

INCREASING THE CONTRIBUTION OF ARTISANAL AND SMALL-SCALE MINING TO POVERTY REDUCTION IN TANZANIA

**BASED ON AN ANALYSIS OF MINING LIVELIHOODS IN
MISUNGWI AND GEITA DISTRICTS, MWANZA REGION**

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Executive Summary

Introduction

This report outlines findings from a study examining the contribution of artisanal and small-scale mining (ASM) to poverty reduction in Tanzania based on an analysis of gold and diamond mining in Mwanza Region. It was funded by the British Department for International Development (DFID) as Phase 1 of a project to provide practical support to miners working in the ASM sector. The Tanzanian study is a component of a broader 'Livelihoods Analysis of the Artisanal and Small-Scale Mining Sector' led by the Centre for Development Studies, University of Wales Swansea, with support from Wardell Armstrong and the British Geological Survey. Alongside the Tanzanian component, parallel research in Ghana and a review of existing livelihoods literature with an assessment of key policy challenges facing the sector have taken place over a period of fifteen months (2003-4).

The overall objective of the study in Tanzania was to examine the role of AS mining in peoples' livelihoods to determine whether it plays a positive part in reducing individual and household vulnerability and poverty. Historically, AS mining has been peripheral to the Government policy on the mining sector; nor has it been integrated into livelihoods or enterprise development in other sectors. By implication, the linkages that can be made between Government priorities for poverty reduction and Government support for the AS mining sector have not been systematically explored.

Within the context of the overall study objectives the research was framed around the following five basic questions:

- What role does AS mining play within livelihood systems at the local level?
- What potential does ASM have to reduce vulnerability and improve livelihood security?
- To what extent are AS miners able to voice their concerns to different stakeholders? Are they aware of their legal rights so as to be able to claim rights and entitlements?
- How is AS mining socially and technically organised?
- How do national policies, institutions and regulatory frameworks translate into actions at the local level?

Methodology

The study adopted a multi-method approach that involved a consultation process and primary research. As part of the consultative process, a range of national and district officials, members of civil society, the private sector and village communities were consulted. The primary research was conducted in three locations within Mwanza Region. These locations were: Nyarugusu Village and Mgusu settlement in Geita District and Mabuki Village in Misungwi District. Nyarugusu and Mgusu are gold mining areas and Mabuki is a diamond mining area. These communities were selected because of their representativeness in terms of type of minerals mined, technology and their potential for linkages with other sectors such as LSM.

The methodology integrated technical, economic and social-cultural expertise in collecting and analysing both qualitative and quantitative information on the linkages between ASM livelihoods and poverty reduction. Some of the key issues drawn in the analysis include consideration of: the implications arising from the lack of an agreed definition of artisanal and small-scale mining; how poverty configures itself within the sector in terms of specific socio-economic characteristics and forms of vulnerability; the legal status of AS miners in eyes of the legislation.

Key Findings

(i) ASM has considerable potential to reduce poverty and in comparison to National level statistics, ASM communities fare better in terms of poverty levels than other communities. In addition to being a source of wealth creation, asset accumulation and investment, ASM has potential to increase people's livelihood security, contributing to vulnerability reduction. The vulnerability picture is by no means clear-cut, however, and simple conclusions cannot be drawn. While involvement in AS mining has significant potential to reduce vulnerability through providing people with a source of income, it is also associated with high levels of risk. When this risk comes together with chronic poverty, levels of vulnerability can be extreme for certain categories of people – particularly vulnerable children and elderly women making a living from gold processing activities.

(ii) The government has taken significant steps in promoting the ASM sector. These include reviewing mining policy and legislation in order to promote the acquisition of mineral rights; the right to renew, transfer and mortgage their mineral rights; simplifying the mineral trading licensing procedures and other measures. However, limitations in governance have minimized opportunities for these provisions to be successfully achieved. For example, limited capacities to implement commitments popularised in the Mineral Policy – such as extension services, poor administrative structures and other support services have meant that the working techniques in ASM have remained the same and have perpetuated many long held conflicts between different stakeholders.

(iii) The lack of an official definition of artisanal or small-scale mining, despite extensive coverage of the sector in both the Mining policy and legislation, has resulted to the pooling of artisanal and small-scale mining in the current policy framework. The implications are such that this fails to create potential mechanisms for transforming artisanal mining into a better developed small scale mining, which is what the Government seeks to achieve. From a wider development perspective, placing artisanal and small-scale mining together has implied that there are no mechanisms to provide differential support to artisanal and small-scale mining according to the varying needs of very different groups of people working within the sector.

(iv) Mining legislation does not recognize, or acknowledge the reality of ASM in the field, such as the labour divisions. By implication, although Government emphasises the importance of licensing individuals to carry out artisanal and small-scale mining operations, in the field the licensed individuals turn into unregulated landlords by leasing out land to unlicensed miners. This raises questions on AS miners' status concerning who is actually a legal or illegal participant in the activity. This contradiction has served to perpetuate contradictions between miners of different status, and has also bolsters highly exploitative relationships within the sector.

(v) The current institutional framework gives the Central Government the prerogative for handling ASM issues and processes in Tanzania. Hence, although Districts having mineral resources recognise that the mining sector can be a potential stimulant for local development processes, they realise that their hands are tied because the sector is still controlled centrally. Whereas decision-making for other livelihood sectors has been decentralised to district level, this is not the case with mining, segregating it from planning for income generation, livelihood development, community development, and health and environmental improvement within the district administration.

(vi) Inadequacies in information dissemination systems and means of communication have denied miners the right to receive information in a timely manner or to be appropriately consulted

regarding within decision-making processes. This is aggravated by many of the ASM's members limited knowledge and capacity to seek their entitlements. This situation has made AS miners vulnerable to exploitation and dispossession of mining rights.

(vii) At the community level, local capacities to enforce laws related to AS mining are limited. For example, many village governments cannot reconcile interests that may create social conflict between their community members and authorities - such as by-laws in relation to environmental pollution or child labour.

(viii) There is an inadequate conceptualization by Government of ASM livelihoods and related activities, for them to be given due as well as appropriate recognition in policy and development planning instruments in the country. Diversity in people's livelihoods has not been fully appreciated and ASM activities are still compartmentalized instead of being seen as one component in the diverse livelihood pursuits of rural people. This misunderstanding has been perpetuated by the inappropriateness of making conclusions based on one aspect of ASM.

(ix) Centralised planning regarding AS mining - and by implication the way AS mining is segregated from wider district level development planning - can imply that in practice mining communities are marginalised from national social policy and local level planning for social service provision. This can mean that the most vulnerable people in mining communities are excluded by the institutions that should be there to support them.

Key challenges

Key challenges that need to be addressed place primary focus on the people involved in the ASM sector and the support they need for livelihood improvement, and secondly, the need to identify ways in which an institutional environment that builds on ASM's poverty reducing potential to generate secure livelihoods can be created. In view of these issues, the following challenges need to be addressed:

The Challenge of Exclusion

The isolation of ASM in Government policy and actions from development planning, and from wider social and environmental policies such as health care and natural resource management is quite significant. The Government and its development collaborators (particularly the civil society) needs to facilitate a change in attitudes and perceptions and thus a change in Government practice towards ASM. While indeed a serious and particular political commitment is in line here, what needs to be practically addressed include the following:

- *Linking support for chronically poor AS miners to existing social policy*

This may involve targeting specifically those categories of poor and disadvantaged people concentrated within mineral/gemstone processing activities. Such categories include children subjected to mine labour in early stages of their physical and mental development and hence influence their long term vulnerability, turning them into low performing citizens; and, mine labourers, and women, in particular, who experience low wages for the work involved, poor health and safety standards, aggravated by the irresponsibility of claim holders in this respect. Linking support to these categories of people should be achieved through drawing focussed policy directives and social action programmes by relevant institutions – including MEM, MGCD&C; Social Welfare Department, Civil Society etc.

- *Improving conditions for working children (with the aim of reducing child labour)*

The Tanzanian Government is already instituting significant measures in the area of eradicating child labour, through the institution of Local government legislation and several project related initiatives (eg. the ILO-IPEC project in Merelani). However, the reality of livelihood systems in ASM communities where mining is a way of life and a good opportunity to make money, is challenging the whole process. Ways in which the conditions for children could be improved include:

- (i) Integrating education on the risks of worst forms of child labour into the elementary education system.
- (ii) Identifying alternative sources of income both within and outside the mining sector, linked to work that is less harmful to physical and social health of children than existing practices.
- (iii) Committing miners/parents in ASM communities to design locally relevant child-protection systems within their localities. It is important that any actions taken at local level should start with this consultative aspect to mobilise support from miners and parents.

- *Mobilising AS miners to support themselves*

The objective here is to empower women and those categories of AS miners in chronic poverty, through their mobilisation into specialised group associations to work as grassroots forums for voice and making demands. This exercise can draw on similar experiences by ‘informally engaged’ people in the country demanding for better work conditions.

The Challenge of Diversity

Since very little systematic baseline data is available to Government about employment in the AS mining sector, its contribution to income at household/community level, and about context/mineral-specific differences in AS mining activities across Tanzania, the following is proposed:

- *Generation of information on AS miners through existing national survey instruments*

This would involve a mandatory collection of baseline data on AS mining, its incomes and livelihoods within national survey instruments such as the HBS report; the Integrated Labour Force Survey and other instruments such as the Social Accounting Matrix (SAM) and Computable General Equilibrium (CGE) Model. A successful data collection integrating the ASM sector will offer a more realistic picture of rural Tanzania – with its diversified livelihood activities, and hence appropriately inform National policy and planning.

The Challenge of Institutional Change

The administration and management of the ASM sector also needs to be strategically addressed if the activity is to benefit its primary participants – AS miners themselves. Currently, the high levels of illegality, risk and under capitalisation, threaten the integrity of Government’s capability to manage and improve ASM in the country. While it is widely recognised that existing policy and legislation (that focuses on formalising the sector through licensing) are supportive of AS mining in principle, it still is not effective in reaching AS miners and improve their life situations. A couple of key steps are therefore proposed here:

- *Promoting decentralisation*

This requires making and effecting policy commitments for decentralisation of the administration of mining activities in order to have effective mechanisms that can reach the AS miners with the right support at the right time. It is envisaged that while still maintaining the current structures at District level, it would be more advantageous to local authorities if a mining office was established at the District level, for example, under the District Executive Director. This office should be given full responsibilities for *inter alia*, licensing and other formalisation procedures, revenue collection, market regulation, security etc. This would leave the Central Government through existing District

Mines Offices to offer technical expertise in terms of advising, training and ensuring compliance with the overall country mining policy and legislation.

- *Making a legal and policy distinction between small-scale and artisanal mining*

Distinguishing between artisanal and small-scale mining is critical to promote regularisation of the sector and to appropriately target support that can build on the very different capabilities and needs of artisanal and small-scale miners, as had been highlighted by the research.

It is expected that the big problems of illegality, difficulties in licensing and other aspects that plague the ASM sector may be solved if policy and administrative directives are made inclusive and therefore sensitive to the differences that exist between Small-scale mining and artisanal mining with respect to size of area of mineral right holding, capacity, knowledge, asset ownership, equipment and organizational capabilities.

The Challenge of Knowledge-building

This involves enhancing the participants' levels of technical know-how in the ASM sector and therefore improving their capacity to access opportunities in this specialised economic area. Therefore, it follows that support for knowledge and skill development for these communities needs to be appropriately tailored to AS miners' existing capacities seeking for improvement within their ability range. This challenge can be highly effectively met through the combined efforts of the Government and other stakeholders e.g., miners' associations, NGOs and private sector companies contribute to building the capacity of ASM participants. What is advocated in this respect include the following:

- *Training and skills development*

Ensuring that AS miners access training and efficient working tools including equipment by increasing site-based demonstration centres (a process that has already been initiated by Government), to cover most AS mining areas. Related to this is supporting the Vocational Education Training Agency (VETA) in its plans to establish a training programme aimed at training artisans that can service the ASM sub-sector and small-scale miners.

ii) Encourage miners to establish "Miners Associations" that they can easily associate with rather than the current regional organizations that hardly cater for their needs. Smaller organizations whose members have similar interests can organize training through interaction with various institutions.

- *Market information*

Improving AS miners negotiation powers by ensuring that they can access reliable and timely market information is very important. This is possible by advocating for implementation of Government policy commitment to "Provide mineral marketing extension services, particularly in mineral grading and valuation as well as offering short term training programmes on minerals marketing", or, setting up the proposed minerals marketing information centres in respective village centres for the easy reach of the miners.

The Challenge of Accessing Finance

Because lack of access to adequate credit and finances has always been identified to be among the biggest problems, despite the several commitments placed by the Government and small kinds of loans offered by the Private sector, fresh strategies to service the ASM sector need to be identified. The associated high risk – particularly as people are seen as highly mobile, and the lack of data that reflect the potential of the sector in terms of poverty reduction, indeed discourages

would-be investors in financial aspects, but lessons can be learnt from existing mechanisms that have been relatively successful in reaching mining communities with loans used to purchase less-expensive equipment. Some of the recommended considerations include the following:

- *Establishing a Government Revolving Fund*

The Government can set up a fund through which miners can borrow money and pay back with small interest for financing the fund's management. The fund should revolve in accordance to repayments made by individual borrowers. This fund can provide loans for the following processes:

- mine development
- Out of hand emergencies
- Equipment purchase loans or equipment hire-purchase schemes

The requirement for the collateral can be met through two considerations: Firstly, through individual or group guarantee arrangements - whereby a group of say five people guarantees one member and ensures that he/she pays back for another member to borrow. Secondly, evaluation of the mineral right where the Government keeps the licensee (done in consultation with geological assessments on lease area) until the loan has been repaid.

The Government should also facilitate for the following:

- Re-establishment of Buyer-credit schemes
- Financing through Cooperation between ASM and LSM.
- Financing through NGOs and the Private Sector

The Challenge of Communication

The right to be informed and the right to be consulted is one of AS miners' greatest demands. Since misinformation and exclusion from decision-making processes that affect miners' livelihoods have fed into the high levels of conflict and poor stakeholder relations associated with the sector. It is imperative that Government and other stakeholders invest in identifying the most appropriate and relevant means for delivery of information; and streamlining the mechanisms of consultation within the ASM sector. Proposals through which this can be effected include the following:

- *Consultation and delivery of information*

Success of this approach should be based on the application of a combination of strategies. Firstly it should involve making productive use of existing local government administrative structure through village governments to reach household levels to disseminate information related to ASM. Other possible channels and forum for disseminating information are grassroots miners' associations, extension services with on-the-job delivery of information at mining sites, and the media – attractive and relevant radio and TV programmes.

The Challenge of Sustainability

Livelihood sustainability of ASM communities is challenged by two key aspects. Firstly is the fact that ASM is based on production of non-renewable resources, and secondly is the limited geological knowledge that participants in ASM have about the resource potential in their areas. The likelihood that people's livelihoods may decline in future is therefore high. Therefore, Government, Local authorities and Civil Society should encourage and facilitate the diversification of livelihood activities within ASM communities through exposure, information dissemination and other means in order to enhance their capacities to sustain livelihoods.

Recommendations

Recommendations for Phase 2 are presented at the end of the report.

Acronyms

AS	- Artisanal and Small scale
ASM	- Artisanal and Small Scale Mining
CT	- Claim Title
DfID	- Department for International Development
DMO	- District Mines Office
DTT	- Dar Tardine Tanzania Ltd
GGM	- Geita Gold Mines
LSM	- Large Scale Mining
MEM	- Ministry of Energy and Minerals
NGO	- Non Governmental Organisation
PL	- Prospecting Licence
PML	- Primary Mining Licence
REMA	- Regional Miners Association
SSM	- Small-scale Mining
URT	- United Republic of Tanzania

Section 1: Introduction

1.1 The Study Objectives

This report outlines findings of a study examining the contribution of artisanal and small-scale mining (ASM) to poverty reduction in Tanzania. It was funded by the British Department for International Development (DFID) to develop baseline information on AS mining as Phase 1 of a project to provide practical support to miners working in the ASM sector. The Tanzanian study is a part of a broader 'Livelihoods Analysis of the Artisanal and Small-Scale Mining Sector' led by the Centre for Development Studies, University of Wales Swansea with inputs from Wardell Armstrong and the British Geological Survey. Alongside the Tanzania component, parallel research in Ghana and a review of existing livelihoods literature with an assessment of key policy challenges facing the sector, has taken place over a period of fifteen months (2003-4). It is intended that Wardell Armstrong will take over management of the Phase 2 Tanzania project.

The report is divided into ten sections: Section 1 introduces the study objectives and methodology; Section 2 examines the national context to ASM in Tanzania; Section 3 provides information on mining and livelihoods in Mwanza Region; Section 4 describes livelihoods and related issues in three mining communities; Section 5 examines the social and technological organisation of AS mining; Section 6 discusses voice and local capacity for organisation; Section 7 considers poverty and vulnerability characteristics; Section 8 draws conclusions from the field research in relation to national issues; Section 9 highlights key challenges; and, Section 10 provides recommendations for Phase Two.

The overall objective of the study in Tanzania was to examine the role of AS mining in peoples' livelihoods to determine whether it plays a positive part in reducing individual or household vulnerability and poverty. Historically, AS mining has been peripheral to Government policy on the mining sector, with little attention paid to whether AS mining contributes to rural employment or helps improve peoples' economic security. By implication potential linkages between Government priorities for poverty reduction and Government support for the AS mining sector have not been systematically explored. This is underlined by the fact that ASM was peripheral to the 2000/1 Poverty Reduction Strategy Paper. However, there are some positive signs: following a Directive from the Prime Minister, a committee headed by senior level government officials has been undertaking wide consultations regarding how the mining sector is being run (2004), with parallel consultations on AS mining taking place as part of the PRSP review.

The timeframe and funding for the study were very small and therefore strategic decisions had to be made in terms of the study focus and selection of research location and type of mining. A global literature review (Bastia, 2003) highlighted the fact that there are a relatively large number of studies examining the environmental, health and safety, gender and child labour, and technical dimensions of AS mining worldwide, also reflected in information on mining in Tanzania. In contrast, there is a relative paucity of good information on AS mining from a social perspective; particularly lacking are studies giving voice to miners' perceptions, values and understandings. Against this background, the emphasis was on bringing together a multi-disciplinary team with social, economic and technical mining expertise who could integrate qualitative and quantitative data gathering and analysis. Some details on environmental issues and health & safety were collected but consideration of linkages between ASM, poverty and environment were deliberately not the focus of the study; likewise, although the household survey asked questions about

sickness, which included HIV/AIDS, further examination of HIV/AIDS related issues was outside the capacity of the research team.

At an early stage of the project a decision was made to conduct research in Geita District of Mwanza Region. This followed initial consultation with a range of national level stakeholders, including the Ministry of Energy and Minerals (MEM) and Department for International Development (DFID), with the subsequent identification of the interface between small-scale and large scale mining as important for Phase Two. The decision was also influenced by a national stakeholder workshop for the end of an earlier UNDP study on mining livelihoods (Tan Discovery, 2003a/b), whose workshop recommendations included the need to pilot the integration of AS mining into district level planning in Geita District of Mwanza Region: the Team felt it was important to build on this existing work.

Within the context of the overall study objectives concerning mining livelihoods and poverty reduction, the research team developed the methodology and analysis around seven thematic questions (see Annex 1):

1. What role does ASM play in reducing poverty and vulnerability?
2. What are the underlying factors and trends affecting local livelihoods and AS mining?
3. What are the differential assets, capabilities and livelihoods existing at village level in mining communities?
4. How is AS mining socially and technologically organised?
5. What are the potential medium and long-term impacts on livelihood security related to ASM?
6. What are the institutional and regulatory frameworks, relationships and processes governing ASM?
7. To what extent are AS miners able to express their concerns to Government, private sector and other stakeholders? Are they aware of their legal rights and able to claim their rights and entitlements?

1.2 Methodology

The methodology included three components: a consultation process, analysis of secondary information, and primary research.

1.2.1 *The consultation process*

A range of stakeholders were drawn into the decision-making process concerning priorities for research and in identifying and verifying key issues as the primary research progressed. This included consultations with the Ministry of Energy and Minerals, district level officials, and representatives of the private sector, civil society, and village communities.

As part of the primary research process, a stakeholder workshop was held in Geita in July 2004, which included participation by villagers from Mabuki, Nyarugusu and Mgusu Villages (see list of attendees in Annex 2), members of Geita District Management Team, District officials from Misungwi District, Ward councillors from Geita and Misungwi Districts, representatives of the Zonal Mining Office and Regional Secretariat in Mwanza Region, the private sector (Geita Gold Mine, Shanta Mining Co. Ltd, MEREMETA) and civil society (Poverty Africa).

1.2.2 Analysis of secondary data

In addition to the Global Literature Review conducted as part of the overall research project (Bastia, 2003), the Research Team undertook a brief review of relevant reports and published literature on livelihoods, poverty and AS mining in Tanzania. These documents are referred to where necessary in the text.

1.2.3 Primary field research: site selection

The research was conducted in three locations within Mwanza Region. These locations were: Nyarugusu Village and Mgusu settlement in Geita District and Mabuki Village in Misungwi District. Nyarugusu and Mgusu are gold mining areas and Mabuki is a diamond mining area. The decision to conduct research on gold and gemstones in Misungwi and Geita Districts reflects the fact that they are by far the most important minerals for ASM in Tanzania (it is estimated that around 80% of all ASM activities are associated with gold (50%) and gemstone (30%) mining)¹, and as Mwanza is within the Lack Victoria Goldfield, a high proportion of all AS gold mining takes place in the area. Hence by selecting broadly representative ASM sites for these minerals within these districts we aim to produce findings that are relevant for the national ASM sector.

Secondly, there was interest within the project to explore potential for private sector support to AS mining. Early discussions with Geita Gold Mine suggested opportunities for collaboration.

Thirdly, the desire to encompass two or more different minerals extracted through AS mining within the field research: this would allow for comparison between production processes, processing, and market linkages for different minerals/gemstones. This raised questions concerning the possibility of exploring whether social organization, dimensions of vulnerability and the role of mining in people's livelihoods differed according to type of mineral. Diamond mining in Misungwi and gold mining in Geita offered just such a possibility.

Selection of field sites within Misungwi and Geita Districts was based on three key criteria:

1. Type of mining settlement and sustainability for the Project: mining villages differ by size and the period that they have been established (and consequently the social, economic and physical structures that are in place to support mining)². A general condition for all sites was that the mineral reserve should be a sustainable deposit to permit involvement in any further stages of this project.
2. ASM technology: there is considerable variation between simple artisanal mineral extraction by small groups of miners using simple hand tools and small-scale mining operations that may employ up to 70 workers using a variety of machinery to extract and recover minerals.
3. Linkages between mining and other livelihood activities: given that the project wanted to explore poverty, vulnerability and livelihood issues it was important to capture different socio-economic linkages within the locality.

¹ Good estimates are not available; this figure is extremely rough and based on the experience of Mutagwaba.

² We deliberately wanted to avoid a mine rush area in order to ensure sustainability for the Phase 2 project, however once we started conducting research we found that distinction between rush mining area and mining settlement – based on a typology frequently used in Tanzania (e.g. Tan Discovery, 2003: 59-61) as elsewhere (Weber-Fahr, n.d.) – was far from clear, with rush mining taking place when new deposits of gold were found within and around established mining settlements.

An initial scoping visit suggested that the villages of Nyarugusu, Mgusu and Mabuki fitted each of these criteria. The comparison between gold and diamond mining was felt to be invaluable because of the contrasts between mineral and gemstone extraction, yet having both locations within one region enabled the Team to situate mining livelihoods and poverty levels within the same regional context. In addition, Nyarugusu and Mgusu are very different gold mining sites, again offering opportunities for contrast and comparison. Nyarugusu Village, a town in all but name, encompasses long established gold mining sites, organization and settlement. Mgusu, in contrast, is an illegally established settlement within a forest reserve with considerable insecurity of settlement and mining rights. Technically, all three locations are typical of ASM sites across Tanzania being based on manual activities for mineral extraction and processing operations.

1.2.4 Primary field research: methods

The primary research sought to integrate social, economic and technical components. The socio-economic methods elicited information on livelihood activities, income and expenditure, asset bases, investment priorities, claims and entitlements, and ability to express concerns to Government, private companies, and other stakeholders. An important element in the study, brought out through the use of qualitative methods, was enabling people to tell their own stories about the contribution that mining makes to their lives and the potential it has to stop them from being poor.

Technical information on ASM focused on organisational and technological aspects, and the legal, institutional and policy environment surrounding the AS sector (see the household survey in Annex 3, details on qualitative methods and sample selection in Annex 4, and the technical data site forms in Annex 5).

The methods were as follows:

1. A socio-economic survey conducted with 306 households across three sites.
2. Thirteen focus group discussions using different participatory methods: a timeline, a seasonal calendar, institutional mapping, wealth and wellbeing ranking, vulnerability analysis, discussion on issues facing AS miners.
3. Semi structured interviews: 23 in Nyarugusu, 12 in Mgusu and 9 in Mabuki
4. Six Individual case studies combining life histories and technical information.
5. Technical data gathering, including: observation at mining sites, interviews with operators, owners of pits and equipment, and mine inspectors.
6. Collection of basic village data for each location
7. Eight semi-structured interviews with selected district officials (Geita District) and broad discussions at the District Stakeholder Workshop.

1.2.5 Primary field research: the sample

The Household Survey was conducted in 3 villages with a total of 306 households. Sampling linked initial focus group discussions to decisions on which village hamlets the survey should be conducted in. Within the three villages a stratified sampling technique was used where hamlets within a village were roughly classified according to high, middle and low income populations. Households were then selected randomly from hamlets chosen from each category. Each hamlet represented a strata of income where from the focus discussion groups it was noted that other social economic characteristics including mining and other livelihood activities seemed to have a similar pattern to the identified income strata by hamlet.

The sample size is approximately 5 percent of the total households in the village and is proportional to the village size. Nyarugusu being the largest village accounts for 52 percent of the sample (see Table 1).

Table 1: Sample composition for household survey

Village	Frequency	Percent
Nyarugusu	159	52.0
Mabuki	85	27.8
Mgusu	62	20.3
Total	306	100.0

In terms of the qualitative socio-economic data gathering: the focus groups sought to include people who would be representative of different social categories within each village depending on the topic of the focus group. Every effort was made to include a gender balance although this was difficult to achieve. The semi-structured interviews sought to interview people from different occupational, gender, age and socio-economic categories. Selection tended to depend on a snow ball technique of using initial focus groups or structured interviews to identify individuals to interview. We were very conscious that this could lead to biases, for instance through village leaders directing us towards or away from certain people, and efforts were made to target individuals who might have deliberately been excluded (for instance chronically impoverished children processing ore).

Selection of individual mine owners, pit owners, labourers and mines to target for collection of technical information was based firstly on selection of people who would represent the range of capacities (capital, technology, knowledge) existing in the AS sector – from small-scale miners with a production capacity of 5-10 tons over a 12-hour shift to artisanal miners with a production capacity of 300 – 500kg over a 12-hour shift. This was used to decide the case studies for the social information. Observations were also made at key mining sites and processing areas around the villages, selected according to number of participants, level and type of capitalization, women groups, existence or lack of organization and other unique features associated with AS mining and processing activities.

1.3 Conceptual Issues

1.3.1 Artisanal and small scale mining: a working definition

There is a lack of internationally agreed definition of artisanal and small-scale mining, not unsurprisingly given the diversity within the sector.³ However country-specific explanations do exist, reflecting locally relevant situations and development processes. Characteristics used in country level definitions include: level of employment, annual production output, capital investment, size of claim, artisanal operations (low levels of mechanisation and/or the use of simple equipment), and depth of mining operations (ILO, 1999).⁴

³ E.g. Quashie, 1991; Priester *et al.*, 1993; Taupitz *et al.*, 1993.

⁴ Examples of a number of definitions used include that put forward by the United Nations, which set the upper boundary of production to 50,000 tonnes per annum from underground and 100,000 tonnes per annum from open pit operations (Barnea, 1978). This definition raised some objections, for example that the amount of ore required to recover, say, a tonne of mineral A is not necessarily the same for mineral B. Based on this argument, some have suggested that the

A commonly made distinction, although not always specified, is that between small-scale and artisanal miners. Artisanal miners are often defined as those who employ manual, low technology mining conducted on a small scale (World Bank, 1995). They are often considered illegal. Small-scale miners on the other hand can have some degree of mechanisation, have a legal licence and/or are organised in some form of mining association (D'Souza, 2002; Quiroga, 2002).

At the national level in different countries, criteria for identifying artisanal and/or small-scale mining are usually tied to the legislative system. For example, in Ethiopia this relates to the depth of working and ban on use of explosives; similarly, in Senegal SSM is recognized in accordance with the depth of working and the production methods applied. Table 2 below shows different criteria for identifying ASM. Here we see that technical – economic features are primarily used to generate definitions of ASM. What tends to be absent from these definitions is an understanding of the way in which artisanal and small-scale mining can be associated with a highly differentiated sector in socio-economic terms.

Table 2: Criteria used in the definition of small-scale mining across Africa⁵

Country/Organization	Criteria
Côte d'Ivoire	Level of mechanization
Ethiopia	Annual production, level of mechanization
Ghana	Capital investment, number of participants
Guinea	Type of minerals exploited
Senegal	Depth of working, crude production levels
South Africa	Capital investment
Tanzania	Capital investment, labour and technology requirements
United Nations	Annual production capacity
Zambia	Size of concession area
Zimbabwe	Size of concession area, capital investment

Having a definition of AS mining at country level is important to focus on the specific needs of artisanal and small-scale miners as compared to large scale miners. Indeed, in this report we will argue that a distinction between artisanal and small-scale mining is also important to be able to identify the different needs of artisanal miners as compared to small scale miners. Without a clear understanding of what constitutes AS mining and of differences between small-scale and artisanal mining it is difficult for a country to be able to integrate AS mining into its development strategy. Furthermore, if this development strategy is to link support for AS mining to national strategies for poverty reduction, we must have a proper appreciation of the socio-economic characteristics of the sector, integrated with an understanding of the role mining plays in relation to vulnerability and livelihood security for people involved in mining activities.

At present, Tanzania does not have an official definition of artisanal or small-scale mining, despite extensive coverage of the sector in both the Mining Policy and Mining Act (URT, 1998a/b). Although Government recognizes the sector's significance, there is still a lack of appreciation that it deserves recognition in planning systems and prioritization of development strategies. Without clear

classification of precious mines e.g. gold mines, should be based on amounts of minerals produced (Quashie, 1991). Another definition attempt was made by setting the upper limits of capital requirements for small-scale mining below the lower limit of project financing by commercial financial institutes or mining financial houses (at the time), i.e., \$3-5 million capital requirements (Taupitz *et al.*, 1993).

⁵ Based on UNECA 2003.

understanding of what we mean by ASM, it is difficult to direct priorities in the face of competition from other sectors. In accordance with the Mining Act, 1998, a small-scale miner is the holder of a mineral right through a Primary Mining Licence issued by the Commissioner for Minerals. However, a small-scale miner can employ workers in the execution of his/her activities, all of which are regarded as mine workers.

This report recognizes the distinction between artisanal and small-scale mining as being that of sophistication of the working techniques, levels on investment, variation in knowledge of minerals extraction and marketing techniques, varying awareness of the legislation and hence the varying levels of productivity and incomes. From field observations, the artisanal activities were identified as being smaller operations involving smaller groups of 2 to 5 people working together in a pit. Similarly, individuals (mostly women) reworking the mine waste around the pits or tailings around the washing sites, are categorized as artisanal mining operations.

Artisanal operations also include those activities within the rush areas some of which are licensed as claims to small-scale miners. These activities include a large number of pits each being operated by a team of 5 – 10 artisanal miners. Small-scale miners on the other hand, include those that operate in licensed claim-holdings through either leasing specific areas to pit owners or developing the pits and employing miners. Such operations range from purely manual operations to those utilising drilling machines, compressors, water pumps and most grind the ore by using ball-mills. Overall however, artisanal and small-scale mining activities are recognized in this report as those activities that are based on labour-intensive mining and processing techniques, whose per capita productivity is low, employ unsophisticated technology and require low capital investment.

1.3.2 Poverty, vulnerability and livelihoods: some definitions

In this section we outline conceptual understandings of livelihoods, poverty, and vulnerability that have shaped the research.

This study takes the starting point that for an understanding of the contribution AS mining can make to poverty reduction, it is essential to situate AS mining in relation to peoples' livelihoods. This means we put the people who are carrying out mining activities in a central position in the research, in preference to taking a technological or sectoral focus. By focusing on people we can ask how important AS mining is to the lives and livelihoods of different groups of people in Tanzania. An important aspect in using this approach is to facilitate debate by thinking otherwise about ASM and poverty reduction. We can then consider what part mining plays either in improving individual or household resilience or in intensifying vulnerability, leading to higher or lower poverty levels.

By livelihood we refer to people's means of living, including the activities they carry out to sustain themselves, the property or assets they hold, and the linkages between their livelihoods and institutional and physical environments.⁶ Importantly, livelihood does not just refer to how people gain cash income but the many ways, monetary and non-monetary, they make a living. It can also suggest people's particular lifestyle, their inheritance and their future aspirations. The most locally relevant concept in this regard becomes people's desire for livelihood security which in Kiswahili is '*uhakika wa maisha*' as the driving force that takes them into ASM and related activities.

Adopting a livelihoods analysis approach to studies on poverty reduction in Tanzania is currently quite popular (e.g. Ellis & Ntengua, n.d.; Kamuzora & Toner, 2002; Madulu, 1998), but the

⁶ Using this conceptualization, livelihood in Kiswahili does not have a direct translation to encompass aspects such as assets and the broader definition of livelihoods as appears in an English dictionary. The nearest translation has referred to livelihood as *kazi* or *riziki* – words that in English are also used to refer to 'work' or 'income' (TUKI, 2000:476)

approach has not been reflected in major national policy documents. Planning for the Tanzania Participatory Poverty Assessment (2002/3) did however focus on livelihood issues and identified four major livelihood groups to inform site selection: farming-based, fishing-based, urban-based, and livestock keeping-based livelihoods. As the categories illustrate, these groups were arbitrarily identified in terms of their dominant means of sustenance or lifestyle, and thus less prominent (in fact by then not well conceptualized) activities such as artisanal and small scale mining did not feature (URT, 2004).

When analysing livelihoods we focus at the household level and start from the premise that household members will have a range of different activities that they engage in to make a living, both income and non-income generating. These activities are likely to be given differential value both by the people themselves, and by government officials – according to a wide range of factors, including gender, legality, and capacity to generate income. For example, sale of small food items by a woman may not be given the same importance as the production of gold by her husband, even though both are essential to the household economy. Likewise an official may think of AS mining as a ‘bad’ or ‘uncontrollable’ activity and therefore not give it the same importance as the cash crop farming also carried out by household members.

Our understanding of livelihood issues is informed by knowledge of an asset-vulnerability approach to conceptualising poverty, such as that which underpins the sustainable livelihood approach used by DFID or understandings of vulnerability in the Tanzanian Participatory Poverty Assessment (TzPPA) (URTc, 2004). However, we have not sought to frame the research data and conclusions within a sustainable livelihoods framework. Instead, in order to understand the relative importance of AS mining to different people we have chosen to map out different livelihood activities and asset holdings at household level and within the village economy, linking these activities to an understanding of AS mining, and to the role of different institutions at village and district levels.

Our understanding of poverty and vulnerability is in line with definitions used by the Tanzanian Government. Poverty in the Tanzanian context is defined broadly as a state of deprivation prohibitive of decent human life. “This is caused by the lack of resources and capacities to acquire basic human needs as seen in many but mutually reinforcing parameters” (Tandari, 2002: 65). The Poverty and Human Development Report (PHDR, 2002) begins with two main data sets to analyse poverty: the Household Budget Survey and the Integrated Labour Force Survey. This data is augmented by socio-economic indicators of wellbeing including morbidity and mortality rates, prevalence of malnutrition, illiteracy, high infant and maternal mortality rates, low life expectancy, poor quality housing, etc. Most of these aspects of poverty are based on quantifiable indicators. Recently, the definition of poverty has been broadened to incorporate qualitative understandings such as problems of self-esteem, vulnerability to internal and external risks, exclusion from the development process and lack of social capital (RAWG, 2002; URT, 2004c; www.tanzania.go.tz/poverty.html).

Following international practice, income poverty is defined as that expenditure (and by implication income) required to provide either minimum calorie requirements (the food poverty line) or goods and services to meet basic needs (the basic needs poverty line). Both poverty lines were defined for 1991/92 and 2000/1. The most recent Household Budget Survey (2000/1) uses consumption expenditure information to analyze income poverty and to compare it to a poverty line, which represents the cost of a basic basket of consumption. Income and expenditure are adjusted for age and gender within the household. Households that fall below the poverty line are poor; individuals are classed as poor if they live in a poor household (NBS, 2002: 78). By using the

consumer price index the poverty lines can be brought up to date. This gives a food poverty line for 2004 of 5702 TzSh (Poor 2) and a basic needs poverty line of 7811 TzSh (Poor 3) per 28 days.⁷

According to the PHDR (2002: 89) “vulnerability is a process in which individuals, households or communities are impoverished and eventually become poor or poorer... [it describes]...the probability of falling below a socially defined minimum level of well being in the future. In this sense, both poor and non-poor households face risks that if realized can generate adverse outcomes that may leave them more vulnerable to manage future risks”. This is contrasted with poverty, which is held to “describe a situation in which households are placed below a socially defined minimum level of well-being, usually manifest in hunger, sickness, powerlessness, illiteracy etc.” (R&AWG 2002:89).

Within this conceptual framework, poverty becomes understood not merely from conventional conceptions of lack of money or material things, but rather as a combination of the inadequacies in income and non-income related aspects of people’s lives. (In keeping with the 2000/01 Household Budget Survey we can refer to these attributes as consumption and non-consumption development attributes.). Poverty can be considered a description of how things *are* now, in contrast to vulnerability which is how they might be in the future (URT, 2004c: 16).

The concept of vulnerability comes from the notion that certain groups in society are more vulnerable than others to shocks that threaten their livelihood and/or survival (Teslieu and Lindert, 2002). Three different situations are distinguished in the process of vulnerability (R&AWG 2002: 89): Firstly, exposure to risk (natural, socio-economic, political and environmental) that generates negative impacts that are detrimental to welfare. According to the TzPPA this can include unpredictable crises, or shocks, and on-going stresses that threaten people’s wellbeing such as floods, drought and HIV/AIDS, or environmental degradation and worsening terms of trade (URT, 2004c: 19). Secondly, responses to risk: these may be actions taken before the risk is realised or actions taken afterwards. And, thirdly, the outcome: realised risk, together with individual or household responses leads to an outcome, in this context measured in welfare change. Therefore poverty or wellbeing is an outcome of the process of vulnerability and resilience. The vulnerable include not only those who are already poor but also those currently above the poverty line who are potentially subject to severe shocks and have little ability to manage risk, in other words, those likely to find themselves in poverty after a shock has occurred (Holzmann and Jorgensen, 2000).

In analysing data from the primary field research, this report captures an understanding of poverty based on both the food poverty line and basic needs poverty line (connected to data derived from our household survey). It seeks to link these static and quantitative understandings of poverty to a broader, dynamic and multi-dimensional view of vulnerability, based on qualitative understandings. This broader view is necessary if we are to capture forces that have driven AS miners into poverty and change in their poverty status: individual miners and mining households may have been poor in the past but are not necessarily poor today, or alternatively they may be poor today but have a probability of falling into poverty (according to some benchmark indicator of wellbeing) in the future (see R&AWG, 2002: 89). A key question this report wishes to ascertain is whether change in poverty status and potential for vulnerability or security is due to mining activities. For this reason the concept of vulnerability becomes very important.

⁷ Poor2= Below food poverty line: Food poverty expressed in monetary cost per person per day, is the cost of meeting the minimum caloric requirement when consuming a typical basket of food.

Poor3= Below basic needs poverty line: A higher basic needs poverty line makes allowance for the fact that individuals need more than just food to live. According to HBS (on which our estimate is based), the share of expenditure on non-food items in the poorest 25% was used to increase food poverty line to allow for non-food consumption.

Identifying sources of vulnerability is crucial prior to designing a mitigating policy for vulnerable groups of a society. To consider the part AS mining activities plays in individual and household livelihood strategies, and by implication its role in relation to peoples' poverty and vulnerability status, it becomes essential for us to examine the extent to which AS mining contributes to increasing vulnerability or, in contrast, improving resilience and wellbeing.

SECTION 2: The National Context to ASM in Tanzania

Artisanal and small-scale mining in Tanzania is mainly based on high value minerals, especially gold and gemstones. Other minerals extracted by ASM operators include salt, limestone (aggregates and lime), kaolin, and gypsum. Poor infrastructure and the complexity associated with handling industrial minerals tend to make them unattractive to AS miners. Here we focus on gold and diamonds, given that they are the subject of this study.⁸

The extraction of gold by ASM takes place within the three major gold fields namely, the Lake Victoria Goldfield, Lupa Goldfield and Mpanda Mineral field. Of late, however, small-scale gold reserves have been discovered and are exploited by AS miners in non-traditional areas, e.g., Tanga, Morogoro and Iringa regions. Gemstone mining is scattered around the country but mainly in Tanga, Morogoro, Arusha, Shinyanga, and Songea. Whilst Tanzanite mining at Merelani in Arusha dominates gemstone mining in the country, the mining of rubies, alexandrite, tourmalines and other less valuable gems are carried out by AS miners. Mining of diamonds is predominantly within the Shinyanga region; apart from the well known Williamson Diamonds Mine at Mwadui, small-scale operations are found in Nyangwale, Maganzo and Mabuki (Mwanza).

Gold mining has dominated the Tanzanian mining industry for more than a century, with a complex relationship having developed between large scale companies and artisanal miners. Organised prospecting and mining dates back to the German colonial period, gold discoveries having been made in Geita, Kahama and Sekenke in the Lake Victoria Goldfields in the 1890s.⁹ At this time, the little gold mining that was carried out was based on alluvial and near surface rich deposits. Although the first small-scale¹⁰ gold mine was opened at Sekenke in 1909, mechanised medium scale gold mining did not start until the mid-1930's, with development of gold mines in Musoma and Geita. Enactment of mining laws by the British administration in 1921 and establishment of the Geological Survey Department in 1923 led to an increase in prospecting activities by representatives of medium and large scale companies.¹¹ Gold production rose to around 4 tonnes/year in the early 1940's but fell back to around 2 tonnes/year towards the end of the 1940's and early 1950's. Before the Second World War gold was Tanganyika's most valuable mineral export, with record levels attained in 1940 to the value of £1.2 Million.

Since gold was first discovered in the Lake Victoria region mining companies have deliberately followed ASM activities.¹² Conversely AS miners have often illegally congregated around virgin exploration sites and larger-scale mines in the Lake Victoria region and Southern Lupa Goldfields, taking advantage of better access and often re-mining company waste or marginal ground.

⁸ We would like to thank Mr Kevin D'Souza for providing inputs to this section.

⁹ This information is contained in various departmental reports of the Ministry of Energy and Minerals which have been compiled since colonial days and which are found in Dodoma.

¹⁰ This is a small-scale mine in the sense of the scale of operations. In other words, this was a mine developed with all the available technology at the time and employing the available mining experts.

¹¹ This led to the discovery of the Lupa Goldfields and the re-opening of the mines in the Sekenke area. The 1930's were marked by intensive gold exploration activities, which resulted in the opening of Kiabakari and Geita mines in 1934 and 1939 respectively. Gold in the Mpanda Mineralfield was also discovered during this time (1936) followed by other mineralizations in the area.

¹² Indeed, the 'discovery' of the 30Moz Bulyanhulu deposit by Placer Dome (and then acquired by Sutton Resources) in 1976 was actually founded on historic ASM workings – at its peak there were over 50,000 artisanal miners on this site producing 5-10kg of gold per day – and its exploitation today is the product of such a relationship.

The impact of the Second World War led to abandonment of small-scale mining operations and hence a sharp decline in gold production. Production during the decade 1950 to 1960 remained at approx. 2 tonnes/year, rising to approx. 3 tonnes/year towards the end of the decade. Exploration activities by large mining companies increased tremendously during the 1950's and saw the introduction of modern techniques including geochemistry and geophysics.¹³

The first diamond in Tanzania is believed to have been found at Mabuki (pipe 34K1) south east of Mwanza in 1910 but prospecting was interrupted by hostilities of World War I and it was not until 1921 that interest was revived (Malinga, 2003). In 1925 the proved existence of diamonds excited considerable interest in South Africa, with Tanganyika Diamonds Limited (TDL) subsequently formed to acquire claims held over the diamond bearing gravels. By the end of 1925, TDL had won 430 carats from the gravels and consequently exposed the underlying pipe. Testing of the Mabuki pipe ceased in 1927 (Williams, 1939) but mining of the overlying gravels continued. By 1930, the main body of gravel over the pipe was considered to be worked out. The Mabuki property was finally sold in 1937 to Mr. E. Ludke and in February 1938 Dr. J.T. Williamson obtained an option over the property. Throughout the remainder of the 1930's more gravels and tailings were treated (Williams, 1939). At the end of 1975 WDL planned to go ahead with mining at a rate of 80t/day (Williamson Diamonds 1976). How such mining was actually done is unrecorded.

In 1966 Mabuki Diamond was established, employing some local people, and in 1968 the Company found diamonds at Imalange. In the 1970s, Williamson Diamonds Ltd and later STAMICO tried to open the area as a small-scale mine but this failed – apparently due to embezzlement - and the prospect was abandoned in 1977: soon after the area was invaded by artisanal miners. In 1997 the mines were placed under the caretaking of Mwanza Regional Government and in 1992 the area was divided and awarded to prospective companies and licensed claim-holders, as it remains today.

The period 1960 – 1980 was witness to a number of events with impacts on the mining industry, including the cessation of almost all mining activities. In terms of gold, closure due to reserve exhaustion was coupled with the inability to locate new reserves and, on the world front, the price of gold dropped to record lows making many mines become economical. The difficult situation was exacerbated by the Government's prohibition of cheap imports of mining inputs from South Africa. By the time the gold price rose in the early 1970's, policies of state ownership introduced through the Arusha Declaration in 1967, made investment in Tanzania unattractive. The State Mining Corporation, STAMICO, was formed in 1973, following nationalization of the remaining mines.

During the colonial and early post independence period the AS sector was small and the typical colonial approach was to suppress and punish native artisanal activities. Due to the wider cessation of mining activities, AS production declined and ceased in the early 1970s, however since the gold mining revival in the 1980s, the AS sector has grown alongside the LS sector and national gold production is now approaching 1.5Moz a year.

The relationship between large mining companies and artisanal miners has been troubled by mutual mistrust and resentment, with both sides having misguided preconceptions and strong feelings regarding each other and their alleged rights. In many cases this is because the two sectors obviously compete for the same mineral resources, even though the AS sector is overshadowed by the ever growing LS sector. This competition is no coincidence, mining and exploration companies have often used artisanal miners as 'barefoot geologists' as they are often very efficient prospectors, and subsequently concentrate exploration where there is AS activity.

¹³ Companies looking for gold included Anglo American which prospected for gold in the Lake Victoria area, The Western Rift Exploration Co. which was working in the South-West and the Colonial Development Corporation (CDC).

There is also a disparity between the objectives of the AS sector scraping a living by high-grading shallow deposits and commercial companies seeking to bulk mine a larger but lower grade deposit of which the high grade areas constitute only a minor part. Since modern operations started, many companies have tried to keep artisanal miners at bay and built expensive systems of security. Today, some companies (e.g. TANSCAN and Anglo American Exploration) have learned that building constructive relationships works better than resorting to force and trying to make the 'problem' disappear.

In such contexts numerous companies come to view artisanal miners as 'trespassers' on their legally endorsed concessions, while miners see the granting of such concessions to a large company as depriving them of land and livelihoods. The tensions created by this relationship and disparities in power and voice between large companies and artisanal miners exist both on the ground in mining areas and within the way different actors come together around mining interests at national level.

2.2 Contribution of ASM to the National Economy and Local Livelihoods

The mining sector is one of the new pacemakers for growth of the Tanzanian economy. This is evidenced by an increase in its contribution to the GDP from 0.8 percent in 1987 to 2.3 percent in 2000. The target is to raise the contribution of the sector to 10 percent of GDP as new investments come into full operation. However, information on the share of ASM to the mining sector GDP is lacking although it is known that legitimate ASM companies pay 3% of their revenues as royalty to the government hence contributing to the national GDP.

National surveys such as the Household Budget Survey (HBS) and Labour Force Survey (LFS) have limited information on mining activities. The recently constructed HBS-based national Social Accounting Matrix (SAM), on which the multiplier effect of one sector on other sectors of the economy are estimated (Wobst, 2003), fails to capture the mining sector (and hence ASM). For the same reason, estimates on the contribution of ASM to national employment are quite subjective.

Apart from its contribution to the national economy through the sale of minerals, ASM is also recognised as providing rural employment (Dreschler, 2001; The Mineral Policy of Tanzania, 1997). Figures ranging from 500,000 to more than 1.0 million have been given on political platforms; however the data sources on which these figures are based are limited. In particular it is difficult to differentiate whether figures refer to direct employment in ASM or indirect dependence on the sector. Tan Discovery conducted a survey for the World Bank in 1995 (World Bank/Tan Discovery, 1996), which estimated that 550,000 people were directly employed in the AS sector, a figure that continues to be widely quoted. However, the Mining Act (1998) had a number of impacts that now make this figure problematic.

Following enactment of the Mining Act, AS miners were given rights to transfer and mortgage their mineral rights. Many miners who were in areas now mined by large scale mining companies mortgaged their mineral rights and left. Furthermore artisanal miners operating illegally were forced to vacate mining areas. Whilst these events were going on, retrenchments resulting from economic restructuring in other sectors of the economy attracted more entrants into the ASM sector. By implication, the 1996 estimate of 550,000 (World Bank/Tan Discovery, 1996), which is still used as a current estimate, simply does not capture the dynamic changes that have occurred post the 1998 Mining Act. Without any baseline study conducted after the introduction of the Mining Act in 1998, able to gauge the impacts of the associated changes, it is difficult to draw any conclusions on the reliability of the figures quoted regarding participants in the ASM sector.

A report published by ILO in 1999 and based on information collected through visits to Government agencies, trade unions, chambers of mines, NGO and small-scale miners from various countries around the world, puts the number of small-scale miners in Tanzania between 450,000 – 600,000 (ILO, 1999; see also UNIDO, 2004). The mode of data collection used, i.e., through interviews and questionnaires sent to various stakeholders could not have changed what was already taken as an official figure in Tanzania, i.e., that from the World Bank Study by Tan Discovery. There is no reputable baseline data established more recently, even at a smaller scale, regarding participation in the AS sector.

Moving away from efforts to quantify the number of people involved in the AS sector, it can be said that artisanal mining has played a significant role as a livelihood activity in Tanzania throughout the Twentieth Century, one that is likely to become more important in the Twenty-first Century. In the 1980s and 1990s, AS mining grew in scale alongside growth in the second economy (Bagachwa, 1995; Philips et al., 2001): until deregulation in 1990, this led to an illicit economy, particularly in sales of gemstones (mainly Tanzanite) and gold through markets based in neighbouring countries, especially Kenya (Philips et al., 2001). Since deregulation, the scale of AS mining activities and the range of minerals being mined as increased notably. Clearly AS mining has been part of a process of household livelihood diversification, linked to changing opportunities provided by processes of economic liberalisation (Phillips et al., 2001; Kulindwa, 2003). With diminishing agricultural opportunities and increased rural poverty, coupled with the opening up of AS mining and mineral markets as legitimate activities, it is likely that AS mining will continue to be perceived as a viable and desirable economic opportunity into the future.

Despite the importance AS mining may hold for households and local economies, it is not recognised as a key livelihood activity within national planning. For example, AS mining was not brought into the first PRSP. There are now, however, some signs of a shift with research and consultation currently taking place under Government auspices; however it is likely that the dominant view will be in terms of administration and environmental issues rather than social and economic issues for AS miners.¹⁴

From the discussion above it is evident that ASM contributes significantly to the economy particularly with respect to creation of direct and indirect employment, but that good quality baseline data is unavailable for us to draw firm conclusions. This raises two questions, namely, what role does AS play in the creation of employment and income generation at household level? And, how significant is AS mining as a livelihood activity at the local level?

2.4 The Institutional, Policy and Legal Environment for ASM

The current institutional framework gives the Central Government the prerogative for handling affairs of ASM in Tanzania. Despite the series of revisions in the mining sector as a whole, most of their provisions concentrate on the organizational and technological aspects of ASM, and less on the administrative set up, socio-political environment, and conflicts over land with mineral rights and access to other resources, such as water.

¹⁴ The draft of the new Poverty Reduction Strategy document, still under consultation, mentions the desire ‘to implement measures to support and enhance productivity and safety in artisanal mining and reduce environmental damage’. Artisanal mining is however not mentioned under its goals and operational outcomes for reducing rural income poverty (URT, 2004d).

2.4.1 The institutional setup

All mining activities in Tanzania fall under the responsibility of the Ministry of Energy and Minerals. The Ministry has a Department of Mineral Resources headed by a Commissioner, which in turn has two sections namely, Mines and Minerals Promotion. Following the promotion of private investment in the mineral sector and the fast growth that is currently being experienced, the Department is going through internal restructuring. Under the new proposed system, the geology section has been moved away from the Department to form a semi-autonomous Government Agency known as “Tanzania Geological Survey”. The Agency is expected to meet most of its budgetary requirements through selling its services. The Department’s remaining sections of Mines and Minerals Promotion are responsible for administration of the mining legislation and promotion of the mineral sector. The new structure emphasizes the shift in the economic policy where the private sector takes a leading role in the minerals development. The Department has eight Zonal offices and twelve District or “Resident” offices spread across the country. The offices are located according to the level of activities in a particular region of the country. For example, the Lake Victoria Goldfields which is the most active mining area has two zonal offices and five district offices.

All regions with active mining activities have organizations known as “Regional Miners’ Associations” (REMAs). REMAs are run by miners but were initiated by the Government as a way of indirectly assisting regional mines offices in overseeing the smooth functioning of the sub-sector. Of late, REMAs representation of miners has declined; a reason for this may be clashes of interest between leaders and their members. It is often contended that the leadership fails to identify with miners’ problems as emphasis is put on pursuing their business interests. In addition most associations depend on members contributions as the main source of funds. With a decline in membership and hence contributions, most associations are facing financial problems.

As a result, miners have started forming smaller and specialized associations, e.g., Mabuki Diamond Miners Association (UWAMA) in Mwanza Region. Other miners’ associations include the “Federation of Miners Associations” (FEMATA) and “Tanzania Mineral Dealers Association” (TAMIDA). Women miners have their own association, the Tanzania Women Miners Association (TAWOMA), aimed at addressing gender imbalances that influence womens’ participation in mining activities (Mutagwaba et al, 1997; TanDiscovery, 2003). However, bad planning and management, poor technical facilities to reach the members and lack of alternative sources of funding to finance association activities have been cited as major handicaps of these associations (Dreschler, 2001: 78).

A key institutional problem facing the Mining Industry is the interaction with other sectors of the economy whose administration has undergone decentralization through the ongoing local Government reform programme. This has particular implications for administrative support that can be given to ASM and for district-level revenue generation from both AS and LS mining.

Under the Local Government Reform Programme (LGRP) instituted in 2000 the administration of most sectors has been devolved to district level; mining (both LS and AS) is an exception because it continues to be run centrally from Dar es Salaam. This process is worth explaining in some depth as key issues relating to district level administration emerged within the field research.

The LGRP is a programme aimed at streamlining the institutional framework for effective service delivery; it combines a series of coordinated activities, conducted at local (district) council level, all focussing on the broader objective of improving councils’ capacities to deliver quality services in a sustainable manner as per local people’s needs and priorities. LGRP works on the foundations laid by the Decentralisation Policy (1984) that re-instituted the two official levels of governance evident

of pre-independence Tanganyika, i.e. the Central Government, responsible for National level policy making and administrative structures, and, the Local Government, whose administrative mandate reside within District to community (grassroots) levels. This separation of responsibilities was designed to facilitate an effective planning and administrative structure that responds to peoples' needs, and bestows Local Authorities with the responsibilities to manage development issues relevant within their localities.¹⁵

A key aspect of the LGRP has been trying to promote participatory decision making in local plans (currently using the O&OD analysis) and raising the capacity of local authorities in resource base identification. Through a Government directive given in 1992, Local authorities are required to commit a minimum of 25% of collections for their development budget.¹⁶ It is expected that through such strategies local authorities will be able to manage their development programmes. However there are very few local authorities that have been able to meet the requirements of their development budget, because even in addition to Central Government disbursement of Compensatory Grants (since 2003) and Development Grants, and funds from other sources such as donors, most authorities find themselves in deficit. These authorities have been somehow affected by National efforts towards poverty reduction. In 2003, the National Budget estimates of 2003/2004 abolished what were termed as 'nuisance taxes' which were regarded as an obstacle to poverty alleviation, but in actual fact depended upon by Local authorities for revenue.¹⁷

The most recent Government directive announced during the National Budget session 2004/2005 of abolishing the annual renewal of taxes comes as an added blow to councils that have relied much on the annual licences from the trading businesses. According to the Geita District Planning Officer, this Directive will significantly affect the Council's income base. The Development Grants are based on annual Council plans and budget for development activities. These are disbursed on an arrangement of contributions that involve Council funds.

Districts having mineral resources recognise that the mining sector can be a potential source of local revenue but their hands are tied because the sector is still controlled centrally. For example, both Geita and Misungwi Districts' Socio-Economic Profiles (of 2003) indicate the mining sector as a potential area for investment, but unlike other economic and social sectors under the District administration – agriculture, natural resources, lands, water, education etc, - mining does not have local government representation. Local governments have therefore played a 'hands-off' attitude on the development of activities related to the ASM sector. The LGRP has also not been able to impress upon the mining sector as it falls beyond their jurisdiction despite its mandate in raising the capacities of local authorities in identifying viable sources of revenue. Under the current investment system, however, many such Districts enjoy the corporal social commitments offered by investors in LSM on local development projects, however there is no legal mandate binding large-scale mining companies to do so.

¹⁵ As part of its responsibilities, the LGRP builds upon the provisions of the Local Government Act (No. 7, 8 and 9 of 1982), and Act No. 6 of 1999, in order to strengthen Local Authorities as legally instituted organs of government at District level to institute mechanisms for management of resources and revenues and therefore be able to respond to local priorities in development and service delivery. To be able to perform this responsibility, the Government has laid down regulations which determine the sources of revenue permissible to Local authorities for collection as stipulated in the Local Government Finance Act, 1982 (No. 9 of 1982). This Act also identifies which sources remain the prerogative of the Central Government (these sources being available in certain districts notwithstanding).

¹⁶ According to this Directive, given by the Minister responsible for Local Government, District Councils are supposed to set aside 10% of revenue collection from own sources specifically for women and youth development projects. In addition, the Council is supposed to re-locate 15% of its revenue (by then collected through the Development Levy) to its Wards for local development projects.

¹⁷ The nuisance taxes were referred to as those taxes and dues directly collected from local people, such as for petty trading in small market places, small business centres etc.

The institutional set up of AS mining raised important questions for consideration in the field research. The first relates to the role played by REMAs: how are miners organised at the grassroots level and what are their organisational needs? The second relates to what implications having a centralised system of governance over ASM has for local level administration and support to the sector?

2.4.2 The Mineral Policy of Tanzania

Following poor performance of the mining sector under state control in the 1970s and 1980s, Government decided a comprehensive revision of its mining policy was needed. The revised minerals policy was introduced in 1997 to ensure the country's mineral potential was harnessed for the national economy and to facilitate benefits reaching a wide spectrum of people in Tanzania (Tanzania Mineral Policy, 1997). Securing employment and alternative sources of income for the rural population were highlighted as key targets under the rationale that this would lead to improved environmental protection and management.

It was envisaged that these challenges could be tackled through allowing the private sector to take a leading role in exploration, mining development, mineral beneficiation and marketing and thus leave the public sector to play the role of stimulating and guiding private mining investment by administering, regulating, and promoting the growth of the sector.

The objectives of the Mineral Policy were therefore set as:

- to stimulate exploration and mining development;
- to regularise and improve artisanal mining;
- to ensure that mining wealth supports sustainable economic and social development;
- to minimise or eliminate the adverse social and environmental impacts of mining development;
- to promote and facilitate mineral and mineral-based products marketing arrangements;
- to promote and develop Tanzania as a gemstone centre of Africa; and
- to alleviate poverty especially for artisanal and small-scale miners (The Mineral Policy of Tanzania, 1997: 8).

Based on the objectives put forward by the mining policy, development strategies were proposed and form part of the policy document. On artisanal and small scale mining, the Strategies developed aimed at transforming the sector from *ad hoc* artisanal operations to more organized operations (see Annex 6).

Although the strategies set out in the mineral policy are detailed and address most of the issues that affect ASM negatively, there is very little on the ground to show their implementation. The few successes that can be associated with the policy include: an increase in the number of licensed ASM operations and simplification of the mineral trading licensing procedures as a way of curbing illegal mineral trading. For example, according to the speech of the Minister of Energy and Minerals to the Parliament in July 2004, the official figures for gemstones production increase from 150,800 kg in 2000 to 1,531,547 kg in 2003. It must be noted that except for Tanzanite which is also produced by one foreign investor, all gemstone are produced from ASM operations.

The strategies associated with promotion of miners' knowledge and skills through extension services, improving miners' awareness on legislation, improving access to information, finance and technology and other commitments remain on paper. The methods used for minerals extraction,

the lack of capital, lack of awareness of the legislative obligations and requirements, poor access to information on technology, markets, etc., are all in the state comparable to the pre-mineral policy era, i.e., nothing has changed with the introduction of a new mineral policy.

In 2004 the Prime Minister issued a directive following complaints from the public regarding how the mining sector was being run. This Directive led to the establishment of a six-member committee of senior level government officials (including representatives of Parliament, the Law Reform Commission and the Secretariat of MEM).¹⁸ The Committee undertook a widespread consultation with mining stakeholders to collect their views concerning changes that need to be made to the Mining Policy. A general conclusion that emerged was that there is little wrong with the actual policy but substantial problems with its implementation. The issue of impacts of the policy failure for miners at the local level will need to be examined further in the primary research of this project.

2.4.3 Mining legislation

A review of the Mining Act of 1998 (URT, 1998) identified a number of issues that relate to the overall performance of the sub-sector. The types of the mineral rights, the size and tenure periods, the ability to renew and mortgage mineral rights, availability of land with suitable mineral reserves, designation of specific areas for ASM, mining in controlled areas and the question of who is legal and illegal in terms of the legislative requirements and the real situation in the field. Although the Government license individuals to carry out artisanal and small-scale mining operations, in the field the licensed individuals can turn into landlords by leasing out the land to unlicensed miners. This raises the question of who actually is legal and who is illegal. These issues are discussed in details below.

(1) Type and categories of Mineral Rights: In Tanzania, there are two categories of mineral rights issued to ASM: Primary Prospecting Licence and Primary Mining Licence. These two categories do not differentiate between the artisanal and small-scale miner nor do they differentiate between mineral types. In the large scale sector, the categories can distinguished between those for gemstones and other minerals. In one way, the lack of distinction has an advantage of allowing a much simpler system for mineral rights acquisition. While the lack of distinguishing between artisanal and small-scale miners simplifies the licensing system, it is imperative that its implications on the overall development of the sub-sector is evaluated by this research.

(2) Size of Concessions and Duration of Tenure: In comparison to the 1979 mining act, under the new legislation, concessions for ASM have been increased to a maximum of 10 hectares and a tenure period of 5 years renewable. Like in the mineral rights category, there is no distinction between size and tenure periods for artisanal and small-scale miners. The possible implications associated with the lack of distinction in the allocated size of concessions and tenure period between artisanal and small-scale miners has been explored by this study and is discussed in Chapter 4.

(3) Renewal, Transfer and mortgage of Mineral Rights: the new mining legislation provides licensed artisanal and small-scale mining operators with the right to renew, transfer and mortgage their mineral rights. These rights for transfer and mortgaging of mineral rights are provided for under the Mining Act, 1998.

¹⁸ A PRSP review of the mining sector was also taking place at this time; this Committee is said to have been part of this process although largely autonomous from it.

(4) **Designation of Areas Specific for Small-scale Mining:** The need to declare and set aside specific areas for ASM is typically hailed as necessary in the promotion of the sector (UNECA, 2003). However, in order to undertake such an exercise effectively detailed geological data must be available that will enable one to classify the mineral reserves accordingly. Such data can only be obtained through conduction of detailed geological exploration the costs of which is beyond what the Government in Tanzania allocates to the Ministry responsible for mines. Because of the limitations of the budget, for example, in Tanzania the setting aside of areas specific to ASM is being used as a way of dealing with rush areas, i.e., areas where large numbers of unlicensed miners turn up at once.

(5) **Access to Information:** Access to information by ASM operators is considered crucial for the success of the formalization of the activities, access to appropriate technology, finance and markets. According to the strategies set out in the mining policy, miners were expected to have easy access to information through extension services provided by the Government and through regular publications, training and specific campaigns. From evidence collected in the field, there is limited access to information even that of basic things like the mining policy and legislation.

(6) **Mining in Controlled Areas:** Controlled areas mainly refer to those areas under the jurisdiction of certain laws that control the use of its resources. Such areas include the Forest Reserves, Game Reserves, Conservation Areas, National Parks. According to the Mining Act, 1998, a mineral right cannot be issued in a controlled area unless a permit from the responsible authority has been obtained. Similarly, the respective laws managing the controlled areas have a requirement for a permit before any activity can be undertaken in such areas. For example, under the Forestry Act, 2002, permits are required for activities carried out in national and local authority forest reserves for:

- Felling or extraction of timber (for domestic use; export; mining purposes; or for prospecting and for exploitation of mineral resources).
- Gathering and picking parts or extracts of any protected plant for the purposes of research or the production, manufacture of any medicine or product.
- Erection of buildings or other structures.
- Construction of roads, bridges, paths, waterways or runways;

Overall, one cannot obtain a mineral right to operate in a controlled area without permission of the responsible institution. There are reports of artisanal mining in certain areas of game reserves and national parks, e.g., in the Serengeti National Park. These would be illegal operations and the National Parks Authority would be expected to ensure that no such activities take place. Gold rush areas have also occurred in controlled areas, e.g., that in Amani Forest in Tanga. These are still illegal activities that take place without any authorizations of the Mining Department and which should be stopped by the responsible authorities.

2.4.5 Child Labor

Child labor is a serious issue in relation to artisanal and small-scale mining in Tanzania due to the potential for exploitation, risk of accidents, arrested physical development through health problems and potential for serious illness. Therefore it deserves special mention within the institutional, legal and policy context.¹⁹

¹⁹ We would like to thank Mr Kevin D'Souza for drafting this section.

Between 1994-1997 action programmes aimed at combating child labor in the mining sector were implemented. These programmes included those by the African Network for Protection and Prevention of Child Abuse and Neglect (ANPPCAN – Tanzanian Chapter), the Ministry of Education, Tanzania Information Service Department (TISD) and trade unions (e.g. Tanzania Mining & Construction Union TAMICO).

ANPPCAN has participated in preventing child labour in the mining sector through sensitisation seminars. Parents, school committees, teachers and community leaders living within the vicinity of mine sites were made aware of the issues surrounding child labour. These seminars included Mbeya (Chunya district), Mwanza (Geita district) and Arusha (Semanjiro district). The Ministry of Education participated in sensitising primary school teachers, ward secretaries and members of school committees. The campaign of the Ministry covered Arusha, Mwanza, Shinyanga, Tanga and Mtwara regions.

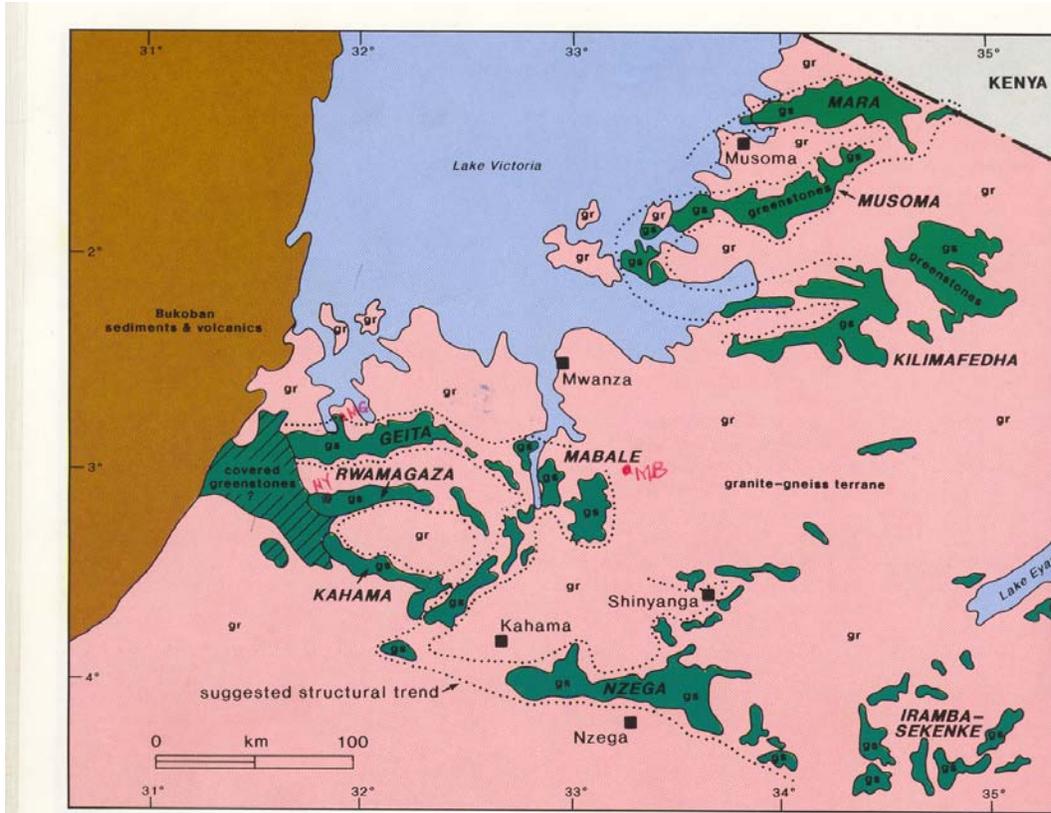
The TISD also participated in raising public awareness about all kinds of working children in Tanzania. The campaign was carried out through mass media institutions such as television, radio programmes, newspapers and placards. As a result, in many places where the sensitisation seminars took place, child labour committees were formulated and the village governments enacted by-laws to ensure that child labour was eliminated. However, the effectiveness of these child labour committees remains to be seen, particularly as the committees have been lacking resources to enforce the by-laws. More efforts continue to be made by different actors in the areas surrounding the mining sites, but it must be realised that enacting the by-laws is one thing and eliminating child labour is another. The efforts which have been made thus far, while a good and solid start, need to address the root causes of the problem.

Even though Tanzania has ratified the International Labour Organisation (ILO) 'Convention on the Rights of the Child' and the 'Worst Forms of Child Labour Convention' (in 2001), formed a special Ministry to coordinate child development (Ministry of Gender, Community Development and Children), signed the Organization of African Unity (OAU) charter on the rights of children and included child labour in the Mining Regulations (officially banning the employment of children in mining areas in August 1999), child labour is still prevalent in many ASM operations.

The ease of opportunity to exploit children, the growing proportion of the population under the age of fifteen and the fact that children and their relatives may view mining work as a good economic opportunity, has resulted in child labour being common practice in AS mining in Tanzania. Although there is no detailed data on child labour in ASM in Tanzania research by ILO-IPEC has shown that there is generally a higher incidence of boys (80%) working directly in mines than girls (20%), with the largest sub-group being children aged between 14-17 years (59%). The research highlighted that the number of children working in AS sites increases during school vacations and that around 54% of the children working in the mines came from either female-headed families or were orphans.

SECTION 3: Mining Livelihoods in Mwanza Region

This section we discuss the nature and characteristics of mining livelihoods in Mwanza region drawing from people's lived experiences in the three villages of Nyarugusu, Mgusu and Mabuki.



(MG – Mgusu, MB – Mabuki and NY – Nyarugusu)

Figure 1: The Lake Victoria Goldfield showing the study areas

3.1 Livelihoods, Population and Economic Development in Mwanza Region

Lying within the Lake Victoria Goldfields and next to Lake Victoria Mwanza Region is naturally endowed with abundant mineral and fisheries resources, while land is used for agriculture and livestock keeping. When combined with trade and petty business this makes for a diversified local economy and livelihoods.

The Region lies in the northern part of Tanzania next to the Lake Victoria and occupies an area of 35,187 kms, 43% of which is covered by water. It is divided into eight districts: Ilemela and Nyamagana Districts, which together form Mwanza City, Magu, Ukerewe, Geita, Sengerema, Kwimba, and Misungwi. In 2002, the Region had a total population of 2,942,148 people, with Geita District having the highest population density per district (712,195 people) and Misungwi the lowest (257,155 people) (URT, 2003:4).

For the period 1988 - 2002 Mwanza had a growth rate of 3.2% per annum, which is higher than the national average of 2.9% per annum. Of this growth, apart from Mwanza City, Geita District has persistently recorded the highest growth rate (1967 – 2002) and Misungwi among the lowest.²⁰ Table 3 summarizes this information. According to District Authorities, this rapid population growth rate is attributed to increasing gold mining activities at the artisanal/small scale level and the establishment of large scale mining companies such as the Geita Gold Mines Ltd attracting immigration because of employment opportunities in mining and related activities.

Table 3: Basic information on Geita and Misungwi Districts

	District	
	Geita	Misungwi
Area	7825 sq km	2553 sq km
Administration	District has 7 Divisions with 33 Wards and 185 registered villages.	District has 4 Divisions, 20 Wards and 78 registred villages
Population	712,195 (2002 National Census) 355,823 males, 356,372 females	257,155 (2002 National Census), 125,970 males, 131,185 females
Household size (2002)	6.2	6.4
Dependency ratio (2003 projections)	97	76
Major livelihood activities	Agriculture, Livestock keeping, fishing, artisanal and small scale mining, small businesses	Mixed farming, fishing, petty busineses and mining on a small scale
Major economic sectors	Forestry, Large Scale Mining (GGM)	Agriculture, Forestry, Livestock keeping, Fishing
District budget	Businesses, Central Govt funds, Donor funds for development projects.	Businesses, Central Govt funds
ASM activities	Gold mining in Rwamgaza, Nyarugusu, Mgusu, Nyakagwe, Nyamtondo, Tembo mine, Rwamchele, Ibondo	Diamond mining in Mabuki, and gold exploration in Mbarika and Inonelwa Divisions
Income per capita	TShs 140, 755.30* (2003 estimate) (Mza region)	TShs 100,000 p.a. (2003 estimate). ²¹

Sources: Misungwi District Socio-economic Profile (2003), District Planning Office Misungwi; and, Mwanza Socioeconomic profile (2003), PO-PP & Mwanza Regional Commissioner's Office.

The local economy is dominated by small-holder agriculture that employs about 85% of the region's population complemented by an expanding fisheries sector (URT, 2003: 39). Most households raise a range of crops for dual purpose (ie cash and food), in addition to livestock. However, people's high dependence on cotton as a major cash crop has been frustrated by declining prices and inefficient marketing. The booming fisheries export oriented industry is currently the major economic mainstay and highest revenue earner for the regional economy. Mwanza has about 13% of the country's livestock, surpassed only by Shinyanga. It has approximately 108 cattle per sq km.

²⁰ Percentage annual growth rate for Geita District was 3.6% in 1967 – 78; 2.2% in 1978 – 88, and 3.6% from 1988 – 02. For Misungwi District it was 1.3% in 1967 – 78; 2.7% in 1978 – 88, and 2.1% between 1988 – 02 (URT, 2003)

²¹ The average per capita for Mwanza Region as a whole is TShs 184, 513 (2004).

Mining activities (large scale and small-scale) are also identified as significant contributors to the Region's economy (URT, 2003).

On average, despite erratic rains and food shortage, overall performance in economic growth has been significant. The rate of growth of the region's GDP moved from 4th to 2nd in ranking, in comparison to the growth rate of other regions and the per capita income of also increased by 44% over a period of five years (1995-2000) at TShs 184,513) to make it the 8th highest among the regions in Tanzania. Much of Mwanza's growth is attributed to the fishing industry and to mining. Regional estimates establish that the output from gold mining in Mwanza region grew from 168,495.8 gms in 1991 to 5,777,523 gms in 2000 valued at TShs 42.2 billion (URT, 2003:93). However, this income is not immediately reflected in wealth and improved living conditions of the majority of the populace: land pressure, food shortages and poverty are experienced to varying extents in each district.

3.1.1 Geita and Misungwi: poverty and livelihoods

Geita and Misungwi Districts have different socio-economic characteristics. Although each has a long history of mineral exploitation, the degree of involvement is very different, taking prominence in Geita while regarded insignificant (although having potential) in Misungwi. This is reflected in the district economies, whereby Geita is relatively wealthy, while Misungwi is significantly less endowed in economic terms.

Misungwi District is administratively a new district, established by Act of Parliament in 1995. Ninety percent of its people are self-employed, most practicing mixed farming and petty trading activities. Agriculture engages 85% of the population. Most of the district has unreliable rainfall (receiving between 700-1000mm) making agriculture quite challenging. The Participatory Irrigation Development Programme (PIDP), working in a few wards, appears to have contributed to improved productivity. The main cash crop is cotton, while other crops (e.g. paddy, sorghum, maize and legumes) serve as food and cash crops. Livestock keeping is predominantly indigenous although improved breeds are being introduced through project funding. Fisheries occupy about 1% of the population and earns the district 5% of its income.

Although the district has an extensive road network (591kms), communication by road is difficult during the rainy season. In terms of social services, primary education is accessible to all, and enrolment rates are high. The status of some key development indicators is not very promising. Hardly 5% of the population is served by electricity and thus there is heavy reliance on bio-fuels. Inadequate water supply infrastructure, extended dry seasons and regular droughts have together limited water supply for both urban and rural communities. Access to health services is constrained by uneven distribution of health facilities, and the poor or dilapidated state that most facilities are in (Misungwi District Plan 2003:11).

In terms of poverty levels, Misungwi District ranks the 7th district among Mwanza's 8 administrative districts. It has the lowest per capita income, a weak economic base, a relatively undeveloped informal sector, and little industry (pers comm., Misungwi District Planning Officer, 28/09/04).

In contrast to Misungwi, Geita District has the 2nd highest economy in the region, only surpassed by Mwanza City in terms of contribution to regional GDP. This is because of its endowments in minerals and good agricultural land. Major economic activities include: farming, livestock keeping and fishing. Cotton is still the major cash crop and other crops serve as both cash and food crop – such as rice, maize, cassava, potatoes and bananas.

The onset of large scale mining in Geita has led to a lot of changes both to the economy of the District and to AS mining activities. Prior to the arrival of the large companies there were a large number of unlicensed operations. In accordance to the Mining Act 1998, these operations are not recognized and hence many areas were re-allocated. This happened within the area now occupied by Geita Gold Mine (GGM) where most of the unlicensed operations were removed. On the other hand, those individual small-scale miners who were licensed entered into agreements with the company and were compensated accordingly. At the same time while some of the miners were mortgaging their mineral rights to the large companies, more miners were being licensed through a more simplified licensing system. Today, Geita District is believed to have the highest population of AS miners in Tanzania (although there are no reliable figures to substantiate this claim).

Mining incomes are reflected in the lifestyles of people in the mining settlements and in the economic development of the district, particularly in terms of retail and service sectors such as shops, hotels and entertainment. This can be seen in Geita Town, where there has been a rapid increase in population over the last decade due to influxes of people looking for jobs with the large scale mining industry and those seeking other business opportunities linked with mining.

3.2 Small and Large Scale Gold and Diamond Mining in Mwanza Region

Artisanal and small-scale mining in Mwanza Region is dominated by gold mining with limited diamond mining activities. In terms of gold mining, the Lake Victoria Goldfields that cross the Region have deposits that can be mined by both ASM and LSM operators.²² The deposits found in most shear and fracture zone structures, which are small in size but of high grade are more attractive to ASM than they are to LSM. Similarly, the alluvial/elluvial deposits which are usually found within shallow lying sediments are more amenable to ASM extraction methods.

As far as diamond mining is concerned, there is no large-scale mining in Mwanza Region and Mabuki in Misungwi District is the only AS mining site. (Most other diamond mining sites stretch southwards into the neighbouring Shinyanga region which harbours the famous Williamson Diamond Mine in Mwadui.). As described in Section 2.1 above, there is a long history of diamond mining at Mabuki. In 1992, the Government decided to divide and award the area to prospective companies and individuals, including AS miners, in whose hands it remains today.

Within Mwanza Region, Geita District is the more dominant area for both large and small-scale gold mining. There are more than 15 major AS mining centres scattered over the district, including Nyarugusu, Mgusu, Rwamgaza, Nyamtondo, and Mawemeru. Smaller areas which attract migrant miners include those around Geita Hill and Ridge 8. Many of the centres have grown up through

²² In geological terms, the Lake Victoria Goldfields are underlain by a greenstone belt of central craton that hosts most of the gold reserves in Tanzania. Mineralization in this goldfield is of three distinct types; auriferous quartz reefs and stringers; auriferous Sulphide impregnations; and, alluvial/elluvial deposits. The auriferous quartz reefs and stringers consist of gold mineralization in steep dipping shears and fracture zones. The shear zones are developed within the volcanic and sedimentary sequences and near the contacts between the greenstone belts and the granites. Deposits found in these structures are usually of low tonnage but of high grade ores. It is estimated that nearly 30% of the gold produced from the greenstone belts are derived from this type of deposit. The auriferous sulphide impregnations consist mainly of pyrite, pyrrhotite and traces of chalcopyrite. The deposition of the ore predates the deformation as clearly shown by slumping and soft sediment folds in the pyrite layers. In some areas, e.g., Samena Hills in Geita, extensive massive sulphides have been found in a volcanic environment with the sulphide bodies consisting mainly of pyrite and pyrrhotite. They contain traces of gold and base metals, predominantly zinc. Estimates show that nearly 65% of all the gold produced from the Lake Victoria goldfields comes from these types of deposits.

the 1980s and 1990s, at a time when, despite artisanal mining being illegal, unregulated AS gold mining flourished in Geita District.

Estimates on the total number of AS miners in Mwanza Region, Geita and Misungwi Districts, or even the three research sites, are hard to establish – certainly within the limited resource/time frame of this research - due to a combination of illegal activity, limitations in Government data gathering, and enormous fluctuations in mining populations. Figures for licensed claim holders²³ with a PML provided by the Lake Victoria Zonal Mining Office show that there are 335 license-holders for gold mining in Geita District, out of a total of 809 for Mwanza Region, and 90 license-holders for diamonds, all of whom work at Mabuki in Misungwi District (30.06.04). According to the Mines Office in Geita, the number of licensed claim-holders for gold mining are 102 in Nyarugusu²⁴ and 18 in Mgusu (15.07.04).

In terms of large-scale gold mining, during the 1980s there was only one operating mine in Geita, Buckreef Gold Mining Company Ltd which closed its operations in 1991 due to financial problems. Less than 100 Kg/year of gold was officially produced in Tanzania, which was mainly from Buckreef gold mine (with some production from Lupa gold mine in Chunya). Lupa gold mine was a small-scale alluvial operation run by the State Mining Corporation (STAMICO). The operations of Chunya were officially closed in 1995 although there was almost no production between 1990 and 1995. In 2000 the large scale Geita Gold Mine started operating under the auspices of Ashanti Goldfields of Ghana. The District of Geita has also been under extensive exploration from large-scale companies including Ashanti Goldfield, AngloGold, Barrick Corporation, East African Mines and medium scale exploration companies like Shanta Mining Co. Ltd, Tanzam 2000, Tancan Mining and others.

If we turn to consider markets for AS produced gold and diamonds, they are different. Being a centre for diamond production, diamonds produced in Mabuki tend to be sold in Shinyanga. In contrast, the major marketing centre for gold is in Mwanza town. Marketing for both minerals is carried out at different levels: the first level is mainly carried out in the mining areas between miners and mineral brokers. The licensing of brokers operating at this level was introduced with the Mining Act of 1998 and a large number have been licensed since this time. The brokers usually take the minerals to the second level of trading which is based in the nearby towns of Geita (gold) or Shinyanga (diamonds). Gold sold in Geita is then moved to the third trading level, which is between brokers and major dealers located mainly in Mwanza. Some of the gold may find its way to Dar-es-Salaam or across the border to Kenya.

²³ These figures include PMLs, PLs and MLs.

²⁴ Across different areas of Nyarugusu the break down is: Ibisabageni 1, Mawemeru 21, Lukarakata 11, Nyarugusu 9, Busolwa 24, Ikundu 1, Ikandilo 3, Buziba 1, Ibondo 5, Illilika 15.

SECTION 4: Three Mining Communities

Here we provide an impression of the research sites and consider features such as migration, livelihood activities, and population dynamics.

4.1 A Portrait of the Research Sites: Nyarugusu, Mgusu and Mabuki

As stated in Section 1, research was undertaken in three sites in Mwanza Region: Nyarugusu and Mgusu in Geita District (gold mining) and Mabuki in Misungwi District (diamond mining). We start by giving a brief portrait of the three sites.

The impression of visiting Nyarugusu and Mgusu is quite striking and marks the villages out as gold mining areas. The large number of small shops, entertainment places (video-halls, snooker tables, bars, etc.), generators supplying electricity, and petty businesses in Nyarugusu and Mgusu suggest both a high dependence on cash transactions and people with money to spend on entertainment. This is in common with urbanised places in Tanzania but unusual for villages in rural areas. Indeed with a population of 27,211, Nyarugusu is more like a small town than a village. In contrast Mgusu, situated in a forest reserve and with a reputation for being rough and a place for 'bandits', has more of a frontier feel to it and is dominated by daily mining and gold processing activities, with noise and dust pervading the air.

The view from Mabuki is rather different, and a more familiar village context in rural Tanzania. Compared to Nyarugusu and Mgusu, one is not struck by a culture of drinking and entertainment within the village settlement, and farming and livestock keeping appear to be very dominant livelihood activities. Despite a newly constructed modern guest house and electricity connected to a few houses along the main road that runs through the village, there are very few shops at the centre, and none of the pool houses and bars you see on arrival at Nyarugusu and Mgusu. Such differences between each of the three settlements are notable but not easy to capture through description.

4.1.1 Nyarugusu Village, Geita District

According to oral histories, Nyarugusu is an old settlement, which in the early 1900s was known as Mawemeru a village occupied by a tribe called Wasumbwa who are said to have lived on farming and hunting. During those times the residences of the local people were located in Busolwa, a village now in a neighbouring ward. In the first half of the Twentieth Century, a company called Geita Gold Mine is said to have started gold production at a location called Simwambogo. In time the mining activities of the company declined but it is said to have left behind workers with knowledge of gold mining who were joined by other people searching for gold. Apparently this artisanal mining led to the first population increase as people arrived in the hope of finding gold, an activity identified as 'illegal' by colonial officials. They are said to have settled at Mawemeru, Busolwa and Ilikika, all mining areas today.

The village continued expanding through immigration by people attracted to gold mining until it was divided under the compulsory Villagisation Act in 1974. In 2000 the settlement was divided into two villages, forming Busolwa and Nyarugusu. Nyarugusu is currently a huge settlement with 27,211 people in 3625 households, so large that it has the population of an entire Ward.

In the mid-1980s, the area experienced a gold rush that attracted many people from different places in Tanzania. In 1989, a private company, Dar Tardine Tanganyika Ltd (DTT) was given a

licence to run mining activities. DTT did not undertake the actual gold production, instead using sub-contractors to collect gold from artisanal miners. The sub-contractors totalled about 35-40. DTT's contract was revoked in 1992 due, it is said, to irregularities for which it was taken to court, leaving the sub-contractors to operate individual units of production. In 1995, these sub-contractors were officially awarded claim titles for their mining land; these titles mounted to 80 in total. A number of individuals who own these claims still play a key role in the mining association, MWAREMA, which has a branch in the village.

Today the number of people with a PML in the Nyarugusu area is 102. Within these claims one can see a range of AS mining activities taking place from, on the one hand, organised small-scale mining – as described in detail in Section 5 – and, on the other hand, areas that have not been developed and are periodically subject to mine rushes, where the number of artisanal miners coming onto the land can number up to 3-4,000 people. In May 2004, for example, there was one such mine rush in the Ibondo area and in July 2004 another around Makanisa hamlet in the village. These mine rushes can take place within an area whose mineral rights are legitimately held under an individual's PML, with the individual effectively becoming a landlord, sub-leasing to 'pit owners' who mine for gold. To make the picture more complicated, the research found instances of individuals who were claim-holders in their own right elsewhere but who had entered a mine rush site as pit owners in the hope of finding gold. This sub-leasing, although not uncommon, is not recognised under the Mining Act.

Added to the mines, one also has to take into account processing areas, which are on sites where water is located. Nyarugusu has currently three sites formally recognised as gold washing sites. One of the sites is located near the claim title of one of Nyarugusu's well-developed mining operations at Mawemeru, another one at Mwabasabi and the other at Kangeme area.

Of late, a company called East African Mines, an Australian company, has been prospecting around the village; this has generated controversy. Some miners view it as a threat to their licences and mining activities, others see it as an opportunity for profit. Those who are not interested in transactions with the company have appealed to the Mining Policy Review Committee in an effort to prevent the company acquiring mining rights that will override those of local people.

A number of features emerge from this account: gold mining activities have been the basis for the growth of Nyarugusu into the large and socially heterogeneous settlement it is today. This settlement has a history of both AS mining and prospecting or by outside companies. One can point to the mid-1990s, when 80 titles were awarded to miners who had worked for DTT, as key in establishing the pattern of claim-holdings that exist today. However, while this has led to settled small-scale mining opportunities with individual investment for some, the picture is complex. Alongside small-scale mining, artisanal mine rushes periodically occur, drawing large numbers of people to the area. A mining company is also prospecting at present, drawing to the fore different mining interests and raising the question of how secure ASM claims and activities are in the face of the interests of an internationally financed private company with capital to invest.

4.1.2 Mgusu Settlement, Geita District

Mgusu settlement is situated 25 km west of Geita Town, 10 km from the Geita – Biharamulo trunk road. It is located in the heart of the Geita Forest Reserve, a national forest reserve occupying 477km²²⁵; it is also on the edge of the Geita Gold Mine concession. According to the Forestry Act (2002), settlement is not permitted in national forest reserves. By implication settlement and gold

²⁵ Geita Forest Reserve was gazetted in 1954, probably to control use of charcoal by gold exploration companies who wanted unlimited access to forests for this purpose.

mining in Mgusu is highly contentious and has been the subject of on-going disputes with government officials: this is made additionally complicated by conflicts taking place between artisanal miners, AS claim-holders, and medium/large scale companies prospecting in the area. In addition there have been recent cases of armed robbery near the village, one case leading to the death of a woman (2004), which have reached the national press. The combination of conflict, disputes and banditry due to artisanal mining activities has served to give this settlement a reputation for lawlessness and uncontrollability – both in the public imagination and in Government perceptions – that make any plans for the future of AS mining in the area extremely problematic.

The human population settled in the area is currently estimated to be 4437 living in 989 households. The settlement is within a valley: on a hill to the North of the settlement side gold is mined, outside the Geita Forest Reserve boundary, and at the valley bottom to the South runs a river. The river is used for household domestic needs but also for the processing of ore from the gold mines. This is important; it is primarily because of this access to water for gold processing that artisanal miners have settled within the Reserve.

Oral history from present-day settlement leaders suggests that the present settlement started mushrooming in 1987 after the discovery of gold in the Saragura – Mgusu Hill area. Initially the area was under the Dar Tardine Tanzania, DTT. During the operations of DTT, all existing claim holders were made to work as mining sub-contractors to DTT. As a sub-contractor, Claim holders were responsible for mining and collecting production on behalf of DTT. Miners were paid at a price determined by DTT. Following the termination of the DTT contract by the Government in the late 1980s, the Government ordered that all former claim holders should be given their licences back in the same areas they held prior to coming of DTT.

Although 18 PMLs exist for the Mgusu area, current mining on Mgusu is located within two claims (CT 36979 and CT 36980) registered under the name of one man who started mining in an old exploration trench with nearly 200 miners. This claim-holder used to work as a sub-contractor to DTT and was re-issued with a mining licence for the Mgusu area. Today he sub-leases his area to pit owners who carry out mining activities in return for a share of the profit. There is a lot of conflict around this situation, which is enhanced by the current prospecting activities of Shanta Mining Co. Ltd and the likelihood of an agreement with the claim-holder in which agreements with pit-owners will be terminated.

By 1989/90 the population of Mgusu had grown to between 8000 and 10,000 people, including service providers and a few government staff working as teachers and medical personnel (Mutagwaba et al, 1997:4). Since this time the human population in the area has fluctuated according to the discovery of new gold mining possibilities. Today the population is less and extremely dependent on mining activities, either directly through mining or processing ore, or indirectly through service provision and petty business. Because the village is in a forest reserve villagers do not cultivate land, although some do rent small areas of land from other villages outside the reserve.

Although Mgusu is not a registered village under Tanzanian law, the settlement is well established. Since 1995, it has had a formally recognised Village Government and a branch of Chama Cha Mapinduzi (the ruling party) since 1990. Despite its 'temporary' status, it is well-endowed with social service facilities: with a primary school established in 1987, two privately run dispensaries catering for minor illnesses, a drug store and water wells built by a multi-purpose social development project - HESAWA (Health, Sanitation and Water Supply project).

Emerging from this description is a picture of a settlement that is very socially diverse, with people coming from many different parts of Tanzania attracted by the possibility of gold mining; from this it

is also striking the extent to which livelihood activities and the village economy are based on gold mining, processing and sales. However, this in itself creates problems in which many different claims are made over access to gold, water, forests and land by people settled in the Reserve, title holders of mining licenses, private companies undertaking prospecting activities, and different sections of Government. These claims, and the differential power relations which underpin them, are associated with high levels of conflict and insecurity for people living in the area.

4.1.3 Mabuki Village, Misungwi District

Mabuki village is located 50 km south from Mwanza city along the Mwanza-Shinyanga highway. It has a long history of settlement, having been a traditional village of Wasukuma farmers and livestock keepers even before European colonisation of Tanganyika. According to oral accounts, by 1919, on the establishment of German colonialism, Mabuki was already a flourishing business centre with Asian traders selling cloth, hoes, ox ploughs, bicycles etc. The village maintained its loyalty to traditional chiefs until after Independence when this local leadership was abolished. Oral sources establish that in the late 1930s Williamson Diamonds was granted permission to establish a diamond mine in the area. Many local people became employed especially because they needed money for Head Tax. Later every household was forced to raise 1 acre of cotton by the colonial government as an export crop. Cotton became, and has since been, an important cash crop among local people. Its prominence has only recently been challenged by mung bean production and irrigated rice cultivation introduced by an IFAD project.

In 1954 Mwanangwa Primary School and Dispensary were built by Williamson Diamonds, underlining the long history the village has had with mining companies. Still maintaining its traditions, the local people ordained Chief Kiyungu in 1956, at the same time keeping at par with broader development processes such as establishing a branch of Nyanza Cooperative Union in 1957 and joining TANU in 1958. After Independence in 1961, Asian traders left the area and the centre deteriorated economically, buildings became dilapidated and trade collapsed.

Mabuki revived temporarily on the take over of the diamond mines by the State Mining Company (STAMICO) in 1979 that also gave local people employment (account of a Mabuki resident who worked for Mabuki Diamond Mines and were taken over by STAMICO 21.06.04).²⁶ Artisanal diamond mining in the area started in the early 1980s after STAMICO left, apparently because of embezzlement. Although District authorities had instituted security around the area, the apparent laxity of this arrangement enabled artisanal miners to start mining and by the 1980s the diamond mines of Mabuki had attracted several thousands of people from different parts of Tanzania, as distant as Arusha in the north and Mbeya in the south.

Since it was illegal to sell diamonds by local people, the artisanal miners sold the diamonds secretly to '*Wapembeji*' (Brokers) or to the Dealers at Maganzo and Shinyanga town, until in 1989 when they were officially permitted to sell diamonds through Government institutions such as the National Bank of Commerce or Bank of Tanzania branches. The miners have however persisted with the status of illegality since the 1980s until only recently (2003) when by the formation of an organization called '*Ushirika wa Wachimbaji Wadogo Wadogo*' (association for artisanal miners) they are expecting to be awarded with Claim Titles. In 1992, the local register of miners had registered the names of 1043 miners, with only a few among these being women (Madulu, 2000). Today, 90 people are miners registered with the Zonal Mines Office in Mwanza.

²⁶ This miner showed the Study Team his NPF Card of number 07745281 issued through his employment with Mabuki Diamond Mines in the 1960s. He claims that after the ceasing of STAMICO activities in Mabuki, many of the employees have not been paid their NPF dues.

Mabuki is currently a trading centre with weekly markets selling livestock (especially chicken), bicycles, farm tools, textiles, food stuff and other items. It has currently a total population of 6888 people in 1019 households. Diamond mining is concentrated in one of its 13 hamlets, namely Imalange Hamlet, around the same area explored in the 1930s. The village is well served by social service infrastructure, having two primary schools; 4 dispensaries; 3 drug stores, electricity in a few houses in its centre and water fed by 13 wells constructed through the HESAWA project.

In comparison to Nyarugusu and Mgusu, Mabuki is less prominent as a mining village, and less people mine diamonds these days. Therefore the rate of in-migration is negligible. Agriculture is still the most dominant activity practiced by the entire community, followed by livestock keeping. There is obviously a low level of cash transactions taking place although local people claim that they earn significant incomes during mung bean and rice marketing seasons. However, diamond mining is still regarded as the only activity that one may get a good income for livelihood development.

4.2 Migration, Household Composition and Housing Characteristics

Here we present findings of the household survey augmented by some qualitative information from focus group discussions and semi-structured interviews.

4.2.1 Migration and population dynamics

There is a need to understand population dynamics within mining areas to have an impression of the change that is taking place, to start to understand the relative importance of mining as a livelihood activity and its viability into the future.

A key feature of the ASM communities is the large numbers of people who have immigrated into the area, although numbers vary according to the prospect of finding gold or diamonds. Although an exact time frame for determining who is an immigrant and who is a native could not be established, however the general perception was that a person is considered immigrant if he or she was not born in the village. The immigrant vs. native status in the three villages is summarized in Table 4.

Table 4: Immigrant vs. native status by village

Village name		Native	Immigrant	Total
Nyarugusu	Count	43	113	156
	% within Village	27.6%	72.4%	100.0%
Mabuki	Count	45	39	84
	% within Village	53.6%	46.4%	100.0%
Mgusu	Count	5	56	61
	% within Village	8.2%	91.8%	100.0%
Total	Count	93	208	301
	% within Village	30.9%	69.1%	100.0%

The general picture from the three villages is that 69.1 percent of the household members are immigrants and 30.1 percent are natives in the areas. In specific terms, Mgusu village has the highest number of immigrants of all the areas, whereas Mabuki has the least. The high figure for

Mgusu is explained by the very nature of the settlement, which started off as a result of a mine rush following discovery of gold deposits in the heart of Geita Forest Reserve in the late 1980s. Hence 91.8% identify themselves as immigrants and just 8.2% as natives who were born in the area since the 1980s.

Nyarugusu is well endowed with gold deposits so periodically immigrants enter the area in large numbers (drawn by reports of new gold deposits being found). The growing urbanization within the mining area at Nyarugusu further aggravates the flow. Here we can see that in Nyarugusu 72.4% of the population identify themselves as immigrants, compared to 27.6% who identify themselves as natives.

Mabuki, on the other hand, has grown up over a long time period, as described above, and at present diamond mining is not leading to the type of regular 'strike it rich' discoveries that might bring miners flocking into the area. Thus we see that at 46.6% just under half the population identifying themselves as immigrants. While there has been significant immigration since the 1980s, people are not at present drawn to the area in the way that gold mining attracts people to Nyarugusu and Mgusu.

The fluidity of entry by immigrants into artisanal and small-scale mining activities has made these communities highly heterogeneous in terms of its residents' areas of origin. In the household survey, most people claimed that they originated from 12 out of a total of 20 regions in Tanzania (Arusha, Dodoma, Dar es Salaam, Mwanza, Shinyanga, Kigoma and Mara). However, the highest number of immigrants comes from Mwanza Region, which accounts for 30 (Nyarugusu) 55 (Mabuki) and 33.9 (Mgusu) percent of immigrants respectively, and the neighbouring regions of Shinyanga, Mara, Kigoma and Kagera. Most of the immigrants come from neighbouring regions, with over 50 percent of these immigrations prompted by a desire to venture into AS mining activities.

Ethnic diversity in these areas is extremely rich, with about thirty tribes discerned during the household survey. However, Sukuma predominate in all villages as they form 47.5, 88.2 and 46.8 percent of household members in Nyarugusu, Mabuki and Mgusu respectively and constitute over 58 percent of household members across the villages. In religious terms, Christians are the majority constituting over 66 percent followed by Muslims and Traditionalists at 17.1 and 16.4 percent respectively.

It was suggested in village interviews that there may be high levels of property and land rental, in preference to ownership, due to people not wishing to live permanently in mining villages. For instance at various points it was explained that migrants live with the hope of 'returning home' at the end of their working life, as one man said "*maeneo ya uchimbaji ni ya utafutaji tu*" (lit: mining areas are for seeking [a livelihood] only). However, the figures do not completely support this impression, although there are differences between immigrants and natives.

About 75 percent of households live in their own houses, 12.8 percent in rented houses, 4.6 percent in guest houses, and 3.6 percent in mining camps. The rest live in free houses provided by an employer or a friend/relative. Mabuki has the highest proportion of rented houses (17.9 percent), while Mgusu has majority of mining camps (4.8 percent), and Nyarugusu has the highest levels of self-owned houses (80.4 percent). Within these figures 68.2 percent of immigrant households own houses, which is far less than 90.3 percent for natives.²⁷

²⁷ In terms of quality, immigrants live in better houses with iron sheet roof (55%), concrete floor (24.1%) and brick (baked) walls (30.4%). The percentages for natives living in houses with iron sheet roof, concrete floor and brick walls is 48.4,

These figures give a mixed view: on the one hand there are quite high levels of property rental, but on the other hand, the number of people owning their own property, suggesting they are settled in the area, is significant if one is starting with an impression of mining as an activity associated with rapid population movement. Nevertheless such population movement does occur and the ability of mining communities to encompass rapid change is marked, even despite problems that inevitably arise with a rapid influx of people hoping to make their fortunes.

This was found to be prominent in the gold mining areas where mine rushes take place. For example, the mine rush in May 2004 at Ibondo within Nyarugusu village drew approximate 2000 people from elsewhere in Tanzania in a very short period, movement facilitated through communication by mobile phone. By late June 2004, this population had dwindled to a few hundred. A resident of Mgusu reminiscing of the rapid pace within which mine rush areas become populated said that,

“A short time after my arrival in Mgusu in June 1987 when ‘*dhahabu ilipohila*’ (implying when gold was struck) I had to leave Mgusu very briefly to go for my wife. I was amazed on coming back hardly two weeks later that I could not even find my hut. The area was so populated that it was difficult to know where one had located oneself” (Mgusu, 18/06/04)

Indeed in Mgusu today it can be observed that in the many houses that have tin roofs the tin is not fixed down so that people can move rapidly, whether because of problems with officials due to illegal settlement or a desire to go elsewhere.

The picture of high mobility in mining settlements and peoples’ connection to places of origin is complex, with no simple conclusions: there can be rapid influxes of people, some may also settle for a short time, but there is also a high degree of permanence if judged by length of settlement, property ownership and what peoples’ aspirations for the future.

4.2.2 Demographic Characteristics

In examining livelihoods and poverty issues, crucial insights can be gained from the demographic structure of the household – a basic unit of production and consumption.

The entire sample from the three villages surveyed recorded an average household size of 8.3 persons and a standard deviation of 4.1. This is a relatively large household size when compared with the national average of 4.9 (mainland Tanzania alone: HBS 2000/1). Surprisingly, Mgusu – an insecure settlement - has the largest household size of 9.5 persons followed by Nyarugusu (7.9) and Mabuki (7.1). This position is accounted for by the presence of large numbers of relatives by the shelter-owning families in the gold mining areas. Mabuki has the least proportion of immigrant households (47%) relative to Nyarugusu (73%) and Mgusu (91.9%) and also the smallest household size. In the general picture, these relatives constitute about 19.8 percent of the household size variable. Polygamy also plays a part as it is manifest in about 12.4 percent of the total surveyed families. Interviews would suggest that harbouring of relatives is pronounced in these areas due to relatives coming in to try to earn livelihood from mining and related activities.

Gender composition is at a ratio of 1:0.92 giving the percentage proportions of 52.0 and 48.0 for males and females respectively, contrary to expectations whereby one would anticipate a higher percentage of women than men, but it could be explained by the fact that mining is more attractive to males, even though women find employment in mining-related activities. Female-headed

20.7 and 28.3 percent, respectively. Such a difference in housing quality might be explained by the fact the more immigrants live in rented houses which are likely to be of higher quality.

households constitute only 12.1 percent of the surveyed households. Female-headed households in the villages stand at 54.1, 35.1, and 10.8 percent for Nyarugusu, Mabuki and Mgusu respectively. Because the issue of female-headed households was not central to the research we do not have a good explanation for the differences between villages, although interviews did suggest that women could make a living in Nyarugusu through provision of services and they were not necessarily amongst the poorest households.

The study also found that there is also a high dependence ratio in ASM households in the communities studied. The dependency ratio is extremely important because high dependency ratios significantly increase the likelihood of household poverty. The broad age grouping has it that majority of the household members are of the age below 15 as they form 47.9 percent of the entire sample. This signifies a high dependence ratio taking into account that 3.4 percent are elderly. The broad groups are shown in Table 5 below.

Table 5: Distribution of household members in broad age groups

Age group	Frequency	Percent	Cumulative Percent
0-14	909	47.9	47.9
15-29	429	22.6	70.6
30-44	315	16.6	87.2
45-64	179	9.4	96.6
65+	64	3.4	100.0
Total	1896	100.0	

Distribution of household members by sex and age gives more or less the same picture, as shown in Table 6. The below 15 age group is still the largest constituting 46.6 and 49.3 percent for males and females respectively. Nearly 50 percent of the population are below 15 years thus signifying a high dependency ratio. The elderly is still the smallest group forming only 3.5 and 3.3 percent respectively. These two groups are the dependants in the society and their proportions in this survey are large when compared with national (Mainland Tanzania only) averages. According to the 2000/01 HBS, the elderly constitute 1.8 and 1.9 percent for males and females respectively whereas the under 15 group form 22.3 and 22.0 percent respectively.

Table 6: Distribution of household members by sex and age groups

Age groups	Statistics	Gender		
		Male	Female	Total
0-14	Count	459	449	908
	% within age groups	50.6%	49.4%	100.0%
	% within Gender	46.6%	49.3%	47.9%
15-29	Count	220	209	429
	% within age groups	51.3%	48.7%	100.0%
	% within Gender	22.4%	22.9%	22.6%
30-44	Count	169	146	315
	% within age groups	53.7%	46.3%	100.0%
	% within Gender	17.2%	16.0%	16.6%
45-64	Count	102	77	179
	% within age groups	57.0%	43.0%	100.0%
	% within Gender	10.4%	8.5%	9.4%
65+	Count	34	30	64
	% within age groups	53.1%	46.9%	100.0%
	% within Gender	3.5%	3.3%	3.4%
Total	Count	984	911	1895
	% within age groups	51.9%	48.1%	100.0%
	% within Gender	100.0%	100.0%	100.0%

The rate of widowhood at 1.9 percent and the divorce rate of 2.7 percent (Table 7) on the broader picture are both below the national rates of 5.6 and 4.8 percent respectively (HBS, 2000/01). Married couples within the age groups of 15-29, 30-44, and 45-64, which are the eligible groups in this case, are pretty high at 46.5, 88.1 and 88.8 percent respectively. This can probably be explained through the predominance of the under 15 age group in the assumption that those are outcomes of the marriages. Moreover, 54 percent of the elderly are married and hence the lower widowhood observed, though, possibility of remarrying after a demise of a couple, could not be ruled out.

Table 7: Distribution of household members by age groups and marital status

Marital status	Statistics	age groups					Total
		0-14	15-29	30-44	45-64	65+	
married	Count	1	188	275	158	34	656
	% within age groups	.1%	46.5%	88.1%	88.8%	54.0%	38.1%
single	Count	764	201	21	1	3	990
	% within age groups	99.7%	49.8%	6.7%	.6%	4.8%	57.5%
divorced	Count	1	14	12	10	10	47
	% within age groups	.1%	3.5%	3.8%	5.6%	15.9%	2.7%
widow	Count	0	1	4	9	16	30

	% within age groups	.0%	.2%	1.3%	5.1%	25.4%	1.7%
Total	Count	766	404	312	178	63	1723
	% within age groups	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

From this data we can see that households in the mining areas maintain a relatively high number of relatives and that the dependence ratio is high, which will have implications for consideration of poverty, as discussed later in the report.

4.2.3 Formal Education

About 14.6 percent of household members across the three villages are uneducated i.e. they have not attended a formal education class, whereas 56.2 percent have either partially or fully attended formal primary school education. The national figure for illiteracy level is 25.0 percent of all adults so the figure for uneducated in this study is more favourable. The on-going education campaigns on compulsory and free education for all school age children could be behind this observation. Only a meagre proportion of 2.7 percent have ever attended ordinary level secondary school education and less than a per centum point have attended advanced level secondary education and/or college courses. The underage are the second largest group after primary school attendants, which is again indirectly connected with the observed predominance of under 15 age group. The results are summarized in Table 8.

Table 8: Distribution of household members by education status

	Frequency	Valid Percent	Cumulative Percent
None	285	14.6	14.6
Primary	1099	56.2	70.8
sec-O-level	52	2.7	73.5
sec-A-level	2	.1	73.6
college	2	.1	73.7
Underage	500	25.6	99.2
other training	12	.6	99.8
Kindergarten	3	.2	100.0
Total	1956	100.0	

The trend looks quite normal on the broader perspective when age groups are related to household education status as majority of the uneducated (about 67.2 percent) are the elderly. Moreover, the majority of primary school attendants/ graduates are from 15-29 and 30-44 age groups (79.2 and 75.2 percent respectively).

4.2.4 Characteristics of houses and housing facilities

The physical characteristics of houses provide an impression of conditions for people living in mining villages, they also give an indication of income that is invested in housing and the provision of infrastructure such as water and electricity supplies.

Generally, the proportion of main houses with corrugated iron sheets is only 53.3 percent whereas the rest are roofed with thatch grass. In the individual villages, Nyarugusu is leading with 60.1 percent roofed houses followed closely by Mgusu with 58.1 percent and Mabuki is the least at 36.9 percent. These observations suggest differences between income earning capacities between gold and diamond miners. The gold miners at Nyarugusu and Mgusu are more affluent and thus able to meet the costs of purchasing corrugated roofing than the diamond miners at Mabuki. Mabuki's performance is below the national average of 43 percent (HBS, 2000/01). One notable feature with the corrugated roofed houses in Mgusu is that the sheets are not nailed on the roof rafters but held in position by weights. Speculation by local people suggests that this practice is a coping strategy against incessant threats of eviction. The situation is likely to change as people have started building permanent houses following anticipation that the village will be registered in the near future.

In general terms, 29.8 percent of main houses have walls made of cement or baked blocks, 46.5 percent are purely earth walls with supporting poles, 23.1 percent of earth blocks and 0.7 percent are just thatched with grass. The performance here is above the national average for households with modern walls which stand at 25 percent (HBS, 2000/01). Mgusu has the highest proportion of earth walls (76.7 percent), while Mabuki has highest proportion of earth block walls and Nyarugusu is highest in cement or baked blocks walls. Mgusu houses are the most temporary of the three and this is explained by the threat of eviction and impermanence.

The majority of the households, over 50 percent, fetch their drinking water from an unprotected source, a feature of particular concern in parts of gold mining villages where there is an increased threat of mercury pollution. These figures are quite below the national average of 55 percent of households accessing protected water source (HBS, 2000/01). Mabuki has been lucky as about 37 percent of her households enjoy piped water, while in Nyarugusu and Mgusu it is less than 2 percent. The advantage for Mabuki is that households have enjoyed HESAWA sponsorship, probably due to its close proximity to Misungwi District Headquarters, which attracts donor support. Interestingly in Nyarugusu 8.9 percent of households have privately owned bore holes, although this does not mean that the water is not polluted because of the link between ownership of boreholes and private processing of gold. In Mgusu the majority of people access water from the river that runs through the valley, upstream from where the gold is processed.²⁸

The main fuel for cooking in the general picture remains to be firewood and charcoal as they are used by over 65 and 30 percent respectively of the households. Mabuki has the highest rate of firewood use of 91.4 percent whereas Mgusu has the highest rate of charcoal use of 50.8. Paraffin is mildly and equally used by only an average of 3.0 percent of households in each village. Electricity is completely out of picture as almost the entire populace is not connected to the public grid. Few (about 5.8 percent across all villages) have own sources which are diesel operated generators. This figure is less than a half of the national average for electricity users of 12 percent (HBS, 2000/01). Nyarugusu has the highest rate of own source electricity at 7.6 percent followed by Mgusu at 3.9 percent. The generated power is mainly for lightning and operation of domestic appliances like refrigerators, TV's and radio sets. However, some of these owners do supply

²⁸ As regards waste disposal, non-concrete pit latrines are the commonest type being used by over 80 percent of the households in the broader picture. Mgusu has the highest use rate of 88.3 percent followed by Nyarugusu at 79.6 percent. About 10.5 percent do not have latrines of their own, which is slightly below the national average of 7.0 percent (HBS, 2000/01). Modern pit latrines with concrete floors are rarely used as only 8.1 percent of the households have them. Nyarugusu has the highest rate of the three villages at 10.5 percent: flush toilets are almost non-existent.

electricity to their neighbours at an agreed consideration thus a fascinating local grid is in place at Nyarugusu and Mgusu.

4.3 AS Mining and Livelihoods Activities in the Village

4.3.1 Livelihood activities at village level

In each of the three villages under study a range of livelihood pursuits take place. These include the range of tasks associated with AS mining and processing of ore and gemstones, but also encompass crop farming, livestock keeping, paid employment, food services, shops and bars and other business activities.

Apart from the people of Mgusu, where mining and associated services are extremely dominant livelihood activities, with restrictions on possibilities for agriculture, in the other communities of Nyarugusu and Mabuki, mining is a significant component of people's lives but is integrated with other activities, as people remain manipulating a combination of tasks in order to sustain their lives. Nyarugusu's reality expresses this combination very well, and people keep on digging for gold but still maintain their agriculture. Table 8a provides details of the main livelihood occupation by village. This data should be treated with some caution as we do not have quantitative information that demonstrates the range of livelihood activities conducted by household in each village. For example, livestock keeping is an important activity in Mabuki, even though people do not consider it their 'main occupation'.

Table 8a: Main Livelihood Occupation by Village

Livelihood occupation	Nyarugusu	Mabuki	Mgusu	Total
Crop farming	69.40	84.20	4.60	62.30
Livestock keeping	0.90	0.00	0.70	0.60
Employee LS mining	2.00	0.00	6.00	2.10
AS mining	14.20	10.70	64.20	22.00
Employee (other than mining)	1.60	1.60	4.00	2.00
Food service	0.40	0.00	4.00	0.90
Shop	2.20	0.40	2.60	1.80
Sell beer/bar	0.70	0.00	2.00	0.70
Other business	8.60	3.20	11.90	7.60
Total	100.00	100.00	100.00	100.00

Within the category of crop farming, diversification of farming activities is particularly evident in Mabuki, in which people grow a number of crops both for cash and food. A Participatory Irrigation Development Programme (PIDP) funded by IFAD that deals with the construction of irrigation schemes has enabled households in one of the village's hamlets to boost their rice production tremendously, making a marked improvement on people's wealth status. Farmers in Mabuki are also able to rotate maize with mung bean (*dengu*) production hence being able to engage in farming almost through out the year. For those who practice mining they tend to juggle farming activities with mining according to time of the day or climatic seasons.

Irrespective of these categorizations, people tend to identify themselves according to the major activity that they are engaged in at that current period, and as was observed in this study, this

categorization is largely influenced by economic opportunity/status and age and gender. A 75 year old man of Nyarugusu explained that he had shifted to Nyarugusu in 1969 because of mining activities but was only able to be active in the industry up to the late 1970s and had to change his main occupation to farming. He also said that “one is able to change positions in mining activities depending on the kinds of tools one acquires or capital” (Nyarugusu, 14/06/04). In Mgusu, people’s capacity to change their major livelihood activities was more limited due to the nature of the geographical and political environment: geographically because the settlement is remote and politically because they are settled in a forest reserve where there are restrictions on the activities that can be carried out. Hence many people are forced to work on the mines until very late in age. The study team witnessed women of more than 50 years of age crushing stones all day long for a living. Almost all able-bodied young men on the other hand, identified themselves first as miners, according to their various responsibilities in the industry – either as *mponchaji* (driller or rock blaster), *mvuta fero* (haulage of ore), *mwoshaji* (ore washer), ‘*mkata makinja*’ (Mgusu name for porter), *mwendesha karasha* (crusher operator), *mwanachama* (pit member) etc.

Immigrants are more likely to be engaged in mining where 68.1 percent of households have at least one person engaged in mining (corresponding figure for natives is 54.4 %).

Tables 8b and 8c provide information on peoples’ involvement in mining activities by village. They demonstrate that proportionally, Mgusu has more persons and households engaged in mining activities.

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Immigrants are more likely to be engaged in mining where 68.1 percent of households have at least one person engaged in mining (corresponding figure for natives is 54.4 %).

Table 8b: Population (individuals) involvement in mining activities (excluding schooling, underage and disabled)

	Village			Total
	Nyarugusu	Mabuki	Mgusu	
Involved in mining	28.0%	30.0%	67.1%	35.7%
Not involved in mining	72.0%	70.0%	32.9%	64.3%
Total	100.0%	100.0%	100.0%	100.0%

Table 8c: Proportion of households engaged in mining

Are you or any one in the household involved in mining activities?	Nyarugusu	Mabuki	Mgusu	Total
Yes	57.1%	56.0%	88.3%	63.3%
No	42.9%	44.0%	11.7%	36.7%
Total	100.0%	100.0%	100.0%	100.0%

4.3.2. Mining and seasonal change

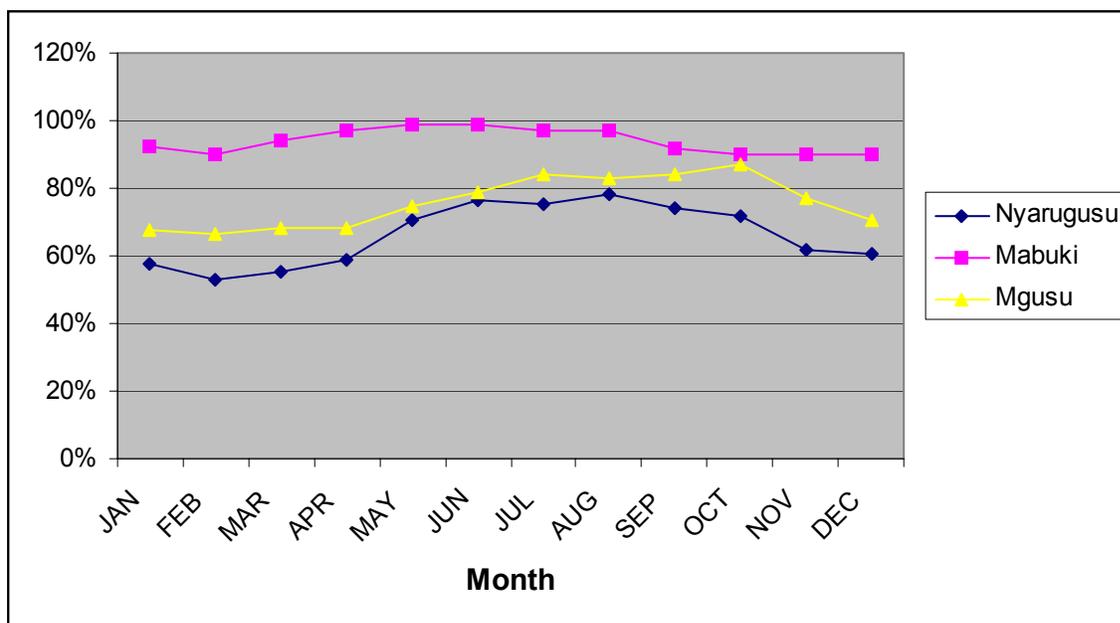
Seasonal change in livelihood activities is common but pursued according to individual preferences and not necessarily as a common pattern across the community as one would expect if conducting research in a rural community heavily dependent on non-irrigated agriculture. Even though people do allocate their labour according to climatic seasons, tending to concentrate on what is best for a particular season, there is a high potential for ASM (gold and diamond extraction) to be continuous through the year. Both heavy rains and prolonged drought can have an impact to mining (due to pit-workers being unable to control water running into uncovered pits/problems of water shortage for processing gold), but otherwise mining continues as usual. Many miners, especially those in Nyarugusu and Mabuki, revert to farming operations during the rainy months of the year thus becoming part-timers in the mines during the period and assume full time participation after annual harvests.

Table 9: Mining calendar for all villages

Mining activities	Months											
	Jan	Feb	March	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
	Percentages											
Full time	71.4	68.1	70.8	73.1	80.0	83.2	84	84.9	82.3	82.4	75.7	73.2
Part time	28.6	31.9	29.2	26.9	20.0	16.8	16.0	15.1	17.7	17.6	24.3	26.8
Total	100	100	100	100	100	100	100	100	100	100	100	100

Results given in Table 9 above suggest that mining operations are carried out throughout the year. However, from Figure 2 it is vividly clear that full time engagement declines from January to May (rainy season), peak during the dry season (June-October) and slow down with the onset of rains towards the end of year. It is also apparent that there are a higher percentage of miners working fulltime in diamond mining and that seasonality of activities is less exhibited that gold mining.

Figure 2: Percentage of miners working full time in mining activities by month and by village



An added gender dimension to diversification was expressed in Mgusu where some women contended that during cultivation season, their husbands would leave mining to go to prepare land in a neighbouring village (where households rent land) as the women continue with AS processing activities. For the planting process, it then becomes the turn of the women to go to farm.

If we turn to consider the extent of involvement in mining activities, Tables 10 provides data from the household survey, which shows that over 90% of households in Mgusu have at least one member engaged in mining activities, and over half of all households in Nyarugusu and Mabuki have a member engaged in mining. In fact the figures are likely to be higher because although they include mining and processing activities they do not include other related activities such as service provision like food vending (restaurants + women vendors), ore grinding/ crushing (grinding machine/ crusher owners), transportation of either passengers or gold ore (commuter bicycle owners + tractor owners) and specialized services like blacksmithery for making mining tools such as 'moko', 'sururu', spare parts for crushing machines etc.

Table 10: Households with at least one member engaged in mining activities

	Village Name			Total
	Nyarugusu	Mabuki	Mgusu	Total
Not engaged in mining	40.5%	47.1%	9.7%	36.0%
Engaged in mining	59.5%	52.9%	90.3%	64.0%
Total	100.0%	100.0%	100.0%	100.0%

It is clear that many households are dependent on mining activities, particularly in Mgusu, and it is likely that if specialised services and businesses were taken into account, the percentage of people dependent on mining for their livelihoods would be much higher. Nevertheless it is also clear that members of households carry out a range of activities and do not depend on mining alone. This diverse nature of people's activities as evident in this study illustrates the way in which ASM

activities needs to be situated as a component in the livelihoods of people, instead of compartmentalized as an entirely separate activity.

4.3.2 Mining as a Lifestyle: Significance in People's lives

Spending time within an ASM community illustrates a lifestyle with diverse characteristics, but all evolving around the mining activity. Earning cash seems to be the major aim to the extent that even children would contend that 'it is common to earn money for your own things – such as school uniform, exercise books and other minor items'. The Head teacher of Mgusu Primary School commented that "the environment brings up children into a lifestyle that they cannot avoid, and even a young child knows what money is, but not necessarily out of poverty. While it is the case that destitute children are forced into mining out of the need to survive, to other children it is proud to earn cash!".

Some of these patterns of life are not so desirable to some members in these communities, but they are difficult to contain. A miner in Mgusu commented, "when my children grow up, I send them home (Musoma) so that they can get on with life without being influenced by the kinds of life that mining implants into people" (Mgusu 28/06/04). In the opinion of this man, ASM areas generate a kind of lifestyle that entails risk taking, gambling, merry making and therefore the danger of extravagance that parents fear may spoil their children.

Firstly is the risk that is involved in AS mining. Being highly unpredictable, many people enter into it either knowing or come to learn of the rules of chance and perseverance. "*Uchimbaji ni kama kamari, kuna kupata na kukosa*" (implying that mining is like gambling, you can win or lose). Therefore many miners are not deterred by long periods of not getting anything or earning small amounts of money because of the belief that one day they will be successful.

As such, seeking for charms for luck or protection is quite common and there appear to be a large number of witchdoctors in the mining areas. As was witnessed by the study team, some of the Mabuki diamond miners periodically undertake a communal rite '*tambiko*' in order "to appease spirits, who are believed to determine the availability or non-availability of diamonds in the area" (Mabuki, 21/06/04). Although not all of the miners participate in such *tambiko*, our observation on site illustrated the seriousness that is put in the practice by those involved.

Another common tendency is the extent of merrymaking and extravagant drunken behaviour that has often been taken as typical of ASM communities. This is what Nyarugusu during the late stages of the Ibondo mine rush illustrated in June 2004. A barmaid working in one of Nyarugusu's bars said, "when they [men] get money, they drink a lot, compete, fight a lot, and do all sorts of unruly behaviour". But "these periodic extravagances are justified"– some of the miners do argue, and they are usually influenced by many reasons, including the right to celebrate on a hard earned income. Some of the reasons given included:

"kwanza watu wanapata vishawishi vya kuiga wenye hela wakifanya starehe, unapomwona mwingine anatanua wakati wewe huna hela - basi ukipata na wewe unaenda kujichana" (lit: firstly people are tempted to copy the lifestyle of those with money, and when you get money you also indulge yourself)

"kukaa muda mrefu bila hela. Siku ukizipata unataka ukidhi matakwa yote ya starehe kwa wakati mmoja" (staying for a long period without money. The day you get it you want to entertain yourself to the maximum at the same period)

“kipato kisichoaminika, sababu upatikanaji wa dhahabu ni mgumu siku hizi” (lit: unreliable incomes, because getting gold is very difficult these days)

Extravagance and merrymaking is thus part of the recreation in the lifestyles of AS mining communities similar to other communities, but as was evident from the study they do not entail the entire life characteristics of these communities, with many people not participating in such activities, and therefore it is inappropriate to make sweeping conclusions based on this one aspect.

There is a mentality of hoping to strike it rich and changing patterns of consumption if this does happen. Elsewhere in this report we have described a mine rush taking place at Ibondo in Nyarugusu at the time of the research. We encountered the claim-holder on various occasions, as he moved to stay in the so-called up market hotels that the team leaders were living in and started to spend extravagantly on food and drink and other items and dream of taking trips in aeroplanes, like a winner of a lottery.

Nevertheless, ASM also entailed serious commitments for self-advancement and financial investment as was evident from the study. On the one hand lifestyles are changing as ASM communities increasingly become exposed to other ways of living and investing in assets. “The days when some gold AS miners in the early 1990s used to go into pits with radio cassettes and beer, are over”, said a District official. This system was temporary because gold was easily available and therefore there was a lot of money. In the view of a Nyarugusu resident, “gold in the 1980s was so much and we were able to scoop it just on the top soils, and much so when it rained.” Changes to Geita and Mwanza towns suggest there is also a lot of investment in the service sector through building hotels and other businesses on the back of income generated through small-scale mining.

4.3.3 Entry into and exit from mining activities

It is relatively easy to enter mining industry as an artisanal miner as no formal skills or huge capital commitments are required. Skills are acquired on an apprenticeship basis. This perhaps explains why mining areas, like the surveyed villages, have large numbers of immigrants. It also accounts for the fact that many artisanal miners are originally low income earners. However, entry as a licensed dealer/ claim-holder or even a self supporting pit owner requires some experience, knowledge of the industry’s modus operandi and capital even at the artisanal level.

Evidence from the results suggests that many entrants do stay in the industry for quite a long time. For example, among the miner respondents, over 50 percent have been in the industry for between 11 to 20 years (Table 11). The highest stay period reported is 48 years. Moreover, there has been a very minimal level of exit from the industry. In over a year period, the surveyed households could only report 15 cases. Gold mining areas were leading on the exit front with a total of 13 cases as opposed to 2 cases in diamond mining areas. The disparity could however be due the differences in sample size between the two. Lack of alternative economic activities by many miners could account for the low exit rate given the probabilistic nature of incomes from the industry especially in gold mining. Also, the survey was not able to capture individuals or families who have exited from mining activities and moved away from the area.

Table 11: Average stay period in mining

Year categories	Percent	Cumulative Percent
1-10	35.0	35.0
11-20	50.8	85.8
21-30	12.6	98.4
31-40	1.1	99.5
41-50	.5	100.0
Total	100.0	

What is emerging from this data is that ASM communities can have high mobility characteristics, but this is periodic because as people indicated, many of them develop permanence in the areas they go seeking minerals. High mobility and people's continued connection to home areas elsewhere exposes one of the challenges of efforts to enhance the lives of people living in mining communities. ASM also engages household members of different genders, ages and status, indicating that the opportunity to earn income for the household is wide. The high dependency ratio as shown in Table 6 may have been one of the pressures forcing household members in the high vulnerable groups such as the elderly and young children into ASM activities.

As indicated above, artisanal and small scale mining exists as a key component in the livelihoods of people living in ASM communities. It is an important source of cash income particularly for communities such as Mgusu that is primarily dependent on mining for their livelihoods. In this case, the people's livelihood can be squarely described as a mining-dependent livelihood. In the other communities of Nyarugusu and Mabuki, mining is a significant component of people's lives but is integrated into their whole livelihood framework, as people remain manipulating a combination of activities in order to sustain their lives. Nyarugusu's reality expresses this combination very well, and people keep on digging for gold whenever it is found but still maintaining their agriculture. Therefore the artisanal mining pits are located haphazardly throughout the village, sometimes in someone's back yard, sometimes in what was once a farming plot.

4.3.5 Asset ownership at household level

Turning to focus on asset ownership at household level, Table 12 shows that households in Nyarugusu and Mabuki villages relatively possess more agricultural and livestock assets than their counterpart in Mgusu, which is unsurprising given that people cannot own land directly adjacent to the village. For instance, 76.7 percent of households possess land and average land size is 8.2 acres. The proportion of households keeping cattle are: 13.2, 28.2 and 6.5 percent in Nyarugusu, Mabuki and Mgusu villages, respectively. Only a small proportion of the whole sample (3.6%) possess a mineral right. Nyarugusu has the highest proportion of households that possess bicycle, radio, and television or radio thus signifying wealthy relative to other villages.

Table 12: Average number of assets and percentage of households owning them by village

Village	Nyarugusu		Mabuki		Mgusu		Total	
	Mean	%	Mean	%	Mean	%	Mean	%
Total land-acres	8.2	76.7	11.3	72.9	2.8	12.9	9.0	62.7

Cultivate land-acres	6.7	77.4	6.3	74.1	2.3	12.9	6.4	63.4
Fallow land-acres	6.2	9.4	30.3	9.4		0.0	14.6	7.5
Mining land-acres	4.3	4.4	0.5	3.5	4.0	1.6	3.2	3.6
Cattle	18.0	13.2	19.8	28.2	27.5	6.5	19.7	16.0
Goats	7.2	28.9	7.6	31.8	11.0	17.7	7.8	27.5
Sheep	2.7	3.8	4.7	15.3	4.0	3.2	4.0	6.9
Poultry	9.4	53.5	12.8	65.9	8.9	33.9	10.5	52.9
Farming machines	3.8	2.5	1.0	1.2	1.0	1.6	2.8	2.0
Farming implements	4.6	28.3	3.4	60.0	5.8	27.4	4.2	36.9
Fishing boats	2.5	2.5		0.0		0.0	2.5	1.3
Mining machines	2.2	11.9	4.2	15.3	4.2	17.7	3.3	14.1
Vehicle		0.0	3.0	1.2		0.0	3.0	0.3
Motorcycle	1.1	5.0	1.0	1.2		0.0	1.1	2.9
Bicycle	1.4	65.4	1.2	60.0	1.2	46.8	1.3	60.1
Radio	2.1	69.8	1.2	62.4	1.4	66.1	1.7	67.0
TV/Video	1.0	5.0	1.3	3.5	1.3	4.8	1.1	4.6
Shops	1.3	10.1	1.0	3.5	1.0	12.9	1.1	8.8
Food service	18.5	6.9		0.0	1.4	8.1	13.1	5.2
Bar	1.0	6.3	1.0	1.2	1.0	8.1	1.0	5.2
Other business	1.3	10.1	7.3	3.5	1.0	8.1	2.0	7.8

However, notwithstanding the above figures, 19.4 percent of the respondents were found to be engaged in mining related activities and 43 percent of them admitted of having at least one member of the household engaged in mining related activities. This observation suggests that mining activities in these areas could be part of many people's livelihoods more than the general figure above may insinuate. The most notable activities include service provision like food vending (restaurants + women vendors), ore grinding/ crushing (grinding machine/ crusher owners), transportation of either passengers or gold ore (commuter bicycle owners + tractor owners) and specialized services like blacksmithery for making mining equipments like 'moko', 'sururu', spare parts for grinding machines etc. Transporters of gold ore are specifically found in Mgusu where mining sites (on the hills) are spatially separated from grinding sites.

4.3.6 Stimulating Business and Investment

ASM and its related activities have contributed to growth in the local economy and to new opportunities at individual and household level. This contribution appears to have gone largely unnoticed in policy documents, possibly because it remains non-quantified.

AS mining provides a source of local revenue, with village governments having established by-laws that provide for tax collection from the businesses related to mining activities, rather than through direct taxation of minerals produced. Nyarugusu and Mgusu have each drawn by-laws subjecting to taxation on businesses such as the operation of crushing mills or management of sluice boxes. A *karasha* owner in Mgusu explained that:

Wenye makrasha "tunalipa ushuru kwanza TShs 3500/- kwa Chipaka Gold Mine na pili kwa Serikali ya Kijiji Tshs 3500/- kila mwezi. Chipaka aliamua kututoza ushuru huu tangu 1995, ila Serikali ya kijiji iliingilia kati mwaka 2004. Kijiji kinatumia ushuru huu kwa amaendeleo ya kijiji kwa mfano ujenzi wa shule" (lit: Mill owners pay a monthly tax first to Chipaka Gold Mine that is TShs 3500/- and then to the Village Government that is also

TSHs 3500/-. Chipaka decided to charge us this tax since 1995, but the VG intervened in mid-2004. The Village uses these funds for local development projects such as the construction of the school (Mgusu, 18.06.04)

We have mentioned the evident cash-based economy in Nyarugusu, stimulating diverse demands – for recreation, accommodation and transportation. But also in both Nyarugusu and Mgusu, individual voluntary contributions by AS miners have been instrumental in the construction of Village Government offices, schools and other establishments.

In terms of participating in the local economy, the miners regard themselves as instrumental in local development processes, contributing and participating in community issues as full members in any society. This is because their lives and homes are integrated into the village life in general. In Mabuki all miners are registered as villagers and live under the jurisdiction of Hamlet leaders. Their economic contribution is thus done collectively as a village community. One miner defiantly contended that:

“If a leader asks miners to pay something as their contribution no one is going to give him a cent because they all pay their dues as members of the village through their village representatives...people are living in communal life”.

The growth and mushrooming of communities like Nyarugusu and Mgusu was also attributed to the high rate of cash flow because of an increase in small businesses in the areas through ASM. Nyarugusu village also boasts of good and modern housing owned by miners. During the 2004 Uhuru torch race in mid-June 2004, leaders of the race inaugurated a residential house in the outskirts of Nyarugusu that was said to be worth TSHs 30 million (pers. observation of ASM study team).

Although we do not have quantitative data to support this contention, evidence suggests there is an increasing tendency of some miners to put money into business investments. Geita Township for example has a number of businesses owned by people within the ASM sector. The District Trade Officer estimated that “about 25% of the businesses in Geita town are actually investments from the ASM sector” (Interview, Geita, 15.07.04). He gave the example of the four new guest houses in the town which are all owned by dealers (some of whom are also miners). The Officer also explained that some of the small businesses such as shops selling cosmetics and car spares are investments of people in the ASM sector. While the growth of Geita town should be mostly attributed to the establishment of GGM, since many of the service establishments mushroomed because GGM had provided a market for the services, there is much evidence to indicate that AS miners play their role.

According to Geita District Trade officer, the collection of revenue for the district has been higher and easier – because people who have money collecting taxes is not a problem. According to the officer “it is also true that ASM plays a very central role in peoples’ livelihoods, for example when the Katoma area was closed for mining (a suburb of Geita town, initially an ASM area of local people) the impact on people’s lives was so great and there was so much crime during that time” (Interview, Geita, 15.07.04).

SECTION 5: The Social and Technological Organisation of ASM

The organization of ASM activities on the ground illustrates sophisticated relationships between rights over natural resources (minerals, land, water), access to these resources, labour divisions and labour relations. This picture is particularly complex in the case of gold mining when compared to diamonds, due to the scale of mining activities and the many different stages involved in gold extraction. Ownership of a PML and the labour relations and produce sharing arrangements this involves, generates an organisational hierarchy with claim-holders being in control of groups of labourers who perform the manual tasks. In this context, different and typically very limited, technological capacities create differentiation in the drudgery involved in the various tasks, particularly since poor quality extraction methods of gold bearing ore opens up opportunities for reprocessing. From this study it was established that the percentage of people who own semi-sophisticated technology – such as engine powered crushers, compressors or water pumps – is very small, hence the difference in the nature of tasks involved is very wide.

Complex divisions of labour around the extraction of gold, and to a lesser extent diamonds, also have gender and age differentiation with a bearing on poverty issues. For example, women are notably found in the processing stages that involve a series of repetitious and laborious tasks – such as reprocessing tailings because of poor extraction methods of gold-bearing ore. Although the study did not elicit quantitative data on age and gender, observations suggest that these women tend to be extremely impoverished and often elderly. In the case of children, it is typically boys who are involved in processing activities.

Mining and processing of gold takes place in the following stages:

- Pit excavation (*kuchimba mduara/shimo*)
- Pit drainage and ventilation (*kuvuta maji*)
- Drilling and Blasting (*kuponchi na kupasua mwamba*)
- Haulage and Hoisting (*kuvuta fero*)
- Ore preparation (Kiswahili term not known)
- Crushing and Grinding (*kuponda na kusaga mawe*)
- Washing of ore (*kuosha*)
- Panning and amalgamation (*kuchenjua na kukamatisha dhahabu na zebaki*)
- Amalgam burning – Gold recovery. (*kuchoma dhahabu*)

Mining and processing of diamonds takes place in the following stages:

- Pit excavation (*kuchimba*)
- Pit drainage (*kutoa maji*)
- Scooping and hoisting of diamond containing gravels (*kutoa mchanga*)
- Panning of the gravels (*kuchekecha*)
- Sorting to recover diamonds (*kuchambua almasi*)

The type of mining operation, the mining and processing of ore, and the labour relations involved for both gold and diamonds are described in detail in the following sections.

5.1 Gold mining

5.1.1. *Prospecting, licensed mineral rights and pit ownership*

The exploitation of minerals starts with exploration, which is a process of searching for economic reserves. Although there are many instances in Tanzania of artisanal miners discovering new mineral reserves, as described with reference to ‘barefoot geologists’ in Section 2.1, limited knowledge, technology and finance, mean that AS miners often find minerals in a specific location by chance – e.g. by excavating a pit latrine – or through reworking materials left by large-scale exploration programmes. Historically, at Mgusu and Nyarugusu, AS miners started exploiting areas following the exploration activities of expert geologists and mining companies.

Sections 4.1.1 – 4.1.3 briefly described the historically development of AS mining in Nyarugusu and Mgusu. Today, around Nyarugusu there are 102 AS claim-holdings (mineral rights) under primary mining licences (PML) and around Mgusu there are 18: not all of these PML concessions are active. In practice there are, however, critical differences in the way mining activities are distributed in relation to claim-holdings in the three places. In Nyarugusu there are a large number of claim-holdings that are being actively worked, which are distributed over a large area around the village, in between many of these claims are agricultural land, settlements, and scrublands. In contrast, operations at Mgusu settlement are concentrated within one man’s concessions (2 PMLs, with 2 other inactive mineral rights close by) and mineral extraction and processing dominates the inhabited area. Although the mode of operation within the claim-holdings is the same in each place, this makes for a very different dynamic of AS activity in the two settlements. Mabuki is different again, because of the geology of the diamond bearing gravels and underlying pipe, claim-holdings under PMLs are concentrated in one area of the village.

In both Nyarugusu and Mgusu, there is a widespread practice of owners of a PML leasing out their concession to individuals or groups who in turn develop a pit or pits for mining, as described in detail below. The mineral right owner then plays the role of landlord, passing to collect a share from the realised production. This arrangement raises questions as to the justification of regarding some miners as legal and others illegal. The miner regarded as legal is just a holder of a mining licence issued by the Government. However, whereas this person is licensed to mine, he turns into a landlord and leases the land to other people without any regard to the environment, health and safety of workers or any social responsibilities. If the law was to take its course, these actions would constitute illegal operations which justify the withdrawal of a license (similar to the circumstances a company such as DTT was subjected to in the past).

In addition to the practice of leasing a mineral right to others, the fact that legislation allows ASM participants to transfer and mortgage their mineral rights, leads owners of PMLs operating in areas of interest to medium or large-scale companies to sell their rights. There are examples of this happening in both Nyarugusu and Mgusu, and this can create extreme levels of insecurity for people working in and around gold mining operations, and subsequent conflict where pit owners and other people are operating in the area. This situation is dramatically underlined in Mgusu where at the time of research the PML holder was in negotiations with Shanta Mining Co. Ltd concerning the concession where large numbers of pit-owners are operating; the company’s approach was to close pits one by one, creating a drawn out process to minimise peoples’ capacity to collectively voice their grievances. In Nyarugusu, East African Mines is interested in mineral exploration and a number of PML owners have entered into agreements with the company to conduct exploration and if there are indications of potential reserves further negotiations will follow. This has been criticised due to the fact that many PML owners do not have the geological knowledge or negotiation skills to negotiate on a level playing field with the LSM, it also creates

insecurity due to misinformation in the locality whereby people become afraid that a large company will take away their livelihood, whether this is based on mineral extraction or farming.

5.1.2 Types of operation

Operations in the gold mining areas of Nyarugusu and Mgusu can be divided into the following major categories:

- (i) operations where the mineral right owner (PML holder) manages the entire process;
- (ii) operations where the mineral right owner (PML holder) runs his operations within part of the claim while leasing out the rest to other operators;
- (iii) organization at pit level where the entire concession is leased to pit owners.

Category (i) is mainly associated with what this report has defined as “small-scale mining”, although the other categories apply to both artisanal and small-scale mining, Category (iii) would be typical in an artisanal mining area.

In addition, linked to (ii) and (iii) are:

- (iv) operation of processing facilities (grinding mills, sluice boxes, manual crushing, etc); and,
- (v) provision of general services

(i) Operations where the mineral rights owner manages the entire process

Operations under this category are managed by the mineral rights owner and there is no part of the concession that is leased out. Such operations are few and are run by miners with a PML who have capital and adequate production capacity.²⁹ For example, only two such operations were observed in Nyarugusu and there were none in Mgusu. These operations are run by leading members of MWAREMA who have been beneficiaries of a USAID mining and environmental improvement project implemented through TanDiscovery.³⁰ Prior to this project the operations were very similar to others in the area. Annex 7 shows such an operation in diagrammatic form: the elaborate organisational structure is in consonant with the socio-economic background of the owner, reflecting the way in which such organisation is a result of a combination of external opportunities (access to donor support) availed to some people over others operating in the same environment.

The payment system under operations where the mineral right owner manages the entire process follows the following procedure:

- (a) Casual Labourers are paid in cash in accordance to the agreed piece of work.
- (b) Mine workers (in the example in Annex 7, 32 people) are paid 30% of the realized production.
- (c) The remaining 70% of the realized production is then divided as follows:
 - i. 35% of the 70% is given to the Manager, Mine Foremen, Supervisors and guards. In this case, this would be shared by 11 people.
 - ii. 15% of the 70% is taken by the Mine Owner (PML) as a cost of running the mine;
 - iii. 50% of the 70% is the share of the Mine Owner (PML). Accordingly, this is used for reinvestment into the mining operations, investment in other businesses such as a hotel, and for personal expenditures.

²⁹ The ability to finance the production of enough mineralised materials from which gold can be recovered and revenue generated to keep the operation running.

³⁰ Personal communication, Dr R. Sezinga, 24th September 2004.

Box 3: Life pursuits of a successful Claim Holder

Mr Rafiki was born in a village near Nyarugusu, in 1948. He has 3 siblings, a brother and two sisters. Rafiki is married and has 16 children; some are already married while the youngest is yet to start school. Rafiki calls himself a miner but he also farms, trying to be self-sufficient. He also has a business investment in Geita. Today Rafiki possesses two claim titles. He started mining in 1962 after completing primary school (Std 8), “by just doing what other people in the village were doing” at a period when artisanal mining was referred to as illegal because miners did not have licenses but were attracted to the gold after being convinced by the *Jaluo* – ex-workers of a mining company that operated in the area during the colonial period. He said, “I did not own anything when I started mining. We used simple tools such as hoes, spades, small iron rods (*tarimbo*) and hammers. The land was also communally shared since if there was a gold rush somewhere we worked together, everyone collecting or digging for gold. During that time people did not think of investing capital since we did not use sophisticated technologies. Our mining knowledge was very little during that time”

This freedom changed when the Dar Tardine Tanzania Ltd Company (DTT) was given a mining lease for the Nyarugusu area, but ended up employing some of the local people as sub contractors, including Rafiki. “I was given an area to supervise mining activities and sell the gold to DTT”. This arrangement lasted until 1982 when the mining areas were put under the trusteeship/supervision of the Geita District Commissioner. Rafiki came to own a Claim title later through Government’s approval, whereby some local miners were offered licenses. Most of those who got these claims were former Supervisors of DTT.

Rafiki has worked in Nyarugusu since, not once migrating to other mining places even if he hears of gold rushes as many miners usually do, “because I always knew that if you are attracted by mine rushes you may never concentrate in your own industry”. He believes that during low production seasons people need to look for solutions and overcome them, not to run away from them and that successes in ASM are both due to natural talent (*karama*) and sound organizational capacities. Rafiki had moved from operating on a share basis, arguing that it was too cumbersome, to working as an employer-cum-director in his own establishment. He said “what I have done through my mining is exemplary – educating my children and contributing significantly to the building of a church and planned secondary school. One of my children has succeeded to join high school”. Rafiki claims that he received the first kind of training in mining related skills when he worked for DTT. In this training he learnt about safety of workers. He was able to get more education on mining skills and regulations sometime in 1991-92 when granted a licence by Government officers. “The Government mining officials have taught me about pit safety, environmental health and regulations governing small scale mining, through seminars or visits to my production units. Rafiki enjoys such consultation since. He also visits the Geita office when he needs to. He is a leader in Mwarema and has benefited from mining projects coming into the area, such as a recent project funded by USAID.

(ii) Operations where the mineral right owner runs part of the process while leasing some pits to others

Under this system, the concession consists of a number of pits, some of which are managed by the mineral rights owner and some are leased out to some pit owners (*Wanachama*). The management of pits under the supervision of the mineral rights owner is carried out in the manner described above. The owner would usually have key personnel who get their earnings from a share of the production and casual workers who get paid according to a particular task. In this set up the leased out pits would be few in number, say one to three pits. This allows the mineral rights owner to still dictate terms on how the pits are operated especially on matters regarding to safety, use of explosives and others. The mineral right owner would usually receive 30% from each of the leased out pit.

This system of operations was observed at Nyarugusu and none at Mgusu. Although the exact number of people running such operations could not be established, it can be estimated that there are more than 5 such operations at Nyarugusu.

(iii) *Organization at pit level where the entire concession is leased to pit owners*

These are operations through which the mineral rights owner leases the entire concession to the pit owners. The number of pits in one concession depends on how many people are interested in putting up a pit in that concession. An individual or group of people (*Wanachama*) would usually select what they regard as the best location depending on their local knowledge of the geology of the surrounding areas or from hearsay and then seek consent from the mineral rights owner to put up a pit. It is in these areas where mine rushes can occur as the following case in Box 4 illustrates.

Box 4: Being a claim-holder and leasing to pit-owners

Daudi described how *dhahabu ilihila* (gold was struck) in Ng'wanza's Claim sometime in May 2004: this claim occupies an area of 600ft by 1500ft whose license was obtained in 1995. From being an idle site, hundreds of people flocked to the area, everyone wanting to dig for gold. He hastily engaged the services of assistants (an Assistant Manager, a Mines Inspector, and Katibu) and guards. Most of these assistants were themselves Claim Holders whose claims were idle. His Katibu explained that in about 2 weeks there were almost 200 pits in the area, and about 2000 people from anywhere you can think of, both women and men), service providers, transporters you name it. People used mobile phones to inform others. By June 2004 the number of operating pits dropped to about 50 after the surface gold 'sesa' had been depleted.

Each pit was managed by a team of members '*wanachama*', many of whom were resident in Nyarugusu, but some were hastily formed groups of people who came together each with different capacities. In one of the pits whose '*Mtoa huduma*' was a man from Magu (also a claim holder with 2 PMLs in Shinyanga), the team was formed on arrival in site, as each of them surveyed promising pits whose original members needed support in one kind or the other e.g. running costs or labor power. While this person provided the cash needed to run the pit – buy food, timber, transportation of raw ore to processing sites etc., his colleagues worked underground. The proceeds were distributed equally; minus the costs he had provided to support operations.

Ng'wanza's claim became a money minter and, from observation, this led him to completely change his lifestyle, preferring to sleep in a guest house instead of going home. Members of each pit subscribed 30% of their product in terms of raw ore to Ng'wanza, the claim holder, daily. Ng'wanza did not supply any equipment, neither did he offer any support; every pit organized its own operations independently. Each pit was also subjected to a daily TShs 500/- collection per every sack of raw ore (about 50kg) in order to cater for unforeseen situations such as mining accidents, which it was claimed, the claim holder had to settle. The miners took this provision grudgingly but they did pay. One of them said "you cover all running costs of a pit of 30ft deep, and after the members get their share, they still follow you at the gate saying you have to leave a sack with the Inspector". "But the miners are not very particular with pit safety", the owner claimed, and that is why the Mines Inspector has to patrol the area now and then. The CH's guards were also paid a bag each from every pit for each work-shift – (roughly a 24-hr period)

The miners also have to pay TShs 700/- a bag to the processing area and Tshs 500/- for crushing ore, in addition to the costs of amalgamation. The final processing is performed by one of the pit members who is an expert in the activity.

Sub-leasing is a very common mode of operation in the Nyarugusu and Mgusu. For example, the entire operations at Mgusu are conducted through leasing to pit owners. In Nyarugusu, apart from about five licensed operations that operate in the other two modes discussed above, the rest of the operations also operated through leasing of the pits. After getting the consent, the members agree on each other's responsibilities in order to develop the pit. The responsibilities are allocated

according to one's abilities and hence ranges from manual digging, provision of food, provision of supplies (picks and shovels, water, etc), and other responsibilities .

This system of 'share-holding' has enabled women to take part in the management of mining pits, since a person can enter into a venture depending on the assets one has – which vary from person to person. Women can readily enter into this share-holding by providing support in terms of food, or cash to purchase items such as '*matimba*'. This opportunity has been advantageous for many women since their inability to provide manual labor in mining pits had excluded them from benefiting from the most productive area in the business. Women *wanachama* were found in each village. Some of these women in Nyarugusu were themselves claim holders whose leases were idle due to lack of adequate running capital, and thus had joined hands with other people in running pits in other claim holders' areas.

In addition, this form of share-holding has increased the presence, and therefore involvement of women in those areas that were originally considered 'taboo'. Oral accounts in Mgusu recalled that up to the mid 1990s women were prohibited to venture in the mining area by Mgusu hill, and therefore the absence of women was so obvious (increased presence of women was noted from the time of an earlier study by Mutagwaba and Mwaipopo: Mutagwaba et al. 1997). Gradually when the pits increasingly needed joint management in the form of shareholding, women who had capital either through their husbands or through accumulating from other businesses were able to join in and therefore their presence in managing the daily running of pits on site became common.

The pit members who perform the manual tasks continue working until they detect signs of mineralized zones. At this stage, the group can rest and either engage laborers to do the mining or engage new members into the group. The engagement of new members (*wanachama*) into the group appears to be more common at Mgusu where the founders of the pit become distinguished members after the excavation has reached the mineralized zones. At this stage, the founders, or distinguished members whose status has now been upgraded do not carry out the manual excavation work but support the operations through other means, e.g., provision of working tools, supervision, provision of food and others. Where new members are engaged, each member is allocated a specific duty which also determines his share in the enterprise. The allocation of duties and hence shares is done in a democratic manner with all participants negotiating in an open forum. Table 13 below shows the division of responsibilities amongst members of a pit. The mineral rights owner would usually collect 30% of production from each pit.

Table 13: Example of Pit Ownership Status and Responsibilities at Mgusu

No. of Shareholders	Responsibilities
4	Rock excavation
3	Supervisors
1	Supply of Batteries
1	Hoisting Rope
2	Supply food
1	Timber for support
2	Construction of mining hut
1	Tool sharpening
1	Supply of hammers
6	Pit Founder members
2	Cooks
1	Supplies meat/beans, etc.
2	Guards

The numbers of participants in each of the above category differ from site to site. At Mgusu for example, there are only two claim holders (active claims). The rest of the miners – several hundred - are either pit owners or workers categorized as shown in Table 17, above. In Nyarugusu on the other hand, there is a large number of mineral rights owners with a PML (102) the majority of which operate through leasing part of their lease to pit owners. The system of working in Mabuki is almost similar to that at Nyarugusu although the number of people working in each pit is relatively small (3 – 6) compared to around 10 in Nyarugusu.

(iv) operation of processing facilities (grinding mills, sluice boxes, manual crushing, etc)

The processing of gold is normally carried out independently of the ownership of a PML or pit-owner/shareholder status. Here, as in mining, there are complex labour divisions, with processing activities segregated into tasks carried out by independent specialised labour. Thus the activity of size reduction, which comprises of crushing and grinding is offered by specialized crushers and grinders who work independently of each other: once the crushing has been accomplished the semi-processed ore is turned over to people who operate grinding mills. Similarly, washing at the sluice boxes is an activity that ends there before it is handled over to an independent panner and amalgamator.

(v) provision of general services

In addition to processing operations referred to in (iv), entrepreneurs provide general services such as water supply, transportation of ore, supply of timber, and food supply at mining sites.

5.1.3 Extraction of Ore

In the mining areas, mining is carried out by underground methods through pitting. Pits (*mashimo*) measuring approximately 2mx1.5m are located haphazardly according to where pit owners believe there is potential for striking the ore body. In areas where gold mineralization is extensive along the strike, the pits are found in a particular orientation reflecting mineralized rock strike orientation. The miners illustrated that the size and spacing of the pits is on their working knowledge, rather than abstract technical calculations. These pits can be referred to as exploration and production shafts; however it can be difficult to determine the point in time when exploration ends and production starts.

During sinking and mining, the waste rock is piled in small mounds in the immediate vicinity of the shaft. The amount of waste rock generated per pit is usually dependent on the depth of the shaft and the extent of mine production development. For example, at Mgusu, the waste rock (*fero*) generated from shaft sinking (depth up to 100 - 150m) is between 300 and 450 cubic metres. These materials are typically reworked by women and children and thus continuously reduced by moving it from the shaft areas to the washing/processing areas. Waste rock excavated in the contact with the ore body is usually sold by the pit owners since it does contain some gold mineralization.

Shafts are usually sunk vertically down until secondary enrichment is encountered. The speed for shaft sinking and even in ore production, depends on the type of material, excavation tools (mainly drilling tools) and the overall work organization. Whereas in areas where rock excavation is purely manual and the rock is hard, only a few meters may be advanced per week, as was the case with most of the operations in Nyarugusu and Mgusu. On the other hand, in some other operations within the same concession where miners have acquired compressors and drilling machines, the rate of advancement was found in the range of 8 - 10 times that in manual operations. It is common practice in Mgusu and Nyarugusu to sink shafts to an intermediate depth of about 15 - 30 meters at which a minor horizontal offset is excavated. These offsets are usually used by miners as resting points during descent to and ascent from work. The offsets are also important during manual hoisting (*Kuvuta fero*) as they are used as hoisting sub-stations from which a new team takes up the load.

The experience that miners seem to have gained in the local geology is evident, such that pits tend to change direction as they detect loss of mineralization. In some cases though, the miners sample the potential ore grade material first before deciding on the next course of action. A small selected sample of material is crushed and ground to an accepted degree of fineness. The material is then assessed through panning with small amounts of water and looking for visible evidence of gold particles. Once mineralization has been encountered it is pursued along the strike through crosscuts and roadways. The width of the roadway is in most cases dependent on the width of the ore body. Consequently, all development is restricted to the mineralized zone. The mineral bearing rock is extracted either entirely manually or with the help of hand held jackhammers (*jekihama*) powered by compressed air. In a manual operation, hammers, chisels and single-sided picks are used to slowly chip-off the ore before being hoisted to the surface. In such operations, productivity tends to reduce substantially as mining goes deeper into the harder primary mineral enrichment. However, in all the sites, rock breakage is carried out by using explosives.

Short holes of up to 1.0m are drilled manually by using a hammer, water and a sharpened piece of drill steel. One person would usually drill two holes (2m) per an eight-hour shift. Up to 10 holes can be blasted per round. Within the shallow pits at Nyarugusu (15 - 20m), i.e., where the rocks are still soft, up to four holes can be drilled per person. Although some mine operators use explosives

themselves on the claim of experience gained somewhere else, it is now popular to carry out blasting operations through hiring the services of a contractor, usually someone with a blasting certificate. The contractor normally provides the explosives, detonators, stamping material, etc. Organized mineral right owners who manage their operations possess a licensed explosives magazine or explosive box and employ a blaster on permanent basis as was observed at two organized operations in Nyarugusu.

5.1.4 Processing the Ore

Transporting the ore

In the gold mining areas, the raw ore material is put into sacks and transported (on porter's backs and by tractor) from the mine to a crushing and grinding area. The porters in Mgusu are locally known as '*wakata makinja*'. At the grinding site the raw ore is crushed manually by using 2-3 kg sledge hammers or any other metal implement of some sort as an initial size reduction (*kuponda mawe*). Both those with grinding mills and those grinding manually carry out this stage.

Roasting, crushing and grinding the ore

In Mgusu, the harder rocks are roasted so as to soften them for crushing and grinding. Roasting is done by piling together 12 – 13 (1 tractor load) large sacks locally known as '*turbo*' and covering it with firewood. Burning of one tractor load costs TShs. 3,000/= - 4,000/= with the cost of firewood adding another 4,000/=. The burnt material is normally crushed manually at a cost of TShs. 200/= per 20 litre bucket of material.

For the fresh rocks, prior to crushing the ore is sorted so as to ensure that only the larger pieces are crushed. Crushing is mainly carried out by specialized groups, especially women who operate either as individuals or in small groups. The material is crushed on a crushing stone placed over a piece of cloth or some kind of a rope ring measuring about 20cm in diameter and 2 - 3cm thick. As the finer pieces are realized, they are swept aside in a separate pile. On average, one person can crush 400 kg (8 – 50kg bags) over a 12 hours shift.

Table 14: Cost of manual crushing gold ore at Mgusu

Equipment	Hand hammers (size 2kgs), Bucket, hand shovel
Equipment ownership	Equipment are owned by women who are doing crushing
Capacity	250 – 400 kgs per shift
Description	Rock of an average diameter of 12 cm is reduced to 1.75 cm
Cost of crushing ore	Tsh 150/20 kgs or Tsh 7.50/ kg.

Note: Shift: 0700 hrs to 1800 hrs

Women dominate ore crushing activities in Mgusu and to some extent in Nyarugusu. In Mgusu, two groups of ore crushing women have been formed that work collectively for certain periods of the week and pull resources together from this activity. Working together has made their task that is purely manual more bearable although it is still arduous. Children also undertake crushing activities, as described in Section 4.11 below.

The product from crushing is then packed into sacks or jute bags (*viroba*) of size of about 1-cm packed in 50 kg bags and transported to the grinding centre for further processing. Transportation

to grinding centre is usually done after having accumulated a certain number of bags (100 – 300 bags for organized operators).

One major improvement that has been noticed in the gold mining sites, since earlier visits were made in 1998 has been in relation the grinding processes. Grinding is now carried out by mechanized means usually driven by a multitude of drive mechanisms. Grinding ball mills (*makarasha*), most of which are fabricated locally, measure about 80 cm in diameter and 120 - 180 cm in length.. The mills are constructed by welding together metal plates and sometimes old tire rims from lorries. Most ball mills are batch mills, with productivity dependent on the driving mechanism, i.e., those driven by an independent small water-cooled diesel engine (Lister or Chinese origin 13.5 horsepower), a stationary tractor, bus, lorry or any other form of motorized drive.

Most mills do not belong to the miners but to private entrepreneurs, both men and women most of whom live in the mining village (at Mgusu) or in nearby villages, e.g., at Nyarugusu. However, it was noted at Mgusu that certain miners own grinding machines that they run as a separate business. The mills have varying capacities and they range from grinding 50 – 180 kg of material over a period of 45 minutes. The charges for grinding depend on the rock type, e.g., hard rocks are charged TZS 2,500 per 50 kg bag and the softer materials are charged between 3,000 – 4000/= as they tend to stick in the mill.

Testing the ore

Testing is a stage done by skilled adults and is conducted before the ore is taken for grinding, it is tested and categorized into low and high-grade ores. Whereas low-grade ore will be taken and washed in public at the washing place, high-grade ores are usually washed in secluded areas. The test is carried out by first assessing the colour followed by crushing and grinding manually a few grams of ore which is then mixed with little water to form a slurry. The slurry made from crushed and ground ore is panned directly normally with little water and visually inspected for visual specs of gold. The test is usually carried out by the owner(s) of the ore, mainly after ore sharing has been done.

Washing the ore

Washing of ore on the sluice boxes is carried out as an initial processing stage. Typically this is a male activity; where women are found washing on sluice boxes it is mainly those groups reworking the tailings. The design of sluice boxes was found to be similar with slight variation in size and angle of inclination. Sluices measured about 1.5 – 3m in length and 0.4 – 0.7m in width (the most common size being 0.6 x 3m). Most sluices were inclined at almost 30 degrees and were lined with sisal sacks as matting. No riffles were observed at the sites although miners put pieces of rock on the matting as a means of slowing down the current. All sluice boxes had a perforated feed box through which fine ground ore is fed by controlled addition of water.

Table 15: Cost of Sluicing by One Woman Entrepreneur who owns four sluice boxes

Item	Cost (Tshs)
One sluice box + one feed box	15,000/=
2 sacks for lining the sluice used every two weeks	3000/=
One piece of cloth material for every two weeks	1000/=
Labour cost of washing 350 kgs	1000/=
Transport of milled ore 500kgs	500/=
Filling water (one washing pond)	8000/=

The locations of sluice boxes differed from site to site, being dependent on a source of water. For example, at Mgusu sluice boxes for washing low-grade ore are located on the banks of the Mabubi River and those for high-grade ore within the camp where a water pump has been installed. There is also evidence at Mgusu that some operators were moving out of the river banks by constructing concrete washing areas in order to minimize pollution to the river: this is a legal requirement. At Nyarugusu, washing bays were mostly located within the areas operated by mineral rights owners. This was with the exception of one area which is located just next to a drinking water source, which is used on daily rates by individual contractors for grinding and washing, does not have any control for pollution of the water sources. Whilst complaints had reached the Village Government and the Mines Office was aware of the problem, the operations were going on unabated, one suspects through influence brought to bear on the matter by the owner through connections within MWAREMA.

Water for washing is either contained in an elevated barrel located behind the sluice, a sump (a small pit dug in the ground that is sometimes cemented to reduce water loss) or directly from the river. Apart from those washing on the river-banks, water is recycled through a combination of ditches and sumps. Estimates have shown that up to 90% of the water can be recycled. Water is thus added by using either a hose running from the barrel or a metal can is used to pick water from the sump or river. Slowly the water is powered on top of the ore running perpendicular to the inclination of the sluice and thus slowly and continuously pushing the ore through the perforated holes to the sluice. Interviews with the miners show that washing is carried out continuously, sometime throughout the shift before recovering the concentrate. Also, most miners contend that they can wash between 250 –300kg of fine ore within one and half to two hours. In most cases however, a single load is available for washing and must thus be cleaned before another one is loaded.

Although most AS mining operations are stopped due to floods in the pits during the rains, in the dry season processing is affected by shortage of water. At Mgusu, water for processing is collected from the Mabubi River located South of the miners' settlements. Most miners have moved close or into the River for their washing and thus causing enormous environmental damage. On the other hand, in some parts of Nyarugusu which has a shallow water table, processing facilities like grinding machines and all the washing and amalgamation are done close to the public water wells and thus leading to conflicts between miners and other members of the community.

The recovery of the concentrate which has collected within the matting is recovered by slowly and carefully removing the matting and dipping it in a bucket of water. The sack is carefully and thoroughly rinsed by shaking it and scrubbing against itself while dipping it repeatedly in water. Once the operator is convinced that all the trapped concentrate has been removed, the matting is given a final shake and rinse and then removed from the bucket.

Panning and amalgamation

Panning and amalgamation is carried out by specialized individuals, mostly young men. The operator is paid by taking into consideration the amount of ore that has to be panned and the recovered concentrate amalgamated. It is estimated that one pan is loaded with 5kg of concentrate (concentrated from the sluice box) and the operator is normally paid between TShs 50 – 100/= per pan washed. It is very common to see boys and very young men involved in the panning and amalgamation processes.

The process starts by adding a small amount of mercury (estimated according to experience and amount of concentrate) into an amalgamation pan. Common amalgamation pans in the area are those fabricated locally and normally they are a small version of those used as wash basin by the local people. The sizes of the amalgamation metal pans are comparable to those used on construction sites (for pouring concrete) and usually measure around 40 cm in diameter. Scoops of concentrate followed by small amounts of water are then added into the pan. The operator continues to add water while massaging the materials in order to ensure that they are thoroughly mixed. As the material is continuously massaged, it is also panned and thus discharging some of the slurry into another pan for reworking at the next cycle. The massaging and panning continues until most of the concentrate has been transferred into the second pan. More concentrate is added into the first pan and the massaging and panning continues until all the concentrate has been treated. Pouring small amounts back into the first pan so as to fully utilize the mercury also reworks the concentrate in the second pan. The number of cycles through which this is repeated usually depends on the experience of the operator, satisfaction of the concentrate owner and normally on the ore grade.

Once the operator and concentrate owner(s) are satisfied that enough material treatment cycle has been carried out, the tailings are disposed-of and the process of separating mercury from gold begins. In Mgusu, if the concentrate treated was from high-grade ore, the tailings are dried, roasted, reground manually and treated with mercury again. The material is dried in a hut after which it is roasted in small scoops on a metal pan over an open fire. Grinding during this stage is done manually on a grinding stone and in all cases it was done by women on contract and they are paid Tshs. 300/= per 20 litre bucket. The separation of gold and mercury is done by first removing the excess free water from the solution left in the pan. The remaining gold mercury solution is then put on a piece of fine cloth which is then twisted and thus squeezing the mercury and water out. Once free mercury and water has been removed, as practically possible, an amalgam nodule is left behind in the cloth. The nodule is then removed and wrapped in a piece of foil paper (obtained from cigarette packets) for further processing. The squeezing of the cloth to remove free mercury is done carefully while ensuring that as much mercury is recovered.

Gold extraction from the amalgam

Burning of the amalgam in order to extract gold is normally carried out by the owner of the material or the person responsible for amalgamation under supervision of the owner. Where the amalgamating person burns the amalgam, payment is that paid as part of the panning and amalgamation.

This stage is one of the most dangerous to people's health because it exposes people to inhalation of mercury vapour released during the process of amalgamation of gold. The extraction of gold from the amalgam nodule is accomplished by placing the nodule wrapped in a foil paper over a piece of metal/can (e.g., a piece of broken shovel) placed on an open fire and burning off the mercury to get gold. Usually the person in charge keeps on blowing the fire continuously in order to raise the temperature of the smouldering wood or charcoal, while observing as the amalgam changes in colour (from silver to golden yellow). In most cases, the amalgam belongs to more than one person, all of which surrounds the fire to witness the output. The fact that some miners prefer to carry out the activity inside their homes instead of in the open increases the likelihood of vapour inhalation. Also, during the rainy season, most of those that are still in production burn the amalgam in their domestic huts.

5.1.5 Local sales of gold

The impure gold recovered is weighed and sold to awaiting buyers, usually *makota* (dealers or brokers), or held in search for a better price either in a nearby town or from other visiting buyers. The artisanal miners are said not to stock gold, 'they sell it when they get it' and *makota* are usually around to deal.

The miners had different views on marketing processes, depending on the status of the seller and the value of minerals for sale. In the view of a well-established claim holder,

"Marketing gold has changed hands from time to time and not necessarily for the better. Before the coming of DTT, gold was sold to anybody who had money. These people were called Kota. During DTT's period, the gold was sold to DTT since he had a licence. After that the NBC and BoT bought gold until 1995 a private company was issued a licence to do so. Later MEREMETA came and now we are back to licensed and unlicensed maKota. The problem with makota is that they do not always have the cash read in hand when you have gold to sell. Sometimes they would tell you after two weeks! Government institutions always had cash so it was not a problem."

For a majority of those who depend on *makota*, there is much room for exploitation in these transactions, even though it was observed that gold sells quite fast. Firstly the transactions may not necessarily involved selling gold directly to the buyer. On this issue, a *kota* in Mgusu explained that:

"We usually have 3 different sections of Kota (Kiswahili: Makota tuko seksheni tatu); the first section is occupied by urban business people (matajiri wa mjini) who look for a trusted person in the village to give money to – what they want is gold; Secondly, the village contact also hires the services of several people in the village (the 3rd section) who are given money to purchase ground ore, oversee the tasks of panning and amalgamation and to take to the village contact for the final processing to gold. Since each of these people in the transaction wants a profit it is common to give the miner the lowest price possible" (18.06.04).

It was observed that it was also possible to cheat the more established miners who sell processed gold to *makota*, because of the crude process of weighing. The weighing scales are balanced on the finger of *makota* as one (usually men) juggles with razor blades or silver coins on one end and the product on the other. It is very difficult to establish if one is deliberately tilting the scales to one's favour. It is therefore not surprising that *Makota* agreed that their business is indeed profitable.

For the *makota* gold buying is not strictly confined to purchasing the final product, but also entails extending supporting to miners in terms of loans or production equipment (*kutoa huduma*). This system binds miners to sell their product to this particular *Kota* "even if they can get a better price elsewhere" (Nyarugusu 13.06.04). Some *Makota* also purchase unprocessed ground ore from the miners.

5.2 Diamond Mining

5.2.1 Prospecting, Ownership of Mineral Rights and Pit Ownership

The diamond working at Mabuki followed the abandonment of the area by Williamson Diamonds and STAMICO in the 1970s. However, following the rush activities that followed then, the Government moved in to allocate plots and bring some order in the area. Whilst the good intentions of the Government by allocating ASM in what they thought were reserves amenable for ASM technology, it did not go down well with the miners. The allocation which was carried out the early 1990s divided the area into blocks consisting of those with shallow alluvial reserves and those that

need mechanical equipment for excavations in the harder materials. The blocks with alluvial reserves were allocated to groups of AS miners and the rest to local medium scale operators. Since the blocks allocated to medium scale operators were in areas which were originally being worked by ASM, the miners complained of being removed from richer areas to those that are barren. Today there are 90 PML's issued for diamond mining in Mabuki.

Unlike in Nyarugusu and Mgusu, the small-scale/medium scale title owners are non-resident, operating as absentee land owners visiting their areas now and then but leaving major operations under supervisors. These 'mine investors' who were expected to inject some funds and run organized operations have in turn turned to cheap labour provided by the small-scale miners. As a result, on site one finds miners working in individual pits rented to them by the presumably licensed local investors. This has justifiably contributed further to the complaints of the AS miners of being robbed their areas as Box 5 below demonstrates.

Box 5: Ownership of mining pits in Mabuki village

The pits are owned by the miners themselves, but so far, none of the artisanal miners own a licence. Women do not own pits but their husbands own them. People form and work in small groups, some of them work with their wives as co-members. Some of the groups were formed because they were told it was the best way to get a mining licence. The proposed 'claims' have the size of 50 x 50 metres. These areas are however far from where our current activities are based. "We have been asked to move away from the areas which we are currently practicing mining activities, there is another area located for them that is different from the present places"

"We are not happy with this arrangement because the area where we work has been given (we are told) to some large scale miners (*wawekezaji*). There are currently about four or five such miners who have mining licences. We also are not happy to move because they believe that there is no diamond in those other parts. Disregarding the rights of 'wachimbaji wadogo' is a common thing here – it started since the times they called us wachimbaji haramu' But we now have our own organization – Umoja wa Wachimbaji Wadogowadogo Wa Mabuki." (Mabuki, 23.06.04)

5.2.2 Types of operation

The types of operation and labour divisions at for diamond mining at Mabuki are much simpler than gold mining and differ depending on the size of the blocks. It is difficult to establish whether the activities carried out at Mabuki are representative of diamond mining operations in Tanzania due, firstly, to the fact that there are limited diamond mining sites in Tanzania to be able to make comparisons; and, secondly, due to the nature of mineralization which dictates the extraction methods are different in different sites, e.g., whereas Mabuki reserves are alluvial ones, the one in Nyanghwale in Kahama are kimberlite pipes.

As such, the activities and labour divisions described in this report are characteristic of the ASM diamond mining at Mabuki and they can be distinguished into two groups based on the size of the blocks.

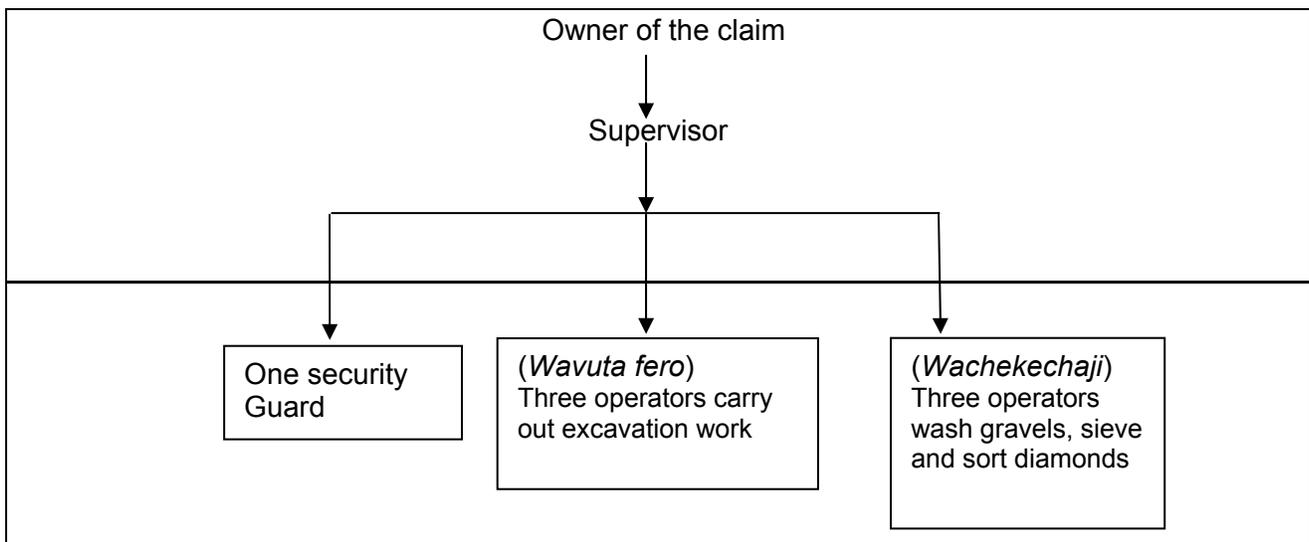
- (i) Labour divisions in large blocks;
- (ii) Labour divisions in small blocks (artisanal mining activities).

In the experiences of one of the small-scale Claim Holders in Mabuki, this arrangement is ideal because it allows the owner to pursue other activities leaving the daily running of activities under the care of a trusted Supervisor as Table 16 and Figure 3 illustrate.

Table 16: Labour divisions in large blocks (diamond mining)

Category	Responsibilities
PML Owner	Administrative duties, paying wages and allowances to operators, marketing, owner of equipment, employs operators.
Pit Owners (3-6 people)	To carry out mining and processing activities

Figure 3: Organizational chart in larger blocks (diamond mining)



Typically the choice between being a pit owner and mine operator depends on the financial capability of the individual. And often, it was noted that many pit owners in order to continue operating seek sponsorship for their operations from diamond dealers on agreements to sell them all the realised stones.

(ii) Labour divisions in small blocks (artisanal mining activities)

Table 17: Organization of labour in artisanal diamond mining block*

Category	Responsibilities
PML Owner (1)	Administrative duties, paying wages and allowances to operators, marketing, owner of equipment, employs operators.
Pit Owners (2-3)	13 members in each concession (licensed with a Primary Mining License) PML are divided into small groups of 2-3 people; 2-3 people organize themselves to develop and own a pit: production/revenue is divided equally among members.

* Note: The two or three people in each group assume together the titles and responsibilities as owners of the pit, owners of equipment, pit/mine administrators, operators who carry out mining and processing activities. Each member of the group is free to continue or to leave the group.

5.2.3 Diamond Mining and Processing

Mining of diamonds is carried out through excavation of shallow pits down to the layer of gravels that contain diamonds. The overburden material covering the diamond bearing gravels contains of consolidated black cotton soils. As such, excavation is usually carried out using picks and shovels. Most pits are shallow and their depth range between 3 – 5m. Once the gravels have been reached, they are scooped using shovels and loaded into buckets that are then hoisted to surface ready for processing. The processing of diamonds is less sophisticated than that used to process gold. At Mabuki, the diamond bearing gravel is panned and thus allowing the heavy diamonds to collect at the bottom of the pan from where it is collected through sorting. As such the processing equipment needed are less sophisticated and include pans and sieves. During the rainy season miners process ore mined during the dry season by using the water that has filled their pits. During the dry season, the shortage of water drives most miners to other activities. However, there are a few deep wells from which processing water is fetched.

5.2.4 Local Sales of Diamonds

Diamond marketing in Mabuki is controlled by local dealers (local name: *Wapembeji*) who are not licensed but operate in a similar fashion to dealers (*makota*) in the gold mining areas. These *Wapembeji* refer to themselves as agents of mineral brokers or buyers who live in Mwanza town, Shinyanga town or in Maganzo, a popular AS diamond mining settlement located in Shinyanga Region. Their role is to “woo miners to sell their minerals to their bosses”. Although it is usually the case that miners are bonded to a particular dealer (*Mpemebji*) through loans and frequent cash assistance, the transactions in buying diamonds can be highly exploitative and not based on trust at all. A Mabuki resident complained as described in Box 6.

Box 6: Diamond transactions at Mabuki

“In Mabuki, no miner has information on the value, standard measurement and hence actual prices of diamond both locally and internationally. Local producers are also not conversant with the standard measurement of diamonds to be able to get better deals – what they know here are measurements pegged against the sizes of certain cereals eg – *kunde* (*chickpeas*), *choroko* (*lentils*), *dengu* (*mung beans*). There is thus no fixed price. At present the prices can be anything such as follows:

1 Carat = 600,000/=, 2 Carats = 1,500,000/=, 1 Point = 2,000/=

Diamond's price fluctuate periodically. Middlemen (*Wapembeji*) obtain information on price fluctuations from the buyers who get the information fax. The small scale miners do not obtain information about price changes and thus, making it difficult to do business especially when the price has gone down. It is possible for miner to refuse to sell the diamond when the price has dropped so abruptly so *Mpembeji* has to educate the miner.

There are no specified pricing mechanisms for the diamonds because miners do not have any information on the prices per value. We sell a piece on 'makubaliano' negotiation basis. ... local miners always are cheated or 'wanalaliwa' ... there is no way that people can tell the actual value of the pieces they have found. “The price for diamond depends on the buyer (*mwenye pesa - mnunuzi*). And since it is difficult for local producers to sell the diamond – they depend on the broker 'mpembeji' and sell after some bargaining. “Utanipa ngapi hapa”? Hii ni kama shilingi kadhaa ... ah ongeza basi (lit: how much will you give me here? This is about a certain amount of shillings ... ah! Increase it). “It is people's need for money 'njaa' that has disadvantaged local sellers of diamond. Njaa ya mtu ndio inayoua manunuzi ya almasi, mtu akiambiwa bei, anaangalia na shida zake, na anakubali tu, maana anaganga njaa ya- muda mrefu” For example in April 2004, a diamond of 15 carats was sold at 6,000,000/= only, when it would have easily fetched more than TShs 20,000,000/=

Women miners also complained that marketing diamonds is entirely a men’s domain. Usually when pit members of mixed sex have been successful, it is the men who take the diamonds to sell and later to distribute the income. Even if a woman gets diamonds in a pit in which her husband is not a member, a Mabuki woman said, “*how could you sell [diamond] without telling the man? ... actually if you get diamond your husband can tell you, we [the men] can go and sell it, you just stay at home*” (Mabuki, 16.07.2004). This tendency of sidelining women in marketing of household resources is common since it is also the case in the marketing of other items such as crops where men are said to use all techniques that they can to sell items from the house without the wife’s knowledge, to the chagrin of one woman as she described the tactics of local men to outsmart their wives:

“both women and men contribute in household food production, but even if he brought food in the house he would be taking it little by little and selling it ... now they have invented a technique were they hide rice in bags [tied to their legs] and cover them under their trousers and then stand on a basin to collect it when they want to sell it”.

The tendency of to get information haphazardly has made many miners vulnerable to cheating and possible dispossession.

5.3 Women and mining activities

Gender concerns and female labour are cross-cutting issues emerging in data presented throughout this report; nevertheless it is worth briefly highlighting information on female participation in mining.

Gender differentiation of mining activities is depicted in Table 18. Women miners amongst the females group in the villages constitute only 5.9 percent whereas the corresponding proportion for men is 24.6 percent. This is expected because men dominate mining activities, which involve labour within the mines. Mgusu has the highest female participation in mining and the lowest is in Nyarugusu. Gender involvement across the villages is statistically different at 5 percent level.

Table 18: Involvement in mining by gender

VILLAGE		Gender		Total
		Male	Female	
Nyarugusu	Not involved in mining	79.2%	96.7%	87.8%
	Involved in mining	20.8%	3.3%	12.2%
	Total	100.0%	100.0%	100.0%
Mabuki	Not involved in mining	55.4%	89.1%	71.2%
	Involved in mining	44.6%	10.9%	28.8%
	Total	100.0%	100.0%	100.0%
Mgusu	Not involved in mining	81.1%	92.2%	86.2%
	Involved in mining	18.9%	7.8%	13.8%
	Total	100.0%	100.0%	100.0%

Chi-square significant at 0.00 in both cases

In Section 4 it was shown that female headed households were less likely to have at least one member engaged in mining. This table shows a similar patter of less female participation in mining activities. For instance among females in Nyarugusu village, only 3.3 percent participate in mining activities which far less than their male counterpart (20.3). Mabuki village has relatively more female participation (12.1%) than other villages. As we described above women’s participation in

mining may be changing in important respects, and these figures are likely to disguise the many activities that women engage in around the mining sector, from acting as share-holders to a pit to the provision of food and other services.

In Mabuki mining activities appeared to be open to women, without the vestiges of taboos existing in the gold mining areas and without such a marked division of labour between the sexes. However, as described in Section 5.9 above, there are inequalities with husbands and male relatives taking control of the sale of diamonds. Box 7 describes the involvement of a group of women in gold processing, where they have managed to come together to try to strengthen their collective ability to make an income.

Box 7: Women in gold processing

Tuleane A Women's Group (Mgusu)

Tuleane A is one of two women's groups in Mgusu. The group was formed in 2003 by 16 women who are 'wapondaji' (stone crushers). These women used to work individually and according to them they realized that they were not able to make ends meet. After a talk by a District Official who visited them very briefly (about 2 hours) they decided to form a group that was based on pooling income together in order to get capital for investment into more profitable business. They continue working independently for 5 days of the week but have selected one day (Wednesday) where everyone works for the Group and the income realised is saved. They now have TSHs 40,000/-. They have also been promised another TSHs 100,000/- by the Geita MP (Special Seats) to boost their coffers. The members are happy with their progress, although slow. Their plans are to operate as buyers and transporters of gold bearing ore, and to conduct the entire processing activity themselves, instead of being offered 'tender' for crushing stones only. They complained that even as a group they have not been able to overcome *dhuluma* by people who do not pay them what they are due. One said "*watu wengine wanatudhulumu, wanatupa hela kidogo kama shilingi 500/- badala ya 1000/- . Huwezi kushtaki maana anaahidi atakulipa*" But they end up not paying. (Mgusu 19.06.04)

5.4 Children's participation in mining

Child labour issues were raised in Section 2.4.5 and have been discussed in several studies of mining in Tanzania, particularly those led by the ILO. As has been noted elsewhere, children engage in AS related activities, particularly in the gold mining areas. Many schoolchildren undertake what are regarded as 'petty chores' in the ASM industry. School boys, far more than girls, in Nyarugusu and Mgusu were found in the processing tasks – such as carrying ore to washing places, washing the ore, amalgamation, and manual crushing of tailings. However, girls are clearly involved in the domestic labour that surrounds the service sector in food provision and other activities. Most boys work on contract basis where their engagement, though highly exploitative, is also done on a 'neighborhood basis' (through family and other social networks). Unlike in the gold mining areas, diamond mining in Mabuki has not attracted many children; those who do participate, work during week ends or holidays helping their parents with the lighter chores in the industry.

According to the Head teacher of Mgusu Primary School, his pupils' engagement with mining and related activities has not necessarily deterred them from performing well in class. Since 1996 when the first students sat for National Primary level examinations, the school has been almost every year producing graduates to Government Secondary schools. This highlights an important point also apparent in Nyarugusu, which is that many children fit ASM-related work around schooling, rather than leave primary school for mine work.

Box 8: Washing tailings for a living

Thirteen year old TP is in Standard III and calls himself a *mwoshaji* because he has been working as a *mwoshaji* since 2002. He lives with his mother in Mgusu. His father had gone to the mines in Nyarugusu and is not yet back, although time and again he pays them a visit. TP sometimes works in amalgamating gold (*kushikamanisha dhahabu na zebaki*) He usually gets daily jobs from miners who pay him at a rate of TShs 800/- per sack (*gunia*) of ore that he washes. Each sack normally has the capacity of 10 buckets. By the evening of 19th June 2004 he was able to wash 5 sacks of mineral bearing ore. He proudly claimed that he was paid TShs 4000/- that day. According to him the youth and children are proud to be able to work in the mining areas because they earn an income. TP claims that washing ore does not deter him from going to school, This full day's work was because he was on school holidays, and he usually seeks for full-day employment only on weekends. In such days he usually goes to the processing sites at 6.00 am, only faulting when he feels tired. He buys his own clothing and gives some money to his mother. When he gets ill, his mother takes care of him. (Mgusu, 19/06/04)

For some highly impoverished families, without a healthy adult income earner, child labor in the ASM sector provides a critical source of income, as in the case given in Box 9. For other children and families it is considered a good means to make an income and part of a way of life engaged in by the family – condoned or otherwise by parents - although not necessarily the only option open to these children. The differing extents to which children have a choice to enter into AS activities needs to be taken into account when designing interventions to reduce or eliminate child labor.

Box 9: Common practices of Child Labour

John (11) in Std III and David (14) in Std IV are living with their grandmother. Their parents abandoned them and left for mining in other areas. Their mother is at Kalenega and father at Kakole. This is the fifth year since their father left home. They depend on the income of their grandmother who sells vegetables (*msusa*) in the market, and from the little money they get as porters at the bus stand, a job which may earn them up to TShs 500/- a day. They also engage, from selling sugarcanes which they buy from a nearby settlement, Busiga village, and sell it by the roadside for a little profit. But they get most money from crushing stones at J's place just around the corner from their home and are paid 1500/= for a sack of stones. John started this job when he was in Kindergarten and David when he was in Standard I. They used to be hired for TShs 1000/- a sack. They use the money that they get for buying clothes, food, and giving to their grandmother. When we don't have money we get maize on credit from a shop, we usually take TShs 1000/= worth amount of maize, and TShs 200/- for milling the maize". They know they will get money from crushing stones at J's. We usually work at J's on weekends and in school holidays. They have to attend classes because "If we don't go to school we are supposed to pay a bag of cement" John was the 16th in class last term while David emerged 10th out 200 pupils. They both want to reach secondary school.

They do not see any problem in engaging in crushing stones, but it is hard work. Their biggest problem is lack of money to get good treatment when they fall sick, since they need what they earn for food. For example John fell down and was bruised in the face but he failed to get money for treatment at the hospital. Sometimes when they are suffering from fever they fail to get money to attend proper hospital treatment, therefore they buy medicine from pharmacies by using the little money that they have. When asked if they have told their teachers that they are not able to pay school's contributions, they responded by saying, "If you tell them you don't have the ability to pay or do not have any assistance they just tell you to go back and ask your grandmother to give you money and bring it tomorrow".

They are occasionally subjected to bullying. One day after receiving our payment of 1000/= from J, an old man whom we were working with, came to us and by force took our 1000/=. We reported to J, who sought the old man, beat him and the following day he returned our money. (17.06.04)

5.5 Technology and Equipment

Common mining equipment and tools owned by households are a pick axe (36.3% of households), shovel (32.4%), pan (21.6), bucket (22.5) and sieve (16.7). Sophisticated equipment such as drilling and blasting machines, generator, sluice box and ventilator are often owned by claim holder, pit owner and providers of specialized services (Table 19 below).

Table 19: Ownership of mining tools and equipment

Mining Tools and Equipment	Number (percentage of households)						Total
	0	1	2	3	4	5+	
Drilling machine	99.3	0.7	0.0	0.0	0.0	0.0	100.0
Water pump	99.7	1.3	1.0	0.0	0.0	0.0	100.0
Crusher	98.7	1.3	0.0	0.0	0.0	0.0	100.0
Stamp mills	100	0.0	0.0	0.0	0.0	0.0	100.0
Pan	78.4	11.1	4.9	1.0	2.6	2.3	100.0
Shovel	67.6	21.9	5.2	2.3	1.2	1.2	100.0
Chisel	81.4	5.2	1.3	2.6	4.6	4.6	100.0
Blasting machine	99.3	0.3	0.3	0.0	0.0	0.0	100.0
Compressor	99.7	0.3	0	0.0	0.0	0.0	100.0
Ventilation fan	98.7	0.3	0.3	0.3	0.0	0.0	100.0
Generator	99.3	0.3	0.3	0.0	0.0	0.0	100.0
Sluice box	96.1	2.3	0.7	0.3	0.3	0.3	100.0
Retort	97.7	1.6	0.3	0.3	0.0	0.0	100.0
Bucket	77.5	12.1	5.9	0.3	2.3	1.8	100.0
Pick axe	63.7	21.3	8.5	2.6	1.3	2.4	100.0
Sieve	83.3	9.8	5.2	0.3	1.0	0.3	100.0

Equipment used for mineral extraction can be differentiated between those whose operations are purely manual and those that have introduced some mechanical equipment. In most manual operations, the equipment, most of which are fabricated at the mining site, are very rudimentary. At the start of the pit excavation, i.e., excavation in soft weathered ground, the following equipment are used: (i) shovels (*bereshi*) (ii) handpicks (*sokomoko*) (iii) forged old drill steels with one end sharpened (*ponchi*) As the pits get deeper: (iv) ropes and (v) sacks, are used. As a much harder rock is encountered: (vi) hammers; (v) forged short steel tools with one end beveled (also known as "*ponchi*") or chisel; (vi) one sided handpicks (*sokomoko*); and (vii) buckets are added. Those who have introduced mechanical equipment have compressors, jackhammers (with no jacklegs) and all use explosives and electric detonators. The initiation of the explosives charge is in most areas being done by using a bicycle dynamo or car batteries.

Mine ventilation (gold)

Whereas those with deep pits face ventilation problems, those mining in shallow pits still utilize natural ventilation. Without enough air circulating at the working face, there are increased concentrations of gases, dust and heat. As a result, some pits have been abandoned in areas like Mgusu where pits have reached depths of up to 220m. With no control in the orientation, size and length of underground excavations, some roadways accidentally go through neighbouring pits thus allowing circulation of air through natural ventilation. At Mgusu, miners contend that they have reached agreements between neighbouring pits to connect the two pits at certain intervals and thus allow continuous flow of air. However, lack of ventilation doors still limits the amount of air getting to

the face. With the increase in ventilation problems as mining go deeper, some miners, e.g., those at Mgusu, have designed and fabricated manually driven fans. The fan has six to eight blades of thin pieces of metal sheet welded on a 16"-19" long shaft. The driving mechanism utilizes a bicycle wheel and a rubber drive belt that connects the wheel to the shaft of the fan. A 25mm diameter PVC pipe is connected from the fan outlet down to the working face. Although the amount of air reaching the face was not established, but there were satisfactory working conditions. However, the majority of the pits still operate under very dangerous conditions.

It was also established that it is now common practice to use compressed air to ventilate under ground workings. At both Mgusu and Nyarugusu those operating deep pits use 25mm rubber hose pipes connected to the compressor and extended through connections with pieces of PVC pipes to supply air to the working face. According to miners, there is usually enough air at the working face. A similar procedure is used to remove exhaust fumes after blasting.

Mine support (gold)

Given the weak weathered ground especially on the top parts of the pits, most miners use timber cribs (*matimba*) to support weak areas of both the pits and working faces. The construction of the cribs which is done on surface before individual planks are lowered down, is impressive and up to standard. However, availability rather than quality dictate the choice of timber type and size. Organized operations at Nyarugusu buy timber through getting a permit from the forestry office in Geita which gives permission to cut certain sizes of trees from Rwangaza Forest reserve. At Mgusu, however, which is located in the middle of the Geita Forest Reserve, authorizations for cutting timber in the forest reserve could not be established. In less organized operations, e.g., in Ibondo, Nyarugusu where operations were still in a gold rush state, the pits were left without any supports due to a number of reasons. Firstly, the pits are regarded as being shallow although inspection indicates poor ground due to weathering. Secondly, the high costs of timber (1 piece costs about USD 1.5 including transport) combined with the lack of appreciation of support significance, leave most pits unsupported.

Haulage and hoisting (gold)

In most mining areas, broken ore at the face is either moved by using shovels or loaded into sacks and moved manually by mine workers. The decision to change from moving rock materials by shovels to loading in sacks depends on the distance from the face to the shaft. However, in most sites the haulage distance is minimized by the fact that most excavations are kept in or around the ore zone. If the material is moved by shoveling to the shaft, it is then loaded into sacks and tied to a suspended rope. There are two ways of pulling the load to surface. The first is where a group of miners (*wavuta fero*) manually pull the rope and hoist the load to surface. The second approach utilizes a pole running across the pit mouth and supported on wooden plunks. The load-holding rope is attached to the pole that is then wound by using two spindles attached on each end to raise the load to surface. Two men, one on each side usually turn the spindles. This is the most popular method of hoisting. More innovative miners use pulleys over which the rope is run to ease the pulling. There is a combination of wooden and metallic pulleys. Whereas wooden pulleys are fabricated from hardwood, the metal ones are usually picked from junkyards.

The movement of workers up and down the pit is facilitated through the excavation of notches on either side of the pit walls. Working tools are dropped down the mine after giving a signal to make sure there is no one at the bottom of the shaft. At the end of the shift, they are put in a bucket or sack, tied to a rope and pulled to surface.

Water drainage (gold)

Problems associated with underground water were found to be common in all sites, (Mgusu, Nyarugusu and Mabuki) some of whose producers are still mining at shallow levels. While in some areas pits encounter water at a depth of 12-15m (e.g., Nyarugusu), other areas encounter water at very deep levels (e.g., Mgusu - >100m). In areas with shallow water tables, the lack of pumping facilities leads to abandonment of pits. Where pits are not abandoned, water is removed from the pits by using a bucket and a rope. A bucket is manually filled with water at the bottom of the pit and then hoisted to surface for disposal. Given the topography and the fact that some pits are located in abandoned quarries, the disposed-off water may find its way underground again.

At Mgusu, some entrepreneurs have brought in pumps operated from diesel engines that are hired by pit owners for mine drainage. Organize mineral right owners at Nyarugusu have their own pumps operated by diesel engines as shown in the photo below.

Processing equipment (gold)

The gold processing equipment used in most mining areas can be categorized as follows: In (i) Crushing and Grinding equipment used include hammers (4 kg), and hardwood mortar and half axle pestle, ball mills driven by an independent diesel engine or from a tractor, bus or any motor-vehicle; and (ii) Separation (Concentrate Recovery), steel pans, sluice boxes (with sacks as matting) and buckets are used. Amalgamation Retorts were reported as available in all sites, but their usage could hardly be established, despite evidence that Mgusu miners had been introduced to the technique by a programme organized by Metal Technic (through a consultant MTL Consultancy Co. Ltd), a Germany Company that produced the retorts, as Box 3.6 testifies.

Box 10: Retorts - unused technology

In 1997, a demonstration of the application of glass retorts produced by a German Company, Metal Technic, was carried out in the field and covered the mining sites at Mgusu in Geita, Matinje in Nzega and Maji Moto in Musoma. At all these sites a free glass retort was given to the proprietor after the demonstration. A follow-up on the use of these retorts that was carried out two years later at Mgusu established that although the proprietor claimed to have been using the retort, it had never been used (Consultations with MTL Consultancy Company Limited). Among the questions this raises is why did the miners not use it? Whether this was because the technology was inappropriate to their working practices or to what they consider their needs to be, and whether the company pressing for the technology and fully investigated the issue.

SECTION 6: Local Organizational Capacity

Capacity to express concerns about issues to different stakeholders and to demand and gain entitlements from Government depends on the ability of members of ASM communities to organize into interest groups, whether initiated from the grassroots or facilitated by Government or civil society. This study observed organizations of two kinds: MWAREMA (the Mwanza Region Miners Association) and other smaller community-based systems of association. Most of these forms of association have shortfalls and have not proved to be effective platforms where people involved in AS mining, irrespective of roles and positions of power and influence, could demand their entitlements from Government.

As described in Section 2.4.1, in a bid to organize small-scale miners, the Government in the 1990s directed and assisted the formation of Regional Miners Associations (REMA) in all Regions where small-scale mining was being carried out. The assistance from the Government was through awareness campaigns, which attracted miners in anticipation of assistance from the Government. On the Government's side, the REMAs were intended to give miners a voice through which they could organize themselves and lobby for support (financial, technical) from various stakeholders. This difference in expectations between miners and the Government contributed to a decline in these associations.

Although Government recognizes REMAs as the only miners' bodies that have official mandate to represent miners in the country, the nature of their formation in Mwanza Region means in practice that they are non-representative of the majority of people engaged in ASM.

The lack of representation of MWAREMA in the mining community is reflected by the study's findings whereby according to the household survey 90 percent of all people employed in mining in each village did not associate themselves with membership of any association or cooperative. People understand this situation as seriously constraining especially when they want to make claims related to ownership and benefiting rightfully from the fruits of their labour. While it is true that MWAREMA facilitates some miners to make demands and be on the receiving end of information and project initiatives, as evidenced in Nyarugusu, they are usually the well-organised claim-holders/small-scale miners. Furthermore, it cannot be assumed that information given to them 'trickles down' to employees or to other miners working in the vicinity. There is a gender aspect as well, with MWAREMA being entirely dominated by men and the very few women with voice being the ones with claims.

Among the three villages, MWAREMA is most recognised in Nyarugusu. This is not surprising; MWAREMA came at a time when people wanted claims in the village and it was reasonable to be members and stay members. In fact, according to the Associations Secretary General, Miners of Nyarugusu are given credit for spearheading the formation of MWAREMA when these Associations were being formed. Four of the Regional Body's top positions are held by Nyarugusu residents. But even as the institutional analysis in Nyarugusu revealed, MWAREMA's ear is primarily for claim holders, some of whom have done well through membership of the organisation, while there are hundreds of other participants in the field. This situation has however perpetuated the stark inequalities in term of benefiting from mining between these people and the wider mining populace as had been discussed above. In Mgusu, MWAREMA is hardly recognised because the vast majority of people are untitled miners.

This is contrary to Mabuki's experience since the government came in too late and therefore miners have been operating illegally for a long time. Miners in Mabuki for a long time associated

MWAREMA with gold mining because MWAREMA itself did not recognise them since none of them had (until July 2004) had a mineral right despite working in the area since the mid 1980s. Only recently they claim with a visit by the MWAREMA General Secretary they were told that they did not deserve to be represented by MWAREMA until they fulfilled MWAREMA's prerequisite of becoming Claim holders. What might have prompted this was a long standing conflict in Mabuki in relation to mining areas. In this conflict, the artisanal miners were told to shift from the area they were producing to another one to give way to small scale miners allocated arbitrarily by the Zonal office. The miners wanted to be heard. Hence, it was claimed, was the beginning of the formation of the 13 groups of miners in Mabuki – "to facilitate the miners to get claim titles" (Mabuki, 22.06.04).

In addition to these institutional constraints generated by policy, AS miners also find fault with the administration of the Resident Mines office, complaining of inefficiency when service takes time to reach them, capitalizing on the AS miners dependence on decisions and actions from Government. Mgusu miners in particular were concerned over the way in which the Resident Mines Office treats them in cases of dispute. A miner in one focus group discussion complained that,

The Resident Mines officers of (Geita) has not helped us very much, but use their positions for individual benefits and bribes. For example, in incidences of conflict between miners eg when the tunnels dug by two teams collide, the company's officials come to arbitrate and usually place a red flag indicating that the pits are closed. But when you got to the mining area later you find that if one of the teams offers a bribe (*kitu kidogo*) they become permitted to continue operating. When you go to complain, the mining officers tend to support the company's decision (Mgusu FGD with Village Reps 19.06.2004).

The Mgusu community has tried to capitalise on other platforms to gain entitlements in their own ways. For example, although it is said that they are illegally settled their history in the area is full of contacts with individuals who have been either top government officials or political commissars seeking electoral support. These authorities have enabled the community to have a CCM branch office; a government primary school serviced by the District government, monthly MCH services and, the District government has facilitated their access to permanent social service infrastructure. Hence despite their complicated status of residence inside Geita Forest reserve, the people have continued pursuing their livelihoods and therefore ward off poverty to some extent.

People's demand for a platform and space where they could make claims has led them to form local organizations to support themselves. District Authorities and NGOS deserve credit for injecting the stimuli to organize, as was evident in the formation of Mabuki and Mgusu's SACCOS, yet occasionally there were organs created by local people themselves to press for common demands.

Some miners have started to form specialized associations or groups, having realised that they do not enjoy the sympathy of MWAREMA. Many of these groups were formed in order to demand the rights of their existence or to be heard, especially when they have a grievance. According to one group, one of the reasons why they formed a group separate from MWAREMA was because they realised that the latter could not stand for their rights, even if they were periodically given information on issues relevant to the industry. Mabuki's *Chama cha Wachimbaji Wadogo Wadogo* formed in 2002 is a good example.

Mgusu miners have their interests represented by a special sub-committee integrated with the Village Government that represents the interest of artisanal miners in the area. By its name, this sub-committee, *Kamati inayosimamia haki za wachimbaji wadogo wadogo*, (lit: Committee that is responsible for the rights of artisanal miners) is responsible to coordinate and facilitate the

demands of Mgusu's majority – particularly against Chipaka Gold Mine company on whose least almost all of the miners work.

Umoja wa Wenye Mialo (Kangeme area - Nyarugusu) was formed in the early 2000s as an association of owners of sluice boxes located in the Kangeme area. In 2003, when the District Commissioner Village Government closed down processing operations in Nyarugusu because of environmental pollution especially of public (open) wells for domestic use, this association pressed for their opening through complaints submitted to the Geita Resident Mining Engineer's office. The DC eventually allowed processing operations to continue.

There are also a few Savings and Credit Cooperative Societies (SACCOS) whose members' objectives are multi-fold, but primarily driven by the need to be secure economically. None of these SACCOS are however formed by miners, but are based on other activities – including water vendors, maize traders and another based on clan-ties. Women also organize themselves into *Upatu* groups which they use to save and exchange small amounts of money.

The motive to organise is also because of the need to create a common force to fight discrimination. This aspect was voiced by women miners (stone crushers) in Mgusu who contend that they feel doubly exploited by being engaged in one of the lower level activities in the mining hierarchy and at the same time being exploited by male miners. According to them, many of the male miners who give them on '*tenda*' loads of stones to crush have the habit of not paying them after the work is completed. They thus feel that their motive to organize is driven by the need to fight against such forms of abuse, as well as having enough income to feed their children. Tuleane A's case captured in Box 7 (above) illustrates this.

With nearly 600,000 miners spread all over Tanzania and only 20 mining offices responsible for administration of both large and small-scale mining across the country, the administrative effectiveness capacity of existing mining officers to handle the demands from the ASM sector is difficult. This is compounded by the fact that responsibility over AS miners is divorced from other district-level responsibilities within planning due to the centralised administration of the mining sector. In effect, this enables district level officials to say that a particular issue that concerns a mining community is outside their area of jurisdiction – be it health care, environment, community development, or enterprise development.

Apart from having a small network of offices to cover the whole country, the capacity in terms of qualified personnel and financial resources and equipment are limited. For example, a busy office like Geita which looks after all mining activities in the Districts of Geita and Biharamulo has two mining engineers and three technicians. Geita can be regarded as being well equipped in terms of manpower as other resident offices have only one engineer/geologist and a couple of technicians. As such, the ability to provide extension services from the central office is almost impossible. Similarly, the ability to closely monitor the activities and hence be able to administer the law effectively is not practical. As a result, the simplified ASM mineral rights acquisition procedures provided by the mining legislation have not been effective in formalization of the activities due to processing delays. Miners have to travel hundreds of kilometres to make an application to the nearest mining office and then wait more than six months before a licence is issued. However, it should be mentioned that ASM applicants are usually allowed to operate after the mineral rights application have been processed at the local office. The long waiting period for mineral rights acquisition coupled with the inability of the local mines office to cover their areas of jurisdiction effectively, is however a disincentive for formalization.

In addition to these administrative hurdles, it has not been the system by mining offices to consult AS miners – when they make an administrative decision at headquarters. There is thus a high

percentage of the mining community not likely to gain ownership of mineral rights because of insufficient consultation procedures. As Mabuki residents explained, the allocation of plots – despite Government’s well-intentioned move to ‘legalise’ miners is often done without prior consultations – ending up with favouritism being rife and unnecessary insecurity and/or conflict created among the miners due to misinformation.

SECTION 7: Poverty & Vulnerability in Mining Communities

Key questions asked in this study were: does ASM contribute to livelihood security or does it make people more insecure? And, what contribution does ASM make to poverty reduction. In order to consider these questions we need to explore character and extent of poverty and vulnerability in the three communities, and the role played by AS mining in adding to or reducing poverty and vulnerability.

7.1 Poverty levels in the ASM communities

As a starting point it was necessary to examine poverty levels in the study sites.

The 2001 Household Budget Survey (HBS) states these poverty lines in terms of Tz shillings required each 28 days per adult equivalent in the household. The amount of money required to feed young children is less than adults and we have followed the HBS in adjusting income and expenditure for the age structure and gender of the household. We have brought these poverty lines up to date using the consumer price index. This gives a food insecurity poverty line (Poor 2) of 5702 TzSh and a basic needs poverty line of 7811 TzSh per 28 days (Poor 3).

Unlike the Household Budget Survey (URT, 2002), it was not possible to draw on carefully maintained diaries of household expenditure owing to the timeframe of the research. The discussion is thus based on information on sources of income, own food production and typical weekly expenditure. The weaknesses in using expenditure recall data are well known as are the incentives for respondents to understate incomes. However, perhaps because very few respondents earn salaries and income tax is not a realistic threat; nearly 2/3 of households reported incomes above expenditures. Cash savings in this mining area are rare – only 7.5% of households have a bank account – and so incomes give a fair picture of expenditure. For those with reported income below expenditure we make the assumption that their income was equal to the reported expenditure. Using this data we calculate that approximately 25% of households live below the food insecurity level and 35% below the basic needs level.

Describing themselves according to local characteristics of wealth and poverty, the qualitative wealth ranking exercises led participants to estimate that about 60% in each community could be classified as poor. There were many similarities in the characteristics of who was poor across the three communities as outlined in Table 20.

Table 20: Characteristics of wealth and poverty in the three study communities (qualitative data)*

Economic status	Village		
	Nyarugusu	Mgusu	Mabuki
High	<ul style="list-style-type: none"> -The few successful Claim holders earning high profits (estimates=3) - Owning 20 acres of shamba and above -Big business people (transporters, big shops, bars) 	<ul style="list-style-type: none"> -Claim holder(s) -Mineral dealers -Business people 	<ul style="list-style-type: none"> -Livestock keepers with more than 50 heads of cattle -Land ownership of 30 acres or above -Business people owning big shops -Pit owners
Middle	<ul style="list-style-type: none"> -Middle class Claim holders -Makota (creative people without adequate capital but with the knack of business deals and can be loaned money) 	<ul style="list-style-type: none"> -Able-bodied persons who can work as Waponchaji, Wachimbaji who can earn at least enough money for their living 	<ul style="list-style-type: none"> Livestock of 10-20 cattle -10-15 acres -Livestock traders -Small business people
Low (poor households)	<ul style="list-style-type: none"> -Labourers – miners (wachoji), stone crushers, -The elderly -do not own or have small size of major economic assets 	<ul style="list-style-type: none"> -The elderly -Ore crushers (women) 	<ul style="list-style-type: none"> -very small (0.5 acre) or no land -very little or no cattle -daily paid labourers in mining and farming (esp. newcomers)

*Based on focus group discussions

As Table 20 illustrates, there is significant variation in the local characteristics of poverty across the communities. Yet in all communities poverty was directly related to the lack of money to sustain one's basic needs, and especially food security. In Mabuki, one's 'immigrant' status also featured as an indicator of poverty because of difficulties for incomers obtaining land on which to grow food.

The household survey built on the characteristics identified in Table 20 by asking various questions related to respondents perceived well-being. The one we draw on to define a further poverty line (poor 4) is whether the "household has experienced food shortage over the past year". As 2004 was a very dry year and nearly 2/3 of the sample grow at least some of their own food, it is not surprising to find that 65% of all households are defined as poor using this measure. There is a close relationship between the three poverty measures (Poor 2, 3, 4). All of those who have insufficient income for food security are basic needs poor. Almost 80% of those who describe themselves as having experienced food shortage during the past year are also basic needs poor.³¹

³¹ Asset ownership is another established means of identifying poor households. In the case of mining communities, the materials used to construct a house (mud, wood and thatch or bricks and tin sheets) may not indicate wealth as miners in areas with insecure access to minerals, such as those in Mgusu, typically do not build modern houses with good facilities even if they are relatively wealthy. In fact, people's expectation of eviction did not encourage them to construct solid or permanent housing or accumulate valuable household assets. The type of housing therefore could not be given as a criterion for wealth or poverty status in this community as is common in standard measurements. An investigation of whether other assets such as radio or bicycle ownership could be used to stratify communities illustrated that these too could not be taken as reliable criteria. Radios are widely owned and those who do not have them may either be very poor or simply may use portable stereo systems or TVs instead. Due to cultural factors, bicycles are considered a basic need

It is important to note that when local people talk about “food” in the context of food shortage, it does not necessarily mean that they literally have no food to eat but that they were not able to eat what they consider to be their normal diet. In Nyarugusu and Mgusu, the gold mining sites, in times of food shortage people said they might shift from staples such as rice or maize to sweet potatoes which are also a staple, but they are not so weather dependent and can be bought very cheaply in the local markets. It is likely they also cut down on or change the types of food used for relish. In people’s own expressions, the experience of food insecurity is dependent on a range of factors, as explained by a Nyarugusu resident illustrated in Box 11 below:

Box 11: Food shortage in Nyarugusu

“When you want to talk of food shortage in Nyarugusu you have to take into account the fact that there is a huge amount of differences in household economic status. [Firstly] the number of households that depend on farming are large, but there are some households that depend entirely on mining. For those farming households, there are those that have large farms, many acres and can get enough maize and grains – some can sell some of it and have enough left for food. There are also those households whose budgeting is not so good, when they get grains they sell most of it and they may suffer from food shortage themselves. But then of the farming households, those who suffer from chronic food shortage are those with very few acres – most of these are newcomers. Many newcomers do not even have areas of farming land although they do rent. There are a few households who are lazy to hold a *jembe*.

The second criterion that determines food security is having cash, in most cases money actually comes from mining and business. For those who dig and get gold they can have cash to buy food. Most of the women do small business and they also participate in those small activities related to gold processing. Women in particular sell green vegetables and snacks. Single women [who do not have enough capital] do petty business and since by getting a low income find it difficult to invest so most of their profit is used for food.

In both Nyarugusu and Mgusu, food shortage is strongly associated with lack of cash to buy food, rather than being directly due to inadequate agricultural productivity at household level (due for instance to a poor harvest) (although this may be the case for those households that are primarily dependent on farming in Nyarugusu). In Mabuki, the diamond mining site, where a higher proportion of households are dependent on farming for household consumption needs, food shortage is more clearly linked to people’s capacity to get a good agricultural harvest, due to the rains and their access to technology. Interestingly this is an area in which IFAD have introduced an irrigation project and new crops: when food is short people may well increase their intake of food such as mung beans (*dengu*) that have been introduced by the project and which are not considered so desirable for consumption. The reliance of people on money to purchase food is a significant finding if one considers that they are living in a rural area in Tanzania where one might expect there to be a much closer dependence on the agricultural harvest for household food needs.

Through qualitative information gathering, the study also elicited information on people’s experiences of poverty and the connections they made between mining and their capacity to get on in life and not to be poor. Entering the AS mining sector was taken as one of people’s strategies not to be poor. A widespread impression was that people migrate to mining areas in search of new opportunities and a way of escaping poverty. Indeed the flexibility with which people can enter into or leave mining activities or communities – particularly artisanal mining and processing – has served as an important avenue in people’s pursuit of a life – especially after failing in other areas. Many of the miners explained that their entry into mining was originally driven by *‘utafutaji’* (lit:

item in some areas and more of a luxury in others, which makes them a weak measure of poverty status across the whole sample.

seeking) a livelihood. The term '*Mchoji*' (lit. seeker or hunter) or *mtafutaji* (lit. one who seeks for...hunts for) are common in Nyarugusu and is used to refer to *all those who come to the area, take a pick and shovel and start digging for gold*.

This opportunity has enabled even those who have been branded as social outcasts – people with criminal records, the destitute, orphans and widows to enter the business and make a life. One interviewee mentioned that ASM communities also accommodate women who have been driven out of their homes because of witchcraft accusations. Another commented that:

“Hapa ukifika mtu hakuulizi kitu, mradi unajiandikisha kwa Balozi ulikofikia kuwa umefuata shughuli za uchimbaji na unaendelea kushiriki masuala ya kijiji kama mwana kijiji” (lit: Here when you arrive nobody asks you anything, as long as you register yourself with the Ten Cell Leader where you are, say you have come for the mining activities, and participate in village affairs as a villager - Mabuki, 22.06.04).

What was important was that mining was seen as a sure path to wealth creation and accumulation. Even for the more settled households in Mabuki, mining was and has been practiced for purposes of getting a good income to purchase cattle, assets of the highest value in that area. In the words of a miner in Mabuki, “mining is a ladder that sends people to wealth” (Mabuki 22.06.04): in interpreting this we should be aware that although all people may hope for wealth, only some achieve it. In this respect AS mining is experienced as unpredictable.

The saying, “*uchimbaji mdogomdogo ni kama bahati nasibu tu*” (lit: ASM is like a lottery) is common among miners. This sense of unpredictability was found to be even worse in diamond than in gold mining. Some miners said that they sometimes complete six months without striking mineral bearing ore, and therefore have had no income from mining. The miners can thus invest or commit their time and money to a venture and end up not getting anything. This lottery is however largely individual, rather than collective, although it may severely affect those categories of miners in the lower levels of work hierarchy. A threat from outside, which may threaten everyone’s mining activities can be devastating but is viewed in a different way from the sense of chance that people associated with getting lucky with gold or diamonds.

Although in cultural terms the sense of chance is very pervasive within the mining communities, with people using charms and making offerings in order to get lucky, mining engineers attribute this unpredictability to limited knowledge of the geological layout of mineral deposits both within their work areas and elsewhere to allow appropriate investment in time and resources. What exists is some general knowledge of the existence of minerals within a particular area, although ex-employees of mine works can also act as pointers in detecting mineral-bearing rock or soil conditions that indicate the presence of minerals, as was witnessed in all study areas.

7.1.1 What makes some households more likely to be poor than others? Evidence from the household survey

We can use a statistical technique called Probit analysis to investigate which variables (factors) are associated with a household being below or above each poverty line, see Table 21. Starting with the largest group, those who say they have experienced food shortage in the last year are significantly more likely to have been living in Mabuki³², to have lost a family member or food aid during the last year, to be directly involved in mining and to have a high dependency ratio (children to working adults and elderly to working adults). These results are as expected.

³² The coefficient on Mgusu or Nyarugusu shows the effect of being in these areas rather than in Mabuki.

More surprising perhaps is that being a recent migrant (making it difficult to grow your own food) is no disadvantage. In fact, having to rely heavily on mining income rather than agriculture during a very dry period is actually a (small) advantage. The role of ASM as a cause of vulnerability (through ill health, for example) is well documented, as detailed below, but our research shows that in some circumstances it can also reduce vulnerability.

Table 21: Probit Analysis of Poverty Status

Dependent variable	Poor4 (Food shortage own definition)	Poor3 (Basic needs income)	Poor2 (Food insecure income)
	Coefficient	Coefficient	Coefficient
CONSTANT	0.781**	-0.554**	-0.631**
MGUSU or NYARANGUSU	-0.793 **		
MGUSU		-0.717**	-0.935**
RECENT MIGRANT	-0.509		
LOSS OF REMITANCES	0.643		1.321**
LOSS OF FAMILY MEMBER	0.496 *		
LOSS OF FOOD AID	1.083 *		0.458
COMBINED IMPACT OF ABOVE		0.505**	
SERIOUS ILLNESS IN FAMILY	0.170		
MINING IN PIT	0.421**	-0.349*	-0.627**
OTHER MINING ACTIVITIES			-0.230
PROVIDES SERVICES FOR MINING	-0.429	-0.827**	-0.355
PIT OWNER		-0.257	
CLAIM HOLDER		-0.436	
PIT OWNER OR CLAIM HOLDER			-0.551*
DEPENDENCY RATIO	0.162*	0.223**	0.153**
NO ONE IN FAMILY WITH 4+ YEARS EDUCATION	0.365	0.408*	0.142
FEMALE HEADED HOUSEHOLD	0.165	0.426*	0.243
GROWS OWN FOOD	-0.292	-0.055	0.047
ASM AS % OF ALL OCCUPATIONS	-0.353		
MEMBER OF SACCO/CHAMA		0.306	0.237
MEMBER OF MWARENA		-0.444	-0.565
Notes: * "t" statistic significant at 10% level ** "t" statistic significant at 5% level Sample = 291 households (observations)			

Other variables that are interesting for their lack of impact are being claim holders (as many are inactive claims and therefore bring no economic benefit) and being members of local credit/support organisations (as virtually no one is in this category). These variables had so little impact they were dropped from the regression.

Turning to the next largest group, households were more likely to have expenditure below that needed to meet their basic needs if they lived outside Mgusu. Losing remittances, food aid or a family member in the past year increases the likelihood of basic needs poverty as does having no one in the household with more than 3 years of schooling (and hence functional literacy). Female headed households are also more likely to be in this category but not the other types of poverty (we discuss why later on). A high dependency ratio is associated with poverty as it makes it difficult for the small number of working members of the household to earn sufficient income or grow sufficient food to support the remainder of those who cannot work.

Certain factors make it less likely that a household will be basic needs poor. Those respondents who worked in a mining pit or provided services for mining were significantly less likely to have households in poverty than respondents with other occupations in the three sample sites. Those households experiencing the most extreme poverty (as indicated by insufficient income or expenditure to meet food security needs) were also most likely to be living outside Mgusu. To illustrate just how much difference this location makes we can estimate how many households would be in extreme poverty if all other factors apart from location remained constant. If all miners relocated from Mgusu to the other sample sites the level of extreme poverty would rise from 24% of households to 40%³³. Although we should take into account vulnerability, (which shows that multiple shocks are experienced by households in Mgusu) as discussed below, this is a good reason why migrants are willing to take the risks of mining in Mgusu and living illegally in a protected area with very crude housing and sanitation. It also illustrates the significant welfare gains that the Government would achieve if it can address the social and environmental problems associated with settlements in protected areas – providing the water supply, for example, to allow miners to live away from the river in the Forest Reserve.

Unlike basic needs poverty, loss of remittances rather than loss of food aid or a family member tends to push households into extreme poverty. Those mining in a pit (rather than providing services) are less likely to be in this type of poverty and, unlike the other categories of poverty, being a claim holder or pit owner makes it significantly less likely that you will have such low income so as to be food insecure. This is confirmed by the qualitative research where it was noted that those with access to social and financial capital required to own a pit or hold a claim (even if inactive) tend to avoid slipping into extreme poverty. While a high dependency ratio (found, for example, when children are abandoned or elderly residents have no children nearby) is strongly associated with being in extreme (as in other categories of) poverty, female headed households are not more likely to be in this severe poverty. Our qualitative research suggests that women heading these households typically undertake a myriad of petty occupations (such as cooking for miners or collecting wild foods). Taking jobs that men cannot or will not do, as well as reliance on prostitution in some cases, helps female headed households stay above extreme food insecurity but does not enable them to escape basic needs poverty.

³³ Projected using coefficients and sample means for each variable and reducing the mean proportion living in Mgusu from 0.2 to 0.

7.2 Vulnerability in the ASM communities

To fully understand whether AS mining can help people seek a livelihood that prevents or reduces poverty it is necessary to examine the relationship between mining and vulnerability because this can move us from a static view of people's current poverty/wealth status to a more dynamic picture of the risks people are subject to and their capacity or otherwise to overcome these risks, thus preventing or mitigating negative impacts into the future. In this section we examine shocks as sources of vulnerability by analysing information on household's experience of various shocks in recent years. Specifically we aim to: i) investigating the relative importance of various shock among households in ASM villages through factor analysis; ii) measure the association between shocks and various socio-economic characteristics of households including mining activities, using cross-tabulation; and, iii) determine empirically who is likely to be affected by shocks through estimating using a Probit model.

From the survey, various types of shocks were reported by households in the three villages (Table 22). These results indicate while some shocks are localized others are widespread and common to all villages. Analysis suggests association between incidence of shocks and location (statistically significant).

Table 22: Household experience of shocks by (percentage in a) village

Shock	Nyarugusu	Mabuki	Mgusu	Significance
Food shortage	59.7	81.3	54.8	**
Low price	26.6	5.2	51.8	**
Member of household sick	46.5	30.6	46.8	*
Involved in conflict	7.5	1.2	21.0	*
Injury to member of household	8.8	0.0	4.8	*
Mine related health problem to household member	13.8	3.8	25.8	**
Eviction threat	1.3	5.9	16.1	**
Legal problem	1.3	1.2	30.6	**
Theft	11.3	2.4	24.2	**
Fire accident	4.4	0.0	11.3	*
Failure to recover money lent to others	9.4	10.6	27.4	**
Loan repayment problem	7.5	3.5	7.8	*
Draught	0.01	4.7	0.01	**

* Chi-square significant at 10% level

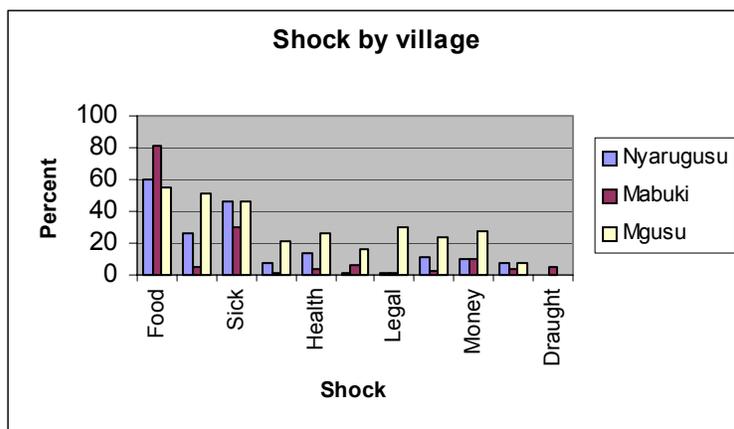
** Chi-square significant at 5% level

(shocks reported as experienced within the last year)

Two highly significant sources of risk, which households had experienced as shocks within the last year, were food shortage and serious sickness of a household member. This sickness could include HIV/AIDS but also other illness. Other risks were more specific to gold mining, with low price for produce and mine-related health problem being notable. Here we should be slightly wary of the data though, because there is ample evidence to suggest that miners receive a poor price for diamonds in Mabuki. They may, however, be less aware of it than gold miners are regarding the price of gold ore.

In the data presented in Table 22, which is demonstrated visually in Figure 4, the high level of shocks that households have experienced in Mgusu within the last year are striking, when compared to the other two villages. Low price of gold, mine related health problem (e.g. chest pain from inhaling dust in the mine), conflict, threat of eviction, legal problem, theft, fire accident, and failure to recover money lent to others are all shocks experienced in the recent past at a significantly higher rate than in Mabuki or Nyarugusu. This does not come as a surprise given the nature of Mgusu settlement; however it does underline how vulnerable people are who live in the area, even though poverty levels are less than in the other two settlements. Drought was not an issue of concern, except in Mabuki where agriculture is prominent. This is consistent with the argument that suggests that food shortage is more related to lack of money, particularly in the gold mining communities.

Figure 4: Shock by village



About 19 types of shock – as categorised in the design of the questionnaire - were reported by households in the 3 villages. In order to have a more focused discussion, it is important to narrow down these shocks into few important ones. Factor analysis is a method used to reduce the number of variables to a smaller number of underlying dimensions. In addition to reducing the number of variables, factor analysis is capable of identifying highly covariant shock; that is shocks occurring together. The impact of a shock is greater if the affected household is simultaneously hit by other shocks (Teslieu and Lindert, 2002). Factor analysis results are presented in Table 23.

Table 23: Factor analysis of households reported existence of various shocks during survey

Type of Shock	Factor							
	1	2	3	4	5	6	7	8
Food shortage	0.427	0.487	-0.015	0.107	-0.094	-0.133	0.196	0.040
Financial problem	0.306	0.496	-0.131	0.014	-0.257	-0.086	0.078	-0.029
Low price	0.406	0.053	-0.116	0.034	-0.007	-0.114	-0.082	0.084
Sickness	0.307	0.275	0.018	0.053	0.032	0.108	-0.093	-0.185
AIDS	0.043	0.254	0.172	0.017	0.110	0.004	-0.133	0.027
Death	0.039	0.373	0.544	-0.287	0.320	0.256	0.013	0.067
Injury	0.287	0.072	-0.445	0.060	0.482	-0.167	-0.186	-0.007
Conflict	0.379	-0.119	0.097	0.165	0.056	0.066	0.069	-0.074
Health problem	0.340	-0.063	-0.117	0.056	0.167	0.083	0.079	0.122
Land eviction threat	0.414	-0.144	0.095	-0.260	-0.071	-0.057	-0.043	-0.059
Legal problem	0.647	-0.309	0.169	-0.466	-0.108	-0.168	-0.047	-0.092
Theft	0.296	-0.119	-0.123	-0.087	0.157	0.084	0.004	0.140
Fire accident	0.327	-0.121	0.161	0.176	-0.199	0.007	-0.080	0.402
Money loss	0.265	0.020	-0.318	-0.020	-0.262	0.533	-0.170	-0.064
Loan default	0.166	-0.112	-0.187	-0.070	0.173	0.204	0.200	0.015
Food aid loss	0.130	-0.134	-0.108	-0.031	0.050	0.062	0.411	-0.031
Remittance loss	0.201	0.041	0.051	0.102	-0.011	-0.128	-0.023	-0.107
Quit mining	0.376	-0.253	0.385	0.554	0.079	0.062	-0.012	-0.143
Draught	-0.086	-0.070	-0.008	-0.005	-0.036	-0.061	-0.003	-0.051

Results suggest a number of issues. First, most households are hit by multiple shocks, as indicated by many significant shocks corresponding with factor 1 (rule of thumb: factor load is significant if >0.3). Second, important shocks are food shortage, low mineral price, sickness, health problem, conflict, land eviction threat and legal problem (all in factor 1). Third, grouping of shocks is not very distinct although in factor 1, eviction threat, legal problem and conflict seems to happen together with food shortage, low mineral price, sickness and health problem. Lack of a clear distinction between shocks suggests that households are exposed to multiple risks and vulnerable to these risks (as shown by many shocks that are statistically significant under factor 1). For instance, food shortage could be associated with low mineral price, health problem of a household member, etc.

The next step of our analysis is to investigate who is likely to be affected by a shock. Cross-tabulation and Chi-square statistical test results are reported in Table 24. Results suggest our previous estimated poverty lines (food and basic needs) are closely associated with most of the shocks. For instance, while poor households have higher incidence of food shortage, non-poor households are more likely to report low mineral price and legal and crime related incidences such as theft, eviction threat and conflict (Figure 5). Similar shocks are reported by claim holder and pit owners, the better off segment of the society. Shocks with highest factor loads (in factor analysis) have more significant Chi-statistics (cf. lost remittance).

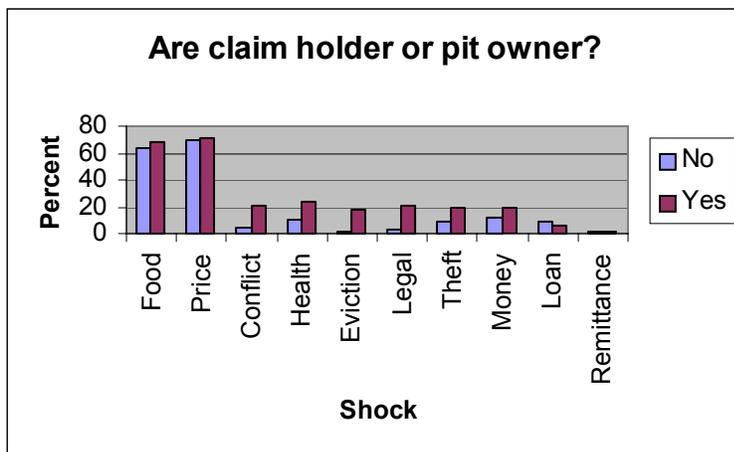
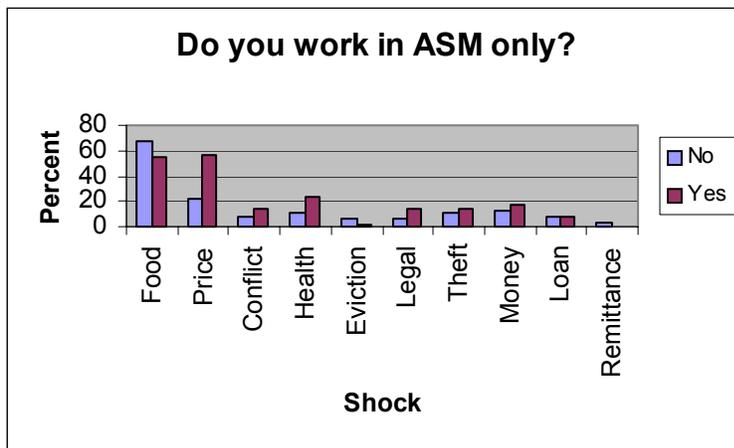
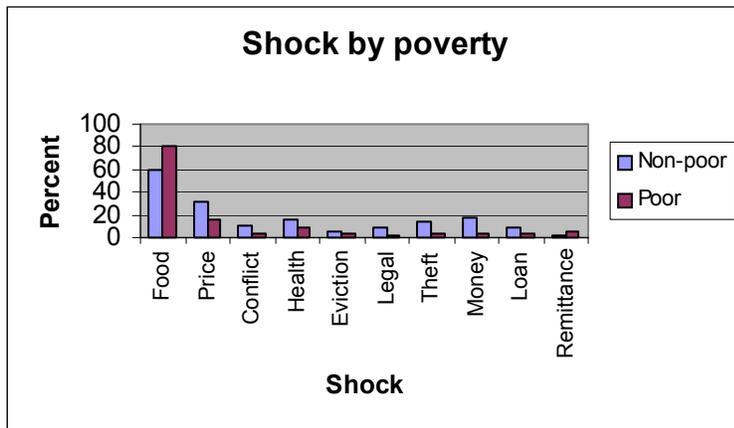
Table 24: Association between Reported incidences of Shocks (%) and Socio-economic Characteristic (percentage within socio-economic characteristic)

		Food shortage	Low price	Conflict	Health problem	Eviction threat	Legal problem	Theft	Money loss	Loan repayment problem	Lost Remittance
Food Poverty	Non-poor	59.3	31.2	10.4	15.2	6.1	9.1	14.6	16.9	9.1	1.3
	Poor	81.3	16.0	2.7	8.0	4.0	1.3	2.7	2.7	4.0	5.3
	Sig.	**	*	*			*	*	**		*
Basic Needs Poverty	Non-poor	56.8	32.7	10.6	15.1	6.5	8.5	14.1	17.6	9.5	1.5
	Poor	79.4	17.8	4.7	10.3	3.7	4.7	6.5	5.6	4.7	3.7
	Sig.	**	**					*	**		
Female headed HH	No	63.6	29.7	8.9	14.9	5.9	7.8	11.5	14.1	7.1	2.2
	Yes	73.0	10.8	5.4	7.2	2.7	2.7	10.8	8.1	13.5	2.7
	Sig.		*		*						
Migrant	No	60.6	31.5	10.8	14.1	5.2	8.5	14.1	14.1	8.9	1.9
	Yes	74.2	18.3	2.3	11.8	6.5	4.5	5.4	11.8	5.4	3.2
	Sig.	*	*	*				*			
Only Work in ASM	No	66.7	22.1	7.4	11.6	6.2	5.8	10.9	12.8	7.8	2.7
	Yes	54.2	56.3	14.6	22.9	2.1	14.6	14.6	16.7	8.3	0.0
	Sig.		**		*		*				
Mine Related Work	No	63.8	19.9	8.1	10.0	6.8	8.1	10.4	12.2	5.9	2.7
	Yes	67.1	47.1	9.4	22.4	2.4	4.7	14.1	13.4	12.9	1.2
	Sig.		**		**					*	
Claim or pit owner	No	63.5	69.5	4.7	10.3	1.7	3.0	9.0	11.6	8.6	1.3
	Yes	68.5	71.2	20.5	23.3	17.8	20.5	19.2	19.2	5.5	1.4
	Sig.			**	*	**	**	*			

* Chi-square significant at 10% level

** Chi-square significant at 5% level

Figure 5: Shocks by poverty and ASM activities



Probit analysis quantifies the probability or likelihood to report an incident among households with various socio-economic characteristics (Table 25 and Table 26 shows estimation of the same models estimated in Table 27, but with inclusion of food poverty as one of the explanatory variables. (Since food poverty is endogenously determined, its inclusion as explanatory variable

would lead to biased estimates. However, estimation without and with food poverty variable do not exhibit much difference in results). For instance, living in Mgusu, increases the likelihood of reporting all shocks (positive sign) except food shortage. Households below food poverty line are more likely to report food shortage but less likely to experience theft than non-food poor, perhaps for the reason that they have less assets to steal. In this respect, even the better off segments of the society are vulnerable to some shocks such as theft, although this is hardly surprising.

Table 25: Probit model results - Likelihood of Reporting Shocks Incidence by Household Characteristics

	Food	Price	Conflict	Health	Legal	Theft
Intercept	0.402	-1.409**	-2.025**	-2.116**	-0.403**	-2.083**
Nyarugusu	-0.737**	1.122**	1.158**	1.029**	0.449**	0.909**
Mgusu	-0.723**	1.162**	1.192**	0.994**	2.113**	1.272**
Claim/pit owner	0.120	0.135	0.927**	0.677**	0.689	0.514*
Migrant	0.091	0.040	-0.344	0.319	0.318	0.265
Dependency ratio	0.116	-0.143	-0.235	-0.283**	-0.007	-0.009
Female head-household	0.088	-0.625**	-0.122	-0.984*	-0.205	-0.005
ASM dependency ratio	-0.183	0.974**	-0.058	0.387	-0.567	-0.209
Death	0.308	0.021	0.388	-0.067	0.264	-0.068
Draught	2.167	-0.875	0.107	-0.894	-0.814	1.419*
Education	0.297	-0.285	-0.671	0.259	-0.546	0.038
Sick	0.39952**					

* t-value significant at 10% level

** t-value significant at 5% level

Sample = 291 households

Table 26: Probit model results: Likelihood of Reporting Shocks Incidence by Household Characteristics (food poverty included as an explanatory variable)

	Food	Price	Conflict	Health	Legal	Theft
Intercept	0.312	-1.367**	-0.181**	-2.087**	-2.131**	-1.911**
Nyarugusu	-0.735**	1.106**	0.969**	1.013**	0.385	0.795*
Mgusu	-0.649**	1.125**	1.021**	0.969**	1.834**	1.099**
Claim/pit owner	0.133	0.126	0.856	0.672*	0.602*	0.500*
Migrant	0.091	0.415	-0.287	0.319	0.256	-0.261
Dependency ratio	0.104	-0.138	-0.185	-0.266	0.006	0.009
Female head-household	-0.022	-0.610*	-0.099	-0.949	-0.169	0.071
ASM dependency ratio	-0.100	0.941**	-0.121	0.361	-0.538	-0.30
Death	0.324	0.027	0.349	-0.071	0.226	-0.047
Draught	1.973	-0.855	-0.002	-0.796	-1.120	1.165
Education	0.186	-0.238	-0.605	0.272	-1.446	0.187
Food poverty	0.575**	-0.206	-0.349	-0.149	-0.209	-0.665*
Sick	0.405**					

* t-value significant at 10% level

** t-value significant at 5% level

Sample = 291 households

Results support previous observations of the multidimensional nature of vulnerability to shocks among households in ASM villages. Emerging from the data is a complex picture in which vulnerability is linked to many different sources of risk and underlying factors. What is also evident is that there are differential impacts according to social category, with certain social groups subject to particular risks, which is highly significant when designing interventions to try to minimise vulnerability.

7.2.1 Underlying vulnerability associated with access to claims and information

The above data and discussion has highlighted a range of shocks that households have experienced within the recent past. What has not come to the fore in this data are underlying processes associate with mining, which contribute to the negative impact of these shocks experienced by mining households and individuals. Here we briefly discuss the way exclusion from mineral rights and information can contribute to vulnerability and the way this adds to labour exploitation vulnerability for people working within AS activities.

Time and again the Research Team found that conflict and difficulties associated with AS mining were linked to problems over security of access to minerals they are able to exploit. This was starkest in the case of Mgusu, although also apparent in Nyarugusu and Mabuki. From Government's perspective this is a simple issue concerning whether an individual does or doesn't own a mineral right. However, as discussed earlier in the report, because of the practice of sub-leasing and because people mine on land without having formally acquired a mineral right due to a complex set of historical circumstances (especially diamond mining in Mabuki), vulnerability is particularly manifest in terms of security and labour conditions for 'pit owners' and people working these pits, rooted in circumstances more complex than whether or not a person possesses a mineral right.

Miners' security of access to pits is challenged in many ways. Although both the policy and legislation accords the right to own mineral rights to all Tanzanian citizens, lack of awareness, the history of complicated licensing procedures, historical circumstances between Government, private companies and local people, plus inability to hold on to property (such as a mineral right) in the midst of the changing investment environment (albeit through voluntary sales), are in addition to a more obvious question concerning access to available land with exploitable mineral reserves, limit ownership of mineral rights to a relatively few individuals. As a result, a large number of those working in ASM communities are regarded as illegal operators, who are working pits but do not have any security of tenure, except verbally from a mineral rights owner if the land is already under a claim.

This situation has made it difficult for the system to give due recognition to those who are actually '*watenda kazi*' (lit: the workers), as the miners in Mgusu called themselves. This is felt by the people concerned to be a primary cause of vulnerability since it has subjected them to exploitation, low incomes and the risk of ill-health without the necessary protective mechanisms. In the view of some miners, the perpetuation of an exploitative hierarchy has allowed license holders who act as landlords to determine the manner of resource distribution and level of investment in the operation, however non satisfactory and exploitative, yet to be the ones who have a voice in front of the government. Complaints such as the following are all too common:

"I am blaming the Claim holders (*wenye klempu*), when you start digging the pit you are supposed to be supplied with tools, but they neither feed you nor provide any assistance whatsoever. They even don't know whether you are using your own tools or somebody else's tools [implying that you have hired them]. They are supposed to give you a torch but they don't give you one and yet he wants to take 3 of 4 shares without considering your position. If you protest you will be threatened by police when they don't realise that you are helping his own [the Claim holder's] family, he does not even think that you have a family also that depends on you and you have to serve them."

Among the issues that arise from this situation include: the claim area is turned into a series of haphazardly located pits that are detrimental to the miners' safety and the environment; the system is exploitative in that apart from paying for the licence, most claim holders invest nothing in the area but reap the highest benefits; and the division of earnings between the claim holder/pit owner and the miners is determined after deducting the operating costs, with usually no records of these costs.

But these miners' situation is usually on their own hands since they do not have the sympathy of the authorities, and not necessarily of the claim holder, adding another dimension to their risk. The welfare of miners is in their own hands as they are not regarded as employees but as people with a non-binding contract with the pit owner. For example, the claim holder may decide to lease a pit to another person with hard cash on short-term basis without the miners' consent. This is known as "selling a shift".

An additional issue that may contribute to vulnerability is the relationship between ASM operators and LS companies prospecting and acquiring titles in their areas. The new mining legislation in Tanzania accords ASM operators the right to renew, transfer and mortgage their mineral rights, and it is still early to assess whether the mortgaging of mineral rights by ASM operators through selling to LSM is advantageous or not. However while ASM operators are exercising rights under the law, what is evident is the lack of preparedness that ASM miners typically find themselves in when they encounter these transactions. They do not have appropriate negotiation skills or geological knowledge, and may not even be aware of what the transactions ultimately entail and may unfortunately resort to sell their areas because they are driven by short term needs for cash.

For example, miners in Nyarugusu have different opinions and are differentially prepared in dealing with the land issue raised at present by the activities of the East African Mines Company Ltd. The confident ones are those with active industries “I think it is not possible for it to happen that one is denied the rights to own the area and to give that right to someone else while even the title deeds themselves are from the same door [government]; I think that it is not possible for East African Mines to acquire/confiscate my area while they know that I have a title over these areas”. He went on to say: “If you have a plot and pits (migodi) it is like you possess an industry whereby you are creating employment opportunities for children and grand children, therefore if you sell them it is the same as selling employment opportunities for these children and grand children.”

But this differently viewed by another miner in the same village who said: “East African Mines do not force us to sell our claims but they are doing research on our claim and have started negotiating to buy some claims for big money. The research will be conducted for 4 years for 12 million, and probably negotiate to buy the Claims for up to TShs 60 million (1000x 1500m). We agreed to do the research but we asked them to give us a sample of what they test, but they refused because they do not want to sell ounces. Because we are not going in the laboratory we are not in a position to understand the amount of gold that can be obtained from our claims therefore it is easy for them to cheat in the buying process and give us wrong estimates to our disadvantage (Nyarugusu, 13.06.04).”

From the study it could be seen that access to mining or ownership rights for example have so far been shaped by having access to the right assets at the right time. In Mgusu, Nyarugusu and Mabuki, this has particularly meant having access to information at the right time. In the earlier experiences of access to claim titles in Nyarugusu and Mgusu processed in the late 1990s, those who were sub-contractors of the defunct company DTT were by virtue of their positions able to know what and how to process such claims after the government had decided to issue them to local miners. Although Mining officials contend that considerable efforts were put on disseminating information on the government’s intention to allocate mining rights to local people, in the view of local miners most people could not relate how they could get a title considering their circumstances.

Inadequate means of acquiring correct and relevant information exacerbates people’s vulnerability in such situations. People can be subject to cheating, exploitation or simply misunderstandings because of being ill-informed. There are several sources that provide information on ASM in the country. These include the government mining offices, Village governments, MWAREMA branches, MEM radio programmes on ASM, sympathetic NGOs, brokers and dealers and the few miners who seek information on their own initiatives. Inappropriate information or lack of information however continues to disadvantage AS miners particularly in making them aware on how and where to make claims, how to improve productivity and incomes and their general livelihoods. Firstly, each source is inclined to specific interests and therefore strives to impress on this interest to stakeholders, secondly the manner in which information is sent to AS miners is, according to the people, not conducive to their environments. What was found out by the study is that most of these information sources tend not to differentiate between what is ‘officially’ relevant and how to make it relevant to AS miners. What is considered relevant by Government officials is usually sent as directives without consultation, without an exchange in information or in a written manner to local government offices, which is ill-suited to the way people communicate in these areas.

Donor funded information is not necessarily better targeted at miners; the local offices of MWAREMA and government mining officers display nicely coloured cartoon posters - produced with support of USAID amongst others - in an apparently simple language. But these pictures appear to be more for the benefit of the office-holders, who can advertise their area of expertise to visitors, rather than for the people working on mining sites in need of this information. If extension were to take place with these officials visiting mining sites on a regular basis one might conclude that such information had been well placed, but this assumption cannot be made.

Insufficient access to market information specifically impacts on AS miners income statuses and hence their poverty. As indicated above, miners normally depend on licensed and unlicensed dealers and brokers for information on mineral markets and prices, and one of their responsibilities was to enable miners access reliable market information. This is with the exception of the few small scale miners who can access information directly from the Government offices in district headquarters. But there isn't any systematic procedure to inform the producers i.e. the miners on prices or availability of markets, making most exposed to exploitation.

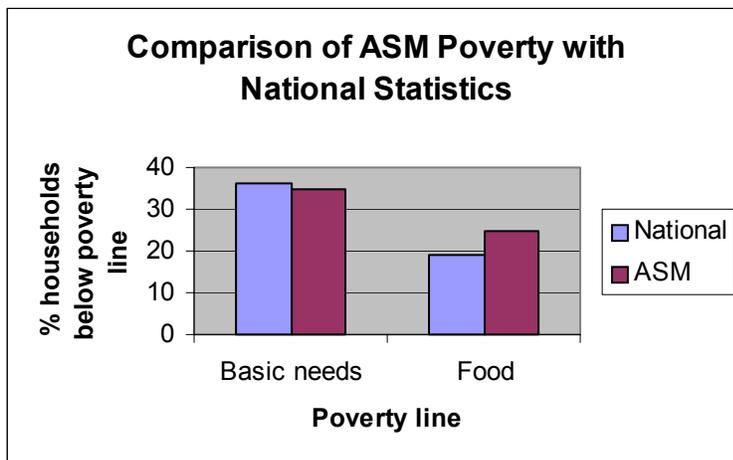
SECTION 8: The Contribution of ASM to Local Communities

The overall objective of the study was to examine the role of ASM in people's livelihoods in order to determine whether it plays a positive part in reducing individual or household vulnerability and poverty. This objective has been analysed by looking at social, economic and technological issues embracing the ASM sector and situating them within an institutional and policy context in Tanzania.

Clearly AS mining is a highly significant livelihood activity within mining communities whose settlements and economies have grown up and developed with an expansion in artisanal mining activities. AS mining involves specialised occupational tasks, differentiated by gender and other social divisions, but does not stand alone as a sole source of income or food generation, being to varying extents integrated at the household level with other livelihood activities such as farming, livestock keeping, the provision of specialised services and petty business.

What conclusions can we draw about the nature of poverty and vulnerability in mining communities? Does ASM contribute to people's livelihood resilience and to local wealth creation? Positive answers can be made, but they are by no means black and white. According to our quantitative data, ASM has much potential for poverty reduction. If we compare findings from the study with national level statistics (see Figure 6) we can see that according to a food poverty line, the three communities fare better than a national average, and according to the basic needs poverty line the communities are almost on par with the national average.

Figure 6: Comparison of Poverty Levels in AS communities with National Statistics



It is not possible to assess the third poverty line created for this study, food security, against a national average. What emerges from the study is that income from mining, particularly gold mining, is a more regular source of income than from other livelihood sources, such as agriculture, and it has been instrumental in reducing household food shortages. Mining is not a strictly seasonal activity and therefore people can acquire and sell products through the year (except in extreme weather conditions); furthermore, the many different activities associated with ASM - again especially gold mining - allows for different categories of people to earn an income, however meagre. People are therefore at least able to buy daily requirements of food even if it is of

undesired quality. It also generates numerous opportunities for employment, however backbreaking and menial.

There was also evidence on the linkages between ASM and other livelihood activities. Mining has served as a source of wealth creation, investment and asset accumulation and is evident in terms of investment in businesses and services in mining villages and towns like Geita and Mwanza. In this respect, we need to scratch beneath the surface of a common perception that AS mining leads simply to extravagance and uncontrolled spending. In fact AS mining can serve as a source of capital to establish a business, buy farming inputs, or build up livestock herds. There are therefore strong indications that if ASM is given due attention by authorities it could offer opportunities for self-sufficiency of communities and reduce dependence on the Government.

The nature of ASM activities and changing socio-economic circumstances have also helped some women (although the minority) to break through the barriers of culture and move up the ladder in the ASM hierarchy to become pit owners and mineral rights owners. In addition, some women are also powerful service providers in these communities. Being able to diversify activities, capitalizing on the different needs in such communities and accumulate capital, these women can now compete side by side with men, and command much respect in the mining areas.

Having said all this and recognising that AS mining has a positive role to play in contributing to poverty reduction, we also need to keep in view the extreme levels of inequality and multiple vulnerabilities that mining can build and perpetuate. If one focuses on vulnerability specifically, what emerges is that it is not possible to draw simple conclusions: AS mining can help people to build their resilience, but it can also increase vulnerability for individuals, households or communities through exposing people to many risks and situations of inequality and exploitation. In this respect, social differentiation and labour divisions need to be drawn into the picture when we ask who benefits from AS mining, who can build their wealth, and who suffers.

In making conclusions on vulnerability, it is instructive to remind ourselves of the situation in Mgusu, in which one or two mineral rights are being mined by large numbers of people with the owner acting as landlord, and in which there are many conflicts with the state (plus between different sections of state) and private companies, as well as between local people themselves. Data from Mgusu shows that households have experienced multiple forms of vulnerability in the recent past; however, it also shows that the food insecurity poverty line is lower than in Mabuki and Nyarugusu. This example is instructive because it underlines the fact that AS mining *per se* doesn't have to be the cause of the multiple shocks that contribute to peoples' vulnerability, but that it can be where people are excluded by the state, where they are marginalised from mainstream society because they are categorised as 'illegal miners', where they find themselves in exploitative local power relations, and where private companies act with impunity through a capacity to exploit these circumstances. Similar issues emerge in the case of Mabuki where artisanal miners have worked the land for more than ten years but do not have legal titles and complain of being side-tracked in the process of gaining mining rights for the land that they have exploited for so long. Clearly an issue with regard to vulnerability is the implications arising from differential power to access mining rights – and the ways in which the state perpetuates these differences by being biased towards external investors.

This takes us into governance issues, and we can turn to consider the question of the impacts of policy failure for miners at the local level. Limited capacities to implement the commitments popularised in the Mineral Policy – such as extension services, poor administrative structures and other support services have meant that with few exceptions provided by foreign aid, the working techniques in ASM remain the same. As a result, owners of mineral rights do not develop any small-scale mine as intended. Instead, they divide the area into smaller blocks and lease it out to

other miners. Not only is sub-leasing mineral claims to other people contrary to mining regulations in the country, this tendency has also perpetuated the vulnerability of a majority of the mining population. Firstly, complete limitations of the system to hold responsible the claim holder over what takes place within a mining claim, has led to poor social welfare for the workers since the working conditions in terms of health and safety, particularly where a large number of people work in a single mineral right. The situation is worse in mine rush sites where there is simply no regard for people's health and safety or environmental protection.

This system perpetuates inequalities and extreme forms of exploitation within the mining population without restraint, such as in the license holder-pit owner-worker relationships and the subsequent distribution of proceeds. This exploitation is all too common, not only in the extreme situations such as that of Mgusu (where a single claim holder has more than 200 pits sub-leased) or in mine rush sites, but even in long established claims where the claim holder does not have the means to develop an operation.

The labour relations resulting from such systems are a source of conflict between the different participants in the mining activity over the distribution of resources or the proceeds of labour. The limited manner in which Government has appreciated these divisions within policy instruments has also served to perpetuate contradictions between miners of different status, and perpetuated highly exploitative relationships.

Another challenge leading to people's vulnerability is related to the process of formalization that is also being carried out without any support in terms of training and awareness raising that would enable more participants to the sub-sector to appreciate the significance of having a license. For example, many people still operate under the assumption that as long as minerals are found in their farms then they automatically own them. The differences between mineral rights and surface rights have not been made clear to miners. In addition, even those who get licensed are assumed to be financially and technically capable of making a mining investment, which is not necessarily the case. As a result, this has led to subleasing of lease areas and thus adding more confusion to already problematic operations.

Limitations in governance are also exacerbated by shortages of key state resources such as trained staff and funds to be able to reach the miners within the Residents' offices' jurisdiction. Therefore it has not been possible for a majority of the miners to enjoy closer consultations with mining experts. The minimal exposure to improved mining techniques among the miners themselves has been an added disadvantage in this regard, and thus mining operations are largely still rudimentary. Hence ineffectiveness of the system to enable people to mine profitably makes ASM a sector of risk and chance taking.

Governance problems have perpetuated conflicts between different stakeholders in ASM. Some of the key issues in this regard include disputes related to ownership of mineral rights such as was the case between the claim holder and miners (Mgusu); the land dispute and forest reserve occupation (Mgusu); between large investors and small scale miners over claims and displacement (Mabuki and Nyarugusu). As was evident in the stakeholders' workshop in Geita, District officials and AS miners see the value of the local authority having the mandate to administer the ASM sector, but their hands are still tied by the system of centralization. Decentralization of the governance of ASM activities, it has been argued may have added value at the local level. This is because administering of ASM activities as a sub-sector within district planning systems may ensure better integration of AS miners with social service provision, with support for other productive sectors (such as agriculture and livestock keeping), closer monitoring, and a production environment facilitated and hence improved collection of revenue from both miners and minerals traders.

Decentralization is not a panacea to institutional successes related to ASM, since as was evident from this and several previous studies, it entails rebalancing of interests over resources – ie readjusting administration over resources and control of the revenues accruing from the process – an issue demanding delicate political commitments. According to the Geita District Planning Officer, even requests submitted to the Central government for a share of the Service Levy from companies servicing the GGM has not met a favourable ear leading the District to realise its limits.

The best opportunity currently lies within the capacities of Local Authorities to draw byelaws as a deferent and also a source of revenue. The LGRP in its section on governance places much emphasis on the enactment of byelaws at village level, and monitors how relevant these byelaws are to the overall objective of poverty eradication (URT, 1996). As had been observed in this study, all village governments had enacted by-laws relating to ASM activities such as those stressing on environmental management, prohibitions on child labour and revenue collection from ASM and related activities. However, as was evident, it is one thing to enact a law, and another thing to be able to make it operational. Local capacities to enforce most laws are limited. Village governments cannot necessarily reconcile interests that create conflict such as byelaws in relation to environmental pollution or child labour.

For example, people are informed about the ASM related environmental and health hazards but do not act on the information. For example, the situation in the mine rush site in Ibondo, Nyarugusu illustrated the high degree of irresponsibility by both the Village Government, the owners of the area and miners themselves in ensuring at least minimal safety, health and environmental management. While mine rush situations may be delicate situations to handle owing from the pace of its operations, there are other situations such as the inability to contain pollution of water sources from long established processing activities just because of political influence. The case in Nyarugusu where the Village government has failed to put a stop to processing activities that were being undertaken in an area with drinking water wells is an example. The implication has therefore been detrimental to the health of the communities themselves.

Village governments however have been effective in collecting revenue and other contributions from ASM and related activities for village development activities. The limitations in governance once again come to the fore at this stage, particularly when local administration is entirely used for income generation of authorities instead of development of the sector.

Differential statuses and abilities to access information within the ASM sector also affects the ability of miners to exercise voice. The existence of Miners Associations such as REMAs, or MWAREMA in this case, has excluded representation of most participants in ASM by virtue of its membership requirements. The low organizational capacities of other miners around mining related issues have furthered their inability to make demands. Mgusu community's history is an exemplary case, especially by the way it had been able to win the sympathy of top government and political leaders to pressurize for most of its demands, except for the controversial settlement process.

The inadequacies in current information dissemination systems and means of communication have placed a majority of the miners in vulnerable situations. For example, although the law gives everyone the right to everyone to access a mining licence, it is still the case that a majority of miners operate without licences. The ability to get the right information and at the right time has depended on one's position in the activity. For Mgusu and Nyarugusu claim holders, their positions as sub-contractors of the company DTT placed them favourably into knowing and accessing mineral rights. This is also the case with market information whereby it is usually the well-established miners who can access fair prices. In addition, inadequate systems of consultation, compounded by shortage of state resources to reach people and exclusion of the AS sector from

other district level planning, has denied most AS miners the right to enjoy appropriate services from government.

A key issue in this regard, is peoples' knowledge of their entitlements and of the processes to gain these entitlements. It is evident that many people know about their entitlements e.g. to a licence, to be fairly served by government, or to be properly informed about mineral markets. However, many do not know how to go about acquiring these things or they think that they are unreachable.

Social status and forms of exclusion also influence people's capacity to make demands. For example many of the women and children in ASM communities have been easier targets for exploitation because their poverty has driven them into kinds of work that on top of their drudgery are also very lowly remunerated. This situation faces elderly women who lack basic assets such as physical strength, relatives or ability to accumulate capital. Unless being in the upper positions within the ASM organizational set-up, such as a claim holder, or as '*mtoa huduma*' (provider of services) these women's representation in AS organisations is non-existent. The lack of direct By-laws or regulations protecting the kinds of work that most women do in the ASM industry is another shortcoming. Organising in order to demand for better conditions is not common, but has been rather for pooling of efforts for common good as was the case with Tuleane Womens' groups in Mgusu. Children are worse placed than the women. The implication has thus not only been lack of voice, but also their exclusion from local systems of protection making them vulnerable to the consequences of physical and environmental hazards.

We have seen that exclusion from mainstream institutional and policy processes is experienced in a number of ways, and it boils down to the question of differential powers and the capacities to determine or influence the ASM set-up as a whole and the inadequacies of current policy to address AS activities and involvement at the local level. Pooling of artisanal and small-scale mining in the current policy framework fails to create potential mechanisms for transforming artisanal mining into better developed small scale mining, which is what the Government seeks to achieve. From a wider development perspective, placing artisanal and small-scale mining together has implied that there are no mechanisms to provide differential support to artisanal and small-scale mining according to the needs of very different groups of miners within the sector.

SECTION 9: Key Challenges

It is clear that the contribution of ASM to poverty reduction and development is under-acknowledged but nonetheless substantial. Therefore it is critical to support the role of ASM in socio-economic development and to create an institutional environment that builds on ASM's poverty reducing potential to generate secure livelihoods.

This project has recognised from the start that in order to think innovatively about the role of ASM in development it is necessary to start with a focus on the people involved and the support they need for livelihood improvement. Here we present eight challenges as the basis for recommendations for the Phase 2 pilot project.

9.1 The Challenge of Exclusion

ASM is frequently isolated in Government policy and actions from development planning for other livelihood sectors, such as agriculture, livestock keeping and fisheries, and from wider social and environmental policies such as health care and natural resource management. As this report has explained, people themselves link mining to other livelihood activities and parts of their lives. There is a need for a change in perception, which situates ASM as an important activity for employment creation and income generation and plans accordingly, making linkages to other productive and social sectors at the level of peoples' lives and wellbeing. The specifics of mining as a productive activity, which can only take place in locations where mineral resources are available, should not dictate that it is treated in isolation within projects or Government support.

Following from this, it is clear that AS miners and mining communities are typically excluded from mainstream poverty reduction policies in Tanzania. This follows from an inadequate perception of rural livelihood systems, which basically depend on a diversified economy and where in some communities, artisanal mining is in fact the economic mainstay of the people. While the PRSP rightfully recognises rural poverty as concentrated among the agricultural poor, and emphasises the modernisation of agriculture and improved capitalisation, artisanal mining does not feature in this enterprise support.

Following from this issue, there is scant recognition of the implications arising from social differentiation existing in the ASM productive sector, and therefore little appreciation of the different population categories to be able to design specific measures to reach them. Making a distinction between small-scale and artisanal miners would be one step in the right direction, but the chronically poor and vulnerable also need to be targeted directly. At present, because many people are categorised as illegal and control for AS mining comes under MEM, within central government these people are excluded from institutional support. It is expected that, decentralising to district level in order to integrate AS mining with action in other sectors (welfare, health, women and children, community development) has the potential facilitate this process. See 9.3 below.

At the national level signs are positive that there are shifts in Government thinking: as described in the report, AS mining was largely omitted from discussions concerning the first Poverty Reduction Strategy Paper but consultations and associated research are underway (2004) regarding inclusion of AS mining within the second round. Similarly, Government has recently undertaken a widespread consultation on the Mining Act and Policy (in 2004).

9.1.1. Linking support for chronically poor AS miners to existing social policy

It is critical that people working in the AS mining sector are not cut off from existing and future Tanzanian social policies to protect the most vulnerable. While certain aspects of vulnerability in ASM communities affect the wider population; there are specific categories of people that are more vulnerable and likely to be chronically poor. Typically these categories of people are concentrated within mineral/gemstone processing activities. Children subjected to mine labour in early stages of their physical and mental development influence their long term vulnerability and make them into low performing citizens. Mine labourers and women, in particular, experience low wages for the work involved. The disregard for even basic health and safety standards in mining pits or areas that the majority of claim holders show exposes these workers to additional health hazards. Although claim holders are required to demonstrate responsibility for people working within their concessions this clearly doesn't work, particularly when these concessions are sub-leased. To reach these most vulnerable groups it is important to explore and capitalise on potential links to existing social policy in Tanzania.

(i) MEM and local government authorities should adopt and implement the Provisions of Labour Law (The Regulations of Wages and Terms of Employment Order Cap 300, 2002; and the Employment Act Cap 366) on labourers stipulating minimum wages, employment protection, etc. This needs to be done in conjunction with consideration of the issue of sub-leasing, such that the claim-holder is held responsible even when mining within his/her claim whether or not it is his/her operation.

(ii) Local government authorities to ensure close monitoring and adopt provisions of (on-going) moves towards social protection policy for the most vulnerable groups spearheaded by the Division of Social Welfare of the Ministry of Labour, Youth Development and Sports,

(iii) Collaborate with existing pressure groups such as the Tanzania Media Women's Association (TAMWA), the Tanzania Association for Legal Aid (LEAT), Journalists on Environment (JET), also ILO, that voice demands for livelihood/job rights of people in special employment categories such as bar maids, house maids etc. Such rights include occupational health and safety, and fair wages

(iv) The Ministry of Minerals and Energy and office holders at zonal and district levels need to facilitate development support by civil society organisations that have experience and capability in terms of social mobilisation. In addition, linkages need to be made to civil society and Government community development officers

9.1.2 Improving conditions for working children (with the aim of reducing child labour)

Tanzanian Government is already instituting significant measures in the area of eradicating child labour. Project initiatives are piloting a way forward (e.g. the ILO project in Merelani) on removing children from the worst forms of child labour in mining communities. For example, in order to take children out of the most risky sections of ASM, the ILO project proposes to give them less risky activities through facilitating communities to create better work environments.

The institution of Village Government By-laws prohibiting child labour are currently toothless because of the inability of officeholders to cope with contradictions created by the reality of livelihood systems in ASM communities where mining is a way of life and a good opportunity to make money. Often children working around the mines are not immediately seen as labourers but

as part of a chain of workers each engaged in a different section in the industry, although their vulnerability to risks of ill-health and exploitation was well acknowledged. The research highlighted how it is not simply an issue of getting children to attend school, because their school performance may be considered satisfactory, with mining work taking place out of school hours. Ways in which the conditions for children could be improved include:

- (i) Integrating education on the risks of worst forms of child labour into the elementary education system.
- (ii) Identifying alternative sources of income, linked to mine work that are less harmful to physical and social health of children than existing practices.
- (iii) Committing miners/parents in ASM communities to design locally relevant child-protection systems within their localities. It is important that any actions taken at local level start with this consultative aspect to mobilise support from miners and parents.

9.1.3 Mobilising AS miners to support themselves

To empower women and those categories of AS miners in chronic poverty, the need for mobilisation for specialised group associations to work as grassroots forums for voice and making demands. This is a role that is within the mandate of Civil Society and Government Community Development Officers. The strength of having such associations is to create pressure groups in the absence of a workers' organization as that provided for auxiliary (but permanent) workers under the Security of Employment Act Cap 387. Under this Act, although casual labourers are recognised, there is no provision to ensure that their demands can be tabled in a formal manner.

An example of an effective labourers' association in Tanzania is the Kariakoo porters association in Dar es Salaam, *Wabeba Mizigo 'Lumbesa' wa Kariakoo*, who demanded to be paid better wages by market traders or to reduce the weight of the load that was also causing them ill-health. NGOs such as Poverty Africa, which have the capacity to mobilise grassroots communities irrespective of their livelihood orientations, are better placed with the task than technically trained mining officers.

9.2 The Challenge of Diversity

Very little systematic baseline data is available to Government about employment in the AS mining sector, about the contribution of mining to income at household/community level, and about context/mineral-specific differences in mining activities across Tanzania. Lack of information restricts Government from having evidence of the contribution of AS mining to the national economy, employment and income-generation, and by implication poverty reduction.

9.2.1 Generation of information on AS miners through existing national survey instruments

There is a need for recognition of AS mining as a livelihood system in Tanzania in order to collect baseline data on AS mining incomes and livelihoods within national survey instruments. Although 'mining' was included as one of the occupations (main and secondary activity) in the Household Budget Survey questionnaires it does not appear in the main HBS report (URT, 2000). There has been a tendency to aggregate mining with 'other', 'non-agricultural' or 'informal' activities. In the 'source of income' section, mining is not included at all, nor does mining feature in the Labour

Force Survey (URT, 2000/01): this is contrary to macroeconomic statistics (e.g. GDP) where mining (LSM and ASM combined) appears prominently. The national Social Accounting Matrix (SAM) and Computable General Equilibrium (CGE) Model used to predict impact of one sector on another sector of the economy through the multiplier effect could not capture mining sector and ASM since both SAM and CGE are based on HBS data. Due to this lack of data, current estimates of income-generation and employment in ASM are contentious.

(i) It is therefore proposed that ASM be mainstreamed into both national survey instruments and into poverty assessment and labour force survey reports. It is further recommended that due to distinctive features, mining statistics be disaggregated between artisanal/small-scale and large scale (corporate) mining.

9.3 The Challenge of Institutional Change

Government is confronted by AS mining activities in which there are high levels of illegality, risk and under capitalisation. In response, the thrust of Government's approach has been to seek to formalise the AS sector, turning illegal artisanal miners into legal and professional small-scale miners, from this it is considered that other forms of support can follow. However, while it is widely recognised that existing policy and legislation is supportive of AS mining in principle that there are enormous problems in implementation.

The report has clearly highlighted how administering AS mining centrally and separately from other sectors limits capacity for government support. It has also underlined the significant reasons why many miners remain unlicensed. Here we suggest two key steps in promoting policy implementation within the AS sector and in improving opportunities for AS miners by increasing ability to acquire a licence are: (i) decentralisation; and (ii) making a legal and policy distinction between small-scale and artisanal mining.

9.3.1 Promoting decentralisation

The demand for decentralisation of the administration of mining activities arises from the need to have effective mechanisms that can reach the AS miners with the right support at the right time. Responsibility over other sectors has been devolved to district level (e.g. Forestry, Lands, Health, Education, etc.) but this is not the case with mining (large-scale and ASM). Currently, representatives of the District Mines Office are accountable to the Central Government (Ministry of Minerals and Energy) to whom they submit both information and revenues accruing from mining (large-scale and small-scale). In terms of AS mining, specifically, this creates a situation in which responsibility over all aspects of mining is separated from other sectoral areas, even though mining clearly has health, education, community development, etc. components and for miners the mining activities are linked to other livelihood activities (agriculture, livestock keeping, small business) over which there is decentralised support.

While still maintaining the current structures at District level, it would be more advantageous to local authorities if a mining office was established at the District level, e.g., under the District Executive Director. This would leave the existing District Mines Offices to play the role of advising, training and ensuring compliance with the overall country mining policy and legislation.³⁴ The more obvious

³⁴ Currently, the DMO are responsible for policing, i.e., enforcing the legislation, and, offering extension services through training and capacity building. Whilst these may seem as conflicting roles, they are complementary in that legislation can

problem is the lack of capacity by the local authorities, especially in terms of human resources to be able to administer the system. However, this may be a short term problem since the country now has a number of programmes producing mining experts that can be used in its implementation.³⁵

One of the advantages of this approach is that, if well managed, the licensing and hence formalization of ASM operations will be fast and effective. One option to explore is whether licenses can be issued to a Village Government that will in turn license it to individual miners. This should be seriously considered and learning drawn from elsewhere in both the AS mining sector and other sectors: it has potential but also raises possibilities for 'mismanagement'.

This will ensure that the Government gets its due rent and that priority in license allocation is given to those indigenous to the villages. In addition, through the Village Government monitoring of operations in terms of environmental management and security in mining areas can be improved. Village Governments may employ technicians to oversee the guidelines for monitoring which should be produced by the central Government District Mines Office. There is the potential to support the Village Government in setting up trading centres through which all minerals are traded openly as stipulated in the strategies of the Tanzania Mining Policy, i.e., "Strategies for establishing formal marketing systems". Apart from the Village Government benefiting through improved environmental management, security and revenue collection, the central Government will also benefit through increased revenue collection (mineral sales and mineral rent).

9.3.2 Making a legal and policy distinction between small-scale and artisanal mining

The research has highlighted the enormous problems of illegality and difficulties with licensing. Very few miners are licensed but mining policies and administrative directives are in practice exclusive, only primarily benefiting these licence holders. The research has examined underlying reasons for this and captured vast differences that exist in terms of access to natural resources (land, water) and to capacity (skills, knowledge, asset ownership, equipment), which underpin the reason why many miners remaining unlicensed artisans.

Distinguishing between artisanal and small-scale mining is critical to promote regularisation of the sector and to appropriately target support that can build on the very different capabilities and needs of artisanal and small-scale miners.

(i) Small-scale mining needs to be distinguished from artisanal mining; and (ii) with respect to size of area of mineral right holding, a distinction needs to be made between different minerals for small-scale and artisanal mining (as takes place in the large-scale mining sector).³⁶

only be enforced upon miners who are aware. Under the new proposed structure, the role of training for the DMO will be training of the trainers. The DMO would be responsible for training the mining technicians employed by the mining village Government who shall in turn be responsible for training the miners.

³⁵ Such programmes include the degree programme at the University of Dar-es-Salaam producing more than 30 engineers every year (since 2004) and Madini Insititute in Dodoma producing mining technicians. Two new programmes are being introduced this year, one by the Dar-es-Salaam Institute of Technology (DIT) for mining technicians (FTC) and Diploma holders and another one by the Vocational Education and Training Authority (VETA) which will train artisans specifically for the ASM sector. As such the problem of capacity in term of manpower is a short term one.

³⁶ To get the majority of the miners to operate through licensed operations would entail the following:

- i) Educating participants on the policy and legislative requirements drawing on the advantages and disadvantages of being licensed.
- ii) Separating artisanal and small-scale mineral rights with clear differences in size of concessions, tenure periods and the associated fees;
- iii) Providing guidelines on the development of both artisanal and small-scale mining operations;
- iv) Promoting the "employer – employee" relations so as to eliminate anyone working outside the legally recognized operations.

Small-scale mining: With organized small-scale mining operations and with mineral rights owners (licensed individuals) taking full responsibility of the mining operations, the relationship with the workers should be that of “employer – employee” governed by the Provisions of Labour law. This would entail mineral rights owners having specific contracts with their workers, with the payment modes agreed between the two parties. The sharing of production can still be used as a means of payment or a combination of cash and production sharing payments. With each mineral rights owner taking full responsibility of the operations rather than leasing out and collecting royalty, the operations will be in conformity with the country’s labour laws. This will also make it easy for mines officers to collect data regarding levels of employment in the ASM sub-sector.

Artisanal mining: Artisanal operations usually consist of workings utilizing rudimentary technology i.e., manual digging using tools like shovels, picks and other hand made equipment. As such this group of people have very different capacities from small-scale miners. It is therefore imperative that the recognition of this category of miners should be followed by a clear definition of what artisanal mining is, with ability to access specific mineral rights with size and tenure periods reflecting their level of operations and the type of mineral. Helping to legalise this sector of the ASM mining population through providing opportunities appropriate to their assets and capacities would benefit revenue collection, control, and skill and organisational development.

9.4 The Challenge of Knowledge-building

The success of ASM as a key player in poverty alleviation is very much dependent on the knowledge possessed by the participants on the sector. Most miners lack the technical know-how to improve their capacity in this specialised economic area. At present many miners are excluded from improved opportunities due to a range of factors including: lack of collective organisation, lack of capacity to access information and skills development, lack of assets, and being categorised as illegal.

From the argument that a distinction needs to be made between small-scale and artisanal mining, it follows that support for knowledge and skill development needs to be appropriately tailored to miners’ existing capacities seeking for improvement within their ability range.

Given the ever increasing numbers of ASM miners, it is difficult to envisage that Government alone can meet the training needs of the miners. It is therefore imperative that other stakeholders, e.g., miners’ associations, NGOs and private sector companies contribute to building the capacity of ASM participants. Here we advocate the need for appropriate training and skills development, market information and micro-credit.

9.4.1 Training and skills development

The Government is currently constructing a demonstration centre in Chunya, Mbeya Region as a way of assisting artisanal and small-scale gold miners in training and access to efficient working tools and equipment. Accordingly, the centre will be used to demonstrate to miners the efficient mining and processing techniques, provide custom milling facilities and enable miners to hire equipment and tools. In addition, UNIDO in collaboration with the Government is undertaking a project aimed at demonstrating cleaner technology that will reduce the use of mercury in gold

v) Providing extension and training opportunities appropriate to different skill levels.
vi) Empowering miners through promotion of associations that incorporate rather than exclude artisanal miners.

processing. Whilst these projects are significant in building the miners' skills and knowledge of the mining operations, they are too few to have much impact on a population of nearly 600,000 miners. Whilst efforts should be made to start more such projects the following are also recommended:

- i) Implement the Policy commitment of providing extension services to small-scale miners. This can be effected by ensuring that a "Small-scale Mining Unit" is established within the Ministry of Energy and Minerals and that it is charged with the responsibilities for training and developing skills of ASM participants. The unit should operate from the District Mines Offices in order to ensure quick outreach to the miners. Once decentralization has been effected, the unit should be the main focal point for building the capacity of the village Governments in implementing their ASM development programmes.
- ii) Encourage miners to establish "Miners Associations" that they can easily associate with rather than the current regional organizations that hardly cater for their needs. Smaller organizations whose members have similar interests can organize training through interaction with various institutions.
- iii) VETA is in the process of establishing a training programme aimed at training artisans that can service the ASM sub-sector and small-scale miners themselves. The proposed modular based programme aims at ensuring that trainees select modules of their interest and that address their specific needs. It is imperative that an emphasis is placed on 'hands-on' training, tied to a support programme from Government whose benefits are visible.

9.4.2 Market information

One of the Government policy commitments is to "Provide mineral marketing extension services, particularly in mineral grading and valuation and offering short term training programmes on minerals marketing". If this commitment is implemented, miners will be able to access information on the various markets related to the various minerals produced. This will enable miners to have more negotiating powers with mineral brokers and dealers.

In addition, if the recommended decentralization of the ASM administration is implemented, minerals marketing information centres can be set-up in respective village centres for the easy reach of the miners. This could be facilitated through close linkage between the central Government mining offices and the relevant Local Government offices. For example through the Local Government office identifying and facilitating a local contact point (e.g. a local miners' organisation or a miner) to whom such information would be furnished or exchanged.

9.5 The Challenge of Accessing Finance

The commitments made by the Government through the Tanzania Mining Policy covers almost all the possible channels that if implemented would remove the number one problem facing artisanal and small-scale miners, i.e., lack of access to credit and finances. However, most of these have remained commitments on paper, thus exacerbating the problem.

Although there are a number of micro-finance schemes being implemented in other sectors, the capital intensiveness of the mining projects and the associated high risk – particularly as people are seen as highly mobile - makes these schemes unavailable in mining projects. Providing micro-finance support in the mining sector is not impossible, as current examples such as a scheme

being run by Poverty Africa in Geita demonstrates. Some of the recommended considerations include the following:

9.5.1 A Government Revolving Fund

The Government can set up a fund through which miners can borrow money and pay back with small interest for financing the fund's management. The fund should revolve in accordance to repayments made by individual borrowers. The requirement for the collateral can be met through two considerations: Firstly, group guarantee arrangements - whereby a group of say 5 people guarantees one member and ensures that he pays back for another member to borrow. Secondly, evaluation of the mineral right where the Government keeps the licensee until the loan has been repaid. This approach, however, would require the Government's Geological Survey Department to take responsibility (as part of the extension services, for example) to carry out the evaluation of the applicant's lease area and provide a report to fund managers for decision making.

NGOs and financial institutions should be encouraged to set-up schemes, as stipulated in the mining policy strategies for promoting artisanal and small-scale mining. Encouragement for these institutions to invest in the sub-sector can be achieved through provision of data that reflect the potential of the sector and its ability to contribute towards poverty alleviation. The lack of data that is currently facing the sub-sector and the negative perceptions usually associated with it contributes to a lack of interest by institutions to invest in it.

A revolving fund should avoid dealing with bigger loans that may prove difficult to repay back by giving smaller loans that are directed to specific targets.

1. For small-scale miners, small loans could include the following:

(i) Mine development loan – this would target the development of a mine to bring it to a stage where mining can commence

Processing Plant set-up loan: This will be the loan to enable the applicant acquire, install and commission equipment for processing of minerals;

(ii) Out of Hand emergency loan: This should be a loan that would enable the applicant to address any emergencies that may occur and that halt the project, e.g., dealing with floods, large rock falls and other emergencies. Emergency loans need to be given cautiously and specifically to address emergencies; it is important that if the miner/s is having more general difficulties these are not compounded by getting into debt.

2. For artisanal miners, group guarantee schemes are particularly appropriate. Actions could include the following:

(i) Equipment loan – this would target improvement to existing equipment;

(ii) Mine development loan – this would target the development of a mine to bring it to a stage where mining can commence.

(iii) Equipment hire-purchase schemes: These are schemes that are set-up through establishing depots through which a pool of equipment that are used by artisanal and small-scale miners are pooled in order to allow miners to hire or purchase the relevant equipment. The equipment may include items such as crushers, compressors, ball mills, concentrating

tables, jackhammers, and other equipment and tools that are commonly used. Where equipment is not available but is established to be in high demand, arrangements should be made to order it.

The operation of such schemes would involve miners making an application to the officer responsible for the scheme which should in turn satisfy itself of the need for the applied equipment and establish the applicant's ability to pay. An agreement between the miner and the Management of the scheme should then be entered into and thus allow hiring with eventual purchase of the particular equipment. For those equipment whose demand is established as being very high, should be limited to hiring only. Hiring rates should be set so as to encourage miners to purchase the equipment.

3. Buyer Credit Schemes: the (now defunct) buyer credit scheme, which was operated in Geita District and the surrounding areas by Meremeta, allowed a gold dealer to provide assistance to miners through an agreement to buy the produced gold at a price that will also enable him/her recover the costs of the equipment. Some of the approaches to this scheme included: Provision of equipment like pumps, compressor, drilling equipment and others depending on the need on an agreement that the miner sells all the produced gold to the company. Installation of custom grinding equipment to which miners bring ore for grinding and after processing, they sell gold to the company at a x% reduced price to cover the cost of grinding.

The collapse of the Meremeta programme was mainly based on the poor quality service supplied to the miners that made the project rather unsustainable. If properly managed, this scheme can provide the miners with access to finance and technology. However, it has a disadvantage that sometimes dealers may collude to lower the mineral prices and thus leading to exploitation of the miners as was expressed by the Mabuki Diamond miners from their experience with diamond dealers from Shinyanga.

4. Financing through Cooperation between ASM and LSM: Although this approach has not been tried in Tanzania, the cooperation between small and large-scale miners have been used in other countries to assist small-scale mining projects.³⁷

9.6 The Challenge of Communication

The right to be informed and the right to be consulted is one of the people's greatest demands. Government communication in the AS mining sector is characterised by lack of consultation at early stages in the decision-making process. Typically miners either hear about decisions second or third hand without being informed directly by mining officers or when communication does occur they are told about decisions after they have been made and then they are expected to act on them.

Misinformation and exclusion from decision-making processes that affect miners' livelihoods feeds into the high levels of conflict and poor stakeholder relations associated with the sector. Clearly Government has not invested in communication and does not see the need for consultation.

³⁷ Such assistances that have been used in South Africa, Mali, and other countries, may involve organization of miners into cooperatives, allocating miners part of the reserves that cannot be mined by large mining methods, provision of equipment and training, buying of ASM produced minerals. The various cooperation models that can be used should be assessed in accordance to the prevailing situation and should aim to benefit both parties.

In other sectors mechanisms are in place for systematic forms of extension, for example in Agriculture and Livestock Keeping. There may be major shortcomings in these extension systems but they are far better than communication channels in the mining sector. It is therefore imperative to have Government's commitment to reach out to mining communities. There is a need to give information that makes sense and is delivered in a manner that is relevant to the people e.g. initiating a verbal grassroots-based information delivery system. Here we must recognise that at present zonal and district mining officers do not have the relevant training for consultation initiatives.

9.6.1 Consultation and delivery of information

Consultations need to go beyond and not be limited to 'formalized' miners with PML since this system perpetuates what is currently experienced on the ground, whereby only members of the REMAs enjoy the privilege of being consulted by Government on developments related to ASM. Since a majority of the AS pit owners, mine workers and those involved in the processing sectors cannot be reached through this system, the most appropriate means to consult miners in these categories is to reach them through their hamlet leadership.

Currently, the Tanzanian local government administrative structure allows for local authorities through village governments to reach household level, based on a compulsory registration process and a system that makes each household accountable to local development processes. It is suggested that existing structures should be utilised wherever possible to disseminate information to people.

Although it is recognised that problems of communication around mine-rush situations pose particular difficulties, in many cases miners are registered citizens in a particular jurisdiction and they respect this administrative arrangement because of its relevance to the several other issues related to their lives such as mobilisation for local development projects. Other possible forums for consultation are through existing grassroots miners' associations.

Further mechanisms for delivery of information to artisanal and small-scale miners could include extension services and radio programmes. Currently, the Government runs a Radio programme that discusses issues associated with ASM. However, interviews with the miners in the field indicated that many have never heard of it. A more effective way of reaching out to as many ASM participants as possible should utilize a combination of approaches. These approaches include extension services with on-the-job delivery of information at mining sites and improvements to electronic communication. For example a video/TV programme could be effectively delivered through the mechanism of the video/TV halls that exist in even remote mining communities, this has been found to be effective in other sectors such as beekeeping. Likewise radio programmes should be given on the most popular stations in particular areas and involve direct discussion with miners to create an interest in listening to more familiar voices.

9.7 The Challenge of Sustainability

Although minerals are finite resources there is a need to promote sustainability of mining activities, communities and environments. This is partly because although the ASM sector has significant potential in enhancing the livelihoods of many people and in addressing rural poverty in general, placing much reliance on mineral production – a non-renewable resource, is surely to frustrate many people in future as has been witnessed by several decaying communities in the country.

Government, local authorities and civil society should thus encourage and facilitate the diversification of livelihood activities within these communities through exposure, information dissemination and other means.

SECTION 10: Recommendations for Phase Two Pilot Project

At the time of report submission, the budget for Phase Two is not known, as support provided by DFID has to be augmented by additional financing. It is therefore impossible to make comprehensive recommendations tailored to the design of Phase Two to be taken forward by Wardell Armstrong and the British Geological Survey. The following suggestions deliberately do not have a livelihoods focus, in line with earlier sections of the report, in order to fit in with the intended planning and management of Phase 2.

At the start of this project, prior to the research, strategic decisions were made to work with gold miners in Geita District. On this basis, Phase One has undertaken a process of engagement and consultation at district, ward and village levels. It is assumed that Phase Two will go ahead in the first instance with AS miners from Nyarugusu and Mgusu villages, where part of the research and consultation processes were conducted. Furthermore, it is assumed – due to strategic decisions prior to the primary research - that diamond miners in Misungwi District will not be included (whether or not there is a rationale for support in terms of actions to promote poverty reduction).

The Geita and Misungwi Districts Stakeholder Workshop held on July 14th 2004 committed Phase Two to providing early feedback on research findings and the way forward for the project to district, ward and village officials. This should include representatives of Shanta Gold Mining Co Ltd., East African Mines Ltd, GGM, district officials (Geita and Misungwi) and Government representatives of Nyarugusu, Mabuki and Mgusu villages and respective wards. Officials from Misungwi should be included in this discussion so they are clear that the project will not go ahead in their area.

It is proposed that a mining unit is physically established within the offices of the Geita District Administration, under the authority of the District Executive Director and with clear integration with the District Management Team. The overall objective of the Mining Unit would be to promote collaboration between the mining sector and other sectors at district, ward and village levels. It is suggested that this is linked to a national-level Steering Committee under the leadership of the Ministry of Energy and Minerals.

In the activities identified below, particular attention should be given to the question of targeting in order to reach particular categories of poor people within the mining sector who are typically excluded from Government and project initiatives in the area, as documented in this report, and to be sensitive to key aspects of social differentiation such as gender and age. The Project should make every endeavour to avoid simply working with those miners who are members of Mwarema and have relatively 'good' existing mining projects due to prior receipt of donor funding.

Having generated baseline data in Phase 1, it is proposed that a participatory monitoring and evaluation (PME) system be established at the start of Phase 2, to encourage partnership, learning and reflection by stakeholders involved, as well as being a basis to evaluate Phase 2 project impacts. The aim of the PME would be to feed lessons horizontally to the District Planning Committee and to the District Mines Office, and vertically up towards the Ministry of Minerals and Energy in Dar es Salaam in order to enhance local voice in the policy process. Handled carefully, a PME can be used as a mechanism for increasing stakeholder understanding of AS institutional processes and concerns and can help give miners a voice where otherwise this does not happen. The participatory aspects of this process require careful nurturing throughout Phase 2.

The Unit could focus on the following activities:

- (i) To consult stakeholders and examine the implications of promoting a licensing system for mining licenses by Village Government. There are attractions to this approach in terms of promoting formalisation of mining activities, as described in 9.4. However feasibility needs to be examined in depth in specific locations: the question of whether there is land with vacant mineral rights available needs to be assessed in particular localities. Also, experience suggests that such a system raises the increased likelihood of mismanagement and potential tension with MEM. A question is whether appropriate mechanisms can be developed to prevent this from happening.
- (ii) To promote training for AS miners through the mechanism of VETA (Vocational Education and Training Association), as described in 9.5. VETA is in the process of establishing a training programme aimed at training artisans that can service the ASM sub-sector and small-scale miners. The proposed modular based programme aims at ensuring that trainees select modules of their interest to address their specific needs. The project should seek to influence VETA to place emphasis on 'hands-on' training, tied to a support programme from Government whose benefits are visible. With financial support, a field-based VETA training programme could be piloted in the project villages.
- (iii) To collaborate with District Community Development Officers and local NGOs, such as Poverty Africa, to support the grassroots development of mining associations. Three mining associations have been identified in the gold mining study areas; these could be used as the basis for the pilot and, with the right expertise for facilitating social mobilisation, it may open up future opportunities for micro-finance and other initiatives.
- (iv) To work with Village Government to develop improved information delivery regarding mining issues through existing structures. The mechanism of hamlet leadership should be used wherever possible to disseminate information to people.
- (v) To develop mechanisms for disseminating market information for gold at village level, paying attention to gender dimensions of information delivery and relating to (iv) above. The research indicated that obtaining a fair price is linked to deeper issues than simply having better market knowledge, such as the provision of credit by buyers; ways to overcome this will need to be explored by the project.
- (vi) To develop support for the most vulnerable in mining communities, focusing on chronically poor men and women and child labour, linking wherever possible to existing social policy and programme initiatives (e.g. by UNICEF). As regards child labour, village leadership, mine workers, and families associated with mining activities are well aware that it is illegal; in the first instance consultation with these groups needs to take place regarding viable options for improving the health and safety conditions within which children are working, without denying them the possibility of income generation.

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Annex 1: Research Themes and Summary of Key Questions

What are the key contributions of ASM to the wider economy?
National/regional/local importance of ASM
How much revenue and net revenue is generated by ASM and how this is utilised – nationally, regionally and locally?
How much revenue does the government receive directly and indirectly from ASM and how is this utilised?
What are the wider multiplier effects of the sector?
How much net benefits remain in country/local region (comparison with large scale mining)
What contribution can ASM make to meeting poverty reduction targets if taken into account by Government – nationally, regionally, locally?
How do we know whether ASM is making a difference to poverty reduction?
Employment generation
What are the differential capacities to exercise voice and claim rights and entitlements in the ASM sector?
Regulatory frameworks? How are these implemented on the ground?
What is their impact?
Do these in practice reach isolated mining areas & specific groups?
What are the incentives to legalise?
What are the resources available to legalise (knowledge, other capital assets, access to institutions and processes)
How different legal status of miners within ASM sector affects how you exercise voice?
How do different levels of access to information and knowledge within the ASM sector affect how you exercise voice and claim rights?
What determines the ability of AS miners to influence the business, legal and political environment?
How are decision-makers held accountable?
What are the key ASM-related conflicts? Are there mechanisms for conflict resolution? What people/institutions are involved? What level if Government institutions?
What are the underlying factors and trends affecting livelihoods and AS mining?
Global/local trends/shocks/economic reforms
Legal/policy environment
Land ownership
Liberalisation of mining sector
Political context: conflicts/stability at village, district, regional & national levels
Environmental factors (including weather & occupational & community health and safety)
Population dynamics and change including migration
Technology: changes to + access issues
Can we say when mineral deposits are inherently suited for: <ul style="list-style-type: none"> • LSM • ASM • LSM+ASM i.e. to what extent is there really competition between LSM and ASM?
Environment of local households more generally (non-ASM HH impacted as well by ASM environmental impacts)
Access to credit
Access to fair markets
How is AS mining organised?
What is the division of labour?

Middlemen/market linkages?
Relationships to the license-holder
What are the gender relations?
What are the power relations?
Differences between diamond and gold mining in terms of organisation
What technology is used for ASM?
What forms of technology are used in the mining area?
What factors affect differences in types of technology used by different miners conducting the same activities? E.g. issues of access, capital, knowledge, etc.
What are the differential assets, capabilities and livelihood activities existing at village level?
What assets capabilities and access to institutions are involved in AS mining (including technology)? How does this relate to the assets, capabilities and access to institutions involved in other key livelihood activities e.g. farming (n.b. are there big contrasts)?
What is the linkage between ASM and other livelihoods (such as agriculture or service provision)? Nb remember gender relations
Can government policy – particularly at the district level – help ASM to add value to these other areas e.g. tailoring agricultural extension advice, small business training etc?
What role does ASM sector play in increasing household security?
What are the major points of vulnerability & resilience? For whom?
What is causing these miners to move in or out of poverty?
How does socio-economic level of mining households relate to poverty in the village (i.e. are mining households wealthy/amongst the extreme poor, etc.? Are there large degrees of socio-economic differentiation between mining households, or mining households and other households?
If mining households are amongst the extreme poor, why?
If mining households “move in and out of poverty”, why? What factors cause this change?
If mining households are amongst the wealthy, why?
How has this changed over time?
Given the pattern of ASM behaviour from rush phase onwards, is it possible to predict how certain communities will develop and what appropriate policy will be at various times (e.g. what communities would need to do to qualify for certain types of assistance?)
Gender dimension to the above
What are the institutional and regulatory frameworks, relationships and processes governing ASM?
International frameworks/conventions
Governmental organisations: what levels govern what in relation to ASM sector (organogram, institutional flow charts)
National, regional, local poverty – ASM links/entrance points for research & assistance

Annex 2: List of Attendees, ASM Stakeholder Workshop for Geita and Misungwi Districts, July 14th 2004

**LIST OF ATTENDEES, STAKEHOLDER WORKSHOP ON THE CONTRIBUTION OF ARTISANAL AND SMALL SCALE MINING IN POVERTY REDUCTION EFFORTS FOR GEITA AND MISUNGWI DISTRICTS, MWANZA REGION
GEITA DISTRICT COUNCIL HALL, 14TH JULY, 2004**

No.	Name	Designation	From
1	Peter N. Mgaka	Diamond mineral Dealer	Mabuki
2	S.J. Shillingi	District Administrative Secretary	Misungwi
3	M.F. Makune	Ward Councillor	Misungwi
4	Ng'wanza Kazi	Artisanal Miner	Mgusu
5	Andrew Gadi Mrinji	Manager – MEREMETA	Geita
6	Chrisant Ishengoma	Activng Village Executive Officer	Nyarugusu
7	Tunu R. Athumani	Artisanal Miner	Nyarugusu
8	Anderson K. Shimbi	Social Welfare Officer	Geita
9	E.S. Keiya	District Administrative Secretary	Geita
10	J.M. Kazimil	Economist II	Misungwi
11	Salu Chenya	Chairperson, Artisanal Miners' Association	Misungwi
12	A Masele	District Security Officer	Geita
13	Nicodemo M. Seni	Small Scale Miner	Misungwi
14	Daudi Luhende	Secretary, Artisanal Miners' Association	Mabuki
15	Charles K. Mageni	Ag. Chairperson, Village Government	Mabuki
16	Richard M Msila	Blaster	Nyarugusu
17	Musa P. Bukulye	Ward Councillor	Nyarugusu
18	T.A. Kyamba	Regional Municipal Planning Officer, - Regional representative	Mwanza
19	Margareth Nzengulla	Ag District Community Development Officer	Geita
20	Leonard J. Chipaka	Small Scale Miner	Mgusu, Geita
21	I. Builomba Mukinga	Inspector of Schools	Geita
22	Charles I. Malunde	Ag District Executive Director	Misungwi
23	John Trayphone	BOLKE	Geita
24	M.A. Mvungi	District Natural Resources Officer	Geita
25	E. Mahendeka	Economist	Geita
26	M. Salvatory	Planning Officer	Geita
27	Mussa Mpokoti	Secretary – Claim operations	Nyarugusu
28	Doto Kiteba	Artisanal Miner	Mgusu
29	Genevieve Pearson	Geologist/ASM project – Geita Gold Mines	GGM
30	David Azaria	Radio Free Africa - Reporter	Geita
31	Masudi B. Kimondo	Ward Councillor	Kaseme
32	Mhoja Kiyuga	Chairperson – Village Government	Mgusu
33	Isaka Wandiba	Artisanal Miner	Mgusu
34	Daud S. Maka	Village Executive Officer	Mgusu
35	J.A. Mihele	Ag. District Health Officer	Geita
36	Joel Nyabukika	Manager – Poverty Africa	Geita
37	Mwahija Msitafa	Artisanal Miner	Msitafa
38	Mobutu Malima	Ward Executive Officer	Nyarugusu
39	David Mulaba	Ag Zonal Mines Officer – representative of MEM	Mwanza
40	Mariya Zakaria	Artisanal Miner (Mjunguaji)	Mgusu
41	Salum S. Libururu	Op. Manager – East African Mines, Buckreef	Geita

42	Peter S. Ndongo	Town Planner- Lands	Geita
43	Lucy Matonange Simon	Small Scale Miner/Business woman	Nyarugusu
44	Dr F.K. Mwanisi	District Medical Officer	Geita
45	B.B. Kilanga	District Planning Officer	Geita
46	Gibson Kinlande	Works Technician – Ujenzi	Geita
47	Golden Hainga	General Secretary – MWAREMA	Nyarugusu
48	P.S. Nsangano	Treasurer – MWAREMA	Nyarugusu
49	Abdul, A.M.	Ag District Water Engineer	Geita
50	Kulwa T. Malele	Small Scale Miner	Mgusu
51	Renatus Masuguliko	Journalist-PST	Geita/Mwanza
52	Rebeka Mirengeri	Artisanal Miner	Mwanza
53	Suzana J. Mashala	Councillor	Mtakuja
54	Mwanganda	Ag.DED	Geita
55	Wilson Mutagwaba	MTL	Dar es Salaam
56	Eleanor Fisher	CDS	UK
57	Rose Mwaipopo	UDSM	Dar es Salaam

Annex 3: The household survey (English version)

HOUSEHOLD SURVEY

A. Identification variables:

Item	
Village Name	
Interviewer Name	
Date of interview	
Household strata (high, medium or low income)	
Name of respondent	
Questionnaire number (Will be numbered before data entry)	

B. Family background

- 1) Tribe-----
- 2) Religion: a) Muslim b) Christian c) Other religions
- 3) Residence and migration

	Yes	No
Is your family originally from this village?		
If not, did you immigrate to this village because of mining activities?		
Has anyone in the family migrated to other areas because of mining activities?		
Do you live in the camp?		
Do you have a residence in this village?		
Is your family living in the village or any other village in Geita district?		
If your family is not living in Geita where does it live?		
If you migrated to Geita where is your origin (district)?		
When did you migrate to Geita?		

- 4) Family type a) Monogamous b) Polygamous
- 5) For polygamous family attach additional page for demographic information (c) for continuation of serial numbers of household members

C. Household demographics and occupation of persons living in the house

1. Demographics

S. No.	Household Member First Name	Gender 1=male 2=female	Age	Marital status 1=married 2=single 3=divorced 4=widow	Years of Formal Education	Highest Education Attained 1=none 2=primary 3=sec-O-level 4=sec-A-level 5=college 6=university 7=underage 8=others	Main occupation 1=crop farming 2=livestock keeping 3=fishing 4=beekeeping 5=employee large scale mining 6=small scale mining 7=employee (other than mining) 8=food service 9=shop 10=other business 11=schooling 12=underage 13=disable 14=others	Relationship to household head 1=husband/male 2=wife/female 3=daughter 4=son 5=relative 6=worker 7=visitor 8=others (make * for household head and R for respondent)
1								
2								
3								
4								
5								

TOTAL number of persons living in the household.....

2) How long (in years) since you (or any member in the household) started to engage in mining activities?

3) For members engaged in mining indicate months engaged in mining activities?

Member (first name)	S.no. (from B)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	No	Dec	Total months

Note: In each month a member works in a mine indicate F for fulltime and P for part-time

4) What do family members engaged in mining do when not working in the mines?

Family member	Activity when not mining
Males	
Females	
Children	

D. Housing Characteristics (Main house or the best in the compound)

1) Residence

Housing Characteristic	Circle one
Roofing material	1. Iron sheet, tiles, asbestos 2. Thatch grass, mud 3. Others (specify)
Floor material	1. Cement, concrete, tiles (modern) 2. Earth 3. Others (specify)
Walls	1. Bricks (baked or cement) 2. Mud and poles 3. Others (specify)
Tenure	1. Own the house 2. Rented 3. Provided by employer 4. Belong to relative/friend (free) 5. Mining camp 6. Guest house 7. Others
Main source of drinking water	1. Piped water in/outside the house 2. Piped water in the community 3. Private well (protected) 4. Public well (protected) 5. Unprotected source (well, spring, dam, lake, etc)
Major fuel for cooking	1. Fire wood 2. Paraffin 3. Electricity 4. Bottled gas
Electricity	1. Connected to public grid 2. Not connected 3. Own source
Toilet facility	1. Flush toilet 2. Modern pit latrine (concrete slab) 3. Non-concrete pit latrine 4. No latrine

2) Under construction

Housing Characteristic	Circle one
Roofing material	1. Iron sheet, tiles, asbestos 2. Thatch grass, mud 3. Others (specify)
Floor material	1. Cement, concrete, tiles (modern) 2. Earth 3. Others (specify)
Walls	1. Bricks (baked or cement) 2. Mud and poles 3. Others (specify)

E. Household Resources and Assets

Resources/Assets	Unit	Quantity
Total land	Acres	
Cultivated land	Acres	
Grazing, fallow and forest land	Acres	

Mining land	Acres	
Livestock		
Cattle	Number	
Goats	Number	
Sheep	Number	
Poultry	Number	
Others	Number	
Farming machinery	Number	
Farming implements (e.g. ox plough)	Number	
Fishing boat	Number	
Mining machinery and equipment (page 7)	Number	
Vehicle	Number	
Motorcycle	Number	
Bicycle	Number	
Radio	Number	
TV/Video	Number	
Shop	Number	
Food service	Number	
Bar/local brew	Number	
Other business entity	Number	
Others-specify	Number	

F. Household Income Sources and Expenditures (combined for all household members)

Source of Income	Income earner (Name and serial no. in the demographics table)	Annual income	Percentage share (%)
Food crops (home use and sale)			
Cash/export crops			
Livestock			
Fishing			
Beekeeping			
Mining and related activities			
Salary			
Casual labor			
Shop			
Food service			
Bar/local brew			
Other business (Shop, tailoring, carpentry)			
Remittances from family member or relative			
Other sources (specify)			
TOTAL			100.00
Yesterday's expenditure	All household members		100.00
Typical weekly expenditure	All household member		100.00

G: Food Calendar and coping strategies in crisis

- Does your household produce own food from a family farm? Yes/No
- If not do you buy all of you food? Yes/No
- If yes what percentage of staples is produced by the household?

Food type	25% or less	26-50%	51-75%	76-100%
Staples (grains)				
Meat, milk and other livestock products				

- List 3 most important crops grown by the family(food and cash)

- Fill the table below indicating food consumption and coping strategies during crisis

Food consumption and other strategies	Harvest season (or good income)	Off-season	Crisis (e.g. draught, no cash, sickness, low earning from the mines, etc)
Main types of food eaten			
1.			
2.			
3.			
Other coping strategies (off-season and crisis)			
1. Reduce number (or quantity) of meals			
2. Reduce quality of meals			
3. Reduce other expenditures (specify)			

4. Sell livestock 5. Sell other assets 6. Borrow 7. Sell labor 8. Food aid 9. Receive cash from a family member 10. Lease out mining equipment 11. Seek employment in other miners 12. Others (specify)			
Preparations for off-season and crisis 1. Store food 2. Acquire assets 3. Save cash 4. Save minerals 5. Diversify income 6. Migrate for labor 7. Send children to relative 8. Others (specify)			

H. Ownership of Mines, Tenancy and Licensing

1) If you own/operate or work in a mine indicate their size and source

Mine (location)	Ownership/ labor division Pit owner 1=claim holder 2=pit owner 3=mine worker 4=reprocessing of tailings 5=sepecialized work-specify 6=service provider-specify	Source 1=Inherited from parents/family 2=Provided by relative/friend 3=Bought it 4=Rented (tenant) 5=Provided by village 6=Provided by government 7=contracted 8=others	Lease 1=Has land lease (owner has lease- if tenant) 2=Has no lease (owner has lease- if tenant)	Does your business /land lord has a license 1=Yes 2=No 3=Do not know

2) Other mine information

Explanation on specialized work	
Explanation on service provision	
If claim holder indicate the number of pits	
If pit owner indicate the number of mine workers	
If pit claim owner number of pit owners who are relative of the claim holder	
If pit owner number of mine workers who are relative	
Mine worker-number of hours per typical day	
Number of days per typical week	
MINING TOOLS AND EQUIPMENTS	NUMBER

OWNERSHIP BY HOUSEHOLD MEMBER	
Jack hammer	
Water pump	
Crusher	
Stamp mills	
Pan	
Shovel	
Chisel	
Blasting	
Machine	
Compressor	
Ventilation fan	
Generator	
Sluice box	
Pick axe	
Retort	
Others-specify	

I. Type of Minerals Mined and Market Outlets

Indicate the amount of minerals mined, outlet market, price and revenue received during the last 12 months

Mineral	Amount sold	Unit e.g. once or carat or grams	Market Outlet 1. Local buyer 2. Distant buyer 3. Company 4. Exported myself 5. Others (specify)	Price / unit	Revenue/year (Sh.)
					1)<500,000 2)=500,001 to 1mil 3)=1,000,001 to 2mil 4)=2,000,001 to 5mil 5)=5,000,001 to 10 mil 6)=Over 10 mil
TOTAL					

J. Expenditure of Income Earned from ASM during the last 12 months

Expenditure	Amount (Sh.)	Indicate approximate share (%) of ASM income
Food		
Other household expenditures		
Education		
Durables assets, radio		
Housing		
Agriculture		
Livestock		
Mining (license, capital, equipments)		
Means of transport (vehicle, bicycle, motorcycle)		
Recreation		
Health		
Bank saving		
Remittance		
Others		

TOTAL		
-------	--	--

K. Risks and Vulnerability

Latest incidence of	Time of occurrence 1. Current 2. Last 6 months 3. Last year 4. Over a year
Food shortage	
Financial crisis	
Low mineral prices	
One household member seriously sick	
AIDS related or long illness of a household member	
Death of a household member	
Mine related injury or accident of a household member	
Involved in mine related conflict	
Mine related health problem	
Mine related land eviction	
Mine related legal problems	
Mine related theft or loss or damage of property	
Fire incident	
Failure to recover money lent to another person	
Failure to pay back loan from formal or informal source	
Loss of food aid	
Loss of cash remitted by family member, relative or friend	
Member of household quit mining	
Others-specify	

L Health issues

Question	Yes	No
Has one member of the household fallen sick during the last 7 days?		
Have more than one members of the household fallen sick during the last 7 days?		
Is any of the health problems associated with working in the mines		
Has death of a household member occurred during the last 12 months		
<i>Have deaths of more than one household members occurred during the last 12 months</i>		
<i>Is any of the deaths due to long illness or AIDS related diseases</i>		
<i>Is any of the deaths related to working in the mines</i>		

M. Preferred Areas of Intervention

Given opportunity which aspect would you need intervention to enhance your mining activities

Aspect	Most important	Important	Moderately important
Credit access facilitation			
Credit management			
Technical skills training (mining and processing)			
Business management skills			
Market linkage and information			
Lease facilitation			

Conflict resolution			
Others (specify)			

N. Other questions

Question	Yes	No
Do you keep records of your mining and mining related business?		
Does anyone in the household have a bank account?		
Is anyone in the household a member of a SACCO?		
Does anyone in the household belong to association or cooperative of ASM?		
Have you ever (or anyone in the household) received credit for ASM from bank or any formal financial institution during the last 12 months?		
Have you ever (or anyone in the household) received credit for ASM from informal sources during the last 12 months?		
When selling minerals do you get your payment on spot?		
Do you perform any value adding process to your minerals e.g. polishing, cutting, grading, etc? Specify.		
Have you ever received (or any member of the household) training related to ASM? Specify.		
Are you a member of MWAREMA?		

OBSERVATION SHEET	
Name	Date
Interviewer	Village
Observations and discussions that are not recorded in the survey (from conducting questionnaire interview)	

Annex 4: Qualitative methods and sample selection

Summary of ASM study Qualitative Methods and Sample selection for Household Survey

Village	Method	Number of people	Selection criteria/details
Nyarugusu	Survey	149	Total population: 27,211 Number of households: 3625 Hamlets (Zahanati, CCM, Makanisa, Mwabageni, Lukaya) Estimated numbers of wealthy, middle, poor households based on initial focus group with village leaders. NB: details on the population in each hamlet were not available
	Semi-structured interviews	23 (6 female 17 male)	<ul style="list-style-type: none"> • Male destitute child • Male destitute child • Male lame child • Male transporter • Male mine inspector • Female seamstress • Female businessperson (guest house owner/claim holder/crusher) • Male miner (mvutafero) • Female farmer • Female miner (claim holder) • Male miner (pit owner/millowner) • Female barmaid • Male miner (mwoshaji) • Male miner (pit owner) • Elderly Male farmer (ex-miner) • Male miner (claim holder/transporter) • Male miner (claim holder) • Male miner (mwosha marudio/mchekechaji) • Male miner (karasha operator) • Male (old man) farmer • Male miner (pit owner/farmer) • Male miner (mponchaji) • Female farmer
	Focus Group Discussions	3	<ul style="list-style-type: none"> • Village wealth ranking • Poverty/Vulnerability analysis • Institutional analysis
	Case studies (technical and economic details + life histories)	3 (3 male)	-Sadick Maulid (artisanal pit owner) -Nsangano Paulo (small-scale miner/claim holder) -Golden Hainga (small-scale miner/claim holder) Selection criteria: range of scale of mining activities

	Basic village information	Location: 39 kms from Geita town Total population: 27,211 Number of households: 3625 Hamlets: 11 (Zahanati, Ziwani, Lukaya, CCM, Kanyalu, Msikitini, Ililika, Makanisa, Mwabageni, Mgongonje, Mwabasabi)	
Mgusu	Household survey	62	Total population: 4437 Number of houses: 989 Hamlets: 4 (& population): -Mtoni – 586 -Mlimani – 1201 -Soko Jipya – 1466 -Machinjioni – 1184 Selection criteria: 3 % of households in each hamlet.
	Semi-structured interviews	11 – male 1 - female	<ul style="list-style-type: none"> • Male (15 years) • Male (13 years) • Male miner (pit owner) • Old man – 1st settlement Village government leader/pit owner • Male head teacher (primary) • Old man miner (claim holder) • Male miner (mwalo owner & karasha owner) • Male miner (karasha operator) • Male broker (gold buyer) • Male Medical Assistant • Male broker (kota) • Female trader
	Focus Group Discussions	3 (mixed sex)	<ul style="list-style-type: none"> • Village wealth ranking • Poverty/Vulnerability analysis • Institutional analysis • Time line
	Case studies (technical and economic details + life histories)	2	-Women stone breakers group (Tuleane A) - Pit establishment and organisation

	Basic village information	<p>Size (Area): 873.5 hectares Ward: Mtakuja ward Total population: 4437 Number of houses: 989 Hamlets (& population): -Mtoni – 586 -Mlimani – 1201 -Soko Jipya – 1466 -Machinjioni – 1184 Size (Area): 873.5 hectares Estimated numbers of wealthy, middle, poor households based on initial focus group with village leaders. Health facilities: -2 (private) dispensaries -7 drug stores -1 laboratory Education: 1 Primary school = 823 pupils (403m=420f) 7 teachers</p>	
Mabuki	Survey	85	<p>Total population: Total households; Hamlets: 5 Mabuki, Mwazenza; Busekwabole; Ng'wanangwa A; Imalange Selection criteria: Most populated hamlet; low income hamlet; middle income hamlet; predominantly livestock keeping hamlet/rich households; ASM area</p> <ul style="list-style-type: none"> •
	Semi-structured interviews	7 (4 males, 3 females)	<ul style="list-style-type: none"> • Female miner (mchimbaji) • Female farmer/miner (mchimbaji) • Male Dealer (Mpembeji) • Male Dealer (Mpembeji) • Male businessperson (ex-miner) • Male farmer/miner • Female farmer • Male farmer (ex-miner)
	Focus Group Discussions	5 (mixed sex groups)	<ul style="list-style-type: none"> • Village wealth ranking • Poverty/Vulnerability analysis • Institutional analysis • Time line • Artisanal miners
	Case studies (technical and economic details + life histories)		
	Basic village information	<p>Total population: Total households: 957 Hamlets (13) Mabuki (centre); Busekwabole; Bujingwa; Ipanga; Hilu; Mwangangala; Igongwa; Mwanachia; Imalange; Mwazenza; Mwabomba; Ng'wanangwa A, Ng'wanangwa B</p>	

District level		Interviews	<ul style="list-style-type: none"> • Geita District Planning Officer • Misungwi District Planning Officer • Geita Security Officer • Geita District Natural Resources Management officer • Geita District Trades Officer • District Manager – Poverty Africa (NGO) • Lake Zone Exploration Manager – Shanta Gold Mining Company Ltd • Goldsmith, Geita
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Annex 5: The Technical Observation Form

1.1 Mining Stage:

1.1.1 Drilling:

Project Identification:		
<ul style="list-style-type: none"> • Mine Owner: • PML Number: • Location: • PML Size (Hectares): 		
	Manual Drilling	Mechanized Drilling
Activity Description		
Number of Drillers		
Hole Diameter (mm)		
Hole Length (m)		
Hole inclination		
No. of drilling shifts		
Hours per shift (hrs)		
Drill rate (holes/shift)		
Drill rate (m/hr)		
Drilling machine: (Make, water inlet, etc.)		
Type of drill steel (single or extension)		
Drill bit (chisel, button)		
Drill bit diameter (mm)		
Drilling productivity (m/man-shift)		
Dust suppression measures		
Use of drilling safety gear (describe type)		
Describe drilling pattern		

1.1.2 Blasting:

Activity	Description
No. of blasters at the mine: No. of Helpers at the mine:	
No. of blasters per team: No. of helpers per team:	
Blasters' name(s): Helpers' Name(s):	
Blasting Licence Number(s):	
Type of explosives:	
<ul style="list-style-type: none"> • Cartridge explosives • ANFO • Detonating Cord (Cordtex) 	
Type of initiation:	
<ul style="list-style-type: none"> • Electric detonators • Fuse (type) • Igniter Cord • Shock tube 	

Blasting Machine used	
Ohmmeter used	
Connecting Cable	
No. of holes charged:	
Hole length (m):	
Amount of explosives & detonators:	
No. of cartridges (give size):	
Amount of ANFO (kg):	
Cordtex length:	
• No. of detonators/hole:	
• No. fuses & igniter cords:	
Type of stemming material	
Length of stemming (m)	
Advancement (m)	
Tonnage blasted (t)	
Type of cut (if any)	
Describe explosives storage (magazine, box, licence no.)	
Safety precautions at storage (fire extinguisher, lightening poles, embankment walls, etc.)	
Explosives records:	
Source of explosive supplies:	
Transportation procedures:	

1.1.3 Ventilation

Person responsible for ventilation:	
Ventilation Equipment and capacity (Fan, compressor, make)	
Air quantity at face (m ³ /sec)	
Air conveying tools (tubing, hoses, etc).	
Distance of tubing from face (m)	
Ventilation duration after blast (mins.)	
General description of ventilation system:	

1.1.4 Loading and Haulage:

Activity	Description
No. of people for loading:	
Loading equipment used:	
No. of people for haulage:	
No. of shifts for haulage:	
Hours per shift (hrs/shift):	
Describe haulage within the mine	
Describe haulage (mine to surface)	

(equipment, etc.)	
ore hauled /shift (t/shift)	
Waste hauled/shift (t/shift)	
Haulage productivity (t/man-shift)	

1.2 Processing Stage:

1.2.1 Crushing:

	Manual Crushing	Mechanized Crushing
Describe crushing process used (equipment type, make)		
Source of power and rated capacity		
Cooling system for power source		
Equipment ownership		
Number of operators		
Capacity (tons/hr)		
Dust generation and containment		
Noise levels		
Use of safety gear		
Fumes and hydrocarbons from power source		

1.2.2 Grinding:

Activity	Manual Grinding	Mechanized Grinding
Describe Grinding process used (equipment type, make)		
Source of power and rated capacity		
Cooling system for power source		
Equipment ownership (own, custom mill)		
Number of operators		
Capacity (tons/hr)		
Dust generation and containment		
Noise levels		
Use of safety gear		
Fumes and hydrocarbons from power source		

1.2.3 Sluicing

Activity	Description
Ownership of sluice box (own, hire,	

etc)	
Sluice measurements (width x length (cm))	
Sluice inclination angle	
Sluice box matting	
Feeder box size and capacity	
Mechanism for feeding water	
Water flow (m ³ /sec)	
No. of operators	
Tons washed/hour	
Tons washed before change of matting	
Describe collection of concentrate	
Containment of sediments and water	
Use of safety gear	
Is mercury added at this stage?	

1.2.4 Panning and Amalgamation

Activity	Description
Describe panning equipment used	
Ownership of panning equipment	
Pan measurements (diameter (cm))	
Amount of feed per panning round (kg)	
Panning rate (kg/hr)	
Amount of mercury used (gm/kg of conc.)	
Source of mercury	
Describe mercury storage procedure	
Weight of amalgam (kg)	
Containment of sediments and contaminated water	
Use of safety gear (e.g., gloves)	

1.2.5 Gold Recovery

Weight of amalgam (gm)	
Describe equipment used (retort, charcoal stove, etc.)	
Time for heating amalgam	
Weight of gold recovered (gm)	
Who owns the gold (mine owner, pit owner, all (number))	
Is gold stored or sold immediately?	
Is it sold at site, nearby town or other (describe)?	
Price of gold (TShs./gm)	
Realized total revenue (TShs)	
Who owns the revenue? (shared among miners, belong to owner)	
How is the price determined (fixed by buyer, negotiations, or other)?	
Are the miners aware of the	

changes in gold prices?

1.3 Cost of Production (for a fixed period)

Activity	No. of items	Unit Cost (TShs.)	Total Cost (Tshs.)
Labour: (if paying salaries)			
Labour cost (mine workers)			
Labour cost (crushing)			
Labour cost (grinding)			
Labour cost (washing/slucing)			
Labour cost (panning and amalgam heating)			
Processing Cost (Custom Milling):			
Crushing costs			
Grinding Costs			
Washing/Sluicing costs			
Panning and amalgamation costs			
Heating and recovery costs			
Cost of materials:			
Explosives and detonators:			
<ul style="list-style-type: none"> • Cartridge explosives • ANFO • Cordtex • Electric detonators • Fuses • Igniter Cord • Shock tubes 			
Working tools:			
<ul style="list-style-type: none"> • Spades • Shovels • Picks • Wire ropes • Ore hoisting bags • Boots • Helmets • Gloves • Goggles 			
Mine support materials:			
<ul style="list-style-type: none"> • Timber • Bolts and nuts • Other Support materials 			
Fuels and Lubricants:			
<ul style="list-style-type: none"> • Diesel • Petrol • Grease • Oils 			
Other Consumables:			
1.			
2.			
3.			
4.			
5.			
6.			
7.			

8.			
9.			
10.			
Miscellaneous expenditures:			
<ul style="list-style-type: none"> • Food for miners • Drinking water • Processing water • Other expenditures 			

Annex 6: Government Minerals Strategy: Sections Relevant to the ASM Sector

In order to realise objectives of the Mineral Policy of Tanzania, the Government put in place specific strategies. Some of the strategies that are relevant to the ASM sector include the following:

Identification of the Government functions in the development of ASM sector as “Reinforcing the provision of extension services and assistance to artisanal and small-scale miners in adopting safe and environmentally-sound mining and processing practices”.

Identification of the ASM constraints to the development of the small-scale mining sector.

Setting Directions and Strategies for ASM Development that include:

Rationalization of artisanal and small-scale mining:- transforming and upgrading ASM activities into organized and modernized mining, facilitate the availability of appropriate and affordable technology; promoting partnership between miners and large-scale investors; providing extension services in mining, mineral processing and marketing; streamline and simplifying licensing of artisanal miners and mineral dealers; prepare, disseminate and enforce a code of conduct for mining and processing and to promote marketing arrangements which are receptive to the needs of the sector.

Legal and regulatory framework:- Streamlining the licensing procedures in order to harmonize small and large-scale mining operations and ensure transparency and fairness by conferring ownership of mineral rights on the basis of first come, first serve basis.

Strengthening appropriate Financial services:- Supporting the formation of formal enterprise groups, formalize traditional funding systems, e.g., hire-cum-purchase systems, forward sales, mutual group saving schemes and encourage banks to develop mine finance expertise, establish mobile and commercial banks in mining areas; encouraging existing financial institutions to support the sector through affordable credit schemes and start-up capital requirements and promote the use of third party guarantees to enable institutions assist miners to get loans, are envisaged; facilitate the creation of mineral property markets to enable discoverers sell their properties, assist establishment of miners cooperative banks and informal financial institutions, establish trust fund to finance simple equipment and other inputs and devise mechanism for its replenishment and to promote a savings culture amongst miners through awareness programmes.

Establishing formal marketing systems through ensuring the growth of both local and export markets, simplifications of licensing procedures for dealers and traders, rationalizing fiscal terms, providing marketing extension services and instituting stiff penalties on mineral smugglers; facilitating establishment of competitive mineral markets close to mining areas that are operated by mining associations, licensed dealers, individuals, companies and financial institutions; Provide up-to-date minerals markets information, offering incentives to encourage export promotion activities, promoting formal financing schemes, promoting direct sales to foreign buyers and utilizing the country foreign missions to identify markets, link them to dealers and initiate promotional programmes.

Environmental management for small-scale mining:- Demonstrating and encouraging environmentally sound technologies, providing environmental information and obligations leaflets in the national language (Kiswahili) and improving awareness through the media; building partnerships with different stakeholders in ensuring environmental awareness and management, establishing strict standards in densely mined areas and carry out regular monitoring; specifying environmental control measures based on “polluter pays” principle and to establish proper authority structures to uphold law and order and facilitate enforcement of health and safety regulations.

Health and Safety by establishing health and safety regulations and preventive measures for accidents and other hazards; strengthening and enforcement of regulations and improving health and safety education and investment in health care facilities; encouraging mining communities to take initiatives for private provision of essential infrastructure and services.

Women and Children Issues:- addressing issues that limit effective participation of women and those that lead to premature introduction of children to mining. The set out strategies include, encouraging and facilitating employment and involvement of women in mining development, alleviating barriers limiting

women involvement as potential investors and conducting awareness programmes in order to encourage acceptability of women participation. Enforcement of regulations against child labour and imposing stiff penalties, addressing poverty problems and providing viable alternatives, targeting children in mining areas for their education and supporting and promoting productivity enhancement programmes that can eliminate child labour.

Institutional Framework by building a stronger and efficient institutional setup pertinent to the development of the entire mining sector. For small-scale mining in particular, this would include improvement of information flow systems to sensitize and create awareness on opportunities present and regulations governing the sector; strengthening the existing training institutions, establishing vocational training centres and bringing administrative and technical support services closer to the mining centres.

Annex 6: Protected areas

Protected areas mainly refer to those areas under the jurisdiction of certain laws that control the use of its resources. Such areas include the Forest Reserves, Game Reserves, Conservation Areas, National Parks.

According to the Mining Act, 1998, a mineral right cannot be issued in a controlled area unless a permit from the responsible authority has been obtained. Similarly, the respective laws managing the controlled areas have a requirement for a permit before any activity can be undertaken in such areas. For example, under the Forestry Act, 2002, permits are required for activities carried out in national and local authority forest reserves for:

- Felling or extraction of timber (for domestic use; export; mining purposes; or for prospecting and for exploitation of mineral resources).
- Gathering and picking parts or extracts of any protected plant for the purposes of research or the production, manufacture of any medicine or product.
- Erection of buildings or other structures.
- Construction of roads, bridges, paths, waterways or runways;

Overall, one cannot obtain a mineral right to operate in a protected area without permission of the responsible institution. There are reports of artisanal mining in certain areas of game reserves and national parks, e.g., in the Serengeti National Park. These would be illegal operations and the National Parks Authority would be expected to ensure that no such activities take place. Gold rush areas have also occurred in controlled areas, e.g., that in Amani Forest in Tanga. These are still illegal activities that take place without any authorizations of the Mining Department and which should be stopped by the responsible authorities.

The existence of Mgusu within Geita Forest Reserve is classic in this sense. Although prohibited by Law and not yet sanctioned by the Natural resources Authorities to occupy the area, Mgusu community seems to be silently accepted by authorities. For example, Mgusu residents recall how the Geita DC once stopped the District Natural Resources Officers to institute a regulation regarding people's occupation of Forest Reserves. According to this regulation, every household would have been supposed to pay TShs 2000 per day for residing in the Reserve. Around late 2003 the DC eventually approved their community's application letter to have their village formally registered. The Director of Forestry and Beekeeping of the MNRT has assigned his officers to evaluate the area in view of Mgusu's occupation for further processing of the issue³⁸.

³⁸ The Geita DNRO confirmed that the evaluation of Mgusu area was conducted in December 2003 together with 2 Officials from the MNRT.

Annex 7: Tanzania Gold Production and Value (1930 - 2003)

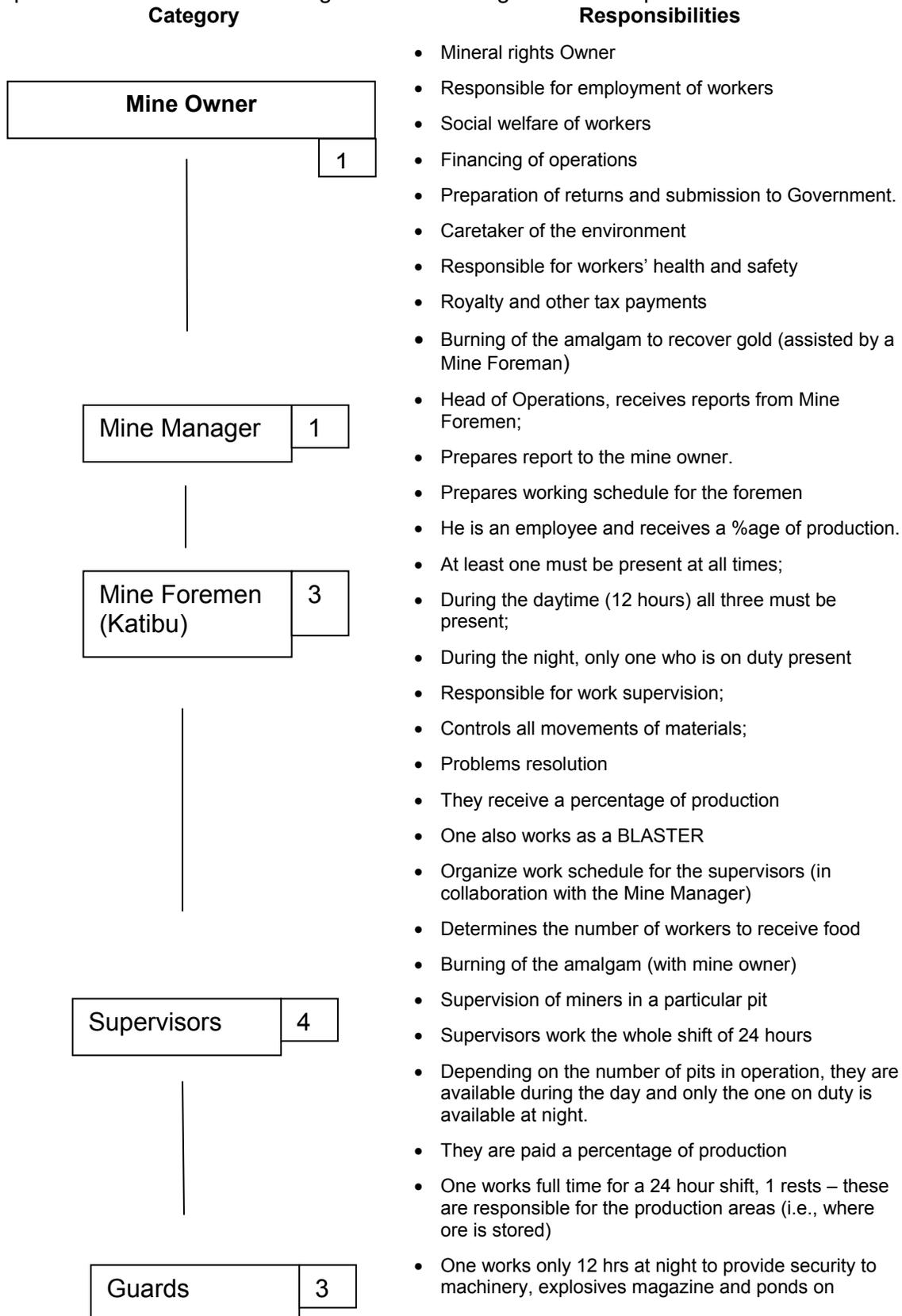
Year	Production (Ounces)	Value (UK £)	Year	Production (Ounces or kg)	Value (TShs/ US \$)
1930	129,777	46,917	1966	55,472.88	14115,500 (TShs)
1931	15,398.52	58,449	1967	18,528.58	4666922 (TShs)
1932	30,880.96	149,604	1968	-	-
1933	39,533	201565	1969	-	-
1934	54,702	290647	1970	-	-
1935	62,612	371218	1971	-	-
1936	85,995	490490	1972	-	-
1937	93,110	525394	1973	-	-
1938	11,2265	587256	1974	-	-
1939	-	-	1975	-	-
1940	144,265	1211788	1976	-	-
1941	142,685	1198322	1977	-	-
1942	106,835	897355	1978	-	-
1943	72,723	610876	1979	-	-
1944	55,148	463213	1980	-	-
1945	50,659	436303	1981	-	-
1946	48,493	418251	1982	11454.96	1326314(TShs)
1947	47,356	408443	1983	17650	3074328(TShs)
1948	57,557	496432	1984	-	Consumed by producers
1949	68,989.27	692574	1985	54530.4	9486580 (TShs)
1950	65,241.1	809814	1986	55407	99983243.80(T Shs)
1951	66396.6	830273	1987	14.2	116024704(TShs)
1952	64693 2738	850268 36163	1988	52000.5	N.R.
1953	69876	903860	1989	111,707	1,152,057(US\$)
1954	71357	890681	1990	1,643.230 kg	13,635,060(US \$)
1955	68892 6141	864279 77088	1991	3,779.043 kg	29,099,700(US \$)
1956	59293	741582	1992	4,524.966 kg	40.380(US\$ Mill)
1957	54088 9192	678287 114660	1993	3,364 kg	31.45 (US\$ Mill)
1958	56299 11951	705180 148987	1994	2,803 kg	27.39 (US\$ Mill)
1959	85403 10391	1067218 130057	1995	322 kg	3.29 (US\$ Mill)
1960	98046 8963	1231666 112642	1996	301 kg	2.78 (US\$ Mill)
1961	100981	1266637	1997		

	521	6525			
1962	101972	1275099	1998		
1963	102917	1289390	1999	4,889.80 kg	39.80 (US \$ Mill)
1964	93040	1169114	2000	15,062.80 kg	120.50 (US \$ Mill)
1965	90819	1140382	2001	30,088.00 kg	256.80 (US \$ Mill)
			2002	43,320.00 kg	374.33 (US \$ Mill)
			2003	48,045.70 kg	504.14 (US \$ Mill)

Source: Ministry of Energy and Minerals (Various Reports)

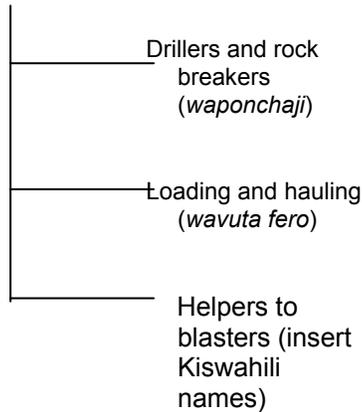
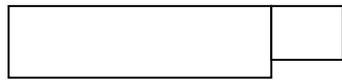
Annex 8: Organisation of a small-scale gold mining operation

Operations where the mineral rights owner manages the entire process



surface.

- Mine owner keeps most facilities at home since he is still in construction stage.
- They are paid a percentage of production
- At the time they were 32, however, this number changes depending on production activities
- They are paid as a group 30% of production



Other Workers:

- Construction Workers (surface work) Paid cash per contract of construction
- Timber men and Helpers Paid cash per timber work done
- Pit Developers Paid TZS 2,000 per foot of advance
- Cook
 - Paid cash according to the number of people fed
 - The number of people to be fed is determined by the Mine Foreman (Katibu)
- Cleaners
 - Cleaning of the surroundings (environmental)
 - Filling old pits
 - Paid cash according to piece of work given
- Casuals for cutting timber logs
 - Cutting logs in the forest, loading and offloading at the mine
 - Paid per piece cut = TZS 200/=
- Processing Casuals
 - 3 – manual crushing
 - 2 – grinding (looking after the material at the mill)
 - 6 – washing, panning and amalgamation (*waoshaji* and *wachenjuaji*)

Source: 2004. Nyarugusu