

THE SOCIO-ECONOMIC IMPACT OF MINING:

A COMPARATIVE STUDY OF BOTSWANA AND ZAMBIA

BY

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ABSTRACT

Mining is an activity that many African countries depend on, and Africa's export-oriented mining and quarrying is driven primarily by the commodity hunger of the world's largest economies. In developing countries commodity exports form the most significant portion of exports. Although economic benefits are present because of mining activities, due to the scale and destructive nature of these mining activities some negative impacts are felt on the environment in terms of deforestation, land degradation, toxic water, and loss of farm lands to make way for mining activities. Using Botswana and Zambia as cases due to their institutional differences, mineral production and variety of ore, the study was conducted to see how mining activities affect communities in 216 households.

Using a case approach, three primary sources of data in the form of household surveys, focus group discussions and the key informant interviews were used to capture data needed to answer the main research questions. Empirical research revealed that the socio-economic impacts of mining are mining induced displacement and resettlement (MIDR), the environment, infrastructure and social amenities, health, and the social fabric. The quantitative findings from the Relative Importance Index (RII) indicated that infrastructure and social amenities was the most important factor affecting communities, other important factors were health, and employment. Qualitative results highlighted negative environmental impacts as a result of a lack of law enforcement in Zambia, a fragmented social fabric in both Botswana and Zambia, and an overall improvement in health facilities more so in Zambia than Botswana. In addition, Zambia had a presence of mafia activity in the form of *Jerabos* and *Chondos* whereas Botswana had no reported evidence of mafia like activities.

Theoretically, the study provided a new dimension of analysis of socio-economic impact which included the macro and meso-level as a better method of assessment of mining impact in communities. Through the empirical findings, a theory was abstracted to position the law as a key determinant of the quality of institutions and not just as one of the listed factors that affect institutional quality. The findings showed that the law greatly influences state capacity to promote economic development. A major difference in mining law in Zambia and Botswana is government's involvement in the implementation of the law. Botswana shows evidence of more government influence on mining operations than Zambia which reduces the incidence of rent seeking behavior in Botswana, and shows that Botswana has better institutional quality than Zambia. However, global legal practices show that both countries require legal reform to improve their institutional quality and mitigate negative mining impacts. Legal frameworks for robust environmental protection, community engagement, and compensation are needed in both Botswana, and Zambia. Institutional quality is based on the extent to which the law is understood by all stakeholders and implemented.

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ACRONYMS AND ABBREVIATIONS

AAC	Anglo-American Corporation of South Africa
AIDS	Acquired Immune Deficiency Syndrome
BCL	Bamangwato Concessions Limited
BEE	Black Economic Empowerment
B-BBEE	Broad Based Black Economic Empowerment
BSAC	British South Africa Company
CDF	Cumulative Distribution Function
CSR	Corporate Social Responsibility
DIS	Department of Intelligence and Security
EFCC	Economic and Financial Crimes Commission
EIA	Environmental Impact Assessment
EITI	Extractive Industries Transparency Initiative
FDI	Foreign Direct Investment
GMI	Global Mining Initiative
HIV	Human Immune Deficiency Virus
IIBA	Inuit Impact Benefit Agreement
ILO	International Labor Organization
IMF	International Monetary Fund
ISO	International Organization of Standardization
KCM	Konkola Copper Mines
LBD	Learning-by-doing
LED	Local Economic Development
LFS	Labour Force Survey
LME	London Metal Exchange
MIDR	Mining Induced Displacement and Resettlement
MPLA	Movement for the Liberation of Angola
NCLA	Nunavut Land Claim Agreement
OECD	Organisation for Economic Co-operation and Development
RII	Relative Importance Index
RST	Rhodesian Selection Trust

SIFOMISA	Socio-economic Impact Framework of Mining in Sub-Saharan Africa
UNITA	National Union for the Total Independence of Angola
ZCCM	Zambia Consolidated Copper mines
ZDHS	Zambia Demographic Health Survey
ZEMA	Zambia Environmental Management Agency

CHAPTER ONE: INTRODUCTION AND RESEARCH RELEVANCE

1.0 Background of the Study

Mining is an activity that many African countries depend on, and Africa's export-oriented mining and quarrying is driven primarily by the commodity hunger of the world's largest economies (Dillon & Barrett, 2015; Breckenridge, 2012). However, price changes in commodity prices have a large impact on commodity dependent economies. In developing countries commodity exports form the most significant portion of exports. Minerals account for more than 90% of the export earnings of Algeria, Equatorial Guinea, Libya, and Nigeria, 80% of the export earnings of Botswana and more than 50% of the export earnings of Mali, Mauritania, Mozambique, Namibia, and Zambia (Algeria, 2017; Oluwatayo, & Ojo, 2016; Hailu, & Kipgen, 2017). The revenues obtained from commodity exports have an important effect on the economies and living standards of developing countries (Dube & Vargas, 2013). Weaker economies of the developing world are affected profoundly by commodity price fluctuations, along with the globalization of the world economy and increased liberalization of commodity markets. The price instability of commodities has a negative impact on economic growth leading to increased poverty instead of poverty alleviation (Addison, Ghoshray, & Stamatiogiannis, 2016).

Member states of the Southern African Development Community (SADC) produce two-thirds of Africa's mineral exports by value (KPMG, 2013). Although economic benefits are present because of mining activities, due to the scale and destructive nature of these mining activities some negative impacts are felt on the environment in terms of deforestation, land degradation, toxic water, and loss of farm lands to make way for mining activities (Evans, 2015). Although studies on socio-economic impacts of mining have been done at a meso and macro-level, most studies focus on environmental impact assessments, not much is written about the extent to which communities are affected socio-economically by the mining activities at the micro-level (Aguilar-Støen et al., 2017). The purpose of this research is to focus on finding out what happens to the people living around the mines in the short and long term.

At the meso-level, institutions are the means to provide a path for sustainability in the extractive industry (Kostova et al., 2008; Starik et al., 2013). Stiglitz (2007), argues that the weak performance of African mining economies is due to improper management of institutions. Empirical findings on impact studies at a macro-level recorded by Bebbington et al. (2008), posit that mining delivers adverse social, environmental and economic effects for many countries and provides substantial gains for the owners of the mines. In Sub-Saharan Africa most of the mines are owned by foreigners. The perception of unfair distribution of wealth has been widely researched (Bebbington, 2008; S. Bhattacharyya, & Roland Hodler., 2010; Haber, 2011; Motesharrei, 2014; Frederick. Van der Ploeg, 2011). In Africa, Foreign Direct Investment (FDI) inflows were the driving force for the mining industry's liberalization. These inflows involved the establishment of large-scale foreign mining companies who crowd out small scale mines and take profits back to their home countries (Anyanwu, 2012; Bunte, et al., 2017).

Many scholars have explained how institutions at the macro -level have a role to play in how the countries manage their resources and how the resource curse has brought about challenges for African countries (Acemoglu, Johnson, & Robinson, 2005; Buonanno, Durante, Prarolo, & Vanin, 2012; Hillbom, 2014; Mehlum, Moene, & Torvik, 2006; North & Weingast, 1989). Some possible impacts of mining include but are not limited to development in the areas located around the mines. Infrastructural developments such as roads, communication networks and

improved housing are the macro-findings that show positive impacts of mining (Banks et al., 2013; Evans, 2015).

Although many African countries such as South Africa, Mozambique and Namibia are involved in mining with significant contributions to GDP, Zambia and Botswana were of focus in this study due to their unique institutional backgrounds (McKeever, 2008; Luiz, et al., 2017). In addition, Botswana was chosen because it is the largest diamond miner in the world. The country also has well-known coal reserves and is estimated to have more than 200-bn tonnes of coal reserves (Wilcox, 2015). Zambia has a wide spectrum of mineral resources including copper, cobalt, zinc, gold, manganese, nickel and gemstones (Nyambe, & Kawamya, 2005). The country remains dependent on the extraction and processing of copper and cobalt for export. Copper and cobalt account for approximately 10% of Gross Domestic Product (GDP) and around 80 percent of export receipts. The sector is expected to expand by 2% to 4% per annum over the next five years (KPMG, 2013). These two countries depend highly on mining and would reveal practical impacts that are experienced by the lives of people living in the areas where mining activities take place.

1.1 Problem Statement

Revenues from mining are increasing and commodity dependent countries are exporting more minerals with evident growth in Botswana and Zambia (Ridde et al., 2015; Koitsiwe, & Adachi, 2015). Botswana developed from being among the poorest countries in Africa at the time of independence in 1966 to an upper middle-income country with an annual growth of 8.4 percent due to its diamond mining activities (Siphambe et al., 2005). Zambia investments in copper mining, and the increase in copper prices coupled with growth in exports, helped Zambia achieve an average annual growth of about 5.7 percent during the last decade (Akinkugbe, 2015). There are clear economic benefits as a result of mining activities in Africa, however, increased revenues, annual growth and exports have not translated to significant poverty reduction or sustained growth. Despite the reported benefits of mining, reports of problems arising from mining activities are numerous. Environmentally, mining destroys wildlife habitats, forests, and landscapes in the area. The clearing of topsoil to make way for the mines leads to soil erosion and destruction of arable land. Mining causes dust and noise pollution when heavy machinery is used for land excavating purposes. As mines collapse and the land above it starts to sink, it leads to serious damage to buildings. Mining lowers the water table, changing the flow of groundwater and streams. For instance, in Germany over 500 million cubic metres of water are pumped out of the ground annually and only a small percentage of this is used by industry or local towns (Environment, 2015). This suggests that it could be that people living in communities around the mines may not be benefiting from mining activities and this needs to be investigated.

Although numerous studies highlight mining impacts, most studies do not discuss how community members cope with the impacts they experience. Current literature on impact studies does not go further to assess the different dynamics that these impacts have on society (Amankwah & Anim-Sackey, 2003; Harvey, 2014; Kitula, 2006; Petkova-Timmer, Lockie, Rolfe, & Ivanova, 2009). For example, how a community should plan its economic sustainability once mineral reserves are depleted is not standardized. Community participation and engagement in mining activities in Zambia, Botswana and other African countries is not as rigorous as it is in developed countries (Campbell, M., et al., 2017; Suopajarvi, L., 2017).

Developing countries are perceived to have extractive institutions which take resources in their raw state for processing and use in developed countries. In developing countries, a fear exists

that minerals are a wasting asset and once the minerals are depleted the mining projects will leave behind a degraded and damaged environment that is not productive. Many African countries survive on mining activities yet the effect this has on local people at the micro-level is not well researched. Obeng-Odoom (2015a) has conducted extensive research on the impacts of oil production in West Africa. However, his studies are focused on the macro-level (Obeng-Odoom, 2015c). Obeng-Odoom (2015b) shows that, on a large scale channelling oil rents into an alternative holistic social energy program would drive sustainable social change through energy security and sovereignty; reducing reliance on oil as an energy source. He identifies the outcomes of this approach to be the creation of green jobs (jobs not linked to non-renewable resources), and a reduction of the social inequalities in Ghana (Obeng-Odoom, 2015b).

Bostock and Harvey (1972), conjectured that minerals in Zambia were developed by foreign capital providing little to no economic benefits for local citizens in the 1970s. Decades later, Fessehaie (2011) pointed out that this was still the case in Zambia today. Citizens are not currently enjoying the benefits from mining projects (Bostock & Harvey, 1972; Fessehaie, 2011). Despite Botswana's overall economic progression, the San (indigenous to Botswana) have been in conflict with the government over the Central Kalahari Game Reserve area. The area is known to have diamond deposits and the San have been suspicious of the government's desire to relocate them from their ancestral land. The few San that remained were denied access to water by the government, using this as a 'stick' to remove them from the area so that they can integrate with the rest of Botswana's society as opposed to being a tourist attraction in the bushes. The social fabric and way of life of the San was and is still disrupted as they are now challenged to find ways to hunt and gather food. Although, in 2013 the court issued an order restraining the government from relocating them, the San battle to recover from the distress as life has not improved (Good, 2003; Griffiths, 2014).

At the macro and meso level, research points to resource curse theory and institutional failure as the reason countries in Africa are unable to develop despite the resource abundance. At the micro level, theory needs to be developed to show how micro factors can positively or negatively affect a community's ability to develop. Existing knowledge on Local Economic Development (LED) provides a level of understanding on how LED models explain the management of resources but not the impact of the mining activities. This study will develop a theory that shows how micro factors can affect local economic development (Jakeman, A., 2006). It will also show the dynamic relationships among micro, meso and macro factors as they pertain to local economic growth. Other African economies with similar cultures and institutional frameworks would find this research relevant to their economies which lean towards high commodity dependency. Botswana and Zambia aims to provide the reference point for such impacts and other nation states can learn and adapt findings to benefit sustainability of their respective extractive industries and the people living in the communities around mining areas.

1.2 Research Objective and Questions

The study aims to develop a socio-economic impact framework for mining activities, and to show how the law influences institutions in mining communities to contribute to resource curse theory (Ross, 2014; Hepworth, 2016; Charmaz, 2011). To achieve this objective the following research questions will be answered by using Zambia and Botswana as the chosen countries of comparison.

- 1) How do communities perceive their short and long term impacts of mining?

- 2) How do current theories on natural resources and local economic development apply in these communities?
- 3) How do differences in country regulations enhance the impacts of mining and what lessons can be learned across the countries?
- 4) What mitigation measures can be put in place to minimize the negative impacts of mining and sustain the positive ones?

1.3 Significance

In Botswana and Zambia, mining is a major economic activity and both countries intend to continue mining as a source of revenue. Most of the impact studies carried out have focused on macro-economic aspects of country development as a result of mining activities by looking at institutions or mining contributions to development (Arezki & Van der Ploeg, 2007; Bebbington, 2008; Buonanno et al., 2012; Cabrales & Hauk, 2011; Harvey, 2014; Mehlum et al., 2006; Sachs & Warner, 1997a; Stiglitz, 2007). Empirical studies of numerous communities around a country and across countries are comparatively few (Akabzaa & Darimani, 2001; Amankwah & Anim-Sackey, 2003; Brereton & Forbes, 2004; Gibson & Klinck, 2005; Kitula, 2006; Petkova-Timmer et al., 2009). Although one such micro-level study looked at numerous towns, specifically, mining impacts in six towns in a Bowen Basin region, findings were limitations as the study did not tackle many social impacts as a result of the economic changes that the mining provided. The research focused on small scale coal mining, and no data was collected on the lifestyle of the miners in the community. Furthermore, the study was conducted in towns where mining was not the primary economic occupation (Petkova-Timmer et al., 2009).

In this thesis, the author looks at how exactly community settlements, where mining is the primary economic occupation, are able to bargain with their institutions and mining companies to benefit more. In some instances, locals do not even understand what the law says concerning a mine and the environment (Malido, 2005; Saugestad, 2006; Taylor, 2007). Findings on impacts will show where gaps exist in the rule of law and how humankind is affected in the short and long term when extractive mining activities take place. This is a study that puts the lives of mankind first in an extractive industry characterized by harsh working conditions, one that pauses as a threat to the natural environment, and risks the health of those involved in it.

Findings will contribute to current literature by adding the extent to which communities are affected by the mines and provide insight into how sustainable solutions in an extractive industry can be implemented. The study will provide SADC countries (as well as other African countries with similar institutional frameworks) which depend on mining with a long term perspective of how institutions affect mining impacts even at a micro-level to provide insight into how future policies can be adapted to suit impacts felt on the ground that are culturally relevant. This insight will provide a guide for investors in the mining sector to invest in Africa and do so in ways which maximize positive impacts and minimize negative impacts. This study seeks to do this in the context of Botswana and Zambia.

1.4 Contribution to Knowledge

Resource curse theory at the meso-level looks at how institutional failure is the reason some countries are unable to develop despite their abundance of natural resources. This research contributes to this theory by looking at the effectiveness of institutions through the lens of mining law to see how well communities understand laws and policies that govern mining in their areas (Peters, 2017; Van Wormer, 2017). In doing so, an adaptation of institutional theory was made to include an element that accounts for the law as a key component of the

effectiveness of institutions and not merely as a measure of institutional quality as mentioned by Ross (2014). Finally, a demonstration of the interaction of natural resource theory and local economic development theory at the macro, meso and micro-level revealed a holistic approach to assess the impact in mining communities.

1.5 Organization of the Study

The study consists of seven chapters and has references and the appendix after the chapters. Chapter one of this study introduced the study by presenting the importance of mining in Africa. It explains the challenges of managing natural resources and explains the research problem which is focused on the need to provide micro-level mining impacts in communities in mining areas. The research objective and questions as well as the significance of the study are also discussed in this chapter.

Chapter two is the background chapter that provides context of the mining impacts in Africa and focuses on a comparison and justification of Botswana and Zambia which are the two countries of focus in this study. A background of diamond mining in Botswana and Copper mining in Zambia are provided and the chapter ends with a comparative summary of mining in the two countries.

Chapter three focuses on the theoretical framework and empirical literature around mining impacts. The chapter presents a review of literature and relevant research associated with the problem addressed in this study. This chapter gives an insight into the local economic development theory as a micro-level framework to aid in understanding mining impacts at community level. Studies on minerals in Africa are strongly linked to natural resource curse theory and this is also discussed to allow the author to research how this theory (which is macro-theory) may also have an impact at the community level and could complement the local economic development theory. Local economic development theory is broad and covers all factors that contribute to development; however, natural resource curse theory provides a specialist investigation of natural resources. As a result these two groups of theory were applied in this study.

Chapter four is the methodological chapter. In this chapter, the research design, which is mixed methods and the philosophical approach which includes both interpretivist and positivist elements are implemented and justified. The chapter contains the sampling frame, data analysis, variables, questionnaire design, survey instruments, research limitations and ethical considerations of the study.

In chapter five the findings of mining law in Zambia and Botswana set a stage for the legal frameworks in which the mining companies operate and compares the laws of both countries to see how differences in law actually affect institutional quality. The chapter also gives an insight into what mining companies currently contribute to their communities in the form of Corporate Social Responsibility.

Chapter six is the results and analysis chapter that presents the data collected and links the findings to the theories presented in chapter three. The thesis ends with the conclusion in chapter seven where a robust mining impact framework is developed by the author, and the inter-relationship of macro, meso and micro theory provide a holistic approach to assessing mining impacts. The Socio-economic Impact Framework of Mining in Sub-Saharan Africa (SIFOMISA) is created in this chapter based on the results and analysis in chapter six. The chapter ends by giving a summary of answers to the research objectives and questions with sustainable solutions that minimize negative impacts and enhance positive impacts of mining.

The study encourages and recommends sustainability both in mining and outside mining to promote overall local economic development in communities providing opportunity for future research and more works to perfect a measure of mining activity and sustainability in the SADC region.

CHAPTER TWO: AN OVERVIEW OF AFRICAN MINNING

2.0 Introduction

This chapter provides an overview of mining in Africa and then focuses on Sub-Saharan Africa in the context of Botswana and Zambia. The purpose of this chapter is to give context to mining by showing how important mining has been and the role it has played in Africa. The chapter then goes on to focus on impacts in Botswana and Zambia as this is the scope of this study. It ends by providing a summary of mining highlights in Botswana and Zambia.

2.1 Impacts of Mining in Africa

As mining forms a significant portion of developing countries' exports, with volatile commodity prices, driven by changes in global demand and supply, developing countries are particularly affected by external shocks that can result in increased poverty and reduced public funding for health and education (Khan, 2000). Globalization of commodity markets and the lowering of trade barriers, along with priorities focused on sustainable development and poverty alleviation, call for a more innovative approach to commodity risk management. Commodity risk management for mining activities in particular is required as many countries in Sub-Saharan Africa rely on revenues from mineral exports (Pegg, 2006).

The discovery of minerals has caused many socio-economic impacts in Africa. These impacts have affected political leaders and the communities around them. In Sub-Saharan Africa, Angola and the Democratic Republic of Congo (DRC) have faced civil wars and a damaged social fabric (Kodi, Handy, & van Vuuren, 2008). In both countries, minerals were the underlying cause of all the political turmoil. In South Africa dissatisfied workers constantly strike demanding better wages and benefits. HIV/AIDS has spread in mining settlements as men are usually separated from their wives for prolonged periods of time (Auvert et al., 2001; Schutte & Singiswa, 2014).

In Angola, the simple technology of 'alluvial' mining was the basis of tensions and conflict. Alluvial mining is the mining of stream bed deposits or alluvial deposits for minerals. These alluvial deposits form when minerals are eroded from their source, and are moved by water to a new location. When the sediments are deposited, they settle according to their weight, with heavier, more valuable minerals like gold, diamonds and platinum often being deposited at the same time (Maconachie & Hilson, 2015). The case of Angola's mineral mis-management involved two political parties; the People's Movement for the Liberation of Angola (MPLA), (with control over oil production in Luanda) and the National Union for the Total Independence of Angola (UNITA), (with control of the diamond rich regions). In 1992, tensions between the two parties led to a civil war (post-Cold-war era) known as the 'Guerra das Citades'. Five hundred thousand people were killed and over one million lost their homes and settlements. After 1992, the war was driven by a desire to have control over the mineral rents in Angola (Collier & Hoeffler, 1998, 2004). A network of trading routes was created from Angola to the DRC. Illegal Congolese mineral dealers called 'garimpeiros' conducted diamond trading activities. Studies on mineral revenues from these activities showed that Angolan total revenue was circa US\$4 billion as a result of these illegal mining activities (Collier & Hoeffler, 1998, 2004; Olsson, 2006).

Critical analyses by external institutions revealed that during DRC's transition period (2003-2006) accountability and transparency was absent. The state had no body to review the tax decelerations put forth by joint ventures formed in the mining sector (Kodi, 2008; Kodi et al.,

2008). In Nigeria, a country known for its abundance in oil, it was noted that when more anti-corruption institutions such as Economic and Financial Crimes Commission (EFCC) were proactive, assets worth over US\$700 million were able to be recovered and the culprits were made to pay for their criminal activities in the oil sector. Despite more institutional transparency, the gap between the rich and the poor is too great, and Obeng-Odoom argues that this is one of the results of the resource curse (Obeng-Odoom, 2014a).

With regards to artisanal mining, in 2009, Mozambique recorded 20,000 participants with production figures of 480–600 kg of gold. Much of the produced gold was circulating in the informal sector (85–90 percent). The mining regulations were insufficient as the provided ‘mining areas’ were not gold rich, and provincial authorities were required to give mining passes. In practice, this hardly ever happens. Workers’ conditions leave much to be desired and pollution of heavy metals in water bodies goes on without scrutiny as small scale miners continue to mine in undesignated areas (Dondeyne, Ndunguru, Rafael, & Bannerman, 2009).

2.2 The Comparison of Botswana and Zambia

Institutionally, Botswana and Zambia have different institutional frameworks that may affect how they manage their resources to date. Botswana was a protectorate and was not colonized to extract minerals but rather to provide protection from Cecil Rhodes (Ime, 2013). On the other hand, Zambia was colonized primarily due to the copper discovered in the country and was taken over by the British for extraction of minerals (Bank, & Jacobs, 2015; Madsen, Adjaka, Stender & Sorensen 2014; Rigo, 2014).

At the meso-level, institutions in mining are vital as they provide parameters in which mining companies should operate. In addition, they provide checks and balances to protect the communities to ensure that mining activities uplift the socio-economic status, and environmental protection (Gamu, 2015). Post-independence, Zambia and Botswana had different institutional frameworks. Botswana sent out its nationals to get international governance training to gain competencies needed to govern Botswana effectively. However, Zambia did not have this approach, and began to manage its own institutions immediately after gaining independence without undergoing the required training for management of institutions (Good, 1992; Geisler, 1995; Van Binsbergen, 1995). The two countries provide an analysis for other countries in Africa that can relate to either form of institutional set up to assess their own mining impacts depending on which institutional framework they can relate to the most.

2.3 Background on Diamond Mining in Botswana

The expected outcomes of countries endowed with minerals are that they will face social conflicts and political turmoil (Robinson, Torvik, & Verdier, 2014). However, Botswana has managed to avoid civil war and political instability. Unlike many countries in Sub-Saharan Africa, the country does not have large amounts of debt to pay back to the World Bank and International Monetary Fund (IMF) (Dreher, 2006; Helleiner, 1992).

Upon independence, chiefs' powers to apportion land were transferred to the government. The Chieftaincy Act of 1965 and the Chieftaincy Amendment Act of 1970 gave the president power to remove a chief's ability to give land to people. (Chieftaincy Act Of 1965; Chieftaincy Amendment Act of 1970). To totally ensure these Acts would be carried out effectively, the 1967 Mines and Minerals Act gave the government sub soil mineral rights. Chiefs no longer possessed sub-soil mineral rights. These rights previously belonged to the tribes residing on the lands where minerals were discovered (Gillett, 1973, 1975).

De Beers is a group of companies with a leading role in the diamond exploration, diamond mining, diamond retail, diamond trading and industrial diamond manufacturing sectors (Claasen, & Roloff, 2012). Founded by Cecil Rhodes in 1888, De Beers began to explore for diamonds in Botswana in 1955. The prospected area was north east of Botswana around the Motloutse River (Levinson & Cook, 2000). In July 1966, minerals were found in Orapa near a village called Letlhakane (Shacinda, 2010). The Botswana government focused on projects that it believed were more profitable (Shashe project & the Selebi-Phikwe mine), and ignored Orapa leaving it to be established by De Beers. De Beers established a mining town in Orapa. The mine is operated by the De Beers Botswana Mining Company Ltd. (Debswana), a joint venture between De Beers and the government. Initially, the government owned 15 percent and used the need for De Beers to have a mining license as a chance to negotiate for more shares. The Botswana government now owns 50 percent of Debswana (Gautheron, Cartigny, Moreira, Harris, & Allègre, 2005; Gwebu, 2012; Shee & Gurney, 1979). De Beers continued to explore for more minerals and discovered a Jwaneng pipe in the south where a mine was opened. The government negotiated with De Beers to increase its shares from 15 percent to 25 percent. Debswana, Orapa and Jwaneng are Botswana's leading diamond producers. Letlhakane, and Damtshaa mine, near Orapa, also contribute to diamond production (Grynberg, Motswapong, & Philimon, 2012).

In 2004, Debswana was granted a renewed license for 25 years. Debswana began what it calls its "Cut 8" project in December 2010. It provides access to about 95 million high value diamonds (Shacinda, 2010; Ziminisky, 2014). In Botswana, Jwaneng has had many social developments such as the building of new primary schools, parks and sporting facilities (Cornish, 2012, 2013b). The increased employment in the area has attracted people from various backgrounds making Jwaneng a socially diverse community. One important social development for the area was the construction of Mpule Kwelagobe's children's orphanage (Council, 2003; Maundeni, 2009). This study will reveal whether these developments have been directly as a result of mining activities.

Another example of a macro-economic impact mining has had in Botswana was experienced with the construction of the Nickel-Copper mine infrastructure facilities in the Selebi-Phikwe area. The mine attracted skilled and unskilled workers seeking better lives for themselves and their families. Due to the lack of intricate inspection and planning by the Bamangwato Concessions Limited (BCL), squatters began to take residence around Selebi-Phikwe. After the mine was set up no environmental impact assessment was conducted (Asare & Darkoh, 2001). More recently, it is the spread of Sexually Transmitted Diseases (STDs) in the area that is a cause of concern. A social assessment survey of the area showed that more than 50 percent of the men and about 42.1 percent of the women in the area had multiple concurrent sexual partners (Matlapeng, 2014). This could be as a result of the nature of the mining work.

Botswana mining is mostly open pit mining. Impacts specific to this form of mining include, alteration of land masses, damaged vegetative resources; interference with surface water and water tables underground; increased automotive traffic, air pollution and an increase in the amount of gas emissions and dust; possible encounters with flying rocks, noise from explosions, ground vibrations and increased employment for members of the local community (Monjezi, Shahriar, Dehghani, & Namin, 2009). Mining also has important social impacts. They include but are not limited to an increase in population as the increased employment leads to an influx of people seeking better opportunities, the spread of diseases such as HIV/AIDS due to the fact that some miners do not move to mining towns with their spouses and children

and are met with challenges of prostitution (Asare & Darkoh, 2001; Bindman & Doezeema, 1997; Laite, 2009).

2.4 Background on Copper Mining in Zambia

Mining activities in Zambia began administratively in the Western Province (previously known and still known by some as Barotseland). The area was the first in Zambia to sign a minerals concession and protectorate agreement with the British South Africa Company (BSAC) of Cecil Rhodes who colonized Zambia for commercial reasons on behalf of Britain (Jourdan, 1986; Lubosi, 2012). King Lewanika of Lealui reigned during this period. In 1909, a concession was signed between the King and BSAC granting the company land rights of the entire kingdom with the exception of a place called the Barotseland Proper (Caplan, 1969). In the late 1920s Zambia had four major mines; Rhokana and Nchanga controlled by Anglo-American Corporation of South Africa (AAC), and Roan Antelope and Mufulira controlled by RST. Large scale mining however, did not commence until the early 1930s (Panayotou, 1978).

From 1940 to 1960 the BSAC continued to mine alongside AAC and RST (Coleman, 1971). Zambia gained independence in 1964, and President Kenneth Kaunda nationalized all sectors including the mining industry (Mwalimu, 2014; Smith, 2014). The introduction of the Chiefs Act of 1965 gave the President the right to withdraw powers of the chiefs to apportion land (Chiefs Act Of 1965). However, to gain political favor, the Lands Act of 1995 demanded that chiefs be consulted when traditional land was to be given out even when mining projects were to be undertaken in their areas (Nolte, 2014).

During nationalization, mining contributions to government revenues reached 58 percent, and the mining sector represented 36 percent of GDP. The copper sector was operating under a state company called Zambia Consolidated Copper mines (ZCCM) (Aggesen, Hahm, & Uldall Thomsen, 2014; Aguirregabiria & Luengo, 2014). When copper prices dropped in the 1970s ZCCM was not generating the revenues that the government needed. This made Zambia subject to structural adjustment programs from the IMF and World Bank as it began to borrow from them to manage the company losses (Chabala, 2014; Whitworth, 2014). By 2000, ZCCM was privatized bringing in a wealth of international investments and a heightened presence of multi-national corporations (Bratton & Lolojhi, 2014; Conrad, 2014; Lindahl, 2014).

The companies that bought the new copper mines then made agreements with the government but the details were not disclosed to the general public and the lack of transparency was deemed highly suspicious by many Zambians. These agreements were called “Development Agreements” and later, it was discovered that the agreements allowed new mine owners to be free of costly liabilities that were previously subjected to ZCCM. Mine owners were exempted from laws including those related to environmental pollution; they were also given relief from taxes and provided very low royalty payments of about 0.6 percent. In the Development Agreements was a subtle clause which gave mine owners a maximum of 20 years of undisturbed operation regardless of future laws that may be introduced which would not be favorable for the international mining companies (Craig, 2001; Lungu, 2008).

From 2000 onwards, copper prices began to appreciate in the world market, which encouraged investment in Zambia’s mining sector after privatization. Unfortunately, the privatization of ZCCM came with redundancies of many mine workers and poorer working conditions with the new contractors who gave less pay. Another downside felt was the loss of social programs and services. Before privatization, ZCCM provided social benefits to Zambians such as free housing, health care, and education. When HIV/AIDS began to spread in Zambia, ZCCM ran

many awareness and prevention campaigns in communities. All these services disappeared upon the advent of privatization. Zambia's institutions could not continue these programs as the country had weak structures in remote mining areas (Fraser & Lungu, 2007; Simutanyi, 2008).

Currently, communities in Zambia's mining areas are desperate for environmental protection from toxic waste (Ettler et al., 2012; Ntengwe & Maseka, 2006). Zambia Environmental Management Agency (ZEMA) has had to shut down a copper smelter in Chambishi. This smelter did not have adequate facilities to minimize the sulphur dioxide (Ntengwe & Maseka, 2006). Zambia's mining sector is also challenged by erratic power supply, and high labor costs. Zesco Limited, the main Zambian electric power company, is erratic, with constant power outages. There are areas in Zambia that still have no access to electricity. Availability of electricity in these areas would make them more attractive for exploration as setting up a mine would be easier (KPMG, 2013a). Despite these findings, not much has been done to see the extent that these impacts have had on the communities and this research will look at how communities are coping in these conditions.

Between 2004 and 2005, Konkola Copper Mines' (KCM) profits had increased to 171 percent. Regardless of the exponential increase in profits and value of shares of KCM, in July 2005, mine workers began an unsanctioned strike demanding increments in their pay (Malido, 2005; Shacinda, 2005). Growth in the mining sector did not translate to better work conditions for existing mine workers. In 1995, ZCCM had 45,000 employees, and by 2000, ZCCM halved its employees to 22,000, due to the volatility of copper prices in the period. When the price of copper went up in 2004, ZCCM employment was back up at 31,000. Irrespective of higher employment, the Copperbelt still had an unemployment level of 22 percent (Fraser & Larmer, 2010; Larmer & Fraser, 2007).

Finally, mining activities in Zambia have recently increased due to Chinese investments. However, the Chinese investors are the least popular as locals are skeptical of the costs that may result from this new relationship. In the Copperbelt Chinese mining companies are known to have questionable safety standards, long working hours and underpaying Zambian mine workers compared to other mining companies (Fraser & Larmer, 2010).

2.5 Chapter Summary

The importance of mining in Africa is evident. Botswana and Zambia are being compared due to their institutional differences in the mining sector to provide contrasting practices to see how this affects mining impacts felt at community level. This way a variety of countries in Africa with different institutional frameworks can relate to either Zambia or Botswana and policies can be applied in these countries to enhance sustainability of mining and reduce negative impact.

Table 1: Mining Highlights in Botswana and Zambia

Botswana	Zambia
Diamonds discovered in 1966	Copper discovered in 1889
Botswana set up as a protectorate	Zambia colonized by the British due to copper discovered
Inclusive institutional set up to promote local processing of diamonds	Extractive institutional set up to exploit copper production for exports as a raw product
Displacement of the Khoi San is a major controversial issue related to Diamond mining in Botswana	Job insecurity for locals is a major controversial issue related to Copper mining in Zambia
Transition of government allowed for Botswana nationals to gain the skills set needed to run the country post-independence in 1965. The country invested heavily in educating its nationals abroad to prepare them to run the country.	No transitional governmental training of nationals by educating people abroad to learn how to govern and manage the country's resources occurred in Zambia post-independence in 1964 under President Kaunda.
Government owns substantial shares in the mines with equal partnership in some instances and a general strong negotiating power.	Mine ownership post privatization of ZCCM is mostly foreign owned and so local influence tends to be minimal and based on mining regulations and compliance. Government has low negotiating abilities.

Resource curse theory at the meso-level looks at institutions and their role in the mining sector (Richard, 2002). The table shows that Botswana has a stronger institutional set up compared to Zambia, this can be attributed to the training of Botswana nationals and the smooth transition of governance post-independence and the government of Botswana's substantial shareholding in mines. Zambia on the other hand, has a weaker institutional set up compared to Botswana, which may be attributed to the lack of substantial shareholding in the mines and also the lack of governance training post-independence.

CHAPTER THREE: THEORETICAL AND EMPIRICAL LITERATURE

3.0 Introduction

This chapter looks into the relevant theories that affect mining communities in Sub-Saharan Africa, and provides empirical data of mining studies that guide the research process. As this is a micro-level study the use of Local Economic Development Theory (LED) is used as it is best suitable to see how mining contributes to local economic development. Local Economic Development Theory is traditionally defined as the changes that affect a local economy's capacity to raise growth, create employment opportunities and wealth for residents (Bartik, 1991; De Blasio, & Nuzzo, 2010). In this study the author will apply the concept of a local economy to be relevant for a mining community. According to Blakely and Bradshaw (2002), a modern definition of LED for a local economy is based on indigenous resources and local control, new wealth formation, new capacity building and resource expansion. The data collected will provide knowledge of how much control locals in mining areas feel they have over the impacts experienced as a result of mining, and whether they are able to create wealth, build capacity and expand on the existing resources for sustainability.

For a broader context, to see whether meso factors also affect mining impacts at the micro-level, resource curse theory has also been reviewed. The macro-theory best applicable to mining is natural resources theory in the form of the resource curse to explain the phenomenon of impact at the national level. Mining impact studies have largely focused on the natural resource curse (Sachs & Warner, 1995, 1997a, 2001). The natural resource curse is a theory that posits that the reason developing countries are not able to improve their economic performance is due to the fact that abundant resources lead to corruption, civil unrest, and reduced productivity in sectors other than mining as entrepreneurs seek to invest in the minerals sector to promote their personal gain and increase their share of profits (M. Ross, 2003; M. L. Ross, 2004, 2014). At the meso level, scholars explain that the institutional quality of a country is really the deciding factor in whether that country is resource cursed or blessed (Harvey, 2014; Hillbom, 2014; Mehlum et al., 2006). In addition to these debates, other scholars add that increased activity in the minerals sector leads to reduced activities in other sectors such as manufacturing which causes inefficiency in the national economy (Corden, 2012; Matsen & Torvik, 2005; Takatsuka, Zeng, & Zhao, 2014).

Others have focused on the role of 'institutional thick-ness' as a driver of economic development. Institutional thickness is defined as the presence of various corporate and cultural bodies (financial, regulatory or social), their interactions with a purpose of shared values which constitute 'the social atmosphere' of a particular locality or community (Amin & Thrift, 1995). Institutional thickness is considered to help determine the capacity of any community to adapt to changing conditions and promote innovation (Hudson, 1994; Amin & Thrift, 1995); in this case it would be the ability to manage resources and adapt to ensure sustainable measures for such an extractive industry are developed. As such, every community is affected by the institutional frameworks set in place to provide a reference point for different stake holders to interact. The mining impacts in communities are closely related to the institutions governed by the nations within which these communities exist.

Studies of Asare and Darkoh (2001), developed a conceptual framework linked to negative and positive outcomes of mining for sustainability in Selebi-Phikwe in Botswana. The study looked at households within the framework of environmental sustainability, which emerged from the concept of sustainable development. In their study, more data was collected using secondary sources of literature and national reports (macro-level data). The specific questions addressed

how disposal of effluents and waste from the mining activities affected the surrounding environment in Selebi-Phikwe and looked at the extent to which the environmental policies of the government were complied with (Asare, & Darkoh, 2001). The paper assessed the effectiveness of the environmental management measures on one mine in the area. The conceptual framework was put forward as a framework within which scholars can balance immediate and long-term mining impacts on the environment, both now and in the future. A framework that builds on this to tackle socio-economic impact in the context of the household (household perceptions of mining impact which also include environmental impacts among others) and not only the environment would create a micro-level framework that shows mining impact on the community. Asare and Darkoh (2001) looked at impact on the environment and so this research will build on their model by creating a framework which shows mining impact at the household level, showing how macro, meso, and micro-level theory have a role to play in the overall mining impact experienced. The diagram below (figure 1) is a display of their conceptual framework (Asare, & Darkoh, 2001).

Asare and Darkoh's (2001) framework clearly illustrates the impacts of mining but does not add a theoretical component of how theory has been applied in the communities. For example, resource curse theory at the meso-level includes the strength or weakness of an institution as measured by its ability to manage resources and adapt for sustainability. If it is the institutions that cause the positive and negative impacts then this relationship must be depicted in the framework to provide a more robust impact analysis.

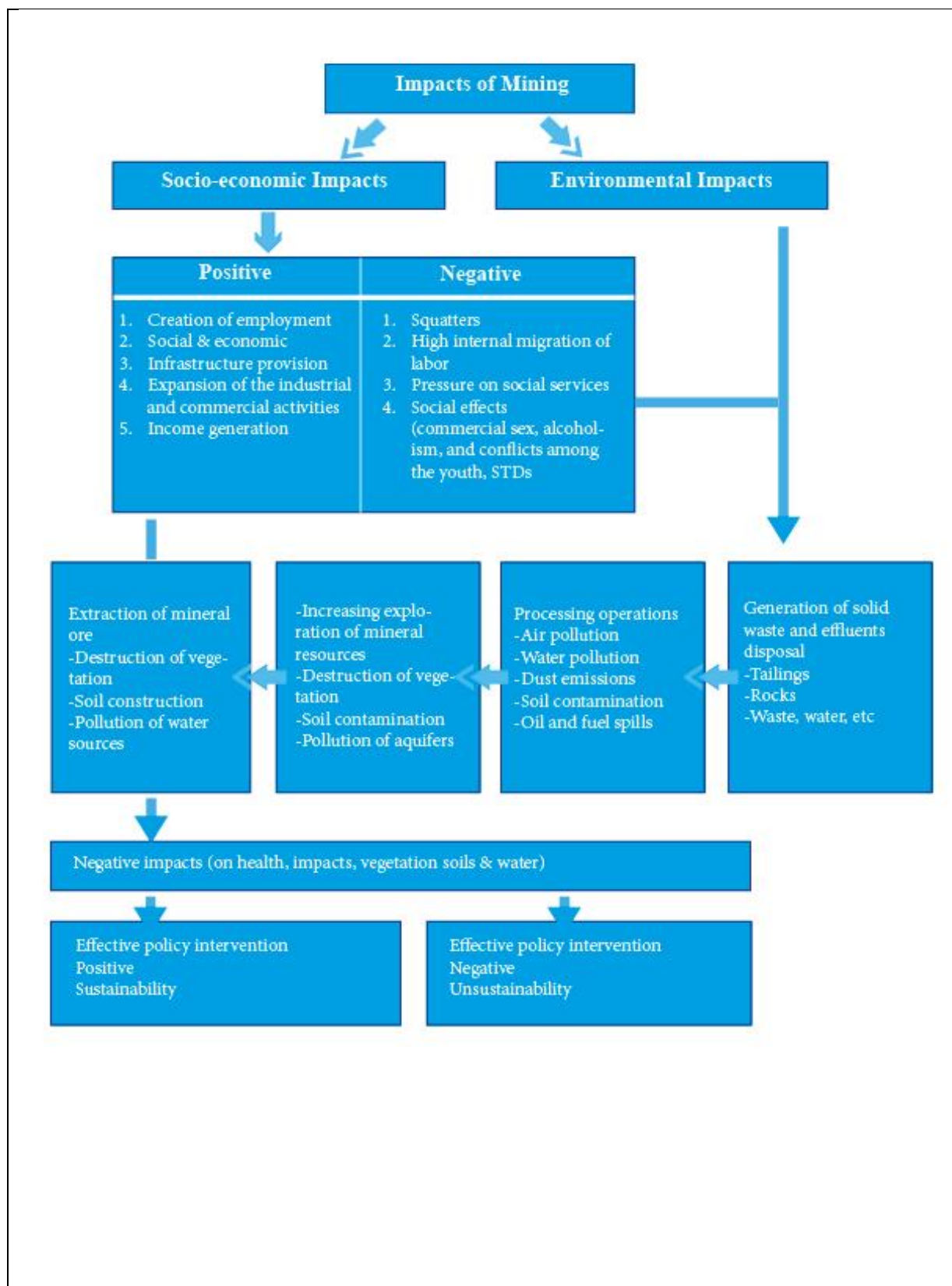


Figure 1 : Asare & Darkoh Conceptual Framework

3.1 Local Economic Development Theory

Local Economic Development (LED) theory is essential to this research as they will form the underlying framework for the micro-level research analysis in this study. Most studies analyze LED through the National Economic Development (NED) framework (Leigh, & Blakely, 2013). As a result, government organizations that function at the local level in specific localities, view economic development in those areas as heavily dependent on the interventions and economic policies implemented by government. In light of this, a locality is affected by national policy frameworks (Tello, 2010). In Southern Africa, LED is considered as an important part of the national economic and development strategies (Rogerson, 2010). However, this study will apply it to the community level in an attempt to create a meso and micro-level framework for mining impacts.

The mines in Zambia and Botswana have attracted the development of cities, as a result in this study, the author will assume a mining community can be a justifiable alternative for the term local economy. A local economy is defined as activities in and by cities, districts and regions (Hildreth, 2011), and a community is defined as a group of people living in the same place (McMillan, & Chavis, 1986). LED provides government and Non-Governmental Organizations (NGO) as well as local economies (mining communities in this case) with the opportunity to work together to improve the local economy (local community). It focuses on enhancing competitiveness and sustainability (Wekwete, 2014). LED involves environmental planning, business development, infrastructure provision, real estate development and finance (Leigh & Blakely, 2013). These functions will form the framework of this community study to see how mining led LED is experienced in mining communities.

3.1.1 Regional Development and Mining

Three main paradigms for post-industrial mineral development exist in current literature. Regional and Global models of mineral development were outlined by Radetzki (1982, 1994) who described the differentiated roles played by mining in regional development, and how this changed over time. Later, other commentators (Auty, 1994; Eggert, 2001; Humphreys, 2000; Muraca, B., 2017) provide a third paradigm that developed as a reaction to the need for more sustainable solutions for development; the Sustainable Development (SD) model of mineral development. These three models offer explanations of the evolution of mining and the way in which it has impacted the national economy over time.

3.1.2 The Regional model

Radetzki (1982) suggests that while mineral production was attracted to regions with mineral deposits, the development of mineral deposits was encouraged by nearby industrial and urban cities. Exploration of minerals usually took place around industrial areas that provided demand for the minerals. The mine was established due to a clear need and ready market in the area. For the mining industry, Radetzki (1982, 1994) highlights that the regional model provides reduced transportation cost as the minerals are sourced in the areas where they are needed, increased exploration activities as a result of mineral demand, high capital requirements, a complex supply chain and economies of scale to sustain and justify the large capital investments to conduct substantial mining activities.

As a result of the increase in scale over time, the mines detached from heavily populated areas to increase production and meet global demands. In developing countries, the capital investment and technical skills required to run large mines is sourced from large multi-national corporations. Large scale mining is not labor intensive, and although unskilled labor can be sourced locally the need for it is diminishing, in most cases the senior management needs to be

brought from abroad due to the experience, technical skill sets, and expertise required for the job. The case of mines in developing countries is that of having little interaction with local communities and the main reference for mining companies is the central government (Radetzki, 1994).

3.1.3 The Global Model

The global model of mineral development is dominated by mining, and leads to dependency on mining activities inhibiting diversification (Auty, & Warhurst 1993). The global model is characterized by government exclusively interacting with mining companies, and then taxes and royalties are paid to the central administration. For compensation in cases of negative mining impacts, the mines deal with single persons on an individual basis. Infrastructure provision is designed by the mining companies to address their infrastructure requirements exclusively, and most supplies are typically sourced from outside the community. This leaves little community interaction and provides a scenario where the mines and government work more closely together.

3.1.4 Sustainable Development

Mines provided public services, and managed the town as an essential element of its production (Harvey, & Bereton 2005). As a result mines were responsible for utilities such as water, sewage, power, and housing and assumed the responsibility for the provision of education and health. In some cases large mines created financial dependency in the community, which often had negative impacts after mines were shut down (Eggert, 2001; Kolk, 2016).

Despite the provisions of public services by the mines, empirical evidence showed that mining and economic growth was negatively correlated (Auty, 1993; Sachs & Warner, 1995; Ross 2001). This marked the birth of the Sustainable Development (SD) model. Sustainable Development in mining initially focused on the ecological and social aspects of mining impacts, more currently literature shifts to include the economic effects of mining (Loorbach, & Shiroyama, 2016). The sustainable development model does not account for a positive correlation of mining and economic growth. Research by Gamu et al., shows that artisanal mining was linked to poverty reduction and industrial mining increased poverty (2015). Such findings place the sustainable development model into question as it does not account for differing scales of mineral production and the resultant effects on development. As a result, although this model is used in this research, the author does so cautiously so as to consider the works of Gamu et al., and only investigates large scale mines for the sustainable development model to hold as true in this research (2015). Figure 2 shows a summary of the three paradigms based on the works of Gereffi, G., Humphrey, & Sturgeon (2005); Humphrey, & Schmitz (2002); Strongman (1998); and Di Boscio, (2010).

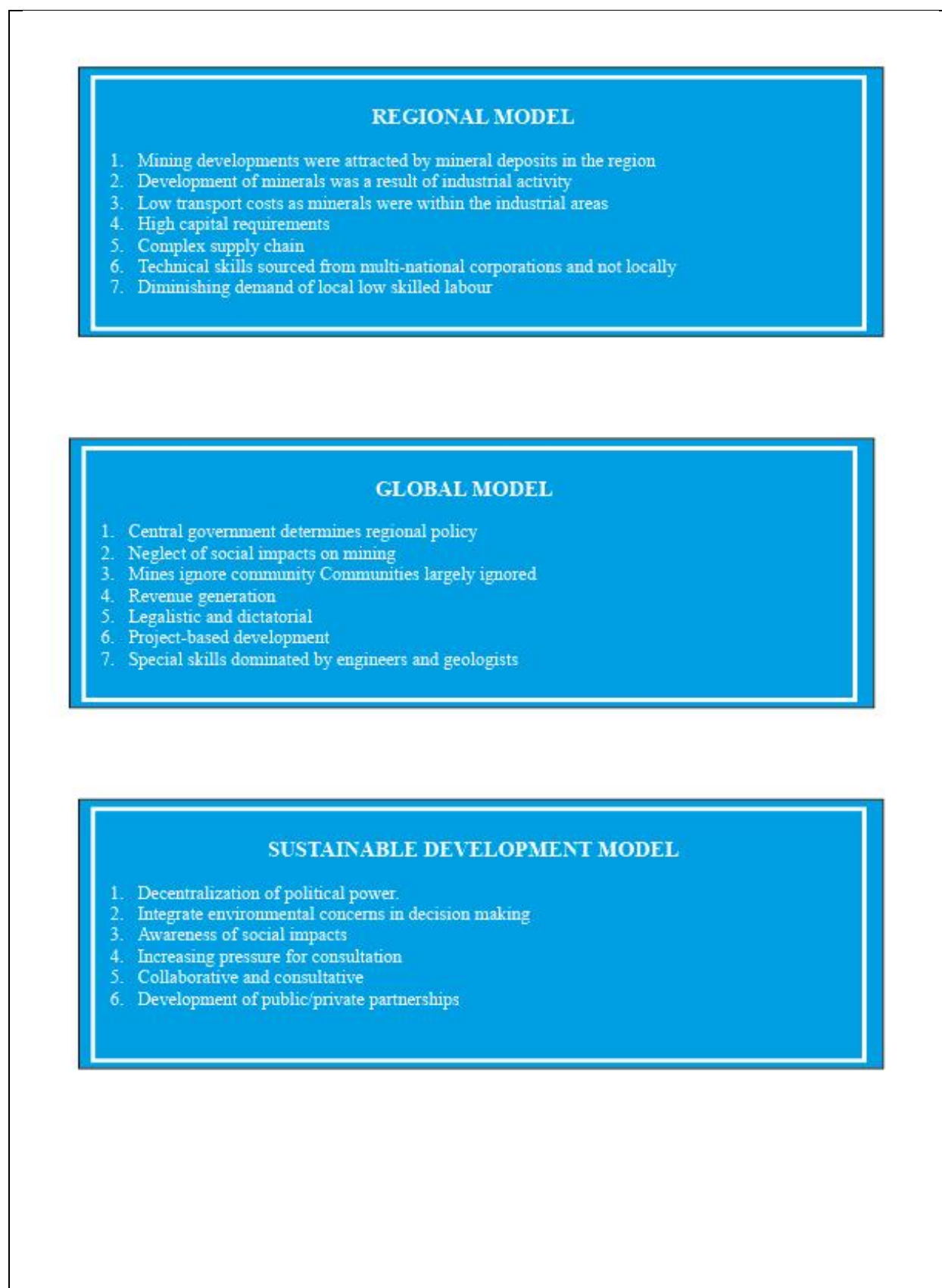


Figure 2: Local Economic Development (LED) Models

3.2 Resource Curse Theory in Context

The framework of this research looks at resource curse theories to show how theorists give reasons for mining impacts by tackling outcomes that arise as a result of mining activities. The theories explain why economic growth is hindered in some countries. With regards to the Dutch disease the following models are addressed, Sach's and Warner's endogenous growth model (1995), the learning by doing concept (Torvik, 2001), and Krugman's model (1974) all give explanations for the effects that a resource endowment can have on the economy. This research will see how these theories as a sum or in part can be applied at a micro-level. As a contribution to knowledge, it will also show interrelationships of some of the theories to better understand how macro theory affects events at meso and micro level.

3.2.1 Resource Curse Theories

Mining has been a controversial industry and has sparked debate across multiple disciplines. Before the second world war, economists had the perception that natural resources were a blessing for the country endowed with them but after the second world war countries abundant in natural resources progressed at a much slower rate than those that did not have plenty of natural resources (Cabrerales & Hauk, 2011; Frederick. Van der Ploeg, 2011; Frederick Van der Ploeg & Poelhekke, 2010; R. Van der Ploeg, 2014). Earlier empirical papers of Sachs and Warner (1997a, 2001), looked at natural resources as the cause of weak institutions, they gave a rent seeking hypothesis stating that minerals led to civil wars, corruption and damaged the social fabric. The rent seeking hypothesis of the resource curse was then dismissed and a dynamic "Dutch Disease" model was embraced (Sachs & Warner, 1997a, 1997b, 1999; Williams & Le Billon, 2017). The LED theories and the natural resource curse theories will be adapted to create a model to explain the phenomenon of mining socio-economic impact on immediate communities.

Many growth models have been developed by scholars to show that resource abundance reduces growth. Mehlum et al. (2006), contested Sachs and Warner's dismissal of a rent seeking hypothesis for the resource curse arguing that there was not enough evidence to dismiss it. Instead of disregarding the possibility that natural resources have an impact on institutions, they believe that it could be a case that works the other way around. Institutions may have an influence on how natural resources affect economic growth (Mehlum et al., 2006). Some explanations on the resource curse are based on the fact that countries endowed with minerals end up overspending the income that comes from their minerals. Deller and Schreiber (2013), argue that it is imperative to investigate the saving behavior of those who are resource 'blessed' and compare them to countries that are resource 'cursed'. The challenge of this type of approach is that income from non-renewable resources in the national accounts of most countries is not clearly distinct. It is classified as general income and not income generated from the extractive industry. Such loop holes make resource studies inconclusive as causal factors could be numerous and difficult to detect (Deller & Schreiber, 2013).

Rent seeking does not add value to the national economy; it is identified as a supplementary profit which is inefficient as it does not create wealth. The result of such behavior is the poor allocation of resources and reduced growth (Sachs 1995; Krueger, 1974). Effective corporate governance can help reduce rent seeking (Lin et al., 2015); Misoczky, & Bohm, 2013, 2015). When governance is weak in a mineral rich country, extractivism characterized by the exploitation of raw materials to impede essential development is present (Acosta, 2013). In the mining sector, when rent seeking is more profitable than production in manufacturing, entrepreneurs move into rent seeking activities in the mining sector. For example, an entrepreneur can close down a manufacturing enterprise reducing production in that sector to

venture into the natural resource sector (Deacon, & Rode, 2012; Ross, 2010). Obeng-Odoom illustrated this in his Ghanaian oil research; political researchers could go to the extent of kidnapping senior executives in the oil industry for their personal gains. In addition to this, he found that the lucrative wages of the oil industry reduced entrepreneurial activity in other sectors (Obeng-Odoom, 2014b, 2015). A resource boom can become a curse when entrepreneurs shift from income generation in other sectors toward rent seeking in the resource sector (Mehlum et al., 2006; Torvik, 2009).

Gylfason (2001) argues that natural resource rich economies are prone to rent-seeking behavior that leads to political corruption and violence that is socially damaging. Political corruption causes citizens to have a lack of trust in their political institutions and government (Morris & Klesner, 2010). As a result, citizens are not inclined to participate in policy making activities to push forward their agendas. Corruption is accepted as the way of life and it is perceived that attempting to change things for the better is impossible (Ramos, 2013). Governments can offer tariff protection and many other privileges to businesses in the resource sector. When rent seeking is prevalent it distorts the fair and just allocation of resources. This reduces economic efficiency and social equity as a result of prevalent corruption (Gylfason, 2001).

In the Democratic Republic of Congo, mining activities provide the primary sources of funding for rebel groups. Minerals are frequently smuggled out of the country to be sold for profit whilst civilians are unable to benefit from the profit generated from these activities. It simply increases the income divide of the rich and the poor (Sells, 2013). Empirical evidence shows a direct association of mineral wealth and conflict. Minerals led to disputes over the Western Sahara in Morocco (Hodges, 1983), civil wars in Angola, the rebellions experienced in the Katanga region of the Democratic Republic of Congo (Perks, 2011), the Bougainville rebellion in Papua New Guinea (Filer, 1990), and the rebellions in the south of Sudan (De Waal, 2014). In Marikana South Africa, people who work for Lonmin platinum mine usually strike fighting for higher wages as they view the income divide between senior management and themselves to be too big a gap to ignore (Alexander, 2013; McKenzie, 2013).

Resource revenues are used to form political parties or to maintain politicians' power bases, allowing the rent seeking behavior to continue like an endless cycle (Del Rosal, 2011; Khan, 2013). Social injustice as a result of rent seeking was experienced in Columbia. Although it was not directly a result of metals it was a primary natural resource. Coffee was positioned in a way that allowed politicians to misuse it. They would provide institutions directly linked to the coffee with subsidies to win their votes. Politicians recognized that the votes of coffee producers were very significant to their success and would do everything in their power to secure their political positions (Ramos, 2013).

The role of a country's political institutions or institutional quality forms the foundations of the extent to which rent seeking can be successful or not. The institutions of a country provide a set of parameters that may or may not be effective in preventing rent seeking behavior (Mehlum et al., 2006). Institutions of society are the channel through which economic change occurs. Institutions define the way that organizations will interact. The entrepreneurs within the organizations introduce new institutions when they believe they are able to gain a competitive advantage (North, 2008; North & Weingast, 1989). Empirical research has shown that resource endowments discovered during colonial times in Africa, influenced the colonial institutions that emerged, and the wealth distribution favored the elite of society in resource rich countries. These institutions had weak property rights that had a negative influence on economic development after colonialism (S. Bhattacharyya & Roland Hodler., 2010; S.

Bhattacharyya & Hodler, 2014). Mineral rich countries in Africa had weak political institutions prone to rent seeking behaviors that did not promote economic growth (Acemoglu, Johnson, Robinson, & Yared, 2005; Acemoglu et al., 2002).

A difference in Africa is observed with Botswana and its unique quality of institutions of private property. The ability of a two parallel system of traditional and modern governance has worked positively for the country. The institutional set up as a British protectorate allowed for minimal influence of British rule which enabled Botswana to continue with its traditional respect for private property whilst embracing a democratic style of governance (Acemoglu et al., 2002; Acemoglu, Johnson, & Robinson, 2005).

Ross (2014) agrees with literature on institutions and the ‘resource curse’ explaining that the quality of institutions is the deciding factor when determining whether a natural resource is a blessing or a curse. He lists the ‘quality’ as dependent on the following variables; government bureaucracy, incidence of corruption, the rule of law and state capacity to promote economic development. When institutions do not function well and there is a lack of accountability and transparency, conflicts over the revenues from minerals is inevitable, as mentioned earlier it gives rise to corruption, rent-seeking, and violence (Collier & Hoeffler, 1998, 2004; Skaperdas, 2002). Literature on crime shows that weak institutions and abundant natural resources create the optimal conditions for mafia-like (organized body of criminals) organizations in mining communities that once formed are not easily erased (Gambetta & Reuter, 1995). The socio-economic consequences of organized crime has been a subject of growing interest among academics and policy-makers alike, and it was found that mafia organizations provide private protection for some mineral producers (Buonanno et al., 2012).

Buonanno et al. (2012) provides empirical evidence of the rise of these organizations as a result of mineral wealth when public law-enforcement institutions are weak or simply non-existent. To this day the mafia still influences the socio-economic development of Sicily. The Sicilian mafia came to being after the collapse of the Bourbon Kingdom (Sardell, 2009). The mafia flourished as there was a high demand for protection by the producers of sulfur. In the mid-1900s, the value of sulfur on the international market rose incredibly (Paoli, 2003). This shock to the economy created a plethora of mafia organizations in places with sulfur reserves (Buonanno et al., 2012; Del Monte & Pennacchio, 2011).

Many of the rent seeking outcomes have been conducted as macro socio-economic studies (Deacon & Rode, 2012; Torvik, 2002; Tullock, 2001). It is evident that after entrepreneurs move from manufacturing production to rent seeking activities in the resource sector in a way that gives them the same or even more profits than what they had from manufacturing, overall production in the manufacturing sector reduces (Tullock, 2001). This leads to low employment levels in manufacturing and an increase in employment opportunities in the mining sector (Meyersson, 2008; Weber, 2012).

However, not much has been documented on the micro socio-economic perspectives of rent seeking in the mining sector. Research is required to unearth empirical analyses of the impacts on stakeholders in mining communities. As discussed above, a lot of work has been done to show the impact of mafia-like groups that emerge because of abundant natural resources. These criminal organizations are not commonly researched in African countries like Botswana and Zambia. However, it is imperative to understand that this is an impact of rent-seeking due to a boom in the resource sector. Mining is a stronghold in Botswana’s and Zambia’s communities, and some outcomes of mining in these countries are expected to be similar to the impacts found

in the mafia-like communities that exist because of endowments in the resource sector. A similarity of mafia-like behavior is seen in Africa when mineral resources have led to civil wars and corruption, as discussed above. This study will seek to develop a framework to analyze micro-level impacts of mining and show its interrelationship with meso and macro-level theory.

3.2.2 The Dutch Disease Model

A theory that stems from resource curse theories is one called “Dutch Disease”. This was a term that emerged after Holland’s currency value increased due to its exploitation of North Sea oil which de-industrialized the country. The main focus became its oil, and other sectors in the country were neglected (Forsyth & Kay, 1980). The Dutch disease is characterized by an increase in activity in the minerals sector leading to a rise in labor demands both in the extraction and the manufacturing industry. This then causes workers to drift towards mining and away from manufacturing. Following this, the relative price of manufacturing products rises and this potentially has an impact on long term economic growth (Corden, 2012; Krugman, 1987; Usui, 1997). Many models of the Dutch disease have explanations of the effect of natural resources on a national economy. The following models are discussed in this section; Sachs and Warner’s endogenous growth model (1997), which explains the movement of labor into the resource sector and away from manufacturing, the learning by doing model (2001), looks at productivity through practice as it relates to natural resources, and Krugman’s model (1987), looks at an appreciation of the exchange rate as a result of increased exports of minerals due to a boom in the resource sector (Krugman, 1987; Sachs & Warner, 1997a; Torvik, 2001).

3.2.3 Sachs’s and Warner’s Endogenous Growth Model

Sachs and Warner (1997a), posit that the economy has three sectors, a tradeable natural resource sector, a tradeable (non-resource) and manufacturing sector, and a non-traded sector. When natural resources are abundant, tradeables production is mainly in the natural resource sector and not in the manufacturing sector. Capital and labor that may have been used in manufacturing are pulled into the non-traded goods sector. When an economy experiences a resource boom, the manufacturing sector tends to shrink and the non-traded goods sector tends to expand. This shrinkage is what is called the Dutch Disease (Barbier, 1999; Hansen & Tarp, 2001; Sachs & Warner, 1997b, 1999).

Corden provides Dutch disease models that affect productivity; he describes a spending effect and resource movement effect as causes of a reduction of productivity in other sectors. In his model he identifies three sectors, the booming sector (B), the lagging sector (L) and the non-tradeable Sector (N). B and L are affected by world prices and produce tradeable goods. Output in B, L and N is based on factors of production specific to each sector. Corden assumes that labour flows in all three sectors (Warner Max Corden, 1984).

A boom or transfer in B raises aggregate incomes in B and it can happen when an exogenous improvement occurs it has a direct impact in B (specific to the country of choice). When there is an exogenous rise in the price of the resources in B due to increased international demand, the sector is more inclined to produce purely for export to maximize profit as the international market will make purchases at a higher price than the local sector. The spending effect occurs when additional income in B is spent by the government. This spending effect causes resources to move out of B and L into N. The feedback effect of this will be that demand shifts away from N to B and L (Corden, 1984, 2012).

The impact of resource movement is shown when an endowment of a transfer in B raises the marginal product of labor, the demand for labor in B rises provided the wage is constant for the tradeables sectors B and L. This brings a movement of labor away from L and N into B, resulting firstly in the movement of labor out of N into B at a constant real exchange rate. Secondly, when labor leaves L to go to B it is called direct de-industrialization as N is not involved and no appreciation of the real exchange rate is required (Corden & Neary, 1982; Usui, 1997). To manage this beneficial "forward and backward linkages" from natural resource exports to the rest of the economy should be smaller compared to exports from the manufacturing industry. This is because manufacturing, as opposed to natural resource production provides a more sophisticated division of labor and a better standard of life for people (Van Wijnbergen, 1986).

The main resource question has been what is the best way of managing wealth in the extractive industry (Torvik, 2009)? By looking at how mining has an impact on communities it is hoped that this study will shed some light on how society is able to benefit from mining and to see if the "Dutch Disease" is present in communities at micro-level. It will be combined with some meso theory and micro theory to see how together these concepts create a hybrid theory to better assess mining impact. Communities focus on mining only or whether other industries are flourishing in addition to mining. The research will show whether or not de-industrialization is present by the evidence that will result from community studies at the micro-level.

3.2.4 Learning by Doing (LBD)

Another theory within the context of "Dutch Disease" is "Learning-By-Doing" (LBD) is a theory used to describe how productivity is gained through practice (Torvik, 2001). For example, a producer of maize can increase output by learning how to use new machinery to minimize labor (Van Wijnbergen, 1984). In LBD, "learning" refers to the ability to strategize and conduct future planning, anticipating solutions to problems that can arise (Van Wijnbergen, 1984). The word "doing" in LBD looks at how workers can increase productivity by performing their tasks over and over again until they are specialized (Matsuyama, 1992). The LBD concept has been used to explain effects of innovation and technical change. It has also been effective in explanations of the evolution of countries as they specialize in their production. LBD has proven to be a framework for long run economic growth (Krugman, 1987; Matsuyama, 1992; Takatsuka et al., 2014; Torvik, 2001).

The LBD theory as it relates to natural resources postulates that an abundance of natural resources may shift factors of production away from the sector that learns by doing, and into the resource sector pushing overall economic growth down (Torvik, 2001). Sachs and Warner assumed that only one sector generates LBD, and a perfect spillover goes into the rest of the economy (Sachs & Warner, 1995). A natural resource windfall then lowers growth in all the other sectors. However, Torvik's (2001) studies differ from Sachs and Warner's (1995) as he postulates that all sectors contribute to learning and spillovers occur between them. Despite these theoretical differences, many Dutch disease papers concur that abundant natural resources may lower production and welfare because the composition of production is changed, and because it is the composition of production that determines the level or the growth rate of productivity (Corden, 1984; Fardmanesh, 1991; Matsen & Torvik, 2005; Takatsuka et al., 2014; Torvik, 2001; Usui, 1997).

A rise in the foreign exchange rate as a result of a natural resource implies a lower productivity. This is based on the assumption that LBD is only in the traded sector (Torvik, 2001). Gylfason

found that an alternative channel gives the same result. With an appreciation of the real exchange rate and volatility, productivity of the traded sector reduces due to lower investments being pumped into the sector. The assumption that only the traded sector contributes to LBD may be true for some countries and not others (Gylfason, 2001). For example, Norway has strict regulations on importation and so its agricultural products are in the non-traded sector even though this is the sector that learns by doing. Most of the countries in Sub-Saharan Africa have strict controls on the imports of manufactured goods a sector that also learns by doing. This means that the manufacturing sector in Sub-Saharan Africa is the non-traded sector. The traded and non-traded sectors clearly differ from country to country. As a result, the assumption that LBD can only be generated in the traded sector cannot be applied across all countries and is not specific to a particular sector (Aslaksen & Torvik, 2006; Torvik, 2001, 2009).

3.2.5 Krugman's Model

Krugman's model (1987) posits that when a country trades with its natural resources such as oil in the case of the Netherlands, it will experience an appreciation of the real exchange rate which will crowd out other sectors of the economy. In practice, there is widespread concern that the contraction of a country's manufacturing sector which follows the discovery of natural resources works to the detriment of the economy. The major concern is that when the natural resources are depleted, the manufacturing sectors will die out.

The model treats income generated from the resource sector as if it were a transfer payment from abroad (Takatsuka et al., 2014). Krugman considers the implications of such a transfer payment from a foreign country to a home country to explain what would happen when the natural resource sector experiences a boom (Krugman, 1987). As long as there are non-traded goods in a country, effects of a large transfer (resource boom) can offset productivity so that some sectors move abroad (Dornbusch, Fischer, & Samuelson, 1977). The impact of this in the long run depends on how long the transfer payment lasts. All transfer payments in this model whether in the short or long run are equivalent to a windfall in the resource sector. A shift of production from the home country to a foreign country will mean that home productivity will reduce in those industries over time (Farzanegan, & Habibpour, 2017).

If the transfer is available for a short period of time, then when it ends the previous home country conditions re-assert themselves and the relative wage returns to its original amount. However, if the transfer lasts for long period of time then some of the industries will not return to the home country when the transfer ends. Regardless of the length of time that the transfer lasts, the home country's market share and relative wage in the industries that went to the foreign countries will be reduced permanently as a result of the transfer (Krugman, 1987; Matsen & Torvik, 2005; Torvik, 2001). With regards to natural resources, it is expected that the economy will respond in the same way in both the long and short run. Therefore according to this model, a resource boom that occurs for the short term (due to a temporary increase in the value of the minerals) will allow other sectors to reassert themselves when the price of the mineral commodity returns to its original price. However, in the long term, a permanent increase in the price of minerals will reduce productivity of the other sectors permanently (Krugman, 1987; Torvik, 2001).

The theoretical framework has shown that rent seeking activities do not add value to the macro-economy yet entrepreneurs who find it profitable continue with rent seeking activities in the mining sector (Deacon, & Rode, 2012). Sach and Warner (1997a) posit that endowments in natural resources tend to shrink other sectors such as manufacturing. Corden and Krugman

explain that a rise in the price of minerals causes an appreciation of the real exchange rate, and if such a case would continue in the long run it would kill the non-mining sectors and most factors of production will be focused in the mining industry seen in the LBD concept (Corden, 2012; Krugman, 1987; Matsuyama, 1992).

The study will seek to investigate which of these theories are applied in Botswana and Zambia. Previous discussions of effects of copper prices affecting the revenues of the Zambian economy in the 1970s are evidence of some Dutch disease effects of Krugman's model (Krugman, 1987; Simutanyi, 2008). In Botswana and Zambia, the increase in mining employment opportunities is suggestive of a movement of labor away from other sectors into the resource sector (Gwebu, 2012; Ji, Magnus, & Wang, 2014; Meyersson, 2008). The lack of transparency in Zambia's development agreements, and the displacement of the San from the Kalahari for mining purposes without proper explanations of compensation are indicative of rent seeking behavior (Lungu, 2008; Taylor, 2007). Findings at the micro-level will be able to magnify which theories are more prominent than others.

Many of these studies were conducted at the macro, and meso-level looking at sectors of the economy and how they get affected by resource endowments. This study will provide the broader approach to resource studies, an area where not many studies have been conducted at the micro-level. The lessons learned will provide new insight into the impacts of mining with possible solutions that enhance sustainability in this extractive industry. As mining is directly linked to development, these findings will be of benefit to the development of the countries in question.

3.3 Empirical Review

Literature on mining shows that there are negative and positive impacts to immediate communities. Empirical impacts highlighted in the literature are on employment, Mining Induced Displacement and Resettlement (MIDR), infrastructure and social amenities, the environment, health, and the social fabric.

3.3.1 Employment and Mining Induced Displacement and Resettlement

Mining Induced Displacement and Resettlement (MIDR) is a topic that has been widely researched (Abuya, 2013; Lange, 2011; Mensah & Okyere, 2014; Owen & Kemp, 2014, 2015; Terminski, 2012, 2013; Wilson, 2013). MIDR can happen when commodity prices increase, raising demand for more land which leads to displacement of communities (Owen & Kemp, 2014). Kitlula's research on the socio-economic impacts of mining on local livelihoods in Tanzania using Participatory Rural Appraisal (PRA) tools and techniques revealed that the influx of foreign mining companies made it hard for locals to secure land. This was caused by government policies that favoured foreigners (Kitula, 2006). There are also unfortunate instances where mines promise to offer compensation packages for resettlement but do not follow through with their promises (Van Alstine & Afionis, 2012).

Despite the common perception that MIDR has negative outcomes on the communities relocated, Downing (2002) argues that the compensation from MIDR provides economic opportunities such as job creation with the sprouting of new businesses in the new areas. However these new businesses have not been discussed in detail. This research will seek to unearth how compensated and relocated communities live presently compared to their past lifestyles and reveal which specific businesses sustain them outside of mining that birthed as a result of the mining activity in the area.

Solomon (2011) explains that, mining can cause welfare improvements such as job creation. In Botswana, employment was reported to increase in the secondary and tertiary industry because of the Bamangwato Concessions Limited BCL mine that was the main source of revenue. One thousand mining jobs sprouted to support about 25 000 locals. Coal mining impact studies conducted by Betz, Farren, Lobao and Partridge (2014), in the Appalachian region of the U.S revealed that the area had a transient workforce that benefited from the mining jobs. There was an increase in the entrepreneurial activities in the area as miners had more spending power to buy household and luxury goods, these encouraged businesses to open up and began to flourish (Betz, Farren, Lobao, & Partridge, 2014). Deller & Schreiber (2013) noted that, employment opportunities for rural communities also increased, and mining created employment in sectors related to and not limited to mining (Deller & Schreiber, 2013). These findings did not provide specific descriptions of the kind of jobs created or the actual entrepreneurial activities that began to flourish (Betz et al., 2014; Deller & Schreiber, 2013; Solomon, 2011). A deeper look at these specificities would provide a better understanding of the impacts of employment that arise from mining activities.

Amankwah and Anim-Sackey found that mining reduced the rural exodus into urban areas, promoted local economic development and reduced poverty. Their study also reported a drastic change in the transformation of unskilled workers to semi-skilled and skilled workers. Although it was noted that mining provided higher incomes for rural areas, the impact of these higher incomes was not looked into, neither did the study reveal what skills were being learned by mine workers (Amankwah & Anim-Sackey, 2003).

With regards to employment, Obeng-Odoom (2014a) explains that, although Nigeria is one of the wealthiest countries in Africa due to its oil production (the country produces approximately 2.46 million barrels of oil per day), the gap between the rich and the poor is great, and unemployment is partly the reason for this. The poor do not have jobs in the oil industry and the research did not go into details of unemployment figures and how that has an impact on the poor communities, and neither did it look at the wealthy communities to see how they benefit directly from the oil production.

At the micro-level Solomon (2011), Deller and Schreiber (2013), Amankwah and Anim-Sackey (2003) agree that mining leads to increased employment opportunities. However, at the macro-level Leshoro (2014), Biyase and Bonga (2007) found that mining companies sought to increase labor productivity and efficiency by using improved technologies and equipment. Despite an increased demand for diamonds in Botswana, the country experienced growth without an increase in employment (Biyase & Bonga-Bonga, 2007; Leshoro, 2014). The findings of Biyase and Bonga-Bonga (2007), and Leshoro (2014) differed from Cornish's findings (2012, 2013a) who showed empirically that mining in Botswana's Jwaneng actually increased employment levels and the standard of living for locals. It is expected that findings at the macro-level will differ from those at the micro-level. As this study is interested in the micro-level impacts, it will focus on seeing whether in some cases even at the micro-level technology and efficiency can affect employment in mining companies.

More people in Ghana move into the mining sector creating in-migration. This weakens other sectors like agriculture as people focus on the mining sector and are attracted by it more than any other sector. Despite this, mining employs between 15,000 and 18,000 people which is less than One percent of the total labor force in Ghana. This is because the mining industry is capital intensive and only a few jobs are available for the locals (Obeng-Odoom, 2014a). In Ghana locals do not possess the skills to operate in management positions, their skill sets allow for

low level, temporary work and not permanent employment. This prevents them from benefiting from the long term employment prospects that mining would offer and creates job insecurity as their temporary work does not provide sustainable predictable income (Obeng-Odoom, 2014a, 2014b).

3.3.2 Infrastructure and Social Amenities

Obeng defines the discovery of minerals as one that will lead to job creation, building of schools and infrastructure, hospitals and community development (Obeng-Odoom, 2014a). The wealth of literature encompasses the macro-economic developments that mines attract (Adada, Aggesen, Hansen, & Lund, 2012; Farole & Winkler, 2014; Herman, 2013; Jacobs, 2013). Petkova-Timmer et al. (2009) undertook some studies to classify key mining impacts comparing them across six mining service towns in the Bowen Basin region during the 'boom and bust' cycles of coal mines. The findings were that mining led to population growth, community diversification, increased financial support, increasing land values, education of communities, improved health services and infrastructure (Petkova-Timmer et al., 2009). Van Alstine and Afionis (2012) revealed different results explaining that the infrastructural set ups in mines built in rural areas are actually for the benefit the mining companies and mine workers who come from other towns. Those indigenous to the mining area are not automatically given housing facilities, health services or schooling opportunities.

3.3.3 The Environment

Okonta and Douglas (2003) performed a study on the effect of oil in the Niger Delta area in Nigeria. It focused on the activities of Shell Oil Company and they found that Shell broke the environmental laws in the Niger Delta area leaving oil pipes naked and rusted. This caused frequent oil spillages and fires. Rivers, lakes and streams were contaminated, and aquatic life was damaged. The affected communities were not compensated, and in the few instances where compensation was needed Shell had to be taken to court to force the compensation payment which in some instances was paid 25 years late once the courts reached a verdict. Furthermore calculations of a fair amount of compensation were never arrived at as it was difficult to reach justifiable figures (Obeng-Odoom, 2015; Okonta & Douglas, 2003).

George (2013) performed research on sand mining near the Kerala River and discovered that it was an activity with dire consequences for the environment. An Environmental Impact Assessment (EIA) showed that sand mining processing activities affected the health of aquatic life and led to land degradation. However the studies did not go further to assess how community members were affected by the land degradation (George, 2013). Kambole (2003), and Patterson and Ingri (2001) found intense pollution in rivers that affected aquatic life. Concentrations as high as 3.4 micrometers (μM) of copper and 4.2 μM of iron were found due to leached products from mine waste in the area. The frequency of zebra fish reduced notably due to exposure to the sediment collected in rivers in the Copperbelt province. (Kambole, 2003; Pettersson & Ingri, 2001). These studies were conducted a long time ago and no recent literature exists that builds on this study. There is no current explanation about how the pollution was controlled to improve the aquatic life conditions or the quality of water. A common challenge in Zambia is that few of these studies are conducted and not much literature in the country exists on this topic.

By using pairwise ranking of problems, Kitula (2006) was able to show that Tanzania's Geita district had polluted water from mercury and cyanide. Excess dust from mine pits, and the collapse of buildings was a major problem experienced in the area. Fifty two cases of housing collapse occurred due to mining explosions. Mineral extraction in the area caused land

degradation. Furthermore, agricultural and grazing lands were destroyed (Kitula, 2006). Balanay et al. (2014) used Propensity Score Matching (PSM) and explained that it also provided reliable estimates of mining impacts. Socio-economic impacts of mining in the Caraga region in the Philippines were assessed using this method and it was found that the environmental destruction affected people in mining areas (Balanay et al., 2014). However, how the people were affected was not assessed in great detail and this is what this study will do. It will provide an in-depth analysis of experiences of communities where mining has caused environmental destruction, current research has not done this.

In some areas that were located near the sea in Ghana, the state decided to ban fishing in certain areas of the sea in order to protect oil installation. The expectation was that this restriction would adversely affect fish harvest. One survey of the opinions of 204 female fishmongers conducted before production began found that 52% of them anticipated a reduction in fish supply. The positive outcome was that the ban protected aquatic life, and the banned fishing zones became a safe haven for fish such as little fingerlings (Boohene & Peprah 2011).

3.3.4 Health

Research on the impact of health in mining communities has been widely researched (Cohen, 2014; Eldoret & Chancery, 2013; Wikle, 2014). Sex workers, multiple concurrent partners and secret sexual activities increase in mining townships as many women find it to be a stable source of income (Opoku-Ware, 2014; Wikle, 2014). It is characterized as one which is predictable and constant as many men either unmarried or married, are separated from their sexual partners for prolonged periods of time (Bryceson, Jönsson, & Verbrugge, 2014; Cohen, 2014). Sexual promiscuity and prostitution has led to the spread of HIV/AIDS in Botswana and Zambia (Eldoret & Chancery, 2013; Sinyangwe, 2012; Williams, 2014; Zachungnunga, 2012). In addition to the Sexually Transmitted Diseases, scholars seem to agree that mining brings about mostly respiratory health problems such as chronic bronchitis, and asthma (George, 2013; Kambole, 2003; Kitula, 2006; Pettersson & Ingri, 2001).

The people of Obuasi, Tarkwa and Akwata in Ghana used to take part in small scale farming but due to the increase of gold mining in the area this way of live could no longer continue as the water was polluted and the land was no longer arable. Due to the loss of livelihoods in Obuasi, Tarkwa and Akwata poverty levels increased immensely leading to higher mortality rates. Many children's immunity levels reduced making them unable to fight prevalent diseases such as malaria in the area. In addition, high infant mortality rates were related to poor nutrition (Boohene & Peprah, 2011). A direct link of diseases caused as a result of the loss of livelihoods due to the commencement of mining activities was not brought out; analyzing this impact would be valuable. There is a need for explanations of health problems that resulted from degradation and water pollution from mining activities.

3.3.5 The Social Fabric

Due to the high wages offered by mining companies, a community that is over dependent on mining can suffer from a social and income divide between mining and non-mining families. In some instances a shortage of skilled labor in other sectors occurs as many flock to the attractive wages offered by the mines. The work schedules of mine workers have been known to put a strain on family life. The common 12 hour work shifts and continuous rosters have a negative impact on families and communities (Brereton & Forbes, 2004). The extreme fatigue and disruption of circadian rhythms results in inattentiveness and major depression among mine workers. Alcohol and drug abuse results when workers have addictions and they

constantly use their mining wages to sustain their habits. This leads to broken homes filled with violence, and increased inefficiency at work (Gibson & Klinck, 2005).

Current research on the social fabric in Africa is scanty and limited. The closest being the mafia-like organizations in Sicily mentioned earlier and the few studies conducted above (Buonanno et al., 2014; Sardell, 2009). Not much research is done concerning this in Africa. The studies that exist are linked to macro-economic aspects of corruption, Sexually Transmitted Diseases and civil wars. A huge gap exists and it is the goal of this research to fill in the gap by bringing out what social challenges and domestic hardships result from mining activities.

Positive or negative outcomes of jobs and businesses created from mining will add to the current wealth of knowledge on impact studies as the literature shows it is easily assumed that jobs are a positive impact. It is not clear whether the jobs provided are available for members of the community whether they are employed by the mine or not. On the surface it may seem as though job creation is a benefit for the immediate community, however, some literature shows in some cases that locals do not qualify for the jobs as they are not qualified for highly skilled jobs as was the case in Obeng-Odoom's work in West Africa (2015). It would be imperative to see if this is also the case in Botswana and Zambia. Furthermore, how communities are affected by land degradation and how they cope with environmental changes has not been addressed in great depth. Aspects of social fabric dynamics in Africa still needs to be brought to light as it would provide insight on how homes are affected socially by the mines and whether mafia-like activities blossom as a result of mining activities and weak institutions that directly affect the community. It will also be imperative to learn how locals have been compensated in mining areas and if sustainable solutions for their livelihoods have been found. This research will build on the model of Asare and Darkoh (2001) by looking into each mining impact and assessing the positive and negative outcomes of each respective impact. This study, will look at the interrelationships of theory at the macro, meso and micro-level as experienced by households.

Chapter Summary

The chapter places local economic development theory at the micro level, and the resource curse theory at the macro and meso level. Theory in this chapter shows how countries can move their factors of production towards mining and away from other sectors in the economy such as manufacturing and agriculture. Institutions form the meso level and when countries are institutionally weak tendencies of extractivism tend to be prevalent. Empirically, mining impacts experienced in communities are employment and MIDR, infrastructure and social amenities, the environment, health and the social fabric.

CHAPTER FOUR: METHODOLOGY

4.0 Introduction

The research approach used in this study is a mixed-methods research approach. A mixed methods approach uses both quantitative (numerical) and qualitative (non-numerical) methods to give a richer more holistic view on any given phenomena as experiences are matched with numbers for validation (Yin, 2013). As the theoretical framework focuses on LED and resource curse theories, this chapter provides the road map for the data analysis as it applies to theory and is deductive in that regard. The chapter justifies why certain mines were chosen and how questions were administered. The data was collected using structured interviews and focus group discussions. Collected data was analyzed using cross tabulations and a Relative Importance Index (RII) to rank mining impacts. The RII is of particular importance as it is a model used to assess impact that provides intensity in research so that it is clear which impacts rank higher in communities (Somiah, Osei-Poku, & Aidoo 2015).

Qualitatively, the perceptions of the communities were captured using focus groups and semi-structured interviews which provided an in-depth perspective on impacts felt from a variety of participants. Quantitatively, the house-hold surveys provided for numeric data for comparison from the respondents. Triangulation means using multiple methods to collect data as a way of enhancing validity and reliability of the results (Baskarada, 2014; Gibbert, 2008). However, the main purpose of it is not just validation. The triangulation in this study was done by using both qualitative and quantitative methods to assess mining impact in communities. The triangulation of this data provides an invaluable mixed methods research approach to bring out robust findings. In this research three instruments were used, the focus groups and structured interviews and household structured interviews. These instruments were needed because the focus groups provided community perceptions, the structured interview provided a mining expert to provide views from the perception of the mines and their perceived impacts. Lastly, the household structured interviews were needed to deductively collect data that was based on mining impacts on communities from the impacts brought out in the literature review.

4.1 Research Design

This research is a case study, as most research on mining impact studies has been in the form of case studies. For Di Boscio's qualitative research on mining enterprises and regional economic development, an exploratory case study of three mines in Namibia, Western Australia, and Madagascar was used (Di Boscio, 2010). Kitula (2006), also used a case study approach for mining in Tanzania, the primary data was obtained using Participatory Rural Appraisal (PRA) tools and techniques, participant observations, and informal and formal surveys. PRA is a research technique that requires at least three people to conduct the research at any given time. They train for the experiment and organize themselves to have a facilitator, a team leader and a note taker. Due to financial constraints, the author only had one research assistant (who also acted as an interpreter) per town, this method could not be utilized. Chi-square tests and pairwise ranking were used to test for significant relationships in various variables for impact assessments and intensity of impact respectively (Kitula, 2006). However, Kitula analysed agro-pastoral systems (using seven farming categories) in mining communities in Tanzania and not the resultant mining impacts directly caused by mining activities. In addition, pair wise ranking as a ranking method only analyses two categories at a time, the author has a total of 18 categories explained in section 4.5 in 216 households and so this method was not time efficient (Kitula, 2006). Though not a mining study, Somiah, Osei-Poku, & Aidoo (2015) used RII to assess factors that influenced unauthorized siting of residential buildings in Ghana. In this study, the author wishes to investigate not only which phenomena communities

perceive to have more priority than others as far as mining impacts are concerned, but also categories within the phenomena which cause it to be or not to be a priority, and so RII is the best method to accomplish this task and will be adopted from Somiah, Osei-Poku, & Aidoo's research (2015). The research will be based on a mixed method design, with the triangulation of data from the qualitative elements in the form of community perspectives through the use of focus groups and key informant interviews, and household responses to the structured interviews to form the quantitative elements of the research. The method in itself is a contribution to knowledge as it goes beyond the generalized approach of case studies and pairwise ranking using the RII to assess mining impacts on communities. In addition case study research can be used to develop theory (Eisenhardt, 1989).

4.1.2 Philosophical Approach

The research focuses on highlighting the perceived mining impacts in communities. The philosophical approach used is the pragmatic approach. Pragmatism accepts concepts to be relevant only if they support action (Heyvaert et al, 2013). Pragmatic philosophy adopts the notion that one point of view can never give a complete picture, as multiple realities exist (Yvonne, 2010). According to pragmatism research philosophy, the research question is the key determinant of the philosophy in research (Creswell & Clark 2014). Pragmatics can combine both, positivist and interpretivism positions within the scope of a single research according to the nature of the research question (Guest & Fleming, 2015; Wilson, 2010).

This research focuses a lot on the perceptions of communities in each respective location where a mine was erected. As such, qualitative research is the best method to be used to understand the perceptions of long term impacts that mining has had in communities. Qualitative methods are also effective in identifying intangible factors, such as social norms (Kvale & Brinkmann, 2009). To investigate how a mine affected people living in the area, the focus groups and structured interviews with key informants were necessary to add validation of richness to the data collected. House Hold surveys (which provided data for most of the quantitative aspects) and in-depth structured interviews are optimal for collecting data on individuals' personal histories, perspectives, and experiences (Legard, Keegan, & Ward, 2003). A focus group is a group interview of approximately six to twelve people who share similar characteristics or common interests. A facilitator guides the group and creates an environment that encourages participants to share their perceptions and points of view. Focus groups are effective in eliciting data on the cultural norms of a group and in generating broad overviews of issues of concern to the cultural groups or subgroups represented (Kitzinger, 1995).

Social science researchers can derive multiple benefits from using focus groups. One is that focus groups are an economical, fast, and efficient method of obtaining data from multiple participants (Elliott et al., 2015), thereby potentially increasing the overall number of participants in a given qualitative study. Another advantage to focus groups is the environment, which is socially oriented. In addition, the sense of belonging to a group can increase the participants' sense of cohesiveness and help them to feel safe to share information (Bryant, 2015). Furthermore, the interactions that occur among the participants can yield important data and create the possibility for more spontaneous responses, providing a setting where the participants can discuss personal problems and provide possible solutions (Regan & Dillon, 2015). The types of data generated consisted of field notes, audio/video recordings, and transcripts.

4.2 Population and Sampling

There are 16 operational mines currently registered in Zambia and 14 in Botswana (BCM, 2015; KPMG, 2013a). The population of Zambia is 14, 400, 000 and that of Botswana is 2, 002, 100 (World Bank, 2014b). The maps (in appendix A) show the basic spread of minerals in each country, each shape or symbol simply shows that there are mineral deposits present in the area (World Map, 2015a, 2015b).

4.3 Sampling Frame

Structured interviews were based purely on the themes from the literature review. For the surveys and focus groups, this data was collected by only individuals above the age of 18 who were based in the communities. The focus groups had 5 participants each and these were a mix of mine workers, non-mine workers, civil servants, students, community members. The household structured interview targeted residents (house-hold heads) in the area who were found in their respective homes. For diverse views from respondents, in the absence of the household head, any person found in the home above the age of 18 was interviewed.

Six mining areas in Zambia and three in Botswana were investigated. The mines chosen were well spread throughout each country and in some of the areas chosen more than one mine was in operation. For example, although 3 out of 14 mines will be looked at in Botswana, the communities were affected by neighboring mines in near proximity. Thus, the study captured even more impacts than possibly expected. Although, Zambia is well known for Copper and Botswana is well known for diamonds, other large mines that produce other minerals also have an impact on the communities around them. In addition, a variety of minerals provide for more diverse impacts and so mines were picked with that in mind. The following are some of the mines in Botswana and Zambia which have been selected. To manage the two countries, purposive sampling was used to select only those residents who live closest to the mines (within a 20km radius). Statistics of country mining data and population are shown in table 2 below (Survival International 2014, Ministry of Local Government and Housing, 2014, City Population, 2014, CSO, 2014).

Three primary sources of data in the form of household surveys, focus group discussions and the key informant interviews were used to capture data needed to answer the main research questions. The data collection themes around the research objectives were based on MIDR, sustainability, regulations and socio-economic impacts. All the questions were designed around these themes. In the results chapter, findings on sustainability and country regulations were recorded. The analysis chapter was based on findings on MIDR and socio-economic impacts experienced in communities. Structured interviews had to be administered in both Zambia and Botswana so as to capture body language, as well as the practicality of needing to be in person especially in rural areas where access to internet and phones is limited.

Table 2: Botswana & Zambia Mining Data

<i>Country</i>	<i>Mine</i>	<i>Mineral Mined</i>	<i>Location</i>	<i>Area Population</i>
<i>Botswana</i>	1. Palapye	Coal	170km south of Francistown	37, 000
	2. Jwaneng	Diamonds	120km west of Gaborone in the Naledi river valley of the Kalahari	18, 008
	3. Selebi-Phikwe	Copper/Nickel	Selebi-Phikwe	53, 727
<i>Zambia</i>	8. Nchanga Open Pit	Copper	Chingola	157, 340
	9. Chilanga	Limestone	Lusaka	1, 700, 000
	10. Mopani	Copper	Kitwe	504, 194
	11. Mufulira	Copper	Mufulira	125, 336
	12. Maamba Colliery	Coal	Sinazongwe	40, 000
	13. Sable Mine (currently closed for maintenance)	Zinc, Lead, Copper, Cobalt	Kabwe	202,914
<i>Total population in coverage area</i>				2, 838, 519

Country Mining Data (Survival International 2014, Ministry of Local Government and Housing, 2014, City Population, 2014, CSO, 2014).

4.4 Data Analysis

4.4.1 Qualitative data and analysis

The research used focus group discussions and structured interviews to form the qualitative elements of the research; the data was analyzed using content analysis. In depth views from mine and non-mine workers who lived in the area provide for a mixture of responses during discussions. It was deliberately designed to have diversity of participants so that a holistic view of perceived mining impacts in communities could be captured. For the content analysis, the author categorized and themed the data. The strength of qualitative research is its ability to provide complex textual descriptions of how people experience a given research issue. It provides information about the “human” side of an issue. In many cases this can be the contradictory behaviors, beliefs, opinions, emotions, and relationships of individuals (Kvale & Brinkmann, 2009). The strength of quantitative research is its ability to indicate statistical variables such as frequencies or averages which can add evidence to the experiences found in a qualitative study. As qualitative data is collected an emphasis on highlighting what theories

are brought out will take place to provide the robust framework to be developed that assesses socio-economic mining impacts at the household level.

4.4.2 Quantitative data and analysis

The household surveys were used for the quantitative analysis. Cross tabulations were then conducted to provide frequencies and percentages of background information for contextualization. Questions one to seven of the household structured interview (see appendix D) provided the data needed to analyse the demographic characteristics of the respondents. A Relative Importance Index (RII) was used to bring out the mining impacts (externalities) that affected communities more than others in the short and long term as well as to give a comparative of Botswana and Zambia. The RII helps to find the contribution a particular variable makes to the prediction of a criterion variable both by itself and in combination with other predictor variables (Somiah, Osei-Poku, & Aidoo, 2015). In this manner, the contribution mining had on the variables was analysed using RII. Its algebraic computation is as follows:

$$RII = \sum \frac{w * n}{A * N}$$

The traditional formula of an RII is placed above, where w is the weight (between 1 and 5 with five being the highest rank on a Likert scale) that the respondent places on a given category or response option in a variable; n is the number of respondents that assigned a particular scale on a response; A is the highest attainable weight on a scale which is 5; and N is the total number of respondents in a given survey that responded to a given variable with various categorical responses. However, this formula was adapted by the author to suit the data captured (Somiah et al., 2015). In this study w is replaced with 1 because a binary response was given for a given impact (respondents answered yes or no to questions about mining impacts; the dependent variable responses). To account for population differences in the two countries being investigated, country weights were applied to the RII (Somiah et al., 2015). Consequently, the overall index is the average of the relative importance index for the variables in the various groups. Stata was used as the software to compute and calculate the ranks from data collected from question 18 of the household questionnaire (see appendix D). Question 18 had each of the main categories of variables of analysis as found in section 4.5 and the main themes of each category formed the ranking themes. The length of time to decipher short and long term in research simply requires defined parameters of reference (Harackiewicz, et al., 2000). To answer the research question of short and long-term impacts, these parameters were defined by respondents who had lived in the area for five years or less as the short term and those who lived longer than five years as long term. In addition, the categories were compared across countries to see similarities and differences of mining impacts in Botswana and Zambia, further providing findings that respond to the research objectives.

4.5 Variables

The quantitative and qualitative data analysis was conducted to understand what relationship existed between mining (the independent/explanatory variable) and the following dependent variables outlined on Table 3.

Table 3: Dependent Variables Affected by Mining Activities

1	Improved health service	Health
2	Number of clinics	
3	Upgraded facilities	
4	specialised health facilities	
5	Reforestation	Environment
6	Access to clean water	
7	Environmental protection	
8	More schools	Infrastructure and Social amenities
9	Salons, bars, shopping centers	
10	Increased trade	
11	Improved roads	
12	Police posts	
13	Gender Based Violence	Social fabric
14	Closeness of families	
15	Mafia activities	
16	Compensation	Employment and MIDR
17	Job creation	
18	Resettlement	

4.6 Questionnaire Design

The focus group discussions and key informant interviews were designed to provide insights into links from what was happening in the communities to resource curse theories and local economic development theories. The personal instrument was designed to provide demographics to show the reliability of the data provided by the respondents and to isolate short term from long term impacts by separating respondents who had lived in the area for five years or less, and comparing their findings to those who had lived in the area for over five years. The key informants were able to give responses as perceived by the mines in terms of

the mine impact on the community. They were also able to provide insight on policy and procedures associated with mining (See appendix D to view each structured interview).

4.6.1 Survey instruments

Three survey instruments were used in this research; a personal instrument (for the quantitative elements of this research), a focus group with a minimum of five community members, and a key informant interview of a manager who worked for the mines or was well experienced (at least five years) and well acquainted with mining activities in the area formed the qualitative elements of this research. For each mine one focus group, one interview with a key informant and 20-25 structured interviews were administered.

4.7 Delimitation of the study

In assessing how communities around the mines are affected by mining activities in Botswana and Zambia; household heads, mine workers, non-mine workers, civil servants and senior management of mining companies were to provide consent to participate in the interviews. Access in Botswana proved to be very challenging as a mining pass was required to enter mining communities. The set-up of some mining communities in Botswana was that of an enclosed community not easily accessible to the general public, whereas, the mining communities in Zambia are easily accessible to the general public. This required extra time and scrutiny by Botswana mining officials prior to the release of passage into some mining areas. However, nearby villages, lodges and non-mining businesses that operated around these areas were more flexible and willing to participate in the interviews. In Botswana, there was also a strong sense of fear of participating in the interviews as nationals were concerned about security of their homes, in Jwaneng and Palapye some thieves would pose as researchers conducting interviews in homes on behalf of local companies and once granted access they would steal household items. Gaining the trust of local communities in Botswana was quite a challenge. In most cases the Tswana research assistants would act as the middle man to gain the confidence of the participants. The author's Student ID did help to ease tension and apprehension amongst participants. Overall, in Botswana more skepticism to participate was encountered as many nationals did not want to be found in error by the Botswana government. A group known as the Directorate of Intelligence and Security (DIS) would dress in civilian apparel and would work under cover as detectives to apprehend any person found giving negative reports about the Botswana government (Mogalakwe, 2008). This fear from locals was overcome when they were assured of anonymity. Travel costs and lodging limited the number of towns the author could cover in this research as it was self-funded. Despite efforts to acquire funding from local Zambian Universities and funding institutions in Zambia and South Africa, it was unsuccessful as most opportunity in South Africa at the time of data collection were available for South African nationals. In Zambia, institutions were not financially able to provide funding.

This study is a socio-economic impact study and it focuses on communities within a 20km radius from the mines in Botswana and Zambian towns to give robust results of how households are affected. Due to financial constraints, time efficiency considerations, as well as proximity of mines across towns, in Zambia five mines were selected and in Botswana three mines were selected (mines in Botswana are more sparsely distributed and less populated compared to Zambia). Mineral variation provides dynamic impacts and so the choice of mine was selected based on variety of minerals mined. For example, as diamonds are mined in Jwaneng, Selebi-Phikwe was selected due to the presence of a Nickel-Copper mine. The focus remains on communities at the household level to see how mining activities have affected them in the short and long term. The variables in the research are solely based on the literature, and

are limited to employment and MIDR, the environment, infrastructure and social amenities, health and the social fabric.

4.8 Ethical Considerations

An ethics certificate valid until April 2017 was granted as all the requirements needed for approval were met. All research was conducted in the prescribed manner as presented to the ethics committee. During the data collection method, anonymity of participants was guarded, and collection of data only took place when consent by the participant was granted. The information collected is for academic purposes only. No. vulnerable persons were interviewed, the use of National Registration Cards (N.R.Cs) were used to number the respondents and also to verify that they were above the age of 18 (Northway, Howarth, & Evans, 2014; Wiles, Coffey, Robison, & Prosser, 2012).

CHAPTER FIVE: FINDINGS OF LOCAL COMMUNITIES AND MINING REGULATIONS

5.0 Introduction

The legislation that is put in place by governments to regulate the operation and day to day activities of mines has an effect on the community where the mines are set up (Essah, & Andrews, 2016). The governments of countries in which mining activities take place are responsible for putting in place laws that will ensure that all possible segments of the community that could possibly be negatively affected by mining activities are protected (Fessehaie, Rustomjee, & Kaziboni, 2016). In this chapter, the different approaches used globally to regulate the impact of mining activities through various global organizations are discussed. Overviews of the mining regulatory framework of the United States, Canada, Latin America, and South Africa are provided. A focus of mining laws of the United States and South Africa are given to contrast the existing legal framework of Botswana and Zambia. The discussions of global mining laws (with the United States and South Africa as justified benchmarks) provide relevant recommendations as gaps and loopholes that exist in Botswana and Zambia are highlighted in this chapter. After the discussion of mining laws, corporate social responsibility efforts by the mining companies of focus in this study are revealed to see how communities are benefiting from mining efforts and contributing to local economic development.

5.1 Global Mining Standards and Organizations

Mining legislation differs from country to country with some countries having more advanced terms of regulation than others. Various Non-Governmental Organizations and international developmental institutions provide global guidelines as a benchmark for countries to use to measure their performance (Shadbolt, 2011). Examples of these organizations include but are not limited to; International Organization of Standardization (ISO), the ISO provides specifications relating to specialised mining machinery and equipment used in mining operations. The ISO gives the recommended practice for the presentation of plans and drawings used in mine surveying, methods of calculation of mineral reserves, and mine reclamation management (ISO/TC 82 Mining, 2011). The Organisation for Economic Co-operation and Development (OECD) gives guidelines to multinational corporations which are non-binding. These guidelines cover ethics, human rights and environmental protection in the mining industry (OECD, 2011). The United Nations (UN) global compact principles that are related to the environment are relevant to mining and serve as a guideline for mining companies. The relevant principles are seven, eight and nine which prompt businesses to consider all necessary precautions, undertake initiatives which promote environmental responsibility and encourage technologies that are environmentally friendly (United Nations, 2011). The Global Mining Initiative (GMI) is an organization with a group of countries as participants that focus on sustainable development. The group has principles that bind participating countries, the principles relevant to the environment and as a consequence mining activities focus on the corporate decision making process, risk management implementation, continual improvement of environmental protection, conservation of biodiversity, and integrated approaches to adequate planning of land use (Human Rights, 2016). Lastly, the Extractive Industries Transparency Initiative (EITI) encourages mining companies and countries to be transparent in an effort to allow natural resources to benefit all of society, and to encourage collaboration of governments, corporate and civil society. EITI promotes corporate publication of government disclosure of revenues from mining companies (EITI, 2016).

5.2 Global approaches to regulating the impacts of mining

This section provides an overview of laws related to mining in countries that conduct major mining activities. Provisions of laws in Canada, Latin America, the United States and South Africa are provided because of the extent to which mining activities contribute to economic development in these countries. Canada has around 375,000 employees in the mining sector. The sector is proportionally the largest private sector employer of the native people in Canada, and is one of the largest global mining suppliers with more than 3,700 companies world-wide (Mining Association of Canada, 2017). In addition to large mineral production, Latin America specifically Bolivia, Ecuador and Mexico were chosen because of their focus on laws that benefit the community and the power that locals have to effect policy change (Helwege, 2015; Globalaw, 2016). The United States is a global leader of sustainability in the extractive industry. Continual research for innovative ways to ensure mining activities has minimal negative environmental impact. U.S laws give a baseline for increased sustainability (National Mining Association, 2016). South Africa is projected to have the world's fifth-largest mining sector in terms of GDP value. It has a legal framework that focuses on economic empowerment on Blacks as a corrective measure taken after the Apartheid period and shows how to integrate community development through its framework (Brand South Africa, 2012). These countries have major mining activities conducted which are main contributors to economic growth they also offer unique provisions for indigenous communities which could provide a good reference point for African laws to see how differently or better mining law can mitigate negative impacts and provide sustainability for local communities.

5.2.1 Community Benefits of Mining Law in Canada, and Latin America

In Canada, some legislative powers are vested with the federal government of Canada and others are within the jurisdiction of the provincial governments (Hoogeveen, 2015). The constitution sets out the legislative powers of the federal government of Canada and the provincial governments. This absolute government ownership is, however, challenged by indigenous groups like the Inuit people (Greaves, 2016; Dodek, 2015). Unique to the Canadian regulatory framework is the negotiation with indigenous people. Indigenous groups have negotiated land claim agreements for financial benefit (Simms et al., 2016). For example, the Nunavut Land Claim Agreement (NCLA) provides the Inuit people with 20percent of the surface rights of the territory of Nunavut and 2 percent of the mineral rights in the territory. The NLCA required government to pay royalties 50 percent of the first \$2,000,000 of revenue and 5 percent of any additional revenues. These funds were placed an Inuit trust for the Inuit to receive royalty payments on lands where they own the mineral rights (Mifflin, 2009; Nunavut Land Claim Agreement, 2016). The NLCA also requires signing of an Inuit Impact Benefit Agreement (IIBA) detailing financial and non-financial benefits to be provided to the Inuit as compensation for potential impacts of mining projects (Jones, & Bradshaw, 2015; Nunavut Land Claim Agreement, 2016; IIBA Review, 2011). This agreement demonstrates social acceptance of a mining project with the indigenous people fully aware and knowledgeable of the mining operations that take place on their lands.

In Bolivia, mining law is controversial, much debate exists around the extent to which mining companies consult with local communities affected by mining activities. In some cases mining operations have ceased because of the displeasure expressed by local communities and the patchy legal framework that does not clearly state how to manage and resolve consultations with local communities (Helwege, 2015). The law follows Resolution 169 of the International Labor Organization (ILO) and takes into account the U.N. General Assembly Resolution on indigenous peoples' rights (ILO, 2016). The continued controversy in Bolivia is based on the

recognition of certain indigenous collective people's rights on their ancestral lands which, however, are subject to third party acquired rights (Anthias, & Radcliffe, 2015). This causes friction between the third parties (mining companies who wish to acquire the land) and the local communities.

In Ecuador, the Mining Law requires 60 percent of the mining royalties to be re-invested in local production and sustainable development through municipal governments and administration. 50 percent of that percentage is given to the indigenous groups of the mining area (Globalaw, 2016). Those resources are distributed according to levels of impact of the mining activities. In addition, prior to commencement of mining works it is compulsory for a community consultation to take place to ensure harmony and mutual understanding as the mine works commence (Carrión, 2015).

In Mexico, the Mining Law establishes three forms of mining titles. These are concessions, Assignations, and Reserve. Concessions are granted only to Mexican citizens or companies to promote local production. Foreign companies can hold the total capital of a Mexican company and obtain concessions, but the company must be a Mexican one (Globalaw, 2016). Indigenous communities are given preference to obtain the mining concession over any other applicant, provided the claims are filed at the same time and the communities live on the land (Boni, Garibay, & McCall, 2015). Assignations are only given to the Mexican Geological Survey and are valid for six years only with a specified purpose to carry out exploration activities. Reserve is granted as a government order to inhibit any mining activities within the reserve zone to ensure resources for public interest are preserved in an effort to plan sustainably for the future needs of the country (Globalaw, 2016). As most controversy in the mining industry is around the surface area where mining is to be conducted, the environment as mining poses a major threat to the environment, and the safety of workers in the mines (National Mining Association, 2016) Highlights from key laws in some of the countries discussed are explained below.

Surface Rights

In Ecuador any people, local or international are free to prospect and explore for minerals unless they are required not to by the Constitution. All surfaces can be explored except in areas that are nationally protected by the law (urban settlements, archaeological and historic sites and already existing mining concessional areas) the required licensees and contracts are granted by Sectorial Ministry by way of a ministerial decree (Mining Act, 2009). In Mexico, the mining rights covered under such a concession do not include direct ownership of the surface where the concession is located. The Mexican Constitution recognises surface lands to include *Bienes Comunes* (social land granted to aborigines), *Ejidotes* (social land granted to a group of individuals or communities), National Lands, and *Zonas Federales* (federal areas, beaches and river causes) (Mexican Mining Law, 2006; Ley Minera, 1992). In Canada, where there is private ownership of the land, a holder of a mineral concession will be required to provide a notice of access to the surface owner of the land where mining is to take place; find a way to agree to access with the landowner; or obtain permission from the provincial or territorial authority in Canada (Mining Right of Way Act, 1996).

Environment

In Ecuador, before mining activities take place, mining rights holders must carry out environmental impact studies to prevent, mitigate, control and repair environmental and social impacts that stem from mining activities. In addition, Ecuador is strict on water treatment demanding that companies return the water to an unpolluted state and send it back to its original source be it river, lake or lagoon Replanting and reforestation is actually placed in its laws and

any works that require removal vegetation (tree clearing, plant removal, etc) are obligated to replant and reforest the area preferably with native species. The impact assessment should include research on the flora and fauna species in the mining area with measures to manage them whilst conducting mining activities or to recover them after mine. Equador has a unique law that protects communities, they have the right to information, participation and consultation and in the case that there is majority opposition by the community, the decision to develop the project shall be adopted by way of a grounded resolution by the Sectorial Minister (Bustamante & Bustamante, 2009; Mining Act, 2009). Since the Canadian Environmental Assessment Act, 2012 Canada also provides similar rigorous measures of environmental protection and considers its indigenous peoples' rights as well (Canadian Environmental Assessment Act, 2012).

Health and Safety

In Equador mining companies are required to preserve the health both mental and physical of employees and to provide them with permanent health care and attention, and also sanitary and comfortable living conditions (Mining Act of 2009, 2009). In Canada, every province and territory has its own workers' compensation board to hold mines accountable to the occupational health and safety laws. The board has an administrative function that provides injured workers with suitable and adequate insurance schemes for their benefit (Government Employees Compensation Act, 1985). Similar administrative organs would be of benefit to decentralise national power in Botswana and Zambia as such administrative organs outside of the mining companies created specifically to represent and protect the injured mine worker do not exist.

5.2.2 United States Mining Laws

The United States is a major international player and member of most of the global mining organizations which set the international mining standards (Shaffer, 2016; American Geosciences, 2016; Statista, 2015). A substantial amount of mining in the United States occurs on federal lands where the federal Government owns both the surface and mineral estates. The United States has an abundance of native reservations comprised of federal lands set aside for indigenous peoples. The United States manages its cultural interests through the National Environmental Policy Act of 1969 (National Environmental Policy Act, 1969). The United States is similar to Latin America and Canada in its provisions for indigenous peoples but not with regards to mining lease restrictions (Mineral Lands Leasing Act, 1947). Unique to the United States is that although the law does not restrict foreign investment the Mineral Lands Leasing Act of 1947 requires that those requesting for a permit to mine in the country be citizens, and a citizen can also be a company that is incorporated in the United States and owned by non-United States entities or corporations (Mineral Lands Leasing Act, 1947). This is different from the other countries discussed in previous paragraphs. Mining law as it pertains to the environment is more detailed and robust than any of the other countries reviewed as it provides specific instructions to managing mitigating processes beyond the extent to which other law has provided in the countries under review in this study. A detailed discussion of the laws of the United States as they affect surface rights, the environment, as well as health and safety are found below.

Surface Rights

The Federal Land Policy and Management Act of 1976 guide how land is to be appropriated and utilised. Not all federal lands are open to mineral entry, including national parks, national monuments, most Reclamation Act project areas, military reservations, wilderness areas, and wild and scenic river corridors. Unlike other countries which allow both local and international

mineral lease holders, the United States limits this to only its citizens (Mineral Lands Leasing Act, 1920, Mineral Leasing Act for Acquired Lands, 1947; Federal Land Policy and Management Act, 1976).

Environment

Mining operations are guided by The National Environmental Policy Act (NEPA) of 1969 (National Environmental Policy Act, 1969) to minimize negative impacts on the environment. The United States also has unique laws such as the to the Clean Air Act (CAA) of 1970, the Clean Water Act (CWA) of 1977 and The Resource Conservation and Recovery Act (RCRA) of 1976 to manage the process and controls of all harmful substances in air water and waste. In addition, The Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) passed in 1980, enables the government to clean up any site where there has been release of a hazardous substance (Comprehensive Environmental Response, Compensation, and Liability Act, 1980; Clean Air Act, 1970; Clean Water Act, 1977; Resource Conservation and Recovery Act, 1976).

Health and Safety

The United States emphasizes annual inspections of mines to see how their work environments are and to check whether the workers are adequately being accommodated in as far as the law is concerned for their health and safety (Mine Safety and Health Act, 1977). Mandatory safety standards for underground mines include but are not limited to roof support, ventilation, underground high voltage distribution, fire protection, clear maps for miners, blasting and explosions procedures, emergency shelters and emergency response plans (Mine Safety and Health Act, 1977).

5.2.3 Mining Law in South Africa

The South African mining sector has an increased emphasis on CSR and an infusion of CSR in its regulatory framework as an African country. South Africa is used to give an in-depth view of how CSR is encouraged by it laws although CSR itself is not a binding legal requirement, the mining industry of South Africa has taken the lead in CSR compared to other industries in the country.

In South Africa, the Mineral and Petroleum Resources Development Act (MPRDA) no 28 of 2002 is the main law that governs mining activities in the country. The purpose of the MPRDA is to ensure the sustainable use of South Africa's natural resources within a national environmental framework policy which primarily protects environments and affected communities. The MPRDA also states that in all categories of mining permits, a detailed environmental management programme is required before consideration of any mining related application. During South Africa's transition to democracy, CSR began to evolve due to international pressures that pressed hard on the mining sector as South Africa's capital markets were reintegrated with international markets (Mineral and Petroleum Resources Development Act, 2002; Sorensen, 2015). South African mining companies were expected to meet international standards which incentivized their CSR to meet corporate governance codes of international organizations and appeal to investors. As expectations increased internationally, policies began to change locally to boost foreign investment (Claassens, & Matlala, 2014).

Despite this pressure, gaps in South African mining law still exist. For example, the law requires that mining companies consult the affected communities prior to any mine works. However, because this consultation does not require public consent by the law, it is simply done as a formality. When mines hold compulsory environmental impact assessment meetings

with communities the knowledge divide is so great as the companies have all the necessary data relevant to successful mining in the area, whereas, communities have low levels of literacy and hardly any tertiary education to understand complex mining terms or impacts that they would encounter living there (Ramatji, 2013). In this regard, the law should accommodate locals by allowing them to receive prior information in good time with language interpretations where necessary regarding the context of the project they are expected to discuss with mining companies during compulsory meetings.

The upside of the MPRDA is that it includes institutionalized systems to ensure sustainability of actual mining operations and environmental rehabilitation of the mining areas after mine closure (Mineral and Petroleum Resources Development Act, 2002). Under this provision of the law, the holder of the mining titles must rehabilitate the environment affected by mining operations to a predetermined state that is acceptable under the concept of sustainable development and the law. By implication, this extends to environmental damage, pollution or ecological degradation that occurs in both inside and outside the boundaries of the area to which such right or permit relates.

In an effort to progress from the racial inequalities of apartheid, in 2002 all mining companies in South Africa were required to renew their mining licenses based on their compliance with the Black Economic Empowerment (BEE) scorecard (see appendix B). This scorecard was based on a racially selective program launched by the government to address the ill treatment of blacks during the period of Apartheid. According to the BEE Act of 2003, the government can make industry specific charters that will govern the way that industry promotes and enforces BEE (Black Economic Empowerment, 2003). The Broad-Based Socio-Economic Empowerment Charter for the South Africa Mining Industry (The Mining Charter) was enacted by the Chamber of Mines of South Africa. The Charter is a legally binding commitment by the mining industry to increase the access of Blacks to South Africa's mineral resources and their associated economic benefits. The Charter recognizes the history of economic injustice in South Africa and provides a formal stated intention from the mining industry to encourage black economic empowerment. There are eight elements of the Mining Industry Charter. These are ownership, joint ventures and control of enterprises and assets; human resource development; employment equity; nondiscrimination against migrant labor; development of rural and mine community; housing and living conditions; procurement; and skills development (Department of Trade and Industry, 2004; Republic of South Africa, 2002).

The law allowed marginalized citizens to enter the mining and minerals industry and to benefit economically and to expand the skills base of black people of South Africa in order to serve the community; promote employment and advance the social and economic welfare of mining communities and the major labor distribution areas; and promote beneficiation of South Africa's mineral commodities. The charter provides a framework to help the mining companies to comply with the MPRDA (Black Economic Empowerment, 2003). The scorecard is the main tool for setting transformation standards that are measurable by mining companies. The charter commits government, industry and labor, to planning mechanisms to enable businesses to achieve their targets (Black Economic Empowerment, 2003). In the context of Zambia and Botswana such a framework would give communities a voice in instances where employment opportunities are not equitable with a bias on foreign employment which tends to be the case when multinational corporations invest in mining areas. The law of South Africa shows a progressive attitude that has a local focus and attracts foreign investment. However, local consultation prior to mining operations is not well laid out in the law and is a challenge in South Africa, Botswana and Zambia. The laws in these countries do not accommodate

communities that have low literacy levels who end up hoodwinked as the mining companies hold the compulsory meetings as a mere formality and proceed with little pushback from communities. In such cases communities do not fully understand the impact that will befall them as the mining commences in their respective areas but have no proper channel to fully express their concerns. In addition to the Acts stated above, South Africa has a very comprehensive and detailed regulatory mining framework summarized in Appendix E. However, like other countries the surface rights, environmental rights and the health and safety laws are briefly outlined below.

Surface Rights

South African law provides extensive terms for surface holders who wish to mine or explore for minerals. The holder is allowed to have employees as well as plant and machinery on any surface, waters or which may be required to be able to mine successfully and within the parameters stipulated in the MPRDA. The MPRDA brought some transformational ideals which included the placement of mineral rights under the custodianship of the state. In this law, there is no provision which requires surface owners (who can exist independent of sub-surface right owners which is similar to laws in Zambia) whose land is affected by mining activities. This however, does not mean that there is no corrective measure that can be put in place to deal with conflict which do arise from the difference in ownership, other laws such as The Regional and Land Affairs Second General Amendment Act 170 of 1993 specifically protects property and environmental rights (Mineral and Petroleum Resources Development Act, 2002; Regional and Land Affairs Second General Amendment Act, 1993).

Environment

Permit holders are mandated to have approved environmental authorisation, before they conduct mining activities in their designated areas. South African environmental law encompasses natural resource conservation and utilization, as well as land-use planning and development. Issues of enforcement are also considered, together with the international dimension, which has shaped much of the direction of environmental law in South Africa (National Environmental Management Act, 1998).

Health and Safety

In mining, there is an independent legislation for health and safety which is the Mine Health and Safety Amendment Act 74 of 2008. The act explicitly explains the need for health and safety training required from employers. In this act mining employers responsibilities include but are not limited to assessments and response to risks faced during working in underground mines as well as open pit mines, and conducting occupational hygiene measurements. The employer is to have an established health surveillance system to track the health of mine workers on an on-going basis and to furnish miners with all the information relevant to their health and safety. South African mine workers are free to leave dangerous working environments without being penalized, without fear of loss of employment and without financial losses of any kind resulting from their absence during such dangerous instances. In addition, the employer is directly responsible for the purchase of all necessary safety equipment and safety wear and cannot pass this cost to the employee indirectly. This is very progressive and specific and Zambian and Botswana mining laws can incorporate similar requirements in their laws (Mine Health and Safety Amendment Act, 2008).

5.3 CSR in the context of Mining

Although economic benefits are present because of mining activities, due to the scale and destructive nature of these mining activities some negative impacts are felt on the environment

in terms of deforestation, land degradation, toxic water, and loss of farm lands to make way for mining activities (Amankwah & Anim-Sackey, 2003). Due to the magnitude of change that mining poses to the environment, mining companies are encouraged to give back to communities in the form of CSR. The author uses the countries discussed in the sections above to provide the overview of what these countries are practicing with regards to CSR particularly in the extractive industries. The table shows the United States and Canada have more international CSR projects which have included financial provisions and subsidized loans, and energy production for thousands of homes in international mining areas. Bolivia's projects of CSR in the mining industry have been mostly to increase community collaboration and engagement (which is reflective of the laws which encourage the mines to do so).

Table 4: Global Efforts of CSR

Country	Practice	Source
Canada/ USA	Canadian International Development Agency and various mining companies from Canada are co-financing CSR projects in developing countries to -Train 400 young in Ghana people to help diversify the local -Train 13 communities to meet labor market demands in the mining sector in Burkina Faso. - Providing loans for people to start small businesses and building social capacity in Peru. Barrick Gold Corporation (Barrick) present in both the United States and Canada has CSR projects worldwide. Examples of projects this company has undertaken include: -An education program in Tanzania. In 2001, Barrick invested US\$2 million to fund a long-term education program in the remote Kahama District. Primary school enrolment increased by 75 percent to more than 7,000 children in 2007. -Investing in energy projects in Chile, Barrick has completed Phase 1 of the Punta Colorada Wind Farm, a \$70 million project featuring up to 18 wind generators with the capacity to produce 36 megawatts of electricity, enough power for 20,000 homes.	(“What is CSR,” 2012)
Bolivia	Respoll Energy has conducted some CSR initiatives in Bolivia to: -Train small and medium-sized Repsol contractors in the areas of budget, budgetary control and project control. - Collaborate with academic institutions in research projects - Formally inform the community, on a half-yearly basis, of the risks entailed in projects carried out in their areas. - Directly receive complaints and suggestions submitted by communities and provide an adequate response.	(Sustainability Plan, 2015)

5.4 Botswana and Zambia's Legal Framework and Governing Bodies in the Mining Industry

Meso-level theory looks at institutions as the reason countries are blessed or cursed. Ross (2014) includes the rule of law as one of the factors that determine institutional quality. This study will provide the context of the law in Zambia and Botswana to emphasize the challenges experienced when loopholes in the law are experienced or when the law is not understood by all stakeholders. This places the law as major factor affecting all of Ross's other factors to determine institutional quality. Mining law in Botswana is structured by the Mines and Minerals Act, CAP 66:01 of the Laws of Botswana (the "MMA") and the subsidiary legislation made pursuant to this Act. The Mines, Quarries, Works and Machineries Act, CAP 44:02 of the Laws of Botswana. This Act looks at the health and safety of employees involved in prospecting, mining and quarrying operations. The Environmental Assessment Act, CAP 65:07 of the Laws of Botswana provides a framework for the environmental impact assessment of prospecting and mining activities. Prospecting and mining activities that result in discoveries of precious and semi-precious stones are subject to the provisions of the Precious and Semi-Precious Stones (Protection) Act, CAP 66:03 (Mines & Minerals Act, CAP 66:01; Mines, Quarries, Works & Machineries Act, CAP 44:02; Environmental Assessment Act, CAP 65:07; Precious & Semi Precious Stones Protection Act, CAP 66:03 of the Laws of Botswana).

Mining companies that conduct business in Botswana are also affected by the Companies Act, CAP 42:01 of the Laws of Botswana, the Competition Act, CAP 46:09 of the Laws of Botswana, and the Employment Act, CAP 47:01 of the Laws of Botswana, and the common law in areas where these companies operate (Companies Act, CAP 42:01; Competition Act, CAP 46:09; Employment Act, CAP 47:01 of the laws of Botswana).

In Zambia the primary law governing the mining sector is the Mines and Minerals Development Act of 2015, of the Laws of Zambia ('MMDA'). The MMDA deals with mining rights, licenses, large-scale mining in Zambia, gems tone mining, health and safety, environmental protection, and geological services on analysis, royalties and charges (Development Act No. 7, of 2008, MMDA of 2015 of the laws of Zambia). Other legislation include, the Mines Acquisition (Special Provisions) Act; Chapter 218 of the Laws of Zambia and Mines Acquisition (Special Provisions) (No. 2) Act; and Chapter 219 of the Laws of Zambia. The National Assembly is currently considering the Mines and Minerals Development (Amendment) Bill, of 2016 (Mines and Minerals Development (Amendment) Bill N.A.B No. 6 of the laws of Zambia).

In early 2012 in Zambia, the former Minister of Ministry of Mines was merged with the Ministry of Water and Energy to form the Ministry of Mines Energy and Water Development. The mining industry is administered by the Ministry of Mines, Energy and Water Development. This was recently split by the President on 18th September, 2015 (Lusaka Times, 2016). It is now back to its former name as the Ministry of Mines although it is greatly affected by the Ministry of Energy and Water Development. The MMDA gives primary power to the Director who is supervised by the Minister. The Director of Geological Survey is specifically responsible for granting prospecting licenses (Lusaka Times, 2016).

Other than the Mines and Minerals Act, the Zambian mining industry is also affected the Environmental Management Act No. 12 of 2011, the Zambia Development Agency Act, 2006, the Lands Act (Environmental Management Act No. 12 of 2011; Zambia Development Agency Act of 2006; The Lands Act 1995 of the laws of Zambia).

In the event of a dispute the courts also apply the English principles of Common Law and Equity. English Common Law and doctrines of equity are applicable in this jurisdiction. In applying common law to mining, Zambian courts have replicated decisions from Commonwealth and foreign countries with similar socio-economic conditions (British Acts Extension Act, CAP: 10 of the Laws of Zambia).

5.5 Surface Rights

The rights to use surface land are of major importance to a country that carries out mining activities because they heavily affect the communities that live near or on the land that is to be used to carry out mining activities (Hilson, 2002). There is need for rightful procedure to be followed when a mining company expresses interest in a certain piece of land for the purpose of mining. According to the legislation governing the mines, both the Zambian and Botswana governments have put in place laws that protect landowners and legal occupants from suffering loss and to protect all other rights that may potentially be infringed with reference to the land. In most cases, the land owner may sign an agreement with the mining company and depending on the specific terms and conditions of the agreement the mining company may either be granted temporal or permanent access to the land, enabling them to use the land for mining activities (Wilcox, 2015; Gilberthorpe, Agol, & Gegg, 2016).

In Botswana, the landowner retains the right to graze cattle or cultivate on the land provided their use of the land does not interfere with mining activities and must get permission from the owner of the mining concession in case they feel the need to erect more permanent structures such as buildings (Mines and Minerals Act, CAP 66:01 of the Laws of Botswana). This enables the landowners to continue to derive some of the benefits that they did before the mines were set up on their land. The law enables landowners to continue to carry out agricultural activities that may play a key role in sustaining both the landowners and the communities as agricultural activities are both a source of food and income. The concession owners are required by law to carry out their operations with minimal infringement of the landowner's rights (Mushinge, & Mulenga, 2016).

In a case where there is no lease between the concession and landowner, a reasonable compensation should be paid to the land owner for any disturbance of rights and for damage to crops, buildings, land and trees (Mines and Minerals Act, CAP 66:01 of the Laws of Botswana). However, the calculation of what is 'reasonable' is not defined. This enables the landowners to be able to cushion any loss suffered due to the mining activities taking place on their land. This also minimizes the negative effects that may occur as a result of MIDR as communities and landowners are expected to be compensated well enough to be able to continue to sustain themselves and replenish all or most of what they had lost when they gave up their land to concession owners.

In Zambia, the concession owners are also expected to pay out a reasonable amount of compensation for any disturbance including damage to the surface by operations. In order for their rights to be protected, landowners must sign a legally binding agreement which is a lease agreement, also referred to as an Access Agreement. Breach of terms of this agreement by the concession owners is cause for legal action, thus protecting the community from exploitation by mining companies (Mushinge, & Mulenga, 2016, Mines and Minerals Development Act of 2015, of the Laws of Zambia). In this case, there is also no clear definition of what is 'reasonable' for compensation.

5.6 Environment

The environment is heavily affected by mining activities and the damage caused to the environment must be minimized at all costs. In order to protect and preserve the environment, Governments put in place regulations which mostly contain guidelines for waste disposal as well as toxic emissions and mining companies are expected to abide by these laws and regulations (Pettersson et al., 2015). In Zambia and Botswana, the government has got agencies that ensure that mining companies act in compliance with the law with regards to the environment. Non-compliance with the law usually results in fines and penalties for concession owners. There is also usually a due diligence process that takes place before a mining company can begin to carry out mining activities and it usually leads to the decision of whether or not to grant the mines permission to carry out their activities (Sequeira et al., 2016; Schoenberger, 2016). Based on the literature review, the inability of the mine to adhere to environmental laws often leads to degradation of the environment to a deplorable state, loss of fish in water bodies, infertile farming lands and health complications (Anaya Romero et al., 2016; Sasaki et al., 2015).

In Botswana, the law requires that an application for a mining license must include a proposed program that contains a provision for environmental protection. This way, the government of Botswana is able to establish whether or not the mining companies will be able to minimize by all means the damage that their operations may cause to the environment. Mining companies are also expected to put in place counter measures to reverse some of the negative effects of mining activities on the environment such as planting trees (Environmental Assessment CAP: 65:07 of the laws of Botswana).

The Environmental Assessment CAP 65:07 of Botswana's laws provides for an environmental assessment for a given list of activities that may affect the environment negatively. Before commencement of operation by the mining companies, the Department of Environmental affairs is supposed to approve the impact assessment. The community derives heavy protection as this law prevents mining activities that may result in severe and irreversible damage to the environment (Environmental Assessment CAP: 65:07 of the laws of Botswana).

In Zambia, mining companies cannot commence their operations until they have obtained environmental clearance from the Zambia Environmental Management Agency (ZEMA) (Makondo, et al., 2015). This is based on the Zambia Environmental Management Act which encourages community participation and involvement in natural resource management emphasizing that it should be promoted (The Environmental Management Act of 2011 of the laws of Zambia). The environmental clearance process usually involves the evaluation of the potential damage that the mining activities in the area may cause to the environment. The impact assessment that is to be submitted to ZEMA must clearly outline how the activities of the mining company will affect the environment and the community as a whole (Makondo, et al., 2015). The Zambian government has put bodies such as ZEMA in place to ensure that communities do not fall victim to injustices such as pollution of their land and waters by large rent seeking mining companies but instead continue to enjoy leading healthy lives that enable them to continue to carry out agricultural activities that may as well include fish farming.

5.7 Health and Safety

Mining activities in a country may bring about tremendous health and safety concerns especially for the employees of the mines themselves. Mine employees suffer the risk of possible injury which is mostly the case in underground mines, permanent disability such as

loss of hearing abilities that may come about as a result of the dynamite that is usually used in the mining process and unfortunate accidents that may occur at deserted mining areas (Haas, & Yorio, 2016).). It is therefore imperative that legislation is put in place to protect the health and safety of both mine employees and the communities that surround the mines.

The government of Botswana has put in place laws that protect the health and safety of mine employees that may find themselves in a position where the mine or its machinery causes them harm by dedicating an entire act of legislation to health and safety called the Mining Quarries, Works and Machineries Act Cap 44:02 of the laws of Botswana (Mining Quarries, Works and Machineries Act Cap 44:02 of the laws of Botswana). This act places an obligation on concession owners, mine owners and their agents. This means that in case of any harm caused to employees by the mine, the employee's medical bills are taken care of by the obliged parties as per the law.

Other pieces of legislation implemented in Zambia are the Underground Work Act 216, Pneumoconiosis Act CAP: 36 of 2010 and the Workers Act of 1999 (The Underground Work Act 216, Pneumoconiosis Act CAP: 36 of 2010 and the Workers Act of 1999 of the laws of Zambia). These acts provide employees and their families with comfort concerning a wide range of items that may affect them negatively including compensation and working conditions of the miners. The Zambian government has also put in place a system where inspectors are sent into the mines to ensure that the mines are acting in compliance with the legislation that has been put in place (Sequeira et al., 2016). Mining companies are usually fined for non-compliance with regulations which may not only be concerned with health and safety but any other regulations put in place.

Based on the legal framework, the author purposed to see how households viewed mining company adherence to the law to see how communities benefited or did not benefit from the law in Botswana and in Zambia. The design of the questionnaire provided for in depth views of respondents to allow for clear conclusions as to whether the mines were operating within the law or whether they were seen by the community to be bending the rules. Differences in country perceptions will shed light on where to close the gap on potential loop holes within the law for sustainability in each respective country. The responses would also hint towards which of the three local economic development theories (global model, regional model or sustainable development model) are eminent in communities (Radetzki, 1994; Auty, & Warhurst 1993; Loorbach, & Shiroyama, 2016). This way recommendation can be proposed to enhance or move towards the model that best fits the community.

5.8 Summary of Country Legal Framework

The discussions of mining laws in these countries show how communities are benefiting from mining law. In addition they demonstrate what governments can do to provide indigenous people with perpetual financial benefit when mining operations are undertaken in their areas. Needless to say, it is not always smooth sailing as is the case of Bolivia with land disputes over who should benefit from mining activities and how to compensate locals. The Bolivia controversy shows the amount of power that communities have as they are able to put a stop to mining operations if an agreement is not reached between themselves and the mining companies. Canada provides an excellent example of how indigenous people can negotiate with government to receive financial benefits from the mines in the form of royalties. In the context of Zambia and Botswana, compensation agreements have not been legalized. Latin America (with cases of Bolivia, Ecuador, and Mexico provided in this study) has strong restrictions to guard local production and development. There is a clear prioritization and

consideration for indigenous applications for mining concessions before they consider foreign applicants. The laws of Latin America seek to protect, reserve, and preserve natural resources where the law accommodates prohibition of mining activities for the benefit of local communities.

Botswana and Zambia have not yet developed laws with specifications of waste management from the point of generation to disposal in mining sites as is practice in the United States. In addition, although both countries (Botswana and Zambia) have environmental laws which aim to broadly minimize harm caused by mining activities, both countries do not have rigorous requirements for the specific management of chemical substances used in mining and their disposal. The environmental laws in Botswana and Zambia give instruction to assess pollutants but do not provide mitigating measures that mining companies should take such as controls on emissions of certain harmful substances on a regular basis with constant government inspection or external independent auditors. Regular checks at random by non-biased parties would provide an improvement in the environmental performance of mines and would give communities a method of keeping the mines accountable. A huge gap exists in the laws of Botswana and Zambia as both of these countries do not have laws to hold the government and the mining companies liable to compensate disadvantaged locals with stipulated pay outs laid down in a framework accessible by the public (Renzaho, et al., 2017). The laws of the United States are clearly advanced and have been for decades. No frameworks for compensation of locals or reclamation of mining sites post mine closure have been developed in Botswana and Zambia. Whilst they do account for pollution they do not provide systematic approaches to recovery of lands destroyed as a result of pollution caused by mining activities. The U.S laws that protect the environment which were designed from 1969 to 1980 seem more progressive about environmental protection than the laws of Botswana and Zambia (Mofokeng, 2017). Additionally, more should be done in Botswana and more so Zambia with health and safety of mine workers, South Africa's transformational law that even allows miner workers to freely leave any dangerous working environments would be a practice that would push mines in Botswana and Zambia to have regular health and safety trainings and bear the cost of safety attire, medical surveillance is not done in Botswana and Zambia to the extent that it is conducted in South Africa, so a review of the health and safety laws of these countries to allow for more responsibility on the part of the mine employers and mining companies would be of greater benefit for Botswana and Zambia.

5.9 Mitigating Environmental Mining Impacts

Communities can work with mining companies as a form of partnership and CSR to manage some of the negative environmental impacts that mining has. The nature of mining is one that causes deforestation, land degradation, loss of natural habitats, affected water and air purity (Edwards et al., 2014). Reclamation of destroyed and eroded lands as a result of mining activities requires a revival of soils and vegetation at a mine site. A modification of the slopes and planting of vegetation stabilizes the soil and prevents erosion. High levels of metals in soils and water can be harmful to plant, animal, and, human life. The most common treatment for acidic and metallic soil and water is the addition of lime to neutralize and reduce the acidity. Acidity tends to be as a result of acid rock drainage in old or abandoned mines (Neuman, Brown, & Jennings, 2014). The effects of acid rock drainage can be reduced by flooding old underground mines with water and neutralizing agents such as limestone, or sealing exposed surfaces in underground workings with impermeable materials. Affected communities can approach government and mining companies to work towards rehabilitating lands damaged by the mines (Palmer et al., 2014). From the discussion on country mining laws, it is clear that much of the mitigation can be done by having detailed environmental

protection laws which give the mines the responsibility of ensuring that the environments in mining areas are rehabilitated to their original state as much as is feasibly possible.

5.10 Mining Company CSR in Zambia and Botswana

Botswana and Zambian mining companies do engage in CSR projects, however, as compared to the efforts of Canada, United States, Bolivia and South Africa the magnitude of these efforts are much smaller. In addition, Zambia and Botswana have mining companies with different shareholders. To see the percentage of local ownership, a column to show ownership was added. The table shows that although Zambia has many mines, its ownership in these mines is largely minimal with foreign companies owning larger shares of the mines which operate in Zambia. Botswana has more ownership percentages of the mines operating in the country. Perhaps the difference in ownership may be an indication of the vested interest in operational affairs to ensure that the law is upheld in all the required areas of interest to the benefit of the community.

Table 5: Selected Mine Ownership and CSR

<i>Mine</i>	<i>Ownership</i>	<i>Mine Community Projects</i>
<i>Jwaneng</i>	Debswana Government of Botswana 50 percent, Debeers 50 percent	Built and runs 2 primary schools, tuition fees subsidized for mine workers. Runs an apprentice program in artisanal mining. Hospitals built by the mines for mine employees
<i>Palapye</i>	Debswana Government of Botswana 50 percent, Debeers 50 percent	Donated 28 bus shelters. Refurbished and renovated the Palapye Community Hall. Donated caravan classes
<i>Selebi-Phikwe</i>	Bamangwato Concessions Ltd	Held a 2016 softball extravaganza. The mine seeks to find solutions to local needs, building capacity to improve quality of life through partnership with the local community.
<i>Nchanga Open Pit</i>	Konkola Copper Mines which is owned by ZCCM-IH	The company operates two hospitals and eight satellite clinics. KCM also runs two schools with about 2,200 pupils. Providing scholarships for A-level graduates from its Konkola and Nchanga Trust Schools to study mining related fields at local and foreign institutions of higher education. Distributed of 23,000 free eye glasses, providing artificial limbs and undertaking eye cataract operations. The

		company is also involved in the sponsorship of three football teams in the top Zambian soccer leagues. The company has also contributed greatly in the development of road infrastructure and construction of boreholes for local communities.
<i>Mufulira mine (in Mufulira) and Mopani (in Kitwe)</i>	A joint venture company comprising Glencore International AG (73.1 percent) and First Quantum Minerals Ltd (16.9 percent) and ZCCM-IH (10 percent)	Since 2000, the company has invested over US\$200 million in various community projects with the aim of improving the living standards of the people. Towns of Kitwe and Mufulira benefit from infrastructural development, water and sanitation, education, health, sports and entrepreneurship development. Since
<i>Maamba Colliery</i>	It is a subsidiary of Nava Bharat (Singapore) Pte. Limited which holds a majority equity stake. The balance equity is held by ZCCM Investments Holdings Plc., a Government of Republic of Zambia undertaking.	Created medical camps to spread awareness of malaria. Sponsors disadvantaged and deserving students with scholarships. Provides shelters to facilitate the sale of products by local entrepreneurs. Sponsors football boxing and gold clubs. Constructed a 32km long Maamba Masuku road. Established a water reticulation system. Provides agricultural support to vulnerable poor women. Provides vocational training in welding and other trades.
<i>Chilanga</i>	Lafarge-Holcim 75 percent, local shareholders 25 percent	Bi-annually sprays the homes of employees with Mosquito repellant in an effort to prevent infection. They spread HIV/AIDS awareness programs to employees. In partnership with Doctors Outreach international, mobile clinics in 2008 attended to 3859

patients. In 2008 Lafarge donated K137 million to Munda Wanga Animal Sanctuary, St. Paul's Mulungushi pre-school in Kabwe, and Twitti community school. The company also rejuvenated old quarries by adding new flora and fauna. It created a 48 hectre golf course with 168 animals inhabiting the grounds.

(Sources: BCL, 2016; ZCCM, 2016; Lafarge, 2008; Debswana, 2016)

5.11 Mining Legislation and Socio-economic Impact

For communities around mining companies, aspects where communities can benefit socially and economically is mainly through corporate social responsibility (CSR) (Owen, & Kemp, 2013). In Botswana and Zambia, it can be viewed as mining companies providing funds for development projects in the community (Lungu & Mulenga, 2005). Development projects may include but are not limited to; environmental initiatives to protect water bodies, land, trees and aquatic life (Zhang, & Moffat, 2015; Loayza, & Rigolini, 2016). Other projects may be housing initiatives, education, health, and infrastructural developments (Rianse et al., 2015). CSR can provide a platform for mining companies to contribute to local economic development. CSR is viewed, understood and practiced differently in different contexts (Essah, & Andrews, 2016).

There has been much debate about whether or not non-renewable resources can be mined sustainably, due to the extractive nature of the industry. It is worth noting that this argument has been raised by academics, local communities, local and central government, in addition to international agencies such as the United Nations. Valid as the argument may be, it has not deterred investment in mining. On the contrary, mining has become one of the major economic drivers of the global economy, whether for minerals, oil or gas. Transnational companies mining in either of these items have embarked on CSR as a way of supporting the community in the area where they operate (Lungu & Mulenga, 2005; Banks et al, 2013; Gilberthorpe 2013). CSR is also a means partly to address this issue of sustainability of the benefits to the community after the mine stops operating in the area (Gilberthorpe, 2013).

Currently no laws in both Zambia and Botswana speak directly to the mines providing CSR to the communities in which they operate. The laws provide a working framework for the mines to operate to mitigate negative impacts of mining activities, however, the laws do not give a mandate to the mines to provide social amenities to the communities in which they operate. Considering the high capital investment into the mining sector and the strain mining places on the environment, laws to require all mining companies to provide social services based on mining companies abilities would provide for greater benefits for people living in mining areas. Through the MPRDA and BEE Act of 2003 of South Africa, the country provides an example of how government can improve economic empowerment of its citizens. In Zambia, where the mine ownership places government as a minority shareholder, a law similar to the BEE Act would be of great help as it would grant more employment opportunity for Zambians (Mineral and Petroleum Resources Development Act, 2002; Black Economic Empowerment Act, 20003).

The African mining laws discussed all require environmental reform to be more inclusive of indigenous people who may have low literacy levels. In cases of South Africa, Botswana and Zambia mining companies are required to have community consultations which they do as a mere formality and the locals are not fully aware of the impact that the mining project will have in the area. Governments need to develop frameworks which provide enough time for local sensitization of the project prior to the compulsory meeting date to allow for communities to have the time to discuss and debate and then send representatives well aware of the community wishes to advocate for their perceptions to be considered. In addition, Botswana and Zambia can adopt South Africa's elaborate detail of health and safety laws. Whilst the laws of Botswana and Zambia require mining companies to have safe working conditions and cater to the needs of miners whose health is directly affected by mining activities there is no law on occupational diseases in the mining industry and detailed elements of the Occupational Diseases Mines and Work Act of 2002 would provide a template that can be adopted to be country specific (Occupational Diseases Mines and Work Act, 2002). Clear remedial action should be outlined and explained in the law so that miners understand how they can receive Medicare and report inadequacies when they are not given their rightful treatment.

Through the MPRDA, South Africa has a national environmental framework for rehabilitation of mine sites to acceptable standards. The United States has a more detailed provision of rehabilitation post mine closure in its Resource Conservation and Recovery Act of 1976 and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (Resource Conservation and Recovery Act, 1976; Comprehensive Environmental Response, Compensation, and Liability Act, 1980; Mineral and Petroleum Resources Development Act, 2002). There is a need for Botswana and Zambia to lay out from the onset the costs of rehabilitation and include these fees for mining companies to know upfront. This way upon mine closure there is no ambiguity as to how and when the mine site will be placed into a predetermined state agreed before the mining project began. Transparency would give clarity and provide solutions that mitigate some of the negative mining impacts experienced post mining such as land degradation and water contamination.

A good example of compensation and resettlement of indigenous peoples can be adopted from laws of Ecuador and Canada where legal binding agreements between the government and the locals exist to pay royalties to the locals. The NCLA and IIBA of Canada are systems that Zambia and Botswana's government can consider to ensure a direct mining benefit to the locals at a micro level (Nunavut Land Claim Agreement, 2016; IIBA Review, 2011). A reasonable royalty percentage can be paid into a trust for indigenous people in each of their respective mining areas and the area can receive perpetual royalties for the development and sustainability of the area. This way accountability and transparency is provided to strengthen community relations with the mines as they are assured of their financial gains from mining activities in their areas. South Africa has an Act specific to royalty administration, such a regulatory channel would allow Botswana and Zambia to have formalized legal systems responsible for ensuring royalty payments to governments and communities are paid out and managed efficiently. Finally, the eight elements of the scorecard developed by the BEE Act (2003) can be reviewed by Botswana and Zambia and re-designed to fit the working environments of both countries to promote equality and sustainability in the extractive industries (BEE, 2017; Black Economic Empowerment Act, 2003).

The BEE Act of 2003 and the MPRDA Act of 2002 of South Africa encourage economic empowerment whilst protecting the environment. In addition, the United States mining laws also provide a good illustration to show where gaps may exist in Botswana and Zambia. The

NEPA of 1969, CAA of 1970, RCRA of 1976, CWA of 1977, TSCA of 1977 and CERCLA of 1980 show that Botswana and Zambia need to catch up in 2017 to develop laws that control management of waste disposal from the point the waste is generated and disposed of, with audit and accountability check points at each stage to ensure that the environment is experiencing minimal harm from the mine waste (Black Economic Empowerment Act, 2003; Mineral and Petroleum Resources Development Act, 2002; National Environmental Policy Act, 1969, Clean Air Act, 1970; Resources Conservation and Recovery Act, 1976; Clean Water Act, 1977, Toxic Substances Control Act, 1977; Comprehensive Environmental Response, Compensation, and Liability Act, 1980). Laws are needed to regulate management of clean water, clean air, and compensation to communities who may be affected by mining activities. Implementing these reforms in the legal structures of Botswana and Zambia would undoubtedly improve local support of mining projects and exemplify good practice that attracts foreign investments as it shows transformative growth and development in Sub-Saharan African mining codes.

CHAPTER SIX: RESULTS OF SOCIO-ECONOMIC IMPACTS OF MINING

6.0 Introduction

This research made use of focus group discussions of community members, structured interviews of household heads and key informant interviews. The survey data was analyzed using quantitative methods and the focus group discussions and key informant interviews formed the qualitative part of the study. These discussions were carried out in selected mining towns in both Zambia and Botswana. For the focus groups, one focus group was used to represent each of the selected towns with participants were well picked to offer diversity of experiences and views to represent the community perceptions. For the surveys, the target was to reach 20 to 25 households in each town. Although 25 was the upper limit and preferred count, this was achieved in Botswana. In Zambia, the six selected towns in Zambia were Chilanga, Chingola, Kabwe, Kitwe, Sinazongwe and Mufulira. In Botswana, three towns, Palapye Jwaneng and Selebi Phikwe were the towns of interest. These areas were chosen to provide mining impacts with different metals, that way diverse impacts were brought out to really give a robust view of mining with the two countries as cases of comparison. Themes were analyzed using content analysis and visualization by incorporation of venn chapatti diagrams. For the quantitative analysis, cross tabulations were performed in Stata and excel was used to present it in a summarized manner; a Relative Index of Importance (RII) was used to rank intensity of socio-economic mining impacts.

6.1 Qualitative Findings

The qualitative part of this study was conducted using focus group discussions and semi-structured interviews. The data was collected using a deductive approach from the categories and themes derived from the literature. These main themes are Employment and MIDR, the environment, infrastructure and social amenities, health, and the social fabric. Using directed content analysis, the author coded the data in priori and used a thematic analysis to make interpretations and patterns based on the transcriptions (Feredey, & Muir-Cochrane, 2006). Each country's findings were placed under the themes to see how communities perceived mining impacts in their communities relative to theory. The themes were developed using data collected with links to theory identified. In the focus group interviews, theory (a deductive approach) and questions were designed to bring out views on the theories placed in well thought questions that were directly linked to mining activities. Visualization techniques were used for the key informant interviews which were presented as venn chapatti diagrams (placed in appendix C). Such diagrams are useful to explain complex relationships or dynamics between people, and organizations (Thomas, 2004). The findings discussed in this section are based solely on perceptions of participants in the focus group discussions and key informant interviews unless otherwise stated and referenced (See household surveys, focus group discussions and key informant interviews in appendix D).

6.1.1 Zambia's Focus Group Findings

Employment and MIDR

MIDR

MIDR is a major area of concern for all areas in which mining activities take place. The setting up of mines usually leads to the displacement of local people in the areas surrounding the mines (Owen, & Kemp, 2015). When asked whether or not the mine has led to the displacement of local people, the people of Chilanga, Mufulira and Kabwe stated that they have in no way been displaced by the mines. In Chingola and Sinazongwe the mines have led to the displacement of some of the local people, resulting in an increase in the number of children on the streets

and homeless people in Chingola. The situation with regards to displacement in Kitwe is different as the locals were not displaced but retrenched mine employees are expected to relocate at their own expense upon termination of employment which has caused their displacement. A relocating procedure in a timely manner would make the transition easier as it provides retrenched workers with the time and support needed from the mines to relocate and start a new life with preparation.

Mine and Community Relations

The mines in Chilanga display CSR by how they relate to the local community by engaging in friendly sports such as soccer with members of the community and assuming the responsibility of providing drugs for their local clinics and hospitals. In Kabwe the mines have been living in harmony with the people. The mines in Kitwe have also been living in harmony with the locals and have been supplying them with stones at order price to enable them to resell these stones for a profit. In Mufulira, the mines have taken on the role of sponsor of the community's local team Mufulira Wanderers. Whilst these efforts are present, the community respondents felt these were minimal contributions to the community and more could be provided by the mines in terms of subsidizing the costs of the medical services to both mine and non-mine workers. However, in Chingola, the mines make little or no effort to relate to the community that surrounds it as they do not assume any CSR and the local people find this disappointing. As the mines are not legally bound to provide CSR, the communities have low negotiating power to prompt the mines to do more CSR.

From these findings it is clear that soccer is a famous sport in both Botswana and Zambia. Perhaps CSR initiatives can include better training facilities to develop professional athletes who can be back up and sponsored by the mines in international competitions. Perhaps it may increase the chances of Zambia and Botswana progressing in world cup soccer competitions. Corporates like Nike, Cocacola, Emirates are known to be global sponsors, it would be good to have mines in Africa feature on the world map as has been known that when athletes are backed up by global giants they are motivated to train and be the best (SportsLens, 2017).

Benefits

In terms of the communities in mining towns benefiting from the mines, the focus groups yielded mixed responses as Chingola, Sinazongwe, Mufulira and Kabwe discussion's revealed that the communities have not derived any benefit from the presence of the mines in their communities. Mufulira locals stressed that the mines do not even allow them to sell scrap from the mines and the people of Kabwe brought to light that they do not derive any benefits from the mines because they are run by small contractors who do not provide employment to the locals. However, Kitwe and Chilanga do benefit from the mines through employment. As per the focus group discussions conducted in the mining towns of Zambia, mine relations with communities are tense.

Compensation

The people of Chilanga and Kabwe could not comment on the issue of compensation as there has been no displacement caused by the mines in their communities. The people of Helen area in Chingola as well as the people of Mufulira and Sinazongwe districts have not been compensated but were displaced by the mines. The people of Kitwe were compensated by the mines with money and housing, although how the amounts with which to compensate were arrived at was not known by the recipients of the funds. Implications of this call for compensatory frameworks in Zambia's statutory instruments to ensure aligned expectations by both communities and the mines. The people of Zambia's mining towns reported that they have

no knowledge of how to calculate compensation or a benchmark to compare whether what they have been granted is just and fair. All of the selected mining towns except Kitwe (who were given money and housing with no specific national framework to follow) share the same sentiments when it comes to whether the compensation that is given to displaced families should be more or less, overall respondents all expressed that they were justified in expecting more remuneration as a result of MIDR.

Employment

The focus groups carried out in selected towns in Zambia yielded similar results concerning Employment and Rent Seeking with regards to the mining sector and its activities. The activities that have arisen as a result of mining activities in the mining towns under observation were mostly non-mining related business activities. Business activities that are unique to Chilanga include; the sale of scrap metal, rearing of chickens and other farm produce, running of bars and taverns, stone selling and operation of hammer mills. In Kabwe, there has been an increase in union activity which has enabled the mine employees to have a voice and channel of airing their grievances and concerns. Increased employment was evident in Kabwe, not only being provided by the mines but also by companies that are connected to the mines.

Benefits

There have however, been very few benefits observed from these activities. The benefits that are being yielded from these activities in Chilanga are that the businesses being carried out serve mostly as an alternative source of income due to perceived instability of the mining sector. Managers are able to secure contracts or tenders for jobs from the mines to support their personal businesses. They secure the tenders before a fair chance is given to the public and then they use the profits from their deals with the mines for their personal gain and not the community as a whole. In Chingola, the mines as well as foreigners who are awarded most contracts are the major beneficiaries from the activities that have arisen from mining activities. Kabwe, Sinazongwe and Mufulira observed no benefits from business activities as the people in the community still have poor living standards and lack food and clean water.

Retrenchment was a feature that was common to all the mining areas under observation. From this evidence in the discussions, it can be said that the mines in Zambia indirectly promote rent seeking tendencies as the communities that surround mining areas are deriving little or no benefits from the mining activities that are taking place. Even current managers within the mines create alternative sources of income with side businesses; this could also be due to the unstable mining environment in Zambia where those still employed by the mines do not see it as a sustainable source of income. Participants report that mining managers secure tenders and contracts before allowing the opportunities to be made known to the public. This creates an uneven field of business players, and is something communities report is difficult to change as it has been going on for many years. As a result, the efforts by the mines in Zambia to empower the locals are negligible.

Resource Movement

The discussions held in Kitwe, Mufulira, Chilanga, Chingola and Sinazongwe revealed that there has not been any significant transition from the agriculture and other sectors towards mining observed in these areas. In all these towns, the fear that the mines do not offer job security due to the constant retrenchments that have recently been taking place explains why this has been the case. Farming in this area is viewed to be more sustainable as compared to mining. Most people have also considered starting their own businesses but have found difficulties because they lack resources. In Kitwe most mine workers are actually considering

leaving the mining sector to focus on agriculture. People living in areas surrounding mines in Zambia find it more secure to focus on agriculture which is seemingly more sustainable and beneficial for them as opposed to mining. The data presented shows no significant movement of resources towards mining from other sectors. In fact, the discussions provided evidence to show considerations for labor to move away from mining towards agriculture, as mine workers did not view the mining industry as a sustainable career path and seek the perceived safety and predictability of farming.

Infrastructure and Social Amenities

New Developments

Chilanga has only been able to identify one new business that has come about because of the direct presence of the mine which is a filling station and its people stated that the profits from this business have only benefitted the developer. The people of Kabwe have been able to set up stone crushing businesses which have been of benefit to both the developers and the community. There has been construction of new roads in Mufulira because of the mines but has yielded the local community little benefit as most people are subsistence farmers and sell their produce within a walking distance. In Chingola and Sinazongwe, there have been no new businesses and developments as a result of mining activities.

The mines in Chilanga and Kabwe have made available housing, schooling and health services which are accessible only by their permanent employees excluding their temporal employees and the rest of the communities. All the other mining towns under observation have been provided with minimal social services by the mines. Most of the mines in Zambia were reported not to have plugged resources into the improvement of housing schooling and social services in the communities in which they operate.

Environment

Due to mining operations, Chilanga experiences water, noise and dust pollution. It is uncertain whether the mining activities in this area have an effect on the fish but they have affected the vegetation in the area negatively as there is very little vegetation in the area. Various forms of protective clothing are provided by the mines in Chilanga. When asked to suggest what the government can do to lessen the negative effects on the environment by the mines, the people of Chilanga stated that very little can be done, as they lack confidence in government's ability to effect change and enforce the law.

In Chingola, the air and water is being polluted with acid fumes from the mines and as such, it was reported that there is no fish in the Kafue River. There is very poor vegetation in this area as the soil fertility has been degraded overtime. The mines in Chingola mainly provide mouth bags as a form of protective clothing. This phenomenon was unique to Chingola as it was not reported in other towns. The participants in the focus group discussions suggested that the government can improve the situation by sending inspectors that are not corrupt to the mines at random intervals and providing better protective clothing. In this instance the law requires that the mines provide the protective clothing and not the government. It is clear that locals do not see a difference in the roles of the mines and the government as any faults experienced are rendered as the fault of the government. Whilst this is true to the extent that law enforcement is lacking, the mines have a responsibility to abide by the law and communities should know when the mines are not following legal requirements. At that point though the fault is with the mine, and community representatives can approach government to report the mines.

The mines in Kabwe were reported to cause air, noise and dust pollution. On the upside, they provide safety boots for their employees as a form of protective clothing. According to the community, government can improve the safety of mine workers by making an effort to cover up the open ditches in the area which can improve safety. Communities pointed to the government to improve safety; however, laws require the mines to ensure they operate in safe environments. This shows the need perhaps for more definitive clarity on what 'safe environments' mean as this incidence can easily be the responsibility of the mine if it is enforced. It also shows a low level of law enforcement as regulators could argue that ditches are not safe and emphasize that the mines have a specific time frame to ensure the ditches are resolved. The addition of penalties if ditches are left unattended in the required time would also prevent the frequency with which this happens. Policy needs to enhance enforcement and give statutory instruments that clearly state penalty for various hazardous environmental scenarios caused by mining. This would provide stronger regulatory frameworks that communities can use to blame the correct offenders in their communities.

The focus group discussion held in Kitwe revealed that no water, dust and noise pollution was experienced but it was pointed out that like Chilanga, the vegetation in the area has been affected negatively by the chemicals. There is also a potential danger of mines collapsing in the area which could cause injuries and fatalities. Protective clothing is only given to permanent employees and the only way that the conditions can be improved is if the government becomes stringent with the mining companies when it comes to their adherence to mining laws and regulations. These strong perceptions of participants show that inspections are needed by regulators and contingency plans need to be put in place to manage eventual collapse and the effects it could have to communities. If laws existed to provide compensatory measure and actual defined payment costs by the mines directly to the communities in such eventualities, there would be more harmony as well as mitigated mining impacts in communities.

Mufulira's mines have brought about water and dust pollution. The vegetation in Mufulira has not been doing very well as the land is being degraded by the chemicals from the mines, such seems to be the case in all of Zambia's mining towns. Protective clothing is provided in the form of safety boots, respirators (and not the mouth bags in Chingola) and safety glasses but there exists a reported danger of potential injuries as the elevators in the mines are faulty. There seems to be a trend of a lack of inspection, or a lack of enforcement once problems are highlighted during inspections.

Like other Zambian towns, Sinazongwe mining activities have led to water and dust pollution and have had a negative effect on the land as the chemicals emitted from the mines have led to the reduced soil fertility in the area. Overall, the perception from Zambian communities is that the mines in Zambia have had a negative effect on the environment.

Rent Seeking

From the focus group discussions, it was explained that the presence of corruption in the mining industry produces negative impacts on the environment. In the responses of community members, it was revealed that mines tend to pay off government appointed inspectors and representatives from regulatory bodies in exchange for concealing some detrimental environmental effects which would go against the requirements stipulated in the law. The paying off of government officials by the management of mining companies makes it difficult for the government to enforce penalties and regulate the emission of harmful substances onto the environment. The communities that surround the mines end up having the shorter end of

the stick as they are hit by the domino effects of corruption and endure living in a challenged environment with contaminated water and soil.

In Kitwe the management of mining companies offer bribes to health and environmental inspectors in order to get good reviews. The people that were identified to be partakers in corruption practices were mostly management and the people in charge of recruitment. Group discussions revealed that people seeking employment are forced to pay recruiters or human resource personnel in order to get employed by the mines. In Kabwe it is uncertain as to whether or not corruption exists in the mines though stone crushers have been suspected of taking part in corrupt activities similar to the bribes being given in Kitwe. Based on feedback from respondents, corruption in Zambian mines is rampant and is being openly practiced.

Health

The mines in Zambia in some of the mining towns have been able to make a positive impact on health services whilst others, have not made any effort to improve health services. In Chilanga the mines have been involved in the provision of health services to the entire community through mobile clinics. In Kabwe, there is a mine hospital that was built by the mines and caters for the entire town. In Mufulira, the mines only provide health facilities for their employees and do not extend their services to other members of the community whereas in Chingola and Kitwe, the mines have not added any value to health services making it difficult to deal with the negative effects of the mining activities on both employees and the community.

Social Fabric

The family

The focus group discussions held in Zambia's mining towns included topics covering social challenges that have arisen due to the mining activities that are taking place in these areas. Discussions revealed, that the mining towns under observation face many challenges with the biggest challenge being, the increase in marriage disputes and divorce because mostly the men who are working for the mines are not making enough money from their jobs in the mines to sustain their families, leaving their wives unhappy. Respondents pointed out that when tensions rise in the home, most men look for solace in alcohol or find multiple sexual partners which also leads to the endemic spread of HIV/AIDS. For example, a notable challenge that was unique to Kabwe was the lack of stable employment as most of the miners in Kabwe are only employed on a temporal basis this caused depression in males who felt they could not provide for their families, and they used alcohol or sex with other women to comfort themselves and temporarily relieve the pressures that they faced. In Chingola, Sinazongwe, Chilanga, Kabwe, Kitwe and Mufulira the discussions held, revealed that the long hours that miners in Zambia have to work have resulted in there being no time for miners to spend with their Families.

Mafia/Criminal Activities

The people of Chilanga and Kabwe stated that there has been little or no crime in their communities due to the mines and that their towns are very peaceful places. In Chingola, there has been some criminal activity that has erupted due to the presence of the mines. Respondents reported that criminal gangs who are locally referred to as *Chondos* have been carrying out illegal mining activities in Chingola and selling minerals, mostly copper, to foreign nationals for a profit. In Kitwe and Mufulira, respondents reported that organized theft syndicates who conduct illegal mining activities named *Jerabos* operate and facilitate the buying and selling of copper and precious metals illegally. However, how they acquire the metals from the mines is not clear although they have been reported to threaten and harass police and other law

enforcement officials who bend to their demands in attempts to protect their families and loved ones (Adamu, 2015).

6.1.2 Key Informant Interview Findings

In Chingola, Mufulira, and Sinazongwe townships of Zambia key informants were not available for the interviews at the appointed times and were not willing to participate at re-appointed times. As a result the findings do not have results from these towns. All the towns in Botswana participated in the key informant interviews. Comparative findings of the interviews are displayed in the Venn Chapati diagrams below (Thomas, 2004). From the Venn Chapati diagrams it is evident that Zambia has evidence of corruption in Kabwe and Kitwe but not Chilanga, despite employment being on the rise in Chilanga, more opportunities are needed to increase productivity in the mining community. For sustainability, Zambian towns express the need to remove the middleman from the hiring process which tends to be the method used by foreign companies, Kitwe key informant believed it added to corrupt practices and hindered sustainability. Kabwe key informant pointed out that sector diversification and plans post mine closure for economic activity from other industries would provide to community sustainability. All towns reported that government investment was mainly focused in the mining sector compared to other towns showing evidence of a resource movement towards the sector (in the form of financial investment and not focuses). With regards to MIDR, all towns reported that it was government's role to incentivize mining companies to compensate displaced people, no incentives existed and locals do not have a framework to guide them to ensure the process is just and fair.

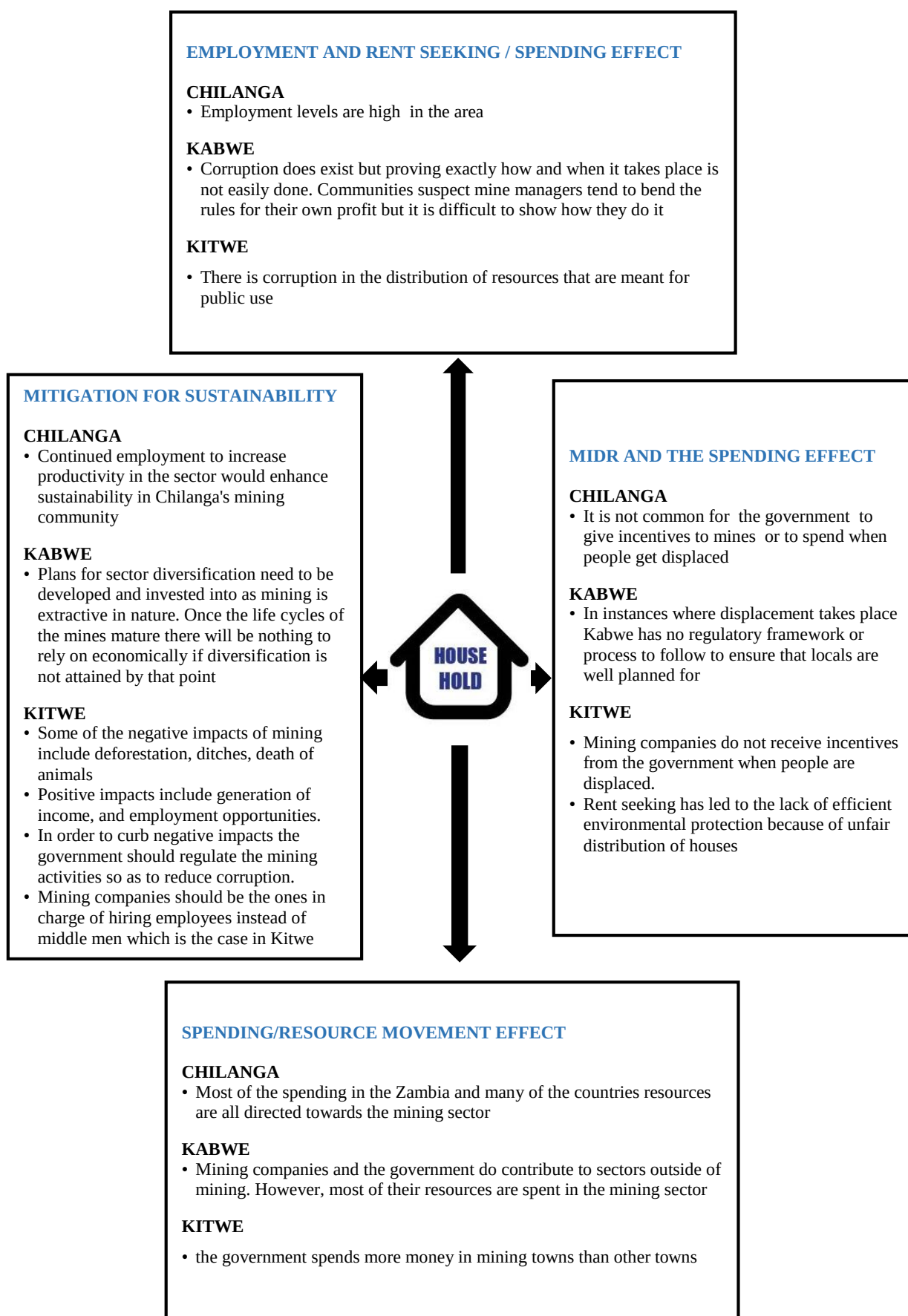


Figure 3: Key Informant Summary in Zambia

6.2 Botswana's Findings

6.2.1 Focus Group Findings

The focus group discussions carried out, made use of questions under the research objectives. These objectives were based on displacement and resettlement, sustainability, and socio-economic impacts of mining activities.

Employment and MIDR

MIDR

Responses from participants in Botswana show that mines have displaced many people in Palapye, Jwaneng and Selebi Phikwe but have accommodated the displaced people in these communities by building houses for the poor, making donations to local primary schools and creating a platform for other business in the communities to flourish such as super markets that cater for the local community and also provide employment opportunities for those displaced.

Benefits

Botswana's people have been able to benefit from the mines through the provision of employment for the local people. Botswana's mining activities do not promote rent seeking as they make an effort to engage with those in the community and have been able to address some of the struggles being faced in the communities through donations and other charitable gestures. Nothing was reported in Botswana concerning mine workers or managers securing business opportunities for their personal business ventures.

Compensation

The compensation status of the displaced people in Jwaneng is unknown as opposed to that of Selebi Phikwe where people have been compensated after being displaced. The people of Botswana's mining towns are unsure of how the calculation of compensation is done but feel that it is dependent on the value of individual or family's property. Botswana's mining towns think that the compensation that is paid out should be more and that they are being under compensated.

Employment

The questions that were asked under this theme sought to determine whether or not the mines have given back to the communities in terms of employment creation and creation of opportunities for the people that live in areas surrounding the mines. Resource movement refers to a shift in resources from one sector to another (Beine et al., 2015). Using the concept of the movement of labor from Sach's and Warner's endogenous growth model from the literature, the resource investigated in communities was labor to see whether there was a movement of labor away or towards the mining sector. The focus group was conducted to find out whether the mining industry is causing a shift in the resources away from non-mining industries towards the mining sector in the selected mining towns.

Mine and Community Relations

Activities that have arisen as a result of the mining industry in Selebi Phikwe, Palapye and Jwaneng include increased employment, more drama and theatrical productions, and increased sporting activities such as soccer and horse racing.

The benefits that the communities in Jwaneng and Palapye have derived from business activities as a result of mining in the area are the reduced levels of unemployment and the

provision of extra-curricular activities for the youth that prevent them from indulging in negative vices such as alcohol, drug abuse or other criminal activities..In Selebi Phikwe, participants of sporting activities have been able to earn extra income through competitions and tournaments being held and sponsored by mining companies as their CSR.

Resource Movement

In Jwaneng, most people strike a balance as they keep their farms whilst focusing on mining whereas others prioritize mining and neglect farming activities because they do not have enough time to juggle the two. In this case the priority is mining, so communities which prefer mining to farming will move towards mining instead of farming when the two are in competition. In Selebi Phikwe and Palapye most people are as a matter of fact leaving the agricultural sector to focus solely on mining due to dry weather conditions (lack of rain) and the desire for job security. In Botswana, there is an observed movement of people away from the agricultural sector to the mining sector which signals a shift in resources. This supports Sachs's and Warner's endogenous growth model which predicts a movement of labor towards the natural resources sector (Sachs & Warner, 1997a).

Infrastructure and Social Amenities

New Developments

New businesses and developments have come about in Jwaneng as a result of the mines which include; schools, lodges and supermarkets which have benefitted both the community and the developers themselves. Selebi Phikwe's people have also seen new businesses and developments in their communities as a result of the mines which include new buildings, a primary school, roads and better housing which have profited both the community and the developers who in this case are the business owners. In Palapye there have not been any new developments.

Jwaneng's mines have only been providing housing, schooling and health services for its permanent employees whilst the mines in Selebi Phikwe and Palapye have been able to provide these services to the miners and the entire community. Botswana's mining towns have felt their government's presence as they receive visits from government officials from time to time. In the mining towns of Botswana, there have been considerable levels of resource movement as the mines have directed resources to the health and education sectors in the communities in which they operate (Natarajan et al, 2017). However, there is evidence provided from the focus groups to show that in Jwaneng (the world's largest diamond producer and richest mine in the world) these were only for the mine workers (Botswana Chamber of Mines, 2017).

Environment

The mines in Selebi Phikwe have brought about noise and dust pollution and have contributed to the reduction in the number of fish in the waters of this area. There is poor vegetation in this town. The dangers that could possibly arise from the mines are health problems such as lung diseases, hearing diseases and fungal infections because of poor sanitation. Protective clothing that is provided includes helmets, work suits, gum boots and ear plugs. Respondents suggested that government must work with the mines to find alternative ways to dispose of the sulfur produced as a result of mining. The overall perception of communities in Botswana is that the mines in Botswana have had a negative effect on the environment. Perhaps a Waste Act that defines the standard process from waste generation to disposal would be of benefit, with punitive sanctions applied to mines who do not uphold the law

Rent Seeking

The discussions held in Botswana's mining towns yielded mixed results. In Selebi Phikwe, corrupt activities have been taking place mostly amongst the management of the mines meanwhile in Jwaneng, it is uncertain as to whether or not there have been any corrupt activities taking place in the mines.

Health

When it comes to value addition to health services by the mines in Botswana, the people of Jwaneng and Selebi Phikwe stated that the health services provided by the mine are only enjoyed by the employees and do not extend to the rest of the community. In Jwaneng, the mines have built a hospital where their employees can access free medical services but non mine employees are expected to pay to be attended to at the hospital. On the contrary, in Palapye the mines have not made an effort to improve health services.

The Social Fabric

Family Life

The mining town of Jwaneng has seen an increase in alcohol abuse since the coming of the mines and in Selebi Phikwe there has been an increase in teenage pregnancy and drug abuse. In Palapye, there has been an increase in the divorce rate and marriage disputes. The long working hours have affected all the families in the communities negatively by contributing to the high divorce rate and leaving the miners little or no time to spend with their families.

Mafia/Criminal Activities

There has been no mafia presence in Botswana's mining towns with only petty crimes such as theft taking place mostly during festivals and gatherings.

6.2.2 Botswana Key Informant Findings

Botswana showed less rent seeking activities which were present in Jwaneng but not Palapye and Selebi-Phikwe (Phikwe). In Jwaneng it was seen in the unfair distribution of housing which was preferentially given to management compared to lower level mine workers. In addition, environmental protection was compromised as a result of rent seeking in Jwaneng. With regards to sustainability all three towns had solutions for the extractive industries some of which included mitigating loss of life with a major threat to the sector, HIV/AIDS, which was a main concern in Jwaneng. Palapye and Phikwe focused on diversification out of mining into manufacturing and an encouragement of youth participation in other sectors with a plea for educators to make other sectors look attractive. The Key informant in Phikwe identified a need to innovate in mining techniques to minimize the negative environmental impacts. Like Zambia all towns in Botswana noted government expenditure focused in the mining sector compared to other sectors. In Botswana's Jwaneng the mines use discretion to compensate locals when displaced as no set price or framework is able to be used as a baseline that the mines and the indigenous communities can use as critical knowledge even prior to the time of displacement. Phikwe and Palapye place emphasis on the need for clear process with aligned expectations by all stakeholders and Palapye's key informant blamed the regulator (government) for this lack of process and recommended more strict rules to guide MIDR and prevent a lack of knowledge by locals in knowing how to gauge what their compensation for relocation should be.

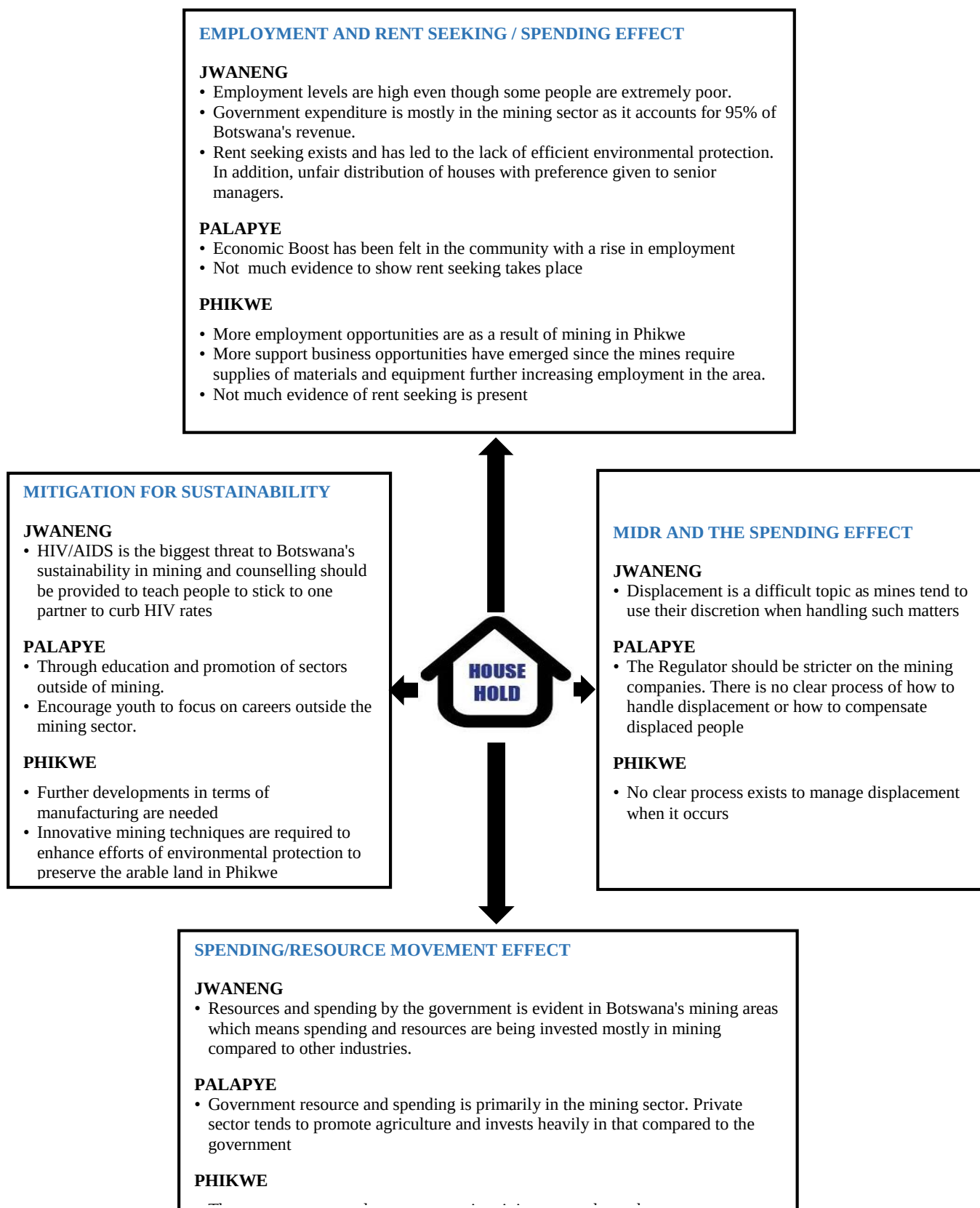


Figure 4: Key Informant Summary in Botswana

6.3 Summary of Findings in Botswana and Zambia

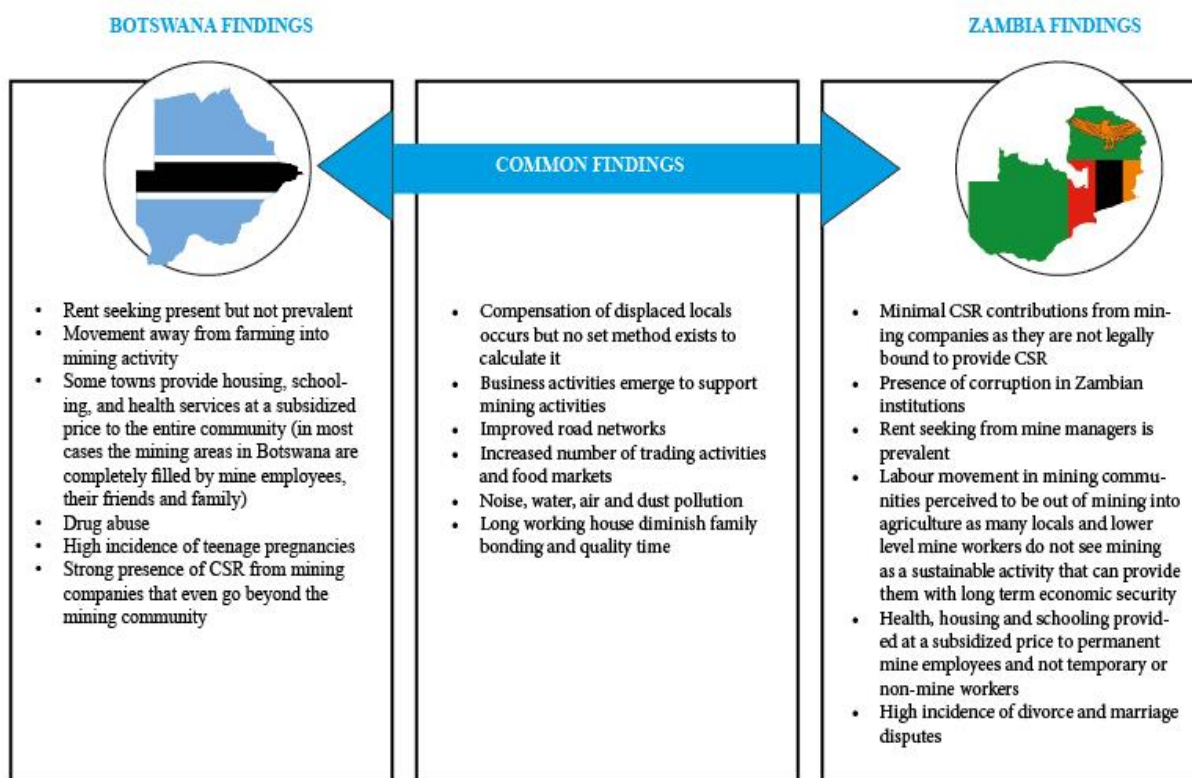


Figure 5: Community Impact Differences and Similarities in Botswana and Zambia from Key informant interviews

Based on the focus group discussions Figure 5 shows a summary of the findings previously discussed. Differences between Botswana and Zambia are that Botswana has some reports of rent seeking but it is not openly practiced or prevalent. There is a clear movement of labor towards mining away from farming, Botswana is plagued with drug abuse and a high incidence of teenage pregnancies. Although some mines provide subsidized health care and education, it is mostly for mine employees. Botswana has a strong presence of CSR that communities find valuable and appreciate. Zambia is not the same, it has minimal CSR reported by locals as not substantial, Zambian institutions have reports of institutions marred by corruption with rent seeking prevalent in even mine managers who secure tenders and contracts for themselves and have side businesses for alternative sources of income. Zambia's labor is moving away from mining towards farming as mining is not viewed as a secure career prospect due to the shocks experienced in the sector in recent years. Health, housing and education are provided to permanent employees and not temporary or non-mine workers. Zambia has a high incidence of divorce and marriage disputes due to the nature of mine work marked by low pay for most mine workers who are unable to please their wives with good salaries. Similarities in both countries exist, both countries do not have explicit compensation frameworks or displacement processes that locals can use to ensure they are receiving fair treatment from government and the mines. Business activities have been on the rise as a direct result of mining activities, both countries have improved road networks because of mining activities and there has been an increase in the number of trading activities and food markets. Mining has brought a challenge of noise, air, water and dust pollution. The long working hours have diminished the family bonding and quality time.

Table 6. Presence of Rent Seeking and LED Models in communities

Town	Rent Seeking	Global Model	Regional Model	Sustainable Development Model
Kitwe	+	+	—	+
Chingola	—	+	—	+
Mufulira	—	+	+	+
Kabwe	+	+	—	+
Chilanga	—	+	+	+
Sinazongwe	—	+	—	+
Palapye	—	+	+	+
Selebi-phikwe	+	+	+	+
Jwaneng	+	+	+	+

In the literature review it was explained that the global model is characterized by government exclusively interacting with mining companies, and taxes and royalties are paid to the central administration. Infrastructure provision is designed by the mining companies to address their infrastructure requirements exclusively, and most supplies are typically sourced from outside the community. This leaves little community interaction and provides a scenario where the mines and government work closely together. The regional model is characterized by mineral activity taking place because of the demand from the industry in the area, and in the sustainable development model, the mines provide public services, and are responsible for utilities such as water, sewage, power, housing, and assumed the responsibility for the provision of education and health (Auty, 1993; Eggert, 2001; Kolk, 2016).

Table 6 shows respective models present and each town to provides links to resource curse theory and local economic development theories based on the responses from the focus group discussions. Areas from the focus groups with reported corruption and tendencies to own mining related side businesses for profit were labelled as rent seeking, areas with reports of governments exclusively interacting with the mines and sourcing their materials outside the community were placed in the global model, and mines which were set up due to demand in the area were placed in the regional model. The table shows that the global model and sustainable development model existed in all towns, Botswana even had the regional model present showing all three LED models exist simultaneously whereas Zambia did not report the regional model in Kitwe, Chingola, Kabwe and Sinazongwe. The reason that more than one LED model can exist is that there are some characteristics of each model which apply to the communities. For example the global model and sustainable development model can co-exist because the towns labelled with these found that the mines sourced materials outside communities and interacted more with government, but they also provided public services (though health, education and housing were provided to mostly mine workers) infrastructure such as roads were available for communities to use.

6.4 Quantitative findings

This section provides the results of the household questionnaires. It begins with a summary of cross tabulations to show the socio-demographic characteristics of the 216 respondents who were interviewed in Zambia and Botswana. The key characteristics analysed were age, gender, main source of income, level of education, and house-hold size. The section also presents findings on the RII of short and long term (short term being 0 to 5 years and long term being above 5 years) as well as across countries. Interpretations of these findings are discussed with evaluative explanations for the resultant phenomena of mining impacts in communities.

6.5 Socio-Demographic Characteristics of Respondents

This section gives context to the characteristics of the respondents in mining communities. Understanding the demographics of the respondents is cardinal for the generation of confidence in the reliability of data collected as well as the findings. Underwood, & Matier (2000) argued that measuring the characteristics of respondents provides context of the richness of data. As a consequence, the relevant demographic variables of respondents that this research covered included age, gender, education, main source of income, and household size.

6.6 Age of Respondents

Age is an important variable to consider to gain an understanding of the maturity levels of respondents who provided the data. Therefore, respondents were asked to indicate their age as of their last birthday. In addition the author sought to maintain the ethical standard to avoid

having participants below the age of 18. An interval of five, which is consistent with the Zambia Demographic Health Survey (ZDHS, 2013) reports, was applied in categorizing the ages of respondents. And the mode age group was 25 to 29 with 21.8 percent of the respondents falling in this age group; this was similar in Zambia and Botswana. The minority of respondents were in the two age groups of 60 to 64 and 65 years and above comprising of 1.9 percent per age group. These two findings support most of empirical observations on labor statistics such as the Zambia Labor Force Survey (LFS) which show that a large percentage of the workforce in Zambia is between the ages of 25 to 29, although the highest percentage is noted to be between 20 to 24 with more women in the general labor force (Zambia Labor Force Survey Report, 2012). This shows that those who responded to the questionnaire most likely had some work experience, thus providing mature responses to the questions administered.

Table 7a: Age of Respondents

Age	Botswana		Zambia		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
min - 19	3	4.0	2	1.4	5	2.3
20 - 24	16	21.3	27	19.1	43	19.9
25 - 29	13	17.3	34	24.1	47	21.8
30 - 34	11	14.7	21	14.9	32	14.8
35 - 39	8	10.7	19	13.5	27	12.5
40 - 44	9	12.0	12	8.5	21	9.7
45 - 49	6	8.0	6	4.3	12	5.6
50 - 54	2	2.7	3	2.1	5	2.3
55 - 59	7	9.3	9	6.4	16	7.4
60 - 64	0	0.0	4	2.8	4	1.9
65 - max	0	0.0	4	2.8	4	1.9
Total	75	100.0	141	100.0	216	100.0

6.6 Sex of Respondents

According to Randall, & Ironside (1996) mining is primarily dominated by males. Most of the respondents that were found home during the household survey which were conducted during normal working hours were females. In most cases the husbands or males of working age were at work and the wife or family member had to be interviewed. This supports studies of Randall, & Ironside (1996).

Table 7b: Sex of Respondents

	Botswana		Zambia		Total	
Sex	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Female	30	22.6	103	77.4	133	61.6
Miner	15	50.0	65	63.1	80	60.2
Not Miner	15	50.0	38	36.9	53	39.8
Male	45	54.2	38	45.8	83	38.4
Miner	1	2.2	3	7.9	4	4.8
Not Miner	44	97.8	35	92.1	79	95.2
Total	75	100.0	141	100.0	216	100.0

6.7 Level of Education

Lockie, et al (2009) observe that the level of education is important in assessing the distribution of populations in mining communities. In addition it shows the level of literacy of the respondents. As shown in Table 7, the majority of total number of respondents irrespective of country had attained secondary schooling (49.1percent) followed by university schooling (41.7percent). Further, while the mode among respondents in Zambia was secondary schooling (53.2percent) followed by university schooling (39.0percent), most of the respondents in Botswana had obtained university/college education (46.7percent) followed by secondary schooling (41.3percent). This observation could be attributed to the investment in education that was more of a priority for Botswana than Zambia at independence. In chapter one, the author mentioned that Botswana focused resources on educating its nationals post-independence whereas Zambia did not (Good, 1992; Geisler, 1995; Van Binsbergen, 1995). Botswana has clearly reaped a long term benefit set up by a sound institutional framework that to this day encourages education at the tertiary level.

Table 7c: Respondents Level of Education

	Botswana		Zambia		Total	
Education	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Primary	9	12.0	10	7.1	19	8.8
Secondary	31	41.3	75	53.2	106	49.1
University/College	35	46.7	55	39.0	90	41.7
Missing	0	0.0	1	0.7	1	0.5
Total	75	100.0	141	100.0	216	100.0

6.8 Household Size of Respondents

In many instances the household represents the family, and the family is the center of socio-economic institutions in human society as it is the foundation that allows for societies to exist. Although studies are yet to clearly link the effect that mining activity has on household sizes or vice versa, understanding the sizes of homes in socio-economic research has provided scholars with the ability to forecast social interaction of countries at macro-level which gives context to the process of effecting policy change as community behavior is better understood (Bongaarts, 2001; Caldwell, 1968; Sahoo et al., 2017). Scholars point out that larger households lead to larger community populations which tend to provide a higher intensity of

positive or negative impacts experienced by the household simply because the number of people experiencing varied impacts is higher (Lui et al., 2003; Deaton & Paxson, 1998). This can be applied to mining areas as well, and it may be that in communities with larger households, the impacts may be amplified in both positive and negative ways. The data shows that the highest percentage overall was a household of four to six people with 47.2 percent of the homes being of this size. This was also the highest percentage in each country with Botswana at 53.3 percent of respondents with a household size of four to six and 44 percent in Zambia. The next highest percentages were households of one to three, with Botswana's communities reporting 32 percent, and Zambian communities providing 30.5 percent of the total number of respondents. In comparison to Botswana, Zambia provided evidence of larger households with homes that had above 12 members whereas Botswana's largest household size was the 10-12 range at 1.3 percent. As a result perhaps Zambians experience a higher intensity of the impacts than Botswana.

Table 7d: Household Size of Respondents

Household Size	Botswana		Zambia		Total	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
1 to 3	24	32.0	43	30.5	67	31.0
4 to 6	40	53.3	62	44.0	102	47.2
7 to 9	10	13.3	23	16.3	33	15.3
10 to 12	1	1.3	10	7.1	11	5.1
13 to 15	0	0.0	2	1.4	2	0.9
16 to 18	0	0.0	1	0.7	1	0.5
Total	75	100.0	141	100.0	216	100.0

6.9 Main Source of Income

The respondents were asked to indicate the major source of income for the household and the results are presented in Table 8 below.

Table 8: Main Source of Income by Sex

MAJOR INCOME SOURCE	ZAMBIA			BOTSWANA			OVERALL		
	Female	Male	Total	Female	Male	Total	Female	Male	Total
Mining & Mining Related Business Activities	34.95	2.63	26.24	83.33	91.11	88	45.86	50.6	47.69
Other Business Activities	30.1	34.21	31.21	13.33	2.22	6.67	26.32	16.87	22.69
Farming	4.85	0	3.55	3.33	4.44	4	4.51	2.41	3.7
Stone Crushing	1.94	0	1.42	0.00	0.00	0.00	1.5	0	0.93
Other Employment	26.21	60.53	35.46	0.00	0.00	0.00	20.3	27.71	23.15
Don't Know	0.00	0.00	0.00	0.00	2.22	1.33	0.00	1.2	0.46
Missing	1.94	2.63	2.13	0.00	0.00	0.00	1.5	1.2	1.39
Total	100	100	100	100	100	100	100	100	100

The major source of income for the majority of households in mining communities as an average for the two countries was mining and mining related business activities (47.69 percent). This was followed by other forms of employment (23.15 percent) and other business activities (22.69 percent). Specific to gender, the majority of males (50.6 percent), compared to females (45 percent), reported that the main source of income for the household was mining and mining related business activities. However, there were major differences between Zambia and Botswana with regard to major source of household-income. While the mode for communities in Botswana (88 percent) in the surveyed districts was mining and mining related business activities, that of households in Zambia was other forms of employment (35.46 percent). This suggests that the labor force in Botswana prefers mining whilst those in Zambia do not. This could be as a result of declining copper prices and severe electricity shortages in Zambia. As a result of the low copper prices, the Zambian Kwacha lost about 50 percent of its value against the U.S. dollar over the past year. The electricity shortages reduced production in some mines, as well as mining related businesses making the cost of business expensive. Copper prices have weakened in Zambia because of softer demand from China, Zambia's biggest trading partner. Zambia's economic growth rate, which had averaged 7 percent annually for the past five years, fell to an estimated 3.4 percent

in Zambia such as Glencore have drastically reduced spending, suspending operations at Mopani copper mine and laying off about 3,800 workers at the mine. Chinese mining companies in Luanshya put 1,600 workers on forced leave at its Baluba mine, while another Zambian mine, owned by London-listed Vedanta Resources PLC, put 133 employees on forced paid leave because of the decline in the global price of copper (York, 2015).

6.10 Occupation and Main Source of Income of Respondents by Country

The occupation of respondents in mining areas is a good indicator of the movement of labor to or away from the natural resources sector to see whether elements of Dutch disease exist (W. Max Corden, 2012; Krugman, 1987; Usui, 1997). Mironov, & Petronevich posit that labor moves towards the mining sector in mining areas (2015). This is true for Botswana with 88 percent of respondents that reported that the main income source for their households was mining and mining related business activities. But Zambia does not display this with only 26.2 percent in mining and mining related business activities and the rest of the 71.7 percent in other business activities, farming, stone crushing and other employment. Some of the respondents did not state what their main source of income was. Results show this to be 2.1 percent of the total number of respondents as shown in Table 9 below. Overall, 47.7 percent, almost half of the entire data set were involved in mining or mining related business activities.

Table 9: Main Source of Income by Country

Source of Income	BOTSWANA		ZAMBIA		TOTAL	
	Frequency	Percentage	Frequency	Percentage	Frequency	Percentage
Mining & Mining Related Business Activities	66	88.0	37	26.2	103	47.7
Other Business Activities	5	6.7	44	31.2	49	22.7
Farming	3	4.0	5	3.5	8	3.7
Stone Crushing	0	0.0	2	1.4	2	0.9
Other Employment	0	0.0	50	35.5	50	23.1
Don't Know	1	1.3	0	0.0	1	0.5
Missing	0	0.0	3	2.1	3	1.4
Total	75	100.0	141	100.0	216	100.0

6.11 Relative Importance Indices of Botswana and Zambia

Table 10: RII of Short and Long Term Mining Impacts

INDICATOR	SHORT TERM				LONG TERM				OVERALL			
	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS
HEALTH		0.0673		2		0.065		3		0.066		2
Improved health services	51	0.281	2		63	0.258	3		114	0.268	2	
Higher number of clinics	42	0.233	3		64	0.260	2		106	0.249	3	
Health Facility Upgrades	63	0.349	1		84	0.343	1		147	0.345	1	
More Specialised Clinics	25	0.137	4		34	0.139	4		59	0.138	4	
<i>Total Obs</i>	181				245				426			
ENVIRONMENT		0.0477		4		0.034		4		0.040		4
Reforastation	32	0.335	2		25	0.266	3		58	0.301	3	
Access to clean Water	31	0.321	3		44	0.462	1		75	0.391	1	
Environment Protection	33	0.344	1		26	0.272	2		59	0.308	2	
<i>Total Obs</i>	96				95				192			
INFRASTRUCTURE & SOCIAL AMENITIES		0.0755		1		0.078		1		0.077		1
More Schools	46	0.227	3		63	0.215	4		109	0.220	4	
More salons, bars, shopping centers	53	0.261	2		79	0.268	2		132	0.265	2	
Increased Tradesmen	60	0.296	1		85	0.287	1		145	0.291	1	
Improved Roads	44	0.216	4		68	0.230	3		112	0.224	3	
<i>Total Obs</i>	203				295				498			
SOCIAL FABRIC		0.026		5		0.032		5		0.029		5

INDICATOR	SHORT TERM				LONG TERM				OVERALL			
	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS
Increased Police Posts	14	0.205	4		34	0.275	2		48	0.250	3	
Reduced Gender Based Violence	19	0.267	2		21	0.170	4		40	0.205	4	
Closer knit families	19	0.273	1		37	0.298	1		56	0.289	1	
Reduced Mafia Activities	18	0.255	3		32	0.257	3		49	0.256	2	
<i>Total Obs</i>	70				123				193			
EMPLOYMENT AND MIDR		0.0605		3		0.066		2		0.064		3
Compensation for displacement	35	0.287	3		61	0.323	2		96	0.309	2	
Job creation	51	0.417	1		68	0.359	1		119	0.382	1	
Resettlement to better areas	36	0.296	2		60	0.317	3		96	0.309	2	
<i>Total Obs</i>	122				189				311			
GRAND TOTAL	672				948				1620			

Table 11: RII of Mining Impacts by Country

INDICATOR	COUNTRY WEIGHT		ZAMBIA				BOTSWANA				OVERALL			
	ZAMBIA	BOTSWANA	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS
HEALTH				0.058		2		0.053		4		0.055		3
Improved health services	1.53	2.88	106	0.281	2		130	0.252	3		236	0.264	2	
Higher number of clinics	1.53	2.88	95	0.252	3		127	0.246	2		222	0.249	3	
Health Facility Upgrades	1.53	2.88	124	0.329	1		190	0.368	1		314	0.352	1	
More Specialised Clinics	1.53	2.88	52	0.138	4		69	0.134	4		121	0.135	4	
<i>Total Obs</i>	<i>1.53</i>	<i>2.88</i>	<i>377</i>				<i>516</i>				<i>893</i>			
ENVIRONMENT				0.044		5		0.056		3		0.051		4
Reforastation	1.53	2.88	66	0.311	2		98	0.240	3		164	0.264	3	
Access to clean Water	1.53	2.88	92	0.434	1		184	0.450	1		276	0.444	1	
Environment Protection	1.53	2.88	54	0.255	3		127	0.311	2		181	0.291	2	
<i>Total Obs</i>	<i>1.53</i>	<i>2.88</i>	<i>212</i>				<i>409</i>				<i>621</i>			
INFRASTRUCTURE & SOCIAL AMENITIES				0.068		1		0.063		1		0.065		1
More Schools	1.53	2.88	101	0.230	4		124	0.204	4		225	0.215	4	
More salons, bars, shopping centers	1.53	2.88	109	0.247	2		176	0.289	2		284	0.272	2	
Increased Tradesmen	1.53	2.88	124	0.282	1		184	0.303	1		308	0.295	1	
Improved Roads	1.53	2.88	106	0.240	3		124	0.204	3		229	0.219	3	

INDICATOR	COUNTRY WEIGHT		ZAMBIA				BOTSWANA				OVERALL			
	ZAMBIA	BOTSWANA	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS	OBSERVATIONS	INDEX	RANKING WITHIN	RANKING ACROSS
<i>Total Obs</i>	1.53	2.88	439				608				1047			
SOCIAL FABRIC				0.053		3		0.046		5		0.049		5
Increased Police Posts	1.53	2.88	86	0.249	4		107	0.241	2		193	0.245	3	
Reduced Gender Based Violence	1.53	2.88	84	0.243	2		72	0.162	4		156	0.198	4	
Closer knit families	1.53	2.88	95	0.275	1		135	0.304	1		230	0.292	1	
Reduced Mafia Activities	1.53	2.88	80	0.232	3		130	0.293	3		210	0.266	2	
<i>Total Obs</i>	1.53	2.88	345				444				789			
EMPLOYMENT AND MIDR				0.05		4		0.061		2		0.056		2
Compensation for displacement	1.53	2.88	81	0.335	3		124	0.281	2		205	0.051	3	
Job creation	1.53	2.88	95	0.393	1		164	0.372	1		259	0.064	1	
Resettlement to better areas	1.53	2.88	66	0.273	2		153	0.347	3		219	0.054	2	
<i>Total Obs</i>	1.53	2.88	242				441				683			
<i>GRAND TOTAL</i>			1615				2418				4033			

For the short and long-term values 0.077, 0.066, 0.064, 0.040, 0.029 indicate the overall RII values of Infrastructure and Social Amenities, Health, Employment and MIDR, Environment, and Social Fabric respectively. Likewise, the RII values indicate that, primarily, Infrastructure and Social Amenities, Health, Employment and MIDR, Environment, and Social Fabric are affected by mining activities in communities. Similarly, it suggests that overall Infrastructure and Social Amenities ranked first, Health ranked second, Employment and MIDR ranked third, Environment ranked fourth, and lastly, Social Fabric ranked fifth by participants in 216 households. Across countries the overall RII values in order of priority placed Infrastructure and Social Amenities first (0.065), Employment second (0.056), Health was third (0.055), Environment fourth (0.051), and Social Fabric was last in fifth place (0.049).

Short Term and Long Term RII

Findings of the short and long term are across countries and reflect the overall impacts when the sums of the weights of both countries are considered. These findings are discussed and evaluated below in order of the overall ranking results beginning with highest priority.

Infrastructure and Social Amenities

Infrastructure and Social Amenities ranked highest with increased tradesmen as the major contributing factor within the group for both the short and long term (see Table 11 above). This indicates that there is a high propensity for people to be involved in trading activities and that is of more importance than other factors within the group. The results agree with those in Table 11 which show a large number of respondents were involved in mining and mining business activities as well as other business related activities. Interestingly, improved roads ranked fourth and third in the short and long term respectively. This phenomenon could be explained by the focus group discussions in Zambia particularly Mufulira where new roads were constructed because of the mines, but yielded little benefit to the local community as most people were subsistence farmers who sold their produce within walking distances.

Health

Health ranked second in the short term with health facility upgrades as the highest within the group. In the long term, health was ranked third with the major contributor being facility upgrades in both short and long term. Specialized clinics ranked least in both the short and long term. This could be due to the advancements in medical technology and medications that have provided better facilities for patients in the areas that were investigated, particularly with the management of HIV/AIDS (Shaw, & Elmendorf, 1994).

Employment and MIDR

Employment was ranked as the second most important impact in the long term though ranked third in the short term. Under this group, compensation for displacement ranked least in the short term, and resettlement to better areas ranked least in the long term. From this, it is clear that communities have challenges with compensation for displacement as well as resettlement. Implications would require frameworks to accommodate this to create more benefit for communities. In addition, job creation was the highest ranking category both in the short and long term. This goes with studies of Banchirigah (2008), who suggests that the natural resources sector creates mass employment.

Environment

Environment ranked fourth both in the short and long term. The most important aspect to respondents in the short term was environmental protection while that of the long term was access to clean water. This could be attributed to the fact that environmental protection in the short term is of greater benefit as a result of the regulations placed to protect the environment

(Jenkins, & Yakovleva, 2006). Despite ranking first in the long term, access to clean water ranked least in the short term. This supports studies of Santos et al., (2015) which show mining contaminates water bodies of surrounding areas. Further, the least prevalent influential factor within environment in the long term was reforestation which is confirmed by studies of Butsic et al., (2015) that provide evidence to show that mines lead to deforestation.

Social Fabric

Social fabric ranked the lowest among the five major impacts in both the short and long term with closer knit families being the most important reported benefit. While increased police posts ranked least among impacts within social fabric in the short term, reduced gender based violence was least important in the long term. This confirms the arguments by Gifford et al., (2010) that mining corporate social responsibility barely has to do with improving security in communities they are set up. Even though closer knit families are ranked the highest within the group, the group is of overall least importance and therefore seen as the least beneficial category.

Botswana and Zambia's RII

Infrastructure and Social Amenities

Infrastructure and social amenities ranked first for both Botswana and Zambia with increased tradesmen being the highest contributor. The increased trade means a lot of goods are available for people in mining communities. This supports findings of Pegg, (2006) who observed that trading activities increase with mining in mining communities. More schools were the lowest among impacts within infrastructure and social amenities for both countries. This however contradicts existing literature that postulates that mining brings about an increase in the development of school facilities (Veiga, 2001). Perhaps it could be that the schools are only provided for mine workers as benefits and other members of the community do not benefit from this. Findings from the qualitative elements of this study provided evidence to support this as most respondents who did not work from the mine did not benefit from the schools set up by the mines

Employment and MIDR

Employment and MIDR ranked second in Botswana and fourth in Zambia. The most important contributing factor to employment and MIDR in both countries was job creation. However, qualitative findings showed that jobs created in Botswana in the mining communities were within the mining sector while those in Zambia tended to move away from the mining sector. The underlying factor for employment being ranked fourth in Zambia could be attributed to the movement of labor out of the mining sector into other sectors due to the drop in the price of copper on the London Metal Exchange from US\$5,860 to US\$5,353.25 per metric tonne (LME, 2015). Mining companies placed employees in Zambia on forced leave whilst others were made redundant as mining costs became high and production reduced due to the softer demand from the Chinese market, Zambia's main market and the reduced production of copper as a result of electricity shortages which were nationwide (Zambian Economist, 2015). This suggests a serious need to diversify in the Zambian economy to increase revenues in other sectors as the mining sector has portrayed some instability and raised concerns of job security forcing people out of the sector.

Further, while the least influential factor under employment and MIDR in Botswana was resettlement to better areas showing that communities benefited the least from this factor. In the qualitative findings, it was observed that displacement was evident in Botswana in all the towns investigated (Palapye, Jwaneng & Selebi-Phikwe), although attempts to build houses for the poor and provide donations was present, the quantitative data shows these provisions were

not sufficient. The least contributing factor in Zambia was compensation for displacement. This supports the qualitative findings reported, which showed that in Zambia (Chingola and Sinazongwe) communities have been displaced by mining projects which have led to an increase in the number of children on the streets and also resulted in homeless people in Chingola.

Health

While health ranked second in terms of importance in Zambia, it ranked fourth in Botswana. The high ranking of health as an impact in Zambia could be attributed to the increased availability of mobile clinics and building of new health facilities by the mines in mining communities (reports from qualitative results of Chilanga and Kabwe respectively). Within the group of health, the highest contributing factor in both countries was health facility upgrades. And the least influential factor for both countries was more specialized clinics. This shows that both countries are in need of more specialized medical practitioners. According to the World Health Organization, doctor-patient ratio is meant to be one doctor per 5,000 patients but Zambia's is one doctor per 12,000 patients (WHO, 2017; Shalala, 2015). Botswana provides evidence of inadequate capacity of specialized services as well (Seitio-Kgokgwe et al., 2014).

Environment

Environment was the third most important impact in Botswana though fifth and hence least in Zambia. This suggests that, communities in Botswana benefit more from the environment than Zambian communities. However, the most important contributing factor for both countries under environment was access to clean water, this result shows that although access to clean water is a benefit it is not as beneficial as others probably as a result of water contamination by the mines as stated in the short and long term RII findings. Mining communities in Botswana ranked reforestation as the least beneficial (similar to short term RII results) factor while those in Zambia ranked environmental protection. The qualitative findings report gaps in sensitizing communities prior to the commencement of a mining project by ZEMA and perhaps this could be the reason for the little benefit given to environmental protection in Zambia.

Social Fabric

Social fabric was ranked the third by mining communities in Zambia while it was ranked fifth in Botswana. The most influential factor for both countries with regard to social fabric was closer knit families. However, overall, Botswana shows lower benefits from its social fabric in mining communities, and therefore Zambian families are more closely knit. It should be highlighted that in both the short and long term, social fabric ranked the lowest. However, closer knit families within the social fabric group ranked highest which contradicts the qualitative findings in Botswana and Zambia which attribute a high incidence of marriage disputes and divorce rates. Further studies can investigate the composition of family members in households. It could be that the men are not present, leaving women to fend for themselves and the children after divorce (Brown, 1983; Kalichman et al., 2007; Carter, 2007; Mah, 2010). The closer knit category within the group could be attributed to women being closer to their children with absent fathers. In the qualitative studies, respondents explained that families in Botswana have high divorce rates due to long working hours in the mines, which would explain why social fabric ranks fifth. In addition, the least beneficial factor in Zambia was increased police posts. Zambian respondents reported mafia activities present in the form of groups and gangs called *Jerabos* and *Chondos* who threaten police thereby making them ineffective in keeping public order and peace (Adamu, 2015). This explains why it is ranked as the lowest. The least contributing factor in Botswana under this group was reduced gender violence, proving that traces of gender based violence may exist in the area. However, qualitative responses did not reveal how or why this was the case. Future studies can investigate whether

traces of gender based violence exist in Botswana mining communities to see if they affect the social fabric in the country.

CHAPTER SEVEN: CONCLUSION

7.0 Impact Framework

The findings from the research show that structure and quality of institutions and the effectiveness and understanding of mining regulations are the main meso factors that have an impact on mining activities even at the micro level. These mining activities directly affect the environment, health, infrastructure and social amenities, employment and MIDR as well as the social fabric of communities where mining activities were taking place or had taken place. The presence or absence of rent seeking in Botswana and Zambia was based on how strict, and transparent regulatory bodies were, and how corrupt inspectors or managers were on the ground. Although both Zambia and Botswana had two towns with evidence of rent seeking, the extent to which it was reported to take place in Botswana seemed to be less than it was in Zambia as a result of constant government surveillance and involvement in mining activities in Botswana. This could perhaps be as a result of the ownership structure of mining companies, from chapter five it is evident that the government of Botswana has more ownership in mining companies than the Zambian government. In Botswana, government also has a vested interest in the operations of the mines as the government has a substantial percentage of the shareholding and is not a minority shareholder. On the other hand, the Zambian government in many of the mining companies is a minority shareholder and is not as invested in the mining operational processes as is the case in Botswana. Despite the differences in ownership, it is evident that in both countries government resources tend to be focused on mining and so the spending effect is evident as witnessed by community members. Communities view government spending more of its resources in the mining sector than other sectors. A resource movement effect was assessed by investigating the movement of labor in the mining communities using primary data, from chapter three this was characterized as Sach's and Warner's endogenous growth model in Dutch Disease theory (Hilson, & Laing, 2017; Sach's & Warner, 1997a; Behzadan et al, 2017). In some areas of Botswana, a balance of both mining and agriculture was maintained, whilst in other parts of the country respondents reported a movement away from agriculture into mining, when the two were in competition, people chose to move towards mining instead of agriculture (evidence of characteristics of Dutch Disease). Zambia's results from respondents show a movement of labor away from mining into agriculture as communities' view farming activities as more secure and sustainable in the long run. This was explained by the copper price shocks, erratic power supply and redundancies that raised skepticism in the mining industry in Zambia.

With regards to other Dutch Disease models discussed in the literature review such as Krugman's model and Learning by doing, none of the findings could be applied to reflect any traces of characteristics of these. Krugman's model looks at an appreciation of the exchange rate due to the trading of minerals, and argues that a country will experience an appreciation of the real exchange rate and crowd out other sectors of the economy as it conducts its trade (Krugman, 1987). The LBD predicts that an abundance of natural resources shifts factors of production away from other sectors and into the resource sector pushing overall economic growth down (Torvik, 2001). This could not be accurately investigated in this study but is an avenue for future research. As data on the active movement of labor in the mining areas was collected using interviews, and no consistent data was found across towns to show the movement of other factors of production.

At the micro-level the LED theories that were most prominent in all the towns in both countries were the sustainable development model and the global model. In the literature review it was explained that the global model is characterized by government exclusively interacting with mining companies, and taxes and royalties are paid to the central administration. Infrastructure

provision is designed by the mining companies to address their infrastructure requirements exclusively, and most supplies are typically sourced from outside the community. This leaves little community interaction and provides a scenario where the mines and government work closely together. In the sustainable development model, the mines provided public services, and are responsible for utilities such as water, sewage, power, housing, and assumed the responsibility for the provision of education and health. In some cases, large mines created financial dependency in the community, which often had negative impacts after mines were shut down (Auty, 1993; Eggert, 2001; Kolk, 2016). Interestingly, Botswana indicated the regional model as well which is characterized by mineral activity taking place because of the demand from the industry in the area.

The presence of all three LED theories in Botswana suggests that it is in fact possible for multiple theories to exist simultaneously. In Botswana, demand for minerals leads to mining activities in areas, mines interact exclusively with the government and the mines are responsible for public services. Zambia has similar results but does not have characteristics of the regional model reported in all towns. Only Chilanga and Mufulira presented characteristics of the regional model present. For future studies, to see whether impact felt by the communities, depends on the amount of mining activity that takes place, a concept to determine how to measure mining would provide a basis to measure the magnitude (not the ranking such as is the case in this study) of mining impact. A possible comprehensive micro-level measure of mining activity in a particular area could be measured by an increase or decrease in mineral production, energy consumption, increase of mining related business activities, pollution levels as a result of mining in the area, and tax contributions from the mines spent in the mining areas by the state (Maya et al., 2015, Mutti et al., 2012, and Brown et al., 2016). However, for this study, one of the objectives was to determine the short and long-term impacts of mining. From the results and discussion, short and long-term mining impacts were assessed with short term being zero to five years and long term being above five years retrospectively.

Using a Relative Importance Index (RII) as a quantitative method, the short and long term the values 0.077, 0.066, 0.064, 0.040, 0.029 indicate the overall RII values (overall impacts irrespective of time) for Infrastructure and Social Amenities, Health, Employment and MIDR, Environment, and Social Fabric respectively. Likewise, these RII values indicate that, primarily, Infrastructure and Social Amenities, Health, Employment and MIDR, Environment, and Social Fabric are affected by mining activities in communities. Similarly, it suggests that overall Infrastructure and Social Amenities ranked first, Health ranked second, Employment and MIDR ranked third, Environment ranked fourth, and lastly, Social Fabric ranked fifth by participants in 216 households. Across countries the overall RII values in order of priority placed Infrastructure and Social Amenities first (0.065), Employment second (0.056), Health was third (0.055), Environment fourth (0.051), and Social Fabric was last in fifth place (0.049). Qualitative studies highlight negative environmental impacts with a lack of law enforcement in Zambia, a fragmented social fabric in both Botswana and Zambia and an overall improvement in health facilities more so in Zambia than Botswana. Despite road developments, locals do not benefit much from them as they are subsistence farmers with markets in walking distance. Finally, Zambia had a presence of mafia activity in the form of *Jerabos* and *Chondos*.

Research findings revealed the presence of both macro and micro-level theories at the community level. This is suggestive of a dynamic relationship between macro and micro-level theories. On the ground at a micro-level corruption distorts the effectiveness of macro-policies such as mining laws from being implemented. At the national level, the lack of clarity of policy

such as loopholes in Zambia and Botswana's law where specific sanctions are not defined for emissions of toxic waste and other substances, allows mining companies some flexibility. As a result it prompted the study to show that macro and meso-elements of the natural resource curse theory as well as micro-elements of LED theory in a dynamic relationship formed a more robust framework to assess the socio-economic impact of mining in mining communities. The author illustrates this relationship using a framework called *Socio-economic Impact Framework of Mining in Sub-Saharan Africa* (SIMOFISA). This framework can be used by scholars and mining companies to understand household level impact of mining in any community surrounded by mining activities. This framework can classify which model (global, regional, or sustainable development) exists based on the nature of positive and negative impacts in a particular area. As was previously explained, Botswana had all three models existing simultaneously because, demand for minerals led to mining activities in the areas investigated (global model), mines interact exclusively with the government (regional model), and the mines are responsible for public services (sustainable development model).

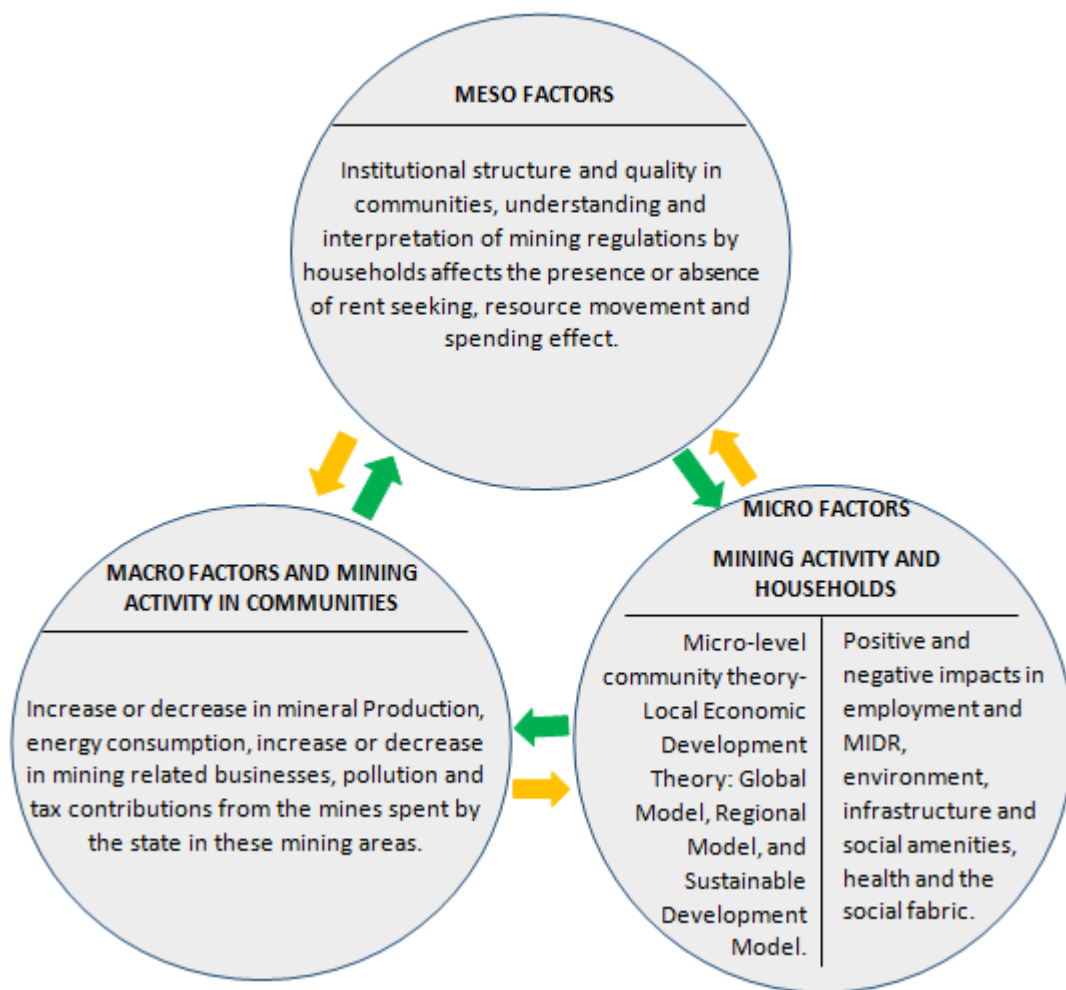


Figure 6: Socio-economic Impact Framework of Mining in Sub-Saharan Africa (SIFOMISA)

7.1 Theoretical Contribution

To advance knowledge and move thinking forward in mining research, providing a new connection with resource curse and local economic development theory will contribute to knowledge (Corley & Gioia, 2011). Ross (2014) explains that institutional quality can be measured by government bureaucracy, incidence of corruption, the rule of law, and state capacity to promote economic development. From the findings in this study it appears that macro, meso and micro theory are in fact inter-related. Meso theory at the institutional level affects macro theory more significantly than it affects micro theory. This is fundamentally based on the rule of law placed as the key determinant of institutional quality. When the rule of law is isolated from the other measures of institutional quality, the qualitative findings show that the law affects macro level theory by affecting the movement of labour (in the case of Botswana labour moves towards the mining industry, but in Zambia it moves away from the mining industry because of the institutional weaknesses that have caused instability in the mining sector in Zambia). The institutions determine how prevalent Dutch Disease will be in a community which then affects the impact felt at the micro level.

7.2 Sustainable Solutions

Currently no laws in both Zambia and Botswana speak directly to the mines providing CSR to the communities in which they operate. The laws provide a working framework for the mines to operate to mitigate negative impacts of mining activities, however, the laws do not give a mandate to the mines to provide social amenities to the communities in which they operate. Introducing laws that promote CSR as a result of mining activities in the communities would provide surety that households would benefit from mining activities. Botswana and Zambia can adopt and adapt the BEE Act of 2003 of South Africa, the IIBA of Canada and the MPRDA to have more substantive programs that benefit the community (Black Economic Empowerment Act, 2003; Mineral and Petroleum Resources Development Act, 2002; IIBA Review, 2011). In Botswana, key informants reported that the spread of HIV/AIDS was the main threat to the sustainability of the mining sector. Counseling services would benefit households and would sensitize the youth on protective measures that they can implement to prevent the spread of HIV/AIDS. In addition to this, Primary, Secondary and Tertiary Education should promote career paths in other sectors such as manufacturing and agriculture. This would increase productivity in other sectors outside of mining to boost growth and sustainability outside of mining activities. When Educators begin to effect change in the classrooms and present diversification in a relevant and applicable manner to attract the youth to grow skills and talent outside of mining, it would provide economic revenues in the long run that go beyond the life cycles of the mines and provide national generational wealth in other sectors.

In Zambia diversification through agriculture would provide sustainable economic growth outside of mining. As communities have started to focus on farming activities, improving their subsistence methods to increase their yield would provide employment and financial revenue for the community. For the mining sector, reduced corruption would provide longevity in the industry with the appropriate use of revenues generated from mining. Improved government surveillance in the mining processes and operations as is the case in Botswana would reduce rent seeking activities and potentially inhibit gangs like the *Jerabos* and *Chondos* from conducting illegal trade of minerals. Improved measures to protect law enforcement officials from threats from these gangs would give confidence to the communities who are affected by these gangs.

7.3 Looking Forward

In Zambia, community participation can be facilitated by ZEMA and government collaboration. ZEMA sensitization of projects should reach grass root level and should not just be reported in local newspapers. Rural people do not have easy access to the national newspapers to be notified of scoping meetings which happen on a particular day. ZEMA gives a 30 day notice period for communities to air their concerns post the advertisement prior to the scoping meeting. Despite the 30 day notice post advertisement, there is insufficient sensitization of the public on issues related to the mining project. ZEMA in collaboration with the government should sensitize the public by having public community meetings 30 days prior to advertising of the one day scoping meeting. This way debates would have been had and language interpretation can be provided where necessary and other preliminary preparations can be made by the communities in good time. This way the scoping meeting is packed with well-informed community stakeholders to provide accurate contributions to the meeting reflective of community values.

In both Zambia and Botswana, resettlement and compensation processes also need to be created to provide systematic methods of managing rural or urban displacement of communities who have to accommodate mining projects. There is no set definition of the kind of displacement that takes place or how to calculate compensation packages in a way that communities are able to be confident that they are receiving fair remuneration. The Canadian NCLA and IIBA can provide frameworks which can be adopted and adapted to be culturally relevant in Botswana and Zambia (Nunavut Land Claim Agreement, 2016; IIBA Review, 2011).

Zambian mining laws have changed and been revised more than the laws set in Botswana and perhaps that provides some stability for Botswana and adds to institutional structure and quality as opposed to the constant changing of the structure of the Ministry of Mines in Zambia which has been changed three times in a period of three years. In early 2012 in Zambia, the former Ministry of Mines was merged with the Ministry of Water and Energy to form the Ministry of Mines Energy and Water Development. The mining industry is administered by the Ministry of Mines, Energy and Water Development. This was recently split by the President in September, 2015 (Lusaka Times, 2016). It is now back to its former name as the Ministry of Mines although it is greatly affected by the Ministry of Energy and Water Development.

Mining law in Botswana is structured by the Mines and Minerals Act, CAP 66:01 of the Laws of Botswana (the “MMA”) and the subsidiary legislation made pursuant to this Act (Mines & Minerals Act, CAP 66:01 of the Laws of Botswana). In Zambia the primary law governing the mining sector is the Mines and Minerals Development Act of 2015, of the Laws of Zambia (‘MMDA’). The National Assembly is currently considering the Mines and Minerals Development (Amendment) Bill, of 2016 (Mines and Minerals Development (Amendment) Bill N.A.B No. 6 of the laws of Zambia). These laws provide a framework for mining companies or prospective investors whether local or foreign to abide by. Whilst such frameworks are in place the research findings show that the degree to which communities understand and can interpret the laws especially in rural areas is minimal. Protective clothing does tend to be provided by most mines but not all mine workers understand that this is a right by law that they have and in some cases others opt to continue to work without adequate protective clothing or safe working conditions. Whilst some mines provide safety boots, work suits and helmets respondents in Zambia reported that the mines in Chingola mainly provide mouth bags as a form of protective clothing, in Kabwe the working environment for the miners can be improved by covering open ditches posing as a threat to safety. In Kitwe, protective clothing is only given to permanent employees. In Botswana more clothing was reported to be

provided across the towns regardless of the nature of one's employment contract, protective clothing is provided in the form of helmets, work suits, gum boots and ear plugs.

The research findings show that government can benefit from this study by enacting laws that encourage community participation and promote environmental regulators by supporting campaigns at the grass root level to increase awareness of mining projects especially during the early stages when mining companies seek permission to commence works in communities. This way a more accurate representation of the community and the mining companies is achieved and would be governed by the law. The study has also revealed where a gap exists especially in Zambia's environmental regulatory processes that can be an opportunity for either more regulatory bodies to emerge or for existing organizations to improve and adjust their impact assessments to encourage community participation. With regards to compensation and displacement, Non-Governmental Organizations could be pivotal agents of change to advocate for, and develop compensation frameworks that can become statutory instruments to accommodate displaced people due to mining or other economic activities that result in the displacement of communities. Within mining companies, management systems can be improved to ensure processes and protocols are followed to ensure safety clothing and safe working environments are provided to all mine workers whether permanent or temporary. Random mining inspection should be accommodated by both government and Non-Governmental Organizations to ensure that mining companies are operating within their legal requirements. Business opportunities in the form of marriage counseling services in mining areas exist as both Botswana and Zambia have evidence of stressed family lives as a result of mining. In the education sector, programs that encourage more social workers, counselors and psychologists would help in providing aid to the traumatized and affected mining households. This would be a societal gain for Sub-Saharan Africa.

7.4 Limitations and Areas for Future Research

This research was not able to provide a longitudinal approach to long term mining impacts as it was based on the perceptions that communities felt were long term retrospectively. Studies can be done to include this to see what the long term mining impacts are using a longitudinal approach. In addition, the study was limited in its ability to assess kilometer coverage in distances from the mine to see how actual measured proximity could alter impacts within communities. Future work can include actual distances of each mine to see how mining impacts may differ.

In addition to this, further studies can build on devising an equation that places in the measure of mining activity to show the magnitude of the mining impact experienced in the community. This would require consistent secondary data acquired to determine the factors that affect mining activities in communities of interest. A challenge for rural communities in SADC is availability of official data on aspects like energy consumption, levels of pollution, tax contribution from the mines spent by the government in the mining areas, and other factors highlighted in the framework below. The framework shows a dynamic relationship between macro factors, meso factors, mining activity, and micro mining impacts as each of these affect the other for better or for worse. To concretize the actual impact the rule of law has on Dutch Disease and local economic development, studies can further isolate the law and see how shifts in all factors of production (not just labour) move towards or away from mining. Research can be done to see how the law affects which local economic development model is applicable in mining communities.

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Statutory Instruments

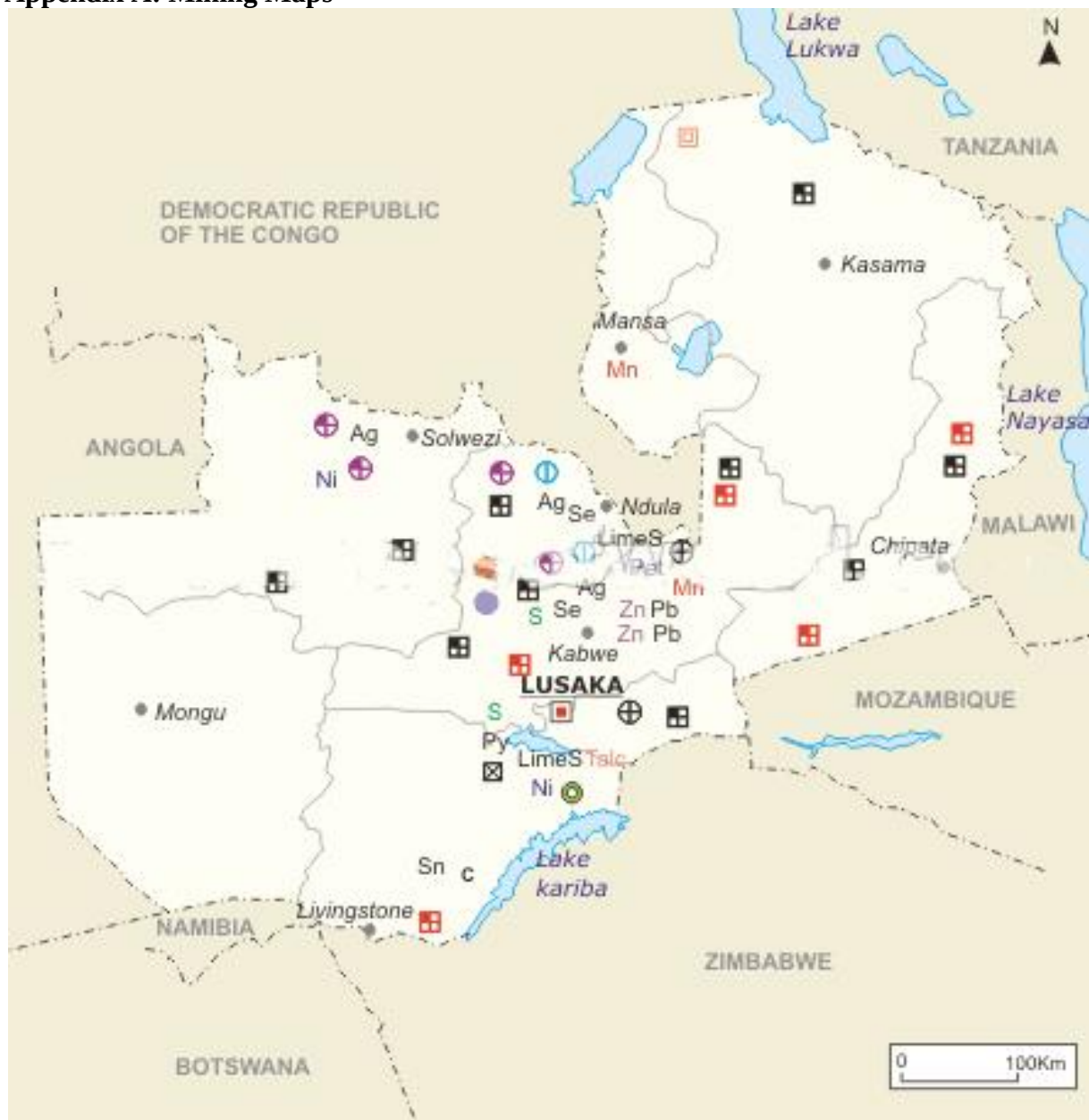
Arbitration Act of 2000, 40 L.Z 1-31 (2000)
British Acts Extension Act of 1964, 10 L.Z 1-5 (1968)

Black Economic Empowerment Act of 2003, 53 L.S.A 1-15. (2003)
 Companies Act of 2007, 42 L.B 01 (2008)
 Competition Act of 2009, 46 L.B 09 (2009)
 Clean Air Act of 1970, 42 U.S.C. 7401 et seq. (1970)
 Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 U.S.C. 9601 et seq. (1980)
 Clean Water Act of 1972, 33 U.S.C. 1251 et seq. (1977)
 Employment Act of 1984, 47 L.B 01 (2010)
 Explosives Act 15 of 2003, (2003)
 Environmental Assessment Act of 2012, 19 S.C 52 (2012)
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 Lands Act of 1995, 184 L.Z 01-32 (1995)
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 Mining Act of 2009, (2009)
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 Mineral and Petroleum Resources Development Act of 2002, 28 L.Z 05-106 (2002)
 Mineral and Petroleum Resources Royalty Act 28, of 2008, (2008)
 Mineral and Petroleum Resources Royalty (Administration) Act 29 of 2008, (2008)
 Mines Quarries & Machines Act of 1973, 44 L.B 02. (1973)
 Mining Right of Way Act of 1996, (1996)
 Mining Titles Registration Amendment Act 24 of 2003, (2003)
 National Environmental Management Act 107 of 1998, (1998)
 National Environmental Policy Act of 1969, 42 U.S.C. 4321 et seq. (1969)
 Occupational Diseases in Mines and Works Act of 1973, 60 L.S.A 1-137. (2002)
 Occupational Diseases in Mines and Works Amendment Act 60 of 2002, (2002)
 Occupational Health and Safety Act of 2010, 441 L.Z 16-32 (2010)
 Pneumoconiosis Act of 1950, 217 L.Z 1-101 (2010)
 Publicado en el Diario Oficial de la Federación el 26 de junio de 1992, (1992)
 Precious and Semi-Precious Stones (Protection) Act of 1969, 66 L.B 03 (2005)
 Resources Conservation and Recovery Act of 1976, 42 U.S.C. 6901 et seq. (1976)
 Regional and Land Affairs Second General Amendment Act 170 of 1993, (1993)
 Skills Development Amendment Act 31 of 2003, (2003)
 Transformation of Certain Rural Areas Act 94 of 1998, (1998)
 Toxic Substances Control Act of 1976, 15 U.S.C. 2601 et seq. (1976)

Underground Work (Medical Examination of Young Persons) Act of 1973, 216 L.Z 1-9 (1973)
Value Added Tax Act of 1995, 331 L.Z 1-55 (2003)
Workers Compensation Act of 1964, 271 L.Z 1-128 (1999)
Zambia development Agency Act of 2006, 15 L.Z 1-4 (2006)

Appendix

Appendix A: Mining Maps



Mineral Map of Zambia (World Map, 2015b)

Figure 7: Mineral Map of Zambia



Mineral Map of Botswana (World Map, 2015a)

Figure 8: Mineral Map of Botswana

Appendix B: BEE Scorecard and Framework

Table 12: BEE Compliance

BEE CONTRIBUTION LEVEL	SCORECARD POINTS	PROCUREMENT RECOGNITION
1	100 or above	135%
2	85 to 99.99	125%
3	75 to 84.99	110%
4	65 to 74.99	100%
5	55 to 64.99	80%
6	45 to 54.99	60%
7	40 to 44.99	50%
8	30 to 39.99	10%
Non Compliant	< 30	0%

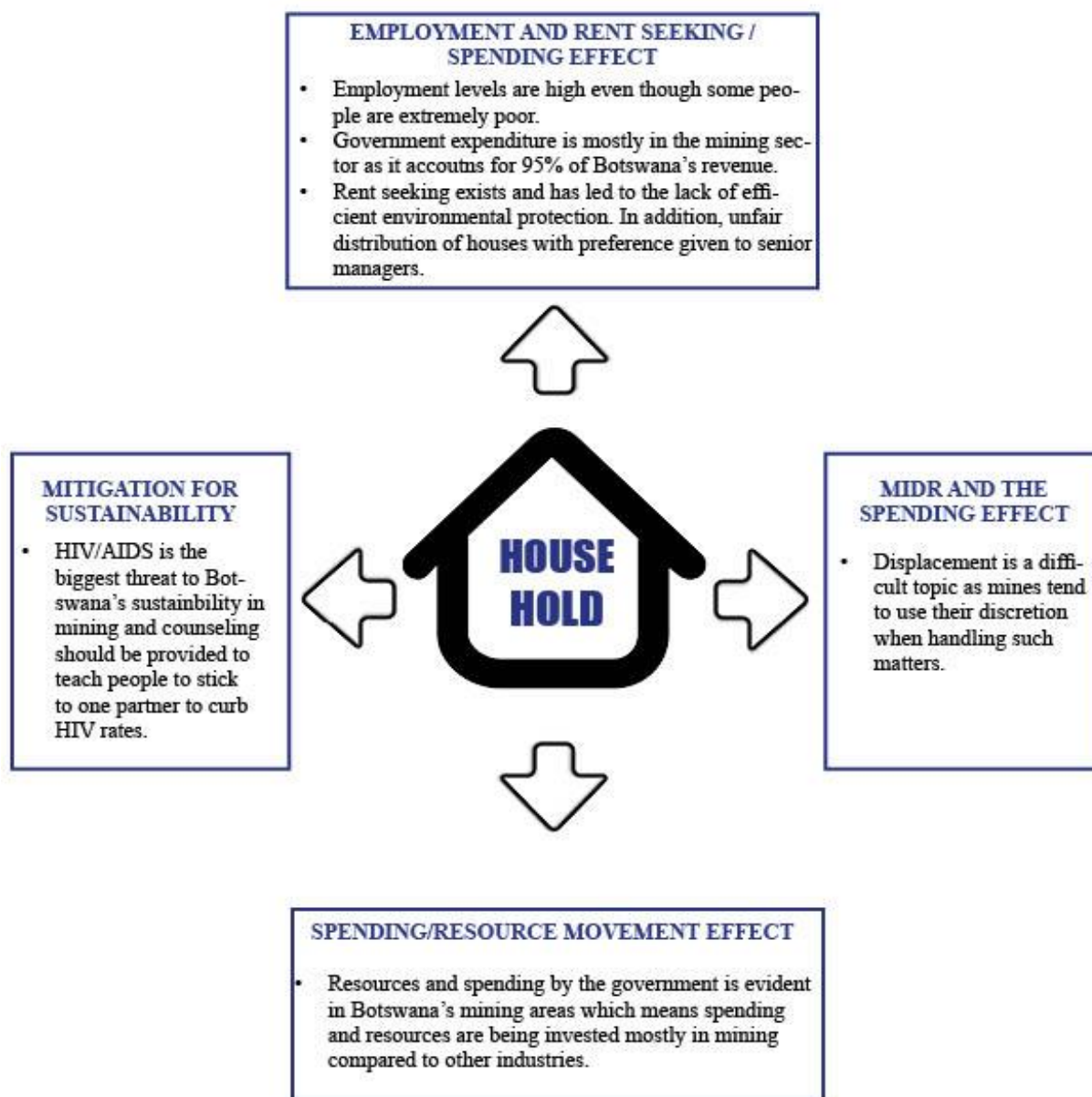
Table 13: B-BBEE Weighted Rating

B-BBEE ELEMENT	WEIGHT
Ownership	20.00%
Management	10.00%
Employment Equity	15.00%
Skills Development	15.00%
Preferential Procurement	20.00%
Enterprise Development	15.00%
Socio Economic Development	5.00%

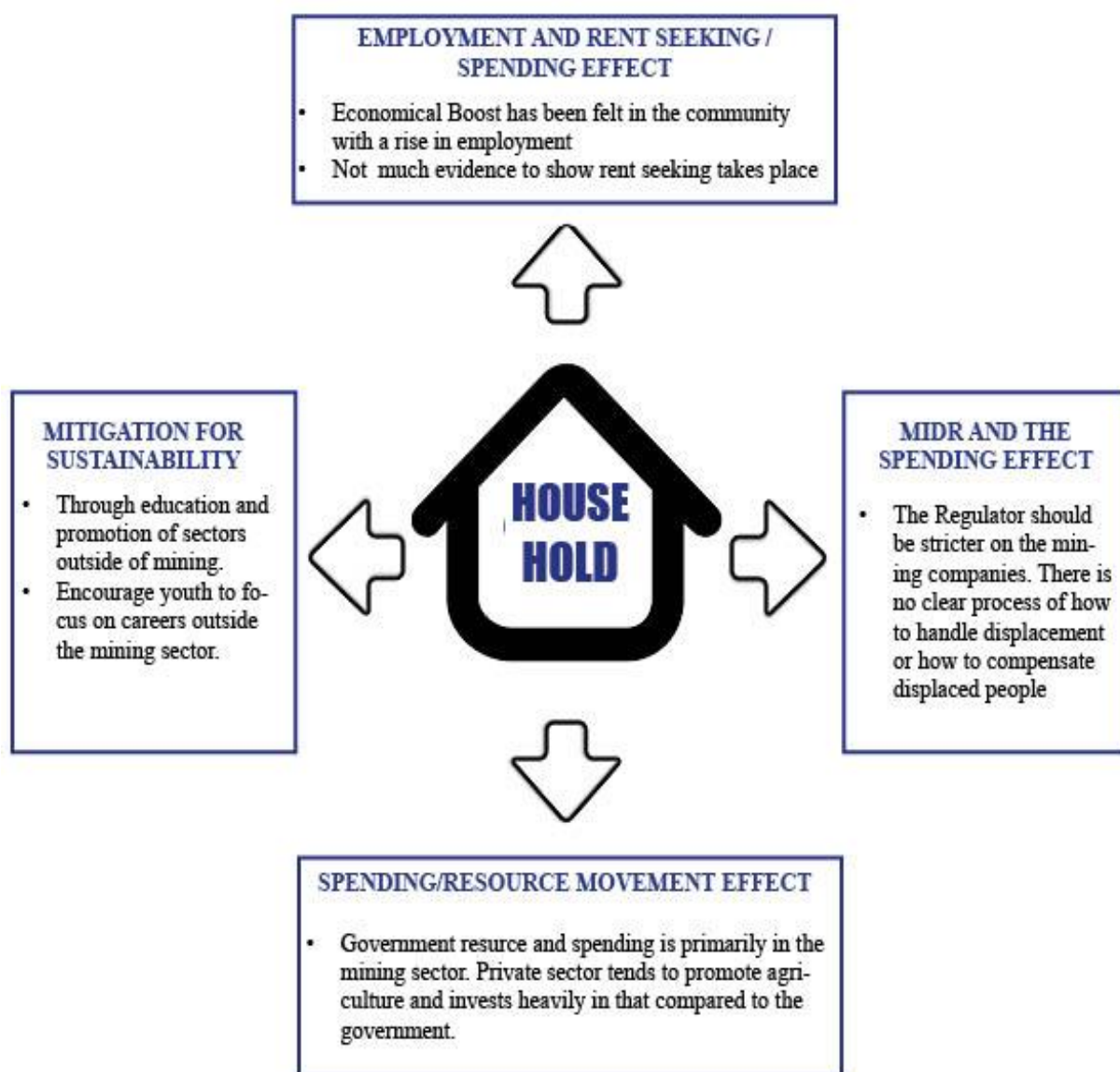
Appendix C: Figures of Key Informant Interview Findings

Figure 9-14 Key Informant Interviews in Each Town

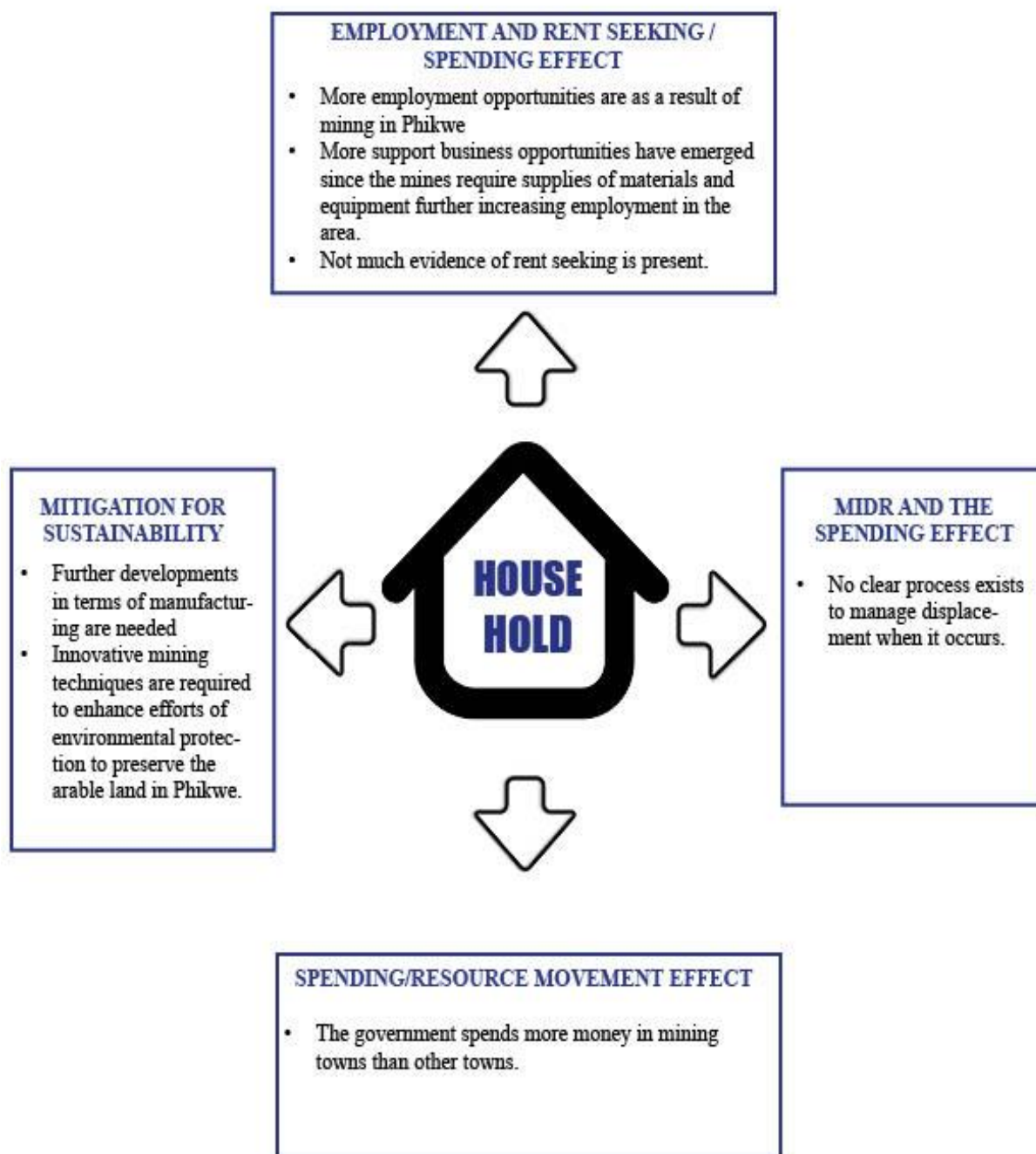
IMPACTS OF MINING ON HOUSEHOLD IN JWANENG (KEY INFORMANT)



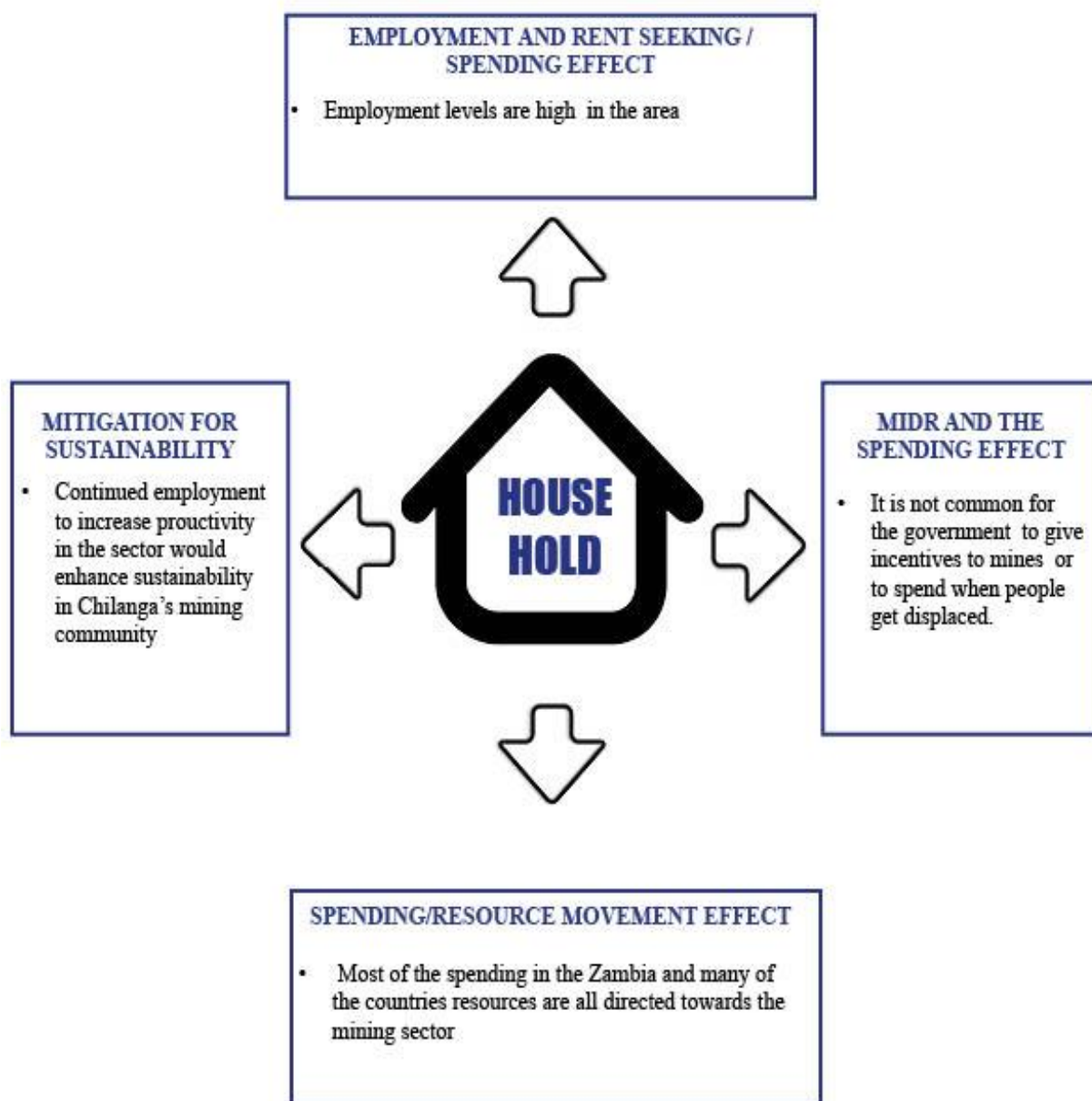
IMPACTS OF MINING ON HOUSEHOLD IN PALAPYE (KEY INFORMANT)



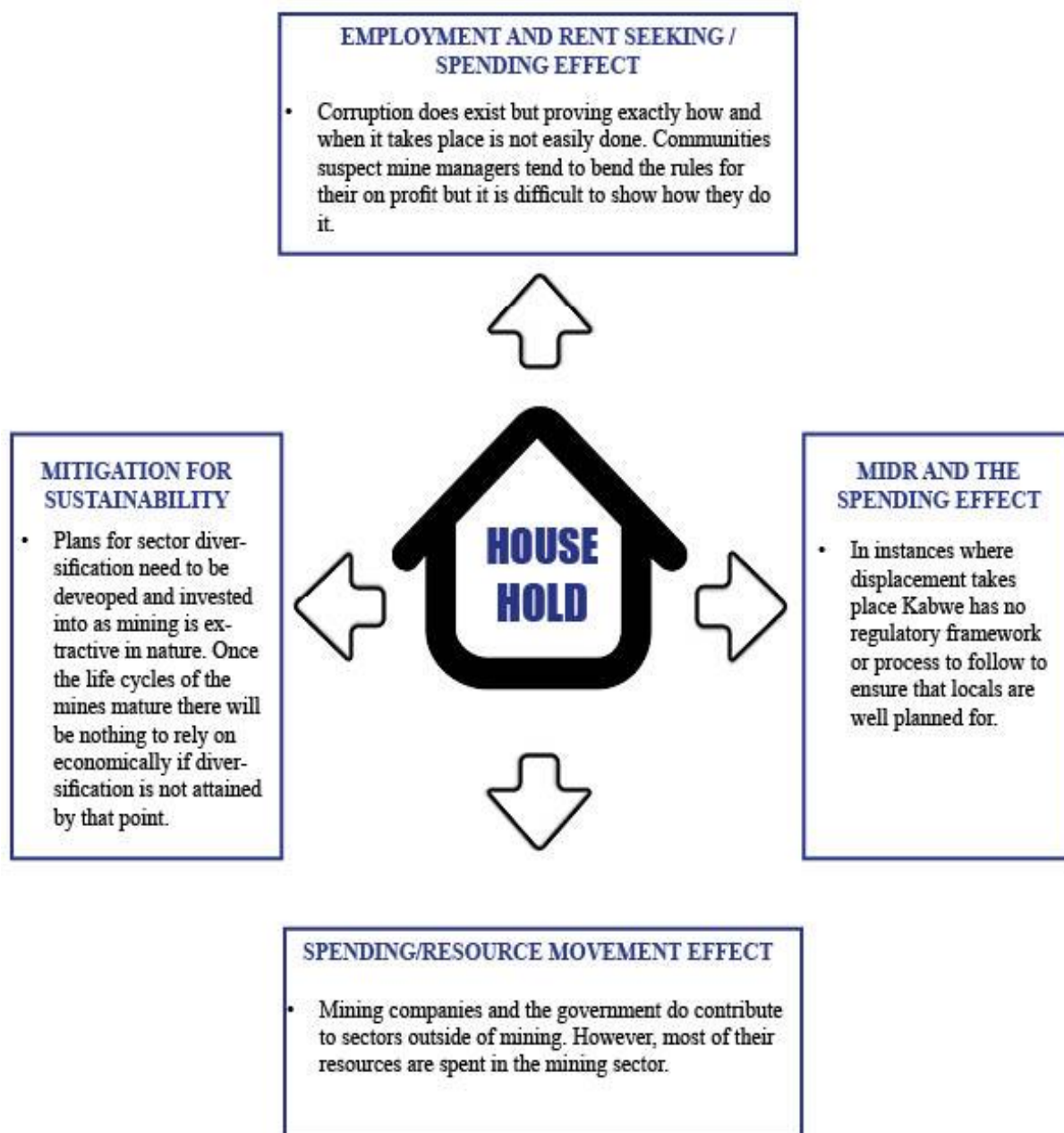
IMPACTS OF MINING ON HOUSEHOLD IN PHIKWE (KEY INFORMANT)



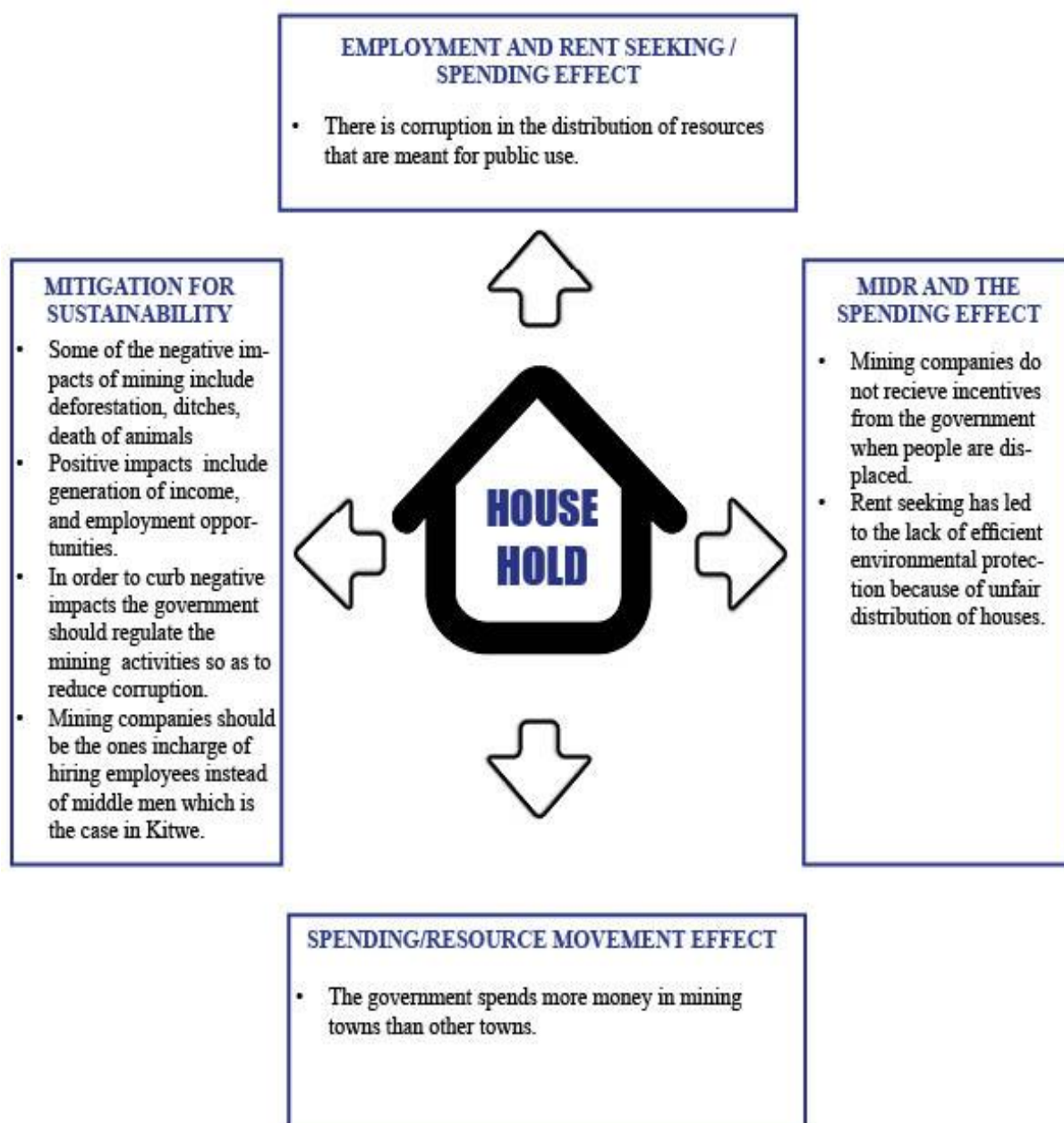
IMPACTS OF MINING ON HOUSEHOLD IN CHILANGA (KEY INFORMANT)



IMPACTS OF MINING ON HOUSEHOLD IN KABWE (KEY INFORMANT)



IMPACTS OF MINING ON HOUSEHOLD IN KITWE (KEY INFORMANT)



Appendix D: Questionnaires

Strictly Confidential



Wits
Business
School

Respondent ID:.....

Questionnaire No:_____

Household Questionnaire – Form 1

The Impact of Mining in Sub-Saharan Africa – A Comparative Study of Botswana and Zambia

INSTRUCTION: FOR ALL THE ANSWERS PLEASE TICK [✓] OR BRIEFLY WRITE THE MAIN POINT(S) IN THE SPACE(S) PROVIDED FOR EACH QUESTION

SECTION A: IDENTIFICATION PARTICULARS

- Q1. Country of residence:** 1.[] Zambia 2.[] Botswana
- If Zambia please tick [✓] Town of residence:**
- 11.[] Kitwe 12.[] Kabwe 13.[] Chingola
14.[] Mufulira 15.[] Sinazongwe 16.[] Solwezi
- If Botswana please tick [✓] Town of residence:**
- 21.[] Jwaneng 22.[] Selebi-Phikwe 23.[] Damtshaa
24.[] Orapa
- Q2. How old were you on your last birthday? (Complete years)** Years.
- Q3. Indicate respondents' gender:** 1.[] Female 2.[] Male
- Q4. What is your relationship with the head of household?**
- 1.[] Head 2.[] Spouse 3.[] Son/Daughter 4.[] Other specify_____
- Q5. What is the highest level of education you completed?**
- 1.[] None 2.[] Primary 3.[] Secondary 4.[] University/College

Q6. What is the total number of household members? (Excluding visitors)

Q7. What is your household's main source of income? (Specify)_____.

SECTION B: EMPLOYMENT QUESTIONS AND MIDR

Q8. How many years/months have you lived in this area? [] Years [] Months

Q9. If more than four (4) years, what changes have you observed in the area over the time? (Explain briefly)

Q10. Do you work for the mine? 0.[] No 1.[] Yes

Q11. If yes, how many years/months have you worked for the mine? [] Years [] Months

Q12. If yes, does the mine provide you with protective clothing? 0.[] No 1.[] Yes

Q13. What is your current contract status? 1.[] Temporary Employee 2.[] Permanent Employee

Q14. What is your position in this contract?

1.[] Supervisor 2.[] Manager 3.[] Director 4.[] Mineworker 5.[] Other specify_____

Q15. Do you have access to any of the following benefits?

Transport allowance		Communication	
Medical insurance	[]		
Pension	[]		
Educational provisions for children		Scheme	
Loans			
A house from the mine/Housing allowance	[]		
Gratuity	[]		

Q16. Have you been displaced from where you used to live before because of the mine? 0.[] No 1.[] Yes

Q17. What kind of compensation was given to you? (Explain briefly)

Q18. Which of the following benefits/positive or negative Impacts has the mines brought to your community

[PLEASE TICK ALL THE APPROPRIATE BOXES]

HEALTH	Benefit?	Negative?	Positive?
1. Improved health services?	[]	[]	[]
2. Higher number of clinics?	[]	[]	[]
3. Protective clothing for the miners?	[]	[]	[]
4. Increased specialized clinics such as Gynaecology/Pediatric clinics?	[]	[]	[]

ENVIRONMENT	Benefit?	Negative?	Positive?
5. Reforestation?	[]	[]	[]
6. Clean water?	[]	[]	[]
7. Environmental protection?	[]	[]	[]

INFRASTRUCTURE AND SOCIAL AMENITIES	Benefit?	Negative?	Positive?
8. More schools have been built?	[]	[]	[]
9. More salons/bars/shopping centers?	[]	[]	[]
10. Increase in tradesmen in the area?	[]	[]	[]
11. Improved roads?	[]	[]	[]

SOCIAL FABRIC	Benefit?	Negative?	Positive?
12. Increased number of police posts?	[]	[]	[]
13. Reduced gender based violence?	[]	[]	[]
14. Stronger and closer knit family set ups?	[]	[]	[]
15. Reduced Mafia like activities?	[]	[]	[]

EMPLOYMENT AND MIDR	Benefit?	Negative?	Positive?
16. Compensation of displacement?	[]	[]	[]
17. Job creation?	[]	[]	[]
18. Resettlement to better areas?	[]	[]	[]

Q19. In the following categories below, which challenges do you face as a result of mining activities?

[PLEASE TICK ALL THE APPROPRIATE BOXES]

HEALTH	Challenge?
1. Chest infections?	[]
2. Problems with food?	[]
3. Headaches?	[]
4. High/low blood pressure?	[]
5. Disturbed sleep pattern?	[]

ENVIRONMENT	Challenge?
6. Dust?	[]
7. Noise from mining activities?	[]
8. Toxic water?	[]
9. Loss of arable land?	[]
10. Loss of fish (in areas near water bodies)?	[]

SOCIAL FABRIC	Challenge?
10. Increase of prostitutes in the area?	[]
11. Increased crime level?	[]
12. Increased abuse of drugs and alcohol?	[]
13. Increased numbers of teenage pregnancies?	[]

INFRASTRCTURE AND SOCIAL AMENITIES	Challenge?
14. Higher rentals?	[]
15. Other Specify	

Q16. Are there any other issues relating to the mines that you would like us to share?

0.[] No 1.[] Yes

Q17. If yes, what are the main issues? (Briefly explain)

~End of Interview~

THANK YOU FOR YOUR TIME AND PARTICIPATION!

Strictly Confidential

Group No:.....

No of Participants:....



Focus Group-- Form 2

The Impact of Mining in Sub-Saharan Africa – A Comparative Study of Botswana and Zambia

SECTION A: IDENTIFICATION PARTICULARS

Q1. Country: 1. ☐ Zambia 2. ☐ Botswana

If *Zambia* please tick ☐ Town:

- | | | |
|---------------------------------------|---|---------------------------------------|
| 11. ☐ Kitwe | 12. ☐ Kabwe | 13. ☐ Chingola |
| 14. ☐ Mufulira | 15. ☐ Sinazongwe | 16. ☐ Solwezi |

If *Botswana* please tick ☐ Town:

- | | | | |
|--------------------------------------|--|---------------------------------------|------------------------------------|
| 21. ☐ Jwaneng | 22. ☐ Selebi-Phikwe | 23. ☐ Damtshaa | 24. ☐ Orapa |
|--------------------------------------|--|---------------------------------------|------------------------------------|

SECTION B: DISCUSSION

Employment and Rent Seeking Questions

1. What activities do the locals engage in as a result of mining activities?

.....

2. How do these activities benefit the community?

.....

Employment and the Resource Movement/Spending Effect:

3. Do you find that many people are moving away from agriculture or manufacturing to work in the mining sector?
.....
.....

MIDR and Rent Seeking Questions

1. Has the mine led to the displacement of local people?
Yes ☐ No ☐
2. How does the mine relate to the local community?
.....
.....
3. Do community members feel that the mining activities in their areas have been for their benefit?
.....
.....

MIDR and the Spending Effect:

4. Have families been compensated to relocate?
.....
.....
5. How is compensation calculated?
.....
.....
6. Is it more or less than what it should be?
.....

Infrastructure and Social Amenities and Rent Seeking

1. With the coming of the mine, what businesses and new developments have come into existence?
.....
.....
.....
2. Do profits from these new developments benefit the developer or community?
.....
.....

Spending/ Resource movement effect

3. Has the mine provided housing, schooling and health facilities for miners and the community?
.....
.....
4. Do you see more government presence in your community because of the mine?
.....
.....

Environmental Questions

1. Discuss the pollution as a result of the mine in:
Water:.....
Noise:.....
Dust:
Fisheries:.....

Vegetation/Forests:.....

2. What dangers do mine workers face as a result of mining activities?
.....
.....
3. What protective clothing is made available to mine workers?
.....
.....
4. What can the government do to protect and preserve the environment?
.....
.....

The Environment and Rent-Seeking:

5. Is there corruption in the mines?
.....
6. If so, who is involved?
.....
.....

Health Questions

1. How has the mining company added value to your health services?
.....
.....
.....

The Social Fabric

1. What are the social challenges families face here because of mining activities?
.....
.....
2. How do the mine working hours affect workers' families?
.....
.....
3. What "mafia" or "criminal gang" like activities take place in the area because of the minerals?
.....
.....
.....

~End of Interview~

THANK YOU FOR YOUR TIME AND PARTICIPATION!

Strictly Confidential

Respondent ID No:...



Key Informant Interview-- Form 3

The Impact of Mining in Sub-Saharan Africa – A Comparative Study of Botswana and Zambia

SECTION A: IDENTIFICATION PARTICULARS

Q1. Country: 1. ☐ Zambia 2. ☐ Botswana

If *Zambia* please tick ☒ Town:

- | | | |
|---------------------------------------|---|---------------------------------------|
| 11. ☐ Kitwe | 12. ☐ Kabwe | 13. ☐ Chingola |
| 14. ☐ Mufulira | 15. ☐ Sinazongwe | 16. ☐ Solwezi |

If *Botswana* please tick ☐ Town:

- | | | | |
|--------------------------------------|--|---------------------------------------|------------------------------------|
| 21. ☐ Jwaneng | 22. ☐ Selebi-Phikwe | 23. ☐ Damtshaa | 24. ☐ Orapa |
|--------------------------------------|--|---------------------------------------|------------------------------------|

SECTION B: DISCUSSION

Employment and Rent Seeking Questions

4. How have employment levels changed over time in the mines and in businesses around the mines?

.....
.....

5. What could be the cause of these changes?

.....
.....
.....

Employment and the Resource Movement/Spending Effect:

6. To what extent does the mining sector provide revenues for government spending in other sectors?

-
-
7. Could increased government spending in other sectors cause an increase in employment in those sectors (provide some examples of how this has happened)?
-
-

MIDR and the Spending Effect:

7. Do mining companies receive incentives from the government when displacement takes place?
-
-
8. Is it directly the revenues from mining that provide mining companies and government with the ability to compensate families and relocate them?
-
-
7. Has rent-seeking led to the lack of efficient environmental protection?
-
-
-
8. On the ground, is it the mining company or the regulator who has more of a say in what happens to the environment?
-
-
-
9. Why is this the case?
-
-
-

Spending/Resource movement effect

10. How do you view government/mining company expenditure on land with minerals versus land without minerals?
-
-

Mitigation for Sustainability

1. What are the negative impacts of mining?
-
-
-
2. What are the positive impacts of mining?
-
-
-
3. What can be done to reduce the negative impacts?
-
-

-
4. What can be done to sustain the positive impacts?
-
-
-

~End of Interview~

THANK YOU FOR YOUR TIME AND PARTICIPATION!

Appendix E: Comparisons of Laws

Table 14: Summary of Country Legislations

Category	Botswana	Zambia	South Africa	United States
Governing Bodies	Mines and Minerals Act, CAP 66:01, Mines, Quarries, Works and Machineries Act, CAP 44:02, Environmental Assessment Act, CAP 65:07, provisions of the Precious and Semi-Precious Stones (Protection) Act, CAP 66:03 (Mines & Minerals Act, CAP 66:01; Mines, Quarries, Works & Machineries Act, CAP 44:02; Environmental Assessment Act, CAP 65:07; Precious & Semi Precious Stones Protection Act, CAP 66:03	Mines and Minerals Development Act of 2015, Mines Acquisition (Special Provisions) Act; Chapter 218, Mines and Minerals Development Bill, N.A.B No. 12 of 2015. provisions of the Income Tax, the Valued Added Tax Act, the Environmental Management Act No. 12 of 2011 , the Zambia Development Agency Act, 2006, the Lands Act 1995,	Mineral and Petroleum Resources Development Act 28 of 2002 Mineral and Petroleum Resources Royalty (Administration) Act 29 of 2008 Mineral and Petroleum Resources Royalty Act 28 of 2008	The General Mining Law of 1872
Surface Rights	Acquire Prospecting license for mining activities only.	Surface rights are granted for mining activities only.	Regional and Land Affairs Second General Amendment Act 170 of 1993 Land Reform (Labour	The Federal Land Policy and Management Act of 1976 The Mineral Leasing Act for

			Tenants) Act 3 of 1996 Transformation of Certain Rural Areas Act 94 of 1998 Mining Titles Registration Amendment Act 24 of 2003 Land Survey Act 8 of 1997	Acquired Lands of 1947 and Reorganization Plan No. 3 of 1946.
Environment	Environmental Assessment Act, CAP 65:07	Environmental management act No. 12 of 2011 Laws Medical Examination of Young Persons (Underground Work) Act, Chapter 216	National Environmental Management Act 107 of 1998 Minerals and Energy Laws Amendment Act 11 of 2005 Explosives Act 15 of 2003	National Environmental Policy Act, 1969. Clean Air Act, 1970. Resource Conservation and Recovery Act, 1976. Clean Water Act, 1977 Toxic Substances Control Act, 1976 Comprehensive Environmental Response, Compensation, and Liability Act, 1980
Health and Safety	Mines, Quarries, Works and Machineries Act, CAP 44:02	Pneumoconiosis Act, Chapter 217 of the Laws of Zambia, Occupational Health and Safety Act, Act 36 of 2010, and the Workers'	Mine Health and Safety Amendment Act 74 of 2008 Occupational Diseases in Mines and Works Amendment Act 60 of 2002	The Federal Mine Safety and Health Act, 30 U.S.C. § 801-966,

		Compensation Act, 1999	Skills Development Amendment Act 31 of 2003	
--	--	---------------------------	--	--