THE IMPACT OF LARGE-SCALE MINING COMPANY ON LOCAL COMMUNITIES' SOCIAL SERVICES: A CASE OF GEITA GOLD MINES Ltd MWANZA, TANZANIA

BY

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A DISSERTATION SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF SCIENCE IN MANAGEMENT OF NATURAL RESOURCE FOR SUSTAINABLE AGRICULTURE OF SOKOINE UNIVERSITY OF AGRICULTURE. MOROGORO, TANZANIA.

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ABSTRACT

This study was undertaken to assess the impact of large-scale mining on the local communities' social services in Geita District with the Geita Gold Mines Ltd as a case example. The overall objective of the study was to assess the impacts of large-scale mining activities on local communities in Geita District. The specific objectives were to identify both negative and beneficial impact that significantly are a result of activities of private large-scale mining companies, to assess status of social services supported by private large-scale mining companies to local communities; and to examine perception of local communities on social services supported by large-scale mining companies in their area. Different methods were used in primary and secondary data collections, including questionnaire, checklist, focused group discussion, documentary search and field observations. Random sampling procedure was employed in which a total of 120 households from four villages were involved. About 79% of the respondents reported that, large-scale mining activities have impacts on social services in their area while 21% indicated that such activities have no significant impact. Furthermore, 47% of the respondents indicated to benefit differently from the presence of large-scale mining. However, 53% of respondents claim not benefit from such activities. The findings from this study have shown that large-scale mining activities have both negative and positive impacts on social services, household income, and environment whereby the negative impacts outweighed positive impacts. In additional, the statuses of social services supported by mining company were considered not to satisfy social needs of local communities. Therefore, communities should be involved directly in the planning as well as implementation of such projects. Mining and minerals sector

should align its policies towards sustainable development and work out community based projects and priorities.

DECLARATION

I, Faustine John Msokwa 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 at any other University.

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The above declaration confirmed

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"Thank you Almighty God our Lord for giving me life, chance and strength to make my dream of contribution for well being of mankind a reality"

DEDICATION

This dissertation is dedicated to my parents, my mother Rose Musese and the late Mzee Wanjala Msokwa who brought me up and showed me the value of education.

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ACRONYMS AND ABBREVIATIONS

AMREF	African Medical Research Fund
CAFOD	Catholic Agency for Overseas Development
CARE	Cooperative for Assistance and Relief Everywhere
CRBEP	Columbia River Bioregional Education Project
DEAT	Department of Environment Affairs and Tourism
GATS	General Agreement on Trade in Services
GDC	Geita District Council
GGM	Geita Gold Mine
ICMM	International Council on Mining and Metals
IDRC	International Development Research Centre
IISD	International Institute for Sustainable Development
ILO	International Labour Organization
IMF	International Monetary Fund
LEAT	Lawyer's Environmental Action Team
MEM	Ministry of Energy and Minerals
MMEM	Mpango Maalumu wa Elimu ya Msingi
MMSD	Mining, Minerals, and Sustainable Development
NBS	National Bureau of Statistics
PRA	Participatory Rural Appraisal
TASAF	Tanzania Social Assistance Fund
THDS	Tanzania Health and Demographic Survey
TWN Africa	Third World Network Africa
UNCED	United Nations Conference on Environment and Development

UNEP	United Nations Environment Program
US$	United State Dollar
URT	United Republic of Tanzania
WB	World Bank
WRM	World Rainforest Movement

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background information to the study

Mining is the series of activities referring to the discovery and extraction of minerals lying under the surface of the earth. Minerals can be metal (such as gold and copper) or non-metal (such as coal, asbestos and gravel). Mines vary in size, from small operations producing a few tons per day, to large mines moving hundreds of thousands of tons (WRM Bulletin, 2003). The method of exploitation used to mine specific mineral deposits depends on the type, size and depth of the mineral deposit and the economic and financial aspects of the undertaking (Tauli-corpuz, 1998; WRM Bulletin, 2003).

Mining is a global industry dating back to pre-historic time (Kimambo, 1984). Labonne (1999) explains that industrial revolution in the developed world was built upon the access, control and economic exploitation of underground resource like coal, oil and gas. According to Tauli-corpuz (1998) and Miller (1997) mining remains one of the major economic activities in many countries.

Like other economic activities, mining has both positive and negative aspects. Mining operation share a number of common stages or activities, of which have potentially adverse impact on the natural environment, social and cultural conditions, or the health and safety of mineworkers or communities in the vicinity of the mine (Akabzaa, 2000). The negative impact of mining in mining areas includes

land appropriation, displacement of local people from their ancestral lands, marginalization and oppression of people mostly belonging to the lower economic classes (Tauli-corpuz, 1998; Filer, 1998). Due to its economic potential, environmental controversies and its complex set of impacts; mining becomes a unique industry on national and local economic development, environment, and social-cultural as well as socio-economic impacts (Tauli-corpuz, 1998).

Socio-economic impacts refer to the impacts on environmental, economic, social and institutional patterns, and their linkages that compose the context of development. Social and economic factors at various levels of social systems form an environment where people interact through roles and relationship defined by gender, age, ethnicity and other social variables (Huising, 1997). Social services are those services provided to individuals, families or communities in meeting their basic human needs. These services may be either preventive or remedial in nature and are to be delivered in such a way that recipients of the services do not become unnecessarily dependent on the services. Instead, they are helped to attain the greatest possible level of independence and self- determination (CCS, 2006).

1.1.1 Mining in Tanzania

Tanzania has a mining history of almost a century; both large and small-scales mining (Uwoya, 2006). The country has unique geological environment that hosts a variety of economic minerals. The most famous deposit is the Lake Victoria Greenstone belt in the central and north-central part of the country, but there are viable resources of various minerals in the north-east and the south-west as well

(Lange, 2006). In Tanzania, mineral exploration and exploitation dates back to 1880s soon after the German Administration (Kimambo, 1984). Minerals that mostly contribute to the economy of the country include gold, gemstones (especially diamonds and tanzanite), natural gas and coal (Kikula and Kiangi, 2002; Uwoya, 2006). There are also some evidences that local people utilized minerals before the colonial administration (Nyelo, 2000; Tesha, 2000).

In order to attract investors, the Government of Tanzania embarked on economic reforms and restructuring between the mid 1980s and the 1990s. The reforms marked a clear shift in favour of private sector development (Mwalyosi, 2004). The economic reform and restructuring have lead to rapid growth of gold exploration during the 1990s using modern technology and refined models (Uwoya, 2006; Lange, 2006). Several "world class" gold deposits have already been discovered in the Lake Victoria Goldfields where six large-scale mines are in operation. These mines are Kahama, Geita, Nzega, Buhemba, Afrika Mashariki and Tulawaka (Uwoya, 2006), and now the Buzwagi.

According to URT (2007), the mining sector has already recorded an impressive growth of 16.4% in 2006 compared to 15.7% in 2005. Estimates show that mining will contribute more than US $ 1 billion a year and contribute over 10% of the Gross Domestic Production (GDP). Mineral exports were US $ 680.2 million, 711.3 million and 856.8 million for the year 2004, 2005 and 2006 respectively. The expansion of mineral production has increased the mining sector contribution to the Gross National Production (GNP) of Tanzania from 3.2% in 2004, 3.5% in 2005 and

US $ 200 000 per year to the respective district council as levies of mining areas (Kizigha, 2006).

In additional to that, all mining proponent indicates a commitment towards social and economic development for the surrounding communities. Sometimes a budget is provided in their report (Mwalyosi, 2004). George (2003) reveals that provision of equitable benefits will improve distribution of mining income to many people and reduce social conflicts.

However, little is known about whether these commitments are fulfilled (Mwalyosi, 2004). Furthermore, it is claimed that although policy reforms have contributed to a large increase in mining investment, production and external earnings but have not significantly benefited the communities located near the mines (Jones, 2001). The benefits have been accrued largely to mining companies and local people have been only facing the consequences on health and environmental crises, social upheavals and economic deprivation (Filer, 1998; Jones, 2001). Furthermore, communities surrounding the mines argue that they have been forced off their land and farmland formerly used for agricultural production and yet, they have neither been compensated nor benefited from social services provided by mining companies. Thus, it is not certain to what extent private large-scale mining companies contribute to economic and social services for surrounding communities despite the fact that they are the most impacted people by the mining activities. Therefore, this study intends to assess the impact of private large-scale mining on economic and social services to communities in neighbourhood areas. The findings revealed by the study

3.8% in 2006 URT (2006, 2007). Tanzania GDP contribution by the mineral sector rose from 2.7% in 2002 to 3.5% in 2004 and it is expected to rise to 10% by 2020. Mining is therefore a leading sector in terms of foreign exchange earnings (Uwoya, 2006). Currently, Tanzania ranks third in gold production in Africa, after South Africa and Ghana (Knight, 2001).

1.2 Problem statements and justification

Mining, especially large-scale mining is one of the growing industries in Tanzania (Mwalyosi, 2004). A major objective of the mining sector policy is to alleviate poverty in the country by creating gainful and secure employment in the mineral sector and providing alternative source of income particularly for the rural population and to ensure environmental protection and management (URT, 1997).

Currently the Government of Tanzania is implementing second phase of poverty reduction strategy known as the National Strategy for Growth and Poverty Reduction [NSGPR] (URT, 2006). Mining being one of the growing industries has a role to play in poverty reduction. Communities surrounding mining areas are expected to benefit in various ways; mining areas are potential markets for their services and agricultural products. They benefit from private large-scale mining companies through provision of social services such as improved infrastructure, water supply, hospitals and schools to communities in the neighbourhood (Kulindwa ., 2003; Uwoya, 2006). The agreement between mining companies and government indicates that any mining company operating in a particular district area should pay

are expected to inform policy makers, development planners and other stakeholders on the effect of activities of private large-scale mining as well as their contribution in achieving sustainable rural development.

This study has highlighted questions that appear to be outside the scope of the local communities. These are issues of a more ethical and political character, such as: What should the social responsibility of a mining corporation be? To what extent should it contribute in a more local and direct way in the area where it operates? How much should the company do to 'soften the blow' and how much should the government do from gains of mining income to communities? In short, how much should the various stakeholders do to meet the challenges created by mining, and what is the 'fair' distribution of mining benefits?

1.3 Objective

1.3.1 Overall objective

To identify and assess impacts of large-scale mining activities on the local communities' social services in Geita district.

1.3.2 Specific objectives

(i) to identify both adverse and beneficial impact on the social services that are significantly a result of private large-scale mining activities.

(ii) to examine perception of local communities on social services supported by large-scale mining in their area

(iii) to assess status of social services supported by private large-scale mining companies to local communities

1.4 Hypothesis

H_1: Large-scale mining activities have significant negative impacts on local communities' social services

1.5 Research questions

(i) What are socio-economic activities impacted by large-scale mining activities

(ii) Is local community happy with having the large-scale mining in their area?

(iii) How do large-scale mining activities impact on the local communities' social services?

(iv) What is the status of the social services impacted by large-scale mining?

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Social services provided by large-scale mining

The mining industries significantly expand its operations into the Third world countries. In doing so, it has found itself increasingly operating amongst poor and vulnerable communities living in remote areas. As part of the international corporate social responsibility, mining can bring significant benefits to such communities, including the building of roads, health and educational facilities, and the creation of jobs and other economic opportunities (ICMM, 2006). According to Filer (1998), among the potential benefits obtained by local communities from the Misima Mine in Papua New Guinea, are social services which include; improved health care and education, improved infrastructure and raised level of skills in work force. The company developed long-term infrastructure including an air strip and air terminal, upgraded the hospital, built a new police station, developed two ports, linked telecommunications to the national system, created housing subdivisions and built school classrooms. Finally, it developed and supported an active business development program.

In Tanzania, the mining companies' investment in social development is registered by the Ministry of Minerals and incorporated into the calculations of the total revenue contributions of the sector under "donations". The donations to community development by the largest mines in the period 1999 to 2002 were US$ 17 million in the whole period, US$ 12 million, or seventy percent was spent on water and roads

(Lange, 2006). Kulindwa *et al.* (2003) describe mining operations as a 'successful vehicle for social integration. Moreover, some mining firms have launched specific social investment programmes (typically in health or education) to increase the 'goodwill' of the neighbouring communities. Barrick Gold Corporation, which runs the Bulyanhulu mine through its subsidiary Kahama Mining Corporation, has for example established a fund to support various 'charitable endeavours', which claims to be responsive to local needs and priorities.

2.2 Impact of mining activities on the world economy

Mineral production constitutes a major source of foreign and fiscal revenues for many third world economies and is an important activity for some developed economies (Auty, 2001). For instance, mining has been and in many cases remains important to the economic development of a number of industrialized countries such as Australia, Canada, Sweden, and the United States, which in many ways their development was based on their natural resources (James, 2002). For all of these mineral-producing countries, it has been hoped that mineral revenues will provide a basis for economic development. In practice, though, this has generally not been the case and few mineral economies have delivered the development promised (Labonne, 1996; Auty, 2001). Mining can effectively foster sustainable development if the accrued rents from the depletion of mineral resources are continuously reinvested into other forms of economic and social development (Labonne, 1996). For poor countries, the revenue generated through exploitation of mineral resources can be substantial, and act as a powerful catalyst for development (Lange, 2006).

However, in a multi-generational period, mining *per se* is not sustainable, as minerals are finite and non-renewable resources. In a life system perspective, mining has an impact on health and well being to local people positively and negatively (Labonne, 1996). Lange (2006) and WRM Bulletin (2003) reported that there are several resources rich countries which have not succeeded in development, and they argued that having natural resources can be a curse rather than a blessing for developing countries. WRM Bulletin (2003) reported that, local communities and tribal peoples from resource-rich countries are the most affected by the detrimental environmental, cultural, social and health effects of mining exploration and exploitation activities. Lange (2006) pointed out that, the question is how tax revenue from mining is budgeted, ensuring that it will be invested for the benefit of future growth and development after the natural resources have been exhausted. Thus, mining activities are unsustainable not only because they exploit non-renewable resources, but also because they leave behind them destruction of the environment and society, which is very often irreversible (WRM Bulletin, 2003).

2.2.1 The impact of mining activities on the regional economy

Mining operations often provide a way forward to open up undeveloped regions, new mines not only require new worlds, power and communications but some times new townships and accompanying medical, educational and shopping facilities (Moody, 1996). Mining features prominently in the history and development of regions around the world. In the United States, gold and silver mining helped settle the Rocky Mountain region. In South Africa, gold and diamond mining spurred economic development in Johannesburg. In Zambia, copper mining has been so

important that one whole section of the country is referred to as the copper belt. The region around Kiruna, in northern Sweden, developed largely around iron-ore mining (Eggert, 2001). According to ILO (1999), mining sector provides subsistence income for some 100 million people mostly in Africa, Asia and Latin America. Mining contributes directly to regional economy by employing workers and generating income at the mine. Mining also contributes more broadly through its links with other economic activities. The mine itself may purchase supplies, equipment, electricity, food, and other inputs from regional businesses (Miller, 1997).

2.2.2 Impact of mining activities on the national economy

Mineral production generates income and foreign exchange which can stimulate national economy through local purchase of inputs and manufacturing industries. Mining companies employ workers, who earn income, some of which they spend on domestically produced goods and services. Governments receive tax revenues from mineral production (Eggert, 2001). In Tanzania two groups of miners responded to the liberalization of the mining sector, small scale miners and large international mining companies (ICMM, 2006; Lange, 2006). On both counts, the economic impacts have been broadly positive (ICMM, 2006). For instance, the production of gold enabled the investors to pay taxes to the Government to the tune of 47 billion Tanzania shillings by 2002, 17 times more than in 1997 (Mwalyosi, 2004).

The growth in the sector reflects a significant increase in the annual production of gold in the large-scale mining sector. The growth in gold production has led to a

significant increase in gold exports (WB, 2005). The mining sector as a whole now accounts for over 40% of the country's exports as well as around 3% of its GDP which has triggered a corresponding increase in total export earnings for Tanzania (ICMM, 2006; WB, 2005).

However, mining as a sector in Tanzania is still small, it accounted for only 1.9% of GDP in 2000, up from a level of 1.4% in 1995 (IMF, 2004; WB, 2005). Hence, despite its rapid growth, general GDP growth has not been significantly affected by the growth in the mining sector (WB, 2005). Furthermore, according to the observations by Tanzania's Minister for Energy and Minerals 2004, quoted by Mwalyosi (2004) the sector has not made any significant contribution to the alleviation of the country's poverty and thus it will take many years for the impact of mining to be felt.

2.2.3 Impact of mining activities on the local economy

Large mining operations invest substantially in local economic development, through providing training, public services such as education and health, and public goods, such as clean water, transport, energy, and infrastructure (WB, 2001). All mining can be accompanied by the growth of small and micro enterprise activities, providing supplies and related services to mining companies, miners, and their families, as well as generating substantial further incomes (Akabzaa and Darimani, 2001; WB, 2001). However, in many developing countries it has been not the case. For instance in Tanzania there is limited institutional capability to manage the social and economic implications of such sudden growth of investments in remote areas.

Any local income from mining is mainly through auxiliary activities such as sale of food, operating restaurants and sale of soft drinks and alcohol, etc (Mwalyosi, 2004). For instance, Akabzaa and Darimani (2001) reported that from the inception of Ghana's economic policy changes in 1983 to date, the mining sector has witnessed a considerable investment boom and increased production, particularly in the gold sector. However, despite this boom, there is a growing unease with regard to the real benefits accruing to the ordinary Ghanaian in the mining communities and to the country as a whole.

2.3 Impact of mining on socio-economics of communities

Communities have been the least regarded actors and have historically been neglected in policy and other discussions relating to mineral development. They have been considered as being at the receiving end of mineral development. Thus negotiations and discussions have been primarily between governments and companies and have not involved those whose lives and livelihoods are impacted directly and, usually, adversely by mineral operations (IISD and IDRC, 1998; McMahon, 2000). Governments have been formulating their mineral development policies without reference to or consultation with the communities that are likely to be affected, while company practice has been to assume that striking a deal with government is enough (Akabzaa, 2000).

Communities have questioned government misuse of mineral revenues because they have suffered the adverse socio-economic consequences of mineral operations and the influx of large numbers of migrants with their attendant economic and social consequences, without seeing significant benefits (McMahon, 2000; Mate, 2002).

Thus, facilities that have come to be perceived as benefits to mining communities are no longer being provided. Moreover, the suspension or closure of mineral operations has often led to economic decline because economic activities intervening have become almost wholly linked to the mineral operations (Mate, 2002).

2.3.1 Impact of mining on social-cultural living

Mining activities can have impacts on the livelihood of indigenous people with social cultural conflict surrounding the established modern mines. Modern mining typically utilizes extensive chemical processing, with intensive impacts on local communities by causing displacement, contamination of water sources, and conflict over natural resources. Such impacts often occur at the expense of the commons (Slack, 2001). Large-scale mining entails the replacement of subsistence economies which have nurtured generations of communities and indigenous peoples with a cash-based economy. The new cash-based economy implies a significant erosion or destruction of traditional values and customs which have been crucial in sustaining community, tribal, clan and family solidarity and unity (WRM Bulletin, 2003).

In many mining areas, local communities' efforts to minimize poverty levels are frustrated by globalization influences and state's interests, which favour large-scale operators, mostly foreigners (Madulu, 2000). Despite the fact that local communities in mining areas bear the brunt of the negative impact of most mining operations, these communities often benefit little from the significant revenues that mining generates. Due to increase in mining activities and social related disruption in the

mining communities, local communities and organizations develop strategies to protect their rights against mining operations (Slack, 2001).

2.3.2 Impact of mining on social values

Mining commonly takes place in remote area, away from population centres. The demand for labour for industrial mining operations often exceeds local supply, thereby creating a need to import the requisite skills (Moody, 1996). The impacts of recruiting, providing job opportunities and providing the necessary infrastructure for large number of migrant workers can be deadly and represents the most significant impacts of mining projects (Labonne, 1996). Mining operations cause massive displacement of local residents to migrate in search of new farmland or be resettled by mining companies, both of these may weaken the family as a social unit and break down traditional resource management (Tauli-Corpuz, 1998). Equally, evident and perhaps even more harmful erosion of social value among the mining communities is an increase in prostitution (Labonne, 1996). Mining is a notable employer of male workers who are usually paid well above the national and regional average. The resulting dispensable income often creates unexpected social problems like alcoholism and prostitutions and their consequence among others including sexually transmitted diseases and abuse against women (Tauli-Corpuz, 1998; Labonne, 1996). According to CARE International report by Akabzaa (2000) some women usually come primarily in mining places with the hope of trading small business or searching for jobs, but soon they lose hope they turn to prostitution option as a survival strategy.

2.3.3 Impact of mining on employment

Mining comes along with its promise of wealth and jobs (WRM Bulletin, 2003). Apart from the direct employment benefits, large-scale mining firm can create employment more indirectly through infrastructure investments (WB, 2005). Through direct and indirect ways, mining accounts for the high rate of unemployment in the mining area. Large-scale surface mining takes up large tracts of land, from farmers at the same time do not provide enough jobs to match the total number of people laid off from agriculture because of the impact of mining (Akabzaa and Darimani 2001).

The Word Bank (2005) main report state that, most of the mineral resources of Tanzania, in particular gold and gemstones, are exported in unprocessed form, hence the country's employment effects are low. Overall, employment in the Tanzanian mining sector accounts for only (0.2%) of total employment, corresponding to roughly 15 500 men and 13 800 female. Thus the sector's impact on the absolute level of employment is limited. For instance, with its 2 400 employees, GGM is said to be one of the biggest formal employer in the country but a small percentage of the employees are from the local community, since the company only hires mine workers with at least secondary education (Lange, 2006). According to Mwalyosi (2004) the recruitment of labour for large-scale mines takes place outside the locality and mining employment fluctuates with production levels and hence is not a source of stable, long-term employment. In Ghana for example, in spite of the massive injection of capital into the mining sector, it employs no more than 20 000 workers

including small and artisanal miners) or only 5% of total formal-sector employment (Abugre and Akabzaa, 1998).

2.3.4 High living cost

Social inequity is further exacerbated by large-scale corporate mining operations in most cases (Tauli-Corpuz, 1998). One of the known social inequities of mining is the high cost of living within communities near mine locations. All the indices such as food, accommodation, health, water, that make a decent life have a price tag beyond the reach of the average person. At the same time, the traditional sources of recreation and livelihood of the people are seriously impaired by mining activities, a situation that sparks off or aggravates other social problems (Akabzaa and Darimani, 2001).

The subsistence economies which have nurtured generations of indigenous peoples are usually eroded and replaced with the cash economy or the market-based economies over which indigenous peoples have no control at all (Tauli-Corpuz, 1998). For example, central plots in Geita that were sold for Tsh. 800 000 in 1997, are now Tsh. 6 millions. The prices of foodstuffs like meat and fruits have also increased up to three times (Lange, 2006).

According to Akabzaa and Darimani (2001) the salaries of the Ghananian staff in the mines are indexed to the US dollar, which raises their income far above their counterparts in the public sector. In addition, the expatriate staffs of the mines are paid internationally competitive salaries, which further widen the income disparities

in Tarkwa. This group of high- income earners has thus influenced the pricing of goods and services such as housing, food and other amenities. As reported by Lange (2006) the majority of the mine workers at GGM are paid around Tshs. 200 000 (US$ 184) per month, allowances included. This sum is higher than the yearly average per capita income of the district, which was only US$ 132 in 2002.

2.3.5 Impact of mining on women

Mining is a demanding physical activity, which historically has been conducted with very little mechanization and has traditionally been a male activity (WB, 2001). Although mining has negative impacts on all those who live in the mining communities in general and those who are affected by the mining operations, there are distinct impacts and added burdens on women. This is obvious when men have to go out for a wage, thereby increasing women's workload and responsibilities, leading to more stress and tensions (WRM Bulletin, 2003). Mining corporations have also deprived women in matrilineal societies (such as those found in the Pacific, Papua New Guinea and, Bougainville) of their rights to their ancestral lands. Incidences of alcoholism, drug addiction, prostitution, gambling, incest, wife-swapping and infidelity are increasing in many mining communities (Tauli-Corpuz, 1998).

Whilst large-scale mining has limited scope for women's employment, the small-scale sector absorbs women as contract or bonded labour under highly exploitative conditions. In India, for example, women's wages are always less than that of men, paid holidays are not allowed even during pregnancy or childbirth (WRM Bulletin,

2003). In Zimbabwe it has also been reported that employment opportunities are fewer for women in mining communities (Eggert, 2001)

Women exist in mining areas rarely as workers but as spouses of mine employees. Only a small proportion of these women are actually employed in mining activities *per se* (WB, 2005). Mutagwaba *et al.* (1997) reported that, women face difficulties on entering the mining sector due to cultural norms and the nature of the equipment applied in small-scale mining, which requires hard physical labour. A case study of the Sadiola mines in Mali by Kassibo *et al.* (2006) revealed that before the establishment of the large scale industry, women in the communities were largely involved in artisan mining. With the establishment of the industry, women were deprived their land which they mined. Again, the company was established with the promise of jobs, but these jobs are geared towards the males and women are unable to compete for the jobs because the industry does not warrant them.

2.3.6 Impact of mining on children

In many cases, mining both small and large-scale represents the most promising income opportunity availability. In spite of the good promising, mining activities are often viewed negatively from social hazard. A more serious social hazard is the employment of child labour in mining (Digby, 2002). They are cheap labour for activities like in quarrying, stone crushing units, marble and masonry stone mining, transporting, head loading, stone breaking, and in some of the processing industries like marble products, slate industry, diamond cutting, etc (Wazir, 2002) (example of '*Nyoka*' Mererani in Tanzania). Child labour has developed and significantly

increased in mining communities (Tauli-Corpuz, 1998). While poverty is a major factor, there are many other relative causes such as economic and political instability, discrimination, migration, criminal exploitation, traditional cultural practices, and lack of decent work for adults, inadequate social protection and lack of schools (Wazir, 2002; Mwami *et al.*, 2002). Thus the use of low paid labour or unpaid child labour has been the necessary condition for the survival of the majority of both artisans and medium-scale diggers (Mwami *et al.*, 2002). However, according to WB (2005) and George (2003) child labour is primarily a concern in small-scale mining operations, and, by contrast, very infrequent in large-scale mines.

2.4 Impacts of mining on the environment

Although the mining industry occupies a relatively small part of the land surface, it does have significant and often irreversible impacts (Boocock, 2002). By its nature, mining has a permanent environmental impact in that a non-renewable natural resource is exhausted (Boocock, 2002; WRM Bulletin, 2003). Environmental impacts can occur during all the phases of a mining project, exploration, disposal of waste rock and overburden, ore processing and plant operation, tailings (processing wastes) management, infrastructure (access and energy) and construction of camps and towns (Boocock, 2002). The environmental impacts which arise from the mining operations include physical and chemical impacts. The major physical impacts of mining are due to site clearance, establishment of mine infrastructure and settlement that lead to the destruction of biodiversity, river and water catchments area. The chemical impacts arise from the discharge of mineral waste such as tailings waste water and emission of noxious like sulphur dioxide and carbon

dioxide which lead to water and air pollution (Tauli-Corpuz, 1998; MEM, 2001). Of course, mining has to take place where mineral deposits are found and can be economically exploited, implying that ecological and social considerations take a second position to profit making (Lassey, 2003).

Presently, over 60% of the materials mined in the world are extracted by the open cast method, causing devastation of the ecosystems where they are operating (deforestation, contamination and alteration of the water, destruction of habitats) (WRM Bulletin, 2003). The destruction caused by mineral extraction is generally considered to be an inevitable consequence of economic development. Meanwhile, the prices of minerals on the world market reflect only production cost; environmental costs are not factored in (Lassey, 2003). Even though the environmental impacts of mining vary according to the type of mineral and the mine, this is intrinsically an unsustainable activity, as it implies the exploitation of a non-renewable resource by means of destructive or contaminating methods, such as crushing, grinding, washing and classifying minerals, refining and casting. Mining is presently doubly destructive both due to its large scale and to technology, which has increased its productive capacity (WRM Bulletin, 2003).

2.4.1 Land destruction

Mining is associated with large-scale destruction of agricultural lands and mountains which leads to erosion and siltation (Tauli-Corpuz, 1998). Currently, land and environmental issues in Africa are growing as important because the main gold belt is mostly found on indigenous lands and cropping zones. Surface gold mining under

certain circumstances has the potential to do more harm than good to the local communities. The damages are irreparable and irreversible, and cannot be compatible with sustainable environment (Lassey, 2003).

2.5 Conflicts derived from mining activities

Resource conflicts are ubiquitous (Anderson *et al.*, 1998). Conflicts over natural resources have classical dimension, pitting those who own resource against those own nothing but whose work makes the resource productive. The intensity of conflicts also vary enormously from confusion and frustration among members of a community over poorly communicated development policies to violent clashes between groups over resource ownership rights and responsibility (Kant and Cooke, 1999)

Mining-related conflicts have become a permanent feature of the political landscape in many developing countries, where there are encounters between mining companies and local communities characterized by public protest, violent conflict and the notable absence of state intervention (Barton, 2005). Mining activities are also in direct competition for lands with other land use sectors such as agriculture, forestry, fishing and game resources in the same sites (Tauli-corpuz, 1998; Slack, 2001). Mining companies, and to a lesser degree, the central government reap the benefits while communities in the mining sites who bear a greater part of negative impacts of mining enjoy little benefits. The unbalanced relationship between beneficiaries and cost bearers breeds the social conflict around mining project (Akabzaa, 2000; Awudi, 2002)

2.5.1 Conflicts between mining practitioners

There is often tension and clashes of interest between large and small-scale mines. The main source of conflicts among mine practitioners is the eviction of small miners from concession and their relocation to marginal site (Tauli-corpuz, 1998; Abugre and Akabzaa, 1998). The liberalization of mining industry has attracted large mining companies with modern technology to replace small scale miners (Akabzaa, 2000) (for example the case of Tanzania One and the small-scale miners in Mererani).

In Ghana, land use competition between small and large-scale mining parties has become noticeably intense (Obora and Jenkins, 2006). Small- scale mining is a poverty driven activity found mainly in developing nations which often generates land use disputes with other stakeholders, particularly large mining companies (Andrew, 2003). The rapid proliferation of large-scale mining activities have increased demand for mineralized land throughout the mineral rich countries in turn, causing disputes between mining parties, and exacerbating tensions between foreign multinationals and indigenous groups (Obora and Jenkins, 2006). The conflict between small and large-scale mining in Ghana is deeply-rooted; large-scale mining companies argue that they have gone through the necessary legal channels to secure concessions and should therefore have legal entitlement, and indigenous groups and small-scale mining parties maintain that they have cultural ties to land (Ayling and Kelly, 1997).

Many disputes between claim holders and smallholder farmers have also been reported in Tanzania. Farmers often plant perennial crops in areas with title deeds. Sometimes claim holders are advised by mineral officials to allow smallholder farmers to plant seasonal crops in areas that are temporarily not operating, but farmers plant tree crops. Both annual and perennial cropping cause disputes particularly when the claim holder intends to mine the planted areas (Mwalyosi, 2004). According to Lange (2006) in Mererani, conflicts between large scale and small scale miners are centred around two main issues: the question of branding of Tanzanite and the different conceptualizations of the where the demarcations of claim titles go: at earth level only or below the ground as well.

2.6 Tanzania mineral policy of 1997 and mining Act No. 5 of 1998

The government of Tanzania instituted a new mining Act in 1998 that is conducive to foreign investors (MEM, 2001). Following trade liberalization policy from 1985 and the enactment of the national investment Act of 1990, mineral production has increased (Makweba and Ndonde, 1996). The mining policy of Tanzania encourages and promotes private sector mineral exploration and development. This policy makes mining sector attractive to private mining companies (Mwalyosi, 2004).

The 1997 Mineral Policy of Tanzania provides opportunity for private sector to lead mineral development and the government only regulates, promotes and facilitates. The public role consists of *inter alia*:

(i) policy formulation to accommodate the overall and sectoral government policy framework;

(ii) advising on legislation, regulation and fiscal matters related to the sector;

(iii) revenue collection through royalties, annual rents, prospecting rights and licenses;

(iv) monitoring of mining activities;

(v) collection and maintenance of geo-technical data for promotional purposes;

(vi) provision of extension services to small-scale miner

(vii) administration and inspection of mining activities; and

(viii) carrying out research on minerals

In section 3.3.8 the policy state that well development and reliable economic and social infrastructure facilities, such as transport, water supply, power supply, communications, education and health services and recreation are vital for the mineral sector's development which may be achieved through;-

(i) Encouraging and supporting the development of reliable economic and social infrastructure facilities relevant for the development of mineral resources particularly in the rural areas.

(ii) Encouraging mining companies to invest in power, water supply and social infrastructure such as schools, hospitals and recreational facilities within the mines and adjoining localities (URT, 1997)

However, the mining Act No. 5 of 1998 does not stipulate on how the contribution of mining sector from private investors will be managed and monitored by the government the situation which give the investor a loophole of not fulfilling their commitment on community's development project (URT, 1998).

CHAPTER THREE

3.0 METHODOLOGY

3.1 Description of the study area

This study was conducted in four villages surrounding Geita Gold Mines Ltd in Geita District in Mwanza. The choice of the study area was based on the expected impacts caused by large-scale mining activities on social services of local communities' within the vicinity to the large mining.

3.1.1 Geographical location

Geita District is located 2° 08′ to 3° 28′ S and longitude 32° to 32° 37′ E. It is one of the eight (8) Districts of Mwanza Region in North-western Tanzania. It occupies a total area of 7 825 km^2, out of which 6 775 km^2 is dry land and 1 050 km^2 is water. The Geita Gold Mine (GGM) is located about four kilometres west of Geita town. The mine lies at the headwaters of the Mtakuja River, which drains into Lake Victoria, 20 kilometres northwest of the plant site (Appendex 1). The mine is surrounded by seven villages, namely Kalangalala, Nyankumbu, Nyakabale, Nyamalembo, Mpomvu, Sargurwa and Bugulula (Fig. 1).

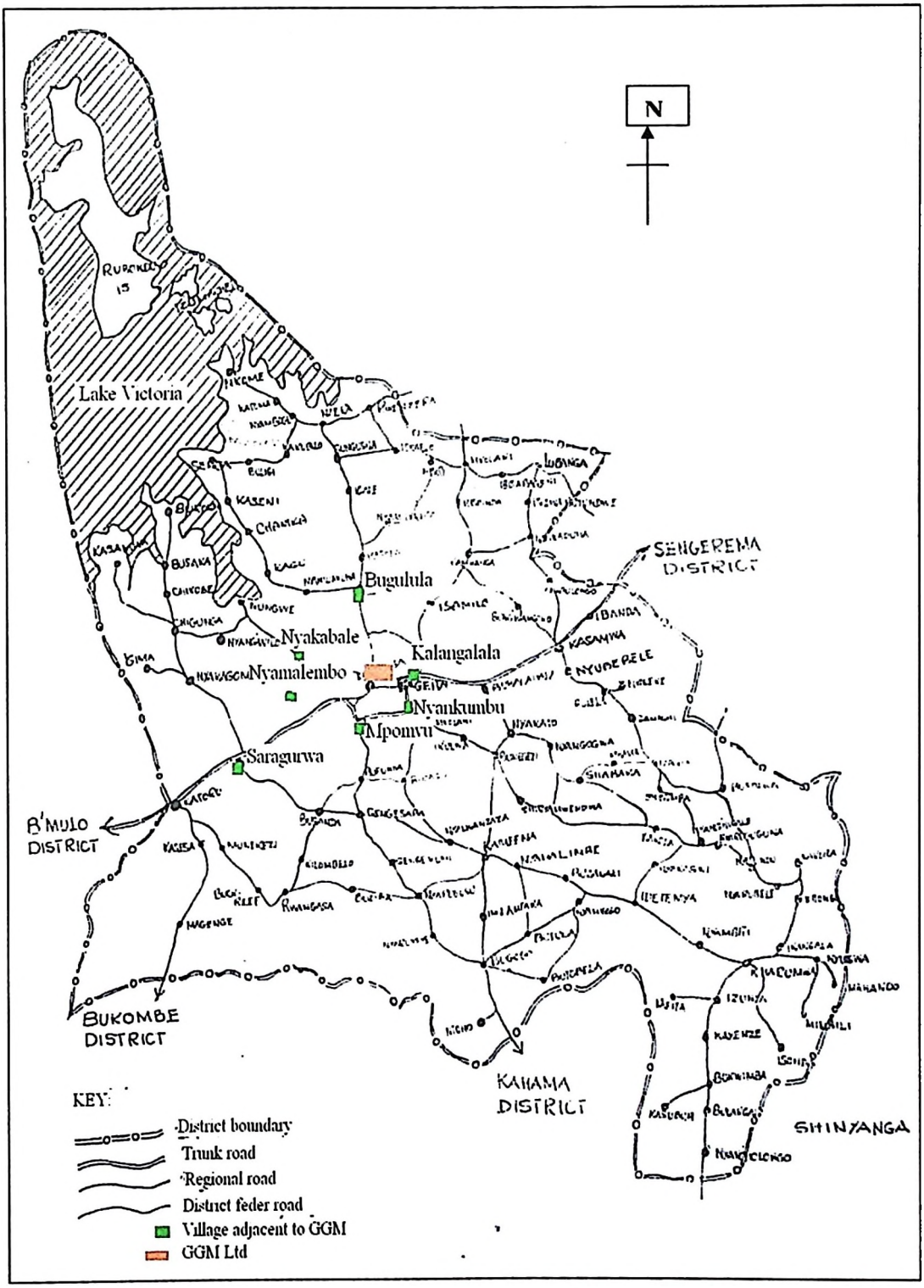

Figure1: Sketch Map of Geita district showing villages centre

Source: Geita District Council (2006)

3.1.2 Climate

The District has two main rainy seasons that run from November to December and February to May with the mean annual rainfall of 1 264 mm. The annual minimum and maximum temperatures for Geita range are 14°C and 30°C respectively.

3.1.3 Topography

Geita District is characterized by hilly topography in the north, west and parts of the south west, with a gentle slope towards the south and southeast. There are pediments that are gently sloping towards the drainage depressions. These pediments are vulnerable to erosion, particularly where vegetation cover has been removed through cultivation, mining or overgrazing. The altitude range from 1 300 to 1 100 m above sea level (Wagner, 2003).

3.1.4 Population size, growth rate and density

Geita District has the largest population in Mwanza Region. According to the 2002 census, it has a total population of 712 195, comprising of 355 823 males and 356 372 females. There are a total number of 115 640 households with an average household size of 6.2. The district population is growing very fast with a growth rate of 3.4% per annum and population density of 91 persons per km^2, considering that there were only 439 191 people during the 1988 census (URT, 2002).

3.1.5 Ethnic groups

The main ethnic groups in Geita District are Longo, Subi, Sukuma and Zinza. However, due to the presence of the gold mine in the area, lately there has been an influx of different ethnic groups from all over the country, including Chagga, Ha, Haya, Nyamwezi and Nyilamba coming as families (GDC, 2006).

3.1.6 Major economic activities

The major economic activities in the District are farming, livestock keeping and fishing. Food crops grown include maize, cassava, sweet potatoes and bananas while the main cash crop has always been cotton. Although cotton is a major cash crop grown in the District, farmers sometimes sell part of the food crops to sustain household income. The second major economic activity is gold mining which is characterized by large and small-scale miners (Wagner, 2003).

3.2 Research design

Social survey was conducted, whereby both purposive and cross-sectional data collection approaches were adopted. By purposive means researcher selected a typical group of individuals who represented the larger population and then data collected on this group. While cross-sectional data collection means parallel data on many units, such as individuals, households, firms, or governments were collected within a narrow time span so that the measurements were viewed as contemporaneous (Singleton . 1993). The data collected were useful for purpose of

description of relationship of impacts of large-scale mining activities on communities' social services variables at the time of study.

3.3 Data collection

Both primary and secondary data were collected based on the study field survey. Primary data were collected using mainly structured questionnaires. PRA techniques were applied during reconnaissance survey. Other methods included direct observation and focused group discussion. Secondary data was obtained through a review of relevant documents. Several literatures were visited and relevant information related to the study was collected.

3.3.1 Primary data collection

Four villages out of seven villages surrounding GGM were enumerated and in each village a list of households was established in collaboration with sub village leaders. This constituted the sampling frame, while the unit of analysis was the individual household heads (Table 1). The sample size per village was at about five percent (5%) of the total number of households as recommended by Bartlett *et al.* (2001) that, the alpha level (percent) used in determining sample size in most educational research studies is either 0.05 or 0.01. In general, an alpha level of 0.05 is acceptable for most research. However, at Kalangalala village about 3% of the population was sampled due to the fact that opening of GGM in the area has attracted many new comers but the research wanted to compare mining impacts before and after large-scale mining.

Table 1: Population distribution in villages adjacent Geita Gold Mine Ltd and sampling unit in four villages in Geita district

Village	Number of household	Human population	Sample unit
Nyamalembo	431	3 015	21
Nyankumbu	424	2 968	
Nyakabale	410	2 870	20
Sargurwa	558	3 907	
Kalangalala	1 572	18 000	49
Mpomvu	489	3 425	
Bugulula	604	4 230	30

Source: Geita District Council (2006)

3.3.1.1 Questionnaires

Questionnaires were developed to pursue major issues identified during reconnaissance survey. There was one type of questionnaire with open and close-ended questions designed for the household heads (Appendix 3). A household in this sense was defined as a person who lives on his/her own or those living together, sharing eating and working and contributing to the household income (Huising, 1997). Information collected included impacts of mining activities on social services, status of social services, and income level of household and environmental. This approach of data collection provided enough information required for determining the impacts of mining on social services of local communities surrounding the private large-scale mining area.

3.3.1.2 Checklist

A checklist was used to collect information from key informants such as; Project key informants, District Administrative Secretary, District Mineral Resource Officer, and Ward Executive Officer and Village Leaders (Appendix 4).

3.3.2 Secondary data collection

Published and unpublished information/data were collected from different sources such as publications, Sokoine National Agricultural library, Dar es Salaam University library; Internet search, government, project, Ward and Village office were used to obtain general information and issues related to the study area.

3.4 Data analysis

Data collected through PRA were analysed directly by local communities while the researcher facilitated the overall process and feedback given direct to the community.

In order to draw conclusion data collected from the primary source using the structured questionnaire were summarized and coded before being entered into a computer for analysis. The analysis of quantitative data was done with the aid of Statistical Package for Social Sciences (SPSS). This was undertaken by using descriptive and statistical tests; the descriptive statistics calculation involved parameters such as frequencies, percentages, and cross tabulation. The logistic regression was employed to assess (the binary variables) i.e. whether the impact is adverse or other wise. The latter was done with respect to the objectives of the study as described below.

Objective (i)

Simple logistic regression analysis was used to predict impacts of mining activities of which were assumed to be binary variable (i.e. coded 0 and 1).

The code 1 was for negative impacts and 0 otherwise. The Logit regression model used is shown below;

$$\log\left(\frac{p}{1-p}\right) = b_0 + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 + b_6X_6$$

Where;

p= probability of occurring of the negative impact of mining activities (observed value of the dependent variable)

b_0= coefficient for constant (intercept)

b_1 to b_6= coefficient of independent variables

X_1 to X_6= independent variables (income, water supply, education and health services, road networks and environment)

The Chi-square test between negative and positive mining activities impacts was tested to assess the relationship of impacts on social services, environment and household income. Frequencies and percentages of respondents were used to determine local people's view on impacts of large-scale mining activities in their area.

Objective (ii)

Spearman's correlation analysis was used to analyze ordinal variables of social services provided in the study area and their status, frequencies and percentages of respondents were used to assess local community's views on social services supported by large-scale mining activities in the area. Problems pair wise ranking on social services as one of the Participatory Rural Appraisal Approach (PRA) was used.

Objective (iii)

PRA (vein diagram technique) was used to assess local people's perception on different institutions/ organizations supporting community development projects in the area. The Chi-square test was used to test level of household income that resulted from mining activities in their area.

3.5 Limitations of the study methodology

It was difficult to get some of the information such as amount of annual income generated by household from different economic activities and average annual income per household since most of the respondents were found to have poor record keeping. However, the researcher managed to get the required information through estimation and giving ample time to respondents to recall.

CHAPTER FOUR

4.0 RESULTS AND DISCUSSION

4.1 Household characteristics

Literacy level, age of respondent, main activities of household head and number of household members available were the main social variables considered to describe household characteristics. These characteristics influence the attitude and perception of local communities on investment of any foreign project to their vicinity. Table 2 shows socio-economic characteristics of the respondents namely; marital status, sex, age, literacy and household size.

Table 2: Distribution of respondents by socio-economic characteristics

Socio-economic characteristic	Respondent counts	Percentage
Marital status		
Single	2	1.3
Married	89	74.2
Widow	21	17.5
Separated	8	7.0
Sex		
Male	94	78.3
Female	26	21.7
Age (years)		
18 – 39	15	12.5
40 – 61	77	64.2
Above 61	28	23.3
Literacy		
No formal education	18	15.0
Primary education	90	75.0
Secondary education	10	8.3
Post secondary education	2	1.7
Household size (people)		
1- 5	26	21.7
6 -10	67	55.8
11 – 15	26	21.7
More than 15	1	0.8

4.1.1 Literacy level

Understanding the educational levels of participants of targeted communities was an important factor in assessing their skills and knowledge in judging different issues. The results show that majority of respondents (75%) attended primary education followed by those with no formal education (15%) and about eight percent had secondary education while nearly two percent had post secondary education (Table 2). The reasons behind for the high level of primary education in the study area might be due to deliberate effort made by the government in 1978 to expand primary education in the country which was made compulsory for all children of 7-14 years (THDS, 1996). The low number of respondents who had secondary and post secondary education could be explained by the fact that after attaining primary education there were fewer places in secondary schools in the 1980s and 1990s where hardly 10% of primary school leavers were admitted into secondary schools. The cross tabulation of respondent's education level and their perception on relationship with large-scale mining company indicated low reasoning of respondents because majority of respondents having primary education and/or haven't formal education reported to have no good relation with the mining company without giving detailed reasons (Fig. 2).

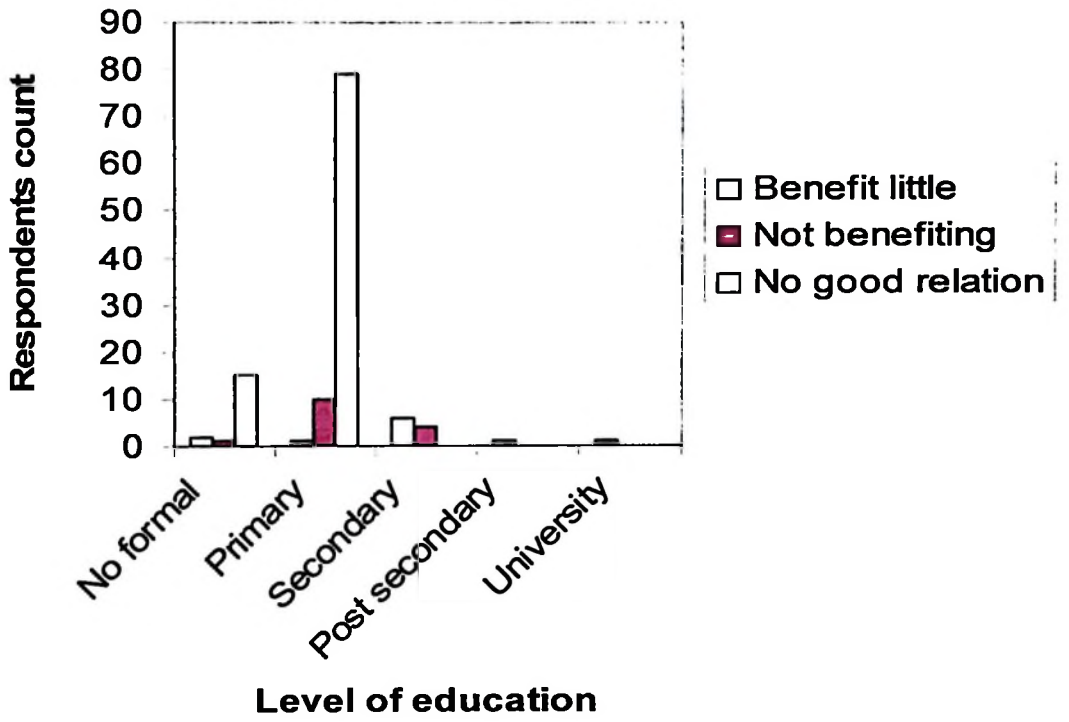

Figure 2: Respondent's education level versus their comments on relation with large-scale mining company

4.1.2 Age of respondents

Age is an important parameter in social analysis since different age groups perform different sets of activities in most societies. Overholt *et al.* (1991) study on gender analysis framework explains that age can be seen as a function of knowledge and experience as well as a measure of maturity of an individual. Ages of respondents at the household level were considered and the results show that the age of respondents ranges from 22 to 78 years with an average of 52 years. Majority of respondents (64%) were in the mid age category (40 – 61 years) followed by those with age above 61 years (23%) while only 13% shows age ranging between 18 to 39 years as shown in Fig.3.

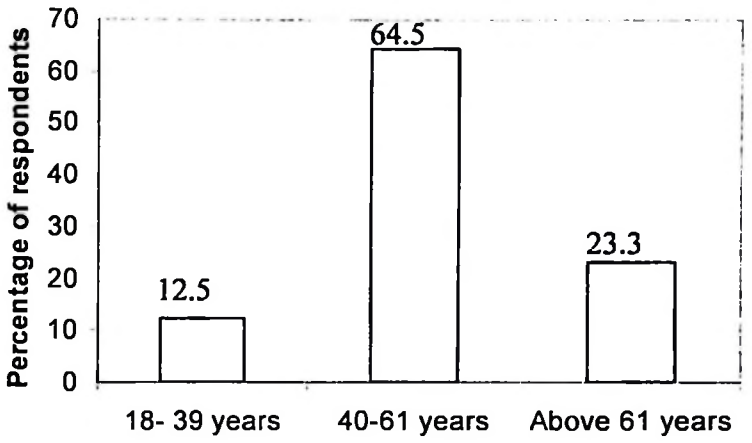

Figure 3: Age group of respondents

Table 3 shows that most respondents interviewed were mature people who might have been involved in mining activities and/or witnessed impact of either large-scale or small-scale mining. Majority of respondents with age group between 40 and more than 61 years old were involved in mining activities. A chi-square test between respondent's age groups versus their involvement in mining activities as a supplement in their households income showed a highly significance ($p < 0.01$) between age groups and mining activities involvements (Table 3). This implies that age of the respondent was a main factor of individual to be involved in mining activities. Furthermore, personal field observation revealed that majority of youths in the study area were engaged in simple business, bicycle transport services and search for jobs in large-scale mine company (Geita Gold Mine Ltd).

Table 3: Cross tabs of respondent's age group versus their involvement in mining activities to supplement household income

Age group of respondents	Involvement in mining activities		Total	χ^2 -Value	Significance
	Yes	No		11.177	0.004*
18-39 years	3	12	**15**		
40-61 years	57	20	**77**		
Above 61 years	22	6	**28**		
Total	**84**	**36**	**120**		

Note: * Statistically significance at 0.05 level

4.1.3 Sex and marital status of respondents

The results in Table 2 reveal that, about 78% of respondents interviewed in the study area were men and 22% were women. The reason for fewer women respondents might be due to the fact that the interview was focused on heads of households. Thus in cases where women are heads, they were either single or widowed. Most of respondents (74%) were married while (18%), seven percent were separated and one percent were single. This implies that most the respondents interviewed in the study area were mature.

4.1.4 Household size

Results in Table 2 also show that about 55% of households interviewed have members ranging from 6 – 10, those with members ranging from 1 – 5 and 11- 15 people is about 22% each and nearly one percent of household has more than 15 people. The results further indicate that the study area has an average size of 8 people per household which is relatively higher when compared to 2000/01

household baseline survey of Tanzania which indicated an average household size of six people in Geita District (NBS, 2002). The reason attributed to higher household size could be the movement of people being attracted by mining opportunities to search for employment and/or to run petty business around the mining complex.

4.1.5 Occupation of respondents

4.1.5.1 Major economic activities

Results in Table 4 show that large proportions of respondents (60%) are engaged in agriculture followed by 33% who are engaged in artisanal mining and nearly 12% in livestock keeping while only five percent 5% are involved in petty business.

Table 4: Economic activities of respondents

Economic activities	Respondent counts	Percentage
Major activities		
Agriculture	72	60.0
Livestock keeping	14	11.7
Artisanal mining	28	33.3
Petty business	6	5.0
Alternative activities		
Petty business	26	21.6
Food vendors	13	10.8
Artisanal mining	25	20.8
Casual labour	15	12.5
Agriculture	22	18.3
Local brewers	16	13.3
Traditional healing	3	2.7

The focus group discussion revealed that the major economic activities for women in those villages included food vending, selling vegetables, saloon, tailoring and mining activities. This result is on line with the result shown in Table 4. However, both women and men were found participating in agricultural activities. Although mining can provide the most significant source of economic wealth in the mining areas, the respondents in the area surveyed were found to engage in diverse economic activities with the main activities being agriculture and livestock keeping as well as petty business.

4.1.5.2 Alternative economic activities

According to the results shown in Table 4, different alternative income generating activities are undertaken by the respondents. The results of this study is in line with the 2002 National Bureau of Statistics report whereby agriculture is reported to be the most important single sector in Tanzania where by (60 to 80%) depend on agriculture while (38.3%) are employed in the same sector (NBS, 2002).

4.2 Status of social services

Focused group discussion and interviews revealed that the status of social services (education, health services, water supply and road network) supported by mining company were not satisfying social needs of local communities. However, linear regression of respondents views on types of social services provided in their area versus their status showed that, only education service status was significant ($p < 0.05$) while other services were not significant (Table 5). This might be due to strategic efforts made by the government to expand and improve primary and

secondary education services in the country to achieve the government education target.

Table 5: Regression analysis of social services provided by mining company and status of social services in Geita district

	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	0.820	0.864		0.948	0.345
Status of education services	0.432	0.167	0.233	2.579	0.011*
Status of health services	0.093	0.137	0.068	0.678	0.499^{ns}
Status of water supply	0.219	0.207	0.108	1.059	0.292^{ns}
Status of road network	-0.356	0.189	-0.190	-1.885	0.062^{ns}

Note * statistically significance at 0.05 level, ns statistically non-significance at 0.05 level, B is unstandardized coefficient of dependent variable

Pair wise ranking in the study area showed that water supply was the first identified problem by participants, followed by health/medical services, road network, farming, grazing and last education services (Table 6). Water supply was the major problem because in the study area there are no permanent water sources instead the community depend on seasonal springs and tradition wells. The identified problems are further discussed in the following section.

Table 6: Pair wise ranking of social services problems at villages in Geita district

Social service problems	1	2	3	4	5	6	Rank
1. Poor education services							6th
2. Poor health services	2						2nd
3. Lack of water supply	3	3					1st
4. Lack of farming area	4	2	3				4th
5. Lack of grazing area	5	2	3	4			5th
6. Poor road network	6	2	3	6	6		3rd
Frequencies	**0**	**4**	**5**	**2**	**1**	**3**	

4.2.1 Status of the health services

About 52% of respondents (Table 7) reveal that, health services provided in their villages are worse resulting from high medical and transport cost as well as aloofness to the nearby health centre. Moreover, results show that about 67% of respondents were of the opinion that health services status is decreasing compared to situation before the investment in large scale mining activities in their area, 31% claimed that there was no differences in health services status while nearly two percent (3%) expressed that health services status has improved after the investment in large-scale mining in 2002 (Fig.4).

Table 7: Correlation of social services and their status at four villages in Geita district

Social service	Status of social services			Spearman's value
	Good	Fair	Worse	
Education	(79)65.8	(37)30.8	(4) 3.3	**0.231****
Health	(20)16.7	(38)31.7	(62)51.7	**-0.255****
Water supply	(4) 3.3	(21)17.5	(95)79.2	**-0.214****
Road network	(5) 4.2	(27)22.5	(88)73.3	**-0.159***

Note: Figures in parenthesis indicate respondent counts whilst not in parenthesis indicate their percentage.
** indicates significance at 0.01level and * indicates significance at 0.05 level

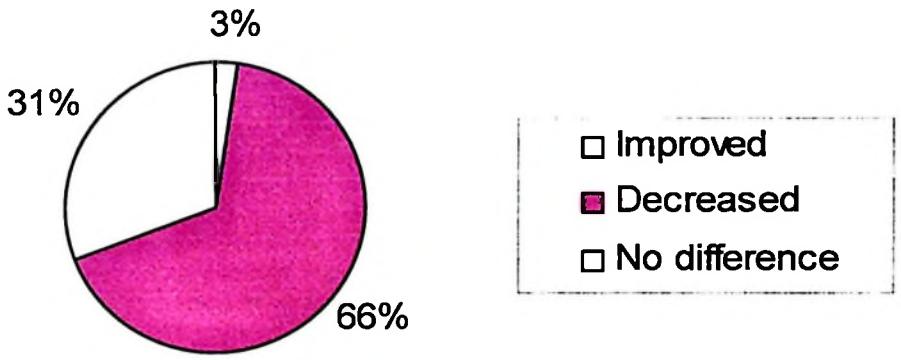

Figure 4: Comparison on health services status before and after the investment of the large-scale firm

Findings from focus group discussions with a group of women at Nyakabale village on problems of health facilities in their village indicated that, sick or pregnant mothers have to walk long distances of about 18 km to the district hospital (in Geita town) due to the diverged road by Geita Gold Mines from the village to Geita. Thus largely they depend on Traditional Birth Attendants (TBAs) services that are few in number and can not solve complicated problems. They further claimed that, the health clinic in Gold mine was reserved for use by employees of mining company.

The findings are similar to a study by Hinton and Veiga (2004) on technical and social-economic profiles of global mercury project sites in Zimbabwe which reported that, despite the presence of health clinics in the Kadoma-Chakari Region, Zimbabwe, most of them are reserved for use by employees of mining companies. A report by LEAT Tanzania (2003) also revealed the same at Bulyanhulu that medical center is inside the mine complex and villagers have to go through rigorous security hurdles and numerous checkpoints before they are allowed. Spearman's correlation analysis in Table 7 on health services supported by large-scale mining versus their status shows a negative relationship (*rho* = -0.255, $p < 0.01$) implying negative relationship on health services supported by mining company and their status.

4.2.2 Status of education services

Results in Table 7 have shown that about 66% of respondents believed that education support by large-scale mining company was good, especially primary education. They indicated to benefit on classroom construction support, school furniture costs and books as well as teaching materials. Also 31% of respondents said that education support by mining company was fair whilst only 3% responded that mining company was not adequately supporting on education services. Spearman's correlation results show a positive relationship significant (*rho* = 0.231, $p < 0.05$) on education services supported by mining firm versus their status (Table 7). The findings further indicated that about 70% of respondents were of the opinion that the status of education services is increasing when compared to period before the investment of large-scale mining activities in their area (Fig. 5).

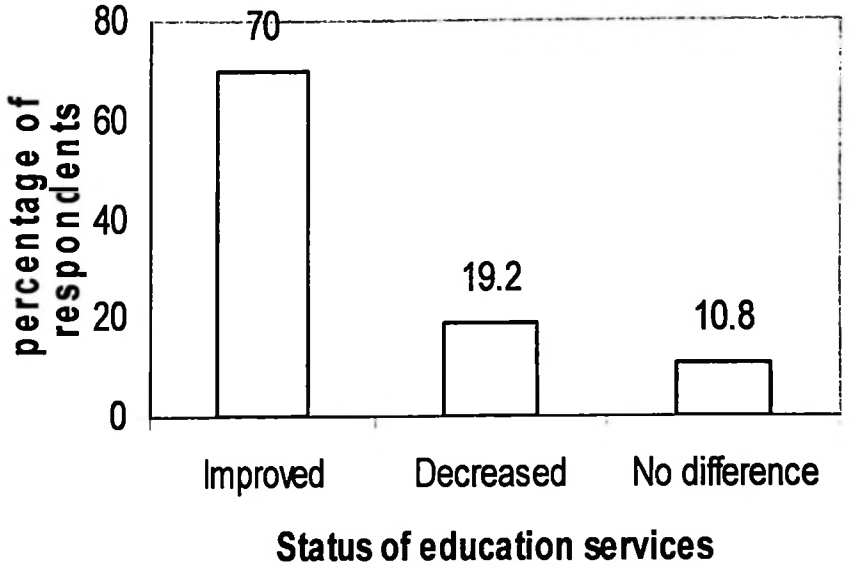

Figure 5: Comparison on education services status provided before and after the investment of large-scale firm

4.2.3 Status of water supply

About 79% of respondents explained that the quality of water supply was worse, 18% thought it was fair while nearly three percent (3%) reported that it was good (Table 6). The results in Table 8 show that 55% of the respondents stated pollution of dust and dynamites from mining as the main causative of poor status of water services. They explained further that the District Authority has warned them on the use of harvested rain water that was not safe for domestic use especially for drinking and cooking as there were great possibilities of being contaminated with dynamite and other chemicals which escape into the air.

Table 8: Respondents reasons for poor status of water supply at four villages in Geita district

Reasons	Respondent counts	Percentage
Dynamite pollution on water bodies	55	55.0
Water scarcity	41	43.3
Poor water policy	2	1.7

Results in Table 8 further indicate that nearly 43% of respondents said poor status was due to water scarcity for domestic use especially during dry seasons when most of water sources become dry. During dry season they are forced to depend only on tradition wells, water ponds and temporary water springs, hence communities had no other alternative. The findings are similar to a study by Akabzaa and Darimani (2001) on the impact of mining sector investment in Ghana who revealed that, most of the wells at Tarkwa mining region were in deplorable condition and were heavily polluted. A study by Lange (2006) on benefit stream from mining in Tanzania also revealed the same problems that water is among the most serious problems of Geita district. Only 46% of the total population had access to clean water within a distance of 400 meters; this is below the national average, which stands at 53% for rural areas and 73% for urban (Braathen, 2004).

Field observations showed that most of people from Nyamalembo and Nyakabale villages depend on Mtakuja River as a source of water which might be highly polluted by GGM. The indigenous wells at Nyamalembo village were located to constructed dam by GGM which was used for disposal of waste from the mining

plant. Spearman's correlation analysis on water services supported by large-scale mining and their status showed a weak negative relationship (*rho* = -0.214, $p < 0.01$) significant indicating low support on water services in the area (Table 7). In addition about 73% of the respondents indicated that the status of water services was decreasing compared with situations before the investment of large-scale mining in their area. About 21% said that there was no difference in status before and after while nearly six percent (6%) said that the status improved after the investment of the large-scale mine (Fig. 6).

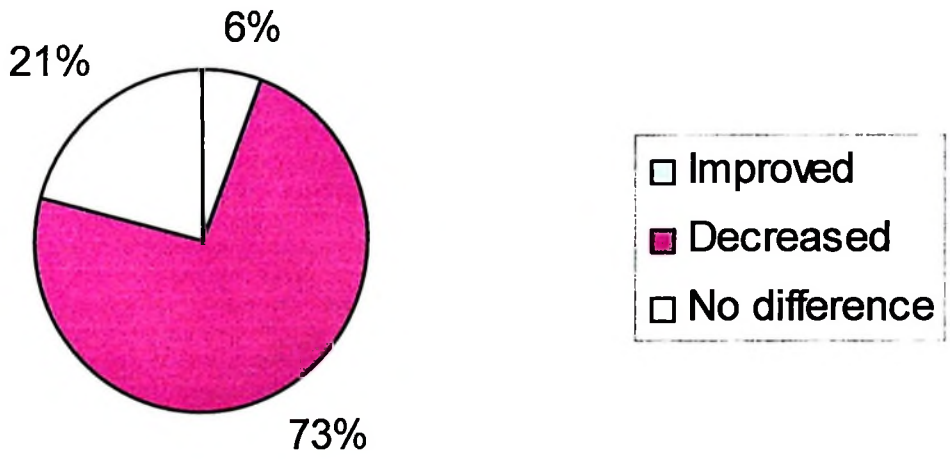

Figure 6: Comparison on water services status provided before and after the investment of large-scale firm

4.2.4 Status of road network

About 60% of respondents were concerned that roads network in their area were poorly constructed and not well maintained which made them mostly passable during dry seasons. Only a four wheel car could pass during the rain season. Nearly 36% of respondents said that there was no road network connecting their villages to

neighbouring villages while three percent (3%) of respondents were of the opinion that road network was well maintained (Table 9). Results in Fig. 7 show that nearly 63% of respondents did not see any difference in road network services status before and after the investment implying that there was no improvement on road network despite the establishment of a large-scale mining firm in their area.

Table 9: Respondent's reasons for poor status of road network in Geita district

Reasons	Respondent counts	Percentage
No road network	45	36.3
Poorly constructed/maintained	72	60.0
No road maintenance	3	2.7

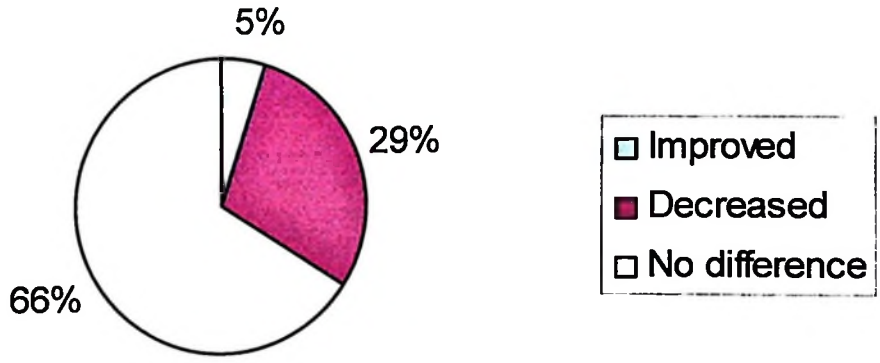

Figure 7: Comparison on road network services status provided before and after the investment of large-scale firm

Focused group discussion revealed that road network is a major problem in their residential areas due to the diversion of roads by mining company. Citing on the

diverted routes participants in Focused group discussions claimed that the mining authority has diverted a route from Butundwe, Katoro to Geita town of which formerly the route was 15 km to Geita town, but the diversion of this road resulted into 22 km (i.e. 7 km more than the former route), route from Bugando, Bugulula to Geita town which was 7 km before but was diverted to 12 km more and the route from Nyakabale to Geita town with 5 km changed to 18 km. The increased distances from the normal route has resulted into transport problems such as high transport costs, consequently, old people, children and pregnant women are facing difficulties to access social services which could only be available in Geita town at short distances.

Furthermore, participants explained that some of those diverted roads pass through dangerous areas like thick forest and steep hills where cars and bicycles can not pass easily. For example, the road from Nyakabale to Geita town which passes through thick forest and hills and the mining authority has named it as dangerous hill due to its steep slopes. Personal observation revealed a locally constructed temporary bridge crossing Mtakuja stream from Nyakabale to Geita town via Bugulula.

4.3 Impacts of large-scale mining activities on social services

A logistic regression was used to predict impacts of large-scale mining activities (dependent variables) on social services and other factors (independent variables) of local communities surrounding the mining area; these were assessed whether the impact was negative or not. Basing on the null hypothesis that large-scale mining activities have significant negative impacts on local community's social services.

The logistic regression results in Table 10 showed a positive coefficient (parameter estimate) of independent variables (water supply, health services, household income and road network) implying high probability of negative impact of mining activities on these social services. However, education services and household income coefficient was negatively predicted implying a positive impacts.

The equation for this analysis is

$$\log\left(\frac{p}{1-p}\right) = -7.252 + 0.583w + 0.009h - 0.209ed + 0.766envir - 0.324inc + 1.502rd$$

Where; p = probability of negative impacts, w = impacts on water supply, h = impacts on health services, ed = impacts on education services, $envir$ = impacts on environment, inc = impacts on household income and rd = impacts on road network.

Table 10: Binary logistic regression results

	B	S.E.	Wald	df	Sig.	Exp(B)
IMWATER	0.583	0.661	0.780	1	0.377^{ns}	1.792
IMHEALTH	0.009	0.603	0.000	1	0.988^{ns}	1.009
IMEDUC	-0.209	0.437	6.426	1	0.011*	0.296
IMENVIR	0.766	0.640	1.431	1	0.232^{ns}	2.150
IMINCOME	-0.324	0.622	0.271	1	0.602^{ns}	0.223
IMROAD	0.502	0.838	3.211	1	0.073^{ns}	1.491
Constant	-7.252	2.817	6.626	1	0.010	0.001

Note: * statistically significance at 0.05 level, ns statistically non-significance at 0.05 level. Exp(B) = e^B where e= 2.71818 and B = regression coefficient which stand for the odds ratio of probability of success of the probability of failure. Wald statistic = $B/(SE)^2$

About 79% of the respondents reported that large-scale mining activities have impacts on social services in their area while nearly 21% explained to have no

significant impacts. The chi-square test on the large-scale mining impacts on social services shows that there was significant difference ($p < 0.01$) between positive and negative impacts (Table 11). This finding implies that local communities in the study area perceived that large-scale mining were causing more negative impacts on social services rather than positive impacts. Similar observations were revealed by Kassibo *et al.* (2006) in a study on socio-economic effects of gold mining in Mali that, the introduction of industrial gold mining in Sadiola and Morila contributed towards changing the social and economic situation in the two areas quite dramatically. While some of the population seen the effects of the establishment of the mines as positive , majority perceived that setting-up of the mines had a number of consequences that were experienced as negative by most local residents.

Table 11: Chi- square test between negative and positive impacts of mining activities on social services at villages in Geita district

Impact	Respondent counts	percentage	χ^2-value	Significance
Positive	21	17.5	**26.034**	**0.000****
Negative	99	82.5		

Note: **Indicates statistically significance at 0.01 level

4.3.1 Positive impacts of mining activities on social services

Data analysis on Table 11 showered respondents indicating that large-scale mining activities have resulted onto both negative and positive impacts on social services in the study area. The reported positive impacts are discussed in the following sections.

4.3.1.1 Education Services

Results in Table 10 show a negative regression coefficient (-0.209) of education services implying that there was a decrease of probability of negative impact caused by mining activities on this service. This means that mining activities have promoted education in the study area. Odds ratio (0.296) of education services show low covariate effect of negative impacts. These low odds ratio implied that the magnitude of negative impacts were 0.296 times the positive impacts.

The focus group discussion at Nyakabale village highlighted education services supported by the mining company to include construction of two (2) classrooms, one (1) room for teachers' office and library. The mining company supplied pupil's reading books, desks and four (4) office tables. Respondents from Nyamalembo village revealed that the mining company has supported construction of four building class rooms in their village. However, focused group discussion at Kalangalala and Bugulula villages did not mention any mining company support on education services. Furthermore, the results from this study reveal that 46% of respondents were of the opinion that large-scale mining have positive impact on education services in their area (Table 12).

Table 12: Positive impacts of large-scale mining activities on social services at villages in Geita district

Social service	Respondent counts	Percentage
Water supply services	28	23.3
Health services	23	19.2
Education services	55	45.8
Household income	18	15.8
Road network services	16	13.0

4.3.1.2 Water supply

Results in Table 12 show further that few of respondents (23%) explained to benefit from Water supply by Gold Mines Company. Respondents indicated that at Nyamalembo village there are three (3) shallow wells, at Kalangalala village seven (7) shallow wells, at Nyakabale village four (4) water tapes connected from the main water supply pipe, which comes from Lake Victoria to the mining plant. Whilst respondents from Bugulula village claimed that, they were not benefiting from water support by Geita Gold Mine. Furthermore, logistic regression results in Table 10 showed a positive coefficient (0.583) of water supply indicating a strong probability occurrence of negative impacts of mining activities on this service. The odds ratio (1.792) of water supply implies high effect of negative impact of mining activities on water supply (i.e. 1.792 times of positive impact).

4.3.1.3 Household income

Logistic regression analysis show a negative coefficient (-0.324) of household income implying less negative impact caused by mining activities on household income. The magnitude effects (odds ratio) of negative impacts was 0.223 times positive impact indicating weak effect (Table 10). Table 13 shows few of respondents (16%) raised their household income through the mining activities. This has been through employment opportunity in the mine and in the Agroforestry project established at Nyakabale village facilitated by the mining company. These findings are supported by Anglogold Ashanti (2005) Tanzania report, which indicated that, the firm had supported the Nyakabale agroforestry project at Geita established in 2001, with 60 registered members, and a micro-finance credit scheme that had granted loans to 145 groups in the local community for small business development. However, the frequency result of respondents is contrary to logistic regression results due to the fact that respondents might view employment in mining as a means of direct income generating, but mining activities can contribute to household income direct or indirectly for example by promoting petty business and selling of agricultural products.

4.3.1.4 Health/medical services

Results from this study divulge that local communities do benefit from the health services supported by GGM. About 18% of the respondents reported to have benefited from the medical services provided either by the mine clinic or from those supported by the mine such as hospitals in Geita (Table 12). In additional, the Anglo gold Ashanti country report (Tanzania) (2005) shows that Geita Gold mines was

involved in a fund-raising campaign in Perth, Australia to support surgery of 11 patients (children) where the company funded their transport to Australia. The report further indicates that the company has contributed to the Programme for the prevention of HIV and sexually transmitted infections (STIs) which are provided in a combined effort between the company and the African Medical Research Foundation (AMREF). However, logistic regression results showed a positive coefficient (0.009) of health services in favour of negative impact (Table 10). This might be due to the reason that GGM is more interested on supporting the health services at nation level rather than to the local communities in the vicinity. This means that in actual practice the local communities do not benefit directly from the health support from the GGM.

4.3.1.5 Road network services

Results in Table 12 show that, only 13% of respondents explained that large-scale mining activities had a positive impact on the road network. Most of them explained that instead of supporting road network the mining company closed some of roads and corridor which formally passed through the mine area. This means that largely the local communities are not satisfied with the way GGM addresses the road issue. The findings on low percentage of respondents to positive impacts of large-scale mining activities on road network is supported by Lange (2006) in a study of benefit stream from mining in Tanzania which reported that Geita Gold Mine contributed US$ 600 000 only, mainly for the maintenance of Geita – Ilogi road (56 km). Moreover, logistic regression results shows a strong positive coefficient (0.502) of road network services implying high probability of negative impact of mining

activities on road network (odds ratio of 1.491 times of positive impact) as indicated in Table 10. This further confirms the community's concern that they do not benefit much from GGM in terms of road networks.

4.3.2 Negative impacts of large-scale mining on social services

The results from this study indicated that 83% of respondents viewed that large-scale mining activities caused negative impacts on their social services and only 17% viewed that large-scale mining activities were causing positive impacts on social services in their area (Table 11). The logistic regression results in Table 10 showed a positive coefficient (0.766) of environment parameters favouring high level of negative impact of large-scale mining activities on environment. The odds ratio (2.150) implied that the magnitude of negative impact probability was 2.150 times that of positive impact.

4.3.2.1 Noise and vibration

Table 13 shows that 47% of respondents experienced vibrations which results into cracking and/or collapsing down of buildings. No compensations are made to this effect. Noise and vibration are experienced in most villages adjacent to the mine. Field observations indicated that buildings at Nyakabale and Nyamalembo villages, which are close to the mining site, had many cracks on the walls that might be due to blasting activities undertaken by this large-scale mine in the area. One villager from Nyakabale whose three houses are approximately 200 to 500 m from the mine were found with many cracks on the walls. Cracks on building of Nyakabale primary

school due to explosion from mine have been reported by George (2003) in a study on socio-economic impacts of mining on livelihood of local communities in Geita District. The main sources of noise are from crushing machines and transportation trucks that cause disturbance to communities in the vicinity. Extremely high level of noise and vibration are experienced during blasting activities.

Table 13: Negative impacts of large-scale mining activities on social services in villages at Geita district

Negative impact	Respondent counts	Percentage
Noise/vibration	56	46.7
Water pollution	85	70.8
Air/dust pollution	68	57.0
Land displacement	71	59.0
Deforestation	83	69.2

4.3.2.2 Surface and ground water pollution

Results from this study reveal about 71% of respondents indicating a negative impact on water service (Table 13). Water pollution is a serious problem in the study area, Chi-square test in Table 14 on positive versus negative impacts of large-scale mining shows a significant difference between positive and negative impact at ($p < 0.01$). Field observations found that springs rivers and indigenous wells continuously being polluted. The leakage of cyanide was obviously observed at Nyakabale village where Geita Mines Company have constructed a trench in which some aquatic grass species (*Typha spp)* were very dry where water accumulates after rains this poses a serious health risk on communities adjacent to the area (Plate 1). This observation is supported by CRBEP (2001) which explains that, no mine

has ever avoided leaking cyanide and waste into the ecosystem. Respondents from Nyakabale village reported that in 2003, 23 livestock (19 cows and 4 sheep) of one villager died after drinking polluted water. Report by TWN Africa (2006) found that cyanide leakage, toxic emissions, improper disposal of mine waste, can be very dangerous and even deadly to humans and can poison ground water, farmlands, marine resources and fauna, the very resources on which the livelihood of the poor depend.

Table14: Relationship between positive and negative impacts of mining on social services at villages in Geita district

	Positive		Negative			
Social service	**Yes**	**No**	**Yes**	**No**	**χ^2-value**	**Significance**
Water supply	32.3	76.7	70.8	29.2	56.527	0.000**
Health services	19.2	80.8	58.3	41.7	9.112	0.003**
Education	45.8	54.2	38.3	61.7	2.368	0.124^{ns}
Environment	10.8	89.2	75.0	25.0	15.212	0.000**
H/ income	15.0	85.0	58.3	41.7	19.429	0.000**
Road network	13.0	86.7	47.5	52.5	16.703	0.000**

Note: ** Indicates statistically significance at 0.01 level and ns indicates statistically non-significance at 0.01 level

Plate 1: Suspected effect of cyanide leakage on aquatic plants (*Typha spp*) in water pond at Nyakabale village

The respondents in this study insisted that currently the mine has disposed not less than five layers of polythene bags by tailing which have formed great mounds, larger than the area given over to excavation resulting to erosion and silting (Plate 2).

Plate 2: Mounded area resulting from mining of GGM had been eroded by rainfall at Geita.

4.3.2.3 Dust and waste pollution

Waste and pollution generated from mining processes is known to have long-term impact on the environment and on the health of people living close to mines. Table 13 shows that 57% of respondents experienced dust caused by large-scale mining activities. Personal observation revealed that dust pollution resulted from mining activities; especially at Nyamalembo, Nyakabale and Kalangalala villages (Plate 3). A focused group discussion in the study area revealed further that dust pollution was mainly caused by blasting activities and transportation trucks. The problem is very severe during the dry season. Respondents also complained of serious health problems which were faced by communities in the area. They include skin diseases, respiratory diseases like coughing and chest throbbing. Similar findings were reported by Tauli-Corpuz (1998) that, people who are at the receiving end of toxic mine-tailings are faced with serious health problems. These include skin diseases, respiratory diseases like tuberculosis, silicosis, asbestosis, gastro-intestinal diseases, and cancers. Disposed polythene bags of cyanide can easily be seen (Plate 4). This observation was also reported by DEAT (1998) in a draft national waste management strategy in South Africa revealed that, the mining industry generates over 80% of South Africa's waste and a significant amount is hazardous.

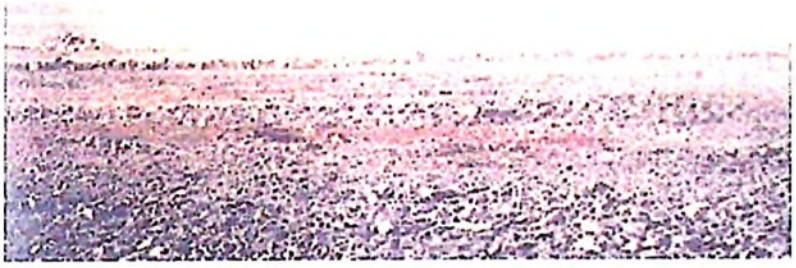

Plate 3: Dusting pollution caused by GGM activities in Geita district

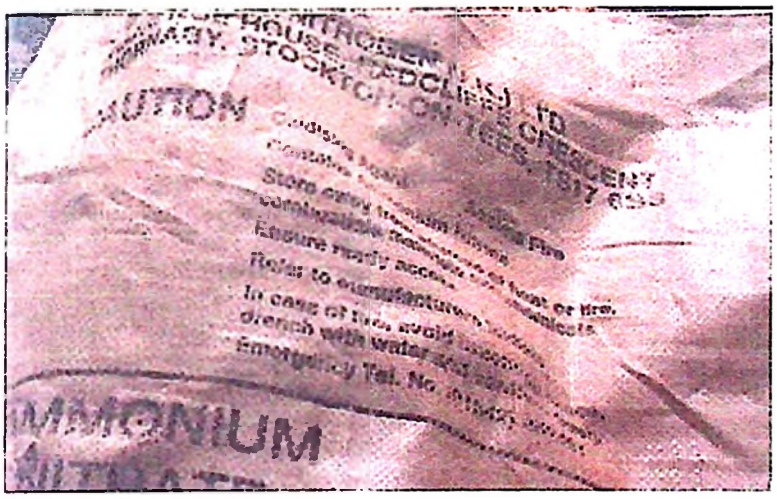

Plate 4: Disposed polythene bags of cyanide chemical storage at Nyakabale village

4.3.2.4 Deforestation

Deforestation is on the negative impacts of large scale mining. About 69% of respondents were of the opinion that open cast methods used by mining to excavate minerals was destroying the natural forest reserve in the area by removing trees during excavation process (Table 13). Personal observation found that in the mining

areas had great mounds of waste materials of rock which have resulted into deforestation (Plate 5). When compared with undisturbed forest adjacent to GGM (Plate 6), the situation seems alarming the environment in the study area. Similar findings have been reported by Rhett (2007) that, large-scale operations in Peru, especially those using open-pit mining techniques, resulted in significant deforestation through forest clearing and the construction of roads which open remote forest areas to transient settlers.

Plate 5: Tailing waste resulting from GGM Ltd mining activities in Geita

Plate 6: Undisturbed forest adjacent to GGM in Geita.

4.3.2.5 Expropriation of land and displacement of villages

About 59% of respondents reported to have experienced land shortage problems due to their land being taken by large-scale mining company and land reallocated to township settlements by district authority (Table 13). The results reveal further that, the expropriation of land and displacement of villages resulted into reduction in agricultural and pastoral activities. People from Kalangalala, Nyamalembo and Nyakabale villages left to the land of their origin (Mtakuja village) to allow the mines to be constructed. The mining companies were supposed to provide compensation in monetary terms based on a proposed rate for each hectare of land, fruit tree and house lost. For example, compensation per hectare of maize land was Tshs 117 452, of banana Tshs 12 636 821 which was Tshs 13 530 per banana plant, of cassava Tshs 85 955 and of sugar cane Tshs.14 040 912 (Appendix 2). However, people claim that, the compensation they had received was less than what they could be compensated. One respondent from Nyamalembo lamented that he was compensated only Tshs 23 000 despite of having 160 banana plants and three mango

trees in his farm. Another respondent said that he had 1.5 hectares of banana plants, 0.5 acre of yam plants and six buildings but he was compensated only Tshs 7 000 000. Similar observation were made by Kassibo *et al.* (2006) in a study on social economic effects of gold mining in Mali who revealed that, when the Morila mine was set up in Sanso municipality, land was seized from four villages close to the site. In order to compensate for any harm done, the Morila SA operating company identified the some villages for compensation. However, many local residents felt they had received less than their 'fair share' of the gold's benefits, which has been a cause for resentment among the neighbouring communities.

4.4 Perceptions of local people on large-scale mining activities

Perception of local people on large-scale mining activities is influenced by factors such as customs and beliefs that might affect critical opinion on stream of benefits, life style and change of household income status of the communities due to the investment by the large-scale mining in their area.

About 47% of the respondents indicated to benefit differently from the presence of large-scale mining. Nearly (43%) out of them explained to benefit from education services, while 45% reported to benefit from water, education and medical services and nearly12% indicated to benefit from casual labour employments and market for selling their agricultural products. However, about 53% of respondents claimed not to benefit on anything (Table 15). The results imply that local communities do not perceive precisely the tangible benefit accrued from privatization of gold mine in their area. Similar findings have been reported by Lange (2006) in a study on benefit

stream from mining in Tanzania that the companies' investments in these sectors are simply for their own benefit. They typically repair roads leading to the mine only, and draw water pipes that they themselves need. A study by Manyika (2000) on socio-economic impact of small-scale mining on forest resource and surrounding community in Kahama too found that local people did not as perceive benefits social services like road network, health services, school construction and water supply from mining activities development (Example of the recent demands by Kakola villagers who stopped the president on 21/08/2007 while on his way to Buzwagi gold mines in Kahama, claiming that privatization of mining area was not beneficial to communities). This observation was contrary to the Anglogold Ashanti (2005) Tanzania country report which showed that Social investment expenditure in Tanzania was US$ 478 000 (TSh 592.2 million) in 2006 and construction of Orphanage hostel (*Moyo wa Huruma)* at Geita which was built in 2005 whereby over US$16 000 has been contributed by company indicating effective involvement of the company on social services support.

Table 15: Responses on benefit streams from mining to local people in villages at Geita district

Benefit streams	Respondent counts	Percentage
Education services	24	43.0
Water, education and medical	25	45.0
Casual labour	7	12.0
Benefit nothing	64	53.0

4.4.1 Community development projects

The results show that about 87% of respondents were of the opinion that the mining company was not fulfilling the community development projects support despite the good promise made by them. They explained that the implementation of community development project support by mining authority was more verbatim than what they could have actually contributed. However, nearly 13% of respondents said to have been supported by the mining authority on community development projects (Table 16). A study by Lange (2006) on benefit stream from mining in Tanzania has also reported similar findings that, community developments donations by mining companies have gone down. For example, donations in 2002 were only one fifth of the level in 2000. In additional, Geita Gold mine has spent close to US$ 4 million on development projects in 2000 and half of this amount, US$ 2 millions, was spent on a 22 km long water pipe drawn from Lake Victoria. Three villages along the route have been provided with water taps on the condition that they protect the entire pipe from damage and sabotage. It seems people in Geita town are bitter because they feel have not benefited from the pipe and continue to experience water shortage.

Table 16: Respondents' opinion on development project supported by GGM at villages in Geita

Opinion	Respondent counts	Percentage
Well supporting	15	12.5
Not well supporting	105	87.5
I don't know	0	0.0

In the study area there are institutions/organizations which support community development project. These include; Plan International, Geita Gold Mine Ltd, Cotcop cotton trading (T), CARE Tanzania and AMREF Tanzania.

Results from PRA (Venn diagram technique) analysis of institution's support on community development revealed that, local people appreciated the support provided by Plan International which is involved in different development projects including boreholes which provide community with clean water, desks to primary schools and in health aspect especially shield for latrine construction. The second organization indicated to have a significance support to communities is Cotcop Cotton trading (T) through construction of primary school premises and computer donation in some of primary school and fences for Nyankumbu and Geita primary schools followed by AMREF for supporting HIV/AIDS campaigns, and lastly CARE International. The GGM contribution is not significant and its negative impacts on local people are highly compared to other organizations operating in the area hence it's being placed close the peripheries of the circle (Fig.8).

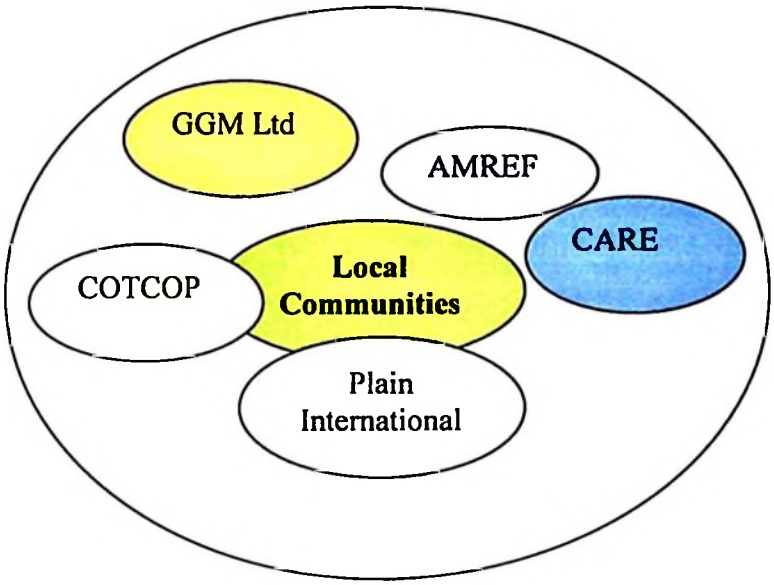

Figure 8: Venn diagram showing communities and Institution support relationship

4.4.2 Impact on local community's income

Table 17 shows that about 87% of respondents were of the opinion that they did not earn any income from large-scale mining activities to supplement their household income, while nearly 13% of respondents said to earn income from mining to supplement their household income. The small percentage of respondents who indicated income earning from mining activities might possibly be due to the fact that local people had high expectations. Local people expected that investment of large-scale mining could have created employment to communities' surrounding the mine. Also this could be due to the notion from the mining authority information during the exploration when they promised to create employment to young people from the community. But contrary to this the management personnel dealing with recruitment were biased when advertising jobs, the well known people was favored to be employed. A study by Kassibo *et al.* (2006) on social economic effects of gold mining in Mali reported similar findings that the local population was also frustrated

due to the fact that few of them obtained jobs at the mine. The report further indicated that, the outsiders were privileged compared with the local people.

Table 17: Responses on income earning from large-scale mining activities

Income earning	Respondent counts	Percentage
Yes	15	12.5
No	105	87.5

An average annual income generated from different economic activities by local people in the study area was 508 209 Tshs per household as presented in Table 18. Furthermore the contribution of each economic activities was reported by respondents as follow; about (58%) of respondents reported that agriculture was their main source of income with average annual income of 830 252 Tshs per household this was followed by livestock keeping (43%) with 571 496 Tshs, petty business (46%) 304 6178 Tshs, mining employment (1%) 285 294 Tshs and lastly was artisanal (39%) with 273 191 Tshs per household. The result imply that even though the area has mining opportunities but the opportunities does not favor local communities instead they depends on agriculture as source of household income.

Table 18: Average income generated from different economic activities by respondents

Economic activities	Percentage of respondents	Total annual income (Tshs)	Average annual income (Tshs) per household
Agriculture	57.5	57 787 400	830 252
Mining employment	1.4	4 850 000	285 294
Livestock keeping	43.3	29 717 800	571 496
Artisanal mining	39.2	12 840 000	273 191
Petty business	45.8	16 775 000	304 618
Total		**121 970 200**	**508 209**

A chi-square test on relationship of respondents' household income level versus impact of large-scale mining activities showed insignificant relationship ($p < 0.05$) on increased household income implying that there was no relationship between investments of large-scale mining in their area and increased community's households' income. The test further showed a significant relationship ($p < 0.05$) on decreased household income level implying that large-scale mining activities have a direct negative impact on households' income. Respondents claimed that the investment of large-scale mining have resulted into expropriation of land, poor road network from their villages to Geita town resulting onto difficult access to reliable market for their agricultural products and social services. In additional, the ban of artisanal mining activities which were used as an alternative source of income especially during poor crop harvest was reported as being another burden to the community (Table 19).

Table19: Responses on level of household income resulting from large-scale mining

Level of income	Respondent counts	χ^2-value	significance
Increased		2.554	0.466^{ns}
Reasons for the answer			
Market for petty business	56.3		
Labour employment	18.3		
Good compensated	6.3		
Market for agriculture product	18.3		
Decrease		16.673	0.049*
Reasons for the answer			
Land expropriation	52.8		
Road network problems	27.8		
Ban of artisanal mining	19.4		
Remain the same		2.358	0.137^{ns}
Reasons for the answer			
Neither affected nor benefited	63.3		
No change in my income	36.7		

Note: * Indicates statistically significance at 0.05 level and ns indicates statistically non-significance at 0.05 level

CHAPTER FIVE

5.0 CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

(i) The findings from this study have shown that large-scale mining activities have both negative and positive impacts on water supply, health services, education services, settlements, household income, environment and road network. The impacts on social services were significant difference ($p < 0.01$) between positive and negative impacts, where by the negative outweighed positive impacts.

(ii) It is further concluded that, the status of social services (education, health services, water supply and road network) supported by mining company were not satisfying social needs of local communities. The findings showed a negative correlation relationship ($rho = -0.255$, $p < 0.01$) between social services supported by large-scale mining and their status implying that in the perception of communities, the company provided low support to local community.

(iii) The local communities did not perceive precisely the tangible benefits accrued from privatization of gold mine in their area including social services (road network, health services, school construction and water) supported by mining company due to their high expectation of gaining much than that and therefore seen as have not been met.

5.2 Recommendations

(i) To ensure sustainable development of local people adjacent to mines, the government must make sure that social services supported by large-scale mining companies appropriate defined by the government itself. The large-scale mining companies on the other hand should ensure that they fulfill their commitment on social services support to neighbourhood communities.

(ii) Some of the negative effects of the mine project are the depletion and destruction of finite resources like water, clean air, forest and topsoil that is suitable for agriculture. These resources once depleted cannot be available for future generations. Nevertheless, they have to be sustained when the mine closes. Therefore it is important to evaluate how the community will be affected after the mine closure and propose ways of ensuring their sustainability after mine closure.

(iii) The mining and minerals sector should identify potential methods for an improved contribution towards social services and economic development. Mining and minerals sector should align its policies towards sustainable development and work out community based projects.

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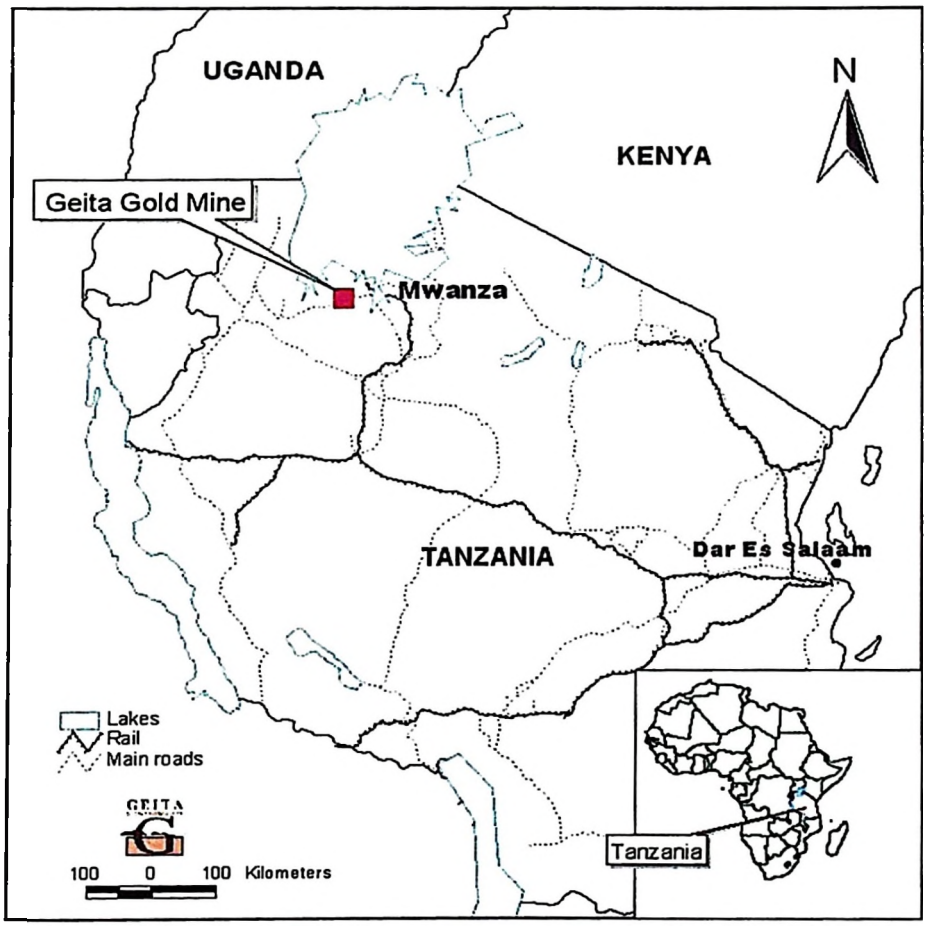
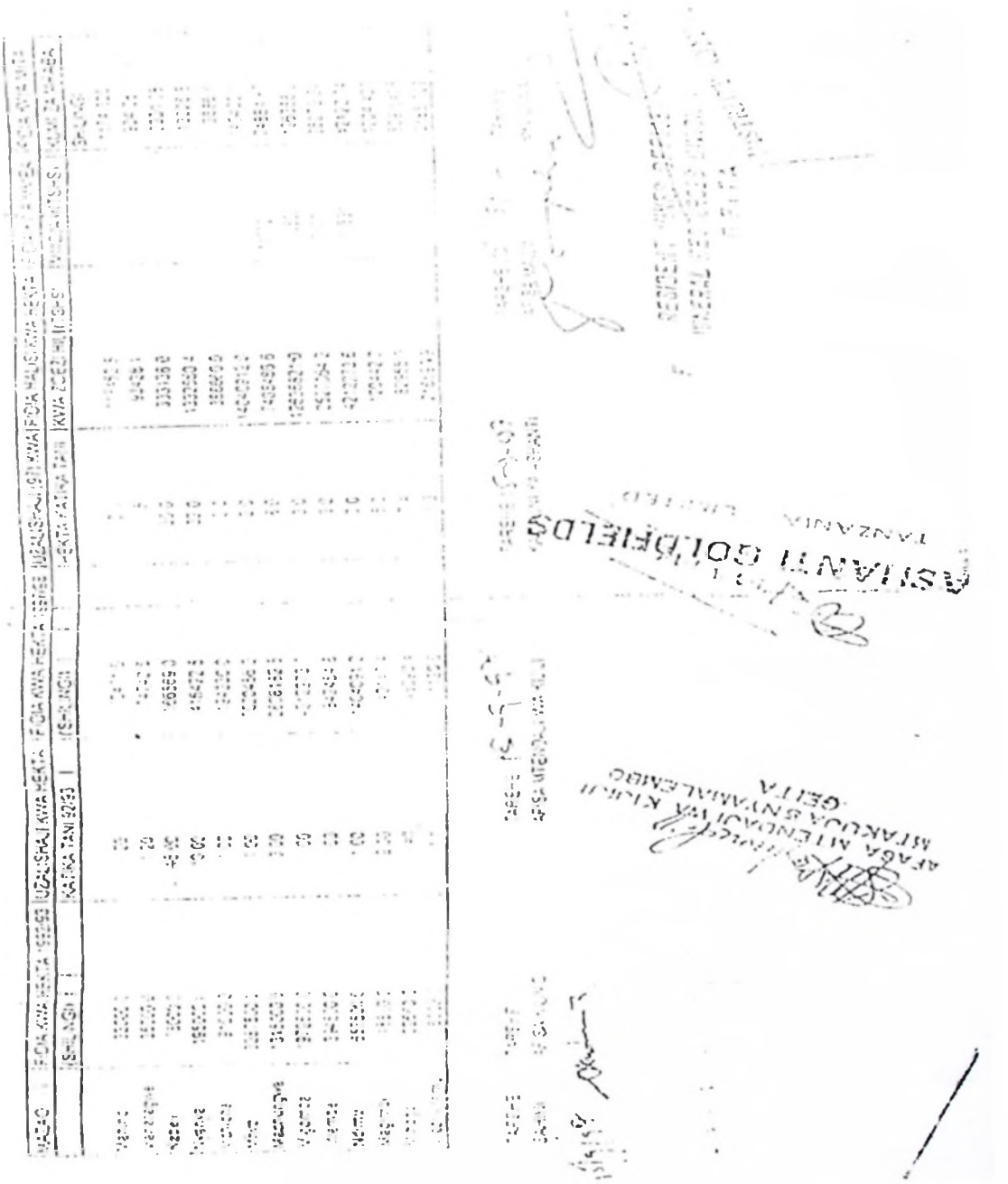
APPENDENCES

Appendix 1: Location map of Geita Gold Mine Ltd



Source: Knol, R. *et al.* (2002)

Appendix 2 Proposed crops compensation rate by G.G.M in Geita District



Source: Nyamalembo village office files (2006)

Appendix 3: Structured questionnaire for community members

Questionnaire

No.....

Village.....Ward.....

District.....

Date.....

A. Demographic aspects

Q1. Who is the head of household?

(1) Male; (2) Female

Q2. Age of the respondent.....

Q3. Marital status of the respondent:

(1) Single; (2) Married; (3) Widow; (4) Separate

(6) Others (specify).....

Q4. Can you please tell me the highest level of education of household head?

(1) No formal education; (2) Primary; (3) Secondary; (4) Post secondary not University; (5) University

Q5. How long have you being here in the village? ..... years

Q6. If your not native in this village, can you please tell the reason to why you come here .....

Q7. Tribe/Ethnicity .....

Q8. I would like to know the total number of people living in your household.....

Sex (1) Male..... (2) Female.....

Q9. Do you have children attending school?

(1)Yes, if yes go to **Q10**; (2) No

Q10. Please tell me how many of your children are attending school.....and indicate their level of education in the table below;

S/no	Age	Sex		Level of education
		Male	Female	
1 2 3 4 5 6 7 8				

Q11. Please explain why do your children do not attend school.....

B. Economic activities aspects

Q12. Kindly please tell me the major economic activities of the head of household

(1) Agriculture crops; (2) Livestock farming; (3) Mixed farming

(4)Artisanal; (5) Wage employment (specify).....

(6)Other business (specify).....

Q13. If agricultural cropping what crops do you produce?

No.	Type of crop	No. of bags/year	Selling price	Total income
1				
2				
3				
4				
5				

Q14. Apart from household's head major activities, what are other activities does the household engage?

No.	Job description	Income per month
1		
2		
3		
4		

Q15. On average, where does your monthly income stand? .....

(1) Below 50 000; (2) 51 000 – 100 000; (3)101 000 – 200 000;

(4) 201 000 – 400 000; (5) 401 000 – 800 000; (6) 801 000 – 1 000 000;

(7) Above 1 000 000

Q16. I would like you to tell me if you have enough land for current household use

(1) Yes; (2) No, if no go to **Q17**

Q17. Kindly explain to me why you say that you don't have enough land for current household use.....

C. Social services aspects

Q18. Would you please tell me types of social service provided in your area.....

Q19. What is your main source of water for the domestic use?

(1) Traditional well; (2) Ponds; (3) River; (4) Boreholes; (5) Shallow wells;(6) Tape water; (7) Other (specify).....

Q20. Can you please explain to me where do you get immediate treatment when one of your household members becomes sick?

(1) Government hospital; (2) Government health centre; (3) Village dispensary;

(4) Private hospital; (5) Private dispensary; (6) Traditional healer

(7) Others (specify).....

Q21. How far is to health centre..... Km

Q22. I would like to know if you have any reliable road network connection with your neighbour villages

(1)Yes, if yes go to **Q23**; (2) No

Q23. Please tell me who assisted the construction and maintenance of that road network in your area.....

Q24. Do you have any school in your village?

(1) Yes, if yes go to **Q25**; (2) No, if no go to **Q26**

Q25. Can you please tell me who assisted the construction and maintenance of school's premises in area.....

Q26. Kindly please tell me where your children do attend for school.....

D. Mining activities aspects

Q27. I would like to know if you have heard any information concerning large-scale mining activities which are undertaken in your area.

(1)Yes, if yes go to **Q28**; (2) No

Q28. Please list all large-scale mining companies of which you know operating in your area.....

Q29. How far do you live from a mining area? ..... Km

Q30. Would you describe your household's income as a result of mining activities undertaken in your area: Is your income has

(1) Increased; Give reasons for your answer.....

(2) Decreased; Give reasons for your answer.....

(3) Remain the same; Give reasons for your answer.....

(4) Don't know; Give reasons for your answer.....

Q31. Do you derive any benefits from mining company?

(1) Yes; if yes, what benefits do you obtain from a mining company.....

(2) No

Q32. How do you comment on level of benefit streams obtained after the investment of large-scale mining at your area.....

Q33. Does Mining Company operating at your area give support for your social services provided in area?

(1) Yes, if yes go to **Q34**; No

Q34. If yes, what are those social services supported by mining company and what are their status.....

E. Mining activities impact aspects

Q35. Are the large-scale mining activities having impacts on your social services provided at your area?

(1) Yes; (2) No

Q36. Indicate in the table below on how you think the large-scale mining activities have impacted the following items

Item	Impacts		Reason for the answer
	Positive	Negative	
Water supply			
Health services			
Education services			
Road network			
Household income			
Settlement			
Land acquisition			
Environment			

Q37. Give your comment on status of social services provided before and after large-scale mining activities in your area.....

Thanks for your cooperation, do you have any questions?

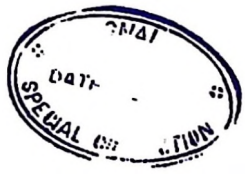
Appendix 4: Checklist for key informants

District authorities

1. Contribution of large-scale mining to communities in the vicinity of the mines
2. Number of households displaced by mining activities
3. Relationship of mining authority with communities in the vicinity of the mines
4. Types of social services provided by large-scale mining companies
5. Available statistics

District natural resource officer

1. Impacts of mining activities to other natural resources
2. Available statistics of adverse impacts and improved of natural resource conservation



Mining authority

1. Contribution of mining to communities social services
2. Compensation to communities' lands
3. Health problems and their management in mining site.
4. Available statistic of benefits provided to local communities.