



Global Mercury Project

Project EG/GLO/01/G34:
Removal of Barriers to Introduction of Cleaner Artisanal Gold Mining and Extraction Technologies



SOCIO-ECONOMIC SURVEY OF RWAMAGASA MINING SITE IN GEITA DISTRICT

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ACRONYMS

AIC	The African Inland Church
DED	District Executive Director
DEO	District Education Officer
DMO	District Medical Officer
FGDs	Focus Group Discussions
GDC	Geita District Council
GGM	Geita Gold Mining Limited
MPs	Members of Parliaments
MWAREMA	Mwanza Region Miners Association
MWAWOMA	Mwanza Women Miners Association
NGOs	Non Governmental Organizations
STD/AIDS	Sexual Transmitted Diseases/Acquired Immuno Deficiencies Syndrome
TBAs	Traditional Birth Attendants
TTCL	Tanzania Telecommunication Company Limited
UNIDO	United Nations Industrial Development Organization
VEO	Village Executive Officer
VETA	Vocational Education Training Authority

EXECUTIVE SUMMARY

Introduction

Mercury is used in artisanal mining, whereby, for every gram of gold collected, about two grams of mercury are dispersed into the environment. Artisanal mining activities provide income to the poorest segment of society in many developing countries, including ethnic minorities, a great majority of these miners being women and children.

Plans are underway for introducing cleaner artisanal gold mining and extraction technologies. The primary target beneficiaries of the program will be artisanal miners – men and women alike. In order to effectively introduce this new program on cleaner and more efficient artisanal gold mining and extraction technologies, a study of the mining communities - their social services, their activities, their surroundings, and their food and water consumption patterns - was required.

This socio-economic study was carried out in one representative mining site, namely, Rwamagasa Village, Rwamagasa Ward in Geita District, Mwanza Region, Tanzania.

Objectives

The objectives of this socio-economic study were to collect sufficient data and knowledge about the artisanal mining communities at Rwamagasa in Geita district with respect to: Types of human habitats and proximity to the mines, educational services, health services and health education. Also information about the artisanal mining, their occupational activities linked to gold production. Types of occupational activities in the community not related to mining. The issue of income and expenditure levels, water sources, accessibility, quality and distribution, willingness to participate on the medical check-up and to learn the new technology.

Methodology

The methodologies used included documents analysis of existing information, discussions with key informants such as district and local government leaders/officials, NGOs as well as leaders and representatives of women's associations, focus group discussions with male miners, female miners, a mixed group of male and female miners (so as to observe gender dynamics), women catering for the miners, and other groups related to mining and, lastly, structured interviews with 250 randomly selected community members.

Summary of the major Findings

Rwamagasa Village is in Rwamagasa ward, Busanda division, in Geita District, Mwanza region, south of Lake Victoria. Rwamagasa village is located south-west of Geita town. Geita town serves as the administrative centre for the district. Geita district is divided into 7 divisions, 33 wards and 185 villages. Rwamagasa is one of a village located in the Rwamagasa Ward. The village is divided into 5 vitongoji (sub-villages) that is, Elimu, Isenyi, CCM, Lubinga and Imalanguzo. Rwamagasa ward, which is a typical rural area, has a total population of 26,990, comprised of 13,879 males and 13,111 females, with 5,017 households having an average size of 5.4 people.

The main ethnic groups in the Geita District are Walongo, Wasubi, Wasukuma and Wazinza. The same tribes are residing at Rwamagasa Village with other ethnic groups as well. On the randomly selected respondents, only 98% have lived there for more than five years.

Land tenure in Rwamagasa village is granted through an allocation system managed by the village administration. Rwamagasa village as well as Geita town has a big number of people who have immigrated there in search of self employment in the artisanal mining or employment in the newly established gold mining. A few people practice licensed business, while the rest are petty traders.

The major economic activities in Geita District are farming, livestock keeping, trading, fishing and mining. At Rwamagasa village, they produce cash crops including cotton and paddy. Other economic activities performed at the village are: artisanal mining, livestock keeping, food vendors and other petty business.

Most people have an income of below Tz Shl 50,000 (1 US\$ is equivalent to 1035 Tanzanian Shillings) per month (64%), while 24% earn between 51,000 – 100,000 and only 3% get more than 200,000 per month. However, when asked about their expenditure, only 45% said that they spent more than Tz Shl 50,000/mo and 7% said they spend more than 200,000/mo. This is typical of a general pattern in the country, whereby people manage to get extra funds in one way or another, outside their regular income, in order to survive.

Gold mining, which is done in Geita district, is of two types: small-scale artisanal mining, which is conducted in 250 small scale mining sites having an average of 8.3 ha, in size, and large-scale mining, which includes sub-components of research, actual mining and master gold dealers. The majority of artisanal miners are in Nyamtondo, Rwamagasa, Nyarugusu and Nyakagwe wards. The residents of Rwamagasa are primarily involved in mining activities.

Geita district has 210 pre-schools, 228 primary schools and 9 secondary schools as well as adult literacy classes. The pupil drop out rate is another serious problem in the district, including Rwamagasa village. At Rwamagasa Village, there are two primary schools with 1,650 pupils, 890 boys and 760 girls. Only 18% of the respondents had higher than primary school education.

The community of Rwamagasa village does not have adequate health services. They are in the process of constructing their own village dispensary. Out of 848 households at Rwamagasa, only 625 have pit latrines. The village lacks social welfare services and a police post for security.

There are trunk roads which are supposed to connect bordering countries, regional roads which connect regions within the country, district roads which connect neighbouring districts, and feeder roads usually leading to district roads. At Rwamagasa village, there are no telecommunication services. The villagers depend upon the services available in Geita town.

Among the people interviewed at Rwamagasa village, 54% are engaged in mining alone, while 14% are engaged in a combination of farming, mining and petty business, 9% practice farming along, 7% buy gold and other minerals and 5% operate bars, hotels and guest houses. The focus group discussion reported that the major economic activities for women in that village are food vendors (*mama lishe*), selling vegetables in the market, saloon, tailoring and few in the mining activities. The agricultural activities are done by both women and men.

The main source of water is from boreholes (63%), followed by shallow wells (20%), rain water and shallow wells (10%) and river and shallow wells (4%). Water for washing/bathing is fetched from boreholes (55%), shallow wells (15%), rain water (10%) and rain water (11%). The quality of water is not safe since the same sources are used for processing gold.

Most of the respondents (40%) spend 12 hours per day in processing gold. The respondents were asked to indicate when they started the mining activities. They said that mining activities started in 1972, but many had moved from different mining sites. The activity of mining gained momentum at Rwamagasa from 1998 onwards. When asked why the number is increasing, the respondents mentioned that a number of them were given compensation by Geita Gold Mining Company (GGM), which is based in Geita Town, and they opted to invest the money gained into small-scale mining. Some of the respondents (36%) are members of the mining association (MWAREMA).

Many of the enterprises such as small-scale mining and small business are basically family affairs. The artisanal miners dig shafts, crush the ore and recover the gold using mercury. They work with their bare hands when using mercury for gold recovery.

The small-scale miners, together with other entrepreneurs associated with gold mining are faced with a host of problems. More than half of the interviewers (56%) said that the main problem was lack of equipment and proper tools, which often resulted in injuries and fatigue. The second biggest problem mentioned by the 16% respondents was insufficient working capital and lack of reliable market for their gold. At present, 65% now sell their gold to businessmen ('Makota') or to the prominent, licensed, small-scale miner based in the village known as Kadeo Blue Reef Gold Mining Company. Also, there is insufficient water for cleaning gold. The respondents were also concerned about the high tax rate charged for mining (37%). The focus group discussions with the Mwanza Women Miners Associations (MWAWOMA) were also concerned with the above problems and reported that, in addition, they encounter the problem of theft, since there is no security system in the mining area.

They learned about the effects from the Resident Mining Officer (50%), UNIDO 6%, Mass Media 15%, other people 16%, Books and seminar 9% and VETA (10%). Others heard this information from their friends (6%). There is substantial number of women who were not informed.

Most of the respondents are willing to adopt a new technology (94%). Regarding strategies for learning the new technology, 78% of the respondents said they would like to be trained through demonstration.

During the focus group discussions, women were less informed about the effects of mercury than men. Most of them do have access to gold pits, but they do not own or have mining licenses. Only 9% actually own mining pits.

Summary of Conclusions and Recommendations

Based on the above analysis the following conclusions can be made:

- Most of the artisanal miners do not own claims and, every three days, 30% of the ore dug out of the ground is given to the claim holder
- Very few miners know the effect of mercury especially women
- Most of the miners were very willing to learn the new technology.
- Most of them are not members of mining associations.

The following recommendations can be made:

- The artisanal miners should be educated regarding the hazards of using mercury.
- A multiple approach should be used to introduce the new proposed technology including tours to other places where the new technology is already in use, seminars and short courses in the mining area and practical demonstrations.
- Alternative sources of income should be found for the Makota who are presently earning their living by selling mercury.

1.0 GENERAL INTRODUCTION

1.1 The Context

Mercury is one of the most toxic substances in the world and has the potential for causing significant environmental damage and health problems when improperly handled. Mercury is used in artisanal mining, whereby, for every gram of gold collected, about two grams of mercury are dispersed into the environment through artisanal mining activities. These artisanal mining activities provide income to the poorest segment of society in many developing countries, including ethnic minorities and a great majority of these miners being women and children.

When mercury is used in mining, it is absorbed by humans through food or contaminated air and may often result in irreversible neurological diseases or death of men, women and children. Moreover, habitats are sometimes permanently ruined.

The relative simplicity and effectiveness of the technology associated with the use of mercury, known as amalgamation, mask its dangers. The process can be improved by using procedures that involve highly efficient devices such as retorts that can be manufactured locally at a low cost.

Plans are underway for introducing cleaner artisanal gold mining and extraction technologies. The objective of this program is to replace mercury amalgamation with improved technologies while at the same time improving the income of the miners through more efficient recovery. This will necessarily involve increasing knowledge and awareness amongst all stakeholders and providing advice concerning the adoption of new policies and regulations related to artisanal gold mining, with due consideration for gender issues.

The primary target beneficiaries of the program will be artisanal miners – men and women alike. The secondary beneficiaries will be governments, local institutions and the society at large due to the very nature and extent of the damage caused by the present methods of artisanal mining.

The activities of the program will mainly be directed towards the introduction of safe and high-yield extraction methods that could pre-empt the use of mercury. This will entail the dissemination of knowledge on appropriate new artisanal mining technology, the training of miners in the application of this technology, the training of local manufacturers, the creation of awareness concerning environmental issues and advising governments and local institutions concerning new policies.

In order to effectively introduce this new program on cleaner and more efficient artisanal gold mining and extraction technologies, a study of the mining communities - their social services, their activities, their surroundings, and their food and water consumption patterns - was required.

This socio-economic study was carried out in one representative mining site, namely, Rwamagasa Village located in Rwamagasa Ward in Geita District, Mwanza Region,

Tanzania.

1.2 Objectives of the Study

The objectives of this socio-economic study were to collect sufficient data and knowledge about the artisanal mining communities at Rwamagasa in Geita District with respect to:

- The structure and demography of the community living in the vicinity of the selected mining site, including ethnic diversity.
- Types of human habitats and proximity to the mines.
- Educational services.
- Health services and any possible health education related to mining.
- Information about those occupied with artisanal mining, including time spent at the mine.
- Detailed description of the overall process of gold production, focusing on the use of mercury and the locations where the burning of the amalgam occurs.
- Occupational activities linked to gold production (mercury selling, gold trading, catering for miners, etc.).
- Types of occupational activities in the community not related to mining.
- Income levels.
- Food consumption patterns, including an estimate of the proportion of local product consumption.
- Water sources, accessibility, quality and distribution.
- The use of river water for irrigation, fishing, washing, drinking purposes, etc.
- The attitudes and behavior patterns in the community which may either act as barriers or which might facilitate the introduction of the proposed new technology in artisanal mining. For example:
 - Willingness to learn the new technology
 - Difficulties they expect to encounter in the change over

2.0 METHODOLOGY USED

2.1 Study Site

The study was conducted in Rwamagasa Village, Geita District, and Mwanza Region.

2.2 Documentary Review

Documents related to the artisanal mining and gender issues were reviewed these included statistics and information about socio economic issues of Geita district and its micro-projects. This information was compiled and synthesized so as to present a concise overview of the overall project.

2.3 Interviews with Key Informants

Key informants were interviewed according to a pre-designed checklist. The key informants were district and local government leaders/officials, NGOs as well as leaders and representatives of women's associations.

2.4 Focus Group Discussions (FGD)

Focus groups discussions were held with male miners, female miners, a mixed group of male and female miners (so as to observe gender dynamics), women catering for the miners, and other groups related to mining. These were semi-structured in that part of the discussions was based on a pre-prepared list of questions/ topics and part was based on open, free discussion. Discussions lasted for 1 hour for each group.

The topics discussed with women included problems faced by women when starting or improving their gold mining projects, interactions between men and women, gender balance in economic power and decision-making, and their awareness of mercury uses and its effect on human beings.

Focus group discussions were important because they enabled the consultant to cross check the information gathered through the questionnaire. Multiple sources of information were used to ensure the validity of the information given by respondents.

2.5 Structured Interviews with Community Members

Capable individuals in the area were selected and trained to administer the questionnaires. Structured interviews were held with 250 community members sampled using stratified random sampling. That is, various strata were identified in the community to represent different areas and different groups of people such as miners, people providing services to miners, traders, and people involved in other types of activities, with gender balance proportional to the population. Within each group, individuals were sampled randomly for interview.

The type of information obtained from the interviews has already been mentioned in the objectives. When asking questions regarding attitudes and behavior patterns that may either act as barriers or facilitate the introduction of the proposed new technology in artisanal mining, a brief, objective description of the new technology was first provided.

3.0 SOCIO-ECONOMIC PROFILE

3.1 Description of Rwamagasa Village

Rwamagasa Village is in Rwamagasa ward, Busanda Division, in Geita District, Mwanza Region, south of Lake Victoria, Tanzania. The village is divided into 5 *vitongoji* (sub-villages) that are: Elimu, Isenyi, CCM, Lubinga and Imalanguzo. According to the elders who are the members of the Rwamagasa Village, the word “Rwamagasa” comes from the indigenous word “Ngwasa” which literary means “animals’ veins”. The village was famous for producing animals’ veins used for tying bows for hunting with arrows, which was the main subsistence activity in that community. The neighboring villages use to come to Rwamagasa to purchase the animal’s vein and there was nowhere else they could get them. Thus, the name of the village has been Rwamagasa up to the present.

It should be noted that when explaining the socio-economic profile of Rwamagasa it is not proper to avoid the profile of Geita District as an entry point. Geita District is located 2° 08’

to 3° 28' South of the Equator and longitude 32° 37' to 37' east of Greenwich (see map of Tanzania below). Rwamagasa village is located southwest of Geita town.



Geita town is 100 km from Mwanza by road via two ferry routes, i.e., Kamanga and Busisi. On the other hand Rwamagasa Village is 25 kilometers from Geita town on earth road. There are also two airstrips, one belongs to the Geita Gold Mining Company and the other one to the forest reserve. Dar es Salaam can be accessed from Mwanza by air which takes 1 hour

for large planes and an hour and half for small planes. There is a railway line from Dar es Salaam to Mwanza which takes 30 hours. Also Mwanza is accessible by road by bus in different route such as Dar es Salaam - Arusha via Nairobi - Mara region to Mwanza; this takes about 20 hours. Another road route is Dar es Salaam - Dodoma region - Singida region - Shinyanga region to Mwanza, which takes about 24 hours. For private vehicles, one can use Dar es Salaam - Arusha via national parks i.e. Manyara, Ngorongoro, Soronera and then Mwanza. (no buses uses this route). It is hard to establish the distance from Dar es Salaam to Mwanza because it depends which route one is using. However Dar es Salaam to Mwanza is approximately 1000 kilometers.

3.2 Climate

Geita District has two main rainy seasons that run from November to December and February to May with the mean annual rainfall of 1264 mm. The annual minimum and maximum temperatures for Geita range between 14°C and 30°C.

3.3 Topography

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

3.4 Administrative Structure

Geita town serves as the administrative center for the district. The District Council (GDC/Council) is the policy and legislative making organ as well as the overseer of all developmental issues in the district. The district Executive Director (DED) heads the Secretariat of the Council. The district has 43 Councilors from all the administrative wards and appointees on special seats. The three Members of Parliament (MPs) come from their respective Constituencies and at the same time serve as Councilors.

3.5 Population Size, Growth, Density and Spatial Distribution

Geita District has one of the largest populations in Mwanza Region. According to the 2002 census, it has a total population of 712,195, comprised of 355,823 males and 356,372 females. There are a total number of 115,640 households with an average household size of 6.2. The district is growing very fast, considering that there were only 439,191 people during the 1988 census.

Rwamagasa ward, which is a typical rural area, has a total population of 26,990, consisted of 13,879 males and 13,111 females, with 5,017 households having an average size of 5.4 people.

Geita district is divided into 7 divisions, 33 wards and 185 villages. The district occupies a total area of 7,825 sq. km, out of which 6,775 sq. km is dry land and 1,050 sq. km is water. Rwamagasa is one of a village located in the Rwamagasa Ward.

3.6 Religion

The main religions in the district are Christianity, with different denominations, and Islam. According to the Village Executive Officer (VEO), at Rwamagasa village most residents are Christians belonging to the Catholic Church, Lutheran, Methodist (TCMC), The Tanzania Assemblies of God and The African Inland Church (AIC). All these religious groups have places of worships at the village.

3.7 Ethnic Groups

The main ethnic groups in the Geita District are Walongo, Wasubi, Wasukuma and Wazinza. However, due to the presence of the gold mines in the area, lately there has been an influx of different ethnic groups from all over the country, coming as families. The same tribes are residing at Rwamagasa Village with other different ethnic groups.

3.8 Land Tenure

According to the VEO of Rwamagasa, land tenure in Rwamagasa village is granted through an allocation system managed by the village administration. Land is obtained by registering with the village government by providing a reference from their previous village leadership who gives the required purchase price of the land. Land ownership is principally in the hands of men. Young population has to rely on goodwill from friends or relatives, inheritance or buying arable land or plots. Women do have access to land but are not supposed to inherit their father's land. This has in the long run left women without land.

3.9 Migration

Rwamagasa village as well as Geita town has a big number of people who have immigrated there in search of self employment in the artisanal mining or employment in the newly established gold mine. Together with this the village is highly populated without enough social services to cater for all. No record was available to establish the number of migration.

3.10 Employment Patterns

Formal and informal employment is a major activity in the Geita town. Formally, people are employed by the Government institutions, Parastatal organizations, Geita Gold Mine (GGM), NGOs, etc. A few people practice licensed business, while the rest are petty traders. Most of these are concentrated in Geita Township, followed by the small-scale mining areas such as Rwamagasa, Mgusu, Nyarugusu, Nyamtondo and Nyakagwe.

3.11 Major Economic Activities

The major economic activities in Geita District are farming, livestock keeping, trading, fishing and mining. The district has about 206,000 hectares of arable land and 252,000 hectares of grazing area. The food crops grown in the district include maize, cassava, sweet potatoes and bananas.

At Rwamagasa village, they produce cash crops include cotton and paddy. Tillage of land is done by hand with hoes. Other economic activities performed at the village are: artisanal mining, livestock keeping, food vendors and other petty business.

Gold mining, which is done in Geita district, is of two types: small-scale artisanal mining, which is conducted in 250 mining sites having an average of 8.3 ha, in size, and large-scale mining, which includes sub-components of research, actual mining and master gold dealers.

According to the Resident Mining Officer of Geita District, the majority of artisanal miners are in Nyamtondo ward, Rwamagasa Ward, Nyarugusu ward and Nyakagwe ward. The residents of Rwamagasa are primarily involved in mining activities. Gold extraction is a labor intensive activity, drawing on all members of the community, including young children who are involved in the processing of gold. The **number of artisanal miners** is unknown but it is estimated to be as many as **150,000**. Practically all of them are mining illegally without licenses or the approval of the authorities. Also there is a substantial influx of fortune hunters. There is no research done to establish how men, children and women are involved in the artisanal mining in the district.

3.12 Income Levels, GDP and Standard of Living

In Geita district, many people are employed in the informal sector to support the population. The main job generators in the informal sector are artisanal mining, fishing, agriculture and livestock keeping. Also, many people are employed in rural trade, retail shops, and the supply of accommodation and food in eating places.

3.13 Social Services

3.13.1 Education

Pre-School Education

According to the District Education Officer (DEO), the district has 210 pre-schools. Many of these schools are operating on primary school premises. Generally, pre-schools have no permanent structures, nor teaching learning facilities. At Rwamagasa ward, there are two pre-schools with 420 pupils, 260 boys and 160 girls.

Primary School Education

Enrolment of children in Standard I have increased tremendously over the past three years. The Table 1 shows the enrolment trend for Standard I in Geita District by sex from 2000 to 2003:

Table 1: List of Enrolment of Children in Standard I – 2000 - 2003

Year	2000	2001	2002	2003
Boys	10,705	12,167	21,948	12,828
Girls	9,897	11,182	19,458	12,101
Total	20,602	23,349	41,406	24,929

Source: District Education Officer, Geita district

There are 228 primary schools. Most of them have a shortage of classroom buildings, teacher's houses, latrines and furniture. Table 2 shows the requirement, the availability and the shortage of each item:

Table 2: Availability and Shortages of Teachers and Classroom Buildings

CLASS ROOMS			TEACHERS			LATRINES			DESKS		
Req	Avail	Def	Req	Avail	Def	Req	Avail	Def	Req	Avail	Def
3105	1086	2019	3309	369	2946	6627	1046	5581	6478	2264	4214

TABLES			CHAIRS			CUPBOARDS		
Req	Avail	Def	Req	Avail	Def	Req	Avail	Def
5739	970	4769	6380	1095	5285	3641	448	3193

Note: Req = Required; Avail = Available; Def = Deficiency

Source: District Education Officer, Geita District

At present, the teacher: pupil ratio is 1:98, as compared to the national standard ratio of 1:45. The shortage of teachers in the district is partly due to deaths. There is an average death rate of one teacher per month, according to the DEO. Also, the shortage of teachers is more serious in the rural areas.

The pupil drop out rate is another serious problem in the district, including Rwamagasa village. The main course of truancy is because the pupils are engaged in fishing, trading, petty trade, migration, artisanal mining, pregnancy (for girls) and distance to schools (mainly for secondary schools).

At Rwamagasa Village, there are two primary schools with 1,650 pupils, 890 boys and 760 girls.

Table 3: Number of Disabilities in Geita District

Disability	Boys	Girls	Total
1. Blind	25	7	32
2. Dumb	36	37	73
3. Albino	13	14	27
4. Handicap	51	32	83
5. Mental Retarded	39	35	74
6. Epilepsy	1	0	1
7. Physical disability	121	57	178
Total	286	182	468

Source: District Education Officer, Geita District

Based on the above information on the number of disabilities in the Geita District, the primary sources and causes of above illness could not be undertaken during the survey. Hence, this could be the area of further investigations.

Secondary Schools Education

Due to the growing population in Geita district, the goal of the district is to have one secondary school for each ward that is 33 secondary schools. Presently, there are only 9 secondary schools in the district, out of which 6 are government and 3 are private. The secondary school for the Rwamagasa ward is still under construction.

Adult Literacy

Since Independence, the country has placed emphasis on adult literacy, so much so that deliberate efforts have been taken throughout the country to get adult illiterates into classes. The ability to read and write in Kiswahili and do some basic mathematics defines adult literacy in its narrowest sense. Rwamagasa village is conducting such classes, although figures on how many are attending were not available.

3.13.2 Health Services

Health Facilities

According to the District Medical Officer (DMO), Geita district has one government hospital with 170 beds, five health centers with 132 beds, and 41 Dispensaries (35 owned by government, 5 Voluntary and 1 private owned). There are 10,646 people per dispensary. Below are the types of services available in health facilities.

Table 4: Health Facilities in Geita District.

S/No	Type of Service	Govt. Hospital	Health Centers	Dispensaries
1	OPD	01	05	41
2.	MCH Services	01	05	41
3.	Laboratory	01	05	4
4.	In Patients	01	05	3
5.	DTC	02	5	40
6.	Postnatal Care	01	5	0
7.	Dental clinical with Equipment	01	0	0
8.	Emergency Oral Care	01	05	0
9.	Family Planning	01	5	40
10.	ANC Syphilis Screening	01	5	11
11.	Microscopes	6	5	1
12.	Sterilizers	14	15	116
13.	X-Rays Machines	2	0	0
14.	Motor vehicles	4	0	0

Source: District Medical Officer, Geita District.

Top Diseases at Geita District

Table 5: Top Outpatient Diagnoses 2002 in Geita District

No.	RANK Diseases	<5 YEARS		5 YEARS AND ABOVE		
		No. of cases	% of all diseases	Diseases	No. of cases	% of all diseases
1.	Malaria	79065	63%	Malaria	102,316	53.3%
2.	ARI	18935	15.2%	ARI	34002	18.04%
3.	Diarrhea	12737	10.3%	Diarrhea	35026	18.6%

4.	Pneumonia	9560	7.8%	Pneumonia	7649	4.
5.	U.T.I	3509	2.8%	U.T.I	8554	4.6%
6.	HIV/AIDS			HIV/AIDS	575	0.3%
7.	TB			TB	265	0.14%
Total	123,806	100%			188387	100%

Table 6: Top Inpatient Admission Diagnoses

	RANK	<5 YEARS			5 YEARS AND ABOVE		
		Disease	No of Cases	% of all Diagnosis	Disease	No of Cases	% of all diagnosis
GEITA	1	Malaria	2210	56.5%	Malaria	1037	51%
	2.	Diarrhea	247	6.3%	Diarrhea	153	7.5%
	3.	Pneumonia	632	16.1%	Pneumonia	454	22.4%
	4.	Anemia	771	19.7%	Anemia	175	9%
	5.	Meningitis	11	0.3%	Meningitis	25	0.05%
	6.	Others	39	0.9%	Others	184	9.07%
TOTAL			3910			2028	100%

Source: District Medical Officer, Geita District

Table 7: Communicable Disease Cases and Deaths

	<5 years				>5 years		
		Adm.	No of cases	Deaths	Cases	Adm.	Deaths
Cholera		0	0	0	0	0	0
Rabies		0	0	0	0	0	0
R/fever		0	63	0	198	0	0
Typhoid		01	03	0	261	04	0
Plague		0	0	0	0	0	0
Meningitis		06	06	04	04	04	02
AFP		0	0	0	0	0	0

Source: District Medical Officer, Geita District

Child and Mother Nutrition, Infant and Under Five Mortality, etc.

Table 8: MCH Services – Year 2002

S/NO	DISTRICT-GEITA	2002
1.	ANS Clinic	34508
2.	Client tested for Syphilis	-
3.	Clients receiving TT dose 2+	31624
DELIVERIES.		
4.	At health facility	8731
5.	BBA	673

6.	Reported by trained TBAS	509
CHILD IMMUNIZATION		
7.	BCG Immunizations children <1 year	28,933
8.	DPT 1 Immunizations children <1 year	34902
9.	DPT 3 Immunizations children <1 year	28274
10.	Polio 3 Immunizations children <1 year	30307
11.	Measles immunization	25947
12.	Children weighed at measles immunization	25947
13.	Children weighed <60% weight for age at measles immunization	815
FAMILY PLANNING		
14.	Total acceptors	16282
15.	New acceptors	8210

Table 9: Maternity Services

	DELIVERIES:-	2002
1.	-At health facility	8420
2.	-B.B.A deliveries	673
3.	-Reported by trained TBAS	664.

Source: District Medical Officer, Geita District

Based on the above health information, it is obvious that the community of Rwamagasa village does not have adequate health services. Moreover, they depend mainly on health services in neighboring areas or at the district hospital in Geita town. The Rwamagasa community is on the process of constructing their own village dispensary. Currently, they depend on five small privately owned pharmacies in their village.

Regarding to the prevalence of STD/AIDS, in Geita, the district Hospital keeps medical records of all diagnosis but at the time of the survey consolidated on STD/AIDS was not available.

An assessment of the primary sources and causes of above illness could not be undertaken during the survey. Also specific knowledge of mercury poisoning signs in the population could not be given; hence this could be the area of further investigations.

3.13.3 Social Welfare

Rwamagasa village lacks social welfare services and police post for security. The police post is under construction. However, they do have agricultural and veterinary extension officers.

3.13.4 Water Supply Services

Water policy

The National Water Policy aims at providing every person or household with access to safe, clean and adequate water supplies within 400 meters by 2002 A.D.

Status of Water Supply, Water Quality, Future Plans and Sanitation

On the 163 villages in Geita district, only 120 are supplied with drinkable water. There is a severe shortage of access to water that is adequate for domestic use in the districts rural areas. The main water sources in Geita district are 11 boreholes, 46 man-made dams, 234 shallow wells, 10 harvested rain water tanks, seasonal rivers and streams and Lake Victoria. Communities have been taking an active part in construction and management of water sources. There are in total of 224 water committees, out of which 160 are active. Some of the communities have already established water funds for running water activities in the future.

At Rwamagasa village, they are using shallow wells and a river as sources of water. The quality of water is not safe since the same source is used for processing gold. The village does not have water committees.

In a rural area like Rwamagasa village, people are required to provide for their households an adequate latrine and a pit for refuse disposal. Out of 848 households at Rwamagasa, only 625 have pit latrines.

3.14 Infrastructure

3.14.1 Power (Electricity, Fuel Wood)

In Geita district, the main sources of energy for both industries and domestic use are firewood, petroleum products and electricity. The common people, such as those in Rwamagasa village, depend mainly on firewood, charcoal and kerosene for cooking and lighting purposes. Other sources of energy are petrol and diesel used for milling machines and crushers.

3.14.2 Transportation

In Tanzania, there are different designations for roads. There are trunk roads which are supposed to connect bordering countries, regional roads which connect regions within the country, district roads which connect neighboring districts, and feeder roads usually leading to district roads. In Geita region, none of the roads are tarmac.

The road from Geita Town to Rwamagasa village is earth road and is impassable during the rainy season, except for 4-wheels drive vehicles.

3.14.3 Telecommunication

The main telecommunication services in the Geita district are: the Tanzania Telecommunication Company Limited (TTCL) and cellular telephone services (Vodacom and Celtel). The Tanzania Posts office offers services such as mailing letters, parcels and financial transfers, both locally and internationally. At Rwamagasa village, there are no telecommunication services. The villagers depend upon the services available in Geita town.

Most of the residents have access to quite a good number of radio stations within the country, e.g., Radio Tanzania, Radio Free Africa and some television stations.

4.0 FINDINGS OF THIS STUDY

A total of 250 respondents participated in the survey. Although not all of the 250 respondents did answer every question in the questionnaire. Therefore the frequencies indicated in the tables are based on the actual number of responses for each particular question, and do not always add up to 250.

4.1 Demographic Information of Rwamagasa Community

4.1.1 Sex and Age Structure

Among the people interviewed at Rwamagasa village, 60% of males were the head of the household and 40% were female head of the household. The dominant age group was between 30-39 years old, which consisted of 37% of the population. Overall, 73% were married and 18% were single. It should be noted that, those women mentioned are the head of the household they are either single or widow.

4.1.2 Tribal Composition

Out of the 250 respondents who answered this question, the highest number belonged to Sukuma tribe from Mwanza region (39%), Muha from Kigoma Region (11%), followed by Kurya from Mara Region (10%) and Sumbwa which are from within the village (6%). The rest of the percentages were divided into other small tribes.

4.1.3 Residence Time in the Village

Of the people interviewed, cumulatively 98% have lived there for more than five years. Most of them come from different parts of the country, but mainly from a neighboring village in Nyarugusu ward (11%), which is another prominent mining area in Geita district.

4.1.4 Distance from the Mining Pits

The distance from the mine pits to the residences of those interviewed ranges from three quarter of kilometer to 3 km, with 33% living half a kilometer from the mine pits, 33% one kilometer from the pits, 6% two kilometers and 21% living three kilometers from the mine pits. Although these pits are outside their residential areas but gold processing is done on their compounds.

4.2 Household Structure

4.2.1 Uses of the Houses, Number of Men and Female

80% of the houses are for residential purposes only, while 19% are for residential and commercial purposes. There are slightly more men in the households (60%) than women (40%). However, most of the house's compounds are used for gold processing and mercury amalgamation and other petty trade such as retail shops, food vendors and bars.

4.2.2 Number of Children in the Household

When asked about the number of children per household, 30% have one child, 27% have 2 children, and 18% have 3 children while 10% have more than 6 children in the household. The small number of children per household is due to the fact that many people come to the

mining areas without their families since they move from one mining site to another.

4.3 Education Level

Overall, 10% of the interviewees have never attended school, while 72% have primary school education, followed by 11% with secondary level education and 7% with advanced level of education. With respect to gender, 6% of males were illiterate, while 10% of females were illiterate.

Amongst the siblings of the respondents, 59% had primary school level, 12% had secondary education, 2% had college education while 27% are illiterate.

4.4 Hygiene and Sanitation

As mentioned earlier, in rural areas people are required to provide for their households an adequate latrine and a pit for refuse disposal. The survey shows that, the biggest percent of the households have pit latrines (97%), while only 3% use bush.

4.5 Economic Life of the Community

4.5.1 Types of Economic Activities

Most of the Rwamagasa villagers interviewed, 54% are engaged in mining alone, while 14% are engaged in a combination of farming, mining and petty business, 9% practice farming along, 7% buy gold and other minerals and 5% operate bars, hotels and guest houses. The focus group discussion reported that the major economic activities for women in that village are food vendors (mama lishe), selling vegetables in the market, saloon, tailoring and few in the mining activities. Both women and men do the agricultural activities.

4.5.2 Monthly Income and Expenditure

Most people have an income of below Tz Sch. 50,000¹ per month (64%), 24% earn between 51,000 – 100,000, while 10% earn between 101,000 - 200,000 and only 3% get more than 201,000 per month. The low-income levels for most of the miners are a reflection of the business size. Many of the businesses are family based, using almost exclusively family labor. Access to capital might be another reason for the low incomes levels.

However, when asked about their expenditure, only 85% said that they spent more than Tz Sch 50,000 per month and 7% said they spend more than 200,000 per month. This is typical of a general pattern in the country, whereby people manage to get extra funds in one way or another, outside their regular income, in order to survive.

4.6 Water Supply

4.6.1 Source of Water

The main source of water is from boreholes (63%), followed by shallow wells (20%), rain water and shallow wells (10%) and river and shallow wells (4%). Most of the water used for

¹ 1 US\$ is equivalent to 1035 Tanzanian Shillings

domestic purposes is fetched from boreholes (60%), while 17% fetched water from the shallow wells.

Water for washing/bathing is fetched from boreholes (55%); shallow wells (18%), rain water (10%) and 22% from the river. Water for mine sluicing, is obtained from ponds (22%), mine pits (18%), boreholes (15%) and the river (8%). Irrigation is very minimal and it is only 3% of water used from the boreholes.

4.6.2 Water Quality

Most of the respondents (70%) were of the view that the quality of water was good, 15% said it is muddy and 6% mentioned that the water is hard. Most (68%) treat the water by boiling, 12% by filtering and 19% they do not do anything to treat the water. They rest either use chemical or buying mineral water.

4.6.3 Who Fetches Water

The traditional image of a woman as a mother and housewife underline a clear-cut division of labor between men and women. Women perform the bulk of household work. Their domestic responsibilities include food production, processing, preparation and storage as well as the provision of fuel and water, sanitation, cleaning the house and laundry. Hence the role of fetching water as it has been revealed by the respondents (men and women) is clearly the responsibility of women (50%), more than men (11%), boys 10%, girls 5%, women and girls 6%. However, men who do not have wives are buying water from carriers 12%. However, young boys are the one who supply water to the miners for washing gold and business areas such as hotels for money.

4.7 Food consumption and nutrients patterns

The reason for asking this question is to know the status of nutrient intake by the Rwamagasa community. The highest numbers of respondents (36%) take meat once a week and 7% eats meat every day, while 36% eat fish twice a week and 6% eat fish everyday. Moreover, 31% eat chicken at least once a week, 17% eat eggs once a week, 38% drinks milk everyday, 36% eat bean everyday, 50% eat vegetables everyday and 27% each fruits everyday.

4.8 Source of Energy

Since Rwamagasa is in the rural area, the main source of energy is fuel and charcoal (36%), Charcoal 21%, fuel/wood/charcoal 27%, fuel and wood 16%. As it has been mentioned earlier, the majority of Geita residents, mainly in the rural areas depend on fuel, fire wood and charcoal for domestic purposes. Fuel products are used of lighting purposes and machine operation.

4.9 Source of information and communication

Information dissemination especially newspaper is a little bit difficult since most of the news is from Dar es Salaam, which is quite far away. Even by the time news reaches Rwamagasa, it is outdated. The source of information they are getting from Radio Free Africa in Mwanza. The greatest number of the respondents (47%) gets information from the radio, radio and TV 12%, 10% from local newspapers/TV/local leader, 6% from local leaders and 5% no source

of information.

4.10 Artisanal Mining Information and the Use of Mercury

4.10.1 Hours Spent on Mining Processing per Day

Most of the respondents (40%) spend 12 hours per day in processing gold. However, there are some (25%) who spend 24 hours in the pits, 35% depending upon the nature of work.

4.10.2 When the Artisanal Mining Started in the Area and How They Get Involved

The respondents were asked to indicate when they started the mining activities. They said that mining activities started in 1972, but many had moved from different mining sites. The mining activities gained momentum at Rwamagasa from 1998 onwards. It is hard to establish the number of artisanal miners because they do come and go. When asked why the number is increasing, the respondents mentioned that a number of them were given compensation by Geita Gold Mining Company (GGM), which is based in Geita Town and they opted to invest the money gained into small-scale mining. However, they were doing the same activities at the place where it is now privatized and the owner now is the GGM.

Most of the respondents got involved into the mining activities due to economic hardship (21%), while 18% had been advised by fellow friends, after seeing that they were getting income for sustenance. The rest 78% are doing it just because they have inherited it from their parents and there are no other activities they can do in that particular village—it has become their way of life.

4.10.3 Provision of Capital for Mining Processing

Most of the respondents they obtained capital from their own initiatives (87%). Only 7% had borrowed money from relatives. Others from their spouse and assistance from relatives. There is no micro-finance scheme in their area.

4.10.4 Mining Association's Membership

Few of the respondents (36%) are members of the mining association MWAREMA (Mwanza Region Mining Association). While 64% are not the member. However, they mentioned they are not getting any support from the association. The reason why others are not members is that they were not aware of the association, and through the experience from the members of the association, they are gaining nothing from the association. Another reason for the low membership is that members of the association must be legally registered as artisanal miners. Since most of them are there just temporarily, they think there is no need of registering themselves. Others mentioned that they do not have enough education to join the association. To be a member of MWAREMA one must provide primary mining license which most of them are not eligible. MWAREMA this is an association for the artisanal miners in Mwanza region. During the survey it was not easy to establish their role in the mining industries.

4.10.5 Employed/Workers in the Small-scale Mining

Many of the enterprises such as small-scale mining and small business are basically family affairs. Where the owner is not the sole worker, the other workers in the business usually

include the husband/wife, children, and relatives. Out of the 250 respondents, only two have permanent employment. In the group discussions it was reported that, many of the small-scale mines use family labor, often leading to increased workload for women who also have household duties. Also, young children perform similar activities around their compounds assisting their parents or for payments for the other people. Such practices stop them from attending school and studying properly as it has been mentioned earlier that the district has a big problem of pupil dropouts and trancies. However, the village government has imposed some by-laws which forbid such activities to be practiced by children especially for those who are school going.

4.10.6 Mercury for Amalgamation and Problems Encountered

The artisanal miners dig shafts, crush the ore and recover the gold using mercury. Artisanal miners work with their bare hands, when using mercury for gold recovery. Most of the artisanal miners do not own primary mining license and every three days 50% of the ore dug out of the ground is given to the license holder. The gold is found in the ore rock, which is dug out with a pick shovel from the rock base. When the miner thinks he has got to the ore rock he crushes a small sample of it to test for gold. A drum of water (200 liters) is supplied by a businessmen brokers locally known as “*Makota*” who charges 200/-Tshs for the water. The artisanal miners wash their crushed ore in the drum. The drum owner claims any gold left at the bottom of the drum.

A miner decides from the gold washing, if the ore rock contains enough gold (not less than two grams of gold). If the ore rock is considered good, he will fill about two bags (50-70kgs) of the ore. Usually the ore is taken home to be manually crushed either by the members of family or laborers. After the ore is crushed to a certain size, the ore is taken to the ball mill, which is usually a modified tractor with a wheel hub connected to the ball mill. The ball mills are set up in the residential areas and the owner of the crusher provides mercury for amalgamation. Business people who benefit from 50% of remaining ores privately own the crushing machine.

After crushing, the material is washed in nearby locally made ponds over a wooden pan covered with sackcloth (sluice box). The sackcloth, which has particles of heavy minerals including gold, is then washed clean in a bucket in which the concentrate settled. Mercury is added to the concentrate in a pan in which by using bare hand the miner make sure that the mercury is mixed well with the concentrate. Panning is conducted until he remains with the final product the amalgam. The amalgam is burned in an open air to release mercury and remain with gold.

The financial income from this task is negotiable but the brokers, known as “*Makota*”, purchase the gold for about Shs.10, 000/- per gram if it is of good quality. Some of these brokers live within the village and others come from outside. Also there are other miners who simply take their gold wherever there are potential customers.

Problems Encountered

The small-scale miners, together with other entrepreneurs associated with gold mining are faced with a host of problems. During the survey, every respondent was asked to list

problems that she/he considers being the major constraints to her/his business. In response, 56% said that the main problem was lack of equipment and proper tools, which often resulted in injuries and fatigue. When they get injured they cannot do their work and they have to travel to Geita for treatment, since there are inadequate health facilities in Rwamagasa.

The second biggest problem listed by the 16% respondents was insufficient working capital and lack of reliable market for their gold. Formerly they use to sell their gold to Meremeta Company, which is no longer buying gold. About 65% are now selling their gold to 'Makota' or to the prominent, licensed, small-scale miners based in the village known as Kadeo Blue Reef Gold Mining Company.

Another problem mentioned by 7% of the miners is that the pits get filled with rain water and they do not have pumps to drain the water out. Lack of knowledge on the gold processing and the use of mercury for amalgamation was yet another problem. Also, there is insufficient water for cleaning gold. Furthermore, taxes and licenses were also cited as being too high for many of the miners.

The artisanal miners are vulnerable to mine accidents in the mining shafts, during crushing ore and to mercury contamination during amalgamation process. Most of the artisanal miners do not own claims or primary licenses and every three days 30% of the ore dug out of the ground is given to the license holder

The focus group discussions with a group of women only at Rwamagasa village were concerned with the problem of health facilities in their village. Sick or pregnant mothers have to walk long distance to the district hospital, which is in a distance of 25km. Otherwise they get delivery services from the Traditional Birth Attendants (TBAs) who are not enough and can not solve complicated problems.

The focus group discussions with the Mwanza Women Miners Associations (MWAWOMA) supported the above problems and reported that they also encountered the same problems of theft since there is no security system in the mining areas. The theft happened when the miners come across the gold in a certain pit (*shimo limehila*) literary means they have discovered the gold in the pit. Usually other miners from different pits invade the pits and steal the ore, which causes a loss to the claim owner. They further requested the provision of gloves and retorts while waiting for the new technology. They also requested the new technology to include “**Mining Kit – mobile processing equipment which can move from one miner to another comprising of crushing, milling and gold recovery equipment fitted in a mobile truck**”.

Furthermore, the specific problems of female entrepreneurs are faced with characteristic problem that are gender related. Women entrepreneurs listed sexual harassment and abusive language from customers as another big problem that they encountered in their daily business.

Environmental or Health Hazards Caused by Mercury

At least 60% of the respondents are aware of the environmental hazards caused by the use of mercury. As high as 25% of them were able to mention some of the effects, such as general body weakness and strokes. They learned about these effects from the Resident Mining Officer (50%), UNIDO 6%, Mass Media 15%, other people 16%, Books and seminar 9% and VETA (10%). Others heard this information from their friends (6%). There is substantial number of women who were not informed. The apparent reason for this is that most of the guests who come to village ended up talking with the leaders and the male miners. During the focus group discussions, women were less informed about the effects of mercury. Also through observation there were not single posters for mercury safety in that village. This shows how the miners are less informed or unaware about the hazards of the mercury. Government leaders were given short seminar but they never share the information with the rest of the fellow villagers.

4.11 Properties Ownership

The respondents were asked to indicate kinds of properties that they have access to and control of. Most of them do have access to gold pits, but they do not own or have mining licenses. Only 9% actually own gold pits. About 10% own livestock and 52% have access to houses, while 30% own houses that are permanent structures, i.e., houses constructed of concrete blocks with a corrugated iron roof. Very few respondents own milling equipments or motor vehicles. The other items which they control, and have access to, are radios, bicycles, sewing machines, etc.

4.12 Decision Making on Income and Expenditure

While female entrepreneurs are performing equally well in terms of income earned with their business, frequently women are not free to decide on how to use the income earned. The respondents were asked the question “who decides how to use the money from your business?” This question was directed to married female respondents. About 10% of the married females said that they make their own decisions, but 57% reported that their husbands make the decisions and 34% said that they make joint decisions run the business.

The above views were also echoed in the focus group discussions (FGD) especially with women’s group only, where a substantial number of the participants reported that their husbands have the last say on how the money from their businesses is to be used. It was reported that, Sukuma tradition, a woman is not allowed to keep money at all! It is the man who keeps all the money, including the money from the wife’s economic ventures.

Whether because of custom or lack of education on the part of the woman, most rural woman unwittingly accede the right to make decisions on their businesses to their husbands. In focus group discussions, Rwamagasa women said that it is the responsibility of the husband to provide them with capital, look for credit facilities and buy raw materials. They did not seem to realize that in so doing the husband ultimately takes over the right to make decisions on the income from the business.

There are many disadvantages associated with allowing the men to make decisions for the

women. When the men make decisions, the women are denied the opportunity to build their confidence in the decision-making process. In addition, the women are denied the opportunity to advocate for her interests, and when they are the ones actually doing the work, it might discourage them from improving the enterprise.

In Sukuma culture, all the cattle belong to the men even though the women contribute considerably to the upkeep of the cattle. The women have access to the milk only and no control over the cows. They have no say when it comes the selling of the cows or using them as oxen. Women are often seen as a source of cheap labor, which has been obtained by the men through a marriage. The group of women lamented that dowry partly contributes to the problem. Once a man pays dowry, he considers the woman as his property, with no decision-making powers in the household.

4.13 Gold Market

There are promising markets for the gold from Rwamagasa. As mentioned earlier, the gold is sold to “Makota” or Kadeo Blue Reef Gold Mining Company or outside the village. Although about 28% of the respondents do not encounter any problems, a number of them do face different problems. Some of these are the low prices for gold, long distances to the mine and poor infrastructure. For example, some gold dealers cannot make it during the rain season due to the bad roads, no reliable markets and undermined prices/price fluctuations. The respondents also were concerned about the measurements of the quality of the gold, theft, payment disturbance and high costs of processing. They insisted that the kind of work they are doing is like gambling.

4.13.1 Plans to Change their Business

About half of the respondents (51%) have plans of changing their businesses. Among the reasons given were they thinking that the availability of gold is limited and that there is not enough mining area because the pits, which they rely on now, have been privatized. About 4% said they want to go back to agricultural activities because they are not getting profit from the mining business. However, on the other hand, 33% mentioned that they do not have a plan to change their business because there is a guarantee of good income, the gold is available and there is no problem of market. The response of this question was very controversial because the respondent might think that, there are some credit facilities will be provided if he/she say is going to change the business. This is an area, which need further investigation.

When the respondents were asked to compare their business from the past and now, 19% mentioned that it has increased, 38% mentioned that there has been no change and 28% said they couldn't make this comparison.

4.14 Short-term Training

The respondents were asked whether they have received any short-term training on top of their basic education. The analysis reveals that half of the respondents (51%) have never received any kind of training and only 22% have received training. Those who have acquired knowledge on artisanal mining got it from the previous mining sites or at Rwamagasa by

VETA, Mining Office at Geita District and TAN-DISCOVERY.

The type of training most of them received was on the effects of mercury, environmental protection, mining techniques, security and precautions, rock blasting, and laboratory techniques. One-quarter (25%) agreed that the training helped them a lot because it has improved their efficiency in recognizing gold and reduced unnecessarily accidents and the effect of mercury. On the other hand 6% think that the training was too short and 12% recommended more training, particularly training on modern mining and how to seek better markets.

4.15 Comments on Licensing/Taxation/Hygiene and Sanitation

The respondents were concerned about the high tax rate charged for mining (37%), poor equipments for environmental protection 35%, 20% they are fear about effect of mercury and 17% did not have comments. Regarding hygiene and sanitation, at Rwamagasa there is no health officer, hence the issue of health and sanitation is a serious problem. Children are exposed to mercury throughout the area since there is no playground set aside for them. They play with mercury everyday. Most of the people do not have proper toilets. So far, no study has been done to determine the safety of the water used in the area. The risk may be high since they are using shallow wells that are close to the pit latrines.

4.16 Attitudes That May Influence Adoption of Improved Mining Technologies

The survey tried to assess the attitudes and behavior patterns in the community, which may either, act as barriers or which might facilitate the introduction of the proposed new technology in artisanal mining. The respondents were asked regarding their willingness to learn the new technology and difficulties they may encounter in the change over. In response, 29% said they think the new technology is good since they know the effect of the mercury, while 16% think that the production will increase. While 15% mentioned that with new technology they will use modern equipments, which will simplify their work and be able to produce good quality for better market. The rest thought it will depend the output of the new technology and availability while other did not have any comments.

Similar comments were supported by the focus group discussions. Some people stopped mining due to the fear of mercury contaminations, but with the introduction of new technology they will start again doing the mining businesses.

4.16.1 Willingness to Learn the Technology and Undergo Medical Check-up

Most of the respondents are willing to adopt the new technology (94%). Very few were uncertain (6%) with the concern that the new technology might reduce the production and they will be unable to make enough profit. The focus group discussions were quite happy about the new technology, which they have been awaiting for long time. Some mentioned that they attended seminars about the technology but they were wondering why the program does not take off.

Regarding strategies for learning the new technology, 78% of the respondents said they would like to be trained through demonstration, 14% said they would like to learn through

short courses to be held within the village and 8% would like to have tours to the places where they are practicing this new technology. The focus group discussion agreed with the above; however, they think that strategies for helping people to change their attitudes might be difficult.

Most of the people interviewed said they are ready and willing to undergo medical check up and, if necessary, be treated. In the focus group discussions, the thinking was the same emphasizes that, most of the people are faced with health problems including heavy cough, body weakness and skin diseases, which they are worried about the causes of such diseases.

In the local leaders' meeting they said they would speed up the construction of the dispensary so that it can be utilized during the intervention. Meanwhile they requested the mobile cinema which shows the use of the new technology and the effect of mercury.

4.16.2 Expected Difficulty

Of the respondents, 62% said there would be no problem at all, while 19% they do not know what will happen and 8% mentioned that they would loose their employment. The focus group discussion felt that there will not be a problem; however, they were concerned about the gold dealers (Makota) who provide mercury and it is their main source of income. They suggested that education should focus mainly on those who supply the mercury since they will oppose the new technology due to the fact that they are going to lose their market for mercury.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the above analysis the following conclusions can be made:

- 1 The artisanal miners are vulnerable to mine accidents because they dig shafts, crush and recover the gold using mercury
- 2 Artisanal miners 35% handle mercury by their bare hands due to poor equipments for environmental protection. Regarding hygiene and sanitation, at Rwamagasa there is no health officer, hence the issue of health and sanitation is a serious problem. Children are exposed to mercury throughout the area since there is no playground set aside for them. They play with mercury everyday.
- 3 Most of the house compounds are used for processing gold and mercury amalgamation and other petty trade such as retail shops, food vendors and bars.
- 4 Most of the people are facing health problems including heavy cough, body weakness and skin diseases
- 5 Most of the artisanal miners do not own claims/primary mining license and, every three days, 30% of the ore dug out of the ground is given to the claim holder
- 6 The training given was effective but was not adequate especially for women. 78% of the respondents said they would like to be trained through demonstration.
- 7 Very few miners know the effect of mercury, particularly women. About 94% of the miners were very willing to learn a new technology and undergo medical check-up.
- 8 The village government leaders promised to give maximum support to the whole intervention

The following recommendations can be made:

- 1 Creation of awareness amongst artisanal miners regarding the effects of mercury
- 2 The artisanal miners should be educated regarding the hazards of using mercury by using a multiple approach such as tours to other places where the new technology is already used, seminars and short courses. The methods should be theoretical and practical.
- 3 Develop Information Education Communication (IEC) materials such as T-Shirts, caps, posters, banners, leaflets, booklets etc. for information dissemination
- 4 Immediate alternatives or ways to reduce the further effects of mercury should be introduced including using protective gear such as gloves, retorts and isolation of special areas for gold washing. This should be done with assistance and cooperation from the respective Government Officials.
- 5 Alternative sources of income should be found for the Makota who are presently earning their living by selling mercury.
- 6 Government, policy makers and mining officials should give technical and financial support to the established associations such as MWAREMA and MWAWOMA also some environmental NGOs/CBOs that could be utilized as agents for inseminating information to the miners
- 7 Information of the importance of the new technology should start from the Regional level down to District council; this will help to disseminate information to the village authority and to impose by-laws to stop miners from using mercury.
- 8 Educational institutions including primary schools should teach students about the effects of mercury.
- 9 The river which crosses the village and is used for different activities should be an area of mercury investigation.

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Appendix 1**STRUCTURED QUESTIONNAIRE FOR COMMUNITY MEMBERS ON REMOVAL OF BARRIERS TO THE INTRODUCTION OF CLEANER ARTISANAL GOLD MINING AND EXTRACTION TECHNOLOGIES**

Questionnaire No:.....

Village..... Ward..... District..... Region.....

Date:..... Name of Enumerator:

INTRODUCTION AND INFORMED CONSENT**(Introduce yourself, explain the purpose of the interview then, and request the consent to be interviewed)****A. Demographic Information (biodata)**

Q1. Who is the head of household?

1. Male 2. Female

Q2. Age of the respondent:

SEX M 1 F 2

10 – 19 years old 01

20 – 29 years old 02

30 – 39 years old 03

40 – 49 years old 04

50 and above 05

Q3. Marital status of the respondent:

1. Single 2. Married 3. Widow 4. Widower 5. Separate

Q4. Number of children:

Sex	F	M
Number		
Living		

Q5. What is the highest level of education achieved by:

1. Father	2. Mother	3. Respondent	4. Siblings
			1.
			2
			3
			4

01. Illiterate 02. Primary education 03. Secondary A Level 04 Secondary O level 05 College 06. University 07 other specify

Q6. Religion: 01 Christian 02. Muslim 03 other (specify).....

Q7. How long have you being here? years

Q8. Where are you from?

Q9. Tribe/Ethnicity

B. Household Structure:

Q10. House situation: 1. Density 2. High 3. Low 4. Unplanned. 5 other (specify).....
(To be assessed by the interviewer)

Q11. Type of houses:

Roof: 1. Grass 2. Corrugated sheet 3. Other (specify)

Wall: 1. Bricks/Blocks 2. Mud 3. Poles 4. Other (specify)

(To be assessed by the interviewers)

Q12. Do you live in:

1. Rented house 2. Own house 3 Other (specify)

If rented what is the monthly rent?

Q13 How far do you live from the mine? m

Q14. Uses of the house: 1. Residential/commercial 2. Residential only 3. Other (specify)

Q15. How many people in the household:

1. Men

2. women.....

3. Children (male female)

Q6. Hygiene and sanitation

Toilet: 1. Flush toilet 2. Pit latrine 3. Using the bush 4. Other (specify).....

C. Socio-Economic life of the respondent

Q17. What type of economic activities are you doing?

1.

2

3

4

Q18. On average, where does your monthly income stand?

Below 50,000 01

51,000 – 100,000 02

101,000 – 200,000 03

201,000 – 400,000 04

401,000 – 800,000	05
801,000 – 1,000,000	06
Above 1,000,000	07

Q19. On average, what is your expenditure on the following per month in Tz. Shs.?

1. Food	
2. Water	
3. Rent	
4. Health	
5. School fees	
6. Clothing	
7. Transport	
8. Energy	
9. Servants	
10. Others (specify)	
Total expenditure	

Q20. What is the source of water?

1. Rain water 2. Ponds 3. River 4. Boreholes 5. Shallow wells 6. tape water 7. Other (specify).....

Where do you get water for the following activities:

1. Domestic use	
2. Washing/bathing	
3. Mining	
4. Irrigation	
5. Livestocks	
6. others specify	

Q21. How is the quality of water?

1. Good 2. muddy water 3. hard water 4. Unsafe 5. other (Specify)

How do you treat water before using for domestic use?

.....

Q22. Who fetches water?

1. Women 2 Men 3 Boys 4 Girls 5 other (specify)

Distance to the water source:

1. 0.0.5 hrs 2. 0.5- 1 hrs 3. 1-2 hrs 4. 3-4 hrs 5. > 4 hrs

Q23. How many times per week to you eat each of the following foods:

01. Meat () 02. Fish () 03. Chicken () 04. Eggs () 05 Milk ()
 06. Beans () 07. Vegetables () 08 Fruits () 08 Other (specify).....

Q24. Source of energy

- 01 TANESCO 02 Generator 03. fuel 04 Wood 05 Other (specify)....

Q25. Source of information and communication:

- 01 Radio 02 News paper 03 TV 04. Local leaders 05. Other (specify)

D. Artisanal Mining Information

Q26. How many hours per day do you spend on mining activities, on the average?

Q27. When did you start?

Q28. How did get involved in mining? Who provided assistance at the beginning and in what form: Self 01

- Husband 02.....
 Relative loan 03.....
 Government Loan 04.....
 NGOs Loan 05.....
 Others (Specify) 06.....

Q29. Are you a member of any Mining Association 1. Yes 2. No.....

If the answer is yes which association.....

If the answer is no Why.....

Q30. What kind of support you are getting from the association?

Q31. Who are employed/working in the enterprise?

Self	Spouse	Children		Other dependants		Casual Employment		Permanent Employment		Seasonal Employment	
		M	F	M	F	M	F	M	F	M	F

Indicate which of the above are paid in cash? Kind? Both. Amount in cash

E. Equipment and Inputs (Mercury)

Q32. Where do you get your raw materials and other inputs?

- Gold Traders 01
 Spouse 02
 Relative 03
 Others (specify) 04

Q33. Do you encounter any problems in handling the overall process of gold production? 01

Yes 02 No. Explain:

.....

Q34. Are you aware of any environmental or health hazards that may be caused by the use of mercury in gold mining.

Yes 01 No 02

Q35. If yes, what are the hazards?

.....
.....

Q36. Who informed you?

F. Properties Ownership

Q37. Indicate kinds of properties you have access to and control that means those you own outright by your name, specify amount or type where relevant.

Properties with specifications	Access	Value	Control	Self	Spouse	Both	Others (specify)
Gold pit							
Livestock							
House							
Farm Equipment							
Milling Equipment							
Vehicle							
Others (specify)							

G. Decision Making on Income and Expenditure

Q38. Who decide on the income and expenditure in your household?

Self 01
Spouse 02
Both 03

Q 39. Who decides how to spend the money obtained from your business

Self 01
Spouse 02
Both 03

H. Market

Q40. Where is the main market for your products?:.....

Q41. How far is the market

Q42. How do you identify potential markets?.....

Q43 Who take the products to the market

Q44. What difficulties have you encountered in acquiring markets?.....

Q45. How do you get information about potential markets? Tick the relevant.

- Spouse 01
 Friend 02
 Fellow miners) 03
 NGO 04
 Government 05
 Others 06 (specify).....

Q46. Which organisations assist you in accessing the market?

Q47. What are your future expectations of this enterprise

Q48. Do you have any expansion plans? Yes 01 No 02

why?.....

Q49. Do you have plans of changing your business? Yes 01 No 02

Explain:.....

Q50. How do you compare you present situation financially since you started the business?

- Increased 01
 The same 02
 No improvement 03

I. Training

Q51. Have you received any training regarding to your business? Yes 01 No 02

Where..... What type of training
 Who facilitated the training?

Q52. Has the training helped in your business: Yes 01 No 02

Q50. How?

Q53. Any recommendations you have for improving training provision?

Q54. Name 3 most significant problems you are facing in the enterprise. How do you solve them.

Q55. What are your comments on the following:

Licensing/taxation/ Hygiene and sanitation/ Pollution etc.

.....

.....
.....

J. Attitudes that may influence adoption of new mining technologies

(The interviewer will read a short description of the new proposed mining technology and explain it if necessary)

Q57. What are your comments incase of the introduction of proposed new mining technology?

.....
.....

Q58. Would you be willing to learn this new technology?

Yes	01
No	02
Uncertain	03

Q59. What form of training do you think you will need in order to learn it?

Short course	01
Demonstration	02
Tour	03
Other	04

Q60. What difficulties do you expect if you might encounter in the change over?

.....

Thanks for your cooperation, do you have any questions?

Appendix 2**LIST OF FOCUS GROUP DISCUSSIONS PARTICIPANTS
MEMBERS OF MWAREMA ASSOCIATION AND LOCAL LEDEARS**

Name	Sex	Activities
1.Zablon Chaha	M	Artisanal miner
2.Pascal Fumbuka	M	Artisanal Miner
3.M.Kajoro	M	Artisanal Miner
4.M.Mganga	M	Village Chairman - Artisanal Miner
5.Elias Kapula	M	Councillor
6.Joseph Kapalatu	M	Village Executive Officer
7.Selestina Charles	M	Villager
8.Dominik Kimambo	M	Artisanal Miner
9.Kristopher Kadeo	M	Chairman MWAREMA - Artisanal Miner
10.Boniface Matale	M	Villager
11.Chacha James	M	Artisanal Miner

Appendix 3**FOCUS GROUP DISCUSSION FOR WOMEN AND MEN**

Name	Sex	Artisanal Miner
1.Athmani Adam	M	Artisanal miner
2.Roby Johnson	F	Mama lishe
3.Betty Makuru	F	Artisanal Miner
4.Poul Kapalatu	M	farmer
5.Christine Kadashi	F	farmer
6.Salama Idd	F	farmer
7.Zablon Boniface	M	Ward Executive Officer
8.Sylvester Serikali	M	farmer
9.Selestina Charles	M	farmer
10.Obadia Silika	M	farmer
11.Simeo Kibela	M	farmer
12.Joseph Kapalatu	M	farmer
13.Tobias Masanja	M	CCM chairman
14.Otieno Johanes	M	Member
15.Letus Bernad	M	mason
16.Eva Lwambo	F	Mama lishe
17.Rehema Matati	F	Tailoring
18.Happiness Manyanga	F	Housewife

Appendix 4**FOCUS GROUP DISCUSSION FOR WOMEN OF RWAMAGASA 8/5/2003**

Name	Sex	Activities
1.Cesilia Juma	F	Petty business in the market
2.Sophia Paulo	F	Petty business in the market
3.Estre Samwel	F	Petty business in the market
4.Hilda Omari	F	Petty business in the market
5.Magret Robert	F	Petty business in the market
6.Leonia Ignas	F	Farmer
7.Ester Tito	F	Farmer
8.Asha Salum	F	Farmer
9.Helen Barnabas	F	Farmer
10.Marieta Daudi	F	Farmer
11.Hadija Almas	F	Farmer
12Monika Zakaria	F	Farmer

Appendix 5**FOCUS GROUP DISCUSSION FOR MWANZA WOMEN MINING ASSOCIATION (MWA WOMA) 9/5/2003**

Name	Sex	Activity
Rebecca Mirengeri	F	Physician and Diamond Artisanal Miner at Mabuki Mwanza also Chairperson of MWA WOMA
Kulwa John	F	Artisanal miner – Mara region
Tatu Kajoro	F	Artisanal miner – Nyakangwe/ treasurer
Paulina Mwiza	F	Artisanal miner – Busolwa – Geita/secretary
Theresia k. Malenya	F	Artisanal miner – Tembo mine – Geita
Bonania Edward	F	Hotelier and Artisanal miner – Mara
Winnie Deus	F	Artisanal Miner