



**Midlands State University**

**Established 2000**

***Our Hands, Our Minds, Our Destiny***

**FACULTY OF ARTS**

**Department of Development Studies**

THE IMPACT OF ILLEGAL GOLD MINING ON THE ENVIRONMENT IN KWEKWE DISTRICT

**Submitted by:**

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***DISSERTATION SUBMITTED IN PARTIAL FULFILMENT OF THE  
REQUIREMENTS OF THE BACHELOR OF ARTS IN DEVELOPMENT STUDIES  
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**Declaration.**

I declare that this research on the impacts of illegal gold mining on the environment in Kwekwe District is my original work and has not been submitted by anyone before. All borrowed material was acknowledged for examination purpose.

**APPROVAL FORM**

The undersigned certify that they have read and recommend to the Midlands State University for acceptance, a dissertation entitled “ **The Impacts of Illegal Gold Mining On The Environment In Kwekwe District**”, submitted to the Faculty of Arts, department of Development Studies by Taonga Agrippa Muraza in partial fulfillment of the requirements for Bachelor of Arts in Development Studies Honours Degree.

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[SUPERVISOR]

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Department Chairperson

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Date -----

## **Dedication**

To my mother Mrs SekaiMuraza and the entire Muraza family who have been very inspirational and have always encouraged me in all my endeavours and even when I am low they were always there for me.

## **Acknowledgements**

I wish to thank the Almighty God, from whom all mercies flow, for keeping me safe throughout my studies at Midlands State University. I would also like to express my gratitude to Midlands State University since my stay and studying at this institute was a pleasure to me, and all this I owe to my supervisor and lecturer Mr Douglas Munemo who guided me through this research and always gave positive comments and encouragement. I would also like to extend my gratitude to the Munyati community villagers, too many to mention individually, I thank you for accepting me into your community and giving useful insights on the illegal gold panning problem. To other individuals who contributed either directly or indirectly to the success of this work, I say thank you and may God bless you!

## **Abstract**

*The main scope of the research was to establish the major environmental challenges caused by gold panning in Kwekwe district in Midlands Province of Zimbabwe. In this study the qualitative with a combination of minor aspects quantitative research paradigms were used with a sample drawn from panners, and stakeholders. The stakeholders comprised local government officials, Environmental Management Authorities and officials drawn from local mining organisations also the local people dwelling along the Munyati Sebakwe and Kwekwe river banks. Given the gravity of the study, purposive sampling techniques were used with extreme variations in selecting panners and other stakeholders while at the same time maintaining a gender balance to the respondents. Purposive sampling was very useful to this research, this so basing on the fact that the researcher could select unique cases that were especially informative. The mainly base on qualitative quantitative data which was collected through the use of face to face interviews and a combination of and observations managed provide an in built triangulation for the study .The study established that gold mining activities which are poverty driven , have incalculably contributed to environmental damages such as deforestation, soil erosion, siltation , and the destruction of aquatic based food chains as a result of disposal of waste material and the use of chemicals such as mercury and cyanide . Gold panning have been seen as having resulted in a serious health hazards associated with the lack of proper hygiene standards in the squatter camps.*

## **1.1 INTRODUCTION**

Across the world many countries have experienced immense natural disasters related to the environment, Zimbabwe in particular has since the turn of the new millennium experienced persistent droughts and rising temperature which is directly or indirectly linked unconscious human activities such as mining and poor farming (Geology survey 2000).It is therefore for this reason that the researcher took a microscopic look on the impacts of illegal gold panning on the environment in Zimbabwe particularly Kwekwe District.

Mining is a very essential economic activity which has the potential of contributing to development of the areas endowed with the resources however it is worth a research to investigate the negative impacts of illegal mining on the environment even though it is of paramount importance to the environment. This research therefore examines and assesses the mining methods used by illegal gold panners in Kwekwe and the associated impact to the environment at large.

## **1.2 BACKGROUND OF THE STUDY**

To achieve rapid economic development, many countries have resorted to various activities to exploit natural resources,( Carolyn Jerkins and John knight 2002). One of such activities is mining. Accordingly, mining is a significant economic activity which has the potential of contributing to the development of areas endowed with the resource both formally and informally. The mining sector plays a crucial role in the economies of many countries, especially through both backward and forward linkages. Substantial contributions can be noted in the form of employment creation and foreign currency earnings that are essential for socio-economic development. According to Zimtrade (2006), over the years, mining accounted for 4% of Zimbabwe's GDP, however the figure is estimated to be more

than 4% since the informal sector is not accounted for in the national GDP Gold production, in particular, is one of the significant sectors in terms of foreign currency earnings and contributes about 30% of the total foreign currency earnings (Zimtrade 2006). It is estimated that, on average, gold exports account for 15% of all exports.

Nevertheless, such a trend has been undermined and affected by several constraints that include rising costs of production, lack of foreign currency, ageing processing technology, complexity of the residual ores as well as the depletion of free milling ores (Ajusa, 2003). As a result of these problems, gold production, which normally accounts for 34% of total mineral production in Zimbabwe in the years 2009-2011, grieyed a massive slump between 2012 and 2015,( Chamber of Mines, 2008). It is worth noting that focus in the mining sector should not be only on the economic aspects, but also on sustainable environmental management, which is part of the integrated global efforts for environmentally friendly production processes (Elkington, 2006) (Ghoshal 2005). According to Picou and Rubach (2006) Mining developments and activities in Zimbabwe are thus highly characterized by profit motives at the expense of environmental protection.

Zimbabwe is among countries that are endowed with many natural resources such as, platinum, gold, iron, and diamond. According to Coakley (1999), Zimbabwe places a desirable position in the mining sector in Africa being the third largest gold producer apart from South Africa. Among other methods one of the two main conventional methods of gold extraction by small scale mining is pounding of gold quartz in metal mortar with metal pestle into powder form. Gold quartz is being extracted by illegal miners from abundant pits of mining companies in the form of stones. These gold-holding ores are hacked from rock

surfaces using harmer and sometimes blasted with dynamites. The broken rocks are then brought to the earth's surface for pounding. The gold quartz is then crushed into pieces in a way that prevent the debris from scattering. The broken gold quartz is then pounded in a steel mortar with steel pestle so as to form powdered grains which are sieved. The process is repeated and continued until all the gold quartz is grounded into powder ready for separation under water. The gold dust is then placed on a well carved car tube or wood pan and rotates under water. The spinning continues while the muddy water is poured away and more fresh water is added. The principle is that the gold particle which is heavier settles under the rubber pan which is then poured into a container for further treatment with mercury. Finally the gold particles are mixed with mercury in the rubber pan to amalgamate the gold particles. The mixture is then squeezed in a white handkerchief or light cloth to release the mercury and the gold is then subjected to fire.

### **1:3 BACKGROUND OF THE AREA UNDER STUDY**

The Midlands Province of Zimbabwe, in general, is characterized by both small scales to medium scale gold mining activities. The proliferating illegal gold panning in the region cannot be ignored. Although these activities are vital for socio-economic development, their associated environmental impacts need to be examined. Considerable priority has been given to the precious metal (gold) at the expense of all other considerations such as the environment and health of locals. This research is an attempt and effort to bring into the lime light the potential environmental effects of illegal gold mining with specific target to Globe and phoenix, Tiger Reef and Munyati mining areas all being under Kwekwe District as case studies to the research.

Kwekwe is a mining city founded in 1898 as mining town in the Midlands Province of Zimbabwe within the green belt and along Great Dyke. Its total area is bounded by Munyati, Kwekwe and the Sebakwe River roughly an equidistance from the capital Harare to Bulawayo According to the 2012 census the city's population was estimated 100 900. According to the National employment council of Zimbabwe More than 40% of the Zimbabwean population living in the Midlands Province heavily depend on mining as the major economic activity. This so basing on the fact that there are high unemployment rates estimated around 88%, Zimstats (2013) which due to the closure of manufacturing industries such as Zisco steel and Lancashire steel and the retrenchment of workers from Zimasco. More over the government of Zimbabwe through the Ministry of Mines has put less attention to counter attack the reckless mining activities by illegal miners since the attainment of independence, According to Ncube (2012) mining claims have been redistributed without proper environmental impact assessment to the youths as a way of cultivating political support of the unemployed out of school youths.

However, the sector has not been without challenges especially illegal mining. Illegal mining has been a major concern by Environment Management Agency (EMA) and by both Kwekwe City council and Zibagwe rural district council in recent times. There has been series of reported incidents of illegal mining over the last couple of years resulting in the loss of many young lives claiming more than 200 lives by 2011EMA report( 2012) through illegal small scale mining activities. Moreover it was also reported that in a single incidence over 6 illegal miners died when the pit in which they were operating collapsed in Kwekwe central near Globe and Phoenix. Children have also lost their lives by accidentally falling into abandoned pits especially in communities closed to the areas where these illegal miners operate. Besides such disastrous incidents, illegal miners have instigated and continue to

cause irreparable havoc to the environment especially water bodies which serve as sources of water for domestic, industrial and irrigation purposes. Pollution of soil and water bodies with mercury, sludge and other chemicals, destruction of farms and farm lands, degradation of land and vegetation, deforestation

#### **1.4 Statement of the problem**

Mining developments and activities in Zimbabwe are highly characterized by profit motives at the expense of environmental protection Ajusa, (2003). This implies that the informal mining sector in Kwekwe district are exploiting the environment for their benefits without special attention given to the ecosystem at large and the future generations. The Midlands Province of Zimbabwe, in general, is characterized by both small scales to medium scale gold mining activities relationship with environment is accompanied by negative impacts specifically to the environment thus the pollution of rivers, air pollution, land degradation and above all threatening human lives that depend on the environment, the extent of environmental degradation and how the effects can be minimized. Therefore the research will be mainly focusing on methods of mining used by informal miners which affect the environment paralleled to the formal mining and what ought to be done. It is important to note that the environment and development are closely linked this is so basing on the fact illegal gold mining is affecting development in the context of basic needs approach by affecting agricultural land. Moreover illegal mining leads to high levels of environmental degradation which on the long run will lead high famines and drought which may lead high mortality rates.

## **1.5 Research aims**

The aim of this study is to investigate and to expose the problems associated with informal mining sector and to assess the extent of the problem. More over the this research aims at coming up with solutions to the problem.

## **1.6 Research objectives**

- To explain how illegal gold mining is affecting the environment in Kwekwe District
- To explore the measures used to curtail the impacts of illegal mining on the environment in Kwekwe district.
- What can be done to protect the environment from illegal gold mining.

## **1.7 Research Questions**

- How has illegal gold mining impacted on the environment in Kwekwe district?
- What are the mining methods employed in Kwekwe district?
- What can be done to protect the environment from illegal miners

## **1.8 Conceptual Framework**

This according to Maponga (1995) refers to the unconstitutional means of extracting the minerals from the ground it may also include restricted methods such as the use of mercury and cyanide in rivers. 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 Mining has also been defined as the extraction of valuable minerals or other geological materials from the earth, usually (but not

always) from an ore body, vein, or (coal) seam. Materials recovered by mining include bauxite, coal, diamonds, iron, precious metals, lead, limestone, nickel, phosphate, rock salt, tin, uranium, and molybdenum. Any raw material that cannot be grown from agricultural processes must be mined. Mining in a wider sense can also include extraction of petroleum, natural gas, and even water from the crust of the earth (Encarta, 2005).

Mining methods are of four basic types. Firstly, materials may be mined from surface mines, open pits, quarries, or other diggings open to the atmosphere. This group constitutes by far the greatest number of mines in the world. Secondly, there are underground mines, entered through shafts or tunnels. Thirdly, there is the recovery of minerals and fuels through boreholes. Finally, there is underwater mining or dredging, which is now extending to the potential mining of the deep oceans.

The environment can be defined as the surrounding or the world we live in. The environment include all the living and non-living organisms. It can be conceptualised into three broad aspects, thus water, land and the atmosphere. Ecosystem According to A.G. Tansley (1935), “An ecosystem is the ecological unit consisting of biotic factors (living) and abiotic factors (non-living) in a specific area. For example forest, grassland, desert, aquatic etc.

### **1.9 Significance of the study**

Several economies have lost sight of environmental and health effects attached to mining activities. Researches that have been undertaken lately to look into the environmental and health effects of mining have found mining activities to be more hazardous to economic development than a blessing. Whether some of these measures have or are capable of reducing the negative impacts of mining on the environment and surrounding communities is a matter of great concern. The significance of this research work lies in the fact that it seeks to undertake a thorough and broader outlook into the environmental and health effects of

mining on surrounding communities, both negative and positive, and recommend policy directives to improve the already instituted environmental policies by EMA and the Ministry of Environment water and Climate.

### **1.10 LITERATURE REVIEW**

Whereas numerous books and research articles have been written and published multi-disciplinary conferences and workshops have been convened with Sustainable environmental management as the main topic or agenda, less literature has focused on the correlation between small illegal mining prospects with the environment and their knock on effects to the environment and the surrounding communities. Available literature examines the impact of mining on the health of both mine workers and the people within the surrounding communities of the mines. According to Stephens and Ahern (2001), mining remains one of the most perilous occupations in the world, both in terms of short term injuries and fatalities, but also due to long term impacts such as cancers and respiratory conditions such as silicosis, asbestosis and pneumoconiosis.

Studies and researches of mining and health by type of mine process are divided into deep and open cast mines. Deep mines produce severe harms for employees in terms of their risks of high blood pressure; heat exhaustion; myocardial infection and nervous system disorders. Studies of surface mining focus on coal, granite and rock mining and health risks related to dust breathing. In all levels of mining health risks occur with dust exposure (Stephens and Ahern, 2001). Further, the mining sector has been affected by the world-wide epidemic of HIV/AIDS, and this is apparent in the studies of South African mines. Several studies Jochelson,

Williams and Campbell, (1998) have focused on the condition of the gold mines of South Africa. Migrant labor plays a vital role in the mining sector in Zimbabwe, and these migrants

are believed to play an important role in the transmission of HIV/AIDS. In terms of how the mining industry has dealt with this problem one study (Williams and Campbell, 1998; Campbell and Williams, 1999) reports that “many mines made substantial efforts to establish HIV-prevention programs relatively early on in the epidemic, (but) these appear to have had little impact”. Nationwide the ZNASP2 introduced the Demand Generation Thrust based on educating the segregated population such as Makorokoza. Meanwhile, Corbett, Churchyard et al. (2000) investigated the combined effects of HIV infection and silicosis on mycobacterial disease in a South African gold mine, and concluded that the danger of silicosis and HIV infection combine in a multiplicative manner. Stephens and Ahern (2001) stress that scientific evaluation of long-term impacts has grown. Employees have been able to use scientific evidence for improved “hazard visibility” and for shifts in health and safety legislation. However, Stephens and Ahern, (2001) exposed the fact that much of the small-scale mining sector falls outside formal legislative shield or scientific analysis therefore. Companies have provided unions have scarcely played an overt role in support for community claims (Stephens and Ahern, 2001).

It is important for one to unveil that illegal mining though it is accompanied by many negative impacts its contribution to economic development is immense provided much alterations have been made to incorporate the environment in on development projects. This is so basing on the fact that environment, economy and social activities cannot be separated this is also in line with the three pillar concept of development UNEP (2005). Mining has an essential foundation for human development through creation of wealth (Acheampong, 2004). The mining industry has been key to the development of civilization, underpinning the iron and bronze ages, the industrial revolution and the infrastructure of today’s information age. In 2001, the mining industry produced over 6 billion tons of raw product

valued at several trillion dollars (Mbendi, 2004). Traditional mining countries such as the USA, Canada, Australia, South Africa and Chile dominate the global mining scene. These countries have become the traditional leaders in mining and exploration methods and technology (Mbendi, 2004).

The contributions of the mining sector for some selected countries can be evaluated. The mining industry in Peru accounts for 50% of the country's annual export earnings. In 1993 the mining industry's contribution to the Peruvian economy was represented by \$2400million paid in taxes, \$400million spent on local purchases and \$280million on imported goods. This accounted for over 11% of GDP (Down and Stock, 1995 cited in Acheampong, 2004:1).

The United Nations Industrial Development Organization (UNIDO) considers joblessness and landlessness resulting from large scale mining to have forced people into small-scale gold mining, and UNIDO estimates that there are over a million people directly involved in small-scale gold mining operations in Latin America. If Africa and Asia are incorporated there could be as many as six million artisanal miners world-wide (UNIDO, 2001). For instance, there are no exact figures on the number of small-scale miners in Ghana, though it is estimated that approximately 100,000 Ghanaians are legally engaged in mining (Aryee, 2003). Nomadic nature involved in illegal mining activities also create challenges for monitoring and regulating small-scale mining activities in the country. Studies by UN on poverty reduction revealed that there is an estimation of 50,000 – 80,000 people engaged in illegal small-scale mining activities in Ghana (Carnegie, et al, 2000).

## **1.11. RESEARCH DESIGN**

### **Observation**

According to Babbie and Mouton (2001) ,observation can be in form of simple observation ,where the research remains an outside observer or participant observation where the participant becomes a member of the group being observed .Observation will also be used to determine different energetic in the community development.

### **Semi-Structured Interviews**

Babbie (2007) stated that a qualitative interviews is an interaction between a general plan of inquiry, including the topic to be covered .Semi-structured interviews involve the use of open –ended question as an interview guide and this method is crucial to the study in order to gather more in-depth information relating to the research problem .

### **Use of secondary sources of data**

The researcher also used primary sources such as official’s documents, such as report, registers and flyers. Secondary source includes government gazettes. Again, some of the information was obtained from the newspapers and internet.

### **Sampling Techniques**

Sampling is concerned with the selection of a subject of the individuals from within a population to estimate characteristics of the whole population (Ganrham 1990) .The free online dictionary knows that a sample is a portion, piece or segment that is representatives of a class or a whole .In addition, Schaefer (2006) says that a sample is a selection from a large population that is statistically representatives of that population .There are various methods of

sampling which include random sampling and non-random sampling just to mention but a few .For the sake of this project, the researcher will employ purposive and availability samplings their advantage and disadvantages are going to be explained

### **Purposive Sampling**

is a sampling method in which elements are chosen based on purpose of the study .Purposive sampling may involve studying the entire population of some limited group or a subset of the population .The researcher chooses a sample based on whom they think will be appropriate for the study (Fiske, 1996).This is used primarily when there are limited number of people that have expertise in the area being studied. This method is relevant since it reduces time Consumption in enquiring people who are irrelevant to the subject .With fewer time constraints and more accurate subject, the cost for carrying out the Sampling project are greatly reduced.

### **1.12 Data Analysis**

In this research, data gathering and analysis will be done simultaneously as per the recommendation of Becker (1961) (cited in Burgess,1982).The recording of data during the unstructured interviews was done thematically in tandem with research objectives, asked question ,answers given and issues that arose during fieldwork and this constitutes “in field ” data analysis. ‘Post-Fieldwork’ data analysis involved the reading and re-reading of the field data transcript and relating them to reviewed literature. A research design means different appropriate methodologies, data collection strategies, methods of data analysis and interpretations chosen as asserted by White (2000). The researcher is going to use exploratory research designs.

### **1.13 DELIMITATION**

Geographically the researcher mainly focused on the Kwekwe Urban and Rural in Midlands Province, Zimbabwe. Moreover the researcher also made use of the responses provided by the locals specifically from Kwekwe District.

#### **Limitations**

- Financial constraints limited the researcher to areas affordable since the researcher has no external funder to the research.
- Limited time also affected the research as the student has other modules to attend to. The time to study such a topic as environment management is too short as this has been an evolving phenomenon which might need a lot of time so that some concepts might not be overlooked or under looked.
- There is also no standard measurement of sustainability and there are also technical resource limitations in measuring the environmental problem impacts. Some issues like climatic change might need more sophisticated resources to measure some scientific aspects which are not available.

### **1.14 ETHICAL CONSIDERATIONS**

Siakwah (2010) asserted that the success of a research depends on the respect to ethical issues surrounding the research. The researcher obtained data from the communities as well as the organization and in order to yield successful results, the researcher did the following:

1. Avoid leading questions
2. Use of vernacular language.
3. Avoid interfering in the social private life of the participants.

4. Avoid promises of any form of gifts after the interviews and filling in of questionnaires.

## **STRUCTRE OF THE DISSERTATION**

### **Chapter 1**

This is the introductory chapter which gives the background of the research, it also justifies the research as well as highlighting the objectives of the research, literature review and the research questions, methods that will be used to collect data and the areas that will be covered. This chapter also dwells on the over view of illegal mining in Zimbabwe.

### **Chapter 2**

Chapter2 will dwells on the impacts of illegal gold mining in detail with specific to water pollution, land pollution and air pollution in Kwekwe District.

### **Chapter 3**

Chapter 3 focuses on looking on the efforts made by the government and other stakeholders in reducing the impacts of illegal mining. This chapter will also present the conclusions, recommendations and areas for further research.

## **CHAPTER1**

### **1.15 Introduction**

In this first chapter of this research the researcher presents the overview of illegal artisanal mining .In this chapter the research will be focusing defining the term illegal mining and explaining and answering questions such as what makes others illegal in mining sector. More so focus will also be on tracing the evolution of mining and in particular illegal mining, the mining methods used by illegal miners will also be discussed in this chapter. In this chapter also there would be a glimpse of look on government response on unconstitutional gold mining.

### **1.1 Overview of illegal gold mining in Zimbabwe**

Mining is an important economic activity which when properly managed may lead to both infrastructural and human development. Botswana being the most contemporary example of a country whose economy mainly base on mining. In the study country of this research the origins of mining can be traced back to pre-colonial states where mining rights where vested in the kings and chiefs therefore any form of exploitation of gold without the consent of the traditional leadership was regarded as illegal. However during this period mining was an off season economic activity hence it was done on small scale since during rainy season the men were involved in agriculture. During this period mining was gender blind, this implies that only men were involved in the extraction of gold. However changes have featured in the contemporary mining industry. The changes include the involvement of women and children in the sector and also the most critical of all changes is the prevalence of many illegal miners.

There is no single definition of illegal mining since according to Africa (2002) the definition of mining varies from country to country. Variations depends on the size of the activity, that is, large scale or small scale mining or in terms whether they are legal formal or informal as well as according to methods used to carry out the operations. Sivotwa and Mtetwa (1997) contend that the illegal mining comprises of the informal small scale operators who are primarily unregistered gold panners concentrated mainly along major rivers state lands.

However according to this research illegal mining is an activity which focuses mainly on the informal small scale miners. This implies that it involves the miners that are not recognized by the government or whose activities are criminalized under the Mines and Minerals. Paying special attention from this research, illegal miners employ rudimentary methods of extracting the gold. This definition is in line with the definition given by Dreschler (2001) that legal small scale is made up of those miners who have their mining claims registered with Ministry of Mines and Mining Development following the provisions of the Mines and Minerals Act Chapter 21:05 (1996). This group includes lowers, syndicates and co-operatives. Zimbabwe's Shamva mining Centre is a living example of such cooperatives (MMSD Global Report, 2002). The smallest mining claim is a block of ten hectares in size measuring 500m x 200m. Research has shown that 80% small scale mining is in gold as it has a ready market. However, it is difficult to establish the exact number of active miners since operations are affected by lack of capital and others register mining claims for speculative purposes (Maponga:1995).

The informal (illegal) small scale mining or artisanal mining refers to those miners who have unregistered claims which is against the provisions of Mines and Minerals Act, they operate illegally. Dreschler (2001) argues that in Zimbabwe, artisanal mining primarily consists of gold diggers and panners (men, women and children) scattered

along some 500km of Zimbabwe's major rivers. Shamu and Wolff, et al (1993) estimate the number of illegal gold panners to be well over 100 000 in Zimbabwe. The ILO (Sectorial Activities Program, 1999) put the figure at between 50 000 and 350 000. Sivotwa, et al. (1999) tried to quantify the number of gold panners in Zimbabwe using panners densities derived from the number of gold panners physically counted per kilometer of river course, and estimated the number to be between 200 000 and 250 000. Dreschler (2001) argues that the number of people earning a living from artisanal gold mining could be well over two million if considering the number of those people providing panners with services. The major characteristic of this category of miners is that it is highly nomadic in nature and as a result they fail to have permanent infrastructure such as houses, water and sanitation. Suffice it therefore to conclude that the practice can promote the spread of diseases. With this in mind one will not be surprised that illegal miners have a negative legacy on the environment and human survival.

It was confirmed by this research that a few artisanal miners own the land and in most cases, this is far removed from the panning area. However, in some cases the panners still manage to produce agricultural crops on their smallholding land. Artisanal small scale gold miners mine by stripping the overburden material to get the minerals at the bottom of the riverbed or along river banks and these are known as gold panners. The material is brought out for hand panning. The activity leaves behind large amounts of piled sand together with numerous pits along the riverbanks. Mined waste is usually dumped close to the shafts and abandoned.

Despite the size of the activities of artisanal small scale mining, it has contributed immensely to the mining industry. The contribution has made mining in Zimbabwe an economic and social backbone. Most scholars argue that the contribution of artisanal small scale mining has not been calculated independent of large scale operations, but has been inclusive

and taken as contribution of mining to the country. However, according to Dreschler (2001) artisanal small scale miners contribute up to 25% of the total gold production in Zimbabwe. The attempt by Zimbabwe in formalizing artisanal small scale mining has been necessitated by this contribution. The facts and figures of mining contribution in Zimbabwe are discussed below.

Mining at its peak in 1986 contributed seven per cent to Gross Domestic Product (GDP) (Zimbabwe School of Mines module, 1997). Again mineral shipments for 2008 amounted to 676 million representing about 51% of the total export shipments and 3.8% GDP. Around 1996 the mineral industry in Zimbabwe was a major contributor to the world supply for asbestos and lithium minerals. During this period mining became Zimbabwe's leading industry, contributing 27% of total export (Gin, 2002), and even today it remains a strong base believed to turn around the Zimbabwe's economy with artisanal small scale gold mining playing a major role in the development of Zimbabwe and the economy. Traditionally, artisanal small scale mining in Zimbabwe can be traced back to the 13th century; however the turn of the 20th century saw an establishment of more than 4 000 mine workings. Although such minerals as nickel chrome, coal and platinum are valuable, gold remains the mainstay of the mining sector contributing about 40% of the overall mineral output, and is the second foreign exchange earner after tobacco (Dreschler, 2001)

## **1.2 Mining methods used by illegal miners**

Mining methods used by illegal or artisanal miners in Zimbabwe include shaft mining, open cast and alluvial depending on the area where the mineral is being extracted. It is important for one to note that among every mining method employed illegal miners there is only one recurring characteristic which is the absence of permanent structures or long term structures.

This is in line with the with Heemberk and Olivera (2003) that illegal or small scale miners are characterised by labour force that is not trained in mining and therefore uses rudimentary techniques for prospecting.

The most common mining method used by small and informal miners is known as open cast mining. Open cast according to the US Geological Survey (1995) is the mining method usually used when deposits of commercial useful mineral or rocks are found near the surface, crust (lithosphere) or when the material is not suitable for tunnelling for example sand and gravel. This is the simplest method which many artisanal miners especially women and children commonly use this mining method because it is less risky unlike other mining method. This involves the clearing of land using hand axes, then to collect the gravel making it ready for crushing to necessitate panning. Open cast is mainly practised in Gaika, Globe and Phoenix. Open cast mining is gender inclusive, this implies that there are also women as well as children involved in the open cast, this so because it is less risky and requires less labour

The second mining method is alluvial mining, which is very rampant nationwide along both major rivers and tributaries respectively such as in the Save, Munyati, Sebakwe and Kwekwe and Odzi rivers just to mention a few rivers as well as other streams and other distributaries. As the term Alluvial resembles alluvial gold is found in rivers dams and streams, this is so because when gold nuggets are eroded in the river basins they are usually deposited in the nearby rivers where they will accumulate, therefore the miners would capitalise on the readily available gold deposits available in the rivers. However basing on the information provided by the respondents alluvial gold is less profitable since it is found in small quantities.

Findings in Zimbabwe have shown that there is more alluvial gold in the area. Alluvial gold is usually found in the rivers or where there is a water source this implies that due to water erosion the gold nuggets are eroded and deposited in the major rivers. Therefore even though statutory instrument 92 of 2014 prohibits mining activities within the river banks, the miners therefore would collect deposits (silt) panning them and separate them using mercury and water from the river.

Furthermore there is shaft mining , as the term shaft resembles involves the digging a shaft or tunnel to reach the gold trail which in most cases would be beneath. Conditions that are necessary for shaft mining include cohesive soil particles which enable tunnelling, moreover the area should not be water logged or its water table should be very low. Therefore it is clear and sensible for one to deduce the explanation from this statement why many shaft mines are located in high grounds or in mountainous areas. It is worth taking that shaft mining produce more gold than any other mining method since most gold deposits are found mainly below the crust.

Government responses on the issue of illegal gold mining has been very unpredictable and is a varied issue .This implies that at one point in time they were completely against illegal mining taking for instance the case of the heavy and ruthless suppression of the illegal miners in the Chiadzwa area in 2008.

## **CHAPTER2**

### **Effects of the mining methods on the environment in Kwekwe**

#### **2.0 Introduction**

The main scope of this research will be discussed in this chapter, thus this chapter focuses on the impacts of illegal gold mining on the environment in Kwekwe district specifically. Despite the associated positive attributes of illegal mining to the economy and social wellbeing of the locals its negative impacts on the environment is a major concern in the district. According to Shoko (2001) the following are environmental problems and that result from illegal artisanal small scale mining and or gold panning. The lay down of problems caused by the clearing of land include soil compaction, siltation, and soil erosion, damage of ecosystems and loss of biodiversity. Moreover Water contamination causes the destruction of aquatic ecosystems, plant life and reduction of fresh water resources. Noise pollution, pan dishes and blasting also causes migration of wild life and birds.1.3.1

#### **2.1 Land degradation**

As defined by UNEP, (1999) land degradation as a complex term is defined as continuous loss in the worth and the productive ability of the land. UNCED in the FAO discussion paper (2004) refers to desertification and land degradation to have the same meaning. Land degradation threatens the economic and physical survival and also threatens the ecosystem (UNEP, 1999) and leads to household and national food insecurity in many countries. A frequent indicator of land degradation is mostly soil erosion in the midst of the reduction in vegetation cover and changes in vegetation composition. Artisanal Small scale miners engage and utilize about 0.005% of total land in use (Dreschler, 2001), but they move a huge volume of about ten million tonnes of rock material per year. Therefore these trends show that the risk accrual process as a result, is massive. According to Shoko (2005) the environmental

impacts of individual operations are not essentially significant; the accumulated impacts of numerous artisanal small scale mining operations can create serious problems for ecosystems and local communities.

In the context of the peri- Kwekwe urban there is problem of land disturbances which is affecting the growth and survival of plants since the profile of the soil is altered by exhuming gravel soil which is not suitable for supporting plant growth .These findings are also supported by Dreschler (2001) 80% who stated that the operations are open casts or shallow pits less than 30m deep and there are left uncovered and unprotected. This form 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 adits, vertical shafts; winzes 22 and raises as well as underground tunnels leading to land subsidence.

## **2.2 Soil Erosion and siltation of surface Water**

As a result of Gold Panning, erosion is more likely to increase and in no time lead to siltation of rivers. Erosion is accelerated by illegal mining operation especially during construction phase and when land is cleared and soil is disturbed. Trenches and roads loosen the soil and this leads to erosion. Soil erosion has significant impact as it contaminates water bodies and modification of the soil profile as the topsoil is eroded (Midlands Mining Commissioner 2007).

During the research the researcher evidenced cases of slope retreat from the trenches dug by illegal miners, basing on the evidence gathered by the researcher there is evidence of continued gully erosion which in the near future will swallow the arable lands in the affected areas. More over the problem of open pits is so common in areas where mining activities are not controlled or monitored, artisanal miners will then leave the pits open without reclaiming them after their activities. At times these open pits are filled with water and becomes of no use to the environment, moreover due to this reason there is displacement of species such as snakes at the same time causing abundance of other species such as mosquitos in the areas where pits have been left open.

### **2.3 Losses and Modification of Soil Profiles**

Since gold panning and mining activities by nature are extractive that is, involve the removal of the soil from underground on to the surface (Pablo, 2006). The result is that the natural arrangement of the soil layers (profile) is altered. The soil particles extracted from the deep down the earth's crust is not suitable for crop/plant growth. If not properly mitigated, the effect can have significant modification of the soil structure and may be of great effect to plant growth (Pablo, 2006). This was also supported in an interview with one of the farmers who stated that agriculture was being affected by the activities of the miners since the soil structure was disturbed.

### **2.4 Ground Subsidence**

As a result of gold panning Mining leaves openings both on the surface and underground and as a result, fractures can develop leading to collapse of the ground. The impact can be catastrophic if the fractures or subsidence occurs where there are structures on the surface. There was a reported case of ground subsidence in the globe and phoenix area in Kwekwe in

April of 2014 where the ground swallowed a fully grown guava tree due to ground subsidence

Another concern raised by the Environmental Officers of the Environmental Management Agency within the Kwekwe area and the communities especially those in the Silobela and Zhombe area is the issue on how small and medium scale gold miners in the area have been digging a lot of deep open pits in the area, which are almost 30metres.. The open pits phenomenon has hit the Silobela area community since 1999. This is because the main type of mining used by the gold miners in the area is open cast mining. This has led to a lot cases being reported in the area of villagers' livestock falling into the deep open pits and getting permanently injured leaving villagers with no option but to slaughter them. Community members from the Zhombe area also expressed their dismay over how they have suffered loss and continue to do so from the accidents that have be fallen their livestock. During an outreach visit that was conducted by the Parliamentary Portfolio Committee on Mines and Energy in Tiger Reef, community members highlighted how the deep open pits from the gold mining in the area have also resulted in the destruction of Agricultural land.

## **2.5 Impacts on forestry**

According Dreschler (2001) when the miners realize a profitable area, they will always construct temporary dwellings from timber and dagga by means of local trees. Illegal artisanal small scale gold miners are responsible for the clearing of wide-ranging areas for fuel and also infrastructural development in Tiger reef Kwekwe district. This is an outcome of the roaming nature of artisanal small scale gold mining. The remarkable point to make a note of is that more than 90 % of the fuel used by illegal miners (makorokoza) come from wood. He goes on to say that the excess reliance on wood as a source of energy results in the

reduction of biodiversity and increasing rates of deforestation. Chiwawa (1993:25) estimates that about four million tonnes of wood is used in Zimbabwe every year as fuel which translates to massive deforestation.

As mentioned above mining activities especially open /pit mining requires the clearing of the land .The miners clear vast lands using their hand axes but impact is immeasurable since there are thousands of miners in the district. It will be very unfair to only blame open cast or pit mining for contributing to deforestation since shaft mining also contributes to deforestation since timber is used as pillars for supporting the mine and also used for heating the rocks so as to break them. Deforestation is a major threat facing the district and the nation as a whole, it of paramount importance to distinguish the contributing factors such as commercial logging and deforestation for the purposes of agriculture from deforestation as a result of mining activities. The impact of deforestation may be traced to causing soil erosion.

## **2.6 Depletion of ground and surface waters**

Since pollution in some instances needs to be technically or scientifically proven, the results of my research could only have weight where any water pollution could be seen with the naked eye. After moving around the rivers and other water points my findings were that the water quality in the following rivers; Kwekwe, Munyati and Sebakwe was such that it can no longer be used for domestic purposes such as drinking, laundry and bathing due to its milky brownish colour Shoko (2005) argued that the complete reliance on the utilization of large volumes of water dictates the site of mining operations close to water sources. Generally, the study has emphasised that artisanal gold mining places a lot of harm on water as a resource. The undertakings of unlawful artisanal small scale mining in Kwekwe as observed by Shoko (2005) have the potential to promote water pollution and depletion of both surface and natural underground sources as they are extremely reliant on water.

Shoko (2005) further notes that the miners in the disturbed district carry out their mining activities such as sieving and amalgamation procedure on the river bed and as such contribute to enhanced evaporation of surface water, drainage of marshlands and the siltation of rivers and dams. In summation all this has the overall net effect of promoting dry conditions as well as flooding correspondingly. This is for instance supported by Shoko (2005) who points out that recurrent flooding of low-lying areas particularly in Zimbabwe has been attributed to the siltation of dams, rivers and lakes. Kwekwe district is no exception to these problems.

In addition, Shoko, (2005) notes that waste stockpiles established on surface has an undesirable impact on the environment. The waste stockpiles contain momentous quantities of sulphides and, with the passage of time, substantial metals, sulphates and other harmful pollutants are dissolved and leached out by rainfall into local tributaries and municipal water sources. The effect of mineral pollution on the bionetwork may be severe and may result in the total elimination of animal life from the receiving waters. Farmers engaged in animal husbandry alluded to the fact that their livestock has lost their lives to the issue of concentration of cyanide in the tributaries in ward 4.

It is also worth noting that there has also been an emergency of invasive alien species on the stockpiles for instance the prevalence of mosquito problems in Amaveni is attributed to the open pits left by the miners According to Dreschler (2001) illegal artisanal small scale gold mining is associated with mushrooming of unplanned squatter camps located close to water courses with poor or no sanitary facilities. This development has high chances of

considerable amount of water pollution from human waste which has lasting negative legacy on the environment.

## **2.7 Mercury poisoning,**

The continuous use of mercury in the amalgamation process of gold, without environmental concerns pollutes water and ecosystems. According to Dreschler (2001) the main toxins are mercury and cyanide. In research done by Mpendazoe (1996:110) in Tanzania, established that 78% of water samples tested in the Lake Victoria contained mercury in absorptions high above 1g/litre the drinking water standard. However this situation is believed to be similar in Kwekwe district of Zimbabwe since the use of mercury and cyanide by illegal artisanal small scale mining is rampant. In an interview with official residents in Munyati area the respondents claimed that it is very common in the area that there has been loss of livestock due to mercury poisoning and cyanide.

Moreover mercury poisoning has the knock on effect this means it affects other dependant variables of the ecosystem, this was also supported by Donkor (2006:3) who argued that mercury is toxic to humans and aquatic based food chains through bio-accumulation. Dreschler (2001) also argued that the use of mercury in Zimbabwe is effective, simple and cheap with as much as up to 2g per gram of gold therefore making it widespread since it is cheap . It is used with the view that the more the mercury used the more the gold is recovered. Regardless of the wide ranging complications, it continues to be used excessively especially in the Midlands Province of Zimbabwe Nartey, Bonzongo and Adotey, 2006).

The salts which are bio available are said to be harmful when they are in soluble state or in water. Therefore according to Donkor, et al. (2006), mercury in its numerous oxidation states is released into the environment from various anthropogenic activities and natural sources. It worth taking that illegal artisanal small scale gold mining forms one such anthropogenic activity that has promoted the use of large amounts of 24 metallic mercury. The above mentioned viewpoint is apprehended by Pfeiffer and Lacerda (1988) in Donkor (2006) in their argument that miners usually discharge mercury into the ecosystem in an abusive manner and without compromise to other dependents of the ecosystem.

Furthermore sediments are now recognised to function as sinks and possible sources of mercury and once polluted they pose great risk to life forms for an extended period of time. Depending on prevailing environmental conditions mercury compounds in aquatic systems can be transformed and released from sediments to water phase. Mercury also has protein binding properties that allows it to readily bio-accumulates and bio-magnifies in aquatic food chains thereby causing a threat to humans and other animals feeding on fish (Lodenus and Malm,1998, in Donkor, 2006).

The estimations of mercury imported into the country stand at nine tonnes and Dreschler (2001) argues that about six tonnes of this mercury is utilized by artisanal small-scale gold miners. This is so because large-scale miners use carbon in the adsorption process (attraction of gold into carbon) from cyanide solution. This is not surprising basing on this research when considering how carelessly mercury is being handled by the miners in this sector in Kwekwe District.

## **2.8 Dust and noise**

Dreschler (2001) in his study finds that the widespread use of pestle and mortar generates fine quartz dust, which is inhaled by those involved in the process. The dust and the fumes generated by blasting are quickly diluted and dispersed as most operations are shallow workings. One respondent confirmed that noise, dust and blasting vibrations produced in artisanal small scale mining operations can only be minimal during the rainy season where the informal sector would be at very high risk from ground subsidence.

The miners access explosives through illegal means as they should be kept in safe places. These explosives once they find their way to artisanal small scale miners, they become a hazard. In addition, on average artisanal small scale miner uses about 5kg of explosives per blast. In Kwekwe district there are some small scale miners who operate legally and have access to the explosives which they buy for their counterparts who are not licensed. The licensed miners get business from unlicensed miners who would want their gold milled.

## **CHAPTER 3**

### **CHALLENGES AND OPPORTUNITIES ON ENVIRONMENTAL PROTECTION**

#### **3.0 INTRODUCTION**

In this chapter research will be focusing on the efforts made by Environmental Protection stakeholders also focusing on the challenges being faced their success stories against illegal miners .Therefore in this chapter there would be a microscopic look on laws that have been put in place how it has protected the environment and what are its short comings hence, EMA, ZINWA, Ministry of mines and mining development as well as the respective local authorities are sectors of interest. This chapter will also present the suggestions or recommendations to the challenges or problems pertaining illegal mining and environmental protection.

#### **3.1 Challenges and opportunities faced by EMA**

The Environmental Management Agency was established in terms of the Environmental Management Act: Chapter 20:27 (Section 9). It is the coordinating institution tasked with environmental management in the country and all other institutions dealing with environmental issues are required to work hand in hand with this agency. The Agency's work is managed and controlled by a board called the Environmental Management Board.

On fines and orders, it is a good move but at the same time, most individuals were bitter about the large fines they are charged because EMA is viewed not as a service provider. One interviewee in the mining sector complained about the exorbitant prices charged by EMA for no good reason, he argued that if it was ZESA it was better since they provide electricity and ZINWA they want to buy their chemicals but EMA is not a service provider, the environment

has a good way of renewing itself .After all even the money does not come to fix environment problems but is used to fund their campaigns. Money taken from the mining sector should fix mining problems. This closely shows that some people are bitter and might not be aware how environment protection is meant to be every one's concern.

Research is undertaken by EMA on various environmental issues like effect of mine dust on plants, veld fires .This helps in identifying some problematic issues surrounding a certain environmental phenomena. However the agency lack resources to carry out these researches thereby they tend to be biased and they cannot readily implement their findings since there are lack of resources to curb these problems. Carrying out researches is also affected by non-compliance of most stakeholders. If stakeholders who are supposed to implement those action plans show less interest, then sustainable environmental management is hindered greatly since no action plans will be implemented.

It is worrisome that despite many environmental laws protecting the environment in Zimbabwe, the environment continues to suffer from the activities of illegal gold miners. This is so because it is a fact that the amended Zimbabwean Constitution has no specific clause providing for the protection of the environment nor did the Natural Resources Act (1941: chapter 20:13 now repealed) directly cover Environmental Impacts (EIA).Under the EMA act on the issue of EIA this is worthless since the illegal artisanal miners are not registered therefore becomes difficult for follow ups and to carry out EIA since for EIA to take place there should be physical address .

This policy requires that the responsible authorities should not grant permits to projects that are prescribed for EIA before such EIA has been undertaken, reviewed and accepted by

the Department of Natural Resources (now Environmental Management Agency). EIA is regarded as part of project planning. This policy is supported by environmental guidelines for various sectors, and led to the promulgation of the Environmental Management Act (Chap 20:27).

Of late the Zimbabwean government publicized the Environmental Management Act 2002 (Chapter 20:27) with the agenda of supplementing and improving 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 many 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. These pieces of legislation should be considered during the EIA decision-making process in artisanal small scale gold mining activities in Kwekwe district.

It is alleged that the Environmental Management Agency (EMA) which is supposed to be monitoring and policing the environmental degradation was not doing enough. The major problem is how the pieces of the legislation is related to one another and the degree of interaction. The various pieces of legislation are overseen by too many different ministries and sector ministries with different and sometimes conflicting agendas. Therefore it becomes very difficult to implement the provisions of one Act to a ministry that has a different agenda. In this case EMA is the example, EMA's duty is to see to it that mining is done in a way that minimises environmental degradation, but EMA is not involved in the licensing of the mining operations. It then becomes difficult for EMA to enforce environmental regulations as it is ignorant of the agreement between the miner and the Ministry of Mines since EMA has the

responsibility of ensuring certain environmental standards, failure of which the perpetrator will be fined.

### **3.2 Challenges faced by the ministry of Mines and minerals**

The Mines and Minerals Act specifically deals with prospecting, the rights and obligations of prospectors the pegging and registering of mining locations and a few other miscellaneous items which are related to mining. The section 2 of the Mines and Minerals Act undoubtedly states that the rights to minerals are vested with the President therefore any mining operations requires the application of a lease through formal writing with a stipulated fee to be registered. In this respect however, illegal miners continues to prevail. In an interview carried out the respondents alluded to the fact that the fees needed for registering a mining claim are costly. In an interview with a mining syndicate from mbizo ,the response was that the process of registering a mining claim are expensive ,too long and a waste of time since it will take a minimum of 2 years to approved for your claim.

They went on further to point to the issue of nepotism, clientilism and politicization of mining, according to the respondents as long one is not a ZANU PF card holder chances of getting a mining claim are nearest to zero. Therefore despite having the mines and minerals act the problem of illegal miners continues to prevail. The respondent's argument is also cemented by Mawowa explorative research to the gold rush phenomenon based in Kwekwe. Mawowa argued that the gold rush in Kwekwe district should not be seen just as a form of local 'survivalist' strategies of the poor, but as a site of political control and accumulation by elites, part of a 'patronage economy

### **3.3 Challenges and opportunities faced by ZINWA**

The new Water Act(1998) has been described as technically sound with a solid base for sustainable and efficient utilization of water resources. The act stated that all the water belongs to the state therefore any commercial utilization without a licence is prohibited .Basing on the Act any use of the water be it ground or surface water for purposes of realizing profits is regarded as commercial therefore one should obtain a license and from time to time pay a stipulated amount of money for water services. ZINWA is said to be responsible for water issues in the country including establishing water quality and therefore assessing pollution levels.

However there is no single document that provides a policy framework for the management of water resources in the country and for the provision of water and sanitation services. The country's Water Act of 1998 restructured the water sector to ensure a more equitable distribution of water and a stakeholder involvement in the management of water resources. Post 1998 period saw an improvement since water was no longer privately owned. The previous system of water rights was replaced by water permits of limited duration which are approved by Catchment or local Councils.

Furthermore, under this Act water was to be treated as a commercial good and the principle of "user pays" was now in effect. Again so under the new water act pollution of water became an offence. The act also adopted the principle of "polluter pays." The Zimbabwe National Water Authority Act of 1998 led to the creation of ZINWA, a parastatal agency responsible for water planning and bulk supply. ZINWA main task was to manage water resources on a catchment basis with involvement of stakeholders in each catchment area. Other responsibilities of ZINWA included the management of the water permit system, the pricing of water, operating and maintaining existing infrastructure, and

Moreover according to the water act one is forced to pay a stipulated amount of fine for polluting the water be it ground or surface water ,this is important in the sense that when miners pay for polluting the water the money may be used for purifying the water, for instance for neutralizing the potential hydrogen of water (pH)in dams. Again so as mentioned earlier on the law enforcing agency are failing to enforce the ZINWA to the illegal miners in Kwekwe basically because they do not have permanent operating areas neither do they have licenses.

However, despite the water act the illegal miners continue to deplete and pollute ground water. Basing on one respondent's argument water is everybody's property and that makes it a nobody's property, paying for using and polluting it makes no sense to them. Moreover vital sections of the act have not been fully enforced, hence its founding principles cannot be supported. The Water Authority is collecting insufficient revenue adequately to support statutory functions. ZINWA is not financially viable, as the four main accounts that were created (raw water account, clear water account, engineering services account and water levy account) are not self-sustaining, hence the new institution has to rely on the government for financial support. In the process, key and experienced staff have left the organization. Therefore the Water act or ZINWA act is just but a paper tiger with limited successes.

### **3.4 Challenges and opportunities faced by the forest commission**

The Forestry Commission is established in terms of the Forest Act. Their duties include all management of forest resources as well as policy formulation in relation to the same resources. However of late the commission has been silent, this is so because its duties are

being consumed by EMA and the budget allocation is very slim considering the fact that it is a subsidiary of the Ministry of Environment Water and Climate

The Forest Act establishes the Forestry Commission which is responsible for the management of forest land and forest estates in the country. As a result, the Commission is more concerned with protecting the forestry because that is where most of their revenue comes from. The Act also deals with the appointment of forest officers by the Minister whose duties are to enforce the provisions of the Act, including those relating to access to forest areas and possession of forest produce. Section 85 of the Act deals with wrongful possession of forest produce and authorizes the Police and Forest Officers to confiscate any forest produce which they reasonably suspect to have been wrongfully acquired and to arrest the person found in possession of such produce.

### **3.5 Challenges and opportunities faced by Kwekwe City Council**

The local authorities as prescribed by the Ministry of local governance and urban development are responsible for the protecting the environment within their jurisdiction as well as the protection of locations of historic or cultural interest. However the degree of environmental damage emanating from illegal mining activities specifically alluvial gold mining, gold panning and small-scale gold mining. In the case of Kwekwe District the ACT and Agency were supposed to jealously guard the gold remains at Globe and Phoenix thus the location of the museum of Kwekwe.

All in all it has been said that the pieces of legislation governing good mining practices are fragmented and difficult if not impossible to implement. This is the reason why

environmental degradation goes on unchecked in mining. It is seen that an activity that is condemned by one piece of legislation is condoned by another.

### **3.6 Challenges and opportunities faced by the ZRP**

Basing on the Police Act Chapter 11:10 the Zimbabwe Republic Police (ZRP) is tasked with the enforcement of all laws. In addition to that different pieces of legislation also list offences that may be committed in terms of their application and the police are authorized to arrest people found violating any of the laws. In terms of natural resources, the police are concerned with its harvesting and how it is subsequently used.

The illegal exploitation and illegal use of natural resources can lead to arrests and confiscation of natural resources by the ZRP. For example, in terms of Section 17 of the Communal Land Forest Produce Act a police officer may at any reasonable time, require the holder of a license, permit, special license or special permit to produce for inspection, his license, permit, special license or special permit, as the case may be. Require any person found inside any communal land transporting or selling natural resources or supplying natural resources to anyone who is not an inhabitant of that communal land Found outside communal land in possession of natural resources that is reasonably suspected to have come from a communal land, to prove to the police officer that they are not committing or have not committed an offence in relation to natural resources concerned and, if they cannot do so, they are liable to arrest, prosecution and payment of a fine. These powers given to police officers in terms of the Act are in addition to any powers that the police may have in terms of any other enactment.

However ZRP as a sector in the ministry of Home Affairs lacks adequate funding to carry out its operations for instance shortage of motor vehicles to carry out the regular visits exploring the district resources for instance ZRPs activities are limited when it comes to the protection of the environment. Moreover due to economic hardships police officers are more likely to be tempted by bribery ZRP is also solely responsible for enforcing the explosive regulations. “Explosives” as defined in the constitution amendment 21 means gunpowder, nitro-glycerine, dynamite and other nitro-glycerine admixtures, gun-cotton, blasting powder, detonators, fuse and every other substance used to detonate as declared by the President, by statutory instrument, to be an explosive for the purposes of this Act, but does not include any ammunition a license to possess or deal in which is regulated by any other enactment, or fireworks manufactured for purposes of amusement.

Therefore all in all, this act prohibits an possession of all forms of explosives without any license and registration of the explosives. However, it is worrisome that in Zimbabwe and Kwekwe in particular, there has been reports of the use of dynamites and other detonators to blasts the rocks by the illegal small scale miners despite the presence of the law. In an interview with one miner from Sherwood, the respondent confessed that blasting detonators are as cheap and easy to get just like bread, moreover he admitted that majority of miners that are involved in tunnel mining uses detonators for easy break through on bigger rocks.

The above mentioned situation clearly shows that the dynamites is one of the cheapest tools used by miners which saves time and labor ,by so doing that it becomes the favorite of every illegal miner .This is because the illegal miners do not intend to stay for long at every place therefore they are more worried of getting the precious stone as soon as possible by whatever means .Again so the explosives act is just a paper tiger in the world of illegal miners .This

was supported by the ZRP Kwekwe DISPOL who confirmed in a report, that miners are aware of the explosives act but however ignore the act.

### **3.7 Economic challenges faced by the government in environmental protection**

While much international and local attention has been focused on environmental protection less attention has focused on redressing the root causes of environmental degradation such as the prolonged economic meltdown which has direct link with the environment, this can be best explain with the three pillar concept to environment which shows the relationship between the economy, socio political and the environment. The concept explains the three pillar concept of the environmental management , in this situation each variable affect the other hence in the case of Kwekwe district many respondents alluded to economic decline as sole cause of high levels illegal gold mining, the figures of informal miners according to Mbendi (2009) ranges from 100 to 300 000.

Due to climate change Agriculture activities have become more difficult to communal and small scale farmers .This is so basing on the fact that subsistence or communal farmers depend on natural rainfall therefore since the turn of the new millennium rainfall have become more unpredictable and scarce hence affecting the farming activities therefore it was therefore inevitable that the active population in Kwekwe would find their solace in the wings of informal mining sector.

According to Mbendi (2009) There is an estimated number of about 100 000 to 300 000 in Zimbabwe, this number is more likely to increase by two fold due economic meltdown which lead to deindustrialization and retrenchment of workers there people are more likely to align themselves with the informal sector in this context is the informal or illegal mining. In the case of Kwekwe as deindustrialization emerges due to political crisis thousands of workers formerly employed in the manufacturing industries such as the ‘steel giant’ ZISCO steel and

Lancashire as well as Zimasco. At the end of 2<sup>nd</sup> quarter of 2015 Zimasco retrenched about 1500 workers therefore mining was the only survival strategy for the unemployed mass of Kwekwe.

### **Challenges and opportunities faced by traditional leadership**

Traditional Leaders include chiefs, headmen and village heads with the chief being the highest in hierarchy in a community and the village heads the lowest. They are the custodians of traditional culture and customs within their areas of jurisdiction. In terms of environmental protection , they are required to enforce cultural practices that deal with land rights on the bases of who had the rights to access mineral resources and how the resource could be used have to be followed in the process of picking the produce. This role is reinforced by statute law (the Traditional Leaders Act) which recognizes the role of traditional leaders in the rural areas generally and their role in environmental and natural resources management in particular. These roles have already been explained above under the statutory provisions of the Act.

### **3.8 Recommendations**

It should be noted that gold panning should be restricted, that is the mining rights should be granted to individuals and group of individuals who have concerns to the environment and who qualify. The law should restrict panning in areas that are not designated to mining and the issue of squatter camps near rivers and dams discouraged and stopped. While some of these recommendations may be bold and strict to the panners the researcher believes they will reduce a serious disaster in the district. Such statutes will assist in arresting the people hence reducing negative impacts resulting from gold panning on the physical environment.

The companies such as Zimasco, Sable Chemicals and Lancashire steel must employ locals for both skilled and semi-skilled work that locals can do such as security, general hand and many others by so doing the unemployment levels would be reduced therefore likewise the rates of illegal miners would also be reduced in the district since the major contributory factor in the prevalence of illegal mining is high rates of unemployment in the district.

The government should synchronise all the acts that reinforce the mining sector. In particular the new mineral policy must combine provisions that deal with the mining sector from acts such as the EMA Act Chapter 20:27 ZINWA Act Chapter 20:25, Rural District Councils Act Chapter 29:13 Urban Councils Act Chapter 29:15 as requirements before issuance of mining licences. The research has shown that most of the mining activities by the small scale miners started mining operations without carrying out EIAs because mining laws are not in line with environmental and other regulatory structures governing the mining sector.

Transparency and Accountability, New laws to govern the mining sector must embrace World Bank's Extractive Industry Transparency Initiative. This will allow Zimbabweans to know how much the government is generating from the mining sector and. Government must revive the Zimbabwe Mining Revenue Transparency initiative (ZMRTI) as a vehicle to operationalise the practice of transparency. Through ZMRTI parliament and civil society can play an oversight role in discussing mining contracts and mining ventures on behalf of the state to ensure that they are done in a transparent manner. The research has shown that opacity in the mining sector especially the Gold sector in Kwekwe was made possible through secretive mining deals costing the country billions of dollars in revenue leakages.

Mining laws must be aligned with the provisions of the new constitution by reforming the access to information laws to allow public access to information and public scrutiny on all mining contracts and deals. Incorporation of Corporate Social Responsibility in the new mineral policy to become mandatory in order for communities to benefit from the exploitation of resources found in their localities

Establish beneficiation and value addition policy for country 'mineral resources in order to diversify mining sector through forward and backward linkages to derive more value and creating employment (Ministry of finance 2013).Government must establish an exploring company to carry out geological surveys and determine the value of minerals underground.

The most critical issue which the government should embark on first in order to protect the environment is formalisation of small scale miners. There is need for the government to invest in baseline surveys and research in order to adapt best practices that can be applied over a period of time in order to formalise small scale mining activities. Good governance of the mining sector will see mining feeding into industry and creating employment for the youth there by reducing large scale panning activities currently taking place in Kwekwe district.

It is also a wise decision for the government to enact a gold policy in Zimbabwe that cancels existing mineral rights in alluvial gold mining and vest those rights in the state. The Zimbabwe Revenue Authority (ZIMRA) should play a prominent role in the entire value chain from production to marketing of gold. Government must establish a gold board for Zimbabwe to control and protect the gold resource including overseeing the establishment of a fund known as the gold intergenerational fund where a certain percentage from gold

proceeds will be invested in projects such as environmental protection and infrastructural development or investments that will ensure that future generations benefit from the gold wealth found in Zimbabwe

More over the government must review all mining contracts signed in the last decade to assess whether the project benefited the country and communities. Minerals and Mining rights especially those that came through special grants were done secretly and they are benefitting a few individuals. Government is receiving paltry figures in terms of remittances from the mining sector and poor communities living in resource rich areas like Sherwood are subjected to gross effects of environmental change caused by miners operating in those areas.

Furthermore the Government must meet its constitutional obligations of protecting the environment from harmful practices of the miners for the sake of future generation as is in the Kyoto protocol (2002) which it ratified and signed citizens and force mining companies to respect human rights. The research has shown that government is turning a blind eye on human rights violations in the mining sector especially in areas where mining rights has been politicised hence it becomes difficult for the environmental responsible authorities to monitor the activities of miners eg in Sherwood.

There should also be a revision of the indigenisation laws to ensure clarity and transparency at the same time promoting investor confidence in the mining sector. Recently there has been an increase in shady mining deals that collapsed because of lack of clarity in the indigenisation law therefore there is also the need to revise the communal lands Act to give some rights to local communities to claim compensation from mining companies for loss

agricultural land and property .There is need for mitigation measures to protect the environment and the people downstream.

The is also need to control all activities and to register the panners and draw regulations that will govern operations. Avoid blasting and any other related noises and vibrations at night as this disturb people and animals. All archaeology/cultural artefacts discovered to be reported to the National Museums and Monuments. All mining areas should be fenced off, to avoid loss of livestock.

### **3.9 Conclusion**

In summation of this research one is convinced with the notion that illegal gold mining has and is continuously harming and degrading the environment. Evidence of this conclusion was based and gathered using the following research designs, observations where the researcher used the naked eyes to notice that the environment was degraded from its natural state, use of secondary or written data from the following stakeholders and sector ministries which include but is not limited to ZINWA, EMA, Kwekwe city council and Zibagwe rural district council these sources have been very useful in this research as they produce adequate information where the researcher was limited due to financial and technological resources for instance the researcher had no knowledge and equipment to test PH of water in the rivers and streams in the district therefore ZINWA, Kwekwe City Council and RDC where the most reliable sources.

It came to the researcher's attention through interviews that the illegal artisanal miners in the district mainly employ the following mining methods namely open cast, shaft mining and alluvial mining. It is also worth mentioning to this researcher that open cast or open pit was the most common mining method since it requires less labour, less machinery thus financial

cheap and requires less labour hence being the most common method. It is also mainly practised in the areas such as Globe and Phoenix. This second mining method which came after open cast in terms of being popular and common among illegal miners in Kwekwe is shaft mining, this method requires more financial resources for instance purchasing dynamites however it produces better quality and quantity of gold than some people are engaged in this mining method. Lastly there is alluvial mining, this is so based on the fact that the type of gold usually found there is of low quality described as “fine or flying gold” and is usually found in small quantities.

The core of this research was on the implications or effects of illegal mining on the environment. The impacts of mining on the environment are grouped into three broad variables of the environment which are the atmosphere/ air, water and land. The results of this research clearly show that illegal gold mining affected the land in the form of land degradation which involves alteration of the soil profile and soil structure and therefore negatively impacts on flora or vegetation. Moreover deforestation is considered an implication of gold mining. This according to D. Waugh (2014), has the knock on effect such as soil erosion and siltation of rivers as well as affecting the atmospheric water budget as the evapo-transpiration is reduced due to deforestation. Moreover on water, mining is blamed for siltation of rivers such as in the Sebakwe and the Mbembeswani rivers. Again so, due to chemicals used by artisanal miners such as cyanides and mercury and other chemicals, water is polluted and the PH maybe affected of which in most cases it would be acidic. Lastly there is air pollution, which is as a result of rock blasting and the release of dust particles into the atmosphere.

The research also exposed the fact that environmental degradation is as a result of ignorance of the miners since there is a range of laws which prohibits exploitation of the environment for instance the Mines and Minerals act states that the land in which all the minerals are held belongs to the state and therefore requires licencing, the environmental laws include

but are not limited to Explosives act, Mines and minerals act EMA and ZINWA which are also the watchdogs of the environment however they lack financial resources and are characterised with corruption therefore undermining their role as watchdogs to the environment. After reading the findings of this research it is worth saying that the law protecting the environment is very vibrant however lacks the proper and vibrant implementing partners.

The research went a mile further by taking a closer look on the implementing partners of environmental law such as ZRP, Municipal police, EMA, ZINWA and the Traditional leaders. The successes of the above mentioned organisation's successes are considered however they are characterised by more weaknesses such as corruption, bribery and politicisation of mining claims by powerful government officials.

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