SOCIO-ECONOMIC CONSTRAINTS AMONG LOCAL ARTISANAL MINERS IN SIMANJIRO DISTRICT, TANZANIA

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ABSTRACT

The study was aimed at assessing the socio-economic constraints facing small scale miners in their effort to reduce income poverty. Specifically, the study identified activities performed by local miners; assessed socio-economic challenges faced by local artisan miners in their daily activities and assessed socio-economic challenges that faced Local Artisanal Miners (LAMs) towards poverty reduction. The study was done at Mererani in Simanjiro District whereby data were collected from 100 local mining workers. Simple random sampling was applied to select respondents. Both qualitative and quantitative data were collected. The study focused on the artisanal miners who worked under the supervision of the claim owners. The study employed a cross - sectional design whereby data were collected through personal observations, self - administered questionnaire and informal discussions with local miners and officials at the study area. Four blocks and one ward were selected in the study area. The study found out that all the respondents interviewed were male. Results revealed that socio-economic constraints were significant to the poor performance of the sector towards poverty reduction among them. The findings show that the technological constraints were fairly low. The majority of the local miners admitted that these socio-economic constraints limited them to accumulate the potential wealth from the mining sector. Lack of government support, lack of adequate operation funds and lack of market center to provide information to local miners were the factors leading to poor social – economic status among the LAMs. It is recommended that, the government should rectify the existing situation through improvement of working condition and advanced simple technology among local miners so as to reduce the level of poverty through small scale mining which employ majority of unskilled youth in Tanzania particularly at Mererani. The study findings suggest that the government should intervene to find a way to reduce

price for mining tools so as to enable the LAMs to afford to buy and use simple sophisticated technology.

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DECLARATION

I, Joel Joseph Sosy, do hereby declare to the Senate of Sokoine University of Agriculture that this dissertation is my own original work, and has not been submitted for a degree award in any other University.

……. ……

Joel Joseph Sosy Date

(Candidate)

The above declaration is confirmed:

…… ……..

Dr. Anna Sikira Date

(Supervisor)

DEDICATION

This work is dedicated to my beloved parents, the late Mr. Joseph Gareya Sosy who laid the foundation of my education and Mrs. Rustica Joseph Sosy who shaped my Career with her affection, love, diligence and encouragement.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

ABBREVIATIONS

ASM	Artisanal and Small Scale Mining/Miners
CBO	Community Based Organization
CDO	Community Development Officer
DED	District Executive Director
DPO	District Planning Officer
GDP	Growth Domestic Product
ILO	International Labour Organization
LAMs	Local Artisanal Miners
LGAs	Local Government Authorities
MARD	Master of Rural Development
MAREMA	Manyara Region Mining Association
MDG	Millennium Development Goals
MMSD	Mining, Mineral and Sustainable Development
NBS	National Bureau of Statistics
NGOs	Non - Governmental Organizations
NSGRP	National Strategy for Growth and Reduction of Poverty
REPOA	Research on Poverty Alleviation
SEWOMI	Simanjiro Entrepreneur Women Miners
SNAL	Sokoine National Agricultural Library
SPSS	Statistical Package for Social Sciences
SUA	Sokoine University of Agriculture
TAWOMI	Tanzania Women Miners
UN	United Nations
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa

URT	United Republic of Tanzania
TANESCO	Tanzania Electric Supply Company
VEO	Village Executive Officer
WEO	Ward Executive Officer

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background Information

The mining sector is a potential driver of economic growth and poverty reduction in the global and national levels. Artisanal and small-scale mining is a global phenomenon too, with estimates of those directly involved in the activity ranging from 13 to 20 million people in over 30 developing countries (Anglo Gold Ashant report 2006). Further, 80 to 100 million people depend on the sector for their livelihood (Lucie *et al.*, 2001). World Bank (1996) points out that over 550 000 people were directly employed in small scale mining in Tanzania. However, Mwaipopo *et al.*, (2004) assert that the mining Act of 1998 entailed a number of changes which have resulted in both a decrease and an increase in small scale mining over the previous years. It is estimated that a number of small scale miners increased from 500 000 to 600 000 (Hentschel *et al.*, 2002).

Nanyaro (1994), as cited by Kulindwa *et al.,* (2003) points out that about 80% of all mineral revenues in Tanzania were derived from artisanal miners actively participating in the mining industry. Fifty percent of all mineral revenues are from gold small scale miners, and the other thirty percent comes from gemstone local artisanal miners in Tanzania (Mwaipopo *et al*., 2004). Most of the gemstones found are mined by local artisanal miners at Mererani in Simanjiro District. The mining sector is believed to be the second fastest growing sector after tourism in Tanzania. However, Local artisanal miners in Tanzania and in other African countries have little prospect of meaningful employment; most of them are living in extreme poverty, and it is the most important group to assist when it comes to using minerals for development (Kulindwa *et al.,* 2003).

The sector may be carefully managed and regulated to ensure that Tanzanians are directly involved and derive maximum benefits from the sector. One of the targets of Millennium Development Goals is the need to eradicate poverty and hunger in the developing countries. As part of efforts towards achievement of the National Development Vision 2025, the government of Tanzania will continue to give priority to the mineral sector through the National Strategy for Growth and Reduction of Poverty (NSGRP) (URT, 2005). However, ILO and MMSD (2002) indicate that most of the local miners involved in this sector in Tanzania are poor. The indicative list includes: poor working conditions, in particular obligation to use crude tools which risk their health, work in geographically isolated environment with limited social interaction and limited assets value ownership. Lack of a conducive and supportive environment under which the sector could prosper resulted in disorganised activities, which is leaving most operators trapped under a negative poverty cycle (Hentschel *et al.,* 2002).

Furthermore, there is an evidence of development policies and projects formulated bypassing the sector in Tanzania. In 1997, the Mineral Sector Policy (1997) was formulated in Tanzania. According to the Policy, the government's role will first of all be to regulate and promote the mining industry rather than being directly involved in the exploration of the minerals (URT, 1997). Following these measures, private companies (both foreign and local) have taken the lead in operating, managing and owning mineral enterprises in Tanzania. The government's principal objective is to develop the mineral sector and increase its contribution to the economy by ten percent of GDP by 2025. The new policy also outlines strategies for strengthening community participation and involvement in mining (Lange, 2006).

In 2007 the Government published a new Act in which there is a full section on local artisanal mining and large scale mining. This new Act investigates social economic hardships faced by local artisanal miners in their struggle to eradicate income poverty which influence limited participation in the development process in Tanzania. Although the Tanzania Mining Act of 2007 has been able to increase an awareness and understanding of the challenges facing local artisanal miners and their needs, they have not yet resulted into providing significant development priorities to eke their living (Tesha, 2000). The study, therefore, aimed at investigating the socio-economic constraints faced by local miners in their struggle to reduce poverty.

1.2 Statement of the Problem

Tanzania is rich in minerals and gemstones. There are large deposits of Tanzanite, Rubby, Green Garnet, Gold and Green Tourmaline (Lange, 2006). There are a range of approaches to artisanal and small scale mining in which the Government of Tanzania is currently engaged. These include: reform of the mineral policies, legal and regulatory environment to attract large scale investors to invest in the mining sector. For example the mineral policies of 2006 and of 2010 aimed at increasing state revenue and accelerate socio-economic development by reforming tax codes and regulatory laws and making them more beneficial for the state and the local mining communities. Although artisanal and small scale mining is recognized by the Government, little had been done to implement new policies on Local Artisanal Miners (LAMs). A research conducted by Rukonge (2006) at Mererani in Simanjiro examined the impact of transitional corporation on the artisanal and small-scale miners and their communities' development. However, Rukonge's research did not focus on the specific socio-economic constraints that face local artisanal miners. The point that needs to be understood, however, is that, a number of factors are responsible for small scale mining operations which are capable of

widespread and significant to the poverty reduction effort as demonstrated in Mererani where a number of LAMs depend on this sector.

There are studies conducted in Africa which show a number of constraints that negatively affect LAMs' activities. Lucie (2007) mentioned some of the constraint as difficulty in accessing bank, finance due to lack of property rights, lack of geology and management skills and harassment due to the fact that LAM operates in location and premises that are not meant for small scale mining activities. While the above mentioned factors negatively affect LAMs, some of them and others not mentioned are associated with poverty reduction among LAMs. Local miners seem to be very poor than others in mining sector due to their exposure to as mentioned above. It is therefore necessary to explore these various constraints and assess issues and factors leading to poverty despite the seemingly high income levels gained by some individual miners.

1.3 Research Justification

There is wide spread tendency of measuring the contribution of mining to the economy by looking at the large scale mining. For instance, some studies have indicated a number of local artisanal miners as insignificant to the growth of the sector (Kramcha, 2004). This study is also in line with Millennium Development Goals that aim at eradicating poverty by 2015. On the other hand this study is also in line with Tanzania Development vision 2025 that aiming at accumulating 10% of GDP from the mining sector by 2015. Findings from this study will be useful for development planners, policy makers, and practitioners in relevant ministries, mining institutions, LGAs, NGOs, CBO's and other bodies interested in local artisanal miners' improvement of livelihood. Similarly, it will contribute towards designing new, or redesigning the best approach for local miners in Simanjiro District and Tanzania at large.

1.4 Objectives of the Study

1.4.1 General Objective

To investigate socio-economic constraints faced by local artisanal miners in their struggle to reduce poverty.

1.4.2 Specific Objectives

i. To identify activities done by the local miners.

ii. To examine challenges faced by local artisanal miners' activities.

iii. To determine the link between miners' activities and income poverty reduction.

1.4.3 Research questions

i. What are the activities of local miners?

ii. What are the challenges associated by local miners work?

iii. What are the factors limiting local artisan miners to reduce poverty?

iv. What is the level of poverty before and after involvement in local artisanal mining?

1.5 Conceptual Framework

The conceptual framework of this study was based on the theory of social exclusion. Based on this theory and according to Hilson (2000), it was assumed that lack of real and accountability data on the significance of the mining sector at local and national levels is a handicap to a more positive or constructive attitude to the sector. For LAMs mining is the matter of survival i.e. whatever is produced is just from hand to mouth. These constraints hinder them to accumulate the unrealized benefits from the sector. Most of them remained in extreme poverty.

The study further assumed that due to poverty, some of the LAM had migrated from far regions to seek for income through mining activities. The reasons towards mining activities are influenced by their situation of poverty and the need for immediate survival. To them, responding to immediate short-term survival or satisfying basic needs assumes greater importance than protecting long-term benefits. The study also assumed that the isolation of LAMs in Government policy and actions from development planning and from wider social and economic constraints such as health care and natural resource management is quite significant (Mwaipopo *et al.*, 2004)

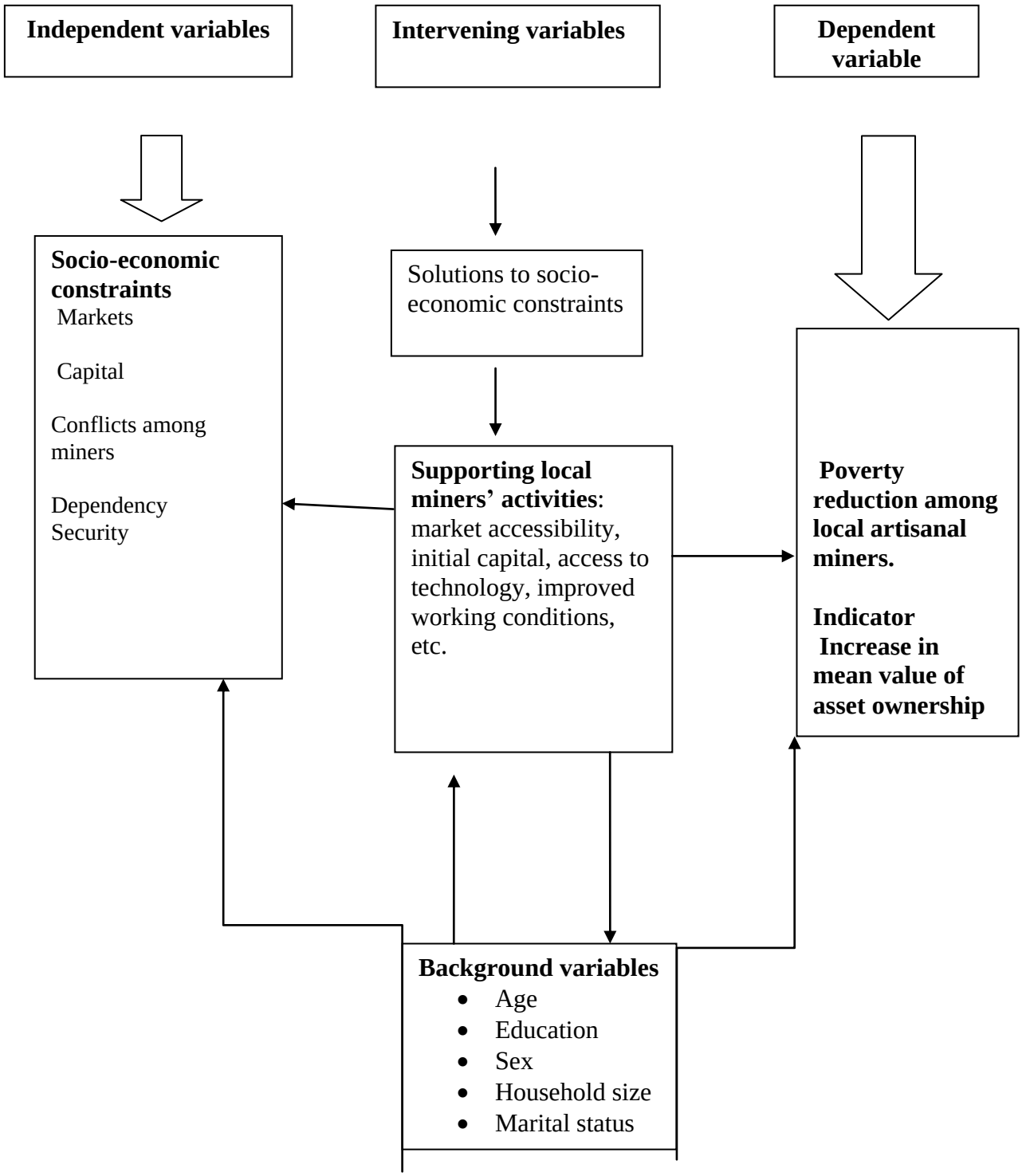

Figure 1: Conceptual framework.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Definitions of applied Concepts

2.1.1 Small Scale Mining

Small scale mining can be defined differently by different people. For the case of Tanzania small-scale mining can be classified into formal small-scale mining and artisanal mining. These words are used interchangeably as Chachage (1995) cited by Kulindwa *et al.,* (2003) calls small scale "Artisans" implying that the word small-scale and artisanal mining are interchangeable. Informal small-scale miners or artisanal miners, on the other hand, hardly ever have a legal right to the mineral deposits they exploit and monitoring of their activities is problematic. Mostly artisanal miners are found in rural areas either of gold, diamond or colored gemstones.

Although artisanal mining provides a source of income, it causes a lot of undesirable effects. Being excluded, it is often unsafe, unhealthy and environmentally unsound, and can give rise to social problems and crime (Lange, 2006). On the other hand, there is currently no agreement on the definition of artisanal or small-scale mining, and what constitutes a small scale mine is still a controversial issue amongst those who are involved in the mining industry. For example, in Tanzania artisanal mining definition is based on different aspects, including, investment costs, labour requirements, ore production rates, size of concessions, amount of reserves, annual sales, or any combination of the above. Barnea (1978) as cited by Mutagabwa *et al.,* (1997) revealed that the United Nations definition sets the upper boundary of production as 50 000 tonnes per annum from open cast operations. Another definition is based on the cost of investment and sets the upper limit for small-scale mining below the lower limit of

project financing by commercial financial institutions or mining finance houses, i.e. $3-5 million capital(Mutagabwa *et al.*, 1997). In the Tanzanian context, the definition of small-scale mining is provided in the "Small-scale Mining Policy" (1983) which indicate the characteristics of small scale mining as Labour intensive with low initial capital below TShs.500 000/=(Mutagwaba *et al*., 1997). Small scale mining does not require skilled labour and/or specialized technology. The gestation period from exploration to production is short.

World Bank's term "subsistence mining" and the SADC Mining unit term "micro-scale mining" to refer to those activities carried out by individuals, families, groups of indigenous people (Kramcha, 2004) the majority of which have no technical expertise and lack adequate working tools but adapt the trade through practical experience Artisanal mining in Tanzania has also been abstracted as a response by people to handle poverty. Since it operates informally, and outside the government structured administrative and institutional framework, it has attracted many people. It also requires neither large investment nor sophisticated equipment, and has considerably more job creation potential than mechanized mining because it is labor intensive and attracts unskilled labour. Often local miners exposed to socio-economic constraints which include, the absence of appropriate mining technology; low safety standards; poorly trained personnel; deficiencies in planning for mining and processing activities, hence low productivity; poor remuneration; lack of capital, seasonal mining and sometimes operating without concession rights (Priester *et al.,* 1993) as cited by Rosemary(1997). Productive capacity is therefore greatly influenced by low skills and low technological capacity, in addition to other factors which affect the share of earnings.

2.2 Socio - Economic Activities of Local Mining Scale

2.2.1 Artisanal Miners and Official Working

A report by the MMSD (2000) reveals that when small scale miners are included in official planning, they are often treated as powerless individuals who should be given assistance. Poverty is generally characterized by low incomes and the inability to satisfy basic needs. It also entails exclusion of individuals and families from the productive process, from integration into the larger society and from access to opportunities. The roots of poverty can be found in the unequal distribution of resources and opportunities. Often people are forced by poor living conditions to engage in various productive enterprises regardless of the risks involved, or the conditions for production so as to attain basic requirements and to survive (Mwaipopo *et al.,* 2004). Attempts to reduce poverty should thus also involve provision of basic services such as health and education. Education, skills and technology improve not only the efficiency in production but also the life styles of the producers. Thus, at another level poverty should also be considered in light of the environmental circumstances which hinder the development of certain capabilities, such as knowledge, information, or inequality in access to resources. Education and technologies among local miners in Tanzania still a constraints to their efforts to fight poverty.

2.2.2 Artisanal Miners

As part of our development goals, there ought to be specific policies geared to the promotion of local artisanal miners' participation in local planning. This is done in order to contribute to overall welfare in society (D'souza, 2002). So, whatever resource Rationalization is undertaken, it is not performed to the harm and disadvantage of local miners, because these miners have attribute of which outsiders are unaware. In Tanzania there is no enough evidence to show the government support to local artisan mining.

Nonetheless in 1983 the government published a policy paper on local artisan mining with the aim of transforming the sector into more organized operations. In 1985 the government of Tanzania introduced three processing plants, two for gold and one for tin. These were to assist the local miners through delivery of centralized processing services. The three plants were located at Kasenga in Chunya, Kyerwa in Karagwe and Buziba in Geita. Despite the good intention the lack of proper research in the sector, poor coordination and inadequate financial resources, led to complete failure of the project.

2.2.3 Artisanal Miners and Education in Africa

The most fundamental reason for the existence of an educational system is that education plays a significant role in the economy of any society. In view of this, it is essential that the education provided meets the economic needs of that society, thus enhancing efficiency in the use of social and economic resources, ultimately leading to improved economic growth and social well-being (Mugisha *et al.,* 1991; Mwamwenda, 1994). According to (Browne and Barrett, 1991) lack of education on the part of inferior group deprives them of their productivity levels in their activities, because they remain ignorant of ways and means of production. Katar (2009) reveal that investment on education and training produces very high internal rates of return in economic output. There is positive correlation between the literacy rate and per capita gross domestic product (GDP) for 48 developing countries sampled the simple correlation between these variables was 0.48. The poor quality of the mining workers, in line with very low per capita availability of capital, explains to a large extent the low productivity and, hence, the low per capital income in Tanzania mining sector.

2.2.4 Women among Artisanal Miners

The number of women in small scale mining activities is generally high. In Guinea women comprise 75% of those involved in the sector, in Tanzania more than 137500 (25%) of women are employed in this sector. Women participate in small scale mining not only to do the mining but also they supply food, drinks, tools and equipment, as well as sexual activities. Women are also involved in trading of minerals such as gold and Gemstone. However, women participating in small scale miners in the family context, it is often the male head of household who controls the income derived from mining and women do not necessary receive a proportionate amount of the income generated.

Simanjiro Entrepreneurs and Women Miners (SEWOMI), is a membership women organization that supports women miners. Although the nature of mining is not conducive for women working in shafts, a good number of them own pits, and some play the role of sponsors giving money to men pit owners who are economically weak. Members of SEWOMI work as brokers, exploiting the profit and at times re-buying gemstone from the share given to their causal workers to go and sell it to master dealers in Arusha or Dar es Salaam. Another group of business women is the Tanzania Women Miners Association (TAWOMI) at Mererani. This is national wide group with branches in mining places to facilitate women miners to organize and access required financial, technical and marketing services so that they can carry out mining activities, leading to both economically and socially development.

UNIFEM affirms that frequently the organizational level is superior to those run by male, women are not given equal opportunities regarding access to financial, technical or legal support only 6% of them had been able to obtain a loan to invest in their mining operations. As a way to overcome the barriers to women advancement within the sector

a numbers of women's mining associations have been developed. At Mererani the situation is not encouraging since there is no any Private or Government institutions to support these associations.

2.2.5 Occupational Health and Safety

Accidents or occupational diseases however are mostly unavoidable in the mining areas. According to ILO (1999) exposure to dust, exposure to mercury and other chemicals, effects of noise and vibration, effects of poor ventilation and inappropriate equipment are major health risk in small scale mining. Causes of accident in small scale mining are due to the rock fall, lack of ventilation, misuse of explosives, and lack of knowledge. Many miners die in the mining pits during explosions. It was established that the rate of mining accidents in the pits is low compared to the health hazards and illnesses occurring in the settlements. There is also lack of adequate sanitation facilities; the source of water for domestic use is the same as that for mineral processing. The protective gears among local miners were non-existent. As a result, barefooted miners had cuts from rocks due to lack of safety boots and gloves, and some were found working under hanging roofs of open slopes without any safety helmets. Local artisan miners use jackhammers for drilling without using water for dust overthrow at Mererani. Artisanal mining workers are exposed themselves to number of health risk such as being hit by the falling rock due to inappropriate working tools applies by artisan and small scale miners (UNDP, 2011). This situation is also observed almost in all Tanzanite mining areas, the ore has high silica and graphite content. According to Mutagwaba *et al.,* (1997) graphite and silica dust leads to lung diseases commonly known as *pneumoconiosis.*

2.3 Socio-economic Constraints among Local Mining Scale

Local artisanal mining scale determined by a number of factors such as education level, capital invested on production, income level, critical livelihood options and technology applied on production. Miners with high socio-economic status are likely to receive information about the market price of the mineral. Local miners with low socio-economic status receive the information of their produce from neighbors and brokers (*madalali).*

Most small-scale mines are working under marginal economic conditions, providing daily living for their owners or workers. As even basic safety measures have a certain cost (in cash or kind) small-scale miner's common economic understanding tends to economize al not revenue related cost items (Hentschel, 2002). Unawareness of risks, especially concerning risks of chronic occupational diseases (dust, vibrations, nitrous gases, mercury, cyanide, etc) due to missing or inadequately implemented education and training. Education and training programs need to be designed according to the social, cultural and ethnic characteristics of the small-scale miners' communities (Hentschel, 2002). Accidents or occupational diseases however are mostly unavoidable in mining areas. According to ILO (1999) Exposure to dust, mercury and other chemicals, effects of noise and vibration, effects of poor ventilation and inappropriate equipment are major health risk in small scale mining.

2.4 Review of Studies Done Outside Tanzania

Studies on small scale mining have been conducted in various countries all over the world. The findings from these studies are useful to new researches on the same sector. Some of the studies, which had a significant contribution, include the study by Lucie (2007) in Ghana. In his study on Artisanal and small scale mining Poverty in Ghana the

author was interested at assessing the reason for formalizing Artisanal miners and its impact on poverty reduction. This study revealed also that in comparison with other anti-poverty measures, small scale miner appears to be successful and relatively cheap at reducing the poverty of those close to the poverty line.

Hassan and Renteria-Guerrero (2001) made another empirical contribution in this area. In their work "*The experience of the small scale mining in Bangladesh*", they examined the small scale mining experience with a purpose of understanding the essential elements of its operations and the factors that enabled local artisanal to escape poverty. These facts assert that the local artisanal miners approach seems to be an effective tool for rural poverty reduction despite minor criticism that has never given alternative solution.

2.5 Review of the Studies Done in Tanzania

Recent studies have shown that, there are over 550 000 in Tanzania, but their overall performance has been poor. Rukonge (2006) evaluated the performance of artisanal and small scale mining at Mererani. The findings revealed that, the overall involvement of government sector to support small scale miners in Tanzania is poor and only few of them have clear and strong organizational structure. It was further observed that small scale mining in Tanzania lack participatory ownership and majority are donor driven. Although client outreach is increasing, with discoveries of new mining areas in many regions of the Tanzania mainland, still local artisanal miners activities remain in unfavorable working condition. studies on small scale miners, in Tanzania done by Kulindwa *et al.,* (2002) and. (2003) examines the role of financial sector in generating small scale mining activities. Their findings reveal that strategies in which informal and quasi-informal financial institutions support to small scale mining activities did not accessed by small scale miners.

From above evidence the researcher found out that there is a strong need to study the constraints among local artisanal mining existing in Tanzania and see to what extent their existing contribute to poverty reduction in the country. Expected contribution of this study is reduction of socio-economic constraints among local miners and improvement of their livelihood. This study investigated the existing constraints among local artisan miners and their effects to poverty reduction.

CHAPTER THREE

3.0 RESEARCH METHODOLOGY

3.1 Description of research Area

The research was conducted in Manyara Region, Simanjiro District. Manyara Region is located in the Northern part of Tanzania bordering Kilimanjaro Region to Northeast, Arusha to North, Tanga to the East, Morogoro and Dodoma regions to the South and Singida and Shinyanga regions to the West. Simanjiro District is one of the five Districts of Manyara Region; other districts are Babati, Kiteto, Hanang and Mbulu. According to the National Census (2002), the population of the district was around 141 676; of whom 76 753 were male and 64 923 were female. Simanjiro District has twelve wards which include Orkesumet, Naberera, Loibor-siret, Emboreet, Terrat, Oljoro-no 5, Shambarai, Mererani, Msitu wa Tembo, Ngorika, Ruvu- remit and Loiborsoit.

3.2 Location of Mererani

Almost half of Simanjiro population lives in Mererani ward, which is a multi ethnic mining area composed of a conglomerate of people from Tanzania and neighbouring countries (Lange, 2006). Mererani is located 150 kilometers from Simanjiro District Headquarters, 70 kilometres from both Arusha and Kilimanjaro Municipalities. The original inhabitants of Mererani are Maasai and Meru. However, due to immigration, immigrants are estimated to occupy a big portion of the population (URT 2002). Mererani consists of five villages which are Songambele A, Songambele B, Zaire, Kazamoyo and Endiyamutu. Mererani is the only place in the world that put Tanzania on the map of Tanzanite producer. One reason for population growth in Mererani could be the contribution of the mine rush. A number of people go to Mererani on various reasons, but generally to make fortune. One of the local miner interviewed during the

study was quoted *"I have come to Mererani search for wealth since 2000, although I have not yet got it, its my hope that one day I will find it."*

There is almost every tribe presented in the area such as Wachaga, Waarusha, Wameru and Masai who score highest percentage in the area. The presence of minerals and gemstones in Mererani makes the places to be major destinations of immigrants from other regions in Tanzania and outside the country. Immigrants to Mererani benefit either as service providers, miners or dealers and brokers. Tanzanite mining is located on a six km long belt, four kilometres south of Mererani town. The major means of transport from Mererani town to the mining area is motorbike commonly known as "*boda boda*". The mining area is divided into four blocks, namely block A, B, C and D. New concerns for explorations for these minerals on block C are currently being given to larger companies known as Tanzanite One Company.

3.2.1 Climate

The landscape is dominated by dry bush land and rocky hills. The area is dry due to shortage of water and deforestation is a great problem, especially in the areas surrounding the mining sites. The climate of Mererani is closely related to sub tropical with a mean annual rainfall or little rainfall.

3.2.2 Population

According to national census of 2002, the population of Mererani was estimated over 50,000 (URT, 2002). Currently (in 2012) the population of Mererani is estimated to be around 60,000 and 100,000. Mererani ward in Simanjiro is the highest populated area compared to other wards.

3.2.3 Economic activities

The main economic activity taking place in Mererani is mining. Both large scale and small scale mining is taking place in the area. Despite mining activities, few people are involved in other activities, for example livestock keeping in a traditional model of production which provides financial and natural capital to the Masai population which were the original inhabitants of Mererani. The pastoralists provide livestock products to miners and mining community, although they live some kilometres away from Mererani town. Crop production was another economic activity taking place in Mererani. However, farming is highly affected by climatic changes in the area forcing young people to opt for other options including mining.

The small scale mining sector in Mererani employs the majority of the artisan miners. There are 800 claim holders in the northern zone, of which 300 are active at any given time. Manyara Regional Miners Association (MAREMA), on the other hand, operates with 700 miners at Mererani, of whom 380 are active. Each of the active claim holders have 30-60 workers which makes 21 000 to 42 000 small scale mine workers at Mererani. In the period before production, the small scale mining workers are not given salaries they only get food and shelters.

Tanzanite One Company is the only large scale mining company operating at Mererani. This company received its licensed in 1999 and started working in 2001, after investing US$ 17 million. The mine currently has six shafts, 750 meter deep. All in all, the mine has 420 employees, of whom 160 are security staff, 84 Tanzanian professionals.

3.3 Research Design

The study employed cross-sectional research design in which data were collected at one point in time. Such a design is highly recommended by Bailey (1998) and Babbie (1990) for determination of relationships among variables

.

3.4 The Study Population

The targeted population was the entire population of men and women aged from 18 and above who were involved in small scale mining. Miners with low income normally spend a lot of time in these activities to supplement incomes for their families. Information was also sought from key informants who were in a position to provide relevant information, ideas on constraints associated with local artisanal mining. Potential respondents included regional mining officers, District Community Development Coordinators, Mining association officers and NGOs like HAKI MADINI and Good Hope that deals with communities along the mining areas.

3.5 Sampling Procedure and Sample Size

Probability and non-probability sampling procedures were used to select respondents. For probability sampling, simple random sampling technique was used to obtain individual local artisan respondents. Six to fifteen respondents were also selected for focus group discussion (FGD) from the population within the study location. The total sample sizes of 100 respondents were selected using simple random technique. Simple stratified random was used to select sample size of the study. Stratified sampling is suitable when dealing with homogeneous subgroups like local artisanal miners. Random sampling was then selected twenty respondents from each mining block. Eighty respondents were selected from four blocks located at the mining pits and the remaining

20 from Zaire Kati ward. Therefore, 100 respondents were selected as the sample size of the study.

Non probability sampling was used to obtain key informants. These were ward officers, village leaders, NGO leaders, pit owners and claim holders who were selected for interview at Mererani area. These key informants were selected purposively due to their working experience to provide information on matters related to local artisanal mining in the district.

3.5.1 Sampling Unit

The sampling unit was an individual local miner, and the total sample size was 100 respondents. The study was conducted in five mining areas known as Block A, B, C, D and Zaire Kati ward. Twenty respondents were selected from each block. These mining areas were selected purposively because they were occupied by the majority of the local artisanal miners.

3.5.2 Pilot Study

It is better to assess reliability and validity of indicators before carrying out the actual study (Yin, 1994). A pilot study was conducted prior to the main study to pre-test the questionnaires whereby 10 respondents were interviewed. The pilot study was meant to assess the time planned for completing the interview and to observe reaction of respondents as they responded to certain questions. After pre-testing no major changes in content were required, except that there were certain questions which were not relevant to the study; therefore those questions were modified. The research team comprised one research assistant and one principal researcher. The assistant researcher was recruited from Arusha Region. The research assistant underwent training on the

purpose of the study, data collection procedures, recording of collected data, instruments to be used in the study, need for collection of all data from each identified individual and issues of confidentiality. The assistant researcher was trained to observe ethical issues such as seeking informed consent from the respondents and maintaining their anonymity before and during interviews. Note books were used for recording additional information that could not be recorded in the questionnaires. Lastly, he was informed that the overall quality of the data collected would entirely depend on how respondents were approached and how the questions were asked.

Prior to actual data collection, the objectives of the pilot study were to (i) familiarize with the areas where the study was to be conducted, (ii) find out the most efficient way of carrying out the main study, and (iii) pre-test the questionnaires in order to validate the relevance of the questions to the intended respondents. According to de Vaus (1993) and Yin (1994) cited by Jeremiah (2009), it is wise to assess reliability and validity of indicators before carrying out the actual study. The study was conducted after obtaining permission from the Simanjiro District Executive Director (DED) and a go ahead from the ward executive officers (WEO) from both Mererani and Endiyamutu in the study area. Before visiting mining areas, permission letters from DED and WEOs were shown to the respondents of the mining blocks. The research team received maximum cooperation from all leaders at different levels in the area.

3.6 Data Collection Instruments

The study employed different methods of data collection, whereby both primary and secondary data were collected using questionnaires designed as instruments for primary data collection. Furthermore, Checklists of questions were used for collecting qualitative data from various officials in the study areas (key informants). The research was

conducted in four mining blocks and one village within Mererani area. These mining blocks were; Block A, B, C, D and Zaire Kati Street. These areas were selected because of their representatives in terms of number of artisan miners. Block C was found to have few local artisan miners because it has been given to large scale foreign company known as Tanzanite One Company.

3.6.1 Quantitative Data Collection

Quantitative data were obtained thorough a structured questionnaire administered to respondents. The Questionnaire, containing both open and closed ended questions were used in collecting primary data in the study area. The questionnaire was formulated in English and translated into Kiswahili to facilitate communication during data collection. Frequency tables and pie charts were used to analyze the quantitative data.

3.6.2 Qualitative Data Collection

Qualitative data were collected through interviews, physical observation and focus group discussions by using checklist guidelines.

3.6.3 Focused Group Discussion

The focused group discussions were conducted in two groups under the facilitation of the researcher. In order to get more details as far as the research topic of the study was concern. Checklists were used to guide both discussions. Kiswahili language was used during discussions. The researcher introduced the topic and allowed the group to discuss one theme after another. The discussions were held for about two hours in each session

3.6.4 Key Informant Interview

A checklist was used to guide the interview with ward leaders, NGO leaders, local mining association officers, resident mine officers, brokers, and claim holders. The aim of conducting key informant interview was to get more details on the issues related to the local mining activities and to verify if the local artisanal miners are recognized by these institutions.

3.7 Secondary Data Collection

Secondary data were obtained from various published documents, unpublished documents and reports from different organisations, including from planning office, health officer and community development officers. Others sources were websites and other publication document from Sokoine National Agricultural Library (SNAL). The data from DPLO, CDO and health officers were mainly on socio-economic aspects of the District.

3.8 Data Processing and Analysis

Data were coded, summarized, and analysed by using Statistical Packages for Social Sciences (SPSS) computer software in conformity with objectives of the study. SPSS was chosen because it can take data from almost any type of file and use them to generate tabulated reports, charts, perform descriptive statistics and conduct complex statistical analysis (Collins, 2005). Frequency distributions were used to variables in relation to objectives of the study. Chi-square test was used to determine relationship in variables. The significance level of 0.05 was used in deciding whether there was significance variation among variables. Multivariate technique was used to analyze the variation between variables. Since the study had three objectives, data collected for each objective was analyzed accordingly.

3.8.1 Methodology by Objective

3.8.1.1 Identification of Activities done by Local Miners

Identified activities of LAMs were assessed using descriptive analysis. Income generation from mining activities, women participation in mining activities and motivation behind LAMs activities were analyzed descriptively.

3.8.1.2 Challenges Facing LAMs Activities

Socio-economic, institutional and technological challenges were descriptively analyzed. The respondents were requested to mention challenges they faced in their activities in twelve months preceding the study. Based on their responses, the frequencies were calculated.

3.8.1.3 Poverty Reduction among LAMs

The relationship between local mining activities and poverty reduction was analyzed. Total value assets ownership was used as an indicator of poverty reduction. Each respondent was asked to mention whether the value of assets they own increased, decreased or remained the same between two years back and the one of data collection. The five assets mentioned were: household furniture, transport facilities, communication, working facilities, cooking facilities and durable assets. The total value of assets owned by respondents were calculated and grouped as 2 000 to 20 000, 21 000 to 50 000, 100 001 to 1 000 000 and those between 1.1 milion and above. High poverty reductions were considered to those with asset value above 1.1 million. Medium poverty reduction was regarded to those with assets between 100 000 to 1 milion. Those with value assets below 100 000 fall into low level of poverty reduction. Chi square model was used to compare the mean of asset value ownership between two years ago and the year of the survey.

3.9 Qualitative Data Analysis

Qualitative analysis in which opinions from respondents based from focus group discussions, documentation review and observation was analyzed by content analysis technique. In many cases the actual words of respondents related to the theme of the study were considered. The responses to open ended items (qualitative data) in form of phrases and words were organized followed by creating categories, themes and patterns related to research questions. This was analyzed and reported by descriptive narrative (Mugenda & Mugenda, 1999). The results of the data gave the researcher a basis to make conclusions about the study.

3.10 Limitation and Delimitation of the Research Methodology

This study, though successful, had some limitations. Some of the respondents were not ready to answer some of the questions for fearing their security. The researcher showed them permission letters from DED for conducting research in Simanjiro District so as to assure them that the study had nothing bad so they should not worry to participate. Furthermore, it was very difficult to get a monthly rate of income for this sector because it all depends on successful production of minerals and also because the miners neither have data nor provide returns on production, or submit under stated production figures. Productivity rates are kept a secret making it difficult to establish actual production figures from these operations. Similarly, judging from the material accumulation and levels of expenditure, it was not so easy because of the nature of mining at Mererani. Some local mining workers earn nothing a month end up with getting only food as salary. Therefore, since it was difficult to get monthly income among local artisanal miners in Mererani, the study focused on the values of assets owned by LAMs to assess the level of poverty reduction.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Background Characteristics of the Respondents

4.1.1 Age of Respondents

The research findings as presented in Table 1 show that the majority (43%) of respondents were in the age between 18 to 30 years of age. This suggests that the majority of young people in Mererani are involved in mining activities. This is the fact since small scale mining activities require young and energetic people. As indicated in Table 1, more than 40% of the respondents were below 50 years of age. In addition, the elderly above 50 years of age comprised of 7% and those above 60 years who were only 2% of the respondents. This reflects the nature of activities in the mining area whereby the elderly appeared to be excluded in the process. Local miners who were below 18 years were only 8% of the respondents. This group was mainly made up of people who had completed primary schools and could not easily find way to secondary education or formal sector employment.

Table 1: Age of respondents

Age	Frequency	Percent
Between 18 and 30	43	43
Between 31 and 50	40	40
Below 18	8	8
Between 51 and 60	7	7
Above 60	2	2
total	**100**	**100**

4.1.2 Marital status

Data as presented in Table 2 indicate that the majority of the respondents were married. Overall, 52% of the respondents were married, while only 39% were single and 5% were

divorced while 4% were separated (Table 2). These results are typical characteristics of many areas in Tanzania whereby 60% women and 50% men are married (NBS, 2002). The situation can be explained by the fact that local mining is not a formal sector, and the majority of local miners have no formal education. Therefore, since married men and women have family obligations, they engage in local mining activities in order to generate cash income to meet various family needs or requirements. In this regard mining is serving as a source of income. This is in line with studies indicating that to most of the urban poor the informal sector has for a long time been a way to rescue them (ILO, 1972; World Bank, 2009). This implies that married local miners migrated to Mererani only for the purpose of mining so as to accumulate wealth from the sector to meet family income requirements.

Table 2: Marital Status of Respondents

Status	Frequency	Percent
Married	52	52
Single	39	39
Divorced	5	5
Separated	4	4
Total	**100**	**100**

4.1.3 Education level of respondents

The finding from the study shows that the majority (86%) of the local miners had only attended primary education. Only 6% of the local artisanal miners had attended secondary education while 8% of them had no formal education. This indicates that most of the local miners engaged themselves in the mining after completing primary education, which is compulsory for all in Tanzania, could not either afford or pass for higher education. The majority of the local miners with primary education had pushed themselves into mining activities due to little possibility of involving themselves in the formal sector. According to Mushi and Kent (1995) the formal sector in many

institutions in Tanzania requires at least secondary education level. Local miners with primary education certificate find it hard to penetrate into the formal sector which requires advanced or professional training. It was also observed that among those respondents with primary and secondary education, many had not even completed their primary education. As a consequence, this has led to a higher illiteracy rate among inhabitants of the study area. Education level is an important tool, and is needed to stimulate, create, achieve and enhance active production of mining workers in development. The rate of local artisan miners' participation in development initiatives is strongly influenced by their educational levels (Munbodh, 2003). This means that education level has an immediate effect on the type of mining scale. The higher a local miner is educated, the greater the likelihood she/he would be included in the labour force and the lower the likelihood he/she would be unemployed. A lack of education is enhanced by inequalities and disparities in the labour markets, including absolute poverty among local artisanal miners in Tanzania.

Table 3: Education level of respondents

Education level	**Frequency**	**Percent**
Primary education	86	86
None	8	8
Secondary education	6	6
Other	0	0
Total	**100**	**100**

4.1.4 Sex

The findings from the study show that 100 of the respondent interviewed were male. This clarifies that due to the nature of mining work and the working conditions, almost

all the mining workers at Mererani were men. Few women are also participating mainly in much more lighter jobs such as catering services. Men significantly outnumber women in mining areas in Mererani, because the nature of the mining pits which does not encourage women to participate in mining activities.

4.1.5 Family Size of Respondents

The family size in this study refers to a family members living in the same residence or where they shifted from other areas. Hence the number of children, parents, and dependants formulated the family size. The findings showed that 49% of the respondents had a family ranging from one to six people (Table 4). Others (40%) had 7 to 10 family members, while 7% of the respondents had 1 to 3 and respondents with above 10 people were only 4% of the sample. These findings imply that large family size tends to strain household budget especially those with low income. The larger the family the more the quantity of food needed. Family responsibilities due to a large number of household members push them into mining activities. The study results revealed that the study area had relatively high household sizes compared to the mean household size of Mainland Tanzania which is about 5 people as indicated in the Tanzania household budget survey (NBS, 2007).

Table 4: Family Size of Respondents

Household size	Frequency	Percent
Between 4 and 6	49	49
Between 7 and 10	40	40
Between 1 and 3	7	7
>10	4	4
Total	**100**	**100**

4.1.6 Origin of Respondents

The study findings indicated that 90% of the local miners at Mererani were migrants from other places (table 5). Only 10% of the respondents were indigenous of Mererani. This reflects a higher level of male migration on temporally bases, hence less possibilities for permanent economic investment besides mining. Most of local miners reside at Mererani without their wives and children. Population growth and movements in the area is one of the concerns, as increased population must be proportionate with availability of social services and other opportunities. This is one of constraints in many small scale mining areas in Tanzania since an increase in population is not proportionate with the availability of social services e.g. schools, health services and infrastructure(Lucie, 2001).

Table 5: Origin of Respondents

Origin of respondents	frequency	Percent
Shifted from other places	90	90
Born at Mererani	10	10
Total	**100**	**100**

4.1.7 Ethnic Characteristics of the Respondents

According to the immigration history, Mererani is occupied by over 60,000 people; however there are sixteen ethnic groups. It was clear that Chagga, Meru and Waarusha tribes were highly represented in the study area; this was mainly influenced by geographical and economic reasons. The Chagga and Meru are at the neighbourhood of the Maasai who are original inhabitants, lagging behind. One reason could be their strategic settlement away from congested areas where they can graze their livestock and visit the mine once in a while during brokering or supplying livestock products such as milk and meat. The Chagga ethnic group is represented in area by 23%, Waarusha comprised 18% of respondents and Wameru were 13% (Figure 2). Economically, Mererani is the only place in the world where the gemstones known as Tanzanite are found. The presence of the precious minerals attracts many people, particularly from these ethnic groups to come and try their lucky so as to accumulate wealth.

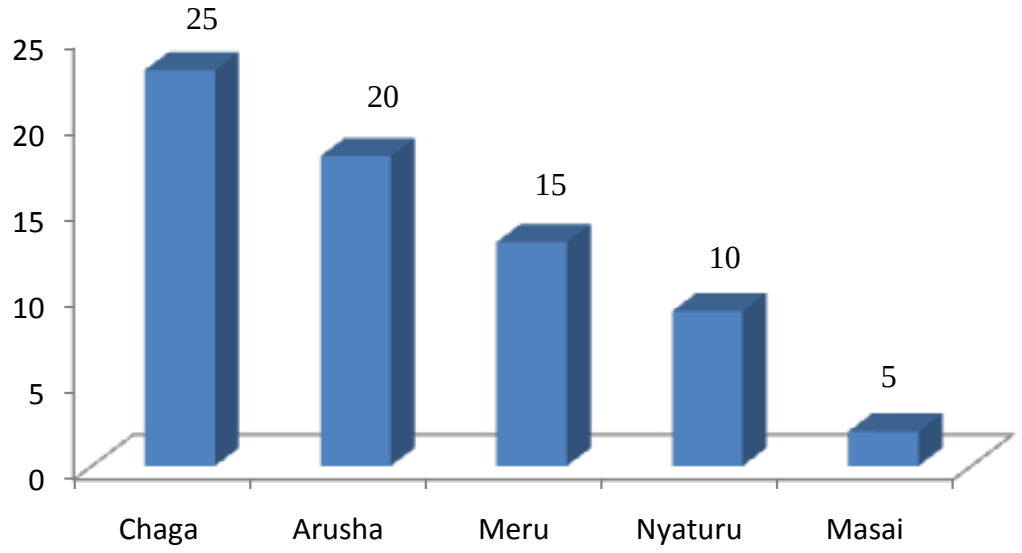

Figure 2: Ethnic Presentation among LAMs at Mererani

4.2 Activities of the Local Artisan Miners

4.2.1 Mining Activities

The respondents were asked to indicate the kind of occupations, employments, or economic activities they were involved in as income generating activities. An analysis of the various kinds of activities was as presented in Table 6. According to the results, 92% of respondents got their income through selling gemstones. Obtaining gemstones is by chance or fortune. This implies that the majority of people in Mererani are highly dependent on mining activities so as to eke their living. It is clear that many households depend on mining activities, particularly the male, and it is likely that if specialized services and businesses were taken into account, the percentage of people depending on mining for their livelihoods would be much higher. About 6 % of LAMs were involved in day worker activities commonly known as *take away*. Day workers are used to remove soil from the mining pits for 24 hours and earn 5 000Tanzanian shilling from small scale mining pit owners. Only 2% of respondents were depending on trade activities to earn their income. The findings show that small scale mining as an informal sector employs the majority of local Tanzanians who have missed opportunities in the formal sector. Therefore the findings indicate that the effort from the government and other private institutions to invest in this sector may probably bring changes in individual income hence poverty reduction.

Table 6: Activities Performed by LAMs

Activities	Frequency	Percent
By selling gemstones	92	92
Day worker	6	6
Trading	2	2
Total	**100**	**100**

4.2.2 Participation of Women in Mining activities

About three fifths (58%) of the respondents revealed that women were also participating in mining areas at Mererani, but as service providers to local miners. Only 37% of the respondents said that women are incapable of working as local miners due to nature of the mining pits. The results imply that participation of women in mining activities is very low. Results indicated in Table 7 also affirm that 4% of women at Mereran were participated in buying and selling gemstones from LAMs.

Table 7: Participation of Women in Mining

Respondents	Frequency	Percent
Women are service providers	58	58
Women are incapable	37	37
Women buy and sell	4	4
Other activities	1	1
Total	**100**	**100**

4.2.3 Reasons for Being Involved in Mining Activities

The study investigated the influence of LAMs' motivation for being involved in mining activities. The results as presented in Table 8 indicates that source of income was the main push for the majority (89%) of local artisanal miners to engage in mining activities. This implies that most of the local miners were involved in this sector in order to earn

income in terms of money. About nine percentages of respondents were involved as they lack formal education that could enable them to get formal employment. This study revealed that few respondents (2%) were involved in mining activities due to lack of initial capital to invest in other activities.

Table 8: motivation behind mining activities among LAMs

Motivation	Frequency	Percent
Source of income	89	89
Low level of education	9	9
Lack of capital to invest on other activities	2	2
Total	**100**	**100**

4.3 Challenges Faced by Local Artisanal Miners

4.3.1 Social challenges

The results presented in Table 9 indicate about 52% of the respondents mentioned poor working condition as the major constraint to their activities. This had substantial impact on income for individual local miners and the national economy. The cost of taking care of those who got accidents in the mining due to poor working conditions could push them into poverty. It was also noted that 32% of the LAMs were constrained by the use of poor technology in their activities. It was observed further that more than 40 to 100 man power is used to empty the pit of 700 meters deep by using plastic bags of 20kg. Low government intervention was mentioned by 4% of the respondents as a challenge. Other constraints were lack of financial accessibility and economic empowerment support which account for 7% and 5% respectively. These figures indicate that there is little government intervention in the local artisan mining.

Table 9: Major Constraints to LAMs Activities

Constraints	Frequency	Percent
Poor working conditions	52	52
Poor technology	32	32
Assess to financial support	7	7
Lack of economic support	5	5
government intervention	4	4
Total	**100**	**100**

4.3.2 Economic Challenges

4.3.2.1 Market

The result shows 71 percent of surveyed respondents mentioned lack of specific center for providing buying and selling information to Artisanal and Small Scale Miners (ASM) as the main obstacle for them to improve their livelihood. This implies that there is little government intervention in the mining sector in Tanzania. During FGD one of the participants admitted that there was illegal buying and smuggling in the market of Tanzanite; as a result valuable stones are taken to Kenya. Speaking to the researcher during key informant interview, the assistant ward executive officer of Mererani town gave straight forward responses when asked as to why majority of brokers choose to sell gemstones through illegal channel to Kenya. According to him, their decisions are based on price and prompt payment. Kenya dealers and brokers have enough capital than those residing in Tanzania. The Kenyan usually pay better price. More than one fifth (22%) of the respondents revealed that in Tanzania there is no good communication between small scale miners and buyers. On the other hand 97% of the respondents got price information only through brokers. For instance, the official marketing for Tanzanite is done through auctions, but because of the trick of under valuing stones done by the

Master Dealers and brokers who control the market and the prices, the miners were often compelled to sell the gem through other channels. This situation has made ASM vulnerable to exploitation and dispossession of mining rights.

Table 10: Market Challenges Facing Local Miners

Challenges	Frequency	Percent
No specific selling and buying to LAM	71	71
Poor communication between LAM & buyers	22	22
Poor infrastructure	7	7
Total	100	100

4.3.3 Institutional Challenges Related to Local Miners' Activities

4.3.3.1 Finance and Credit Institution

One of the research questions of the study was to determine factors which limited local miners to conquer poverty. LAMS were asked to say whether there was any financial institution in Mererani which offered loans to local artisan miners. The majority (100%) of the respondents affirmed that there was no institution offering loans to support local artisan miners. Presence of financial institutions in Mererani was thought to be a source of capital. Lack of financial institutions and organizations willing to provide financial support was mentioned to be one of the constraints by the LAMs towards economic improvement. The study revealed that most of the financial institutions consulted indicated willingness to provide financial support to artisanal miners, provided that special conditions were fulfilled. However, only a few of them indicated commitment to support the sector. This result, on the other hand, is contrary to the Mining Act of 2010,

Article No 8 which states “any mining company should provide training to Tanzanians in all skills in respect of the operations of the mining project” (URT, 2010).

4.3.4 Technological Challenge among Local Artisan Miners

From the findings, it was clearly indicated that 75% of the respondents operated with poor technology; for instance most of activities were done manually as indicated in Table 11 where 24% of the respondents depended on the use of local technology in mining processes. Only 1% of the respondents used simple technology such as manrope to empty the mining pits. This result proves the theory of social exclusion development which states “*no country or a given society has developed economically without investing in technology and education.”* Technology minimizes accidents and makes the production process safer and healthier. Also, it is expected that the use of equipment like air compressors, water drainage facilities would reduce physical anxiety and illness and thus leads to better health. Furthermore this would lower medical costs and increase production hence improves income (REPOA, 2007). Technology has the ability to improve productivity and incomes. This study revealed that 68% of the artisanal miners in Mererani did not have geological knowledge (Table 11). Mining activities are conducted simply by observing at the reef of the rock, they didn’t have specific instruments to know exactly where the ore body was located. It was further observed that the percentage of people who own semi sophisticated technology such as engine powered crushers, compressors or water pumps were very few.

Technology does not operate in nothingness; Chungu and Mandara (1994) contend that technology is normally what determines the quality of produce, its effectiveness and its social and economic implications within the sphere it operates. This implies that the processes of poverty reduction among LAMs need some simple advanced technology,

infrastructure, and sound policies. Poverty among artisanal mining can thus be seen as an outcome of the limitations in the institutional and organizational framework guiding the sector. These factors, indirectly, determine or influence the performance of the sector to poverty reduction among LAMs.

Table 11: Mining Methods used by LAMs

Technology	Frequency	Percent
Observing reef of rocks	68	68
By using experience	19	19
Mining by chances	1	1
Man power is used to find minerals	12	12
Total	**100**	**100**

4.4 Local Mining Activities and Poverty Reduction

The study also determined the level of poverty before and after involving in mining activities. Research question number four of this study was to investigate level of poverty reduction before and after being involved in mining activities. The good indicator of poverty reduction was measured through investment level, expenditure level and number of assets owned by individual local miners through their activities. The assets owned by local miners were grouped into furniture, communication facilities, transport facilities, working facilities and immovable assets (house and land). Those with high assets value were regarded as non-poor; those with low assets value were regarded to be poor. There was positive relationship between the income through asset ownership and the activities performed by LAMs. The study focused on the fact that more often than not, people consider the ownership of assets in whatever form as one of

the basic indicators for the owner to be considered as non-poor. This section describes various types of assets ownership in the study areas in relation to poverty reduction among respondents.

4.4.1 Asset Ownership

4.4.1.1 Furniture Ownership

It was found out that 43% of the respondents owned furniture including beds, mattresses and tables (Table 12), while 13% of the respondents had only spongy mattresses. Other 9% of the respondents possessed beds alone. Only 1% revealed to own a table alone. On the other hand, 34% of the respondents possessed nothing. These figures show that with small scale mining activities, although they provide informal employment to the majority, there is significant difference in the poverty reduction status among local miners. These figures imply that the majority owned little furniture hence categorized as poor.

Table 12: Furniture Possessed by LAMs

Furniture	Frequency	Percent
Bed, table and matress	43	43
None	34	34
Spongy matress	13	13
Bed	9	9
Table	1	1
Total	**100**	**100**

4.4.1.2 Cooking Facilities

Cooking facilities was one of the variables assessed in the study and the results are presented in Table 13, which shows that the majority (54%) used charcoal and firewood as the source of energy. About 45 percent of artisan miners possessed neither a charcoal stove nor a kerosene stove. Only 1% of the respondents used kerosene as the source of

energy. The finding reveals that charcoal and firewood are used by the majority of respondents as the source of energy. On the other hand, use of firewood would lead to environment destruction. Similarly, the use of charcoal and firewood as the source of energy indicates the poverty status of respondents. Looking at the trend of ownership of cooking facilities among respondents, it can be assumed that those who owned neither charcoal nor kerosene stove were poor. Few LAMs use fuel such as diesel operated generators in line with of 12 percent (HBS, 2001). The generated power is mainly for lightning and operation of domestic machines like refrigerators, TV and radio sets. However, some of the mining pit owners were using electricity from the National Grid through TANESCO to run compressors and other mining activities.

Table 13: Cooking Facilities Possessed by LAMs

Cooking facility	Frequency	Percent
Charcoal and firewood	54	54
None	45	45
Kerosene stove	1	1
Total	100	100

4.4.1.3 Working Equipment

Working equipment was also assessed. It was revealed that all the respondents (100%) possessed a dry batteries torch (sold between 3000 and 5000Tsh). No artisan mining worker owned heavy boots, helmet and overall. Few local miners who owned pits had compressors through sponsors which are sold at around ten million each. Through FGD, participants informed that LAMs cannot afford buying compressors. This gave an opportunity for sponsors to take 60% of production, while small scale miners pit owners take 30% and the artisan local miner workers take only 10% which is to be distributed to all miners who are working on that mining pit. Lack of working equipment among

respondents indicate high level poverty among LAMs, if there will be no other means of acquiring working tools.

4.4.1.4 Transport Facilities

The findings, as indicated in Table 14 show that 86% of the local miners had no kind of transport facilities. About 9% of respondents owned bicycles sold at 100 000 and 120 000/= Tsh. Furthermore, the results indicated that 5% of the respondents owned motor bike sold between 1 500 000 and 3 000 000/=Tsh. One of the FGD participants was quoted "where can I get money for bicycles or motor bike while all the money I get is taken by our boss, we are laboring for nothing". Majority of LAM don't have money; all the minerals are taken by the pit owners, and very little is left for LAMs. Lack of transport facilities among local miners was constrained by lack of capital. The study also revealed that some of the local miners possessed cars mainly when they obtain money "fortune period" and sold the cars after a short period of time "bankrupt period."

Table 14: Transport Facilities among LAMs

Transport facility	frequency	percent
None	86	86
Bicycle	9	9
Motorbike	5	5
Total	**100**	**100**

4.4.1.5 Ownership of Means of Communication

The results as indicated in Table 15 show that 74% of the artisan miners owned mobile phone sold at Tsh. 30 000 to 300 000. About 18% of the respondents possess TV, radio and mobile phone sold around Tsh. 20 000 to 300 000. Few local artisan miners at Mererani had the lowest proportion of individuals that possessed bicycles, radios, and televisions thus signifying that they are not more wealth compared to non- LAM. Table

15 shows that only 8% of the artisan mining workers had no any access to communication. This indicates that few local miners had no mobile phones. However, majority of LAMs are buying phones for entertainment and others possess mobile phones as a fashion. This implies that possessing a mobile phone by respondents did not indicate exactly the poverty status among them.

Table 15: Communication Assets among LAMs

Assets	**frequency**	**percent**
Mobile	74	74
TV, radio	18	18
None	8	8
Total	100	100

4.4.1.6 Immovable Assets Owned by LAMs

The findings indicate that 8% of the respondents owned houses and 9% owned land. Only few (3%) respondents owned both land and house. The rest about 86% of the local mining workers had neither land nor house. The study excluded all properties owned through inheritance or rent house to determine the level of poverty among local miners.

Table 16: Durable asset Owned by LAMs

Asset	Frequency	Percent
None	80	80
Land	9	9
Land and house	3	3
House	8	8
Total	**100**	**100**

4.5 Level of Poverty Reduction before and after Being Involved in Local Artisan Mining

4.5.1 Distribution of Total Value of Assets Owned by LAMs from Mining Activities

The value of acquired assets and other expenditure, are presented in Table 17 indicating that only 16% of the respondents had total value of acquired assets ranging between 1 000 000 Tsh and above, and this could be the pit owners and those close friends of the pit owners. One FGD participant from Zaire Kati street was quoted saying "*pit owners are not fair to us; they search and take every thing from us whenever the minerals are found and leave us with nothing"*. This could be due to economic, institutional and mining technology constraints among artisan mining activities. The majority 76% of local miners affirmed that the level of assets ownership had remained the same for the period of two years after being involved in mining activities.

4.5.2 T- test value of Assets Owned Before and After Working in Mining Activities

Further analysis was done using t-test to compare the mean value of assets before and after joining mining activities. There was little improvement in the mean value between two years back and current. The mean value of assets ownership was 2.41 two years ago and 3.61 currently i.e. the period before the study complementation.

Table 17: T- test mean value of asset owned before and after

Mean	Mean value	p-value
Before	2.41	0.168
After	3.61	

4.6 Solution for Their Problems as Perceived by LAMs

Figure 3 indicates some of the suggestions given by artisan local miners as solutions to their problems. About 50% of the respondents suggested that technological support will

enable them to work properly, while 39% of respondents assumed that having support in acquiring their rights would enable them to work hard and earn their living from the sector. Only 8% of the respondents informed that the government should provide financial support to them. Two out of 100 respondents suggested other solutions such as an establishment of the government institute to stand for their rights would be a solution to LAMs constraints.

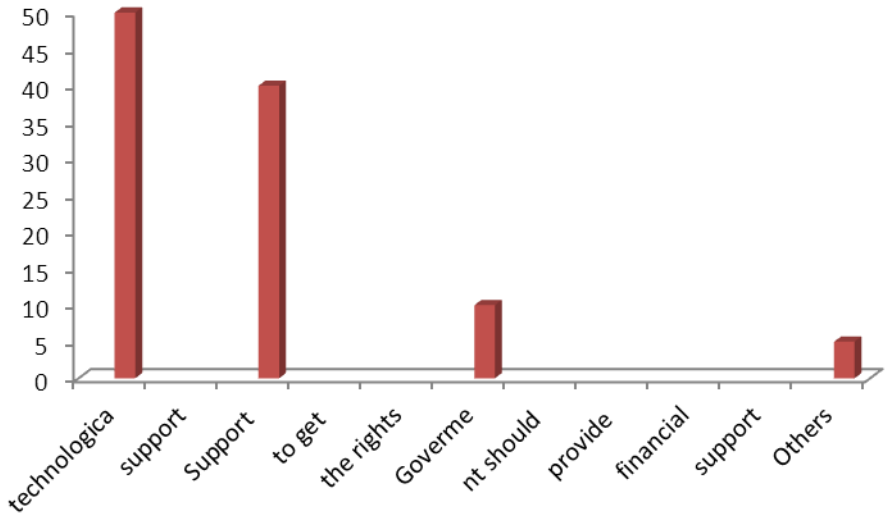

Figure 3: Suggestions given by local miners as solutions to their problems

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 CONCLUSION

Based on the findings it can be concluded that mining sector is among the potential sectors in poverty reduction. From the findings LAMs expectation towards poverty reduction through mining activities is very high. However, the working conditions were relative very poor. Based on the findings, LAMs are producing just for subsistence (from hand to mouth), hence difficult to eliminate poverty among them.

Based on the theory of social-exclusion, it is true that majority of LAMs are constrained by lack of capital. Another constraint mentioned by LAMs was technological problems. Simple tools such as manrope could ease their work. Issue such as market requires government intervention through enacting strong policies in which LAMs and buyers could communicate. Preventation of illegal buyers from the neighbouring country would ensure more profit to LAMs as well as high contribution to the GDP. From the findings where mean value of asset owned is higher than before engaging in mining activites is an indicator that the sector is highly profitable and could eventually eliminate poverty among LAMs. This is only possible if the government enact laws and policies to safe guard the LAMs.

5.2 Recommendations

The following recommendations were put forward in order to improve working conditions of LAMs. The involment of key stakeholders such as District directors, councils multisectoral commitees, NGOs/CBOs dealing with mining in the districts, representatives of local miners, District/zonal mining officers and Community

Development Officers is crucial in discussing strategies that would reduce constraints among LAMs and jack up their efforts towards poverty reduction.

5.2.1 Recommendations to Policy Makers and Other Influential Partners

Policies to reduce the constraints facing local artisan miners should aim at giving them adequate knowledge on mining techniques. It is recommended that policy statements be given by both local government authorities and the central government which will direct all authorities to implement the following:

i. Providing education and training on mining skills and legal rights. NGOs and CBOs can play a crucial role in this aspect if local authorities are pressurized by them.
ii. Formation of associations of small scale miners and requesting NGOs to build the capacity of the formed associations to enable them communicates their problems and negotiates with local authorities.
iii. The Government should develop, for decentralization of the administration of mining activities in order to have effective mechanisms that can reach the local miners with the right support at the right time.

5.2.2 Recommendations to Local Government and to the Community

i. Local Government should work together with the community in the identified suitable mining sites.
ii. Work with Mining Associations, NGOs, CBOs, and other development partner who are willing and ready to provide mining skills and methods to small scale miners.

5.2.3 Recommendations to Local Artisanal Miners and Pit Owners

Local artisanal miners in Tanzania sometimes operate in unauthorized premises making it difficult for the government and other stakeholders to assist them in improving their mining activities and reducing their socio-economic constraints. It is therefore recommended that:

i. All artisanal miners should register themselves to the chairperson in the area. Through this approach, information concerning their development can easily be communicated to them
ii. LAMs should unite together through groups' formation so as to get loans from the financial institution as a group rather than individual. The artisanal mining sector requires improved working conditions in order for it to become an instrument for development in the fight against poverty.
iii. Pit owners should provide identity cards to artisanal miners. This will eliminate the tendency of the pit owners to deny their rights incase of accident.

5.3 Area for Future study

Few respondents were interviewed and therefore cannot represent the whole population of the local mining workers in Tanzania Therefore further studies are needed to cover the following areas:

i. The impact of technology advance among local miners in Tanzania.
ii. The effects of socio-economic constraints among local miners on other variables like food security and welfare.
iii. The impact of what has been recommended in this study to the local mining workers in Tanzania.
iv. There is need to study the impact of institutions to the livelihood of local miners at Mererani in Tanzania.

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APPENDICES

Appendix 1: Questionnaires for Individual Local Artisanal Miners

TITLE: SOCIO-ECONOMIC CONSTRAINTS AMONG LOCAL ARTISANAL MINERS IN SIMANJIRO DISTRICT
Ward/Block name……The year you start mining…….

SECTION A: BACKGROUND INFORMATIONS
HOUSEHOLD LOCAL ARTISANAL MINERS

Personal characteristics

1. What is your current age? (Tick the appropriate answer).
    a) Below 18
    b) Between 18 – 30 years;
    c) Between 31 – 50 years;
    d) 51 – 60 years;
    e) Above 60 years

2. Sex of respondents?
    a) Female
    b) Male
3. What is your marital status?
    a) Single
    b) Married
    c) Separated
    d) Living with partner
    e) Divorced
    f) Widowed
4 What is your family size number? ----------

5 What is the highest level of education?
    a) None;
    b) Completed primary school;
    c) Completed secondary school;
    d) College;
    e) Others (specify…….)

6 What is your originality?
    a) Born here
    b) Shifted from other place
7. What is your tribe?.....

SECTION B: Activities of local Miners

8 What is the main source of your month income? (Tick the appropriate answer)
    a) Mining
    b) formal employment
    c) petty trade

d) livestock keeper

e) Others (specify……).

9 How do you generate income from Mining activities?

a) Through selling minerals
b) Salary from working as a day worker.
c) Selling alcohol i.e. beer, cigarettes etc. to local miners
d) Others (Specify…….)

10 Which Benefits have you obtained from this activities?

……
…

11Apart from mining do you have other economic activities?
(a) Yes [ ] (b) No

12 What problems do you face in your activities are they?

a) Poor equipment used in mining
b) Lack of mining linces
b) Mineral policy is in favor of large scale miners
d) Poor working Conditions
e) Conflict with foreign mining company
f) Others (Specify……..)

13. What is your motivation behind the mining activity/activities? (Tick the correct answer)

a) Source of income
b) To get employment
c) I want to increase my income through mining
d) Providing social service to family
e) Lack of enough capital to invest on other occupations
f) Low level of education have pushed me into mining activities

SECTION C: Socio-economic constraints faced by local miners' activities

14 What are the common undesirable behaviors in this area?
a) Lobbing
b) Robbing
c) Theft
d) All above
c) None of the above

15Do women participate in these activities as the same as men?

a) They are incapable
b) They join men
c) They have their small activities to do here
d) Others (specify……..)

16 How do you spent the money you get from mining activities

a) Buying new clothes

b) Buying food
c) Take children to school
d) Invest at bank
e) Buying assets such as Radio, TV. Mobile phone etc.
f) Building houses
g) Spending with prostitutes
h) Others(specify…….)

17 Do you have any conflict with your fellow local miners?
a) Yes
b) No I have conflict with large scale mining company
c) I have no conflict with both miners

18 What is the source of that conflict?
……

19 How that conflict has affected your income?
a) Much time is being spent on solving conflict instead of working
b) Low production of minerals
c) Killing of local miners.

20 Is there any Institution at Mererani which provide capital to small scale mining activities?
a)Yes
b) No

21 If the answer above is yes have you requested capital from that institute, if No why?

…….

SECTION D: Market aspect among local miners
22 Where do you sell your minerals?
a) At home
b) To the brokers
c) Mining shops
d) Other (specify……..)

23 How do you get price information?
a) Obtained from my fellow who living in town
b) Through mobile communication
c) Obtained from middlemen
d) Others specify……

24 What are constraints in accessing market?

……

SECTION E: Technological factors hindering small scale miners towards reduction of income poverty

25**.** Have you attending any Training involving local miners activities?

a) Yes
b) No

26 Are there local institutions that provide technological support to small scale miners' activities here at Mererani?

a) Yes
b) No

27 If yes what are they?

a)Local NGO
b) Mineral and field office
c) Local bank institute

28 Which technology do you apply in your mining activities?

a) Modern technology
b) Poor technology
c) Local technology
c) Other (specify……..)

29 How the uses of poor technology have been an obstacle on your effort to reduce income poverty?

a)Spending a lot of Time in exploring Minerals
b) Death of Miners due to fall of rock
c) Health risk d) other (Specify……)

30 Can you explain the method you applied in artisanal mining activities?

…….

SECTION F: Institutional factors among local miners

31 Do you know anything about the existing government mineral policies regarding your mining activities?

a) I know
b) I don't know
c) This is my first time to hear that

32. Do you know anything about the mineral laws regarding your activities?

a) Yes
b) No

33 If the answer to the question above is Yes what can you say about the mineral laws?

a) The laws are not in favor of local miners
b) Local miners are not given opportunity to participate in making those laws

34 What do you advice the Government to do on local miners?

a) Financial support them
b) Technological assistance

c) Health support
d) Food
e) Local miners Right support
f) Other (specify)……

35 Can you estimate the level of support from District and mining associations in your area (tick the appropriate answer)

a) Very low
b) Low
c) Moderate
d) much
e) Very much

36 What the Government and other mineral sector should do if needs to reduce income poverty among local artisanal miners?

a) Supporting local miners activities
b) Economic empowerment of local miners
c) Improve working conditions in the mining areas
d) Improve technology
e) Loans accessibility to local miners

37 Do you have any suggestions on measures to reduce socio-economic constraints among local artisanal miner in Simanjiro District?

38 Please indicate the assets you own from LAMs activities

Type of asset	Number	Price/value per unit	Total (Tshs)
Motor cycle			
Radio			
Spongy mattress			
plot			
Car			
House (type)			
bicycle			
Charcoal stove			
Kerosene stove			
Torch			
Rain boots			
Mobile phone			
TV			
Helmet			
Table			
Others (specify)			

39 How has your assets ownership and expenditure been in the last two years? Would you say it has increased remain the same

increased
Decrease
Remained the same

40 what has been the most important cause for the change ? …….

Appendix 2: Interview Guide for FGD

1 When did you start working in the mining field?

2 What is your vision regarding LAM?

3 Do you have specific project for local and small scale miners at Mererani?

4 What are the main obstacles on implementing that project?

5What strategies are at hand for suitability of that project

6What are the social cultural constraints facing LAM as they struggle to increase their income?

7How do you help LAM to eradicate socio-economic constraints?

8 What are common beliefs among local artisanal miners at mererani?

9 How those beliefs have been an obstacle to socio-economic improvement among LAM?

Appendix 3: Interview Guide for key Informants Wards: Village Leaders, NGO's and Block Owners

1. What are the local miners' activities within your District?

2. What does the village government say about local mining activities?

3. Where do they run their activities?

4. What assistance do local miners get from district council?

5. How do you get the report/information on activities performed by local and small scale mining?

6. What problem do you face in cooperating with the local miners in improving their income?

7. What need to be done in order to improve the income of local miners from the mining sector in Mererani and simanjiro district?

Appendix 4: Formula Used to get a Sample Size

The following formula developed by Yamane (1967) was used to get a sample size.

$$n = N/ 1+N (e)^2$$

Whereby n=Sample size, N=Total Population, e= Confidence interval of 0.5, 1=Constant Number.

Whereas,

Population of Simanjiro= 141,676

Confidence level 10% (0.1) = e

$n= 141,676/ 1+ 141,676(0.1)^2$

141,676 /1+141,676(0.01)

141,676/1417.76

= 99.9 ~100 sample size

Appendix 5: Operational Definition of Variables

Variable(independent)	Operational definition
Age	**Ranges in years of birth**
Sex	**Being a male or female in the biological sense**
Education level	**Highest level of formal schooling attained by mining workers**
Income	**Money earned per month**
Poverty	**Inability to get basic need**
Technology	**Tool/equipment used in economic activities**
Socio-economic	**Relating economic and society**
Marital status	**Current state of the marriage status of the respondents**
Family size	**Number of people in the family**
Livelihood occupation	**Activities in which someone depend to eke a living**
artisan	**Manual oriented activities**
Small scale mining	**Simple technology applied in production**
Dependent variable	
Poverty reduction	**Process of making people live out of poverty through various strategies and enabling them access important resources to transform their livelihood.**