.

Livelihood Strategies are dependent on asset endowment and policies, institutions and process in place. The livelihood strategy that applies to this study is Artisanal small scale gold mining activities where we see people using natural resources and their assets in order for them to earn a living.

### **1.6 Significance of the study**

The main objectives in developing countries is to reduce the loss of life, property damage and social and economic disruption caused by gold panning. This research will then try to bring to light some of the problems that are a potential hazard and bring about solutions and recommendations. The research on environmental degradation from gold panning provides a fundamental basis for decision making for organizations, gold panners, police force, school children involved in the areas practicing gold panning. The current study provides crucial baseline information to the ministry of natural resources on the disasters and dangers to the natural environment caused by gold panning in Shurugwi district.

The findings from the research will establish the extent of damage or the disasters to the physical environment and community caused by artisanal mining and the associated reparations on the surrounding dams, rivers, and other water sources. All things being equal the findings could be made available to Shurugwi local authorities, Midlands State University, EMA, Ministry of Mine and other NGOs to identify the impact of gold panning on the physical environment. The study shall therefore be a cornerstone to the baseline carried out by the other stakeholders.

### **1.7 Limitations of the study**

- Gathering information from carrying out some interviews might be a bit difficult because some of the people will not be able to open up because they do not trust strangers they will be thinking that it is the police since some of the police usually come wearing some casual in order to arrest these gold panners.
- The researcher will find it difficult to interact with these gold panners because most of them operate in the middle of the forest where robbery can take place anytime without anyone noticing it. It is also difficult for a lady to have interviews with these gold panners because she will be vulnerable to sexual harassment.

- Time is going to be one of the limitations to this research, the researcher might not be able to interview more people because they will not have much time as they will be wanting to resume to their working place.
- Travelling from Zvishavane to Shurugwi will be a bit difficult since we have been moved to our new campus in Zvishavane and this will cost me in terms of transport

### **1.8 Delimitations**

The researcher's home town is Shurugwi so it is not a difficult task to carry out a research in a place where I come from and I also have free accommodation hence no need to pay rentals. This will then give me enough time to go to the nearby area practicing gold panning and thus had enough room to experience the whereabouts of gold panners in their operational areas.

### **1.9 Ethical considerations**

- The researcher is going to use free power of choice without the intervention of any elementary force such as fraud and deceit.
- The research is going to yield fruitful results for the good of the society that they will be able to manage the environment well.
- The researcher is going to try by all means to be neutral and nice to each and every person she will interview.

### **1.10 Chapter summary**

The above chapter managed to give a well detailed background of Artisanal small scale gold mining in Shurugwi, and it also managed to give a definition of what Artisanal small scale mining, environment, livelihoods and biodiversity is all about. It also gave a theoretical framework of Sustainable livelihood approach which was used by the researcher in this study. This chapter notes that ASM is the major activity in gathering livelihood and income in Shurugwi, through ASM people are able to earn a decent living

## LITERATURE REVIEW

### Introduction

This chapter talks about the connection of Artisanal Small Scale Gold Mining as perceived in this research. The research alludes to all ASM exercises going on in Shurugwi, legal or illegal that use simple and unregulated methods of extracting minerals. A layout of the framework guiding mining operations and their challenges in Zimbabwe is examined also. Issues relating to the management of natural resources to ensure sustainability and as well as protection measures proposed by different researchers shape part of this chapter. Challenges brought by other ASM to the environment include human and wellbeing of animal, security issues relating to chemicals used and collapse of shafts, land degradation, soil erosion, gulley formation, deforestation, air and water pollution are some of the challenges facing both the formal and informal mining industry in the developing countries and Zimbabwe specifically.

### 2.1 An Overview of ASM

The term Artisanal Small-Scale Gold Mining refers to the mining activities that use rudimentary methods to extract and process minerals and metals on a small scale. Artisanal miners likewise often use harmful materials in their attempts to recover metals and diamonds. Such miners work in a troublesome environment posing large health risks to the miners, their families and surrounding communities. In this context gold mining operations are especially hazardous as they often use the mercury amalgamation procedure to extract gold from metal. Dreschler 2001 places ASM under two broad categories of mining activities, namely the formal small scale mining activities and the informal small scale mining activities. Hence Shurugwi consist of both formal and informal small scale mining because some of the miners are underequipped and uses rudimentary methods in extracting gold.

The informal (illegal) small scale mining or artisanal mining refers to these miners who have their claims unregistered in accord with the provision of mines and minerals act, they operate illegally, Dreschler 2001 argues that in Zimbabwe, ASM primarily consist of gold diggers and panners (men, women and children) scattered along some 500 km of Zimbabwe's major rivers, Shamu and Wolf, etal (1993) estimate the number of illegal gold panners to be well over 10000 in Zimbabwe. The ILO (Sectorial Activities Programme, 1999) put the figure at

between 50 000 and 350 000, Svotwa et al (1999) tried to quantify the number of gold panners in Zimbabwe using panner masses derived from the number of gold panners physically counted per kilometre of river course, and projected the number and people earning a living from artisanal gold mining could be well over 2 million considering the number of people providing panners with services.

To add more, studies shows that not only men are engaged in ASM activities but also women participate in the activities. According to Hentschel et al, 75% of those involved in ASM activities in Guinea are women, while those of Ghana, South Africa and Indonesia are 44%, 5% and 10% respectively. Small scale mining results in loss of source of livelihood of miners when they have accidents which cause some miners to depend on their relatives' sustenance and assistance. ASM is noted with its myriad and primary and secondary problem through land degradation, deforestation, air pollution and water pollution.

Most ASM are from socially and economically side-lined communities and turn to mining with a specific end goal to escape extreme poverty, unemployment and landlessness. The dangers force miners to not only risk persecution by the government, but also mine shaft collapse a toxic poisoning from the variety of chemicals unsafely used in processing, notwithstanding the many dangers of this activity artisanal mining keep on spreading as the interest for metal increases and other livelihoods such as farming are no more financially suitable.

UNIDO estimates that mercury amalgamation from this kind of gold mining results in the release of an estimated 1000 tons of mercury per year which constitutes about 30% of the world's anthropogenic mercury emissions. It is estimated that between ten and fifteen million ASM worldwide, including 4,5 million women and 600 000 children. According to UNIDO, As much as 95% of all mercury used in Artisanal gold mining is released to the environment posing a danger on all fronts economic, environmental and human health.

This research regards Artisanal small scale gold mining as unauthorised or illegal mining operation although not seriously prevented by the government mainly because such activities provide at least some sustenance at the local people living below the poverty line and the government is unable to provide regular employment to all of them. The ASM as many of us believe, normally work in small groups of family members without employing any paid associates. They might work in their own particular area in broad daylight places or on the

other hand they can work on state owned land with no permit or formal authorisation. They are therefore the most part uncontrolled, illegal and unauthorised work.

## **2.2 Background of Artisanal small scale gold mining in Zimbabwe**

ASM has been on the run for many years in Zimbabwe since precolonial times. Miners still rely on many of the simple ore extraction tactics used by native precolonial and early colonial miners. At the beginning of the 20<sup>th</sup> century most mining activities were carried out manually or artisanal. As late as 1908, more than 70% of the mines were named ‘small working’. By 1988, however only 20 % of the country’s gold mines were classified as small, based on annual ore tonnage (up to 50 000 tonnes or about 55 115 tonnes). This descending trend in artisanal mining reversed during the 1990s and 2000s as a result of the drop in gold prices, the collapse of the Agricultural sector due to drought, the implementation of a land reform program and the downsizing of public sector workers during structural adjustment programs.

Hollaway articulates the inverse relationship between the rise of ASM and the decline of the economy in Zimbabwe. The ASM sector grew in leaps and bounds during the last 20 years between 1980 and 2000, fuelled by many factors, including the economic decline that led to high unemployment as a result of retrenchment and drought during the 1980s, prior to the droughts of the 1980s and that of the early 1990s, panning was primarily a dry season activity. The upsurge in gold panning during the 1982, 1992 and 1994 agricultural seasons is directly attributed to drought.

Government’s intervention from the 1990s until 2006, the Zimbabwean government formulated several interference to support Artisanal small scale mining activities and to improve delivery of gold to FPR. These interventions include stabilizing Gold Mining and Mineral Development Trust (GMMDT), launching Operations Chikorokoza Chapera and forming the mining investment loan fund.

In the past decades the rate of unemployment increased to over 80% due to economic and political hardships which chased away foreign direct investors in Zimbabwe. Large-scale mines trimmed their operations and even closed due to high operational costs and political uncertainty, thus making many people ending up being engaged in Artisanal Small Scale Gold mining. The whole scenario was worsened by the collapse of large-scale commercial farming events following the Fast Track Land Reform Programme in the early 2000s. The ASM still subjugated the narrow unpredictable discontinuous quartz veins. The Artisanal

miners used the same traditional tools used during the colonial period. They worked on sites lacking proper housing, hygiene and sanitation, clean water as well as educational and health facilities, (Legal Resources Foundation, 2003; Government of Zimbabwe, 1989, 1990 and 1995).

### **2.3 Environmental Concerns of ASM**

ASM communities may also be affected by environmental degradation, ASM can pollute waterways through mercury use, dam construction, development of residue, poor sanitation and gushing dumped in rivers. Improper mine closure and absence of recovery can likewise result in acid rock drainage, monitoring and enforcement of environmental regulation is hindered by familiarity, the remote area of mine operations and absence of resources. Kambani (2001) alludes that from a basic and specialised point of view ASM is directed on an exceptionally simple level using small tools such as pick and shovels. Ghose (2003) points out that it is because of their nature that these operations feature poor environmental management practices and safely conditions. Kambani (2001) argues that as a result the environmental degradation caused by ASM, it is growing with the intensification and growth of ASM. This is further aggravated by the fact that institutions responsible for managing the environmental are unable to effectively carry out regulatory and monitoring mandates due to lack of resources which is the case with Zimbabwe.

### **2.4 Shurugwi's Physical environment**

Shurugwi lies around the mineral rich geological construction commonly referred to as the Great Dyke. The formation also has fertile soils ideal for agriculture, Shurugwi has been experiencing land use and land cover changes prompted both by people and machinery in recent years following the government's Fast Track land reform and resettlement programme and exploitation of different minerals including gold and platinum.

Shurugwi is situated about 30km to the Southeast of the city of Gweru in the Midlands province of Zimbabwe. Shurugwi remains an important mining centre for gold, nickel, chrome and recently platinum. This small town is located on the mineral rich belt commonly known as the Great Dyke in Zimbabwe. The town lies in agro ecological region 3 and receive an average rainfall between 650-800mm. Major land use in this town include residential

(settlements), agriculture, mining, industrial and forest areas. Subsistence crop and livestock farming are the dominant human activities in the rural areas.

## **2.5 Effects of Artisanal small scale gold mining on the environment**

Artisanal small scale gold miners' operations have negative impacts on the environment. This particular mining sector causes a severe ecological disaster and thus the economy will suffer and shrink. The Zimbabwe School of Mines module (1997) argues that in as much as mining should continue to flourish and grow in Zimbabwe, it is vital that it continues whilst upholding the principles of International Strategy for Disaster Reduction (ISDR) in which Zimbabwe is a signatory. The ISDR is an ideology which was created and designed by the General Assembly of the United Nations in 2000 to offer a global framework for action with the "objective of reducing human, social, economic and environmental losses as a result of natural hazards and related technological environmental phenomena" (ISDR, 2002). ISDR is a theoretical framework that puts emphasis on integrating disaster risk reduction (DRR) into a broader perspective of sustainable development and related environmental considerations.

### **2.5.0 The Environment**

The environment is the surrounding. It could be a physical element - physical environment that includes the built environment, natural environment - air conditions, water, land, atmosphere only to mention but a few or it could be human or social environment - people surrounding the item or thing. The environment is a dynamic entity. It is shaped by institutional, technological and socio-economic factors although, natural phenomenon plays an important role in what the environment is today and can be tomorrow.

According to the United Nations International Strategy for Disaster Reduction, environmental degradation is, the reduction of the capacity of the environment to meet social and ecological objectives, and needs" (UNEP, 1995). Environmental degradation therefore has unlimited significant results. When natural habitats are destroyed or natural resources are depleted, the environment is degraded. The immediate results of environmental degradation are pollution of air and water bodies, deforestation, global warming, unsustainable agricultural and fishing practices among others, whilst the overreaching consequences include, increased poverty,



overcrowding, famine, weather extremes, species loss, acute and chronic medical illnesses, war and human rights abuses.

### **2.5.1 Land Degradation**

According to the United Nations International Strategy for Disaster Reduction, Environmental degradation is ‘‘the reduction of the capacity of the environment to meet social and ecological objectives and need’’ (UNEP 1995). Closely linked with vegetation destruction and land degradation is the issue of soils erosion. Artisanal miners as argued by Dreschler (2001) move an average of 8 million tonnes of material panning per year, and this ends up in the streams and dams as silt. In Shurugwi they have destroyed river banks and dams on either side in cases where mineral extraction continues beyond the banks. Some dams and wells have been known to silt completely within 5 years (MMSD, 2001).

### **2.5.2 Siltation**

Dreschler alludes that 80% of the operations are open cast or shallow pits, less than 30 m deep and there are left uncovered and unprotected. This kind of land disturbance resulting from gold panning activities leave a noticeable effect on the siltation of rivers and dams, deterioration of water quality, reduction of grazing land for animals and the overall reduction in biodiversity. In some cases, underground operations require the opening up of vertical shafts and raises as well as underground tunnels leading to land subsidence. Chiwawa (1993) and Shoko (2005) argues that siltation in Zimbabwe, Mozambique and Tanzania is reported to have increasing at the rate of more than 5 % per annum. He further annotates that siltation results in the reduction of conveyance and storage capacities of rivers and dams.

### **2.5.3 Deforestation**

According to the UN Body, rapid population growth without a corresponding economic growth especially those of Sub Saharan Africa is responsible for deforestation, water pollution and siltation, overgrazing and erosion of farmlands , sand and minerals , mining related pollution and degradation (UNEP,1995). Deforestation is caused by the ASM activities which includes the cutting down of trees, the burning of forest hence so that they

can conduct their activities well without any destruction hence living the environment uncovered.

#### **2.5.4 Loss of Biodiversity**

The implantation of a mine is a major habitat modification and smaller perturbations occur on a larger scale than exploitation site mine waste residuals contamination of the environment for example adverse effects can be observed long after the end of the mine activity. Destruction of drastic modification of the original site and anthropogenic substances release can have major impact on biodiversity in the area. Destruction of the habitat is the main component of biodiversity loses but direct poisoning caused by mine extracted material and indirect poisoning through food and water can also affect animals, vegetals and microorganisms. Endemic species are especially sensitive, since they need very specific environmental conditions. Destruction or slight modification of their habitat puts them at the risk of extinction. Habitats can be damaged where there is no enough terrestrial as well by non-chemicals products, such as large rocks from the mines that are discarded in the surrounding landscape with no concern for impacts on natural habitats. The mining industry can impact aquatic biodiversity through direct poisoning and risk is higher when contaminants are mobile in the sediment or bio available in the water. Also huge areas of natural habitat are destroyed during mine construction and exploitation, forcing animals to leave the site.

### **2.6 Effects of Artisanal mining on the Livelihood**

#### **2.6.0 Livelihood**

Livelihood strategies are dependent on asset endowments and policies, institutions and process in place. Livelihood on the other hand, is a means, activities, entitlements and assets by which people make a living, which is immediate and continuous. It is also a framework that seeks to build the capacity of people to continuously make a living and improve their quality of life without jeopardizing the livelihood option of others, either now or in the future by coping and adaptive strategies (Aubynn, 2004; Labonne and Gilman, 1999). Another definition is a livelihood comprises of the capabilities, assets and activities required for a means of living. A livelihood is sustainable when it can cope with and recover from stresses and shocks. Chambers and Conway (1991).

According to Sen, capability measures the freedom to achieve marginal functioning. To function as an individual therefore, demands some basic requirements. The unique and real cause of attaining a level of functioning and choice making is income and the logic and reasoning behind the money-metric approach to poverty is that, in principle, an individual above the poverty datum line is the one who possesses the potential purchasing power to acquire the bundle of qualities yielding a level of well-being satisfactory enough to function and make choices.

### **2.6.1 Health**

The activities of Artisanal small scale gold miners have a very huge negative impact on human health thus causing harm on the livelihoods. The issue with their activities is that the effects or results of their activities are not seen at that very same time but it is a long term effect on human health. The health of the artisanal small scale miners deteriorate due to mercury contamination, affirming the well-known fact that mercury poses a serious threat to human health (Hilson, 2002) and the findings of Lacerda and Marins, 1997 that mercury emissions through small scale mining exposes and their communities to severe health risk. The lives of ASM are at high risk as the tools and methods used in the mining activity expose them to a high risk of injury, and also some of the places they operate in some will end up being trapped underground. Another effect of ASM on livelihood is an increase in HIV/AIDS confirming the findings of Banchirigah (2008). This will then result in the death of so many people and undermining development and as a result many children will become orphans and they will have a difficulty in earning a living.

### **2.6.2 Dust and noise pollution**

Dreschler (2001) in his study finds out that the wide spread use of pestle and mortar generates fine quartz dust, which is inhaled by those involved in the process. The dust and fumes generated by blasting are quickly diluted and dispersed as most operations are shallow workings. He also notes that noise, dust and blasting vibrations produced in artisanal small scale mining operations are by no means comparable to those produced in large scale operations which are a common feature in a large scale mines. In artisanal small scale mines these are almost non-existent. The miners access explosives through illegal means as they should be kept in safe places. Once these explosives find their way out to artisanal small scale

miners, they become a hazard. One can therefore assume that many of the miners exposed to this operation are likely to end up with pneumoconiosis diseases such as silicosis and tuberculosis.

### **2.6.3 Agriculture**

Research have clearly shown that more than half of all the people living in Africa depend on agriculture. Agriculture forms a significant portion of the economies of all African countries, as a sector it can therefore contribute towards major continental priorities, such as the eradication of poverty and hunger, boosting intra-Africa trade and investments, rapid industrialization and economic diversification, sustainable resources and environmental management and creating jobs, human security and shared prosperity.

Dreschler 2001 argues that when these Artisanal small scale old miners discover a lucrative environment they construct some temporary homes out of poles and dagga using local trees. In most cases they will just conduct their activities anywhere without taking into account that, that particular place might be someone's land. Also most of the farmers have abandoned their farms and started being involved in mining activities thus becoming artisanal small scale mining. Agricultural activities have depreciated due to the activities of ASMs because their activities will also result in land degradation, deforestation burning of forest which will then result in climate change which will then have a negative impact on Agricultural activities.

## **2.7 Legislative Framework**

In most developing countries, policy and legal frameworks tend to favor environmental protection and the interests of large gold mine holders instead of promoting more efficient and safer work practices which could result in the development of more stable mining communities, (Cawood, 2004). However In 2002 the government of Zimbabwe promulgated the Environmental Management Act 2002 (Chapter 20:27) with the purpose of complementing and enhancing the Environmental Management Act and other complimentary acts pertaining the environmental protection, management and sustainable development, (Ministry of Environment and Natural Resources Management, 2010). It has numerous pieces of legislation which have a bearing on environmental management and sustainable development. However, some scholars note that these legislations pose challenges in

environmental management as they are fragmented and conflicting. The challenges have to be addressed in line with environmental issues cutting across a wide range of sectors.

The mines and minerals Act (Chapter 21:05) does not embody the above listed regulatory acts because they fall under different ministries. As a result, critical stakeholders like EMA and ZINWA are made to police the environment after mining concessions had already been issued by the ministry of mines. In some instances mining activities commence on the ground without the knowledge of rural district councils. Issuance of mining claims depending on the size is done by different office bearers from the mining commissioner up to the President inclusive of the provisions of the Indigenisation Act that requires foreign investors to partner indigenous people in order to carry out mining activities in Zimbabwe. However rampant corruption in government has also seen some bogus investors especially from China partnering indigenous Zimbabweans to prospect and mine without the approval of rural district councils, Environment Management Agency (EMA) and Zimbabwe National Water Authority (ZINWA).

Inadequate public regulation, absence of law enforcement agents and poor medical provisions perpetuate chaos and insecurity in gold panning areas. Heemskerk and Oliviera (2003) regarded gold panning as characterised by formally untrained mining techniques and uses poor techniques for prospecting, extracting and processing of minerals. These panning activities have been widely criticised for being wasteful, inefficient, ineffective, damaging to the environment and dealing in illegal trading of minerals. It is commonly believed that gold panning is largely informal, technologically backward and a greater proportion of this sector's activities are illegal, (Shoko and Veiga, 2003).

The year 2013 saw the government of Zimbabwe warming to the idea of formalising gold panning or small scale mining operations. According to government sources small scale mining can produce upward 40% of national production if properly regulated and funded. The same sources also reveal that small scale miners contributed 30% of gold output in 2012. The demise of the Zimbabwean economy from the late 1990s saw the increase of small scale artisanal panning activities throughout the country. Many Zimbabweans turned to gold panning because of high unemployment as a result of company closures and the fall of large commercial agriculture (Chimonyo 2012). Increased panning activities forced government to

carry out operations such as “chikorokoza chapera” in order to clamp down on illegal panners and safeguard the environment.

## **2.8 Mining**

Mining is the removal of minerals from the earth’s crust in the service of man (Down and Stock, 1977 cited in Acheampong, 2004:1). The Encarta encyclopaedia also defines mining as the selective recovery of minerals and materials, other than recently formed organic materials from the crust of the earth (Encarta, 2005). The Oxford dictionary defines mining as the process of getting coal and other minerals from under the ground.

## **2.9 Poverty and Livelihoods**

Poverty is the stance of lacking basic necessities and absolute poverty is the lack of basic human needs, such as clean and fresh water, nutrition, health care, education, clothing and shelter, because of the inability to afford them. About 1, 7 billion people in the world live in absolute poverty and the 30 poorest countries of the world, 21 are in Africa (World Bank, 1995). The UNs World Summit on Social Development in 1995, the Copenhagen Declaration by 117 countries described poverty as a condition characterized by severe deficiency of human basic needs including food, safe drinking water, sanitation facilities, health, shelter, education and information. And that it depends not only on income but also on access to services. At this summit, the programme of action had eradication of absolute and reduction of overall poverty as one of the core actions.

## **2.10 Women, children, poverty and ASM**

Available statistics disclose the extent to which women are disadvantaged in the developing world. Women play a comparatively small part in large-scale mining but are frequently involved in small scale operations. In Bolivia, for example, women account for around 40% of the ASM work force, in Madagascar, Mali, and Zimbabwe, the proportion is 50%; and in Guinea, the figure is 75%. Moreover, women may be predominant in particular parts of the industry: in the Gaoua region of Burkina Faso, for example, the exploitation and selling of gold has traditionally been a female-only activity based on Mining Mineral and Sustainable Development commissioned studies, which summarizes the extent of women’s involvement in selected countries.

**Table 1.1 Number of women involved in ASM in selected countries**

Country	Number of Women	Proportion of Women %
Bolivia	15, 500	22
Burkina Faso	45,000-85,000	45
Ecuador	6,200	10
Ghana	89,500	45
India	33,500	7
Indonesia	10,900	10
Malawi	4,000	10
Mali	100,000	50
Mozambique	18,000	30
Philippians	46,400	25
Papua New Guinea	12,000	20
South Africa	500	5
Tanzania	137,500	27
Zambia	9,000	30
Zimbabwe	153,000	5

Source: Mining Mineral and Sustainable Development) country studies 2010

### **2.11 Hazard and risk mitigation**

Setting up sound information of hazards and risk association with artisanal small scale gold mining helps communities to create important adaptation strategies (Wisner et al 2001). An understanding of the ecological disasters related with gold panning is critical to decision making preparation and implementation of development projects that are competing for the same resources in the district, for example, rural, urban, legal and illegal mining and irrigated commercial and subsistence agriculture. This research therefore provides a step towards good land management practices, crucial in sustainable utilisation of natural resources. The paper also contributes to the essentials formalising illegal gold mining and promoting community participation in policy making and environmental protection as the same community is

involved in these illicit activities. Community participation helps promote efforts that advocate for cleaner production technique to be used in the participation of gold to reduce impacts on gold panners and environment (Ghose 2003).

## **2.12 Chapter summary**

The chapter talks of the effects of Artisanal small scale gold mining's activities on the Environment and Livelihoods and these effects include Land degradation, siltation, deforestation, threats to biodiversity, health, agriculture only to mention but a few. The chapter also gave a brief background or history on the development of Artisanal small scale gold mining and an overview of Artisanal small scale gold miners.



## **RESEARCH METHODOLOGY**

### **Introduction**

This chapter examines techniques and strategies used to gather information. The Research study was based largely on qualitative research and relied on document review, interviews and observations for data. Data was collected mainly through observations, conducting some interviews with the Artisanal small scale gold miners, household heads, local leaders, use of questionnaires. A visit where most of land degradation took place was carried out and photos were taken where effects of artisanal small scale gold miners' activities on the environment were witnessed for analysis.

### **3.1 Definition of research methodology**

Research methodology is seen by Miller (1979) as the planned order of the process involved in carrying out a research. The research methodology is undeniably the most compound process in research given the huge variability in their different models, operations and the interactions that take place. Research methodology implements and anchor patterns in specific pragmatic sites or in specific methodological practices. It specifies how the study addresses the critical issues of representation and legitimating. Methodology positions the researchers in the empirical world and attaches them to specific sites, persons, groups, institutions, physical places and bodies of relevant explanatory materials including documents and archives.

### **3.2 Research design**

A research design is not just a work plan. A work plan tells what has to be done in order to complete the project but the work plan will flow from the project's research design. The purpose of a research design is to guarantee that evidence obtained enables us to answer the initial question as clearly as possible. Gaining relevant evidence needed to answer the research question, to test the theory, to evaluate a programme or to accurately describe some occurrence. In other words when designing research we need to ask given this research question, what type of evidence is needed to answer the question in a resounding way. Research designs deal with a logical problem and not a logistical problem (Yin, 1989:29).

The strength of a qualitative approach as noted by Hitchcock and (Huggers 1995:12) are that it allows the researcher to learn at hand, about the social world being investigated by means of involvement and participation in that world through a focus upon what individual actors are involved in.

### **3.3 Qualitative research**

Qualitative Research is mainly exploratory research. It is used to gain an understanding of underlying reasons, opinions, and motivations. Qualitative methods examine the why and how of decision making, not just what, where, when, or "who". Methods used was that which allowed the gathering of as much information about the case study, which can be processed to make deductions and conclusions.

Qualitative research therefore uses realistic approach that seeks to understand an occurrence in a context specific setting. The researcher made some visits to the areas where most effects of artisanal mining on the environment are witnessed. During these visits the researcher used observations to see the effects of artisanal small scale gold mining on the environment. The researcher then used some questionnaire and interviews to get information on the effects of ASM on livelihoods.

### **3.4 Target population**

The target population of this study involved household heads, people from the community thus non artisanal small scale gold miners, stakeholders (EMA, Shurugwi town council, ZINWA, Zimbabwe Republic police and selected clinics and the ASM. The population was classified into three broad stakeholder groups whose perspectives the researcher felt were important to obtain in this study: artisanal small scale miners (include those working in stamp mills, owners of stamp mills, users of metal detectors and those panning on the mountain), Shurugwi Town Council, EMA, ZINWA and non-mining members of the community. People from the local communities were referred as stakeholders for analysis purposes in this research whilst artisanal small scale miners are referred to as panners.

### **3.5 Sampling**

According to Pilot et.al (2001:234) a sample is "a proportion of a population." William (2006) defines sampling as a process of selecting units from the population of interest so that

the sample obtained will be used to generalise results from the population in which the sample was chosen. In other words, sampling refers to the process of choosing a fraction of the population to represent the whole population. This will be done in case of producing a few questionnaires for a selected group of representatives from the target population. Konthari (2007) notes that the main advantage enjoyed from sampling is that, it saves time and efforts to the researcher by generalising the findings for the entire set.

### **3.6 Sampling techniques**

#### **3.6.1 Random sampling**

There are four methods of sampling under random sampling. Simple random sampling is a method which allows each section of the population to have an equal chance of being selected to become part of the sample (Frankel and Wallen, 1996). Allison et.al (2001) postulates that systematic sampling has similarities with simple random sampling except that random selection involved relates to which subject is selected as the first one from the sampling frame.

Stratified sampling involves dividing the population into strata with each stratum having relatively homogeneous elements and once the strata have been identified a simple random sample is selected from each stratum separately. Stratified sampling is used when the population is thought to consist of a number of smaller subgroups such as male or female which are thought as well to have an effect on the data to be gathered (Allison et.al, 2001).

#### **3.6.2 Non random sampling**

Guijt and Woodhill (2002) suggests that non random sampling method make an open choice based on the researcher's own judgment about whom exactly to include in the sample. This method can also be done in four ways which include quota, convenience, snowball and judgmental sampling. Barlett (2001) suggests that quota sampling involves the selection of a sample in the ratio similar to that of the whole population. Convenience sampling involves the process where the most available people are chosen as subjects (Sekeran and Bougie, 2009).

The researcher used simple random sampling method as it is considered to be a fair method of choosing a sample from the entire population and also the student is dealing with a large

district which might make the research difficult to conduct with such a limited time. Moreover, simple random technique has less bias than other methods and it is also the simplest of the probability techniques, which can make the analysis of data gathered easy. Random sampling is the best technique for such illegal gold panning research as there are no fixed proportions for the number of mining sites in the district and also the actual number of panners operating in the area.

### **3.6.3 Sample size**

Wood and Haber (1998) suggests that the larger the sample the more representatives and the less the sample, the less accurate of results to be obtained because of less representatives. The researcher used a sample size of 150 respondents in Shurugwi District to collect data which involved random selection representatives from the target population on which everyone was interviewed and some also received questionnaires. The researcher chose to work with a sample of 150 respondents as the population size of Shurugwi District was too large to work with as the time frame and cost bearing was inadequate for the researcher. However the sample size gave the study more chances of credible findings important for the research.

### **3.7 Research instrument and data collection**

Pierce (2009:159) states that, "a research instrument is a survey, questionnaire, test, scale, rating, or tool designed to measure the variables, characteristics or information of interest, often a behavioural or psychological characteristic". Creswell (2003) mentions that data collection steps includes setting of the boundaries for the study, collecting information through unstructured or semi-structured observations and interviews, documents and visual materials as well as establishing the protocol for recording information. In this research project the researcher used the survey design in which data was collected by way of questionnaires and interviews. Research was conducted through primary and secondary data methods which include interviews, questionnaires, study of documents that show the trends for this issue past and present to mention a few. The researcher will choose instruments, which will help get the most relevant information about the study within the limitations of time.

### **3.8 Primary data**

According to Bryman and Bell (2003) primary data refers to the original data which is free from any alteration by human beings and the data has not been published. In other words, primary data refers to original data that has been collected specially for the purpose in mind. It means someone collected the data from the original source first hand and the data has not been published yet and is more reliable, authentic and objective. It has not been changed or altered by human beings therefore its validity is greater than secondary data (Bryman and Bell 2003). According to Forshaw (2000) primary data are those that the researcher has collected himself/herself. The primary data sources the researcher used in doing this research were questionnaires and personal interviews.

### **3.9 Interviews**

Interviews were also used to get to the depth of the problem. The researcher probed these people about the failings in the policies in a way that a questionnaire may not collect as much evidence as is required. In this case the interview as the best tool because is able to present a case to the people in question and probe as much as was expected. This helped raise research questions and discuss them fully with the individuals concerned.

The interviews were conducted by talking to groups of people targeted in this research that included 90 respondents. These included the (Stake holders) local authority, the district Administrators Offices, Environment Management Agency, Ministry of Mines, ZINWA, (non-panners) rural and urban households, business community and from the gold panners themselves. The Zimbabwe Republic Police (ZRP) of Shurugwi, urban and rural clinics were interviewed to identify gold panners' dangerous activities in the community and town at large from their behaviours. The interviews aimed at obtaining data on how people conducted the activity to determine compliance with regulations, perceptions about environmental degradation as a result of gold panning, the causes for opting for panning as an income generating activity and the perceived solutions to the effects of the activity to the environment and the community.

### **3.10 Questionnaire**

According to Weijun (2008) questionnaire is a general term to include all techniques of data collection in which each person is asked to respond to the same set of questions in a predetermined order. Czaja and Blair (1996, p. 106), “The questionnaire is one indispensable means by which the opinions, behaviours and attitudes of respondents are converted to data”.

Questions in the questionnaire seek to identify the views or opinions as well as knowledge and understanding of the issue that the target group has. In so doing the researcher will be trying to establish how much of the panning activity is done with full understanding of the problems its causes and so how much planning for the future is drafted into the activity. The researchers would also be interested in gathering information from those not involved in the panning but are equally affected by the results of gold panning as it is these people who are likely to push for environmental protection.

The questionnaire allows reaching out to a lot of people at the same time. The researcher has to use simple English to communicate with some villages that may not be educated enough. This will help to get the most correct information on what the research is all about. The questionnaire has the advantage of being able to collect a lot of information on a snap shot, which could cover a lot of areas. Thus the questionnaire is considered an appropriate instrument to use for this group of people.

Questionnaires accounted for 70 respondents where some of the questionnaires went to different rural communities and urban communities representing non ASM, the District Administrators office, ZRP Shurugwi, clinics, gold panners and also including clinics Ministry of Mines, EMA, Shurugwi Town Council. The researcher made follow ups in trying to verify whether the respondents understood how to interpret and answer the questionnaires as some may not understand the demands of each questionnaire.

### **3.11 Use of ASM associate**

Most importantly the researcher used a trusted associate engaged in gold panning activities who has knowledge of the study area and also operates in the area. This associate helped in introducing my study to other ASM who might be rather violent to new visitors which opens up their views and freely share their benefits, grievances and how they ended up panning, why they leave the environment such deteriorated through interviews and distribution of

questionnaires. Also the associate will show the researcher some of the damaged areas and how are their relationships with the surrounding communities they operate in.

### **3.12 Secondary data**

Secondary data is the data that have been already collected by or readily available from other sources (<http://www.secondary-data.com.htm> visited on 11/04/2014). According to Forshaw (2000) a secondary data research project involves the gathering or use of existing data for purposes other than those for which they were originally collected. Secondary data also refers to the information gathered by someone other than the researcher (Zikmund, 2000). Thus, secondary data involve the collection of data from sources that are already available. The theoretical background of the research topic will be framed from secondary data. Secondary data found will be helpful to the researcher especially in the literature review and the analysis section of the research project. Listed below are various sources of secondary data.

### **3.13 Internet**

Internet was found to be of greater importance as it offers convenience by providing a range of service and data at once, thus it has become a “One stop shop” for all information. The researcher will access e-journals, e-books and organisations' websites, PDFs via the internet that have discussed gold panning trends from the study area and also any part of the world that endures gold panning impacts.

### **3.14 Textbooks and journals**

Textbooks and journals are manuals of instruction or standard books and codes in any branch of study. Textbooks are only published in printed format and some online mainly known as electronic books, or e-books. The researcher had to use different textbooks and e-journals on compliance to the mining industry in Zimbabwe and global in determining how to manage the impact of gold panning to communities.

Also the researcher would consult various professional journals in coming up with the research as not much books in the library look at gold panning but small scale mining or rather gold mining at large. The advantages enjoyed by the researcher from using journals and textbooks are, they bring new problem areas to the research which is a move that helps to

avoid duplication of researches. This helped the researcher in having a broader and deep understanding of the subject matter.

However journals and textbooks have got their own drawbacks which include time consuming and tiresome process of searching the relevant information about the subject matter under study. Thus, to obtain information from journals online many steps are involved and to be followed.

### **3.15 Online media tools, (Newspapers, radio and TV Broadcasts).**

This will help the researcher obtain recent news and information on Artisanal small scale gold miners in the country and importantly Shurugwi as there are few book writers who wrote about ASM in the Shurugwi. The newspapers have cited information on the bad behaviours and havoc caused by ASM in the area, their day to day activities that have made the rural and urban communities sleepless.

### **3.16 Data analysis and presentation plans**

Data analysis is a process of inspecting, cleaning, transforming, and modelling data with the goal of highlighting useful information, suggesting conclusions, and supporting decision making. Data analysis has multiple facets and approaches, encompassing diverse techniques under a variety of names, in different business, science, and social science domains. (<http://www.answers.com/topic/data-analysis> visited on 11/04/2014).

After gathering all the relevant information, the researcher will evaluate data using analytical and logical reasoning to examine each component of the data provided, then present, analyse and establish solutions to the research problem. The collected data from questionnaires and personal interviews will be presented in pie charts and graphs, appropriate to reflect the correct trends. The obtained results will be presented in relation to the objectives and research questions of this study.

### **3.17 Data presentation and techniques**

There are a number of techniques that can be used to present data. For the purpose of this research, the following data presentation techniques were used by the researcher.



### **3.18 Tables**

Tables will be used to display numbers since they are arranged in rows and columns. Tables will be employed to present numerical figures where the exact figures are important. Tables show facts and figures relatively easier than narrative techniques. The tables also represent an easier way for comparison of variables.

### **3.20 Image classification**

The image classification process involved taking pictures around Shurugwi District to portray the activities damaging the environment and at large infrastructure. This technique further involve both supervised and unsupervised classification in order to come up with a current depiction of the state of land-use and land-cover in the district. Five vector layers of affected environment areas to be shown by pictures include forest areas, silted and gullied water bodies (rivers and dams), affected roads, houses, bridges, pit holes, abandoned shafts, cultivated (farming) land will be digitized as sites for the research supervised classification.

This technique was useful in terms of this qualitative research based where correct figures are not used or are not obtained as pictures shows the actual layout of the environment impact at large. Images will be used on most classifications that will work as evidence to explain the different areas covered by the researcher and also reflect the current and extent of damage caused by gold panning activities in the Shurugwi

### **3.21 Chapter summary**

This chapter discuss the instruments that were used by the researcher in conducting the study. Interviews, questionnaires and image classifications will be conducted to collect data for the research. Only those instruments which the researcher judged as compatible with his population of the study and that brought the best and relevant results were chosen from among the multiplicity and other factors.

## **DATA FINDINGS, PRESENTATION AND ANALYSIS**

### **Introduction**

This chapter presents the primary and secondary data collected by the researcher from the field so as to examine the findings and get a clear understanding on the effects of Artisanal small scale gold miners on the Environment and Livelihood. In order to conduct the research well the researcher made use of some questionnaire, carried out some interviews and observations in order to gather source of the primary data. In the case of gathering secondary data the researcher used, textbooks, online journals, newspapers, magazines and the internet. Data presentation and analysis included an arrangement of interpretive and narrative techniques. Data was broken down into manageable units, synthesized and patterns or themes were identified to make possible for meaningful analysis, (Leeddy and Omrod, 2001).

### **4.1 Response rate**

Response rate also known as completion rate or return rate in survey research refers to the number of people who answered the survey divided by the number of people in the sample. It is usually expressed in the form of a percentage. The response rate is very crucial in a research as the lower the response rate the higher the probability that the sample is biased, so the response rate has to be greater. The response rate is commonly affected by the methods of data collection, the more the interaction between the respondents and the methods used for data collection the higher the response rate.

The researcher in this case used Qualitative research, Interviews and questionnaires were accounted for 150 respondents in Shurugwi, 100 were successful. The researcher interviewed Artisanal small scale gold miners, Non-small scale gold miners, Police, ZINWA, Town Council, EMA, Clinics, Ministry of Mines, Local leaders, clinics out of all these group of people only 100 managed to respond to the interviews and questionnaires.

### **4.2 Interview response rate**

The researcher was targeting to conduct an interview with 60 people in Shurugwi these included people from the town and surrounding villages which are near the Shurugwi town,

Zimbabwe Republic Police, Clinics, ZINWA Officials, some Artisanal and non-Artisanal small scale gold miners. When conducting these interviews the researcher managed to get more information or many people managed to respond because the researcher sometimes could speak in the language in they could understand. Hence there was no language barrier or communication breakdown. The researcher noticed that most people where more comfortable with the interviews rather than the questionnaires because most of them could not understand English and some could not read, so interviews gave room to the uneducated people and they were able to participate very well because they were using the language they could understand.

The only challenge that was there on the field was that some of the targeted people were not available to respond to the researcher's interviews and some were very busy that they could not even come to meet the researcher. These people include Mill operators, Respondents from ZINWA and mine owners were not available to give their view on the effects of ASM. More people form the community were free to air out their grievances as they are the ones who are being affected by the activities of the Artisanal small scale gold miners in other words they can be regarded as victims of the effect of the small scale gold miners' activities.

The researcher's interview accounted for 60 but only 47 people managed to respond to the interview.

#### **4.3 Questionnaire response rate**

The researcher used some questionnaires which accounted for 90 with 75 having responded to the questionnaire. The researcher therefore made some follow-ups making sure that all the people to whom she had distributed her questionnaires to could understand and if they were able to interpret and give answers to the demands of the questions. Through the use of questionnaires the researcher managed to reach to so many people within a short period of time and at a lower cost.

The distribution of questionnaires was an easy task but the only challenge that the researcher faced was that the response rate was very low the reason being that having distributed the questionnaires and gave people time to fill in or answer the questions which were on the questionnaire some did not manage to answer them because most of the people could not read. And some were too busy to sit and answer the questions, the researcher then left the questionnaires with the respondents hoping that she could come and collect them the

following day but she only managed to get hold of a few people somewhere nowhere to be seen. Thus one can actually note that the use of questionnaires is time consuming, more costly and more labour intensive.

#### **4.4 Gender of respondents**

The research reviewed that both male and female are being involved in artisanal small scale gold mining activities. The researcher found out that men were mostly involved in the digging as it require more power hence some able bodied men are required to conduct this kind of activities. However, some women were involved in searching for gold, through sieving the soil using some pan dishes or washing bowls which is easier than digging the ground, the soil that they were using was that which the men would have left seeing that there is nothing on it since men will be looking for higher grams of gold unlike women. In most of their responses, the female ASMs indicated that being involved in the Artisanal small scale gold miners activities was not suitable for them but they had no choice since most of them are uneducated and in order for them to earn a living they should find something to engage themselves in, in order to get money that is the reason why they embarked on ASM because they do not have any other choice. The majority of the ASM are male which might constitute approximately ninety-five percent the reason being that most of the activities in ASM requires maximum physical strength which most of the females might fail to provide.

Moreover, the majority of the respondents rate are married people this include Artisanal small scale gold miners and non- artisanal small scale gold miners. This is to prove that ASMs activities is a poverty driven activities where we see the whole family being involved in the mining activities in order to earn a living. This is in support with Chikowore (2002), who argued that in developing countries like Zimbabwe, most of the illegal panners are rural married man who are driven by hash poverty levels. The current economic hardships and critical food shortages in Zimbabwe however, have forced most rural and urban families in Shurugwi district to resort to gold panning, creating higher risks to the environment concurrently with the economic recession. There is also quite a number of single men and women, children who are also involved in the mining activities in order to earn a decent living since there are no jobs in the country.

#### **4.5 Age group of respondents**

The researcher found out that most of the people who are being involved in the activities of Artisanal small scale gold mining range from between thirteen (13) up to fifty (50) years. The reason being that this mining activity in most cases requires the able bodied men, people who are fit and strong since it requires more strength in terms of digging, carrying the equipments which are to be used during mining. On those who are thirteen years the researcher noted that they are school dropouts whose parents were no longer able to pay for their fees so since they have nothing to do or in order for them to earn a living they embarked on ASM. And also another large number of people being engaged in ASM are those who range from eighteen years to thirty-five years the reason being that there is no employment in Zimbabwe so most people are now being involved in ASM activities.

#### **4.6 Experience of respondents**

The researcher after having distributed he questionnaires and conducting her interviews she noted that most Artisanal small scale gold miners have more than 5 years of mining experience. Also the stakeholders that deals with the mitigation of the effects of Artisanal small scale gold miners have more experience as they have been dealing with these ASM for a long period of time but they have not yield any tangible result, the reason being that most of these people benefit from the ASM.

When asked on the damages that they were causing on the environment they showed no interest at all some of the ASM knew that their mining activities were causing harm to the environment they showed that they really do not care about that what they care about is money and nothing else. The researcher asked the respondents if they were not afraid of being trapped underground and their response was that they now have more experience so there is no way they can be trapped underground. Also the stakeholders which include ZRP Shurugwi, Shurugwi Town Council and EMA have more experience when it comes to dealing with these Artisanal small scale gold miners. Also the Non Artisanal small scale gold miners from both the urban and rural community have been leaving in the panning sites for a long time with some having been the first to arrive at the areas and thus explained much of their grievances towards the behaviour of artisanal small scale gold miners.

## **Analysis, presentation and discussion of findings**

### **4.7 Effects of ASM on the environment**

#### **4.7.1 Deforestation**

The researcher through observation noted that Artisanal small scale gold miners activities come with devastating effects because enormous tracts of grazing areas are lost due to digging everywhere as well as veld fires caused by ASM. The researcher noted that almost every place in the Great Dyke within Shurugwi has been destroyed. Blooming trees, thick bushes, valleys and evergreen grasslands were the beauty of Shurugwi. The long winding Boterekwa River and magnificent scenery made the area a hit with tourists from all over the world. This beauty has long been taken away by Artisanal small scale gold miners' activities which left trails of destruction as panners recklessly hunt for gold deposits in the district. The researcher noted that Boterekwa is now acting like a desertification catalyst causing siltation in nearby Muterekwi and Manzimudhaka rivers. The researcher did not look at deforestation in Boterekwa only but she also visited places like Fan Creek where she noticed or had a vivid evidence of deforestation due to ASM activities. One of the cause of Deforestation in Shurugwi is that ASM when they find a lucrative area they then clear the land where they want to conduct their activities through the burning of trees which will result in veld fire, there is also the cutting down of trees. The only problem that these Artisanal small scale gold miners is that when they clear that particular land they will not even think of planting another tree but they will be thinking of moving to another area where they can cause another damage in order to get gold.

Through the interview that the researcher conducted with the Artisanal small scale gold miners on the effects of these activities she received different types of response some showed that they really don't even care about these effects, what they care about is money.

*My sister the reason why you are asking us those questions is that things are still good on your side, the world is very tough as you know that there is no employment in Zimbabwe so whether I damage the environment or not I really don't care because I am after money. I also do not have time to plant another tree because time is money so there is indeed no time to waste and such is life. said Haruzivishe*

*Look here young lady at my age how many children do you think I have? Those children need food, clothing and school fees and you are here telling me of*

*deforestation, does deforestation or that environmental management thing bring food on my table, as for me I will not stop cutting down trees wherever I find a lucrative environment or even to burn that particular place because cutting down trees is time consuming I will just burn.* said Chaza.

The above comments are some of the response the researcher got from the ASM that she interviewed. Due to this kind of response the researcher noted that the ASM do not even care of the effects they cause to the environment as a result of their activities. However there are some who did not even know that they were causing some damages on the environment, they actually thought that the trees will grow if God permits. This then proved the point that most of the artisanal small scale gold panners are uneducated, they do not have the know-how of the effects of what their activities will be causing to the environment. Hence there is need of an awareness campaign where the ASM will be taught of the effects of their activities to the environment.

The researcher then come across some non-ASM and noted that these are the most affected group of people, they were actually complaining of this deforestation thing. They state that deforestation was being caused by the ASM activities because sometimes they engage themselves in veld fire which destroys almost every tree. Most of the non-ASM are farmers they were complaining that the burning of the forest was resulting in the loss of grazing land and they do not even know where their cattle will go for grazing.

#### **4.7.2 Land degradation**

Land degradation is a process in which the value of the biophysical environment is affected by a combination of human-induced processes acting upon the land. It is viewed as any change or disturbance to the land perceived to be deleterious or undesirable. The researcher has noted that most of the land degradation in Shurugwi is being caused by Artisanal small scale gold miners' activities in their search for gold. The researcher have noted that these ASM are involved in the digging of the land in search of Gold. This will then result in some deep pits that people will end up being trapped underground. From the research the researcher noticed that the Boterekwa area is now degraded and you can see pits everywhere. Land degradation is also seen in the Fan Creek and Bhonza area where the researcher noticed some degraded areas that a person can easily get trapped underground and no one will notice

that. These pits are very deep that if a person come closer to them that person might fall on those pits. This is evidenced by the picture below.

**Fig 1.2 Land degradation**



**Source: Field survey 2016**

#### **4.7.3 Water pollution**

A survey around Shurugwi in areas like Fan Creek indicated some pits left uncovered and heaped soils which have solidified into small hills all around the mining communities. Rivers, streams and ponds have been turned into washing bays for gold dust. Although almost all the ponds and streams had turned brownish and highly polluted to pass for human consumption.

During an interview with these artisanal small scale gold miners stated that the reason why they do not to cover up the pits that they have dug was that they will save as water sources or ponds in which rain can collect for their use and also these ponds will be closer to where they operate from, instead of them travelling a long way in search of water to wash their gold dust. These gold dust causes water pollution.

More so the water sources are also being used as the dumping sites by some small mining companies thus destroying the aquatic life because of the mercury that will be deposited in the water. This water can also affect the human health. On one of the questionnaire a certain woman was complaining on this issue of water pollution by the Artisanal Small Scale gold miners stating that after having used the water to wash their gold dust one cannot use that water even to wash her/his body because the water will be dirty.

During an interview one of the respondents stated that there was a certain point in time where taped water was coming out with a brown colour in other word the water was very dirty and it was not healthy for one to drink. Later on the news spread saying that this was being caused



by the artisanal small scale gold miners' activities which was causing the water to be dirty. Water pollution can indeed be caused by the activities of the ASMs.

#### **4.7.4 Mercury and Cyanide danger**

Questionnaire sent to Environment Management Agency established that the use of mercury in the amalgamation process of gold has polluted water and ecosystems. The authority has castigated that the main pollutants in the rivers and dams are mercury and cyanide, and to some extent human excrete because of lack of sanitation facilities at panning sites. Also in alluvial gold panning operations, mineral concentration is conducted by the use of gravity separation through the medium of water using panning dishes and sluice boxes (Chiguruguru).

Through the interviews carried by the researcher with the workers at the milling points said that they could not conduct any operations if cyanide was not there as it is the main chemical to extract the finest gold deposits. The use of cyanide has led to the death of small and large animals that require water to drink and this will then result in the loss of biodiversity. Interviewed the Artisanal Small scale gold miners and they said " we usually operate at night without enough facilities at the same time fearing the police raids and also bullies (Magweja) who disturb our operations. Hence we will be operating in a hurry to get the returns as fast as possible" The reason why they fear the police and the "gwejas" is that if they are caught the police will arrest them and the gwejas will take away everything they have worked for the whole day or night and they will return home with nothing.. On a survey by ZINWA in Dzamabande Dam 7km South of Shurugwi Town established that approximately 22% of water samples tested in the dam contained mercury in concentrations risky to everyday users of the water.

#### **4.8 Effects of Artisanal small scale gold mining on Livelihoods**

##### **4.8.1 Loss of rural and urban household property**

The activities of the ASM have resulted in so many negative effects on the livelihoods, to such an extent that so many people have become victims to these kind of operations. Most farmers have lost land, cattle only to mention but a few to the activities of the ASM. The farming land has been taken away by the ASM one of the farmers responded to the

questionnaire stating that he lost his farm to the ASM, one day he just walk up in the morning and noticed that there were hips of soil in his farm and some pits. He then told himself that it was nothing but the activities of the gold miners. Farming land has been converted to haphazard mines with pit hole dug all over the land thus farmers failing to produce their usual harvests and this will then result in food insecurity.

The researcher have noted that a lot of cattle have been lost due to the pits that have been dug by the gold miners, especially metal detectors which villagers expressed to be the biggest problems as they dig as close as their yards risking cattle that fall in and die. This issue of the people losing their cattle did not start this year, this is also evidenced in the Herald newspaper of March 05 2015 where we see people reporting that they have lost their cattle due to the activities of ASM.

Also the ASM are regarded as the most dangerous people in the society who can only cause more harm than good. Some of the women from Mambowa during an interview said that they are now afraid to leave anything outside during the night because the following day they could not find it. Most women were at agony because they had lost their dishes which they use to wash clothes and they only suspected the ASM. During an interview one of the ladies said; *“Aaaaaah it’s not safe in this area to leave your belongings outside, they must be kept indoors because makorokoza can steal, my daughter, can you believe that someone can actually steal a dish which cost less than \$10”*

For the researcher it was really unbelievable that someone could steal a dish but that was the truth that the gold panners were now stealing from the people and these dishes were being used to conduct their activities.

However on the other hand the researcher noted that the activities of the ASM posed a great deal of accumulating wealth on other communities as they are managing to send children to school, to cater for their own needs without struggling, they are now able to earn decent living, sustaining their livelihoods from mining or buying gold. Some of the business community are benefiting a lot from these ASM especially those who will be operating from shops, boutiques and flea markets. These people are making a great deal of profits from heavy spending of the Artisanal small scale gold miners. Interviewed were flea market operators in the Shurugwi town who said they come and buy all their high priced clothes that

at some moments when they see them approaching, they raise their prices since they do not negotiate a lot.

#### **4.8.2 Loss of life**

The researcher found out that the Artisanal small scale gold activities has caused more harm than good. The reason being that most of the panning methods are carried out with pick and shovels and these panners leave some open pits less than 30 metres deep uncovered or unprotected. This kind of land disturbance leave a noticeable effect on the ground and later on these pits during the rain reason will become breeding grounds for mosquitoes which will then result in the spread of Malaria. Also Malaria is not good for human health it can kill if not treated in time.

During an interview carried out by the researcher, she noted that these pits which were being left uncovered has resulted in the death of so many people, in Shurugwi there was a result which was reported to have trapped underground and this resulted in the death of a lady whose body was not found. So many methods have been used in trying to bring that land out but to no avail. Also on the questionnaire which people were answering the researcher noticed that quite a number of people have lost their children as their children, some of these children fell in the pits which ASM left uncovered after conducting their activities.

Artisanal Small scale gold miners have become a threat in people's lives, during an interview carried out one of the respondents said that residents in Makusha and Mambowa are now afraid to travel at night because of the panners. If they fail to get gold they are now resorting into stealing if one tries to fight back then that will result in your death.

On an interview with one of the police officer in Shurugwi he said that the most death cases which have been reported at the police station are those of Artisanal small scale gold miners. As some will be fighting over mine ownership. In a case explained by one of the ZRP Shurugwi officers, a panner died when he was stabbed in the stomach as two mining syndicates clashed over the control of a mine in Shurugwi. The interviewed police officer, said the incident occurred at Wandara Mine in Shurugwi November 2015. He said the two groups who were fighting for the control of the mine attacked each other with machetes and stones resulting in one of the groups retreating. The mining syndicate, which was already conducting mining operations, resumed their operations but the group which had been

overpowered waylaid the rival group and attacked back. There is also an incident which took place early this year were two ASM attacked a man and dragged him into the forest so that his dead body could not be seen by anyone. As fate has it these two people's plan failed to work as they were caught at the act.

**Fig 1.3 Deep pits left uncovered by the ASM**



Source: Field survey 2016

#### **4.8.3 HIV/ AIDS and prostitution**

Due to the fact that ASM get a lot of money from panning has resulted in risking their lives by being engaged in unprotected sexual activities which will then result in the spread of HIV/AIDS. On the questionnaire that were distributed one of the respondents stated that most of the ASM do not like to use protection, most of them engage in unprotected sex and they sleep with quite a number of people. The nurses at clinics both in rural and urban communities gave much details on the panners' risks of having the highest number of infected individuals as all they have tested only five have come out negative out of 33. Panning sites have attracted the highest risk of commercial sex activities. Sexually transmitted diseases including HIV/AIDS spread among miners who take the virus to their homes. Socio-economic problems include variable incomes and unreliable contracts which

produce economic uncertainty. Crime and violence are rampant as traditional authorities cannot control deviant behaviour among migrant miners.

Most growth points and beer halls in Shurugwi the likes of RB a small location which is located in Shurugwi have become homes to young girls who are now being engaged in prostitution behaviours for the love of money. Some of these young girls are reported to have been running away from their homes due to harsh living conditions, some of them their parents could not afford to pay their school fees and some just ran away from their homes so that they can get money from Artisanal miners. Most of these girls are reported to have travelled a long distance, from faraway place like Gweru, Mutorashanga, Kwekwe just to be close to where the Artisanal small scale gold miners conduct their activities, this has led to an increased HIV/ AIDs infections in the suburbs of Shurugwi town and rural homes, also most young primary and secondary level boys have in recent years of 2008 found no reason of going to school hence they are also being engaged in these small scale mining activities.

An investigation at one of the bars in Shurugwi established that young prostitutes are travelling from as far away as Gweru and Masvingo to work in areas such as Seminary, Boterekwa and The Village. Some ASM from Chachacha and Zvishavane, said young girls often lie about their age in order to attract clients where the majority of the girls look all grown up and if they lie about their age, it is easy to fall for them. Also gold buyers from Mambowa suburb, said the majority of the girls first come on the pretext of selling various wares but end up trading their bodies for as little as \$1. Sometimes the prostitutes follow the ASM to areas where they discover gold posing a great deal of HIV infections. Also people from the community were crying that their children were no longer attending class and this resulted in a high rate of school dropouts. This children were being used by gold buyers who would come and pretend as if they have a lot of money with their very expensive cars. This resulted in some unwanted pregnancy and abortion and also the spread of HIV/AIDS.

#### **4.8.4 Infrastructure destruction**

The researcher has found out that the Artisanal small scale gold miners activities has resulted in the damage of infrastructure. During an interview which took place one of the respondents said that the ASM activities has resulted in them not reasoning at all because some of them were now digging on the road in search of gold, because that particular area was reported to have gold so the ASM ended up digging the roads and this resulted in infrastructure destruction. Roads are being damaged as a result of artisanal small scale gold miners' activities.

#### **4.10 Regulations and mitigation strategies governing ASM activities in Shurugwi**

Mitigation strategies must be put in place to try and mitigate the dangers that have been posed by the Artisanal small scale gold miners' activities on the environment and livelihoods. Some of the mitigations measures include carrying out some awareness campaigns educating people on the dangers of illegal gold panning and teaching them the effects of it on the environment and livelihoods. The reason for these awareness campaigns is that most of the ASM are not educated and they do not know the effect of their activities hence there is need to educate them through an awareness campaign. These awareness campaigns should be conducted by EMA, Forestry Commission, Ministry of Mines and ZINWA, these organisations must work hand in glove in order to educate people on the effects of illegal gold panning activities on the environment and livelihoods.

As it has been discovered that the government and Shurugwi community need to come up with a strategy to mitigate the impact of ASM activities, Council Rangers, policing and fines and taxing needs to be implemented. In reality to put an end to ASM is not an easy task as there is no employment in Zimbabwe hence there is need to tax these Artisanal miners.

There is also need for the provision of mining licenses at an affordable fees, equipment, training and carrying out some environmental awareness campaigns and educating both informal and formal small scale gold miners on the effects of ASM activities on the livelihoods and environment and how they can mitigate these effects.

#### **4.11 Legal framework**

The current legal framework that guides operations in the mining industry have not been synchronised but however bind the operations of gold panning. The following are some of the important acts that govern gold panning activities. (Secondary Data)

1. (National Water Policy 2013).
2. Zimbabwe National Water Authority, ZINWA Act of 2009
3. Environmental Management Agency (EMA) Act (Chapter 20:27)2002
4. Mines and minerals Act (Chapter 21:05)2013 edition
5. Rural District Councils Act Chapter 29:13)2013 edition

#### **4.12 Chapter summary**

The above chapter reviews all the findings of the research and I also helped to answer the objectives which were brought forward by the researcher. This chapter also managed to discuss

Some of the things that need to be done in order to mitigate the effects of Artisanal small scale gold mining activities on the environment and livelihoods.

## RECOMMENDATIONS AND CONCLUSION

### Introduction

This chapter is going to give recommendations to the above research which was being discussed from chapter one up to chapter four. The recommendations will be that of mitigating the effects of Artisanal small scale gold mining activities on the environment and livelihood. As noted in the above chapters the researcher noticed that indeed artisanal small scale gold mining activities have caused much harm than good. Most of these ASM are uneducated, they do not even know the effects of their activities, the impact they have in the future. Hence there is need for an awareness campaign, training on both Artisanal small scale gold miners, implementation of effective policies, licencing and giving permanent claims to miners at a lower cost, environment rehabilitation, the distribution of condoms only to mention but a few. Hence it is the duty of this chapter to give detailed information of the recommendations that will help people to mitigate the effects of Artisanal small scale gold mining.

### 5.1 Land rehabilitation

As said earlier on that after the ASM have conducted their activities they leave some open pits which are 30 metres deep these pits are very dangerous to the livelihoods as they result in cattle, young and big people being trapped underground. Hence to reduce land degradation and loss of biodiversity, ASM have to backfill their excavations so that their bid to the legalization of gold panning will be effected. This will go a long way in protecting livestock from falling into pits and also human lives saved including the communities farming land. According to the requirements of the Forest Commission one has to plant two trees after cutting one tree. Thus artisanal miners need to be encouraged to practise such practices if the environment is to be sustained. Taxes and fines paid under the Community Share Ownership Trust (CSOT) by offenders should be channelled into projects that seek to mitigate against community development in Shurugwi district. By so doing this will help to mitigate the effects of ASM activities to the environment and livelihood and also in the future people will benefit from this kind of act.



## **5.2 Awareness campaigns**

Having noted that most of the ASM are uneducated the reason being that some dropped out of school so that they could engage in ASM for them to earn money, only a few out of the rest are educated. Some of these Artisanal small scale gold miners do not know the long term effects or how dangerous their activities are to the environment and livelihoods. Hence there is need for an awareness campaign to be carried out teaching the ASM and people from the community the effects of ASM and how to mitigate the dangers being posed by these activities. ASM need to be taught on the risks involved in chemicals like Mercury and Cyanide which they use when conducting their activities. To reduce unplanned destruction of natural resources panners need to be aware that the environment is for future generation for them to mine with due care. This can be done or organised by the authorities from EMA, District Council, Police and many more stake holders.

## **5.3 Training of ASM**

Mining is an activity that requires skills for it to be carried out sustainably. Thus the Local government, Shurugwi District Council, Ministry of Mines and EMA need to take it upon themselves to organise training workshops for artisanal small scale miners in order to reduce associated disaster risks. This will help in mitigating the dangers of miners being trapped underground and some being injured.

## **5.4 Developing the mining sector**

With the closing of industries in Zimbabwe, most of the people are left unemployment without any source of earning a living this will then result in extreme poverty. The reason being that if one tries the buying and selling business no one will be able to buy anything from anyone because they will not be able to afford it. It is of this reason that it is recommended that in spite of the environmental problems, a special attention should be given to the mining sector in Shurugwi by the government to minimize the environmental degradation and bring out the potentials of ASM to eradicate poverty which is one of the Millennium Development goals which the country is trying to achieve. There is indeed need for the government to support these ASM, the support can be inform of financial and technical support for the ASM to enhance their mining extraction and skills as it has been

highlighted in the above chapters that ASM use rudimentary methods to extract gold. By offering their help to ASM the effects of these activities can be reduced.

Also through the Ministry of Small Scale and Medium Enterprises the government needs to offer help to ASM in the form of loans, safety clothing and machinery to improve on their activities. Through the legalization of gold panning proper mining methods will be effected thus monitoring will be also easier and the distribution of necessary tools will be possible. This will help to reduce the risk caused by ASM the likes of reduced death rate and also injuries will be mitigated.

### **5.5 Implementation of mining policies**

Currently in Zimbabwe there are no clear rules and regulations governing artisanal mining operations. It is necessary to have a policy aimed at mainstreaming disaster risk reduction in all artisanal small scale gold mining activities. Therefore there is a need for a collaborative effort amongst key ministries and stakeholders concerned with land and natural resources to come together and come up with a policy that will guide prevention and mitigation plans in artisanal gold mining activities.

In addition, that policy should be regulated and implemented through clear regulations and rules. These involve Ministry of Mines and Mining Development, Ministry of Tourism and Environment, Environmental Agency, Local government, Shurugwi District Council, Ministries of Agriculture, Water Resources, Health, Small and Medium Enterprises, ZNWA and Shurugwi Town Council. Such a policy should be drafted after consultation with all stakeholders to cater for their interest including the local community for everyone to have a buy in. Blackman (2003: 21) underscores the need to involve all stakeholders for any project to be sustainable. Such a policy needs to realise panners as the victims not as unruly elements so that they receive assistance due.

### **5.6 Stakeholder institutions collaborations**

There should be coordination among state structures which are connected to mining, livelihood enhancement, poverty reduction, health, infrastructural development, law enforcement and environmental protection to ensure effective evaluation, monitoring and input management. Aside coordination among key institutions, the Mineral Commission and

the Environmental Protection Agency in the region must be resourced with both human and material resources to enable them discharge their mandate effectively.

### **5.7 Licencing and giving permanent claims at lower cost**

It is imperative to regularise and formalise all gold mining activities through licensing, giving permanent claims and operating permits to panners to recoup some of the added costs in the form of taxes. However the taxes and licences charged should be reduced so that most individuals will afford legal operations and all miners turn to small scale mining which easily remote controlled. That money will be channelled to community development in rehabilitating the lost infrastructure and land.

### **5.8 Distribution of condoms, HIV/AIDS Programmes**

Artisanal small scale gold miners works far away from shops and there is no nearby shop where they can get some condoms, hence there is need for some organisation which deals with the mitigation of the spread of HIV/AIDS to move around distributing condoms to these ASM. The distribution of condoms will help in reducing the spread of HIV/AIDS through engaging in unprotected sexual activities, so when people use protection the spread of this deadly disease will be reduced.

### **5.9 Chapter summary**

This chapter is a summary of the research conducted in Shurugwi. That of the effects of artisanal small scale gold mining activities on the environment and livelihoods occurring within Shurugwi. Recommendations to mitigate the effects of ASM on the environment and livelihoods were also discussed in the above chapter.

The study has used Qualitative research methodology in the gathering of data and analysis of data. Views, attitudes and what people think about the effects of Artisanal small scale gold mining activities and their effects on the environment and livelihoods was collected through instruments like questionnaires, interviews, observations and the review of existing evidence on the internet, books, newspapers and journals.

Participants in this research include Artisanal small scale gold miners, people from the community, Zimbabwean Republic Police officers of Shurugwi, ZINWA, Shurugwi City

Council, EMA, Ministry of mines only to mention but a few. The researcher then narrated her findings in the above chapters.

Although mining plays an important role in the sustainable development and livelihood sustainability of rural communities in developing countries, the research set out to establish the major effects of gold panning in with the environmental and livelihood damages caused by Artisanal small scale mining in Shurugwi. The main reason for choosing this research topic was to explore the negative effects caused by illegal gold panning activities in Shurugwi. Also the study was undertaken to provide the mitigation measures in order to limit the impacts of gold panning and the associated disasters at community level.

The research on the effects of artisanal small scale gold mining in Shurugwi was necessitated by the rate at which land degradation, siltation of rivers and dams, deforestation and water pollution is taking place interfering with the natural ecosystems on the environment. Environmental elements such as land, soil, water, flora and fauna face serious damage if not total extinction and or alteration due to prevailing veld fires, water pollution and land degradation as a result of gold panning going on.

ASM highlighted that they were aware of the problems created by their operations but are forced by lack of employment and drought prevailing in the district and the nation as a whole. They were so concerned about the dangers of gold panning and expressed fear for their lives as they were at risk due to shaft collapse which had injured and claimed lives of many. Deforestation and siltation were ranked by panners as the highest enemies of the environment and they assured the researcher that mercury was under control as they recovered all of it. They admitted that some of them were responsible for burning huge tracts of the land in search of gold reefs, but were not aware of its long-term negative impacts on the environment.

The researcher found out that both stakeholders and artisanal small scale gold miners do not view the stopping of ASM as an effective measure of protecting the environment as this does not solve any problem as the root cause remains unsolved. The root cause of ASM is lack of employment in the country hence if this root cause continue to prevail there is no way ASM is going to stop. However they suggest that the government needs to empower and educate the ASM on how to conduct their activities without posing any danger on the environment and livelihood so that they carry out their activities sustainably. Among the suggestions

raised includes awareness campaigns, training on both Artisanal small scale gold miners, implementation of effective policies, licencing and giving permanent claims to miners at a lower cost, environment rehabilitation, the distribution of condoms. All these are regarded as mitigation strategies of the effects of ASM activities on the environment and livelihood.

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## **Appendix 1: Community Questionnaire**

### **Questionnaire**

Lucia Gwenero is my name a fourth year student at Midlands State University studying Development Studies. I am carrying out a research on the effects of Artisanal small scale gold mining on the environment and livelihood. I would like you to assist me by answering the following question, your response will be strictly used for academic purposes.

(N.B Circle the appropriate)

#### **A. Demographic information**

1. Sex: Male      Female

2. Age group

(i.) 18 years and below (ii.) 18 -30 years (iii) 30-50 years

3. Level of Education

(i) No schooling (ii) Primary level (iii) Secondary level (iv) Advanced level (v) Tertiary level

4. Occupation

(i) Employed (ii) Self-employed (iii) Unemployed

#### **B. Research questions**

5. What are the challenges that you have come across due to ASM activities?

.....  
.....

6. How have you been affected by these ASM activities?

.....  
.....

7. State the most vulnerable elements on the environment

.....  
.....

8. How does Land degradation and the burning of forest affects the community?



9. Have you tried reporting this case to the police?

.....  
.....

10. What are the measures that the police have put in place in order to do away with these challenges that you are facing?

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.....

11. Are these measures helping in any way?

.....  
.....

12. What do you think should be done in order to reduce these effects of Artisanal small scale gold mining activities?

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.....

13. What are some of the environmental damages that you have come across?

.....  
.....

14. What measures have you taken as a community in dealing with these environmental effects?

.....  
.....

15. Can you still conduct your Agricultural activities on that particular area?

.....  
.....

16. What kind of property have you lost due to these activities?

.....  
.....

**Appendix 2: Artisanal small scale gold miners Questionnaire.**

**Questionnaire**

Lucia Gwenero is my name a fourth year student at Midlands State University studying Development Studies. I am carrying out a research on the effects of Artisanal small scale gold mining on the environment and livelihood. I would like you to assist me by answering the following question, your response will be strictly used for academic purposes.

(N.B Circle the appropriate)

**A. Demographic information**

1. Sex: Male      Female

2. Age group

(i.) 18 years and below (ii.) 18 -30 years (iii) 30-50 years

3. Level of Education

(i) No schooling (ii) Primary level (iii) Secondary level (iv) Advanced level (v) Tertiary level

4. Occupation

(i) Employed (ii) Self-employed (iii) Unemployed

**B. Research Questions**

5, Where is your permanent resident or home town?

.....  
.....

6. How long have you been involved in ASM?

.....  
.....

7. Do you have any other source of income besides ASM?

.....  
.....

8. What are the factors that lead you into gold mining?

9. Are you aware of the fact that you can register your company and become a legal gold panner?

.....  
.....

10. If yes, have you tried registering your company or yourself?

.....  
.....

11. Do you know of the benefits of becoming a legal gold panner if yes specify?

.....  
.....

12. How are you coping with the police because I have heard that they are some raids which take place sometimes?

.....  
.....

13. Are you aware that your activities damage the environment?

.....  
.....

14. What measures have you put in place to reduce land damages?

.....  
.....

15. Do you cover up your pits or you just leave them uncovered?

.....  
.....

16. Should gold panning be legalised?

.....  
.....