INSTITUTIONAL DIMENSIONS IN MANAGEMENT OF SMALL- SCALE MINING IN TANZANIA: A CASE OF WINZA RUBY MINING AT MPWAPWA DISTRICT

By

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CERTIFICATION

The undersigned certifies that he has read and hereby recommends for the acceptance by the UNIVERSITY OF DODOMA a dissertation entitled: "Institutional dimensions in Management of Small-Scale Mining: A case of Winza Ruby Mining in Mpwapwa district.

…….

Dr. Sinda H. Sinda

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Date……

DECLARATION

AND

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I, **Sakunda Ndeliso Kimambo**, declare that this dissertation is my own original work and that it has not been presented and will not be presented to any other University for a similar or any other degree award.

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DEDICATION

This work is dedicated to my lovely wife, Gladness and our child Happiness for their tolerance and moral support during the whole period of my academic endeavors.

ABSTRACT

This study focused on investigating institutional dimensions in management of small-scale mining: A case of Winza Ruby Mining at Mpwapwa district by looking on the managerial aspects and awareness of small-scale miners on mining policies and laws, examine the factors influencing informal and illegal SSM, investigate the environmental impacts of SSM and law enforcement mechanism towards execution of monitoring and evaluation of environmental plan, and examine the challenges and prospects in the management of SSM.

Using data collected from ground survey and questionnaires through SPSS and Microsoft excel it was established that; managerial aspects are in place but what came out was inadequate implementation. The awareness of SSMi on mining laws and policies was found to be law and therefore, awareness creation is of paramount to local miners. Even though the data revealed the decreased number of miners in Winza ruby mining, there still potentials for the livelihoods of small-scale miners not explored at the moment. Deforestation, pollution (land, air, water and sound) are the challenges pointed out by the respondents.

From the findings it may be concluded that the Government policies on mining are often confused and inconsistent, and frequently favor or focus on large-scale mining. Government neglect of the SSM sector can be costly to governments in administrative, financial, political, and environmental terms. Thus the study recommends the government on; creation of small-scale mining policy, provision of knowledge mining based, and financial support, reopening of STAMICO, decentralization of mining licenses acquisition and the increased budget of the ministry of energy and minerals.

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ABBREVIATIONS AND ACRONYMS

BOT	Bank of Tanzania
CBOs	Community Based Organization
EWURA	Energy and Water Urban Regulatory Authorities
FDI	Foreign Direct Investment
GDP	Gross Domestic Product
GRS	Gem Research Swiss lab
GST	Geological Survey of Tanzania
ILO	International Labor Organization
IMF	International Monetary Fund
EITI	Extractive Industry Transparency Initiative
LEAT	Lawyers' Environmental Action Team
MEM	Ministry of Energy and Minerals
MRD	Mineral Resources Department
NGO	Non Government Organization
NBS	National Bureau of Statistics Tanzania
PRSP	Poverty Reduction Strategy Paper
ASM	Artisanal and Small—Scale Mining
SAP	Structural Adjustment Programme
SSM	Small-Scale Mining
SSMi	Small-Scale Miners
TIC	Tanzania Investment Centre
TIC	Tanzania Investment Centre
TRA	Tanzania Revenue Authority
URT	United Republic of Tanzania
WB	World Bank
NGO	Non Governmental Organization
MMSD	Mineral, Mining and Sustainable Development
STAMICO	State Mining Corporation

CHAPTER ONE

INTRODUCTION AND BACKGROUND

1.0 Introduction

This chapter describes the background of the problem, statement of the problem, objectives of the study, research questions, and significance of the study, delimitation and limitations. The problem is critical because most mineral policies in sub-Saharan Africa in general and Tanzania in particular have focused mainly on large-scale mining projects. This is because large-scale mining projects date back to colonial times. Secondly, the predominance of multinational corporations whose interest was in large-scale mining in order to achieve economies of scale has since dominated the thinking. Institutional dimensions in management of small-scale mining have consequences remained relatively unexplored until recently.

1.1 Background to the problem

Worldwide, there are about sixty countries containing about three quarters of the population of developing and transitional economies where the mining sector should be taken into account when devising poverty reduction strategies. Some of these countries are “mining countries”, often well known for the sector’s contribution to economic growth through exports, such as Chile, Mexico, Peru, Botswana, Ghana, South Africa, Jordan, Indonesia and Papua New Guinea (LEAT, 2011). Others are lesser known mining countries such as Argentina, Mali, and Tanzania.

Table 1 : Participants in Small-Scale Mining sector within Southern Africa

	Malawi	Mozambique	Tanzania	South Africa	Zambia	Zimbabwe	**Total**
Mining contribution to GDP	0.9%	2.0%	2.8%	8.0%	12.1%	8.0%	
Formal large-& medium scale mining	14,000	87,000	365,000	1,350,000	300,000	350,000	2,466,000
Number of small-scale miners (estimated)	40,000	60,000	550,000	10,000	30,000	350,000	1,040,000
% Informal small-scale miners (estimated)	90.0 %	95.0 %	90.0 %	n.a	60.0 %	85.0 %	84.0 %
% Women in SSM (estimated)	10.0 %	30.0 %	25.0 %	5.0 %	30.0 %	>50 %	25.0 %

Source: Mining, Minerals and Sustainable Development Report (MMSD, 2001)

The nature and extent of the growth of artisanal and small-scale mining sub-sector in Tanzania is influenced both by social, political, economic structure and geological setting of the country. The growth therefore is attributed to several factors. One is the attractive geological environment, which has various sites of high-grade mineralization easily workable with simple tools. There is also a search for sustainable livelihoods in the mining sector due to collapse of other productive sectors such as a poor market of agricultural products and droughts. Lack of public and private employment, including the closure of both the state-owned mines in the 1980s and privately owned mines in Tanzania in the early 1970s, has forced semi-

skilled people to resort to artisanal mining. Another factor is that from 1970 to 1990, government had long and complicated process for granting mineral rights to applicants. This increased the number of informal artisanal miners. The discovery of numerous gold deposits south of Lake Victoria in the mid-1970s attracted indigenous people into mining as a fast way of getting rich. Finally, the economic policy reforms on mineral trade liberalization and the new legal and regulatory framework has encouraged the growth in artisanal and small-scale mining (Lange, 2006).

Since colonial times, there has been no private ownership of land in Tanzania. Individuals, clans and villages have use rights to land, but ownership is vested in the President. People with land rights (customary or formal) are supposed to be compensated for the investment they have done on the land, but this has proved extremely problematic. First, the official rates are too low. Second, there have been cases where civil servants have embezzled the compensation money. Third, many people do not know the law. Above all, ownership and tenure of land is in itself extremely ambiguous, since the land laws respect customary land tenure and village ownership of land but neither is surveyed or registered, and villagers lack knowledge about the laws.

The mining Act only presupposes consent from people who have registered their land tenure. Since there are only four zonal offices for land registration in the whole country, it is too cumbersome and expensive for ordinary people to travel long distances to formalize their land rights. And when conflicts do arise, villagers often find the court system too inaccessible and expensive (Lange, 2006).

In Tanzania, 70% of all mineral export earnings (49 dollar million) in 1992 came from SSM activities (Lange, 2006). Unclear land and mining rights, and conceptual

differences in how land and mining rights are perceived, contribute to considerate conflict in the country and to a feeling among both local people and human rights advocacy groups that the government has betrayed ordinary people. A case of Winza ruby mining in Mpwapwa district at Dodoma region justifies it.

A completely new type of ruby mines has been discovered in Tanzania in the area of Winza (Dodoma province at Mpwapwa district). These rubies are of exceptional beauty. The rubies are of excellent colors and exceptional clarity. Significant numbers of unheated rubies appeared on the market. Parcels that have been acquired from these new occurrence contained synthetic rubies and first samples of heat-treated rubies appeared in the market as well. Beside rubies, blue sapphires, orangey-pink sapphires and color-changing sapphires are also found (GRS, 2008).

The rubies were formed from solutions rich in alumina, fluorine, chlorine, sodium, phosphor, calcium, chromium, titanium, iron and nickel solutions. Main mining area was started along the river close to the mountain where alluvial materials have been dug and washed. Poorly-sorted sediments composing of clays, sands and pebbles to gravel mostly have low sphericity and angular shapes. This deposit type is quite shallow and easy for mining; however, large area along the river has already been occupied by the miners hence the new miners have to move to the hilly area in which it becomes the center of Winza Mtakanini (GRS, 2008). The study intended to examine the institutional (laws and policies) dimensions in the management of SSM at the study area.

1.2 Statement of the problem

Tanzania is endowed with a number of minerals, including precious metals, gemstones and natural gases such as Uranium. The mining industry for a long time in Tanzania especially during Mwalimu Nyerere's regime was a stagnant sector in the sense that very few mining activities were taking place in the country (LEAT, 2011). Currently, Tanzania has a booming sector where both small-scale and large-scale mining are taking place in the country. Mining is increasingly becoming the leading sector in Tanzania in terms of exports. During the last ten years Tanzania has witnessed high growth in mining sector. Reputable mining companies such as Barrick Gold, Ashanti Anglo-Gold, Placer Dome and Resolute are operating large-scale mines in Tanzania (LEAT, 2011).

There is also small scale mining areas like Winza-Dodoma, Maganzo- Shinyanga and Ngoma-Mwanza (LEAT, 2011).

According to Land law of Property and Conveyance Ordinance, 1923 (cap. 114) "Unexhausted improvement" means anything or any quality permanently attached to the land directly resulting from the expenditure of capital or labor by an occupier or any person acting on his behalf and increasing the productive capacity, the utility, or the sustainability of its environmental quality and includes trees, standing crops and growing produce whether of an agricultural or horticultural nature. The weakness of this land law it has kept quiet about the minerals found underground.

The currently Tanzania Mining Act of 2010 stipulates that the government should set aside areas for SSM to take place, this has not been implemented up to the present. Worse more there is no law for SSM alone thus SSM receives little attention from the government. For instance in Philippine there is so called People's Small-Scale

Mining Act of 1991. Basically small-scale mining in Tanzania has received little or no technical assistance (The Mining Act, 2010).

The main problem is that the government has been unable to carry through its own policies, and there is too much ambiguity in the laws. It is also worrying that so much power is vested in the Commissioner of mining which is bad in terms of accountability. But with the government membership in Extractive Industry Transparency Initiative (EITI) Tanzania now has greater transparent and accountability in the management of minerals than before. The country produces EITI reports that disclose revenues from extraction of its natural resources. Companies disclose what they have paid in taxes and other payments and the government discloses what it has received. These two sets of figures are compared and reconciled (EITI, 2009).

In this regard, the research has been compelled to investigate the Institutional Dimensions in Management of SSM industry by conducting a study in a sampled Winza ruby mining in Mpwapwa district at Dodoma region.

1.3 Objectives of the study

The general objective of the research was to investigate the institutional dimensions in management of small-scale mining in Winza ruby mining at Mpwapwa district in Dodoma region.

Specific objectives

The specific objectives for undertaking the research were to:-

i. Identify the managerial aspect of small scale-mining and awareness of small-scale miners on mining laws and policies;

ii. Examine the factors influencing informal and illegal small-scale mining;

iii. Investigate the environmental impacts of SSM and law enforcement mechanism towards execution of monitoring and evaluation of environmental plan; and

iv. Examine the challenges and prospects in the environmental management of small-scale mining.

Research Questions

This study was guided by the following research questions:

1) How and what is the managerial aspect of small-scale mining and awareness of small-scale miners on mining laws and policies?

   Indicators:

   - Planning
   - Organizing
   - Mining officers visits
   - Miners associations

2) What are the causes or factors for influencing informal and illegal small-scale mining in Winza ruby mining?

   Indicators:

   - Economic gains
   - Unemployment
   - Unreliable rainfall for agriculture

3) What are the environmental impacts of SSM and law enforcement mechanism towards execution of monitoring and evaluation of environmental plan?

Indicators:

- Deforestation
- Open mine pits left
- Soil erosion

4) What are the challenges and prospects towards the management of small-scale mining in Winza ruby mining?

Indicators:

- Mitigation measures
- Environmental committee
- Seminars and miners meetings on environment

1.4 Significance of the study

Through the findings obtained, this study was of great significance which revealed the strengths and weaknesses of the laws and policies in the management of local small-scale mining in Winza ruby mining, thus in turn enables streamlining of the institutions. Furthermore the study influenced the policy changes on small-scale mining in Tanzania whereby it was found that there is no SSM policy alone but there is current Tanzania Mineral Policy of 2009 and Mining Act of 2010.

The study helped more understanding of the laws and regulations governing small-scale mining in Tanzania which are not well known. Also this study will help to attain an award in MSc. Natural Resources Management at Dodoma University.

The study aimed at helping the Government to take serious measures in controlling and regulating informal Small-Scale Mining by using suggested recommendations of

the study and thus facilitate it to take measures to stop informal and illegal small-scale mining.

In academic level this study will provide new theoretical knowledge and the basic data for other scholars and researchers to conduct more research.

1.5 Delimitation of the study

The study was delimitated to Winza ruby mining in Mpwapwa district only. The researcher concentrated on improving mining laws and policies which affects Small-Scale Mining and mining industry in general.

1.6 Limitation of the study

The study suffered from various limitations as follows:

i) Some Small-Scale Miners were hiding some facts for fear of government interaction or thinking the researcher is government spy. However through confidentiality assurance the data collection was successfully done.

ii) Some of the respondents were reluctant responding to research questionnaires because they expected to earn some money from the researcher. Therefore the researcher used convincing language that this study is crucial for SSMi growth and development.

1.7 Conclusion

This chapter described the background to the problem that emphasized on the development and consequences of Mining Act and Mineral policies. The problem statement observed unfair compensation of local miners by foreigners, inadequate technical assistance from the government and there is too much ambiguity the mining law. Objectives of the study, research questions and significance of the study

which includes policy changes, revealed the weaknesses of the law enforcers and provide new theoretical knowledge and the basic data for other researchers to conduct more research. Last part covers the limitations and delimitation. The results of the study are to examine the mining laws and policies implementation and the appropriate measures to address informal small-scale mining in the study Winza ruby mining.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This chapter analyzes theoretical framework, empirical review, laws and policy guidelines. The chapter further provides a detailed analysis of empirical review on the nature and causes of informal and illegal small-scale mining. It further provides the linkage between economic and environmental impacts of small-scale mining and its relation to poverty reduction and sustainability. The chapter also assesses efforts by the government and other agencies to solve the problem of informal and illegal small-scale mining in Tanzania.

2.1 Theoretical Literature Review

Mining is a unique industry due to its complex set of impacts on national and local economic development, environment, and socio-cultural profiles. Small-scale mining is an activity that is increasingly gaining momentum in Tanzania. This industry faced with customs and behavior of disorders such as informal and illegal-small-scale operations. This problem leads to loss of government revenue, environmental degradation, and insecurity and health hazards.

2.1.1 Definitions of key Terms and Concepts

(i) Institution

An institution is any structure or mechanism of social order and co-operation governing the behavior of a set of individuals within a given human community. The term "institution" is commonly applied to customs and behavior patterns important to

a society, as well as to particular formal organizations of government and public services (Berger, 1966).

(ii) Institutional Dimensions

The context of the institutional dimension is to ensure effective coordination, collaboration, synchronization, ownership and sustainability of the sub-sector programmes (Baden and Noonan, 1998).

(iii) Management

Management is the act of getting people together to accomplish desired goals and objectives using available resources efficiently and effectively. Management comprises planning, organizing, staffing, leading or directing, and controlling an organization (a group of one or more people or entities) or effort for the purpose of accomplishing a goal. Resourcing encompasses the deployment and manipulation of human resources, financial resources, technological resources and natural resources (Oxford English Dictionary).

More broadly, management is the process of designing and maintaining an environment in which individuals, working together in groups, efficiently accomplish selected aims (Koontz and Weihrich, 1990). In its expanded form, this basic definition means several things. First, as managers, people carry out the managerial functions of planning, organizing, staffing, leading, and controlling. Second, management applies to any kind of organization. Third, management applies to managers at all organizational levels. Fourth, the aim of all managers is the same to create surplus. Finally, managing is concerned with productivity, this implies effectiveness and efficiency.

(iv) Institutional Management

Institutional management is the conduct of drafting, implementing and evaluating cross-functional decisions that will enable an organization to achieve its long-term objectives. It is the process of specifying the organization's mission, vision and objectives, developing policies and plans, often in terms of projects and programs, which are designed to achieve these objectives and then allocating resources to implement the policies, and plans, projects and programs.

(v) Environmental Management

Environmental Management is a purposeful activity with the goal to maintain and improve the state of an environmental resource affected by human activities. It is not, as the phrase suggests, the management of the environment as such, but rather the management of the interaction and impact of human societies on the environment. Environmental management aims to ensure that ecosystem services are protected and maintained for equitable use by future human generations, and also, maintain ecosystem integrity as an end in itself by taking into consideration ethical, economic, and scientific (ecological) variables (Pahl., et al, 2009). Environmental management tries to identify the factors that have a stake in the conflicts that may rise between meeting the needs and protecting the resources. Ethical-Environmental management strategies are intrinsically driven by conceptions of human-nature relationships. Ethical aspects involve the cultural and social issues relating to the environment, and dealing with changes to it (Colby, 1991).

(vi) Small-Scale Mining and Artisanal Mining

There are currently no universal definitions of artisanal or small-scale mining. The lack of consensus, as echoed by several researchers, e.g., Quashie, 1991; Priester et al., 1993; Taupitz et al., 1993 and others, is due to the fact that such a definition varies from country to country. Several attempts to arrive at a widely accepted definition of small-scale mining have been made, based on criteria ranging from investment costs, labor requirements, ore production rates, and size of concessions, amount of reserves, annual sales or any combination of these. Some countries have more than one definition for small-scale mining. For the case of Tanzania the criteria used is; capital investment, labor and technology requirements (Barnea, 1978).

Small-scale mining is commonly associated with informal, unregulated, undercapitalized and under-equipped operations where technical and management skills are lacking. They are also believed to erratically produce limited amounts of minerals from uncertain reserves. Small-scale mining is particularly labor intensive and thus provides employment and incomes to large numbers of people who are generally uneducated, poor and live in remote areas where no opportunities exist for formal employment (Kambani, 1997).

Artisanal mining is the smallest and simplest mining operations; it involves the use of simple tools and the absence of a formal enterprise. Many times this is conducted as informal operations on registered claims (Kambani, 1997). Kambani (1997) further states that artisanal miner's prospect for gold, diamonds and colored gemstones. Because of the informal nature of these operations, even subsistence farmers get involved on a seasonal basis.

(vii) Legal System and Legal Framework

Legal system and theoretical framework refers to the legal regime of a country consisting of a written or oral constitution, primary legislation (statutes) enacted by the legislative body established by the constitution, subsidiary legislation (bylaws) made by person or bodies authorized by the primary legislation to do so, customs applied by the courts on the basis of traditional practices, and principles or practices of civil, common, or other code of law.

A statute is a formal written enactment of a legislative authority that governs a state, city, or county. Oral constitution is the term used to describe a constitution that is entirely unwritten (Campbell, 1990). Bylaws are the rules and regulations enacted by an association or a corporation to provide a framework for its operation and management (Oxford Dictionary, 2010).

However, there are a number of reasons why in Winza ruby mining at Mpwapwa district artisanal and small-scale miners continue to operate within the informal sector. An unawareness of legal requirements and this may be compounded by demanding bureaucratic procedures often required to become and remain a formal operation. Where communities have traditionally operated outside of the formal sector, also they are reluctant to be legalized because there are no obvious incentives to do so and where legalization involves paying taxes that they would otherwise not pay. A lack of capacity on the part of governments to enforce penalties and to provide the benefits, which should be associated with legalization, acts as a further disincentive to miners to be legalized.

(viii) Organization

An organization is a social unit of people systematically structured and managed to meet a need or to pursue collective goals on a continuing basis. All organizations have a management structure that determines relationships between functions and positions, and subdivides and delegates roles, responsibilities, and authority to carry out defined tasks. Organizations are open systems in that they affect and are affected by the environment beyond their boundaries (Businessdictionary.com).

(ix) Property Rights and Property Regime

Laws created by governments in regard to how individuals can control, benefit from and transfer property. Economic theory contends that government enforcement of strong property rights is a determinant regarding the level of economic success seen in the area. Individuals will create new forms of property to generate wealth, only when they are assured that their rights to their property will protect them against unjust and/or unlawful actions by other parties. In Tanzania the radical title is vested in the President as trustee for and on behalf of all citizens of Tanzania (Krier, 2006). Property regime refers to a particular social arrangement regulating the preservation, maintenance, and consumption of a resource (Ostrom, (1990).

Basically, property is a legal institution that governs the use of things (Barnes, 2009). While it is often only seen in a private context, it also has social and public dimensions: it provides a means to achieve social order and represents a mode of public and economic organization (Singer, 2000). The structure of a property system influences how societies are shaped and how people interact. Consequently, the theory behind property rights (its theoretical "justification") is of great practical significance. How one understands and justifies the existence of property determines,

for example, what forms of property are perceived to be valid to manage a certain resources.

Finally, other property issues arise in the context of land use. In most cases, miners will not own the land on which the minerals are located. This leads to questions of land allocation, for example if the government should set aside specific lands for ASM, and what provisions are made with regards to other private owners of land on which minerals happen to be located (Long, 1995).

(x) Household Income

Household income is the consumption and savings opportunity gained by an entity within a specified timeframe that is generally expressed in monetary value. However, for households and individuals, income is the sum of all the wages, salaries, profits, interests' payments, rents and other forms of earnings received in a given period of time that can be a day, week or a month. Winza ruby mining in Mpwapwa contributes to the income of its people. However, the sector contribution to the economy of the region is minimal because of poor technological capacities (Barr, 2004).

(xi) Poverty

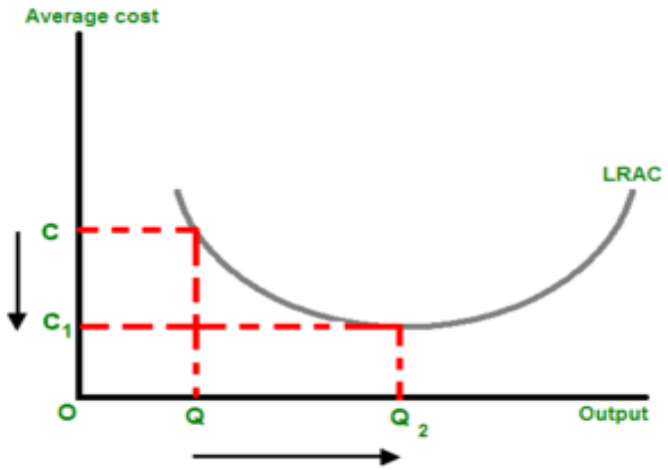
Poverty is the state of one who lacks a certain relative amount of material possessions or money. Poverty is relative to, and is the antonym of, wealth. Poverty is a result of the laws of ownership. In the ideology of ownership there can only be poverty so long as there is wealth, as they are relative (Gordon, 1972).

(xii) Economies of Scale

In microeconomics, economies of scale are the cost advantages that an enterprise obtains due to expansion. There are factors that cause a producer's average cost per

unit to fall as the scale of output is increased. "Economies of scale" is a long run concept and refers to reductions in unit cost as the size of a facility and the usage levels of other inputs increase (Sullivan et al., 2003).

Figure 1: Economies of Scale



Source: Sullivan et al., 2003

Long run average costs LRAC

As quantity of production increases from Q to Q2, the average cost of each unit decreases from C to C1.

(xiii) Multinational Corporation (MNC)

A Multinational Corporation (MNC) or Multinational Enterprise (MNE) is a corporation enterprise that manages production or delivers services in more than one country. It can also be referred to as an international corporation. They play an important role in globalization (Christos, et al, 2000).

2.1.2 Theoretical Framework

2.1.2.1 The Management Theory of Small-Scale Mining

Contemporary theories of management tend to account for and help interpret the rapidly changing nature of today's organizational environments, several important management theories are as follows: The Scientific Management School comprising the works of Taylor (1916) and Lillian Gilbreth's motion study, among others; the Classical Organizational Theory School comprising the works of Henri Fayol's (1949) views on administration, and Max Weber's (1949) idealized bureaucracy, among others; Behavioral School comprising the work of Elton Mayo (1933) and his associates; the Management Science School; and Recent Developments in Management Theory comprising works such as Systems Approach, Situational or Contingency theory, Chaos theory, and Team Building approach.

Fayol's (1916) theories of administration dovetail nicely into the bureaucratic superstructure described by Weber (1949). Fayol (1916) focuses on the personal duties of management at a much more granular level than Weber did. While Weber laid out principles for an ideal bureaucratic organization Fayol's work is more directed at the management layer.

Fayol (1916) believed that management had five principle roles: to forecast and plan, to organize, to command, to co-ordinate and to control. Forecasting and planning was the act of anticipating the future and acting accordingly. Organization was the development of the institution's resources, both material and human. Commanding was keeping the institution's actions and processes running. Co-ordination was the alignment and harmonization of the groups' efforts. Finally, control meant that the above activities were performed in accordance with appropriate rules and

procedures. Fayol was a successful mining engineer and senior executive prior to publishing his principles of "administrative science and his five principle roles of management are still actively practiced today (Swartz, 1994).

Regulatory frameworks for mining operations are best developed in a collaborative manner, involving governments, the private sector, and civil society. Given the complexity of the consequences of mining on the socio-economic situation and on the environment, interventions initiated by only one of these three parties are not likely to succeed in the long run (Andrews, 1992).

The government of Tanzania is committed to support the small-scale mining sub-sector by facilitating the transformation of the present artisanal mining activities into more organized and modernized small-scale mining groups. It also promotes mineral marketing, which encourages transparent business transactions and discourages smuggling. Government strategies and initiatives include:

(i) Transforming and upgrading artisanal mining into more organized and modernized mining.

(ii) Facilitating the availability of appropriate and affordable mining tools and equipment.

(iii) Promoting partnerships between local small-scale miners and large-scale mining companies and facilitate technology transfer and optimize mineral resources exploitation.

(iv) Provision of supportive extension services in mining, mineral processing and marketing.

(v) Streamlining and simplifying the licensing of artisanal miners and mineral dealers.

(vi) Preparing, disseminating and enforcing a code of conduct in mining and mineral processing.

(vii) Promoting market arrangements, which are responsive to the requirements of the artisanal and Small-Scale Mining sub-sector (Boddy, 2002).

Department of Minerals and Energy (DME) have sole regulatory control, which is governed by national/central policy/legislation, and regulation of the minerals sector which is highly centralized in Tanzania. The issuing of licenses and permits, monitoring, enforcement and closure are the preserve of the DME. A frequently cited reason for the failure of governments to address the issue of SSM effectively is that of lack of capacity to manage and control, and this is as true of the DME as it is of other government departments in Southern Africa.

It would make sense for local governments to be provided with the skills and resources to regulate the sector within their locality. They are familiar with the area, with the community and with events within their jurisdiction, and are in a better position to monitor and enforce regulations justly and efficiently. They would also be able to respond rapidly to SSM activities which pose a threat to the health and safety of the miners or the community. Currently, all local government can do about such circumstances is report them to the DME. Local Governments, in consultation with the DME and other role-players, should be given the authority to formulate regulations which are appropriate to SSM, flexible enough to be adapted to local conditions and which will not be perceived by small miners as threatening their livelihood opportunities.

2.1.2.2 Poverty Reduction Theory

Small-Scale Mining and artisanal mining can be an important source of employment and income for workers, families, and communities. Income generated can be substantial and critical for further economic development, giving rise to the growth of micro-enterprise activity supplying miners and their families. In some cases, artisanal mining has been well established for many decades and takes place in an orderly manner and provides reliable cash incomes. However, more often than not, small-scale mining is a "default" option chosen as a direct result of economic contraction in other sectors or geographical areas. If so, miners and their families often expose themselves to harsh working conditions for minimal income in a high-risk context, endangering their health and often the surrounding environment. The local structure of the small-scale mining activities, profiled below, determines whether poverty among miners and their families is drastic and requires outside intervention, or whether mining is an activity that makes them economically better off than other community members (D'Souza, 2002).

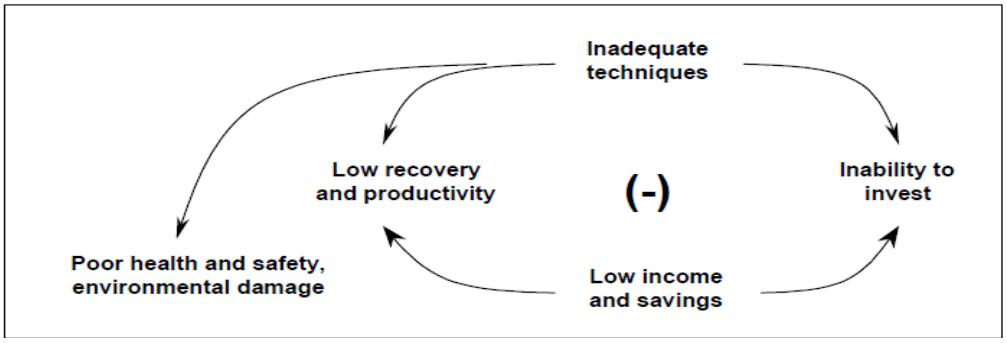
From a livelihoods perspective, ASM often provides the only means of obtaining income for many poor Africans in remote rural areas who have few employment alternatives. Nonetheless, the ASM sector has the potential to economically empower disadvantaged and vulnerable groups and contribute to national poverty eradication efforts. On a local level it can provide a means of survival and decent work for the miners and stimulate demand for locally produced goods and services and various types of infrastructure. On a national level this can translate into foreign exchange earnings and tax revenue for national governments, providing that ASM is legalized and a mutually conducive environment is created. In fact it has been estimated that gold and gemstones worth United State 1 dollar billion/year are

produced by ASM in sub-Saharan Africa, but the question to ask is that how much of this capital stays within the continent and is reinvested (D'Souza, 2002).

ASM can also be very disruptive particularly when it takes the form of a sudden rush. When large numbers of new people arrive, they can come into conflict with local residents. This sometimes provokes violence and introduces new social and health problems. But other problems can arise when local people are attracted by these ASM opportunities that cause them to leave their farms. When the rush is over and mining activities have subsided, local people may conclude that have seen few lasting benefits. Most of the profits will have disappeared while the social and environmental damage persists (D'Souza, 2002).

The fundamental problem is that both the ASM sector and governments are caught in negative circles of cause and effect. A poverty trap (Figure2) results from a denial of choices and opportunities whilst living in a marginal and vulnerable environment

Figure 2: Negative circles affecting Artisanal and Small-Scale Mining communities



Source: D'Souza, 2002

Types of Artisanal and Small-Scale mining

(i) Permanent artisanal and small-scale mining

Many small-scale miners are involved in the activity year round for most of their productive careers. Sometimes they will spend all of their lives working in the same region; other times, they will move to other areas as new opportunities arise at times giving the appearance of gold rush miners. While it is difficult to categorize these miners, they often have substantially higher incomes than they would in other activities. When they do, the above-subsistence funds can be used for entrepreneurial development and for the education of their children. In Indonesia, for example, artisanal and small-scale mining is very well established and mining incomes are reported to be many times higher than in the miners' previous occupations; there are even strong multiplier effects to the rest of the area. Communities interviewed during the course of a recent study affirm that the increased incomes they received as a direct and indirect result of the mining more than compensated for the problems associated with the activities (Otto et al., 2000).

(ii) Seasonal Artisanal and Small-Scale Mining

This can be a regular, often life-long source of income, performed in the context of seasonal work. Agricultural labor moves to the mining areas during the off-seasons, generally to mine relatively high value minerals, notably gold and precious stones. This practice is common in the Sahel countries in West Africa. In addition to the incomes directly generated, this type of mining may lead to significant entrepreneurial development among the miners, the traders, and the shops that supply the mining communities. By generating above-subsistence incomes, savings can be an important source of funds for developing other businesses. For example in East Kalimantan (Indonesia) with the abate of the timber boom in late 1960s, the majority

of Dayaks in the Middle Mahakam area would alternate their incomes by mining the rivers beds and turning to agriculture during the time of the rice planting season. When gold prices dropped they would work full time on agriculture, but during periods of drought or harvest failure they would once again go down to the rivers to supplement their incomes (Otto et al., 2000).

(iii) Poverty-Driven Mining

Poverty-driven mining is practiced by a largely itinerant, poorly educated populace with little other employment alternatives, typically as a consequence of recent loss of employment in other sectors or other regions, for example in South Africa, the droughts in 1973-1974 and 1984-1985 destroyed many farmers' crops and drove large numbers of the rural population in the SSM sector as a source for survival. In Bolivia, the collapse of the tin industry in the 1980s drove many workers out of the commercial industry into artisanal and small-scale tin mining. Mostly, small-scale mining's actual economic potential is lost due to: (a) the absence of a legal or fiscal framework; (b) rudimentary production and processing techniques (e.g. unprotected handling of mercury in small scale gold mining) that also cause serious health risks for miners and their families; and (c) the weak position of the typically poorly educated small-scale miner in purchase, sales and marketing, resulting in extremely low pay and income. Many of the individuals operating in this sector do so because they have no choice and miners remain trapped in a low revenue earning cycle. In this case SSM can either be the cause or the result of poverty with neither really taking precedence, since few of these miners are pursuing their activities with a long-term view, the mining methods employed often cause grievous environmental damage (Otto et al., 2000).

(iv) Gold Rush Type of Mining

Gold rush type of mining leads to an often short-term concentration of small-scale and artisanal miners, consisting of both those normally operating in the sector, and those temporarily leaving their regions and traditional occupations; such as farming and petty entrepreneurial activities. Examples include gold rushes in Brazil, Philippines and Papua New Guinea. This concentration happens when mining promises, often falsely, to be far more lucrative than anything else people are currently engaged in. As in poverty-driven mining, the lack of a long-term perspective often leads to mining methods causing serious environmental damage.

While some small-scale miners might enjoy new and significantly enhanced opportunities, their usage of natural resources and land has the potential to directly and negatively impact on the opportunities that exist, in the region, for indigenous people. Conflicts for indigenous people arise, in the context of mining, with both small-scale and large-scale mining. However, the transitory nature of many small-scale mining means that there is a tendency of "outside" ethnic groups to simply "invade" lands and water systems that traditionally belong to indigenous people right after the discovery of a mining prospect. When this occurs, serious conflicts can arise, bordering on cultural warfare. This has happened, for example, in the Amazon regions (Otto et al., 2000).

2.1.2.3 Theory of Small-Scale Mining and Sustainable Development

This is another theory of small-scale mining; there is quite some debate about the contribution of small-scale mining to sustainable development and sustainable livelihoods. For the thousands of poverty stricken and hungry people in both rural and urban areas, small-scale mining is a welcome solution to their problems. Many

people, particularly those involved in gold and semi-precious minerals like emeralds and diamonds, small-scale mining represents the “fast track process to their earthly riches”. And yet there are those who view small-scale mining with high contempt. This contempt is based on the belief that small-scale mining represents the “greatest environmental disaster-in-the making”. The question is who gets the benefits from small-scale mining and who pays the environmental costs?

From the point of view of environmental degradation, there is a need for an environmental management programme to be put in place in Tanzania because currently the minerals and mining sector operates without much regard to protection of the environment and the sustainable utilization of natural materials. There are insufficient resources targeted at both the Department of Mines and the Geological Department in the field of environmental management because government in the past did not view mining as an important sector (Hestor, 1998).

2.1.2.4 Market Failure and Environmental Theory

In economic theory, land clearance or land reclamation involves a market failure. The market does not value naturally occurring resources in the production process. Nature's "capital" is not assigned a value by the market. The externalities that lead to private individuals cutting trees and the real economic costs and benefits to the nation of doing so arise because some of the biosphere's products, especially environmental protection functions, are neither produced goods nor do they have clearly defined ownership. As a consequence, they are regarded as free goods.

Destruction of forested areas, wetlands, grasslands and bodies of water arises because of the difference between the discount rate of the individual and the society as a whole. Poor people, who are responsible for a significant share of the losses

because of their pressing current need for fuel, fodder, water and land for cultivation--assign a higher discount rate to these resources than does society as a whole (Rabin et al., 2000).

The private interests of poor people and the social interests of the broader society diverge. The interest of poor, local people in using these lands and water resources is intense, immediate and focused--food, fuel, fodder, crop land, and irrigation water. They will (often unknowingly) incur almost any social cost to permit the immediate exploitation of these environmental resources to sustain their livelihood. The interests of loggers, commercial farmers, builders and others who exploit the forests, range and grasslands and water resources are equally intense, but driven more by immediate profit considerations, not by the need to survive (Rabin et al., 2000).

2.1.2.5 Institutional Theory

Institutional theory attends to the deeper and more resilient aspects of social structure. It considers the processes by which structures, including schemas, rules, norms, and routines, become established as authoritative guidelines for social behavior. It inquires into how these elements are created, diffused, adopted, and adapted over space and time; and how they fall into decline and disuse. Although the ostensible subject is stability and order in social life, students of institutions must perforce attend not just to consensus and conformity but to conflict and change in social structures (Scott, 2004b).

The roots of institutional theory run richly through the formative years of the social sciences, enlisting and incorporating the creative insights of scholars ranging from Marx (1905) and Weber, Cooley and Mead (1914), to Veblen and Commons (1933).

Much of this work carried out at the end of the nineteenth and beginning of the twentieth century's was submerged under the onslaught of neoclassical theory in economics, behaviorism in political science, and positivism in sociology, but has experienced a remarkable renaissance in twenty first years (Scott, 2004b).

Contemporary institutional theory has captured the attention of a wide range of scholars across the social sciences and is employed to examine systems ranging from micro interpersonal interactions to macro global frameworks. Although the presence of institutional scholars in many disciplines provides important opportunities for exchange and cross-fertilization, an astonishing variety of approaches and sometime conflicting assumptions limits scholarly discourse.

Meyer (1970) suggested that much social order is a product of social norms and rules that constitute particular types of actors and specify ways in which they can take action. Such behaviors are not so much socially influenced as socially constructed (Scott, 2004b).

2.1.2.6 Contribution of Small-Scale Mining to the National Economy and Local Livelihoods

The mining sector is one of the new pacemakers for growth of the Tanzanian economy. This is evidenced by an increase in its contribution to the GDP from 0.8 percent in 1990 to 2.3 percent in 2005 (Wobst, 2003). The target is to raise the contribution of the sector to 10 percent of GDP as new investments come into full operation. However, information on the share of ASM to the mining sector GDP is lacking although it is known that legitimate ASM companies pay 3% of their revenues as royalty to the government hence contributing to the national GDP (Wobst, 2003).

Since deregulation, the scale of ASM activities and the range of minerals being mined as increased notably. Clearly small-scale mining has been part of a process of household livelihood diversification, linked to changing opportunities provided by processes of economic liberalization (Phillips et al., 2001; Kulindwa, 2003). With diminishing agricultural opportunities and increased rural poverty, coupled with the opening up of small-scale mining and mineral markets as legitimate activities, it is likely that small-scale mining will continue to be perceived as a viable and desirable economic opportunity into the future (Phillips et al., 2001; Kulindwa, 2003).

2.1.2.7 Challenges of Small-Scale Mining in Tanzania

SSM in Tanzania facing a number of challenges such as health and safety, environmental aspects which includes; land disturbances and degradation, hydrological effects and water pollution, air pollution, noise pollution, water quantity, and dust are issues that can adversely affect food security, the health and livelihood of the poor and vulnerable groups with little mobility or means of alleviating negative impacts. Such environmental damage can be caused by small-scale mining as well as by large-scale mining if no appropriate precautions are taken or deemed affordable.

- **Environmental aspects**

The environmental impact of small-scale mining can be attributed mostly to the simple technology and the lack of technical know-how of most miners. The tools and extraction methods employed by most small-scale miners are very basic. The rudimentary technology employed usually results in low rates of recovery that in turn lead to poor earnings and an inability for most miners to invest in appropriate technology. This results in a poor market, a vicious cycle which most miners find difficult to break. This mode of operation affects their ability and willingness to

invest in retorts that can process gold without releasing mercury into the environment, to fence pits and to dispose of fill and tailings appropriately. The widespread use of explosives and charcoal are also of concern (Drechsler, 2001).

- **Land disturbance and degradation**

Most of the gold mining activities are carried out through pit mining. A single licensed claim is divided into smaller blocks, each of which is allocated by the owner in small sections to pit gangs and/or their funders. Often the gangs have staked out their pit before the claim validation is received, so the claim owner is in the position of negotiating with existing groups and work in progress. During both development and mining, a substantial amount of waste is excavated and piled in the vicinity of each pit. The excavated pits and piles of waste rock left behind after mining ceases have been identified as severe, but localized, land degradation. As the pits and piles of rubble become obscured by grass, these areas become dangerous to both people and animals. The most common impact is a loss of grazing land. Some agricultural land is lost due to blanketing of the topsoil with the waste rocks. The excavated pits and piles of waste rock also lead to accelerated erosion from both wind scour and surface runoff erosion. The topography of the area seems to determine the extent of the erosion. For example, Mugusu is located on a steep hill and shows severe erosion; the flat areas of Sirori Simba show minimal erosion effects. The erosion of mine tailings has been found to lead to serious siltation problems in rivers located nearby (Tenga, 2000).

- **Hydrological effects and water pollution**

The observed effects of small-scale mining activities on surface and ground water quality is related to erosion, sedimentation, siltation, contamination from toxic elements and poor sanitation from mining camps. Tailings dumps around surface

water bodies as a result of ore washing activities and piles of waste rock in mining areas are eroded into these sources. The increased sediment loads to most nearby rivers have resulted into a change of the river courses. The tailings left behind are usually highly contaminated with toxic elements used in processing (like mercury) which are washed down into water sources especially during the rainy seasons. The other areas that are raising concern are those where sluicing and amalgamation are carried out directly on the lake shores. This is being carried out in Ikungu, Musoma, on the shores of Lake Victoria. It is common to find flocks of livestock and birds drinking next to the washing areas, and neighboring villagers catching fish within meters from the amalgamation activities. The key concern is the direct release of toxic chemicals like mercury into surface water or the water table. It accumulates and subsequently methylates to organo-mercury, then transfers into the food chain through the marine life. However, the results from a number of studies in the past indicated low contamination levels. In areas where washing is done far away from water sources, the impact on water quality is limited, especially during the dry season. During the dry season the volume of water used is small, and very little finds its way back to the water sources. Elevated concentrations of heavy metals in surface waters have been found in the Lake Victoria area by different studies, e.g., Ikingura et al, 1996. Underground water contamination can be linked to leakages of contaminated water from the processing areas to aquifers in the area (African Mining Bulletin, 1997).

- **Air pollution**

The impact of small-scale mining on air quality comes from the emissions of dust, hydrocarbons and vapors. In almost all mining areas, dust is emitted into both surface and underground air. Underground drilling, ore loading, surface crushing and

grinding, are all dry processes generating a lot of dust. Grinding mills are normally located in open air or in some kind of a grinding house (usually a shed). Grinding houses/areas are generally dusty, as the locally fabricated mills do little to suppress dust. Where manual crushing and grinding is practiced, direct inhalation of dust by the operators can be observed. Long exposure to any irrespirable dust is very dangerous to one's health. The exposure to silica dust can cause a serious lung disease, silicosis. In confined spaces like underground workings and grinding houses, this is a problem The release of hydrocarbons into the air can be associated to those areas that have introduced mechanical equipment 1ike compressors, diesel generators and engines, drive mechanisms for the locally produced grinding mills (for example, engines of buses, lories and tractors). The number of these units is still small, and the environmental impact limited (Drechsler, 2001).

- **Noise pollution**

The use of explosives in most mining areas is a major contributor to noise and vibrations. In some areas with a large number of pits, blasting is not coordinated such that blasts can be heard one after the other. This is the cause of many mining injuries and deaths among miners. It disturbs those living around mining areas, and sometimes damages to buildings and neighboring excavations. Government regulations require explosives to be handled only by trained and licensed experts, but the regulations are not enforced (Hollaway 1994).

- **Other impacts**

Other possible impacts resulting from small-scale mining are those affecting the biological environment. As the number of miner’s increases at a particular site, the demand for wood to construct shelters, support the pits and provide energy for cooking increases tremendously. Consequently, the pressure on the surrounding

forestry resources increases tremendously. However, observations from areas like Mugusu where mining is carried out within a National Forestry Reserve shows that miners can observe the laws as the forest there can be found to be almost intact. In general, the use of timber for mine support is normally negligible compared to those used in shelter construction and cooking. People clearing for agricultural activities clear large areas, whereas mining areas do not involve clear-cutting (Tenga, 2000).

- **Health and safety aspects**

The poor technology used in extraction and recovery of minerals, the inability to invest in safe working equipment and tools, the lack of technical know-how and the poor sanitary conditions in the mining camps, are some of the factors that threaten the miners' health and safety. Some studies have observed that the rate of mining accidents in the pits is low compared to the health hazards and illnesses occurring in the settlements, (Mutagwaba et al., 1997). Lack of adequate sanitation facilities, use of the same source of water for household use and for mineral processing, and conduct of crushing, grinding and amalgamation operations within living quarters, are some of the visible health hazards.

Once pits are abandoned, they are usually left open. This is a hazard to wandering people and animals, particularly when they are obscured by tall grass. It also allows water to accumulate, providing a breeding ground for mosquitoes. Malaria is a very common disease within the mining areas (Robins, 2005).

Accidents in most working areas can be attributed to poor technology and lack of technical know-how. Lack of adequate scaffolding leads to accidents from collapsing walls and tunnels such collapses are a cause of accidents even in large mines. Stabilizing the pit walls and shafts requires engineering knowledge and the willingness and ability to take adequate measures. Poor ventilation in deep

underground pits leads to accidents due to lack of adequate air circulation. Poor circulation of fresh air leads to depletion of oxygen and the build-up of other toxic gases. Suffocation from the accumulation of toxic gases like carbon monoxide, hydrogen sulphide, sulphur dioxides and others, are common incidents. In areas where drilling is carried out using drilling equipment such as jackhammers, there are rarely any measures to suppress the dust. In correct usage, drilling equipment for underground work is provided with a special connection for water that is used to suppress dust and for cooling (Robins, 2005).

Most miners use machines designed for surface work underground, where ventilation is limited and thus are exposed to large amounts of dust. Exposure to dust in small-scale workings can also be observed on the surface during crushing and grinding operations. Women, who carry out manual grinding and those reprocessing tailings, are usually exposed to large amounts of dust. The dangers from dust exposure are made worse by the fact that miners usually lack protective gear, in this case, dust masks (Robins, 2005).

- **Soil and Water Damage**

Although underground mining generally has less dramatic environmental impacts than other forms of small-scale mining, it carries the potential for a collapse of the underground shaft. In addition, the movement of large amounts of waste rock and vegetation can lead to the same pollution problems as an industrial mine, such as acid mine drainage which is discussed further in this section. Most small-scale mining operations increase sedimentation in rivers, especially through the use of hydraulic pumps and suction dredges. By blasting hillsides with water under high pressure, hydraulic pumps leave scars on the landscape, which may take years to develop even the lightest covering of vegetation. According to a study published by

the local electric company in Bolivar state, EDELCA, in 1991, small-scale mining using both suction dredges and hydraulic pumps increased the sediment load in the Caroni River ten times over what could be considered normal. Deforestation, contributing to erosion and loss of fauna, is also associated with small-scale mining. The same EDELCA study found that small-scale mining had eliminated over 60 percent of the vegetation in an 8,000 square kilometer area, most of which had been forested (Smith and Mudder, 1993).

Since most small-scale miners do not preserve the topsoil removed before excavation begins, this topsoil is often washed away into surface water, carrying with it ecologically valuable seed banks that are necessary for the regeneration of vegetation. In addition, few small-scale miners engage in reclamation or post-mining recovery practices (Smith and Mudder, 1993).

2.1.3 Conceptual Framework

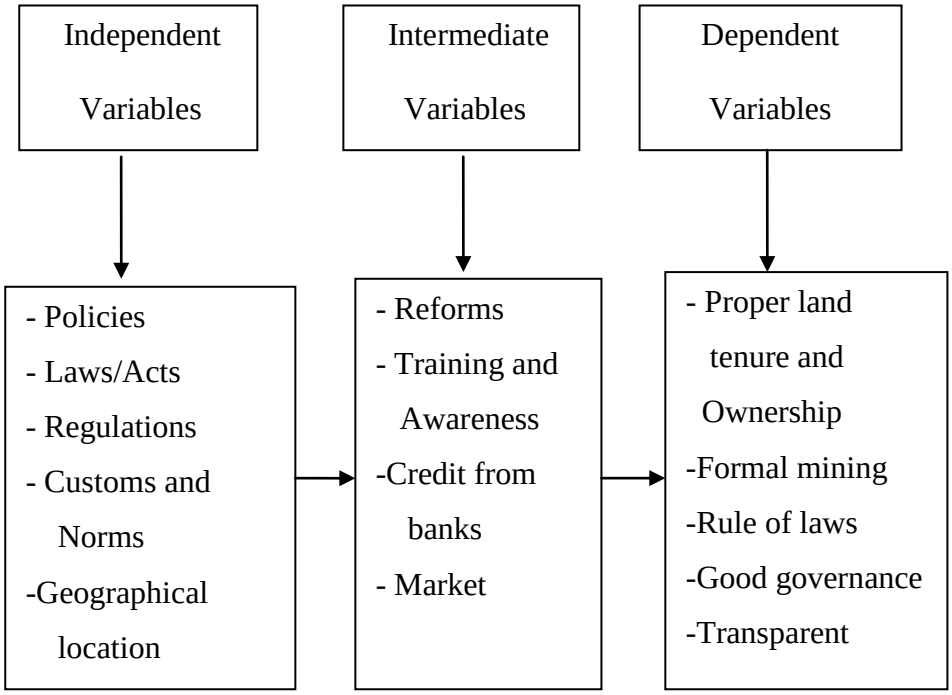
The most important thing to understand about conceptual framework is that it is primarily a conception or model of what is out there that constitutes to plan of the study, and of what is going on with these things and why a tentative theory of the phenomena that a researcher is investigating (Miles & Huberman, 1994; Robson, 2002).

Perception is a concept in behavioral sciences, it is defined as the process by which individual organize and interpret their sensory impressions, in order to give a meaning to their environment. Therefore, different individuals may look at the same thing yet assign different meanings (Robins, 2005).

Conceptual Framework involves the interactions between Independent Variables, Intermediate Variables and Dependent Variables as shown in figure 3.

Acquisition of mining licenses, registration, environmental protection and sustainability of small- scale mining requires well strengthened and enforcement of institutional dimensions as an independent variable in the management of small scale mining in Winza ruby mining at Mpwapwa district. The concept of institutional dimensions in the management of small scale-mining is indicated in figure 3.

Figure 3: Conceptual Framework



Source: Documentary Review, 2012

2.1.4 Knowledge Gap

Various studies have been done on small-scale mining such as increasing the contribution of artisanal and small-scale mining to poverty reduction in Tanzania based on an analysis of mining livelihoods in Misungwi and Geita districts, Mwanza region. This study is newly done in Tanzania. It examines the institutional dimensions in management of small-scale mining in Tanzania with the case of Winza Ruby Mining. The institutional dimensions in management of small-scale mining has a consequences remained relatively unexplored until today.

2.2 Empirical Literature Review

2.2.1 Small-Scale Mining Activities Worldwide

Worldwide small-scale mining activities plays a great role for the establishment of great large small-scale mining companies, furthermore it has provided with the people a means for earnings a leaving most especially the rural residents.

2.2.1.1 Small-Scale Mining in Peru

Artisanal mining in Peru takes place all over the country, producing a great variety of minerals and construction materials. Most significant, nevertheless, is artisanal gold mining, which started to flourish in the early 1980s, pushed by the rising gold price, economic recession and political violence, as a self-employment opportunity and survival strategy of the poor (Consorcio, 1999).

In many communities, artisanal miners had not developed organizational forms superior to the small groups of 4 to 10 individuals, sharing mine workings. In some communities, and mostly with help of NGOs, rudimentary local organizations ("Associations") existed. These had predominantly self-defense character, which means, that they were mostly founded in a certain moment to achieve a specific goal, but lacked institutional maintenance. Therefore, most of the few existing organizations were as informal as their members, lacking public registration of their statutes, suffering overdue committee elections. Consequently, their representatively was considered weak, not only from the point of view of other stakeholders but also in the eyes of their own members (Consorcio, 1999).

Another important element for the failure of many associations was an existing misconception of their possible role. Many associations were intended as productive associations, while the Peruvian legislation defines associations clearly as non-profit

organizations, in-line with foundations or other forms of NGOs. Thus, as mining is definitely not a non-profit operation, not even at artisanal level, associations is excluded from access to mining rights or from contracting or being contracted in the terms defined by the mining law. In the Sur-Medio region, the first successful community of artisanal miners who realized that the only viable way to access mining rights consisted in the creation of a regular mining company was Sta. Filomena. In 1992, they founded SOTRAMI S.A. with about 250 artisanal miners being shareholders7. A couple of attempts, made by other groups of artisanal miners, to replicate this experience, failed either due to internal problems or due to overwhelming external pressure (Kuramoto, 2001).

The Legislative Decrees 107 (1981) and 708 (1991) constitute the key elements of the Peruvian mining legislation. In 1992 the Ministry of Energy and Mines compiled both Decrees into a "Texto Unico Ordenado" (TUO), which is actually referred to as the Mining Law. Modifications, like the Legislative Decree 868 (1996) and some other minor changes are continuously included in the TUO, maintaining the characteristics of a "Unique Text" (Kuramoto, 2001).

Public policy in mining has always rotated around the formal sector and with a basic preference towards providing incentives to encourage investment for large mining projects. The Mining Codes of 1950 and 1992 are explicit on this point. The reason is that mining has been looked upon as an activity to generate foreign currency, the larger the operation, the more it will contribute in this respect. Other considerations such as, the creation of jobs and the generation of technological education, have been absent from the legal framework. In this regard, it is understandable that void are to be found in mining legislation with respect to activities with a relatively small impact

on production and consequently mine exports. Consequently no distinction was made between conventional (industrial) and artisanal small-scale mining (Kuramoto, 2001).

2.2.1.2 Small-Scale Mining in United Kingdom

London, UK - The International Council on Mining & Metals (ICMM) has published a new document, called "Working Together", for companies engaging with the artisanal and small-scale mining (ASM) sector. The interaction between large-scale mining companies and ASM operations has not always been positive, and encounters between the two sectors are increasing. There are a number of ASM sustainable development challenges - including security, human rights and relocation programs - that require specific consideration.

For the first time, "Working together" brings together a number of approaches and tools for engaging with ASM operators. It includes the business case for engagement with ASMs, guiding principles, conventions and codes. Of particular interest is the section on baseline surveys, approaches and tools.

2.2.1.3 Small-Scale Mining in Brazil

Suriname is situated north of Brazil, between Guyana and the French Department of La Guyane, or French Guiana. Suriname's small population of less than half a million people (ABS, 2006) has settled almost entirely in and around the capital city of Paramaribo. The country's vast interior is home to indigenous peoples and Maroons, who are the descendents of runaway African slaves that established independent communities in the rainforest.3 Suriname is rich in natural resources. Relatively intact tropical rainforest covers 80 per cent of the country. Exports of minerals such

as bauxite, oil, and gold exceed 50 per cent of GDP (IMF 2007). Gold mining has historically been part of the Suriname economy, but today the number of people involved, the amount of gold extracted, and its social and ecological impacts are unprecedented. Most gold is extracted by often informal and semi-legal miners from Brazil, where small-scale garimpos, or small-scale gold mining sites, have been an important sector since the 1970s (Bilby, 1990).

Today approximately twenty thousand Brazilians (although the exact number is unverifiable) are working almost exclusively in Suriname in the small-scale gold mining industry and accompanying service economy (ABS 2006, de Theije 2007a). The term garimpeiros is used to distinguish Brazilian migrant miners from local gold miners, called gowtuman or porknockers. Their activity is called garimpagem, and small-scale gold mining sites are called garimpos. The Suriname government has failed to control the small-scale mining sector, and much of Suriname society sees small-scale miners as a problem, a barrier to large-scale mine development, and the culprits of the country's environmental problems. Nevertheless, the production of gold in small-scale mining is still increasing, and the Central Bank of Suriname's purchases from garimpeiros and porknockers almost doubled between 2000 and 2006. Gold produced by small-scale gold mining constituted 17 per cent of the national export in the recent years (IMF 2007, 2008).

2.2.2 Status of Small-Scale Mining in Africa

Small-scale mining is an activity that is increasingly gaining momentum in Africa. It is largely practiced in rural areas by artisans who lack the requisite education, training, management skills and essential equipment. Small-scale miners also lack financial resources with no access to bank loans. Very often, the mining operations

are done haphazardly with severe consequences to the environment, the surrounding, and even distant, communities and to the miners themselves. Other constraints include lack of technical-economic information for long-term planning (Taupitz et al., 1993).

Although SSM in Africa is still far from achieving its full potential, there are indications of positive efforts by individual countries to promote the sector. The practices documented herein represent some of the examples, selected through literature review and consultations, of how the sector can be promoted to ensure its positive contribution to the establishment of sustainable community life and rural economic development (Taupitz et al., 1993).

Most initiatives have been isolated practices that do not reverse the poverty cycle that limits development of the SSM sector in Africa. There is limited evidence of participatory integrated approaches that aim to promote and develop the sector through putting clear policies, strategies and implementation plans in place. Most approaches have been developed to respond to a certain crisis, such as dealing with mining rush gangs.

Promotion of the sector should be done in an integrated manner in order to ensure that: Legal, organizational, technical, management, environmental and socioeconomic issues are accorded the same importance; Programs for promotion of the sector take into consideration the need to integrate mining activities within much wider rural development programs as the “mining-alone” program approach, usually dealing with isolated issues, has very little overall impact; Poverty reduction strategies are mainstreamed in the mining policies of member States and where relevant SSM is integrated in their Poverty Reduction Strategy Papers (PRSPs); and

Provisions and incentives exist to encourage informal and illegal SSM activities to evolve into legal, licensed small businesses (World Bank, 1995).

Putting an efficient legal framework in place without enhancing the financial capacity of miners or raising their awareness of their legal obligations does not help to eradicate informal and illegal SSM mining activities. Similarly, enacting regulations for improving health and safety standards or environmental management without improving access to technology, finance, information and support services might have little long-lasting impact. Even, where all these have been put in place, other factors have to be considered, such as ensuring that at government level there is adequate human and technical capacity to support the sector and enforce laws and regulations in a sustainable manner (ILO, 1999).

2.2.3 Status of Small-Scale Mining in Tanzania

Tanzania has great potential and variation of mineral resources, which include gold, base metals, industrial and construction minerals as well as a wide variety of gemstones, some of which are unique (for example, Tanzanite). Small-scale miners have worked most of these minerals since the independence of the country in 1961 (Massawe, 2003).

Statistical data indicate that, prior to independence mining activities contributed about 10 per cent to the country's Gross Domestic Product (GDP). This amount was produced solely by large-scale gold and diamond mines. The post-independence political structure emphasized state-owned production, including in the mining sector. However, the state 64 *Small-scale Mining and Sustainable Development within the SADC Region* enterprises, which were entrusted to develop the mineral

sector, had inadequate technological, human and capital resources. Meanwhile, individuals resorted to informal artisanal mining activities of easily marketable items such as gold and gemstones. These informal mining activities were not officially recognized and mineral commodities were informal and illegally marketed or smuggled out of the country (Phillips et al., 2001).

The government passed the National Investment Act of 1990 with the objective of attracting investors. Concerted actions have been taken aimed at creating an attractive investment environment including replacement of old National Investment Act by the Tanzania Investment Act 1997. The new act created the Tanzania Investment Centre, (TIC) a one-stop shop that promotes, coordinates and facilitates investment. Government changes have attracted several small- medium- and large-scale private mining investors to Tanzania. This has resulted in the growth of the mineral sector and a greater contribution to the national economy. The sector recorded the highest growth rate of 24 per cent in 1992 and mineral exports rose from United State 15.8 dollar million in 1989, to 53.2 dollar million in 1992, to 184 dollar million in 2000. The number of mineral dealers' licenses has increased from 17 in 1989, to 180 in 1995 to 2,000 in 1997. The number of registered claims has increased from 1,998 in 1990 to 4,123 in 1995 (Tesha et al., 2000).

2.2.3.1 Conflicts related to Small-Scale Mining in Tanzania

In the book *mining for sustainable development in Tanzania*, Kulindwa et al., (2003) identify two main causes of land conflicts related to mining. First, there is lack of planning and co-ordination at the national level. Potential investors are given maps that have not been updated for years. Other claim holdings, and even villages, schools or health facilities may lie within the prospecting area without being marked in the map. The mining companies do not feel that they are obliged to compensate

such land users as long as they have not been informed about them (Kulindwa et al., 2003).

In their view, they will all be informal and illegal occupiers upon their property. In Geita, there have been cases where investors have been allocated licenses within reserved forests. Kulindwa refers to four villages that had been established in Geita and Mkombazi Forest reserves. The villages had applied for government registration around 1989, but more than ten years later, in 2002, their registration had not yet been completed. The villages are therefore nonexistent in national records, something which further complicates the issue of compensation. Second, there is often a misconception among local people with regard to both land ownership and legal rights over mining (Kulindwa et al., 2003).

The great majority of conflicts between mining companies and local people in Tanzania are related to informal small-scale miners' informal mining on mining companies' concessions. These conflicts cases are shown below:

2.2.3.2 Mahenge: Tom Mines vs. small-scale miners

One of the earliest reported cases of violent confrontations between foreign investors and local, small scale miners after the liberalization of the economy took place in Mahenge in 1993. Two small-scale miners who were accused of informal and illegal mining in an area licensed to a Thai owned company were shot dead by two Thais (URT, 2001:26). A year before, in October 1992, Honorable Augustine Mrema, then Minister for Home Affairs, had visited the area. Miners told him that it was hard for Tanzanians to mine since the areas had been given to Thais. Allegedly, the Minister had told the miners to get a claim for a certain area as soon as possible. The miners started mining, found the area to be resourceful, and then went to peg a claim with the Zonal Mining Officer. The officer told them that the area already belonged to the

Thais. The miners continued mining, even after the District Commissioner warned them that they would have to face the consequences, and that all miners without licenses would have to leave the area. The 1993 shooting led to a demonstration by around 4000 people from the mining communities. The paramilitary Field Force Unit (FFU) was used to enforce a curfew. According to Chachage, (1995:37-38) no further action was taken by the authorities against the Thais. In this case, a high-ranking politician is said to have made a somewhat 'populist' promise without consulting the mining authorities. The same thing is said to have happened in Bulyanhulu.

2.2.3.3 Bulyanhulu, Kahama: Barrick vs. small-scale miners

The conflict at Bulyanhulu is the most well known and controversial mining conflict in Tanzania. Allegedly, more than 50 small-scale miners were buried alive when the pits were filled. The conflict also concerns relocations. Small-scale miners claim that the process when Sutton Resources got the concession for the 52 sq kilometer mine was irregular, and that the mine legally belonged to SSM, since they had been promised the mining site by a number of politicians over the years, including former President Ali Hassan Mwinyi (in power from 1986 to 1995). The Kahama mine initiated a case to evict the artisanal miners in 1995, and the High Court ruled in favor of the small-scale miners on 29 September 1995 (Bradburn, 2003). The mining company appealed, but withdrew the appeal seven months later. On July 30 1996, the then Minister of Minerals, Dr. Shija, decreed that the small-scale miners would have to vacate within a month (Bradburn, 2003). According to the Ministry, artisanal miners who had invaded the license area in the exploration stage of the property refused to move, and this "forced the Government with financial assistance from the owning company, to take steps to remove them by force, fill their mining pits, fence

the area and provide security up to when the company started to build the mine" (Tesha, 2000). It is during the filling in of the pits that around 50 miners – who had not followed the vacation order - allegedly were buried alive. In 2002, the Tanzanian NGO Lawyers' Environmental Action Team (LEAT) sent a complaint to the Compliance Advisor Ombudsman (CAO) of IFC on behalf of small scale miners. The complaint regards the process around the concession, and the alleged burials. LEAT claims that the shafts were filled the morning after the decree, the CAO's review says that it happened some days later. Neither the SSMC nor LEAT have been able to provide the CAO with a list of names of those who allegedly were trapped. According to the CAO report, neighbors of people who claim to have lost relatives when the shafts were filled in, say that these people are either alive or died before August 1996 (Bagachawa and Naho, 1994).

In the same year as the CAO visited the mine, LEAT invited a team of international observers to investigate the allegations. The team was ordered to leave after three days by the minister of Home Affairs who claimed that they could not conduct investigations since they had entered the country on tourist visas. Amnesty International has expressed interest to visit Bulyanhulu but have been denied access by Tanzanian authorities (Simbeye, 2002).

2.2.3.4 Geita: Geita Gold Mine and re-locations

With the re-opening of Geita Gold Mine in 1999, a village called Mtakuja had to be relocated. The company paid United State 5.06 dollar million into a government-controlled bank account, and left it to the government and District Council to deal with the practicalities. According to several sources, at least 857 people who were entitled for compensation never received their money (AllAfrica.com, 2001; Knight, 2001). Apparently, the lists contained fake names, while people who were living in

the village were never registered. It is also said that “most people compensated received less money than is shown in the government records” (AllAfrica.com, 2001). The CEO of the company informed the press that according to the law, compensation for crops and structures is the responsibility of the government, and that ten government officials from local authorities had been present during the exercise. “It is our understanding” he said, “that fictions names have been added to the claims and that some committee members were sharing Tanzanian shillings 100,000 (United State 120 dollar) to prepare bogus claims” (AllAfrica.com, 2001).

The government’s Prevention of Corruption Bureau investigated the case in 2002. Two GGM employees and a number of lower level civil servants were found guilty. In February 2004 it was decided that the government should offer Tanzanian shillings 600 million (United State 550,458 dollar) to those who had not been properly compensated. People in Geita still have the feeling that the “big fish” got away with their crime, and there are all kinds of speculations as to what levels of government were involved and who benefited from the compensation money. In a report, Geita Gold Mine states that “progress feedback from the Government is still awaited” (Geita Gold Mine, 2004).

2.2.3.5 Tarime: North Mara Gold Mine and officials vs. Nyangoto villagers

The North Mara Gold Mine was officially opened by former President Mkapa in September 2002. At his opening speech, the president said that the arrangement between the former claim owners at Nyabirama and Afrika Mashariki Gold Mines (AMGM) was “a step in the right direction” since small scale miners had capital and technological limitations, and that he encouraged it (Tanzania Chamber of Mines, 2002:4). In 2003, a group of villagers gave the Commission for Human Rights and Good Governance in Dar es Salaam a 40 page long complaint drafted by Lawyers’

Environmental Action Team (LEAT), and asked to have their case registered (LEAT, 2003a:9). According to the document, mining had taken place informally in the area since 1987, but only in 1991 had the five villages been granted claims titles. The villages had then sub-granted mining rights to local individuals. In August 1993, a locally registered company (Winani Mining) that held claims in the same area sold their rights to EAGM/Afrika Mashariki. In October 1994, this company started extensive drilling, including in the claims that belonged to the five villages. In August 1996, the Minister of minerals, Shija, granted EAGM/Afrika Mashariki new mining licenses in Nyabirama, excluding the claims already granted to the villages. The complaint, directed against government officials and the mine management, 5 holds that that two government officials in Tarime District – the District Commissioner and the District Land Valuation Officer - had put undue pressure on 60 villagers to make them accept compensations that were too low, and that they had threatened them with arrests if they didn't comply. According to LEAT, both the mining company and government officials "exerted undue influence upon the leadership of the villages to force them to informal and illegally and irregularly sell the claim areas legally granted and held by the said five villages" (LEAT, 2003a:9). The AMGM Company was accused of causing damage to houses and threatening villagers' health by blasting and dumping waste rock close to homesteads (LEAT, 2003b).

The Commission for Human Rights and Good Governance in Tanzania decided to make an interim order where the director of the mine, the director of Placer Dome, the Public Relation Officer of the company, the District Commissioner, and the District Land Valuation Officer, were to "refrain from doing any act on the said disputed area until the final determination of the complaint" (Commission, 2003). In

February 2007, the case was finally settled. The company agreed to pay the formal small-scale miners one per cent of the proceeds from the gold mined in plots that "originally belonged to them" (Daily News, 2007b). The deputy Minister of Energy and Minerals, Mr. William Ngeleja, was reported to say that "the government cannot give back the plots to the artisans because they had entered into agreement with AMGM at their own volition" (Daily News, 2007b).

2.2.3.6 Mererani: AFGEM/Tanzanite One vs. Small-Scale Miners

In Mererani, the only site for Tanzanite mining in the world, a serious conflict has developed between the large scale mining company AFGEM, and small scale miners whose mines are adjacent to AFGEM.8 AFGEM received its license in 1999 and officially started mining in 2001. In May 2004, AFGEM sold the mine to a group called Tanzanite One Group, a subsidiary of JABE; a British/Australian company specialized in mining.

The AFGEM/Tanzanite One mine is situated in Block C, between Blocks B and D, which are both under small scale miners. According to a map made by AFGEM, old and new shafts enter far into AFGEMS property (Lange, 2006:32). In order to stop small scale miners, AFGEM has constructed a 400 meter long tunnel cutting across the reefs. In 2002, there was a violent confrontation between artisanal miners and AFGEM employees in one of the shafts. According to the AFGEM management, the small scale miners threatened the AFGEM workers with knives, and the AFGEM security guards shot back and wounded eleven miners.

People in Mererani claim that name given high ranking people in the Ministry of Minerals own shares in Tanzanite One through relatives, and they suspected that this was the reason why the company's security guards had not been prosecuted after

killing the miners (Lange, 2006). In contrast to the 1979 Mining Act, which "expressly prohibited Ministry of Mines officials from holding shares in mining companies or mining licenses" this prohibition was dropped from the 1998 Act (Butler, 2004:75). Small-scale miners claim that between themselves, demarcations between licensed areas are only relevant at the surface, where the pit starts, while "there is no demarcation down the pits" and that anyone is free to follow a reef that starts within their mine. A study by Kulindwa et al. show that also between small scale miners, "quarrels over veins inside the mining pits can sometimes be very serious to the extent of causing injuries and even loss of life" (Kulindwa et al., 2003). Of disputes recorded by village leaders in Mererani, around 75% are related to land and mining rights. In addition to the conflict between small-scale miners and Tanzanite One regarding whether borders are relevant at the surface only, there is a conflict regarding the boundary separating Block C from block B. A commission of inquiry called General Mboma Probe Commission has been formed, but has not reached a conclusion. In June 2007, the conflict was discussed in Parliament, after having been raised by the MP from Simanjiro, Christopher Ole Sendeka, a Maasai by origin. The MP was very skeptical against the process: "It is surprising to learn that the original file with all the necessary documents detailing the limits of the block at the center of the controversy went missing at the Ministry of Energy and Mineral together with 110 other files" (Shayo, 2007). In June 2007, an inspector from the Ministry came to physically check 40 mines in Mererani to determine whether small scale miners (block A, B and D) mine in block C (Tanzanite One), and/or in each other's concessions (Radio One, 2007). The conflict in Mererani has symbolic value to many Tanzanians, since Tanzania is the only country in the world where Tanzanite is mined.

2.2.4 Small-Scale Mining in Dodoma Region

Dodoma region have various mining activities such as gypsum, the deposit is situated at Msagali in the Mpwapwa District, Dodoma Region in Central Tanzania. The gypsum is soft and porous (gypsite) and occurs in beds near the surface with a purity of up to 75%. The deposit is mined and used in the cement industry. Mpwapwa town has been rapidly developed and reconstructed after the new discovery of Winza ruby deposit since April 2007. That is quite different from previous just a few months before ruby rush in Winza. Thai dealers started to stay and buy ruby and sapphire; subsequently, Sri Lankan dealers followed into the area. This led to many gem dealers in this town up to 50 shops during the peak time in December 2007-June 2008 ruby mining in Winza. There is inadequate management aspect in Winza ruby mining due to disorganized mining activities resulting to health and safety hazards, and environmental damages (Gem, 2008).

2.3 Policy Aspects in Tanzania

With the current reforms, the role of the Government in the mineral sector has been narrowed down to providing clear policy guidelines, stimulating and promoting investment activities at all levels, and regulating activities in the sector. Objective of the policy is to support and development of SSM so as to increase its contribution to the economy.

2.3.1 Effective Development of Small-Scale Mining

Since 1997, the Government has taken efforts to formalize artisanal miners into small-scale miners and provide extension services. In spite of these efforts, the contribution of SSM to the economy is insignificant. This is due to the use of inappropriate technology and lack of capital. The Government is still committed to

support SSM through provision of supportive extension services and establishment of mechanisms for accessing capital. The policy states that;

(i) The Government will empower its institutions to participate strategically as a developer or jointly with private sector in mining projects;

(ii) The Government will take necessary measures to allow Tanzanians to participate in medium and large scale mining;

(iii) The Government will collaborate with stakeholders to eliminate obstacles hindering mining companies from registering in the Dar es Salaam Stock Exchange; and Tanzanians from buying shares in mining companies registered abroad; and

(iv) The Government will take steps to allow Tanzanians to enlist their mineral rights in foreign stock exchange markets to access capital (The Mineral Policy of Tanzania, 2009).

2.3.2 Strengthening Management of Safety, Occupational, Health and Environment in Mining activities

Mining activities cause's adverse effects to safety and occupational health of mineworkers as well as environmental land degradation, pollution, and social disruption to local communities around mine sites, However, improved management systems for health, safety and environment have dramatically increased safety and environmental performance in mining operations over the last decade.

To ensure sustainable mining activities, there is need for the Government to strengthen monitoring and regulation of the mining industry to reduce or eliminate the adverse effects on health and safety, environment and social issues. It is also important for the Government to make efforts to increase environmental awareness

and promote environmentally-friendly practices in the mining industry, particularly among small-scale miners.

Objective of the policy is to promote best practices for health, safety, and environmental management in mining areas. The policy sates as follows:

(i) The Government will strengthen the institutional capacity in monitoring and enforcement of laws and regulations on safety and occupational health, environmental protection and management in mining areas.

(ii) The Government will require mining companies to set aside funds for environmental rehabilitation and mine closure obligations;

(iii) The Government will continue to harmonize laws and regulations governing safety, occupational health and environmental issues in the mineral sector;

(iv) The Government will continue to collaborate with stakeholders to ensure that small scale, medium and large scale miners preserve the environment;

(v) The Government will continue to provide education on health and safety; HIV/AIDS and environmental management to small, medium and large scale miners and their surrounding communities; and

(vi) The Government will administer and monitor exploration, mining, handling, transportation, storage, usage and export of radioactive minerals, explosives and toxic materials (The Mineral Policy of Tanzania, 2009).

2.4 Institutional relationships

2.4.1 Administrative structures

The country has put in place a number of business and institutional organizations to support and administer the mining sector in various ways. These include the Ministry

of Energy and Minerals (MEM), Chamber of Mines, TAMIDA, FEMATA, REMAS, NGO research institutions and others. Each of these institutions has definite visions and missions and their functions are closely related to the national long-term objectives of the mining sector. The development of the mining sector requires commitment and cooperation among the key stakeholders, to address without delay the sector's development challenges (Haule, 1996).

2.4.2 MEM faces classical underdevelopment constraints

Since the reforms in the mid-1980s the development of the mineral activities has been influenced by institutional reforms within the government departments (MEM and local government reforms) and the increasing facilitation support given to the mining sector. It is taking time for the organizations to perform new functions effectively. Meanwhile mine operators are without efficient procedures for claim allocation and rarely receive training, guidance on equipment and mining techniques, or on-site mine inspections. There are several reported cases in the Lake Victoria gold fields where exploration programs of mining companies have been interrupted by informal and illegal mining activities of small scale miners in mineral properties. Most of the minerals are still sold to unlicensed small brokers near informal primary markets. There are many areas given to mining companies or individual owners who have failed to operate them. Regular mine inspections could have addressed these problems, as inactive mines revert to the state. Frequent inspections also might have mitigated the collapse of the gemstone markets, which resulted from the allocation of hundreds of tiny plots and a scramble to produce. At present there is dangerous underground mining where several pits cross each other in underground tunnels (for example, Merelani and Ruangwa). Pit owners normally do not go under the pits for safety reasons, which has resulted in the poor custody of recovered gemstone that are

stolen by workers and end up in brokers' hands. If minimal safety standards were observed and the claim owners enforced operations supervisions, mineral products could be sustained for a long period and smuggling practices would diminish (Ikingura et al., 1996).

2.4.3 Increased facilitation of mining investment opportunities

The Mineral Resources Department (MRD) is responsible for broad policy direction, coordination with other stakeholders, organizing and leading negotiations of mining agreements and monitoring development of the mining sector. The department has facilitated channeling of investments into the mining sector. Both Tanzania Revenue Authority (TRA) and Tanzania Investment Promotion Centre (TIC) have been strong partners in carrying this responsibility. However, it is important to note that complicated processes and involvement of many interested institutions may create uncertainty and provide room for corruption. This may in turn lead to inefficient investment decisions and / or loss of government revenue. In order to enhance mineral development from the early stages of exploration through mining and processing to marketing, the MEM recognizes that the private sector's investment in the mineral sector is of paramount importance.

Hence the Government is determined to attract private investments in the mineral sector by creating an enabling environment for private sector development in the sector. Serious investors look to conduct business with government in an orderly and punctual manner. The mining sector is now very open and improved policy environment has facilitated increased investment opportunities and interests from many major mining companies. Stability of the fiscal regime is very essential to maintain investors, sentiment to operate in Tanzania (BOT, 1996).

2.4.4 Data and information on mining activities is still very weak

The collection, storage, analysis and dissemination of data and information on mining activities have not improved despite the ongoing institutional reforms and widespread development of information technology in Tanzania. The present recording system of mineral purchases and exports does not allow easy data processing to monitor the export trends of minerals. This information would enable the Mineral Resources Department (MRD) staff to advice dealers and miners. No serious data and information collection is done at the mining level. No one has exact data and information about the performance of the mining sector. The little that is done is mostly guessed estimates based on case studies or*1*and estimated figures to satisfy administrative procedures and donors. A few foreign buyers visiting the Ministry of Energy and Minerals are usually directed to dealers. In the early mine rush years no foreign market information, service or any training in gemology has been conducted or organized by the MRD. The country lacks specialized institutions to offer professional services on how to start value-added activities or the choice of appropriate lapidary and jewellery equipments. Very few on the MRD staff have gemological knowledge, which limits the ability of the field staff to advise mineral operators. It was noted during the survey that MRD has initiated specific projects to address some of the above issues. More than 10 field technicians were sent to Germany, the UK, and Thailand to study gemology. The first basic gemological training of small-scale miners was offered in Arusha in December 1999 (Kilonzo, 1996).

2.5 Lessons Learned from Empirical Literature Review

The study shows that there are efforts played by many countries to promote the sector, although SSM in Africa is still far from achieving its full potential. Mostly

SSM is practiced by the rural residents who lack technical knowhow, fiscal support and operates informal and illegally. In Tanzania SSM has been done since its independence in 1961 whereby many policies and Acts have been passed so as to monitor its operations. However the situation has not improved due to low capacity of the Government to administer the sector, limited private stakeholders engaged in the sector, worldwide SSM has played a great role for rural economies, for the case of Tanzania SSM activities has increased but not developed whereby the miners has continued to use manual tools.

2.6 Conclusion

This chapter presented literature review, theoretical framework, empirical literature review on the nature and causes of informal small-scale mining and conceptual framework. It further provides detailed review of policy, laws, conflicts and challenges related to small-scale mining activities in Tanzania, institutional relationship, contribution of SSM to national economy and livelihoods, effective development of SSM, strengthening management of safety, occupational, health and environment, facilitation of investment opportunities, constraints faces MEM and the scarcity of data and information on mining activities.

CHAPTER THREE

RESEARCH METHODOLOGY

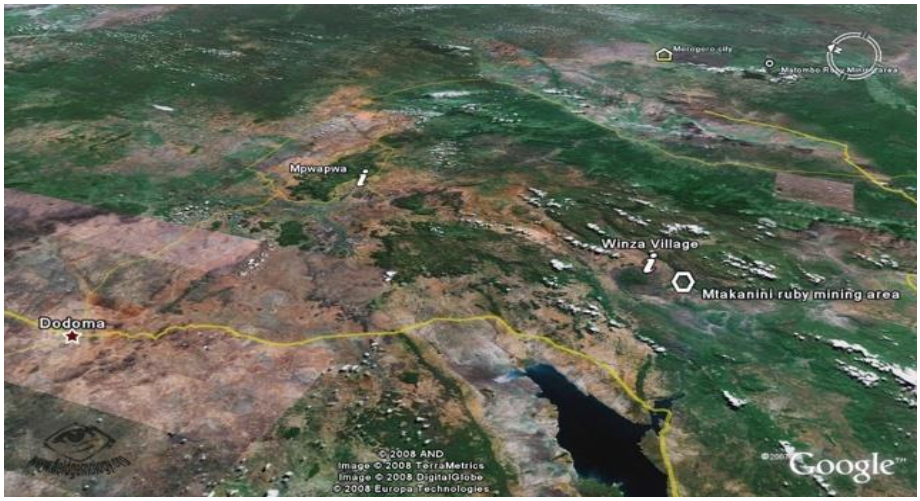
3.0 Introduction

This chapter describes how the research will be conducted. It covers the following elements: Selection of study area, climate and physical settings, geographical location, research design, population, sampling units sampling techniques, judgmental sampling, sample size, data collection techniques and instrumentation, data handling, validation of instruments, source of data used and justification of the study area.

3.1 Study Area

Three villages of Winza ward in Mpwapwa district at Dodoma region will be included in this study, where by the villages are; Ipogolo, Kikuyu and Winza Mtakanini. The reason for choosing these areas is because mining activities takes place. Mpwapwa district is located about 120 kms from Dodoma Regional Headquarters. It lies between Latitudes 6°00” and 7°30” S and between Longitude 35°45” and 37°00” E. It borders Kilosa district on the eastern part, Kongwa district on the Northern part, Chamwino district on the western area and Kilolo district on the southern part. The district covers a total area of 7,379 square Kilometers (18.1% of total area of Dodoma Region). Plate 1 shows Winza ruby mining area.

Plate 1: Winza Ruby mining area



Source: Senoble, 2012

3.1.1 Justification for the choice of Winza ward

Winza Ruby mining area is experiencing pressure from a rapid population growth as well as the surrounding areas. This leads to an increase in number of people engaging directly or indirectly in small scale mining activities. This area has also attracted foreigners from various countries as mine dealers and brokers such as Sri Lankan. There has been a conflict between the small-scale miners and foreign investors from China who took some part from the small-scale miners and therefore led to the conflicts. Furthermore small-scale miners tends to degrade the environment by digging randomly in looking for ruby mines and left the empty holes leading to soil erosion and also these holes act as a breeding sites for mosquitoes hence spread of malaria.

3.1.2 Climate and Physical Settings

Most of the district is predominantly arid with spontaneous mountain chains especially in the southern and western parts lies between 915 to 1,200 meters above sea level.

The district has a dry savannah type of climate characterized by the average temperature of 270 C. Short rain season starts December to April ranging between 600 – 700mm per annum. The district receives relatively more rains compared to other districts in Dodoma region. In mountainous areas like Kiboriani, Wotta, Lufu, Mbuga and Mang'aliza, the areas receive heavy rains up to 1,200mm per annum (GRS, 2008).

3.1.3 Geographical location of Winza Ruby Mining

Winza ward is an area which is found in Mpwapwa District at Dodoma region. A famous big village became the name of new ruby deposit of Tanzania. Some sapphires are also found in the same area. The deposits are exactly located southwards from the village where it has recently been called Mtakanini, Swahili means "what do you want?"

Main mining area was started along the river close to the mountain where alluvial materials have been dug and washed. Poorly-sorted sediments composing of clays, sands and pebbles to gravel mostly have low sphericity and angular shapes. They appear to have been sourced and transported from the nearby surrounding hills and mountains trending in N-S direction. This deposit type is quite shallow and easy for mining; however, large area along the river has already been occupied by the miners hence the new miners have to move to the hilly area in which it becomes the center of Winza Mtakanini (GRS, 2008).

3.2 Demography

By the year 2002 the district had a total population of 253,602 according to National Census conducted August that year. With an annual growth rate of 2.8% the district population is now estimated to be 912,288 (Tanzania Census, 2012).

3.3 Study design and Methods

A socio-economic survey design was employed during data collection. This assisted in assessing the prevailing socio-economic conditions in the study area. This includes provision of a baseline study and characterizing the existing state of the study site. This assisted in identifying the main areas of concern according to Muddock *et al.,* (1986). Various methods of data collection were used including: interview, questionnaires, observation and secondary data.

3.4 Sampling Frame

The sampling frame consisted of Divisions, wards and villages of Mpwapwa District. Four villages of Mpwapwa District were used to draw the sample for the study. Respondents were SSMi, Mining office of Dodoma region, Mpwapwa District Natural Resources Office which total number is 100 respondents.

Table 2: Sampling Frame and Size

S/N	STATUS	MALE	FEMALE	TOTAL
1.	Small-Scale Miners (SSMi)	75	15	90
2.	Regional Mining Officer (RMO)	1		1
3.	District Mining Officer (DMO)	1		1
4	District Natural Resources Officer (DNRO)	1		1
5	Ward Executive Officer (WEO)	1		1
6	Villages Executive Officer (VEO)	2	1	3
7	Village Chairpersons	2	1	3
TOTAL		**83**	**17**	**100**

3.5 Sampling Units

The sample unit of the study was the villages within the selected ward of Mpwapwa district. Non probability sampling method was used to identify Small-Scale Miners. These miners were picked from their mining sites as well as from the River Mtindiri washing site. This enables to reduce biases (Kothari, 2004).

3.6 Sample Size

The expected sample size included small-scale miners and the key informants. The sample size of key informants was 10 people and SSMi were 90 people. Appropriate sample size of 100 respondents was established for the convenience of statistical data. This facilitates generalization and achieves intended result within such a short period of time and the selection based on gender issues (Kothari, 2004).

3.7 Sampling Techniques

Both primary and secondary data on socio-demographic variables, economic activities, institutional impediments in management of mining, status of small scale mining, costs involved in excavations, tools used in excavation the nature of miners and the rate of mine extraction from the study area.

3.7.1 Primary Data

Primary data on the historical background of small-scale mining, land acquisition and management, various institutions involved in management of mining, environmental effects from mining activities, ways used to disseminate the information about laws and policies governing small-scale mining in the area.

3.7.1.1 Questionnaire Survey

The socio-economic survey was employed using both open-ended and close-ended questions. The questionnaires were administered among SSMi drawn randomly from

their mining sites and washing site of corundum material. The information solicited included socio-demographic variables (education, gender, age); Economic activities such as mining status and management, the costs related to mining, revenues related to mines trading and prediction of cost benefit from the eviction of some small-scale miners in some areas of Winza.

3.7.1.2 Focus Group Discussion

Focused interviews were made to the small-scale miners. The aim was to seek more insight into issues mentioned during the interviews, cross-checked information and collected missing data. Officials from the mining companies and government officers were interviewed lastly after the preliminary analysis of the field results in order to clarify and confirm issues raised by small scale miners.

3.7.1.3 Key Informants Interviews

Various key informants were consulted for specific knowledge on, mining laws and policies, information dissemination about mining laws and policies. Relevant official documents were accessed and used as a source of data. The key informants included Region Mining Officer (RMO), District Mining Officer (DMO), District Natural Resource Officer (DNRO), Ward Executive Officer (WEO), Village Executive Officers (VEOs) and village chairpersons.

3.7.2 Secondary Data

Secondary data on background of mining extraction, markets, abundance and revenues related to mining activities were obtained from village executive officers, district mineral and energy officers, district natural resource managers, Ministry of Natural Resource and Tourism, Regional Natural Resources Office, District Natural

Resources Office, Government agencies such as the Chamber of Mines, TAMIDA, FEMATA, REMAS, and other NGOs, CBOs, working in the region.

3.8 Validity and Reliability of the Data

Validity is defined as the degree to which the findings are interpreted in a correct way, whereby reliability is the degree to which the findings are independent of accidental circumstances of the research (Malele, 2004).

According to Barr, (2004) defined validity as the ability with which the results of study can be verified against the stated objectives.

3.8.1 Validity of Data

According to Enon, (1998) the validity of the instruments are obtained from the result which are used to test content. This helps to test if the tools were accurate and true. Therefore in this study the validity of the instruments were tested using a total sample of 100 respondents from Winza SSMi, RMO, DMO, VEOs, WEOs, DNRO, and village's chairperson.

3.8.2 Reliability of the Data

Reliability of the instruments was tested through asking the same questions to respondents in different ways in order to come up with consistency answers. Furthermore, the reliability of the study was guaranteed by the following; Confidentiality of respondents was highly observed and the respondents were assured that the information obtained is to be used purposively for the study and not otherwise; good relationship with the respondents was practiced so as to yield the information required.

Pre-testing of the instrument such as interview, questionnaire, observation and survey was done before their application in order to see whether are appropriate.

3.9 Data Analysis and Presentation

Analysis is the process of breaking the collected data by organizing them into categories and basic descriptive units (Kombe, 2004). This was done using a computer programme known as Statistical Package for Social Sciences and Microsoft Excel. Raw data was fed in each programme depending on the anticipated analytical output, and then it was followed by interpretation, which includes attaching meaning and significance of the analyzed data by looking for its relationship linkages among descriptive dimensions.

Data analysis process started during the stage of field work i.e. when the data were being collected. In this study, the collected data were analyzed and interpreted using both quantitative and qualitative tools such as text, figures tables, photographs and diagrams. The research findings were also displayed in the form of text, tables, and figures.

3.10 Conclusion

This chapter described the methods of the study; the research design was adapted through the case of Winza Ruby Mining where unsustainable mining continued. Sampling techniques used were both primary and secondary data so as to cover the stated objectives. The sample size was 100 respondents from mining sites and Mining Offices. Through Statistical Package for Social Sciences and Microsoft Excel the data were analyzed and interpreted by both qualitative and quantitative ways.

CHAPTER FOUR

RESULTS, DATA ANALYSIS AND DISCUSSION

4.0 Introduction

This chapter presents and discusses the research findings. It is based on four guiding questions; to what extent are small-scale miners are aware of the mining laws and policies, what are the factors responsible for the increasing number of informal small-scale miners in the presence effective governing institutions Winza ruby mining, what are the impacts of informal and illegal mining currently prevailing in the study villages and what are the challenges and prospects in the management of small-scale mining in Winza ruby mining.

4.1 Socio-economic characteristics of the respondents in the study area

The field data indicates that the majority of respondents 90 (57.8%) in the study area were males. Again at village level males were dominant over their counterpart females as shown in table 3. As for the age, respondents aged 31 to 40 years, consisted the majority of respondents 66.7% in the study villages. However, age structure across villages varied. This implies that the majority of respondents 66.7% in the Winza ward comprise of an active manpower which is a productive force.

Regarding education 90 (75.6 %) of the respondents in Winza ward are primary school leavers while only 16.7% being secondary school leavers. This implied that the observation level of illiteracy in the study area is high. According to Hayek (1973), education is essential as it paves the path leading to disillusionment. It wipes out all the wrong beliefs in our minds. It helps create a clear picture of everything around us and we no longer remain in confusion about the things we learn. Education brings up questions and also helps us devise ways to find satisfactory answers to

them. As for socio-economic activities majority of respondents engages in subsistence agriculture. Though respondents were sampled from their mining centers, only 10% of the respondents identified mining as their economic activity.

Table 3: Small-Scale Miners (SSMi) Social Characteristics

Village	Sex %		Age %				Education %				Activities %		
	M	**F**	18 - 25	26 - 30	31-40	40+	Inf	Pr	Sec	Ab	Ag	Mn	Ot
Winza mtakanini	70	30	26.7	20	46.7	6.7	6.7	70	23.3	0	83.3	10	6.7
Ipogolo	66.7	33.3	53.3	16.7	23.3	6.7	6.7	70	23.3	0	83.3	16.7	0
Kikuyu	76.7	23.3	13.3	20	66.7	0	10	86.7	3.33	0	96.6	3.33	0
Average	**57.8**	**42.2**	**31.3**	**18.9**	**45.6**	**4.5**	**4.5**	**75.6**	**16.6**	**0**	**87.7**	**10.0**	**2.2**

Source: Fieldwork Survey, 2012

Key: M-Male, F- Female, Inf-Information, Pr-Primary, Sec-Secondary, Ab-Above, Ag-Agriculture, Mn-Mining, Ot - Others, %- Percentage

4.2 Objective One: Identifying the managerial aspect of small-scale mining and awareness of small-scale miners on mining laws and policies

Based on objective number one, the researcher's interest was to know the managerial aspects of small-scale mining in Winza ruby mining. The main concern was to investigate the respondent's management initiatives and their implementations over

small-scale mining. On the other side, the research aimed at finding out the awareness of SSMi on mining laws and policies.

4.2.1 Managerial aspects of small-scale mining

Planning as a component of management revealed in Winza ruby mining area whereby SSMi had their association called MWAMAWI (Muungano wa Wachimbaji Madini Winza). The function of this association is to make sure that SSMi have registered into this association, and acquires necessary mining permit from the village authority, knowledge sharing on the best practices. Furthermore, this miners association is responsible for the conflicts resolution among the small-scale miners.

Informal and formal local organizations of artisanal and small-scale miners historically have played a crucial role in Tanzania. Diverse informal organizations exist among groups of pit holders, diggers, gold processors, and others at any given artisanal and small-scale mining site, even if they do not have licenses. Their organizational capacities in working together to address environmental health, safety, and well-being are vital for the success of the community. Knowledge-exchange between miners' organizations is an important strategy in generating lessons and sharing insights about organizational development, technologies, business practices, and livelihood challenges and solutions. In 1983, the government directed small-scale miners in each region to establish associations to link miners and government institutions. Regional miners' associations, such as the Mwanza Regional Miners' Association (MWAREMA), formed in 1986, play major roles in coordinating miners and facilitating organization and capacity-building. Based in Geita District and covering 579 licenses for small scale mining, MWAREMA has more than 700

members (Carstens, 2009). The association has various significant roles, including training miners to abide by the mining laws and helping miners to acquire good markets for their gold.

The government tends to control SSM activities in Winza ruby mining. Controlling as an indicator of management is done by both the village government, district, regional and national level. It was found out from Winza that the village's authorities have the direct control over small-scale miners. The area has been visited by the District Commissioner (DC), Regional Commissioner (RC) as well as the former Minister for energy and minerals honorable William Ngeleja in addressing SSMi on the mining best practices.

4.2.2 Awareness of SSMi on Mining Laws and Policies in Tanzania

Respondents were probed on their understanding of laws and policies governing their activity and the approaches that the trusted authorities used to enhance their awareness. On the first part, answers were limited to Yes or No and identifying approaches on the other. The researcher's interest was to find out the source of information and recommendation on the methods to be used by the government to disseminate information about mining laws and policies, visits by Mining Officers for awareness creation, presence of Miners Association and awareness building. Respondents were asked whether they are aware of policies and laws governing SSM in their villages or not. Answers were limited to Yes or No as shown in table 4. Field data showed that large portion of sample population 90 (76.7%) were not aware of both policies and laws that governs their mining activities as shown in table 4. It was revealed from the interview also that the majority 10 (80%) of respondents did not understand the laws and policies, while only 20% of the interviewed key informants showed some recognition. The little understanding of the mining laws and policies

could be resulting from the fact that most of the small-scale miners in the study area are illiterate and poor and thus they are not motivated to read.

According to Frankl (1962), education a set of practices that may foster particular forms of awareness in students, forms conducive to the conscious motivation and regulation of learning, and also to freedom and transcendence in life more generally. It helps society look at the social and ethical questions raised by new development policies and projects, ensuring that conservation long-term interests are given priority over short-term gains. (Galbraith, 2011) There is a need to provide professional skills to small-scale miners and ore processors on how to apply an appropriate technology which is environmentally friendly and cost-effective for extracting precious metals from primary and secondary ores. Protection of the environment and mitigation of the human health impacts associated with SSM practice shall also be taken into account.

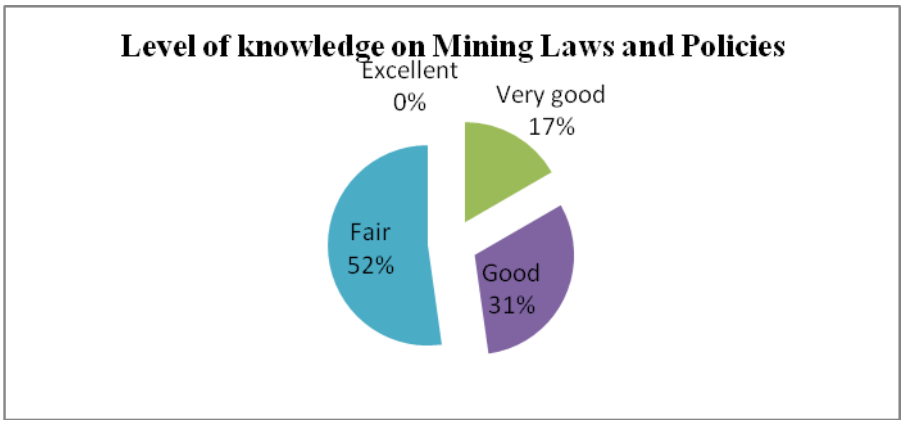
Table 4: Awareness of Small-Scale Miners on the mining laws and policies

Village	Yes (%)	No (%)
Winza mtakanini	10	90
Ipogolo	36.67	63.33
Kikuyu	23.33	76.7
Average	23.33	76.67

Source: Fieldwork Survey, 2012

Level of knowledge included the respondents from small-scale miners on their opinion concerning their understanding level on the Mining Laws and Policies.

Figure 4: Level of knowledge of the respondents about Mining Laws and Policies



Source: Fieldwork Survey, 2012

Neither of the respondents had excellent knowledge on the mining laws and policies, 17% of the respondents had very good knowledge on mining laws and policies, 31% had good knowledge and 52% of the total respondents results concerning the knowledge on mining laws and policies had fair knowledge because of managerial incapability by the government official, small-scale miners and other mining stakeholders.

4.2.3 Approaches used by authorities to create awareness on mining laws and policies

Respondents were asked to identify strategies/approaches mining officers use to create awareness on laws and ensure its adherence. An answer was limited to mentioning the strategies. Respondents who agreed that there were efforts to educate them on laws and policies identified visits by mining officers 3.33%, TVs and radio programs 10% and meeting with mining associations leaders 3.33%. Therefore the recommended way to raise awareness among SSMi on policies and laws is through

TVs and radio programs as shown in table 5. Radio is one of the best vehicles to bring information to the isolated interior (Pitelis, et al, 2000).

Table 5: Approaches used to create awareness on laws and policies

Approaches	Winza mtakanini	Ipogolo	Kikuyu	**Average %**
	%	%	%	
Visits by mining officers	10	n.r	n.r	3.33
TVs and radio programs	n.r	20	10	10
Meeting with association leaders	10	n.r	n.r	3.33

n.r = not significant

Source: Fieldwork Survey, 2012

4.3 Objective Two: Factors influenced informal and illegal Small-Scale Mining

Analysis of objective number two was guided by four variables that were inquired from the respondents. The researcher was interested to find out the factors for the increased informal and illegal SSM. The questions asked here included, does economic gain lead to an increased informal and illegal small-scale mining in Winza ward, Unemployment increases the number of SSMi in Winza, and to mention the factors for the increased informal and illegal SSM in Winza ruby mining.

4.3.1 Economic gain

Respondents were asked whether economic gain leads to the increased informal and illegal SSMi in Winza ruby mining. Average data revealed that the majority 75% respondents in all studied villages agreed that economic gain leads to an increased informal and illegal small-scale mining in Winza ruby mining and only 25% ignored. The responds were as follows; respondents in Winza Mtakanini village 75% of respondents agreed with the question while 15% ignored. In Ipogolo village, 63.33% of the respondents said yes to the question while 36.67% of the respondents

disagreed with the question. The last village of Kikuyu about 76.7% of the respondents accepted while 23.33% did not agree with the question.

Table 6: Economic gain leads to increased informal and illegal SSM in Winza

Villages	Yes (%)	No (%)
Winza mtakanini	85	15
Ipogolo	63.33	36.67
Kikuyu	76.7	23.33
Average	**75**	**25**

Source: Fieldwork Survey, 2012

4.3.2 Unemployment

Respondents were asked whether unemployment rate could be the reasons for the increased informal and illegal small-scale mining in Winza ruby mining area. The field data showed that 76.67% of all studied villages agreed to the question that unemployment rate leads to increased informal and illegal small-scale mining in Winza ruby mining, and 23.33% of the respondents said No as shown in table 7 below. According to a recent survey carried out by ILO and MMSD, at present around 13 million people working directly in small mines throughout the world, mainly in developing countries. A large percentage of these miners are women, and regretfully, also children.

Table 7: Unemployment leads to increased informal and illegal SSM in Winza

Villages	Yes (%)	No (%)
Winza mtakanini	90	10
Ipogolo	63.33	36.67
Kikuyu	76.7	23.33
Average	**76.67**	**23.33**

Source: Fieldwork survey, 2012

4.3.3 Unreliable rainfall for agriculture

In finding out the reasons for the increased informal and illegal SSMi in Winza ruby mining the respondents were asked to say Yes/No if unreliable rainfall for agriculture led to the increased informal and illegal SSMi in Winza ruby mining. The results revealed that about 67.79% of the respondents said No to the question that unreliable rainfall for agriculture leads to increased informal and illegal mining in the area. However, only 32.22% agreed that unreliable rainfall for agriculture leads to increased informal and illegal small-scale mining in Winza ruby mining as indicated in table 8.

Table 8: Unreliable rainfall for agriculture

Villages	**Yes (%)**	**No (%)**
Winza mtakanini	10	90
Ipogolo	63.33	36.67
Kikuyu	23.33	76.7
Average	**32.22**	**67.79**

Source: Fieldwork Survey, 2012

Whatever the reasons, illegal small-scale mining is accompanied by considerable economic losses, and there is no possibility of using official means to improve working conditions and occupational health and safety so long the activity itself remains illegal (Whitehorse, 2006).

4.3.4 Identified factors for increased informal and illegal SSMi in Winza

Respondents were sought to identify factors which could be causing increase in informal and illegal mining in the study area. Results revealed that 90 (63.3%) of the respondents did not perceive that there was an increases in informal and illegal mining in their villages. However, 36.7% of respondents viewed informal and illegal mining as was increasing. When asked to identify factors, the common ones were

failure in agriculture crops, low technology and capital, easy mining extraction as shown in table 5 below. The rate of responses varied across the studied villages.

Table 9: Identified factors influenced informal and illegal SSM Mining in Winza

Village	Low technology and capital %	Failure in agriculture crops%	Easy in mining extraction %
Winza mtakanini	39.5	50	22.5
Ipogolo	39.5	33.33	27.5
Kikuyu	21.04	16.67	50

Source: Fieldwork Survey, 2012

Consistently, the result from the interview revealed that increase poverty level in the villages (60%, n=10) and inadequate facilitation of village economic development 40% were the most critical factors leading to increased number of informal and illegal small- scale miners. However, data from observation reveals that disruption of village economies resulting from disruption of national philosophy are relatively the highest factors that may continue fostering the situation. However, there were other factors identified by the respondents as follows; bureaucratic in acquiring mining licenses, lack of knowledge of legal requirements, extreme poverty, and drought, reluctant to be legalized due to the absence of incentives, lack of government capacity to enforce penalties and to provide the benefits.

It was found out from the interview that, inability of most villagers to afford education costs had led to increased number of unemployed primary and ordinary secondary school leavers in the villages. According to the VEO of Winza Mtakanini village, out of an average of 754 primary school leavers only 10 to 12% joins secondary school while 94% of secondary school leavers return to villages. Yet, it was revealed also that, unreliable rainfall for agriculture and fluctuated prices of its

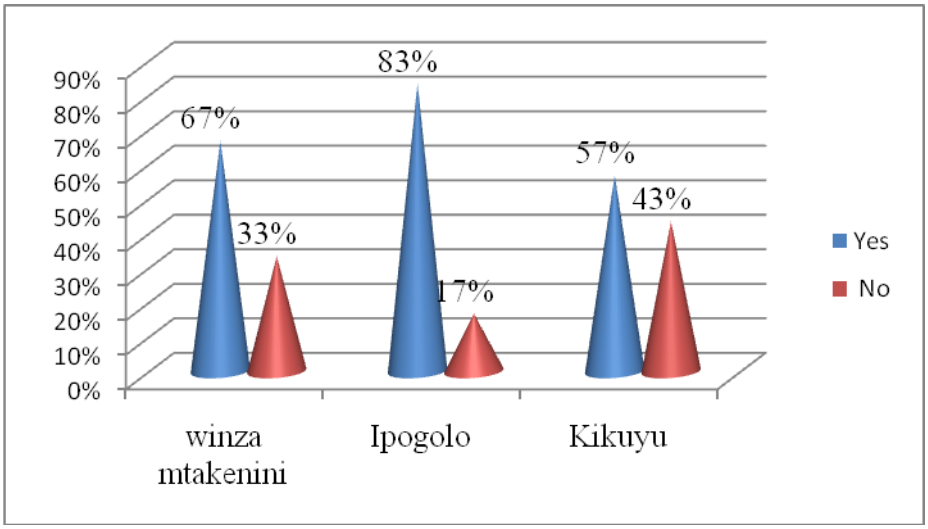
input had influenced the population of small-scale miners in the area hence increased informal and illegal mining.

According to ILO, (1999) informal and illegal SSM in developing countries increases due to the Government failure in "Ensuring that title and property rights over minerals are straightforward to acquire and transfer; that access to finance for small-scale mining is on equal terms with other sectors; that labor and social issues are addressed and the working and living conditions of small-scale miners and their communities are improved; that the environmental impact of small-scale mining is minimized; and that small-scale miners have the necessary technical and business skills to ensure the safe and efficient operation of their mines".

4.4 Objective Three: Environmental effects of SSM activities in Winza Mining area

In this objective there were four variables inquired to the respondents. The research intended to explore significant environmental impacts and measures taken to mitigate those impacts. Respondents were asked whether there were any environmental effects of the mining activities in their villages or not. They were further asked to identify effects based on their perception and experience. Answers were limited to Yes or No on one part, and mentioning the environmental effects on the other. Results showed that the majority of the respondents 90 (69%) agreed on the presence of effects while only 31% did not as shown in figure 5.

Figure 5: Environmental effects of small-scale mining in Winza Ruby Mining



Source: Fieldwork Survey, 2012.

When asked to identify the environmental effects in their villages the most commonly effects appeared were deforestation 64.4%, increased open mine pits 23.3% and air pollution 7.77% as the most experienced effects in their areas as shown in table 10. However, significant variation in perception of the effects was evident. For instance while deforestation increased mine pits received a fairly higher response from the respondents in all the villages, air pollution received the least rating from all of the study villages. This could be due to lack of understanding that air pollution by dusts and noises are also pollutions equally dangerous as the other afore identified effects.

Table 10: Environmental effects of mining activities in Winza ruby mining

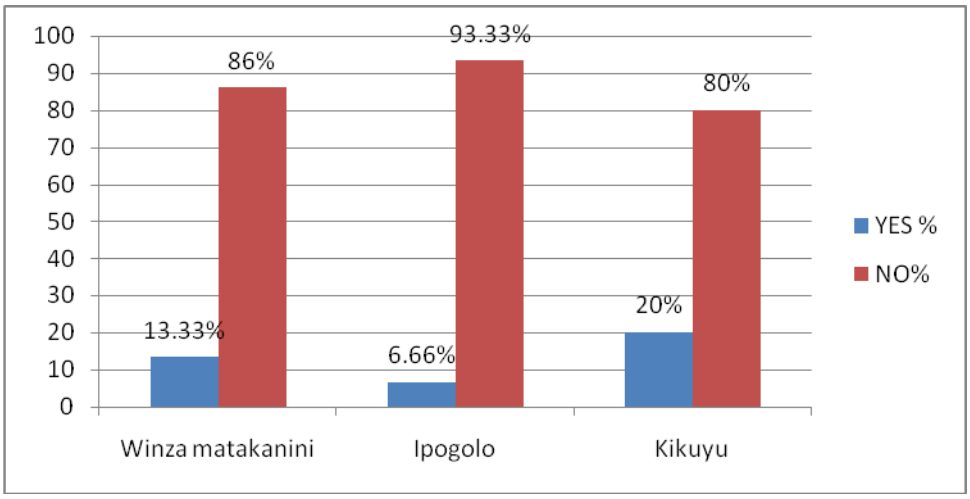
	n	Deforestation (%)	Increased open pits in the village (%)	Air pollution (%)
Winza mtakanini	30	76.67	23.3	0
Ipogolo	30	66.67	10	23.33
Kikuyu	30	63.33	36.67	0
Average	**30**	**64.44**	**23.33**	**7.77**

Source: Fieldwork Survey, 2012

Interview results were not different to those of local respondents. It was revealed that despite increased malaria cases during rainy season due to settled water, spread of HIV/AIDS was one of the most manpower killers that increased rashly due to influx of people from village within and out of the ward. According to the DNRO of Mpwapwa Mr. Hamis Mwangu said that, he has ordered the VEOs Mr. Kinana Kirenga to liaison with the WNRO to ensure that SSMi covers their pit and replant trees in the areas with mines pits left.

Furthermore the respondents were asked whether there were any measures taken by the SSMi to mitigate the environmental effects of small-scale mining activities. The answer mode based on Yes/No responses. As a result 90 (86.44%) of the respondents said no and went ahead giving reasons such as there is no any government authority in local level or national level do emphasize on that. In a broader perspective could be due to the nature of SSM operates vigorously and illegally. On the other hand 90 (13.33%) of the respondents agreed that there are some mitigation measures taken by SSMi in environmental management as illustrated in figure 6.

Figure 6: Environmental effects Mitigation Measures of SSM activities



Source: Fieldwork Survey, 2012

The need for strong government regulation, oversight, and an informed civil society, the level of enforcement and regulation varies widely between and even within countries. Many developing countries, such as Papua New Guinea, and the Tanzania either do not have adequate capacity to monitor the activities of SSM or allow practices that would be illegal in developed countries (Buvinic & Morrison, 1999).

By using observation method the researcher found that the area before the discoveries of minerals was a forest area on hills which could act as climate modification, habitat for animals and micro organisms, however with disorganized mining activities whereby the forest is cleared, mining pits were left uncovered after exhaustions of minerals is a threat to the environment of Winza and its surroundings.

Plate 2: Trees cleared and mine pits left open in Kikuyu area

Source: Fieldwork Survey, 2012. Photo taken by researcher on 28th, June, 2012

A physical visit to Ipogolo village's mining area confirmed that the wide existence of the mining activity as shown in plate 3. However, though deforestation was stated to be severe, it was observed that most mining were carried out in areas where vegetation was sparsely grown. A significant environmental threat observed was the use of river Mtindiri in washing Corundum bearing material that small scale miners used to extract rubies and sapphires from the germ rich ground.

Plate 3: SSMi of Winza washing Corundum bearing material in River Mtindiri

Source: Fieldwork Survey, 2012**.** Photo taken by Researcher on 02nd, July, 2012

According to Redmond (2008) corundum materials are acutely hazardous as a form of water-soluble.

4.5 Objective Four: Challenges and prospects of small scale mining in Winza

4.5.1 Challenges

Respondents were inquired to identify challenges they faced in their mining activities. Answers were limited to mentioning challenges based on their perception. In Winza Mtakanini village where mining activities is at the maximum, respondents identified challenges of inadequate understanding of mining laws and policies, inability of GST in identifying mineral ores deposits, inadequate financial support from the government, and inefficient local market. For example, one SSMi from Winza Mtakanini village said that he hired a vehicle to Mpwapwa town for about TZ sh. 200,000/= to sell his ruby mine and found a market price of TZ sh. 300,000/= whereby the quality of stone was good. Data shows that 38 (42.22%) respondents from all villages studied indicates that inadequate supportive fund from the government, 29 (32.2%) indicated the increase in unemployment, and 23 (24.03%) responded inadequate understanding of the mining laws and policies as the challenges towards management in Winza ward. Therefore, the majority of the respondents 38 (42.2%) agreed that inadequate supportive fund from the government is a core challenge in the management of SSM in Winza ruby mining as shown in table 11.

Table 11: Challenges in management of small-scale mining in Winza ruby mining

	Inadequate supportive fund from the government (%)	increase rate of unemployment (%)	Inadequate understanding of mining laws and policies (%)
Winza mtakanini	33.33	63.33	3.33
Ipogolo	60	16.67	23.33
Kikuyu	33.33	16.67	45.45
Average	**42.2**	**32.2**	**24.03**

Source: Fieldwork Survey, 2012

The researcher observed a certain area fenced in Winza ward and given to foreign investors from China whereby indigenous SSMi were displaced. The Chinese company operates at Winza using highly mechanized techniques and thus employing small number of both skilled and semi-skilled workers. The arrival of FDI in mining projects also saw numerous challenges emerge. Large scale mining has been blamed for the decline in employment due to the use of advanced technology and is crowding out small-scale mining operations. According to Phillips (2001), artisanal mining can only coexist with international mining companies during the exploration phase. When the companies are ready to fence and begin mining, artisanal miners have to be displaced.

4.5.2 Perception of SSMi on foreign investors by the Chinese in Winza ruby mining

The respondents were asked whether the presence of foreign investors from China in mining activities has benefited the local miners. The question was restricted on Yes/No answer. The data varied among the villages which indicated that the majority

of the respondents who were the local miners about 90 (79%) are not benefited from foreign investors by the Chinese whereas only 90 (20%) said yes to the question that they were benefited from foreign investors by the Chinese as indicated in table 12 below.

Table 12: Perception of SSMi on foreign investors by the Chinese mining company in Winza

Villages	Yes (%)	No (%)
Winza mtakanini	3	97
Ipogolo	31.5	68.5
Kikuyu	26.07	73.03
Average	**20**	**79.51**

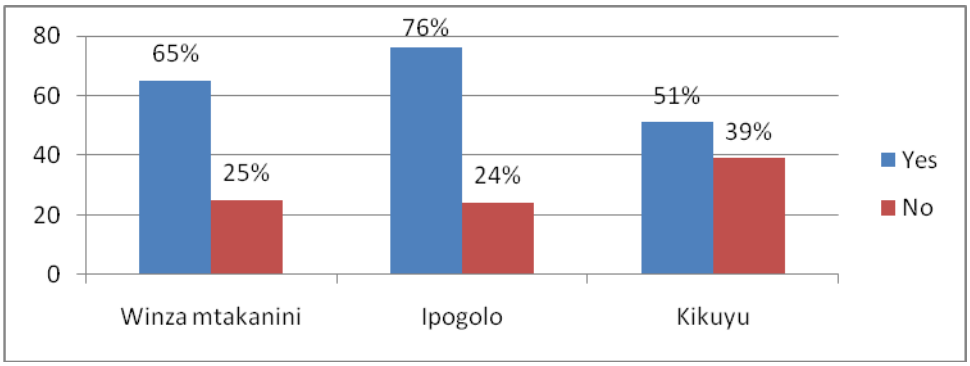
Source: Fieldwork Survey, 2012

FDI may not be the only appropriate solution for domestic economic growth, particularly when it takes place at the cost of domestic labor, environmental and health standards. However, many states have limited options available to them should they wish to avoid the trappings of renewed debt cycles and conditionality (Anan, 1999).

4.5.3 Prospects

Respondents were asked questions based on Yes/No format whether SSM in Winza ruby mining will prosper, also they were asked to identify those prospects. The majority of the respondents 90 (71.7%) agreed that SSM in Winza ruby mining will prosper while other respondents 90 (28.3) ignored as shown in figure 5.

Figure 4: The prosperity of SSM in Winza ruby mining



Source: Fieldwork Survey, 2012

Respondents from Winza Mtakanini village identified prospects which were increased direct employment, maintaining the vital link between people and land, reducing rural-urban migration, essential for economic growth of the local village and increase the government revenue through exportation of ruby and sapphires mines. However those who ignored had reasons such as; lack of simple and transparent legal and fiscal frameworks, weak institutional structures; lack of capacity to implement existing regulations, and sometimes lack of political will, increased malaria and HVI/Aids cases and environmental damages. Inadequate support services and access to information and technology and restrictive marketing systems further contribute to making small-scale mining, not only unproductive, but also counter-productive.

Through observation technique the researcher believes that, the prosperity of SSM in Winza ruby mining can be created by governments, by small-scale miners themselves, and by other stakeholders. But this will only happen if they can work together to: (a) recognize the value of existing indigenous or traditional mining practices; (b) establish better networks for sharing information and advocating better

policies and practices for the sector; and (c) develop an agenda for integrating the small-scale mining sector in national development plans and programs.

Despite the long history behind these activities, the lack of a conducive and supportive environment under which the sector could prosper resulted in disorganized activities, which is leaving most operators trapped under a negative poverty cycle (MEM, 2000).

4.6 Conclusion

This chapter described the findings analyzed and made presentation of the results. The emphasis was put on the observations on four objectives; managerial aspects and the awareness of SSMi on mining laws and policies in Tanzania, examine the factors responsible for the increase of informal and illegal SSM, investigate the extent of environmental impacts of informal and illegal SSM in Winza area, and lastly to examine challenges and prospects in the management of SSM. The data indicated that the managerial aspects are in place and awareness of SSMi on mining laws and policies is low, this could be due to the absence of any measures for awareness creation. The majority of respondents said that SSM in the study area decreased. However, there are those who said that SSM increased due to high rate of unemployment, unreliable rainfall for agriculture activities and economic gains. Environmental impacts of SSM identified were; deforestation, spread of malaria due to uncovered mining pits, air and noise pollution from blasting. The challenges and prospects identified by respondents were; inadequate supportive fund from the government, inadequate understanding of mining laws and policies, lastly increased unemployment rate. The prospects identified were direct employment, effective utilization of resources that cannot be mined by large scale mining companies and essential for the growth of local economy of Winza area.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATIONS

5.0 Introduction

This chapter presents the summary of findings, conclusion and recommendations of the study discussion, and the areas that the researcher was not able to tackle thus giving chance for further research.

5.1 Summary of Findings

The objective of this study was to investigate the institutional dimensions in the management of small-scale mining. To achieve this objective the researcher was guided by four research questions; how is the public informed and aware of issues concerning informal and illegal small-scale mining in Winza area, what are the causes or factors of informal and illegal small-scale mining Tanzania, to what extent does informal and illegal small-scale mining affects the environment in Winza area and how successful is the Government and other agencies mitigate the effects of small-scale mining in Tanzania. The study involved two types of respondents which were Small-Scale Miners (SSMi) themselves as the main target and the key informants such as Region Mining Officer (RMO), District Mining Officer (DMO), Village Executive Officer (VEOs), Ward Executive Officer (WEOs), District Natural Resource Officer (DNRO), and village's chairperson.

This study demonstrated that SSMi are not aware on the mining laws and policies. Respondent's result 90 (76.7%) are unaware of the laws and policies governing SSM activities. The increased number of informal and illegal SSM in the study area was reverse in a sense that the number of informal and illegal SSM was not increasing

and this was due to the displacement of some SSMi, seasonality of river Mtindiri used for washing corundum materials and the scarcity of minerals in the area. Furthermore the challenges and prospects towards management of SSM were put forward which includes inadequate supportive fund from the government, increased unemployment rate and inadequate understanding of mining laws and policies. The prospects were creation of direct employment for indigenous people, means of effective utilization of resources that cannot be mined by large-scale mining companies and essential for the growth of local economy.

5.2 Conclusion

This research has explored the potentials of institutional dimensions in the management of small-scale mining and on the other hand the need for effective enforcement of these mining laws and policies in Winza ruby mining at particular and Tanzania in general.

This chapter draws conclusions based on the research questions in Chapter One. It will also make recommendations based on the conclusions.

5.2.1 The managerial aspect of small scale-mining and awareness of small-scale miners on mining laws and policies.

The fact that public managerial aspect, that informal and illegal SSM does not mean there are should not be any planning measures. According to the respondents 68% said that the area has been planned by the government for foreign mining investors. This was justified by the eviction of some SSMi in Winza ward and given to the Chinese foreign mining company. The rest of the respondents 32% said that the area has been reserved for SSM activities. According to the 2010 Mining Act, SSMi to be allocated to their areas for mining activities as a result this has not been implemented

in fairgrounds whereby some areas created for SSMi activities are subjected to mining hardship. The Bomani Presidential Mining Sector Review Committee noted, “There are also complaints that small miners are usually allocated tiny mining sites that make it difficult to operate without interfering with each other.” The report notes, “A good example is Mirerani where the 50 x 50 meters area allocated to each small miner is too small compared to Plot C which was allocated to big miners.

Controlling of small-scale mining activities in Winza ruby mining is normally done by the government official mainly when there are some conflicts between the foreign mining investors and SSMi. According to the respondents, environmental management, training and provision of technical support to the SSMi is less considered by the public authorities.

On the other hand, SSMi awareness on the mining laws and policies is little and thus operates informally and illegal. The findings indicated that the majority of SSMi in Winza ruby mining have little awareness on the laws and policies that governing the mining industries in Tanzania.

5.2.2 Factors influencing informal and illegal small-scale mining

Findings from the research indicated that informal and illegal SSM was not increasing, the majority of the respondents did not perceive that there was an increased informal and illegal SSM in Winza ruby mining. According to the respondents during the early discoveries of ruby in 2008 there was congestion of miners unlike these days the number has been lowered due to some factors such as; scarcity of ruby mines, seasonality of river Mtindiri used for washing corundum materials. However, the minority of the respondents viewed informal and illegal SSM as was increasing and went ahead mentioning the factors; failure in agriculture crops, involves low technology and capital in extraction. Others included;

bureaucratic in acquiring mining licenses, lack of knowledge of legal requirements, extreme poverty, and drought.

5.2.3 Environmental effects of SSM in Winza ruby mining area

Mining activities whether in small-scale or large-scale is attributed to environmental effects. Likewise the majority of the respondents in Winza acknowledged that SSM activities have negative effects on the environment of Winza. The identified effects were deforestation, increased open mine pits and environmental pollution (air, land, water and noise pollution). Furthermore, despite the increased Malaria cases during the rainy season due to the settled water, spread of HIV/AIDS was revealed. There is need for training on the best mining practices as far as environmental management is concerned, provisional of knowledge based on prevention of HIV/AIDS transmission.

5.2.4 Challenges and prospects of small-scale mining in Winza ruby mining

Small-scale mining activities employs a large number of people and provides a means for a leaving especially the rural residents. However this sector is faced with some challenges from the national level to local level. The findings from Winza ruby mining area indicated that the majority of the respondents said the lack of government support fund is the core obstacle for the growth of industry sector in Winza ruby mining.

The increase in unemployment level in Winza ward tends to create more pressure in mining activities and its vulnerability was also mentioned as a challenge of small-scale mining. Other challenges identified were inadequate understanding of the mining laws and policies, ensuring environmental management and protection, child labor, and infrastructure in terms of roads to reach these remote mining areas.

The respondents from Winza villages were asked whether SSM in Winza will prosper as a result the majority of the respondents agreed that SSM will prosper and mentioned the reasons such as increased direct employment, maintaining the vital link between people and land, reducing rural urban migration, essential for economic growth of the local village, and increased government revenue through exportation of ruby mines. On the other hand, minority of the respondents disagree on the prosperity of SSM. They further went ahead mentioned that; lack of simple and transparent legal and fiscal framework, weak institutional structures and inadequate capacity to implement existing regulations.

5.3 Recommendations

From the research finding, the mining laws and policies were not seen as a problem in the management of small-scale mining. What came out was the need to have a serious implementation plan and enforcement of these mining laws and policies. For this to happen few things need to be done by the government;

a) Provision of knowledge based, mining equipments and financial support is of crucial needed. Experienced from various sources shows that State Mining Corporation (STAMICO) was doing great work in the management of mining industry hence the study recommends the re-opening of STAMICO.

b) Mining rights and licenses acquisition should be decentralized whereby the villages' authority to have the power in granting the mining permits under the observable guidelines from the central government. This will reduce informal and illegal small-scale mining in Winza ward.

c) Reviewing of the Mineral policy of 2009 and the Mining Act of 2010 so as to set an enforcement mechanism towards execution of monitoring and evaluation plan of environmental effects of small-scale mining. This will reduce the effects of small-scale mining on the environment.

d) The government through the parliament should increase the budget of the ministry of energy and minerals so as to have enough funds in order to support small-scale mining activities in terms of knowledge provision based on mining, technological and equipment assistance.

5.4 Areas for further research

(i) Assessment of managerial aspect in mining laws and policies enforcement and implementation

(ii) Examine the acquisition of land and mining licenses for the indigenous small-scale miners.

(iii) Assessment on the benefits accruing from small-scale mining on the expense of environmental costs.

(iv) Contribution of small-scale mining industry to the nation's foreign currency.

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APPENDICES

Appendix 1: Sample questionnaire for small-scale miners

Date of interview…… …..

Name of respondent…….....

Name of the place/village of interview……

PROFILE/CHARACTERS OF RESPONDENTS

1. What is your gender? (i) Male [ ] (ii) Female [ ] (Please tick appropriately)
2. Your level of education is (i) Informal education [ ] (ii) Primary education [ ] (iii) Secondary education [ ] (iv) College education [ ] (v) University education [ ]
3. What is your age? (i) 18 – 25 years [ ] (ii) 26 – 30 years (iii) 31 – 40 years [ ] (iv) above 40 years [ ] (v) 41- 50 years [ ] (vi) 51 – 60 years [ ] (vii) Above 60 years [ ]

ISSUES CONCERNING SMALL SCALE MINING

4. Are you aware of laws and policies that governing small-scale mining in Tanzania? (Just tick one)
   a) Yes [ ]
   b) No [ ]
5. To what extent do you understand the law and policies that governing small-scale mining in Tanzania? (Just tick one)
   a) 0% - 25%
   b) 25% - 50%
   c) 50% - 75%
   d) 75% - 100%
6. Where do you get the information about the law and policies that governing small-scale mining activities? (Just tick one)
   a) Public meetings

b) Seminars

c) Brochures

d) TV and radio

e) Others.....

7. Does economic/financial gain leads to an increase of small-scale mining in Winza?

   a) Yes [ ]

   b) No [ ]

8. Do you have any other economic activities apart from small-scale mining at Winza?

   a) Yes [ ], b) No [ ]

9. If the above answer is Yes! Please mention four economic activities found in your area?

   i. .....

   ii. .....

   iii. .....

   iv. .....

10. Are there any environmental impacts of small scale mining at Winza area?

    a) Yes [ ]

    b) No [ ]

11. If the above answer is yes! Mention at least four environmental impacts

    i) .....

    ii) .....

    iii) .....

    iv) .....

12. Are the impacts of small scale mining at the level of: a) Local b) Regional c) National or, d) Global

13. In your opinion do you think the environmental impacts can be compensated by mining business?

    a) Yes [ ]

    b) No [ ]

14. Are there any measures taken by small-scale miners to mitigate environmental impacts of mining activities?

    a) Yes [ ]

    b) No [ ]

15. If the above answer is yes! Mention at least four measures taken by small scale miners

    i.....

    ii.....

    iii.....

    iv.....

16. Do you think the Government enforces it laws and policies in order to stop informal small-scale mining?

    a) Yes [ ]

    b) No [ ]

17. In your own opinion do you think small-scale mining in Winza area is sustainable?

    a) Yes [ ]

    b) No [ ]

18. What should be done by the Government to enforce its laws in the management of small- scale mining?

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.....

.....

What are the opportunities and costs in the management of small scale mining in Winza?.....

.....

.....

Appendix 2: Key informants questionnaire

(RMO, DMO, DNRO, WEO, VEO and Village chairperson)

Date of interview…….

Name of respondent……

Name of the place/village of interview……

Designation…….....

PROFILE/CHARACTERS OF RESPONDENTS

1. What is your gender? (i) Male [ ] (ii) Female [ ] (Please tick appropriately)

2. Your level of education is (i) Informal education [ ] (ii) Primary education [ ] (iii) Secondary education [ ] (iv) College education [ ] (v) University education

3. What is your age? (i) 18 – 25 years [ ] (ii) 26 – 30 years (iii) 31 – 40 years [ ] (iv) above 40 years [ ] (v) 41- 50 years [ ] (vi) 51 – 60 years [ ] (vii) Above 60 years

FACTORS BASING ON SMALL- SCALE MINING

4. Is the public aware of the laws and policies governing small-scale mining activities? (Please tick appropriately)
   a) Yes [ ]
   b) No [ ]

5. Mention at least four factors responsible for the increase of informal small-scale mining in Tanzania?
   i) .....
   ii) .....
   iii) .....
   iv) .....

6. Are there any impacts of informal and illegal small-scale mining to your society?
   a) Yes [ ]
   b) No [ ]

7. Are the impacts of informal and illegal small-scale mining whether? (Circle one)

   a) Local b) Regional c) National or, d) Global

8. Are the people informed about informal and illegal -small scale mining?
   a) Yes [ ]

   b) No [ ]

9. If the above answer is No, please give reasons for your answer
   .....

   .

   ……..

   .....

   .....

   Are there any efforts by the Government in overcoming informal small-scale mining?

   a) Yes [ ]

   b) No [ ]

10. If the answer is No give reasons for your answer

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

Appendix 3: Household heads questionnaire

Date of interview…….

Name of respondent……

Name of the place/village of interview……

Designation…….....

PROFILE/CHARACTERS OF RESPONDENTS

11. What is your gender? (i) Male [ ] (ii) Female [ ] (Please tick appropriately)
12. Your level of education is (i) Informal education [ ] (ii) Primary education [ ] (iii) Secondary education [ ] (iv) College education [ ] (v) University education [

13. What is your age? (i) 18 – 25 years [ ] (ii) 26 – 30 years (iii) 31 – 40 years [ ] (iv) above 40 years [ ] (v) 41- 50 years [ ] (vi) 51 – 60 years [ ] (vii) Above 60 years

ISSUES CONCERNING SMALL- SCALE MINING

14. Are you aware of the laws and policies governing small-scale mining activities? (Tick one)
    c) Yes [ ]
    d) No [ ]

15. To what extent do you understand the laws and policies governing small-scale mining?
    a) 0% - 25%
    b) 25% - 50%
    c) 50% - 75%
    d) 75% - 100%

16. Does the public aware on the issues concerning laws and policies governing small-scale mining activities? (Just tick one)

Strongly Agree	Agree	Don't Agree	Strongly Disagree

17. In your own opinion do you think small-scale mining in Winza is increasing?

    a) Yes [ ]

    b) No [ ]

18. Mention at least four factors responsible for the increase of small scale mining in Winza?

    v) .....

    vi) .....

    vii).....

    viii) .....

19. Are there any environmental impacts of small scale mining to your society?

    c) Yes [ ]

    d) No [ ]

20. If the above answer is yes! Mention at least four environmental impacts

    v) .....

    vi) .....

    vii) .....

    viii) .....

21. Are the impacts of small scale mining at the level of: (Circle one)

    a) Local b) Regional c) National or, d) Global

22. Do you think small scale mining in Winza is sustainable?

    c) Yes [ ]

    d) No [ ]

23. Please give reasons for your answer

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……

.....

.....

24. Are there any efforts by the Government to prevent small scale mining at Winza?

c) Yes [ ]

d) No [ ]

25. Please mention those efforts

.....

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26. What should be done by the Government to enforce its laws in the management of small-scale mining?

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