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THE UNITED NATIONS INDUSTRIAL DEVELOPMENT
ORGANIZATION
(UNIDO)

Project No. EG/GLO/01/G34- Community Awareness of the Hazards
of Mercury Exposure and Demonstration of Cleaner Gold Processing
Technologies to Mining Communities within the
Geita Mining District of Tanzania.

UNIDO Contract No. 16001069

FINAL PROJECT REPORT

Presenter:

TAN DISCOVERY MINERAL CONSULTANCY CO., LTD

P.O. BOX 13519, DAR ES SALAAM

TANZANIA

September 2007

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Ref: No. TAN/UNIDO/09/07

2nd October 2007

United Nations Industrial Development Organization
(UNIDO)

Procurement Services,
Division of Administration,
Wagramer Strasse 5,
A – 1220 Vienna
AUSTRIA



ufs: Ms. Patricia Scott –UNIDO Representative

Dear Sir/Madam,

RE: UNIDO Contract No. 16001069 – Community Awareness of the Hazards of Mercury Exposure and Demonstration of Cleaner Gold Processing Technologies to Mining Communities within the Geita Mining District of Tanzania.

Subject: Submission of Final Project Report

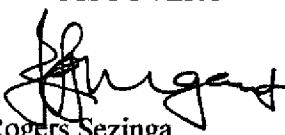
Please refer to the above subject, and contractor's obligations to submit final report as per Section 2.09 (b) of the above contract.

We are submitting the Final Report in three copies and one electronic version. The report covers the work performed by Tan Discovery from January 2007 to mid-August 2007 when the Technology Demonstration Unit equipment was handed over to the Government of Tanzania at Geita Resident Mines Office.

The report present the summary of activities, achievements and challenges encountered while implementing fully the Terms of References of the above contract. Despite some delays to commence field activities in February 2007, the project staffs have worked closely with the local leaders to meet project targets and now anyone visiting Lwamagasa and Nyarugusu villages will note the behavior changes of the mining communities after attending GMP training. The local leaders have owned the project objectives and the mining community is now putting pressure to the polluters.

We would like to extend our sincere thanks to UNIDO Resident Representative office and Country Focal Point for the valuable support the offices have provided to our team to accomplish well this assignment.

With best regards
TAN DISCOVERY



Rogers Sezinga
DIRECTOR
rsezinga@yahoo.com

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Attachments:

- No. 1 – Terms of References (TOR)
- No. 2– Handed over TDU Equipment List
- No. 3 – Training Posters
- No. 4 – Newspaper’s Project Articles

SUMMARY

The artisanal and small-scale (ASM) mining activities in Geita District engage more than 150,000, which is about 15% of active small-scale miners in Tanzania. Like in other parts of the world, such activities are associated with negative impacts to the environment and socio norms.

Tan Discovery was contracted by UNIDO in 2006, to implement the Global Mercury Project (GMP) objectives through project No. EG/GLO/01/934. The project aimed to conduct community awareness of the hazards of mercury exposure and demonstration of cleaner gold processing technologies to mining communities within the Geita mining district in Tanzania.

The project preparation activities commenced early January 2007 and the field's activities were officially launched in March 2007 and ended mid August 2007. The project designed an outreach strategy, which was supported well by the Geita District leaders, and this led to active participation of the Lwamagasa and Nyarugusu villagers and their leaders in the project activities.

The project was implemented in two main components: Awareness Campaigns; and, Training and Technology Demonstration activities. The Awareness Campaigns activities involved preparation of awareness campaign materials, followed by disseminating the information and finally executing awareness campaigns. The Training and Technology Demonstration activities covered class trainings, field demonstrations and provision of extension services.

The implementation of the above two components was closely monitored by the Country's Assistant Focal Point and the office of the UNIDO Resident Representative Office. Summaries of the projects activities were reported in the three bi-monthly progress reports submitted to UNIDO.

Some of the project activities led to immediate impact to communities' awareness on the dangers of mercury exposure. The village leaders and project team took additional measures to support the community behaviour changes, which included offering support to polluters – wash pond owners and gold buyers – so that they can smoothly transform their operations. In addition, village leaders through village councils allocated new gold processing areas and project team trained more local fabricators to make retorts.

Assessment of the project activities shows there are several immediate outcomes, which indicates the overall project objectives have been met as anticipated. Some of the observed impacts are:

- The awareness of mining community has increased to the extent of exercising serious pressure to the polluters (batch-mills,

washing pond owners) and requested them to operate away from residential areas and sources of water.

- Project's trained gold buyers are now using protective gears and retorts. For the first time in Tanzania, more than 95 retorts were fabricated locally and sold to gold dealers within a span of three months.
- Those who have to relocate e.g. washing pond's owners in riverbeds have entered into an agreement with village councils to shift to higher grounds allocated by the village.
- There is local ownership of the project objectives as is shown in the inclusion of environmental agenda in the Village Council Meetings
- Local trainers gained training experience through support and guidance from the project team.

However, the project's team noted some shortcomings that will require further interventions. Processing center owners were reluctant to use some of the appropriate technologies, as they will lose earnings from current customers. For example, exploitive practices limit the use of better sluices to disadvantage a group of miners because what they left as tailings is the main source of income to washing pond owners.

To sustain the project achievements it is important for the government of Tanzania to address the current forms of mining activities of ASM in Geita district. One area is allocation of more mining land for ASM to minimize illegal mining activities and the village councils should have sufficient powers to deal with illegal migrant miners who do not want to adhere to environmental regulations.

Entrepreneurship training and credit facilities to cooperatives groups will improve incomes of exploited groups and further protect them from the dangers of mercury exposures. Sufficient budget allocation to Geita Resident Mines office is necessary to sustain extension services, inspections and TDU activities

The project awareness campaign was successful to transform some of the bad practices linked with dangerous handling and uses of mercury and uncontrolled discharge of tailing in the water bodies. The dangers of mercury disposal are now well known to several socio groups in Lwamagasa and Nyarugusu mining villages. The Government with donor support should continue its efforts to raise awareness campaigns and demonstrations activities in other gold mining areas in Tanzania.

1.0 INTRODUCTION

1.1 Background

Mining industry is one of the fastest growing economic sectors in Tanzania. Its contribution to exports has significantly increased from 26.9% in 2000 to 52.1% in 2004. Artisanal and small-scale mining is increasingly becoming dynamic as it provides rare alternative economic opportunities to rural communities.

Geita district situated south of Lake Victoria in Mwanza region is one of the active gold mining district in Tanzania. Gold prospecting licences (PL's) of junior exploration companies cover more than 90% of the district land. These companies have been attracted by favourable geology and the history of the artisanal and small scale miners (ASM) over the years.

The ASM are estimated to be more than 150,000 in the district out of more than 1,000,000 who are believed to be active in Tanzania. Due to lack of technical knowledge and enforcement of existing regulations, the activities of ASM have caused negative impacts to the environment and socio norms.

The uncontrolled use of mercury through amalgamation and discharge of tailings in or close to water bodies and deforestation are some of the ASM environmental effects. A reduction of the release of mercury vapour from Geita artisanal miners through better extraction methods would reduce the number of mercury-intoxicated people in the area.

Tan Discovery was contracted by UNIDO on 29th December 2006, to implement the Global Mercury Project (GMP) objectives through project No. EG/GLO/01/934. The project aims to conduct "Community Awareness of the Hazards of Mercury Exposure and Demonstration of Cleaner Gold Processing Technologies to mining communities within the Geita mining district in Tanzania".

This report provides a summary of activities, challenges and achievements of the above project.

1.2 Brief Project Description.

The Terms of References (TOR) shows the project specific objectives are two but closely related:

- Improvement in gold recovery and reduction in mercury use and /or loss, and
- Awareness of the health risks of exposure to mercury.

The TOR, also provide the general approach and basic activities to be implemented to achieve the above objectives. The activities are grouped under two main components: Health Awareness; and, Technology Demonstrations. See TOR as Attachment No 1.

Tan Discovery team prepared a work schedule together with the outreach strategy to ensure the community and the local leaders have active participation in the project activities.

2.0 PROJECT IMPLEMENTATION AND COORDINATION

2.1 The Structure and Roles

While implementing the project the sub-contractor was observing carefully the conditions of the contract and the proposed management structure in the tender technical proposal. A Tan Discovery office in Dar es Salaam was the project coordination centre to liaise with UNIDO through the Tanzania UNIDO Resident Representative Office and on the other part to support the project field activities in Geita district.

The UNIDO Resident Representative, Madam Patricia Scott and Program Officer, Mrs. Giorgina Cattaneo offered important support in the preparation of the promotional materials and the custom clearance of the imported demonstration equipment. The office also monitored project implementation progress and endorsed the progress reports.

The field activities were implemented with close consultation with Assistant Country Focal Point, Mr. Aloyce Tesha who was also representing the Commissioner for Minerals Resources in the project. Geita Resident Mines Officer, Mr. Donald Mrema was responsible, on behalves of the Commissioner, to make official contacts with Geita

district officials. These contacts were essential to link the project activities with other on going poverty reduction initiatives and it was possible to have active participation of local leaders, including the District Commissioner himself, in the project activities.

The project's villages contact members were the village Chairpersons and the Village Executive Secretaries. These leaders were responsible to mobilize their people to attend training and technical demonstration activities. They also participated in the Village Council team, which was monitoring work behaviour changes of mineral operators. The team also, took administrative measures to support the transformation process and acted on various complains related with exposure to mercury poisoning.

The project team was lead by Mr. Rogers Sezinga, assisted by Dr. Crispin Kinabo -Training & Technology Demonstration section and Mr. Halid Kiluvia - Awareness Campaign section. Day to day training and custody of the TDU was under Head Technician, Mr. Samwel Gombekile who was assisted by Mr. Elias Kabadi of Madini Geita. Health officers who took part in the awareness campaigns were Dr. Simon Ngowi, Dr. Daniel Izengo, Mrs. Mwajuma Libuburu, and Mrs. Laurencia Mkungu. A team of health officers from Geita -Mrs. Rosemary Binamungu, Mrs. Asifa Rashid and Mr. Kessy, Lumex technician from Mwanza Water Laboratories, conducted mercury blood test exercise and counseling to the villagers.

Active village leaders in the awareness campaign activities were, Mr. Salvatory Mapalale (Chairperson Lwamagasa), Mr. Mpini Muhabwa (VEO Lwamgasa), Mr. Hamisi Mgoi (Chairperson Nyarugusu), Mr. Binas Malekela (VEO Nyarugusu Centre), Mr. Phillip Malindo (VEO Busolwa), and, Mr.Sekile Muhagwa (Ward Executive Officer Nyarugusu).

The project used Blue Reef Mine, at Lwamagasa village, to conduct capacity-building workshop and most technology demonstrations activities. The mine owner is a transformed small - scale miner, Mr. Christopher Kadeo who has about 150 fulltime employees and has mechanized most of his mining and processing activities. The mine

also provided several technical supports, which enhanced the technology demonstration classes.

2.2 Implementation Stages

The project document was signed by Tan Discovery on 29th December 2006 and immediately began mobilization activities using own resources as the first phase payment was received on 29th January 2007. There were also delays to receive imported equipment and some of the field activities were delayed to accommodate visits of national leaders in Geita district. The adjustments to the work plan were reported in the bi-monthly progress reports.

The first awareness campaign was launched at Lwamagasa village on 7th March 2007 and was immediately followed by a six days trainer's capacity building workshop at Blue Reef mine. Training and TDU activities started at Lwamagasa village on 14th March 2007 and lasted for two months. Extension services and supports to behaviour changes activities commence by mid June 2007 when the TDU was moved to Nyarugusu village.

TDU and awareness campaigns were launched at Nyarugusu village on 17th May 2007 and later followed by training and demonstration activities. Nyarugusu is one of the biggest villages in the country with a population of about 23,000 people, it has eleven sub-villages some of them are 8km from the main sub-village. To reach more miners it was agreed to have four training centres and trainers have to travel everyday to these centres.

Between 6th and 10th July 2007 a team of health officers and Lumex technician conducted mercury blood tests and counseling to 220 villagers.

In July 2007, Asst. Country Focal Point, Mr. A. Tesha attended UNIDO meeting in Vienna and on his return informed the sub-contractor that it was recommended to extend the project field activities and the project closing ceremony should coincide with the Annual Miners Day at Nyarugusu village which by then it was planned to take place on 2nd September 2007.

A brief review of the project achievement was conducted by Dr. C. Kinabo between 30th July 2007 and 3rd August 2007.

The TDU equipment was officially handed over to Geita Resident Mines Office on 9th August 2007. The office issued nine original copies of Tanzania Government Local Stores Requisition Vouchers Nos. 9/01530740 to 01530748 to acknowledge receipt. See Attachment No. 2.

3.0 PROJECT ACTIVITIES & ACHIEVEMENTS

3.1 Summary of the Project Activities

The project team implemented two main components, which are sub-divided into:

a) Awareness Campaign Activities

Preparation of Awareness Campaign Materials and Information Dissemination

Execution of the Awareness Campaign

b) Training and Technology Demonstrations Activities.

Preparation of Transportable Demonstration Unit (TDU)

Conducting Trainer's Capacity Building Workshop

Conducting training and TDU Demo Activities

3.2 Review of Project Activities and Outcomes

3.2.1 Community Health Awareness

To raise the community health awareness, the project first prepared promotional materials and an outreach strategy to reach as many people as possible in Geita district mining areas.

The promotional materials were intended to be used to educate the mining community members of health hazards from exposure to mercury and to encourage them to attend training programs, which will improve their existing gold recovery technology.

a) Preparation of Awareness Campaign Materials & Information Dissemination

The promotional materials included training booklets in both English and Swahili versions, wall posters, banners and printed T-shirts.

- Four Sets of Educational Booklets

Global Mercury Project (GMP) had prepared educational booklets which were tested during the June 2006 training of trainer's workshop in Geita town. The titles of the booklets are: Mercury and Health; How to use and re-use mercury; How to protect your water; and, How to get more gold. The contractor worked closely with the Asst. Country Focal Point to translate the four booklets in Swahili language. The translation take into account the local terminologies as well as the standard Swahili terms to ensure the miners and public understand proper meanings to the topics covered in the booklets.

UNIDO Resident's office was responsible in the printing of the four educational booklets. Each booklet a hundred copies were produced in both Swahili and English versions. Copies of the booklets were part of the attachment of the 2nd Progress Report.

The booklets were distributed to the stakeholders during the TDU launching ceremonies and class trainings sessions. All trainers and village leaders have received the English and Swahili sets for their reference in class training and awareness campaigns. While checking progress of the project activities it was noted that the format of the booklets, which has use mainly pictures to convey technical themes, was very helpful to assist miners to learn.

- Developing additional promotional materials

A local artist was engaged to assist in the designing of the four wall posters and the project printed 1000 copies of each poster. One poster shows how bad mining practices can pollute the living areas and water bodies, the second one shows good practices to concentrate ore and handling of mercury in amalgamation process. See the copies of the posters as Attachment No.3.

Like other promotional materials, the posters were distributed to the mining communities during the TDU launching ceremony and training sessions. The posters were also placed to all public areas and mineral

processing sites in Geita district. The idea of printing calendar was dropped after consultations with other stakeholders on its overall impact and instead it was agreed to increase the number of wall posters.

A high quality, polyethylene project promotion, poster was affixed to the sides of the Transportable Demonstration Unit (TDU) and the front part of the TDU classes. The poster has project logos and title -Global Mercury Project and the Swahili theme has the following meaning: Appropriate technology and skills to improve quality of life in mining areas.

- Get more gold by using less mercury
- Protect your environment and sustain good health.

The project also printed 750 T-shirts and caps. All printed products carried the project logs in the front side. The sides of the caps have Swahili words of "Mercury Kidogo, Dhahabu Zaidi" meaning Less Mercury, More Gold. The backside of the T-shirts have prints, "Jikinga na Madhara ya Mercury" meaning "Protect yourself from dangers of Mercury". Most of the T-shirts were distributed a day before the TDU launching days a Lwamagasa and Nyarugusu villages. The printing materials also reached other stakeholders at Geita and Mwanza town.



Figure No. 1-TDU with Project Poster

In addition, project banners announcing the project launching events were posted in different public locations, at Katoro, Nyarugusu, Lwamagasa villages and at Geita town.

- Media

The project maintained a good working relationship with the member of the press as part of the information dissemination strategy. Both specialist journalist from Dar es Salaam and local reporters had opportunity to visit the project activities and later report to their respective news media.

Press releases were made through radio and television to announce the TDU launching days and progress of project activities. The GMP activities appeared as news on three different occasions covered by five newspapers and three television networks. Also 16 newspapers articles on GMP objectives and its Geita activities appeared periodically in The Guardian, Mwananchi, Habari Leo, Msanii Africa newspapers. Attachment No. 4 represents some of the articles. Star TV network of Mwanza also presented a one-hour special mercury awareness program soon after the launching of the awareness campaign at Lwamagasa village.

b) Execution of the Awareness Campaign

As stated above, the immediate objectives of the awareness activities were two fold, first was for the public to be aware of the activities of GMP and the second, was to encourage villagers in Geita mining areas to be active in the project activities.

Mercury awareness campaigns started with press releases and public announcements of dates of launching project activities at Lwamagasa and Nyarugusu villages. The project also conducted capacity building workshops to trainers and village leaders to increase the number of local campaigners.

Training to trainers and other awareness campaigners focused on three main areas:

-First was to raise the awareness of the dangers of exposure to mercury and losses incurred for using poor technologies. The focus was to educate the community on the short term as well as long term impacts of the above shortcomings.

-Secondly, GMP program was offering miners appropriate technology and skills which can improve productivity in gold extraction and also safe guard individual health, and the environment.

-Lastly the awareness campaigns should encourage different groups [miners, schoolchildren, Community based organizations-CBO's)] in the mining community to participate in the project activities. It has to be clear that although miners are the ones using mercury but the dangers of mercury affects almost everyone in the community.

The trainers also learned the effectiveness of different promotional tools and ways of addressing mercury awareness campaigns while conducting technical training sessions to different sub-villages.

Project trainers and other campaign facilitators later used the promotional materials effectively in various events and public gathering occasions. Awareness campaigns were conducted in different venues such as:

- Launching days of project activities at Lwamagasa and Nyarugusu villages.

District Commissioner of Geita and UNIDO Representative attended the ceremony together with other senior government officials. The presence of these leaders helped the launching ceremonies to be well attended. The Mgusu community theater group with several mercury dangers related displays and awareness songs entertained the gathering.

The district officials also participated in the outreach strategy meetings organized to increase the active participation of the mining community to the project activities.

The events were well covered by the press, with articles reported in more than five newspapers and three national wide radio stations - Radio free Africa, Radio Tanzania and Radio One. Star TV of Mwanza and ITV of Dar es salaam also aired the mercury awareness campaign events in their evening television news.

- **Training and Demonstration Sessions**

Trainers and village leaders conducted most of the mercury awareness campaigns.

During the class sessions or video shows the trainers also provided the opportunity for the best learners among the villagers to provide specific explanation to other villagers. See Figure No. 2. Training on health and sanitation issues was provided to all socio groups in the community. Focus of the training was on communicable diseases, sanitation and protection of water sources.



Figure No. 2 - A villager explain benefits of using retort

- **Village meetings**

The village leaders of Lwamgasa and Nyarugusu villages, who attended the trainer's workshop later, requested the project to provide special training sessions to all village council members. This exercise was very important as it transformed the way the village government viewed the issues of environmental conservation and how to deal with dangers of mercury emission and tailing disposals in their community. Environmental issues are now part of village council meeting agendas and the councilors were active in mercury awareness campaigns. The two village councils now are playing the leading role to monitor

behavior changes of polluters and have taken regulatory measures to address complaints of the public on stubborn polluters.

- Hospital Counseling Sessions

The medical officer of Nyarugusu village health centre, Dr. S. Ngowi, initiated counseling sessions to outpatients at his centre. The sessions are conducted twice a day before starting treatment to non-emergency patients and are lasting for five to maximum 15 minutes. The aim of these short sessions was to discuss and raise awareness on health, sanitation and danger of mercury poisoning.

Dr. Ngowi's initiative helped some villagers to realized their illnesses are signs of mercury poisoning. Several others requested to conduct mercury blood tests.

- Multimedia and Video Shows

Multimedia projector was an important tool in class sessions to raise the awareness on effects of mercury poisoning through audio visual displays.

Arrangements were also made through village offices to conduct evening video shows to the -public in the sub-villages. The villagers had opportunities to see the dangers caused by mercury poisoning in other parts of the world. About 28 video shows were conducted and were attended by more than 8500 people.

3.2.2 Technology Demonstrations

(a) Preparation of Transportable Demonstration Unit (TDU)

As explained in the first progress report the TDU was a platform to undertake project-training activities. TDU preparation activities involved identifying equipment suppliers, ordering and assembling the equipment on a small-trailer and transporting the unit to Lwamagasa village in Geita district.

Equipments purchase, collecting and transporting to Geita District was accomplished in two phases. The first phase involved the equipment that was purchased locally. GMP vehicle towed the TDU- trailer from Dar es Salaam to Lwamagasa village about 1400km trip.

The bulk of the imported equipment from USA arrived in Dar es Salaam in mid March 2007 and was shipped to Mwanza airport before transported to Lwamagasa village by road.

The technicians provided good care of the equipment during demonstrations activities and the inventory was checked weekly.

Some of the disposable items were distributed during training activities these include gloves and earplugs. The rest of the TDU inventory was handed over to Geita Resident Mines office and as reported above, Government Requisition Vouchers were issued.

One of the important preparation works was the construction of a canvas covered timber frame structure as a training centre at Blue-Reef mine at Lwamagasa village. The training area had capacity to accommodate more than 60 people. See photo below, Figure No. 3. At Nyarugusu village the project used rental buildings and school premises to conduct training in the sub-villages.

The training sites were equipped with a desktop computer, multimedia projector, screen, white board, blackboard and a mini sound system.



Figure No. 3 - Lwamagasa GMP Training Site

(b) Conducting Trainer's Capacity Building Workshop

In order to demonstrate appropriate gold processing technologies to the mining community, the project initially conducted module-oriented training programs meeting training needs of different working groups from both Nyarugusu and Lwamagaza areas. As stated above, a five days trainer's workshop was conducted at Lwamagasa village from 8th March 2007. The workshop objective was to improve the trainer's skills in different approaches involved in bringing awareness to small-scale mining community on improving gold production, reduction of mercury use, improvement of occupational health and prevention of environment destruction. About 32 participants attended the workshop including mining technicians, Geita district health officials, selected miners, and divisional/village administrators all from Lwamagasa and surrounding villages. The summary of the workshop was reported as an attachment in the 2nd Bi-Monthly Project Progress Report (April 2007 - May 2007).

(c) Conducting training and TDU Demonstration Activities

Training programs and demonstration activities covered technical subjects on gold extraction methods and health & sanitation issues. The training subjects in module forms addresses the specific needs of the following groups:-

- trainers/administrators;
- village councilors;
- different functional groups, pressure groups in community (school children, food vendors, mine labourers, kiosk/show owners);
- main mercury polluters (washing pond owners, gold buyers, Small gold tailing operators Batch mill owners).

Modules covered included:

- Ore crushing and grinding
- Concentration of gold using gravimetric methods - panning, shaking tables, sluice boxes;
- Water recycling, re-use, and protection of water sources in mines;

- Gold amalgamation processes - mixers, amalgamation drums, use of protective gears,
- Proper burning of amalgams - use of retorts, energy conservation by using blowers instead of charcoal
- Marketing of gold - use of proper electronic weights instead of razors.
- Mining methods - was provided only on request.

The courses durations varied depending on the group's training module package. Some courses lasted only for two class sessions while others covered 10 class sessions. The trainers worked seven days a week to meet the various training needs of the miners. Villagers requested training even during the public and religion holidays.

The class training first covered the technical subjects of economic interest to a particular group using a package of subject modules. However, all groups have to cover compulsory subjects these are environmental care and health risks related with mercury exposure and sanitation issues.

As reported above, well performing students in a particular group took part to explain a topic in front of other participants by using available tools like retors, posters, etc. This class participating approach together with several demo examples using equipment and audiovisual facilities has helped to accelerate the transfer of intended knowledge to the mining community.

Field demonstration

Technology demonstrations activities provided opportunity for miners to realize benefits they can get by adapting appropriate technologies, which are safer, cost effective and more productive.

Each demonstration session was designed to address a particular problem in the current gold processing practices. To convince miners to change, some demonstrations activities were conducted by comparing performances of appropriate technologies to the traditional practices. For example, the good recovery of the modern sluice box convinced miners to consider using riffles in their sluice boxes.

A comparison of the size of gold and the amount of mercury, which was recovered by a retort after burning an amalgam, was made frequently. See Figure No. 4 below. This simple picture had instantly changed the behavior of many miners who used to burn amalgam in the open. Miners now could see the amount of mercury released into the atmosphere each time they burn an amalgam. A warning message attached with the picture states, "*... the more you smell the mercury vapour the more of this mercury you will inhale*".



Figure No. 4 - Gold and amount of Mercury recovered by retort.

Training and demonstration in Lwamgasa

At Lwamgasa village, 1430 villagers attended the various courses offered at the TDU centre. About 220 class sessions were conducted between 14th March and 15th May 2007.

The groups which attended training at Lwamgasa include owners of gold recovery centers-*mialo* (5.6%), ore grinding group (10.1%), gold buying traders/brokers (4.6%), women groups - girls (41.8%); women groups - elders (15.2%), women groups - pregnant (2.5%), disables (6.6%), gold mining SACCOS (6.3%), Hekima women SACCOS (4.8%) and private operators (2.5%). Furthermore, training was conducted to two primary schools at Lwamagasa village attracting 522 pupils and 20 teachers.

Field demonstration and other practical classes were conducted at the Blue-Reef mine gold recovery section area. The aim of the demonstrations were to provide opportunity for miners to realize benefits, they can get by adapting appropriate technologies which are safer, cost effective and more productive. Examples of areas that demonstrated included:-

- Improving water management in mines - it was demonstrated that one small gasoline powered water pump is capable of serving more than ten washing ponds constructed more than 1000 meters from the water source.
- Using appropriate technologies - it was demonstrated that 20kg bag of milled ore was concentrated through traditional sluice box and another 20kg milled ore was passed to a sluice box with appropriate mats and well placed riffles. The good recovery of the modern sluice box convinced miners to consider using riffles in their sluice boxes.
- Conserving mercury usage - Miners also noted the strength of a retort over open fire burning of amalgam. Miners and gold brokers also learned how to charge mercury before reusing it.

Demonstrations activities at Blue-Reef mine and other processing centres at Lwamagasa village was attended by more than 2700 people.

Training and demonstration at Nyarugusu

As stated above Nyarugusu village has eleven sub-villages and the four trainers rotated to conduct the training in the sub-villages. About 3900 villagers attended the class-training courses. The distribution of the trained persons included owners of gold recovery centers-*mialo* (6%), gold buying traders/brokers (3.5%), private operators (50%), primary Licence Holders-PML (4.5%), sluicing Operators (5.5%) and ore Porters (11.3%), women groups-girls(4.2%), old women(4%), and other groups(11%). Training also was conducted to more than 1855 pupils from three primary schools at Nyarugusu. About, 4800 people attended field demonstration activities at Nyarugusu centre and its sub-villages.

3.2.3 Summary of Activities and Achievements

	OUTPUT/ACTIVITIES	STATUS (Completed/In progress/Re-scheduled)	ACHIEVEMENTS & REPORTING
1	Prepare Material for Awareness Campaign		
	<ul style="list-style-type: none"> Design & print 	Completed	<ul style="list-style-type: none"> -Participated in the translation of the four educational booklets from English to Swahili. -Design three campaign & training posters and print 1000 copies each. -Design, print and distribute 750 caps &T-shirts - Design and posting of 6 banners.
	<ul style="list-style-type: none"> Scripts for newspapers, radio, TV & Community theater 	Completed	<ul style="list-style-type: none"> -Different scripts were prepared for the press and was also used as background material by the press. -16 newspaper articles appeared in 4 newspapers. Star TV and ITV television networks also reported project activities. -Mgusu Community theater group was very active with promotional songs and plays during the TDU launching days.
2	Recruiting & Training of Trainers		
		Completed	<ul style="list-style-type: none"> - A six days trainer's course was conducted from 8th March 2007 to 13th March 2007 at Lwamgasa village. - 32 trainers from Geita Ministry of Energy & Minerals office, the Health Dept., the Local Government and the village leaders attended the workshop. -The most important work was to develop the training approach and campaign outreach strategy. -The participants were active as trainers and work to motivate other villagers to attend training and TDU activities.
3	Execution of the Awareness Campaign		
	<ul style="list-style-type: none"> Launching Awareness Campaigns 	Completed	<ul style="list-style-type: none"> -Launching of Awareness of Campaigns was held on 7th March 2007 at Lwamgasa village and was well attended by villagers, district leaders and UNIDO Representative. - The event was reported in more than four newspapers, three national radio stations and two TV networks. - Launching ceremony for Nyarugusu village took place on 17th May 2007. Geita DC was the guest of honor and the event was well covered by the press.
	<ul style="list-style-type: none"> Conducting village Awareness Campaigns 	Completed	<ul style="list-style-type: none"> -Village awareness campaigns started during the official launching day and gained pace after the trainers workshop reported above. - The campaign activities were carried in two big gold mining villages of Nyarugusu and Lwamgasa. The project activities also reached most of the communities in the sub-villages.

			-220 people underwent mercury blood test and counseling
4	Prepare Transportable Demonstration Unit (TDU)		
	<ul style="list-style-type: none"> Identify equipment suppliers, purchase & custom clearance 	Completed	-All the equipment and tools ordered were first at Lwamgasa and later at Nyarugusu training centers. After the completion of the trainings, the equipment were handled over to MEM. The list of the equipment delivered to MEM is attached.
	<ul style="list-style-type: none"> Assemble & Transportation of TDU 	Completed	-The rented TDU trailer was modified and was used to transport and store the equipment and tools. - The TDU was at Lwamgasa village in Geita for 8 weeks and on 16 th May 2007 was towed to Nyarugusu village for another period of 10 weeks.
	<ul style="list-style-type: none"> Train trainers on demonstration & care of TDU equipment 	Completed	- Part of the training was conducted during the trainer's workshop and later after arrival of imported equipment. - 4 more fabricators were trained and 95 retorts sold to the mining community.
5	Conduct TDU Demonstration Activities	Completed	- The demonstration activities started soon after the trainer's workshop at Lwamgasa village. - The demonstration activities were well attended: 2700 at Lwamagasa and 4800 attended at Nyarugusu. - Project immediate impacts explained under Section 4.0 of this report.
6	Develop Partnership & Coalition among Stakeholders	Completed	-Contacts were made to Mining Association leaders to work closely with village leaders -Coalition with other implementing partners like Geita Gold mine was made to plan the needs to conduct Miners Day at Nyarugusu

4.0 IMPACT OF THE GMP PROJECT

4.1 Approaches to Support Behavior Changes

Few weeks after commencement of the awareness campaigns in March 2007, the project team at Lwamagasa village, started to observe few immediate impact indicators. Individuals including schoolchildren began to raise questions and complain to the village leaders on gold buyers who are burning amalgams in the open or conducting gold processing activities in residential areas. Some of the gold buyers on the other hand wanted to own retorts but did not know where to buy them.

The project team met with the village leaders and agreed to speed up the process of allocating land for gold processing activities and to train other fabricators on making retorts locally. Later, the Village Council met and authorized the Community Services Committee to allocate appropriate land away from the water bodies, that will be used for establish washing ponds.

It was also agreed that on-going complains should be treated as good indicators of public awareness of dangers of mercury poisoning and the polluters should be supported to transform their operations rather than prosecuting them. Polluters should be required to attend training on better gold extracting methods or seek advice from those who have already started transforming their processing practices, with the aim of protecting the environment and dangers of mercury to human.

The village governments also provided sufficient time to those who have to relocate to new processing sites or improve their gold buying offices to do so before regulatory measures are imposed. This process started at Lwamagasa village but was later repeated at Nyarugusu village centre and its other six sub-villages. Figure No. 5 shows a new washing pond located away from the river channel.



Figure No. 5 - Relocation of washing ponds away from the water bodies.

The trainers also met with the village fabricators and provided them with the retort types, which were mostly preferred by the miners. Five more welders were trained to make retorts using locally available materials. See Figure No. 6 below.

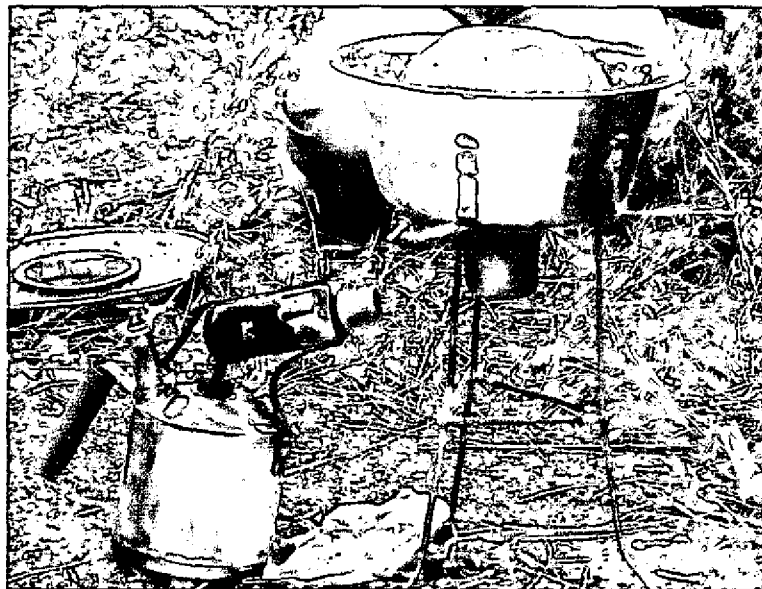


Figure No. 6 - Locally fabricated retort

4.2 Monitoring Activities

The project team together with the village executive officer conducted several behavior change monitoring exercises. The project prepared a checklist to assist the monitoring team to identify changes made by gold buyers and owners of washing ponds. The team assessed the quality of the operations and how owner's observed safety and environmental issues. Technical assistance was provided to the operators to improve their work performances. The first week of August 2007, Dr. C. Kinabo conducted a four days assessment of project activities at Lwamgasa and Nyarugusu sub-villages.

The results of the reviews shows most operators have started to take measures of improving their work performances. The gold buyers are ahead in the transformation process of reducing mercury vapours to the environment by using retorts. Ending July 2007, about 95 retorts were consistently used by miners at Lwamagasa and Nyarugusu village. This is one of the major achievements of GMP project as for

the first time in Tanzania gold operators willingly they use and acknowledge the importance of using retorts.

In protecting agricultural produce from being contaminated by mercury in washing and amalgamation sites, the project team observed that miners operating near flood prone areas like rice farms of Nyarugusu area have been partitioning working areas by building walls to control tailings spillage into farms. In addition, amalgamation ponds in or near riverbeds have been closed down, and the area is now self revegetated, covered with original grasses. This has a significant impact on the watershed hydrology and water quality of rivers draining to Malagarasi wetlands and Lake Victoria.

4.3 Immediate Impacts

Assessment of the project activities shows there are several immediate impacts/outcomes, which indicates the overall project objectives have been met as anticipated. Some of the observed impacts include:

Related to Awareness Campaigns

- Dangers of mercury poisoning and dust
 - (a) Community is now putting pressure to polluters (batch-mills, washing pond owners) to operate away from residential areas and sources of water. The village executive offices have received several letters of complain and rule cases against polluters brought by the villagers.
 - (b) Gold buyers are taking measures to improve ventilation in their offices and they have started to use protective gears and retorts as a way of sustaining their businesses. Individual miners now prefer to sell their gold to brokers who have proper retorts. In addition, gold brokers whom do not use retorts are prohibited to operate from the village centres.
 - (c) Washing ponds owners through their representatives have promised to cement canals and wash ponds as well as to recycle process water in their working areas. Miners working within the water bodies have stated to move to higher grounds as directed by the respective village governments.

(d) Most gold dealers sought medical counseling and later undergo mercury blood tests. In addition, 220 villagers went for mercury blood tests and counseling.

- Sanitation and Health

- (e) Food vendors have improved the care and handling of food.

- (f) Noted improved sanitation and hygiene practices from the community, which is reflected by a drastic fall of diarrhea cases at Nyarugusu and Lwamgasa villages

- Protection of Water Sources

- (g) Water wells are protected by walls to safeguard against surface flooding waters or distant tailings discharges

- Awareness Campaign Materials & TDU Launching Events

- (h) Attracted member of the public to attend project activities

- (i) There is local ownership of the project objectives. Outreach strategy and capacity building activities have enable village leaders to be actively involved in the project activities. Environmental issues are now part of the Village Council meetings agenda and Village Executive Officers oversees transformation process.

Technology Demonstration

- Capacity Building

- (j) District health officers and Mines Dept. technicians conducted most of the training after attending UNIDO trainer's workshop.

- (k) Two types of retorts are now been produced by village fabricators to meet the local demands of gold buyers and miners.

- Class Training & Field Demonstrations

- (l) Class attendance of socio/work group's members was good because the training module approach addresses the group's specific needs.

- (m) The benefits of new skills spread fast to other mining districts. Individual classes were added to meet specific needs of miners from distant villages. Others traveled long distances to Lwamagasa village only to see technology demonstration activities.

- (n) Conducting separate training to particular socio groups offered rare opportunity to exploited and disadvantaged groups in the community, as they were free to express themselves well in class sessions. It was also possible to reach elderly woman and stone breaking workers and train them on occupational health hazards.
- (o) Washing ponds owners purchased water pumps to supply water to reallocated working areas, far away from the water bodies.
- (p) There is increase use of dust masks and operators of batch mills are now wetting the discharge parts to reduce dust emissions
- (q) Five miners have requested addresses of TDU equipment suppliers with the intension of ordering stone crusher, riffled sluice boxes and plastic pans.

4.4 Short Comings

Few commercial operators for fear of loosing their current businesses could not apply some of the better extracting technologies and methods effectively. Some of the examples are short-listed below:

- Batch-mill operators viewed the efficiency of the TDU crusher-miller as replacement of their custom ore milling business. The current operators raised unfounded claims about the costs of operating a modern crusher; although field-tests shows the new crusher's performance was 10-fold of classical batch mills.
- The owners of washing ponds would not allow small gold miners to use better sluicing methods in their premises. The main reason given was that washing pond owners offer free sluicing services to miners on conditions that they leave the tailings behind for further processing. Therefore, a poor recovery during the first run of washing is a blessing to pond owners who will use better recovery methods to the left behind tailings. This is an exploitation practice, which can be addressed well in a poverty reduction intervention program.
- There are signs of new invasion by new mine immigrants to riverbanks and few flooding plain places that has been evacuated by resident miners.

5.0 PROJECT SUSTAINABILITY

The projects technology demonstration activities and community's health awareness campaigns have shown a positive impact towards driving miners to comply with minimum economic, environmental and social standards. After five months of training, miners in Lwamgasa and Nyarugusu villages now use retorts, which contribute to global mercury reduction to the environment, while reaping more gold benefits from such actions. However, these achievements are also threatened by other dynamic factors related with the current forms of mining activities in Geita district.

Currently most of the gold ore processed at Lwamagasa and Nyarugusu villages comes from unattended mineral properties of a large-scale exploration company. In addition, majority of the miners are frequently involved in gold rush activities in and outside Geita district. The Geita Resident Mines office has proper records of only few registered miners and depends very much to the village leaders on the activities of illegal miners in their respective villages. It is then necessary to consider additional measures if the current project achievements are to be sustained. Among the areas for consideration are:

- To sustain training activities to reach more mining communities in the district,
- The government through district authorities should consider incentives to the village leaders involved in the behaviour change monitoring activities,
- The government should allocate more mining land to ASM to minimize illegal mining activities,
- Village Councils should have sufficient powers to prosecute stubborn polluters who do not want to adhere to environmental regulations,
- Sufficient budget allocation to Geita Resident Mines office is necessary to sustain extension services, inspections and TDU activities
- Entrepreneurship training and credit facilities to disadvantaged groups are necessary to address the exploitative practices of most gold brokers and washing pond owners.

6.0 FINANCIAL INFORMATION AND STATUS

The project was planned to be completed towards the end of June 2007, but as explained above the field activities continued up to mid-August 2007. Been a fixed-cost contract the subcontractor took all necessary cost saving measures to ensure the project objectives are attained using the allocated budget.

Deliberate measures were taken to reduce the field operation costs. These include, sourcing most of the demonstration equipment from the manufacturers or major distributors and to rent TDU trailer as the invoices costs from the local suppliers were ten times the budget figure. Also, Tan Discovery's car, a Nissan Patrol 4X4 wheeled vehicle was stationed in Geita for five months as it was not possible to get UNIDO vehicle as originally planned and a motor cycle belonging to one of the trainers was also used and the project covered the maintenance costs which were lower than the local transport renting charges.

NO.	DESCRIPTION	ACCUMULATED COSTS from Dec.06 - Aug2007		Project Budget US\$
			Amount US\$	
1	TDU Equipment		18,665.00	18,250.00
2	Auxiliary TDU Supplies		19,556.79	20,707.00
3	Professional Services, Supply & other Operating Costs		96,240.21	95,505.00
	Preparation of Materials for Awareness Campaign	12,091.25		
	Training Trainers	5,833.30		
	Execution of the Awareness Campaign	16,548.97		
	TDU Activities	14,278.34		
	Developing Partnership & Coalition among Stakeholders	2,676.18		
	Project Management & Coordination	11,135.34		
	Reporting	5,021.81		
	Other Project Operating Costs	28,655.02		
	TOTALS		134,462.00	134,462.00

7.0 CONCLUSION

The project awareness campaign was successful to transform some to the bad practices linked with dangerous handling and uses of mercury and uncontrolled discharge of tailing in the water bodies. The dangers of mercury disposal are now well known to several socio groups in Lwamagasa and Nyarugusu mining villages.

Gold buyers are now using retorts and the community is putting pressure to those who are reluctant to transform. These achievements have to be sustained to ensure the transformation process reaches all the ASM community in Geita district and beyond.

The Government with donor support should continue its efforts to raise awareness campaigns and demonstrations activities, which will reduce mercury emissions in small-scale gold mining centres, while protecting both the environment and miners health.

Similar efforts like impacts of GMP activities in Geita District need to introduce in other gold mining areas in the country.

ATTACHMENT NO. 1

**TERMS OF REFERENCE
(TOR)**

TERMS OF REFERENCE

Campaign for Raising the Awareness of the Hazards of Mercury Exposure and the Demonstration of Cleaner Gold Processing Technologies to Mining Communities within the Geita Mining District of Tanzania

1. Background

Geita mining district is located south of Lake Victoria where gold mining is conducted in 7 mining centres. The Geita District has an area of 7,825 km², 185 villages and a population around 712,000 (census of 2002). The number of artisanal miners in the District is unknown but it is estimated to be as many as 150,000, in which most of them are illegal miners. To most people mining is usually associated with wealth creation. As a result, it is a magnet to many in a bid to break away from poverty or due to a quest for "get-rich-quick". With a relatively easy entry into artisanal and small-scale mining (ASM), i.e., one could enter with just a pick and shovel and in disregard to the mining law that requires one to possess a mineral right, the numbers of those directly engaged in the activities have been increasing every year. Whilst it was estimated that nearly 550,000 people were engaged in the activities in 1996 (MEM, 1996), current figures are put over one million participants and about half of these are located in Geita Mining District. The increase in participants in ASM has also been linked to increases in poverty amongst the Tanzanian population as a result of increase in layoffs from formal employment as a result of the economic restructuring, long-dry spells resulting in meagre earnings from agriculture, HIV/AIDS which has resulted in increased orphans and reduction of the workforce and disintegration of the extended family fabric as a social security and the raising gold prices.

As such, most people do not enter in ASM as a matter of choice but as either a survival strategy or from a quest for making quick money. As a result most enter without any prior knowledge of what is required in terms of legal obligations, investment, access to markets, technological requirements, health and safety considerations and others. The lack of knowledge of mineral rights acquisition procedures results in many entrants being exploited by a few mineral rights owners who have turned themselves into landlords. Children as young as seven (7) years are the major victims of the exploitative system where those licensed by Government to develop small-scale mines turn to this cheap labour. Such victims usually sell their labour for a day's meal or meagre earnings, e.g., Tshs. 100/day, which is not enough to meet their daily dietary requirements. In most mining areas women also still suffer segregation from primary mining activities as these are regarded as men's activities. In addition, the masculine based working methods that have been adopted in these manual based mining activities relegate most women to perennial activities with meagre earnings.

The ASM activities have negative impacts that are not only of its own making but also of the system that tries to regulate it. Due to the lack of adequate support and regulation, most activities are carried out in an uncontrolled manner. The lack of technical know-how by the operators result in activities that, are inefficient, do not adhere to any health and safety standards, have adverse negative impacts to the environment and have no proper marketing arrangements. The uncontrolled use of mercury through amalgamation, haphazard location of pits, increased siltation to water bodies, degradation of riverbanks and water sources, and deforestation, are some of the ASM environmental effects. Poor security in mining areas, smuggling of minerals, high inflation in mining areas and social vices, are all too common in mining areas.

A reduction of the release of mercury vapours from Geita small-scale gold mining into the atmosphere will not only reduce the number of mercury intoxicated people in the area, but it will also reduce the global pollution of the atmosphere with mercury. Much of the mercury vapours formed by open burning of gold amalgam is transported by air on long-range distances all over the globe. The total release of mercury vapour from gold mining is estimated today up to 1,000 metric tons per year while from all other anthropogenic sources approximately 1,900 tons were released into the atmosphere.

ASM, need to be educated as to the poisonous nature of mercury. Low cost and safe technologies to separate mercury from the amalgam should be introduced to ASM and to successfully promote sustainable decrease in the exposure of Geita's mining families to mercury, it is essential to follow a multi-faceted program to reduce the general stress these people face. For example, general health status can be improved by offering temporary rural nursing services; teaching proper mining techniques can reduce accidents at mining sites; the risk of sexually transmitted diseases can be reduced through safer sex campaigns; and, clean water supplies and sanitation programs should be supported. Acknowledging the importance of gender in limiting the ability of women and families to insure that mercury exposure is minimized, women of childbearing age especially need to receive information and training focusing on the risk of mercury to the foetus and to children in general. Furthermore, families need enhanced communication skills so that they can insure mercury is no longer burned in or near their households.

2. Aim of the Project

UNIDO is seeking an implementation subcontractor in Tanzania to implement the GMP objectives. Overall goals are to improve existing technology to increase gold recovery and efficiency to increase income, while at the same time reducing release and exposure of people to mercury and minimize off-site and environmental contamination. **The overall objectives are:**

- Improve community health by raising awareness of the dangers of mercury exposure to miners/panners, processors, their families and vulnerable members of the community; and by promoting health seeking behaviors through the implementation of Awareness and Education strategies that reduce actual stress on mining communities
- Improve community quality of life by means of increasing miners' income through the introduction of cleaner technologies such as gravity concentration and retorting for the reduction of mercury use in small scale gold mining
- Build local capacity in local government, health care services, and the mining community and people that support miners/panners and their operations.
- Encourage local equipment suppliers and manufacturers to provide the necessary equipment to improve gold recovery and to reduce mercury contamination.
- Support improved delivery of rural local health care, and implementation of appropriate water and sanitation technologies.
- Educate women and children, both on-the-job and in homes and schools to encourage behavioral changes to avoid hazardous activities involving mercury.

- Involve other stakeholder groups (e.g., mines offices and local government, UN agencies, large mining companies, churches, NGOs, etc.) to assist in implementation of GMP goals.
- Reduce environmental contamination and collateral damage to humans, wildlife and their food sources, by properly containing mining and milling wastes.
- Reduce global mercury contamination by reducing local emissions from artisanal mining activities.

Specific Objectives:

The project objectives are divided between two different, but closely related foci – improvement in gold recovery and reduction in mercury use and/or loss; and awareness of the health risks of exposure to mercury.

Both objectives are to be accomplished by providing miners with access to information and technology to increase the efficiency of their existing mining practices and at the same time, make miners and their families aware of the risks of mercury exposure and the steps they can take to protect themselves and their families. These will be accomplished by raising awareness within the local mining communities, building capacity within the local community (e.g., gold dealers, other business owners, health care providers), and through education and training of health practitioners, mine inspectors and as well as District and Village level government officials, Non-Government institutions and project personnel.

Health Awareness

1. Conduct campaign programs to raise awareness among specific target groups of the health hazards of exposure to mercury. Activities such as workshops, group discussions, presentations, Community Theater, as well as media coverage (print, television and radio broadcasts) and other social mobilization and behavioral change communications are recommended.
2. In conjunction with existing campaign activities, increase awareness for the prevention of infectious and transmissible diseases, improved water and sanitation practices etc and to build partnerships to communicate awareness of health hazards of mercury at the same time as partnering with other related community programs to convey health information.
3. Assist UNIDO to develop further awareness campaign materials to advise miners/panners, silver and goldsmith shop owners, and their families of the health risks of exposure to mercury. Masters of brochures and training materials in English focusing on various themes, will be provided by UNIDO. Specific campaign tools should include, but not necessarily be limited to the following:
 - Publish, print and distribute awareness campaign brochures;
 - Produce other print additional communication material such as posters, billboards, newspaper inserts, booklets for school children, etc. not developed

by UNIDO. Themes will include issues surrounding health awareness of mercury including amalgam burning, handling of mercury and amalgamation of gold, personal and community protection during secondary refining of doré, protection of children and the family.

- Produce Community Theater events focusing on the challenges facing artisanal mining communities; produce live media (TV and/or Radio broadcasts dealing with ASM challenges; broadcast content must be previously evaluated by UNIDO and/or developed in conjunction with the implementation subcontractor (e.g., how to protect your family from mercury; how to reduce loss of mercury).
- Produce additional awareness campaign materials such as hats, tee shirts, calendars, stickers or other promotional material as culturally appropriate.

Technology Demonstration

1. Operate a Transportable Demonstration Unit (TDU) as a continuous education platform. The unit will house education materials and assembled demonstration equipment (purchased by the subcontractor under direction of UNIDO experts). The TDU will be used as a mobile means of communicating program objectives: to demonstrate new technology, improve existing technology, reduce mercury use, recover mercury; and to advise people about the health risks of mercury exposure and how to take steps to protect themselves, their families, and the environment. A minimum of three people will be required to be in the TDU at all times and will include a mineral processing technician trained to make practical demonstrations on how to improve mining and processing practices reducing mercury emissions, technician responsible with Lumex mercury analyzer from the Mwanza Water Laboratory and a health care advisor (as per advise from Geita District Medical Officer), trained to communicate health awareness information.
2. Conduct programs to demonstrate technologies using small-scale gold processing equipment to recover more gold and recycle mercury used by the gold miners/processors/secondary refiners/gold shops.
3. Assist UNIDO to develop the capacity of local equipment suppliers and manufacturers to provide equipment to improve gold recovery and to reduce mercury contamination.
4. In association with related programs, improve community quality of life by suggesting means of increasing miners' income as a result of improved mining and gold extraction techniques or diversification of the economic activities in the region.
5. Assist UNIDO to develop additional programs to demonstrate technologies using small-scale gold processing equipment to recover more gold and recycle mercury used by the gold miners/processors/secondary refiners/gold shops.

3. Scope of the Contracting Services

The subcontractor will undertake the following activities on site and report results to UNIDO

Activity – 1: Prepare Material for the Local Awareness Campaign and Capacity Building

1. Deliver training and awareness campaign materials provided by UNIDO to educate miners/panners and community members of health hazards from exposure to mercury and to introduce/improve existing technology to increase gold recovery and daily income. It is recommended a strong focus on women, children and family health. Trainers provided by the subcontractor must be able to:

- Understand and implement the objectives of the Global Mercury Project - GMP
- Understand and implement the technical concept of mineral processing cycle in gold production (for mineral processing technician)
- Understand and implement training on health impacts of mercury exposure (for health care advisor)
- Understand and demonstrate ability to recommend better processing technology (for technician)
- Understand simple ways of analysis mercury exposure using Lumex Mercury analyzer and reporting the results (for Lumex Mercury analyzer technician)
- Understand how to motivate people to change behavior (health care advisor and mineral processing technician)
- Communicate effectively with appropriate cultural sensitivity (health care advisor, mineral processing technician and Lumex technician)
- Utilize training materials to successfully participate in awareness campaign activities and the TDU education platform (health care advisor, Lumex technician and mineral processing technician)

2. Develop, adapt and create additional training material and strategy under UNIDO direction: The subcontractor must adapt existing materials and create additional educational/training materials as appropriate to suit local customs, level of education and interest to optimize communication. The subcontractors should develop strategies such as entertainment shows (e.g. demonstrations, community theatre plays or popular bands) to attract more people to be educated in the TDU. Partnership with an existing health campaigns should be fostered. UNIDO will work closely with the subcontractor to approve such activities. Examples of the additional educational activities/material include billboards, radio broadcasts, additional brochures, posters, stickers, hats, T-shirts, etc.

All information/educational material and activities must be developed and delivered to the public in Swahili language. The subcontractor should build on the information available on the training and awareness material provided by UNIDO. Scripts for radio broadcast messages with various themes (e.g. proper gold burning procedures; safe handling of mercury; health risks of mercury exposure) should also be developed in association with UNIDO and broadcast by local radio stations. Latitude is given to the

subcontractor to be creative and innovative. Ideas and creative content must be previously discussed with UNIDO. The subcontractor should film the training periodically to document the progress of the activities. Midway and at the end of the contract, the subcontractor must deliver a film and photos to UNIDO.

The subcontractor will prepare and disseminate awareness campaign billboards, posters and training brochures. These materials should be efficiently distributed and displayed in order to guarantee a long-lasting communication effect.

Activity – 2: Execution of the Awareness Campaign

1. Identification of demonstration sites: An initial demonstration site has been identified at Blue Reef Mine, Rwamagasa and an agreement has been signed for the use of this site. The period of activity at Blue Reef Mine will be 3 months. The contractor will obtain baseline site data from UNIDO to plan the rotation of the demonstration campaign to other ASM sites in Geita District.

2. Execution of the Awareness Campaign Activities: The subcontractor will conduct the launch of the awareness campaign with a ½ day workshop introducing the TDU activities to approximately 40 stakeholders including government officials, Members of Parliament, local government leaders, religious, medical doctors, journalists, teachers, and mining associations.

The subcontractor will engage a community theater production company to raise awareness of the solutions available to address the health, mineral processing and other challenges that mining communities face, and to open dialogue between the GMP and trainers with communities in order to promote sustainability of health enhancing ideas and improved gold production. It is expected that the premier performance of the community theater play will coincide with the launch of the Awareness Campaign, and precede the training activities in each of the 15 TDU villages.

3. Promote Awareness Campaign: The subcontractor must promote the interests and activities of the GMP locally and around Lake Victoria. Local radio stations and newspapers should be engaged periodically to broadcast the arrival of the TDU at a new location in order to attract more people. In addition, the subcontractor should provide reports and information to support the development of a National Mercury Campaign.

Activity – 3: Transportable Demonstration Unit (TDU)

The present phase of the project aims to provide local technical and health experts who will teach local mining families. Focus will be in two areas, Health and Mineral Processing. Priority will be on skills development as well as knowledge. Trainers will give classes and operate a portable classroom or "TDU" containing small-scale mineral processing equipment to the mining communities in the Geita district of Tanzania.

The TDU is a platform to provide and improve on existing knowledge on the basic technical concepts of mineral processing cycle in gold production. Trained technicians

will recommend and demonstrate techniques and equipment that can be used to improve gold recovery and reduce mercury emissions. Miners/panners will also be informed about the health hazards of mercury and be provided with advice on how to reduce exposure. Information on infectious and communicable diseases and the importance of clean water and good sanitation will also be disseminated to miners/panners and their families.

1. **Identify Suppliers/Manufacturers of TDU Equipment:** A mobile demonstration unit must be set up at the above mentioned mining centres where miners/panners and gold processors can conveniently visit during operations and their time off. A variety of technical options for gold concentration, amalgamation and retorting must be demonstrated to miners/panners. These include, but are not limited to mercury amalgamation barrels and retorts, sluice designs, carpets, crushing and grinding equipment, and retorts/fume hoods for use in gold shops to minimize loss of mercury during roasting of amalgam in urban areas. A list of the recommended pieces of equipment to be acquired by the subcontractor to be used at the TDU is included in the session 8 of this document. The subcontractor must identify potential local manufacturers and suppliers of similar equipment or materials required to construct TDU equipment.

2. **Assemble and commission a TDU:** Specification for assembling the necessary equipment suggested in session 8 will be supplied by UNIDO. The subcontractor must identify manufacturers/suppliers, assemble and assist the construction (if necessary) of the pieces of equipment using local materials from local suppliers wherever possible and install the TDU. This work must be conducted under supervision of UNIDO-GMP team. Technicians trained by UNIDO must demonstrate the principles and advantages of relevant equipment. Ultimately it is up to the miners/panners themselves to adopt, adapt, modify, improve or purchase an assembled product (e.g., crushers, ball mills, sluice boxes of improved design, centrifuges, amalgamation barrels or retorts).!!

3. **TDU Operations and Maintenance:** The subcontractor must manage day-to-day operations and maintenance of all equipment provided for the TDU.

The subcontractor will employ trainers (preferably locally based) with mining and mineral processing knowledge, and in the case of the team nurse, community health expertise; the subcontractor will coordinate a workshop where trainers will be trained by the GMP PCU team in research based health education methods to ensure capacity to achieve optimum community capacity-building, as well as individual mining and mineral processing skills; in addition to the employed trainers, stakeholders from government and community based organizations will be invited to participate in the trainings.

It is expected that the TDU will be transported and demonstrated to expose as many miners/panners and their families as possible to technology and health awareness. The subcontractor must be responsible for the expenses to transport the TDU from one location to another. Safety and security issues must be observed by the subcontractor during the TDU operation and transportation. Personal protective equipment must be supplied by the subcontractors to all individuals operating any type of equipment in the

TDU. Liaison with local and regional government officials, workers associations, and police offices is important so there is awareness and support for these activities.

TDU technicians and basic health care providers will be responsible for holding meetings, discussions and consultations with miners/panners and their families during hours of operation or as convenient for the learners. The subcontractor will run 3-week long educational sessions for miners/panners and families in at least 7 mining centres within Geita district in conjunction with the TDU. Trainings should offer lectures for miners/panners and their families, but should focus on hands-on, practical demonstrations of the use of the different types of equipment of the TDU. In order to encourage burning of amalgam away from pregnant women and children, the subcontractor should locate and develop in consultation with the communities "amalgamation sites" away from habitation which, when appropriate, may include measures to insure safe water supply and sanitation.

The suggested curriculum for training of miners, panners, millers and other stakeholders is contained in Appendix 1. UNIDO will provide training for the operating personnel in health and environmental awareness as well as the topics for technical training prior to the kickoff of the awareness campaign and first implementation of the TDU. UNIDO will provide ongoing support and assistance to the trainers in the field as required. Additional resources are available via the proposed collaboration between the gMP, Geita Gold Mine and DIFID which will be discussed in detail with the successful tenderer.

Activity – 4: Develop partnerships and coalition among stakeholders

An agreement is being negotiated between UNIDO, Geita Gold Mine and the UK Department of International Finance and Development (DIFID) for ASM related activities in the Geita District. The subcontractor should suggest and develop further partnerships and coalitions with national, regional and local stakeholders to optimize distribution, access and delivery of technical and health awareness campaign materials and message. Goals of the GMP include promotion of health-seeking Behaviour, disease prevention and improvements to health and livelihood. Meet and liaise with partner groups and build this task into budgeting and schedule as appropriate.

Activity – 6: Project Management and Coordination

Subcontractor must set up a project management system and reporting schedule for regular liaison with UNIDO staff. Budget tracking, progress report for technical assistance and health training and update on metrics of success will be filed monthly. Subcontract must assess the effectiveness of the training (e.g. every one to two months) to gauge progress and employ adaptive management principals to alter or change delivery vehicles, information, and communication strategy to optimize dissemination of information and to effect change. The subcontractor must coordinate its activities with the UNIDO GMP Chief Technical Advisor (CTA) through Assistant Country Focal Point ACFP). The subcontractor must produce every (2) two months a synthetic report to UNIDO describing the main activities of the period, progress, problems and suggested solutions.

4. General Time Schedule

Implementation of TDU and awareness campaign programs will take place as soon as possible after awarding of the contract. It is expected that the activities would cover a minimum period of 8 months and a maximum period of 12 months in 2006. Priorities will be discussed and set with the input from UNIDO-GMP staff at implementation to ensure optimization of effort, personnel, materials, delivery and evaluation.

5. Personnel in the Field

Four to six health care advisors and mineral processing technicians must be trained and retained by the subcontractor. They will be trained by UNIDO prior to the commencement of the Awareness Campaign to be the miners' instructors for health and technical issues. The curriculum for training is contained in Appendix 1. UNIDO will provide ongoing support and assistance to trainers in the field. The subcontractor could propose additional instructors if necessary to ensure redundancy and safety in the program.

A minimum of three people at any time will be required to operate the TDU when in the field. This includes at least one mineral processing technician, Lumex Technician from Water Laboratory Mwanza and one individual trained as a health care advisor from the Geita District in liaison with the Geita District Medical Officer. Latitude is given to the subcontractor to be flexible and innovate with deployment of project staff to maximize the number of people to whom training is offered and to ensure the safety, security and enthusiasm of the project team. Latitude is given to the subcontractor to adjust staffing and responsibility as the project proceeds to maximize project goals.

6. Language Requirement

Swahili will be the official language for communication in the field. Communication with UNIDO will be in English.

7. Project Evaluation and Monitoring

A key component of both technology and health awareness campaigns is the development and documentation of "success indicators". These are indicators that are important to UNIDO and its donors and measure the success of the program components relative to current baseline conditions prior to implementation. Success indicators will be measured at regular intervals during the program and at its completion. There are two independent success indicators that must be tracked:

Implementation Indicators: Examples of implementation indicators are:

- Number of people/families, mining groups consulted or advised about technological changes and health awareness
- Number of family visits made by the health provider.
- Number of miners/individuals tested for mercury intoxication.
- Number of television and radio broadcasts, and newspaper articles published
- Number of community theater presentations offered, video broadcasts or other demonstrations delivered and audience attendance
- Number hats, calendars, tee shirts or other awareness material distributed
- Other program/awareness implementation measures as appropriate or developed during the course of the contract
- Number of brochures, pamphlets, and posters printed and distributed

Behaviour/Technology Indicators: Prior to implementation of the GMP goals, it is assumed, based on UNIDO previous assessments, that there is very little awareness about the risks of mercury exposure and little if any prevention of exposure by miners/panners and their families or neighbours. Examples of Behaviour/technology indicators are:

- Number of miners/panners that adopt new technology or change existing technology (e.g. more efficient sluice boxes) to increase gold production
- Number of "amalgamation sites" constructed outside the perimeter of villages. (i.e., number of amalgam burning areas moved away from areas where people are nearby)
- Increase in number of ounces of gold recovered
- Reduction in amount of mercury lost
- Number of retorts used
- Number of amalgamation barrels used
- Number of shops carrying or supplying new products (retorts, filters, carpets, etc.)
- Number of gold and silver smith shops informed as to the hazards of refining mercury-containing doré.
- Other behavioral or technological changes observed, including improvements in the quality of local water supplies and acceptance of improved sanitation practice.

The sub-contractor will be required to monitor these indicators during the duration of the awareness and technology demonstration project in the Geita district and report to UNIDO on these indicators on a bi-annual basis. A preliminary evaluation of these indicators will be conducted in May 2006.

8. Deliverables, Reporting and Project Management

A detailed final report (3 hard copies and electronic files in MS Word or other software as

appropriate) will be provided to UNIDO documenting the major tasks and accomplishments between inception and completion, including but not limited to:

- Documentation of all field activities including timing, location, target audience, outcome of all meetings, demonstrations or other activities.
- Photographic and cinematographic record of field activities highlighting the success indicators.
- Detailed summary of success measures for a) technology and b) health awareness as described in Section 2 Aim of the Project.
- A record of production and distribution of: 1) all communications material including brochures, calendars pamphlets, posters, hats, pins, radio broadcasts etc, and 2) any technological materials or hardware including retorts, fume hood filters, carpets, etc.
- Assessment of overall success of the study in achieving the project objectives and goals.

Deadline for delivery of the final report is six weeks after completion of the project.

A detailed interim progress report, and a ½ hour broadcast quality film documenting training and awareness activities and miner/panners community feedback must be delivered to the GMP PCU by May 31, 2005. This progress report will reflect the assessment criteria required for the final report.

9. Equipment Supply

The following list of equipment will be procured for the demonstration project. Prices must be supplied for the equipment on a take-out basis i.e. where possible, some equipment will be provided free-issue by UNIDO to the subcontractor, in which case the price of equipment will be removed from the contract value. In some cases UNIDO will assist the subcontractor directly in the procurement and assembly of the equipment (eg retorts and stands. For all other equipment specified, the subcontractor must provide the total cost for the contract. Fuel, per diem and other identifiable variable costs are accounted for as part of the Other Project Operating Costs .

TDU Equipment (for local manufacture and/or purchase) *	TDU: 1 or 2 small trailers for moving equipment with project vehicle
	1 small ball mill (Æ48 x 60 cm)
	1 ABJ centrifuge concentrator or similar
	1 hammer mill
	1 elutriator (Ø 4 x 120 cm)
	1 spiral pan (Ø 40 cm)
	1 centrifuge and/or 1 pressing filter to remove excess Hg from amalgam
	various retorts RHYP, kitchen bowl, CETEM retort
	1 Thermex glass retort for demonstration purposes

	3 stands with clamps to support retorts
	1 fume hood with carbon/potassium iodide filters for gold refining shop
	1 3phase, 380V power generator (5.5 kVA)
	2 primus paraffin burners
	1 air blower to increase temperature of bonfires
	1 bellows
	1 Hand held LPG torch for retorts
	various amalgamation barrels (made of plastic barrels, PVC and steel)
	different types of sluice boxes (e.g. zig-zag sluices, Keene A52 sluice, Cleangold sluice)
	different types of carpets for sluice boxes
	Hand lens (x10) with light
	Pulp density scale
	200 kg scale
	2060-D Digital Acculab Pocket Scales
	bench scale mortar and pestle
	3-set portable small screening system with 200 l plastic container and replaceable screens
	set of large sieves (e.g. 2mm, 1 mm, 0.5 mm, 0.2 mm, 0.07 mm)

*For further details, see: "Equipment Specification for the Demonstration Units in Tanzania," Marcello Veiga, March 2004. Available online: www.globalmercury.org

The following list of equipment is suggested for purchase by the subcontractor to supply the TDU and for day-to-day operations (e.g., transportation, communication). In the session 9, the subcontractor must provide the total cost for budgeting purposes. Fuel, per diem and other identifiable variable costs are accounted for as part of the Other Project Operating Costs in Section 10.

<i>Major Component</i>	<i>Suggested Equipment</i>
	barrels for inventorying fuel; fuel pumps
	office supplies
	2 – 3 tables; chairs or benches for 30-40 people
	notebooks, paper and pencils for learners
	blackboards and chalk
	computer, projector, screen
	TV set with VCR or DVD player
	other office supplies as necessary
	project vehicle maintenance
	6 x 6 meter canvas tent and lighting
	other consumables
	Personal Protective Equipment (e.g. plastic gloves, dust masks, hard hats, boots, etc.)

	steel and plastic buckets
	Wheelbarrows
	Picks & shovels
	small tools (e.g. hammers, screwdrivers, etc.)
	one 2" dirty water pump and pipes
	hand operated water pumps and pipe
	Materials for construction of amalgamation centers away from villages (cement, roofing materials, etc).
	first aid kits
	miscellaneous

*For further details, see: "Equipment Specification for the Demonstration Units in Tanzania," Marcello Veiga, March 2004. Available online: www.globalmercury.org

10. Schedule of Services and Supply (to be filled by the invited subcontractor)

	Cost
1 Prepare Material for the Local Awareness Campaign and Capacity Building	
A Deliver training material provided by UNIDO	
B Develop, adapt and create additional training material and strategy under UNIDO direction (e.g. billboards, radio broadcasts, additional brochures, pamphlets, stickers, hats, T-shirts, community theater etc.)	
C Hire trainers to be trained to operate the awareness campaign and TDU	
Subtotal	
2 Execution of the Awareness Campaign	
A Map physical context; identify target villages	
B Execution of lectures for miners/panners, sessions on practical demonstrations of the use of the different types of equipment of the TDU; sessions on whole ore amalgamation and cyanidation	
C Promotion of the activities of the TDU locally and regionally.	
Subtotal	
3 Transportable Demonstration Unit	
A Assist in equipment specification and manufacturing of TDU equipment (e.g., retorts, sluice) based on UNIDO direction; commission TDU	
B Operation and maintenance of the TDU and maintenance	
C Supply of project vehicle??	
D Vehicle maintenance	
Subtotal	
4 Success Measures	
A Develop measures for success and implement baseline and follow-up assessment programs -	
Subtotal	
5 Partners Coalition and Collaboration	
A Form all necessary associations, partnerships, collaborations or other arrangements as necessary to maximize information dissemination	
Subtotal	
6 Project Management and Coordination	
A set up a project management system and reporting schedule for regular liaison with UNIDO; bi-monthly synthetic report to UNIDO	
Subtotal	
7 Final Report	
Production of final report; photographic and cinematographic record of field activities	
8 Other Project Operating Costs	
A	
B	
C	
D	
Subtotal	
TOTAL COST	

11. Responsibilities

Activity	Subcontractor	UNIDO
Awareness Campaign	Deliver training material	Provide training material
	Develop additional training material and activities	Evaluate additional training material. Assist subcontractor
	Hire trainers	Train trainers Ongoing support for trainers
	Identify groups of individuals to be trained	Assist subcontractor
	Train miners/panners and community members	Assist subcontractor
	Hire Community Theater Company,	Assist subcontractor
TDU	Purchase/produce TDU equipment	Purchase/produce TDU equipment
	Procurement and assembly of small equipment, retorts etc.	Assist subcontractor in procurement and assembly of small equipment
	Installation, transport, operation and maintenance of the TDU	Assist subcontractor. Provide project vehicle??
Overall	Assist UNIDO with success indicators	Develop and communicate success indicators
	Suggest possible partnerships	Suggest possible partnerships. Assist subcontractor to form partnerships.
	Set up project management for regular liaison with UNIDO	Communicate with subcontractor
	Produce record of the activities every 2 months	Assist subcontractor
	Produce interim and final reports, photographic and cinematographic records and ½ hour documentary film	Assist subcontractor

12. Evaluation criteria

The following criteria shall be applied for the evaluation of the proposals:

1. subcontractor's understanding of the implementation objectives and the Global Mercury Project (GMP) goals
2. subcontractor's experience in the specific GMP implementation site and contacts with local community leaders
3. subcontractor's knowledge about artisanal gold mining
4. subcontractor's experience on education, development and capacity building for mining communities
5. subcontractor's understanding of the local customs and traditions (at least 3 years of experience)
6. subcontractor's experience with multimedia campaign
7. subcontractor's experience/curriculum on technical (geological, mineral processing, health) subjects
8. adequacy to the TOR requirements
9. realism of the cost figures

Appendix 1 – TDU training curriculum (materials and training to be provided to subcontractor by UNIDO)

1. Field Training methodology and practice
2. Geology of gold ores, mineralogy, liberation
3. Crushing, grinding and mineral liberation
4. Gravity concentration
5. Amalgamation & Retorting
6. Cyanidation
7. Gold smelting in gold shops
8. Gold trading and market
9. Health problems caused by mercury
10. Environmental problems caused by Hg
11. Health and sanitation conditions in mining sites

Additional health and mercury awareness brochures are also available:

- Mercury and Health
- How to use and re-use mercury
- How to protect your water
- How to get more gold

ATTACHMENT NO. 2

HANDED OVER TDU EQUIPMENT LIST

GEITA MINES OFFICE ISSUED

LOCAL STORES REQUISITION VOUCHERS:

NO. 9/ 01530740

NO. 9/ 01530741

NO. 9/ 01530742

NO. 9/ 01530743

NO. 9/ 01530744

NO. 9/ 01530745

NO. 9/ 01530746

NO. 9/ 01530747

NO. 9/ 01530748

To

SF. 7

C LOCAL STORES

ISSUE VOUCHER
No.
DATE

REQUISITION/ISSUE VOUCHER

ALLOCATED STORES ONLY **9/ 01530740**

Not for use in connection with unallocated stores or local Purchase

Date **9/8/07**

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
1. Stand mounted Rock Crushe.	PC	1	1		
2. 4 Mesh Classifying Sieve	PC	2	2		
3. 8 Mesh Classifying Sieve	PC	1	1		
4. 12 Mesh Classifying Sieve	PC	2	2		
20 Mesh Classifying Sieve	PC	1	1		
30 Mesh Classifying Sieve	PC	1	1		
50 Mesh Classifying Sieve	PC	1	1		
100 Mesh Classifying Sieve	PC	1	1		
3' x 20' Normal Matting Sieve	Roll	1	1		

REQUISITIONING OFFICER,

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KMO

Designation

GEITA

Station

ISSUING OFFICER,

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MINING TECH I
Designation

DSM

PROJECT
Station

CERTIFIED:

- A. Received in good order.
 - B. Taken on charge in my stores ledger/for immediate use.
- Delete whichever is inapplicable

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Designation

9/8/2007

To

SF. 7

C LOCAL STORES

ISSUE VOUCHER
No.
DATE

REQUISITION/ISSUE VOUCHER

ALLOCATED STORES ONLY **9/ 01530741**

Not for use in connection with unallocated stores or local Purchase

Date **9/8/2007**

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
Super Mini Juice Box	PC	1	1		
16 Steel pin layer base	PC	4	4		
2 Mesh Classifying Sieve	PC	2	2		
4 Mesh classifying Sieve	PC	1	1		
Achromatic Loupe (20x)	PC	1	1		
Digital pocket gold scale ^{Black}	PC	1	1		
Large Mortar & pestle	PC	1	1		
Clay be Groue	PC	1	1		
Gold test kit	PC	1	1		
Shaker table base	PC	1	1		

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S. Bombardier MINING TECH I

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No.
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REQUISITION/ISSUE VOUCHER

ALLOCATED STORES ONLY **9/ 01530742**

Not for use in connection with unallocated stores or local Purchase

Date 9/18/2007

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
VIBRO TUMBLERS	PC	1	1		
GOLD MINING IN THE 21 st Century	book	1	1		
FINDING GOLD NUGGETS 21 st SERIES	book	1	1		
ADV. TECH V:2 PT 1 (New/updated)	book	1	1		
ADV. TECH V:2 PT 2 (New/updated)	book	1	1		
Gold dredging	book	1	1		
Shaker table with magnetic ^{table} separator	PC	1	1		
Hand Sluice Box	PC	1	1		
Dredging Riffle	PC	1	1		
Min H/B classify Screen	PC	2	2		

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ISSUE VOUCHER
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ALLOCATED STORES ONLY **9/ 01530743**

Not for use in connection with unallocated stores or local Purchase

Date

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
Black Rubber Ribbed Matting	PC	3	3		
Standard Ribbed Matting	PC	1	1		
Min. ^{Frame} 175 Class. leg Assay	PC	2	2		
14 Inch Super 3-Stage Gold pan	PC	3	3		
12 Inch Super 3-Stage Gold pan	PC	3	3		
14 Inch Gold pan plastic	PC	4	4		
Gold-Screw Automatic panner	PC	1	1		
Shaker Tube Pump kit	PC	1	1		
Economy sluice	PC	3	3		
Prospector's Sluice	PC	2	2		

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ISSUE VOUCHER
No.
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REQUISITION/ISSUE VOUCHER

ALLOCATED STORES ONLY

9/ 01530744

Not for use in connection with unallocated stores or local Purchase

Date 9/2/2007

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
Clean up Trough	PC	2	2		
Canvas Sheet 6x6m	Sheet	3	3		
Ear plugs @ 100 pcs	100 pcs	80	80		
Disposable masks (3-chemicals)					
3-washerble, 50-Single use)	PC	60	60		
Leather gloves	PC	9	9		
Safety glasses	PC	25	25		
Safety helmets	PC	21	21		
Safety boot	PC	8	8		
DELL Optiplex 9x520 Computer	PC	1	1		

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REQUISITION/ISSUE VOUCHER

ALLOCATED STORES ONLY

9/ 01530745

Not for use in connection with unallocated stores or local Purchase

Date 9/2/2007

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
- Intel Pentium 4, 3, 4 GHz					
- P4 Motherboard					
- 512 MB Ram, 80 Gb HDD					
HP Photo Smart Printer ^{model 253}	PC	1			
EPSON PowerLite Multimedia Projector	PC	1			
XGA (1024x768), 500:1-Contrast ratio					
Ink Cartridges HP	PC	4			
VER SYSTEM	PC	1			
RADIO CASSETTE & SOUND SYSTEM	PC	1			
FOOT OPERATED WATER PUMP/PIPE	lot	1			

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GLOBAL MERCURE PROJECT

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No.
DATE

REQUISITION/ISSUE VOUCHER
ALLOCATED STORES ONLY

9/ 01530746

Not for use in connection with unallocated stores or local
Purchase

Date 9/23/2007

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
Plastic Chairs	PC	26	26		
PVC Cable for wiring 25mm rolls		1	1		
2" Inlet wire-ringed hose pipe 6m	PC	1	1		
2" outlet hose pipe	PC	1	1		
Inlet retainer strainer 2"	PC	1	1		
1" hose pipe 30m	rolls	1	1		
1 1/2" stiff rubber hose pipe 6m	PC	1	1		
Galvanize T-Connector	PC	1	1		
Galvanize tapes & accessories	PC	1	1		
Kerosene pressure stove	PC	1	1		

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No.
DATE

REQUISITION/ISSUE VOUCHER

ALLOCATED STORES ONLY **9/ 01530747**

Not for use in connection with unallocated stores or local Purchase

Date 9/8/2007

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
Wooden boxes with hinged cover	PC	3	3		
UPS - power supply	PC	1	1		
Lighting system - fluorescence tubes & connectors	Set	3	3		
Wheel air blower	PC	1	1		
Water pump Set 2"	PC	1	1		
Generator 2.5 kva	PC	1	1		
White Beard	PC	1	1		
Retort	PC	1	1		
Small size Sieves	PC	7	7		

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No.
DATE

REQUISITION/ISSUE VOUCHER

ALLOCATED STORES ONLY **9/ 01530748**

Not for use in connection with unallocated stores or local Purchase

Date **9/18/2007**

Description of Article	Unit	Quantity		Ledger Folio	
		Required	Issued	Issuer	Receiver
Rock Crushing Hammer	PC	1	1		
First Aid Box	PC	1	1		
Miscellaneous items - steel blocks, Pvc sheets etc	Lot	1	1		
Various accessories to fabricate rotors of Centrifuges	Lot	1	1		

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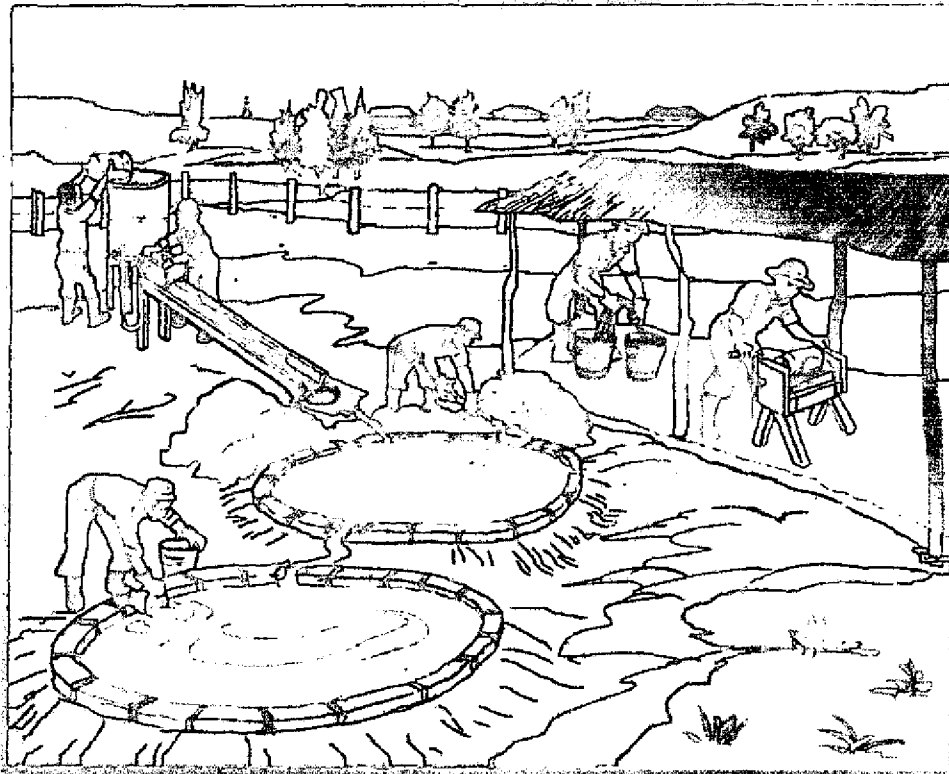
9/18/2007

ATTACHMENT NO. 3

TRAINING POSTERS

- a. Measures to Protect the Environment**
- b. Mercury Exposure Protection**
- c. Mercury Vapour is Dangerous**
- d. Pollution of Water Bodies**

Hifadhi Mazingira wakati wa Uchenjuaji



Tumia makaro maalum:

- Vyanzo vya maji havichafuliwi.
- Unapunguza matumizi ya maji na gharama.
- Masalio ya mbale hayasambai.

Tumia nyenzo maalum (amalgamator) kukamatisha dhahabu.

Faida:

- Unajikinga vyenisi na madhara ya zebaki (mercury).
- Unakamatisha dhahabu nyingi kuliko kutumia mikonzo.
- Unatumia zebaki (mercury) kidugu.



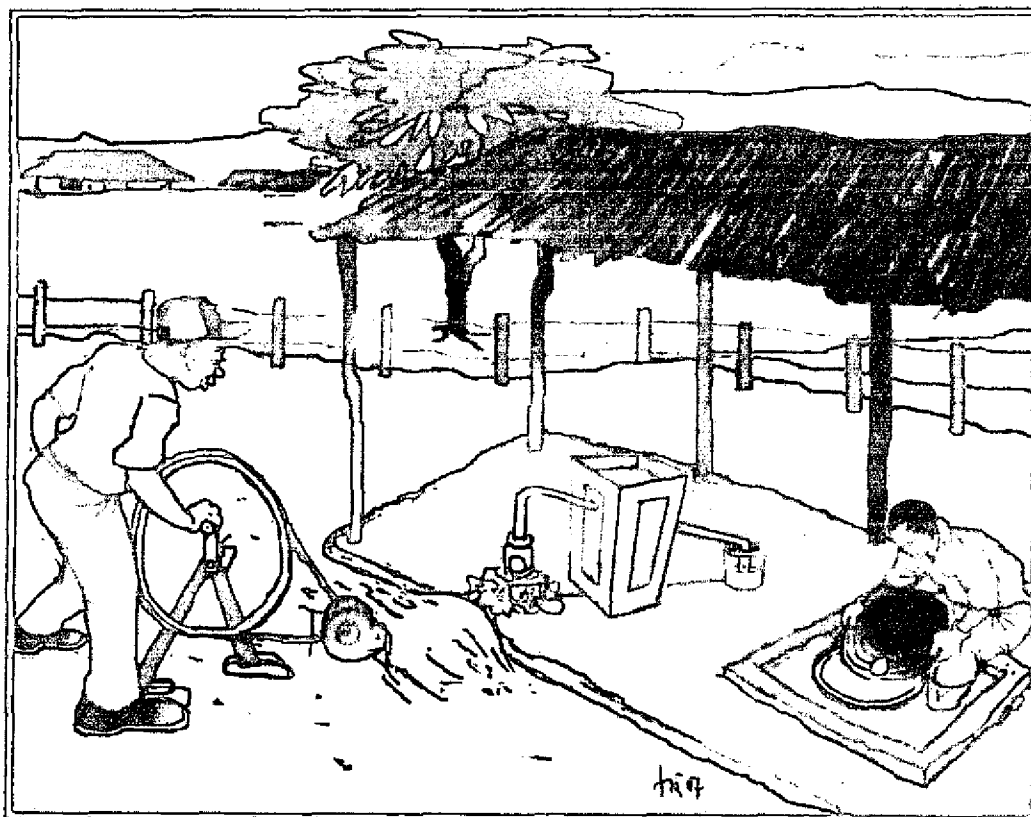
Imetolewa na:
Wizara ya Nishati na Madini

Imefadhiliwa na:



Imetayarishwa na:
Tan Discovery

Kujikinga na athari za Zebaki (Mercury)



Tumia zana na mavazi ya kujikinga unaposafisha dhahabu.

Tumia Retort ili:

- Kujikinga na athari za mvuke wa zebaki.
- Zebaki haipotei hivyo unapunguza gharama.

Kuondoa zebaki (mercury) kwenye amalgam:

- Tumia moto mkali wakati wote.
- Choma kwa muda wa kutosha.



Imetolewa na:
Wizara ya Nishati na Madini

Imefadhiliwa na:



Global Mercury Project



Imetayarishwa na:
Tan Discovery

Mvuke wa Zebaki(Mercury) ni Hatari kwa Afya yako



Kumbuka!

Mvuke wa zebaki hauonekani wala hauna harufu. Hivyo ni rahisi kuuvuta endapo utakuwa karibu au ndani ya chumba inapochomewa dhahabu.

Madhara:

- Zebaki ni sumu kwa binadamu, wanyama na mimea.

Dalili za kuathirika kwa binadamu:

- Kudhurika kwa ubongo na kupoteza fahamu.
- Kutetemeka mwili na hata kufa.



Imetolewa na:
Wizara ya Nishati na Madini

Imefadhiliwa na:



Imetayarishwa na:
Tan Discovery

Uchenjuaji Holela wa Mbale



Uchenjuaji wa mbale kwenye makazi na vyanzo vya maji unamadhara mengi kwa Binadamu na Mazingira.

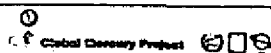
Hasara:

- o Eneo kubwa la mto huchafuliwa .
- o Ni rahisi kupoteza dhahabu yako mtoni.
- o Huchochea uharibifu wa hifadhi ya mto kwa ukataji miti na uoto wa asili.



Imetolewa na:
Wizara ya Nishati na Madini

Imefadhiliwa na:



Imetayarishwa na:
Tan Discovery

ATTACHMENT NO. 4

**NEWSPAPERS ARTICLES ON
PROJECT ACTIVITIES**

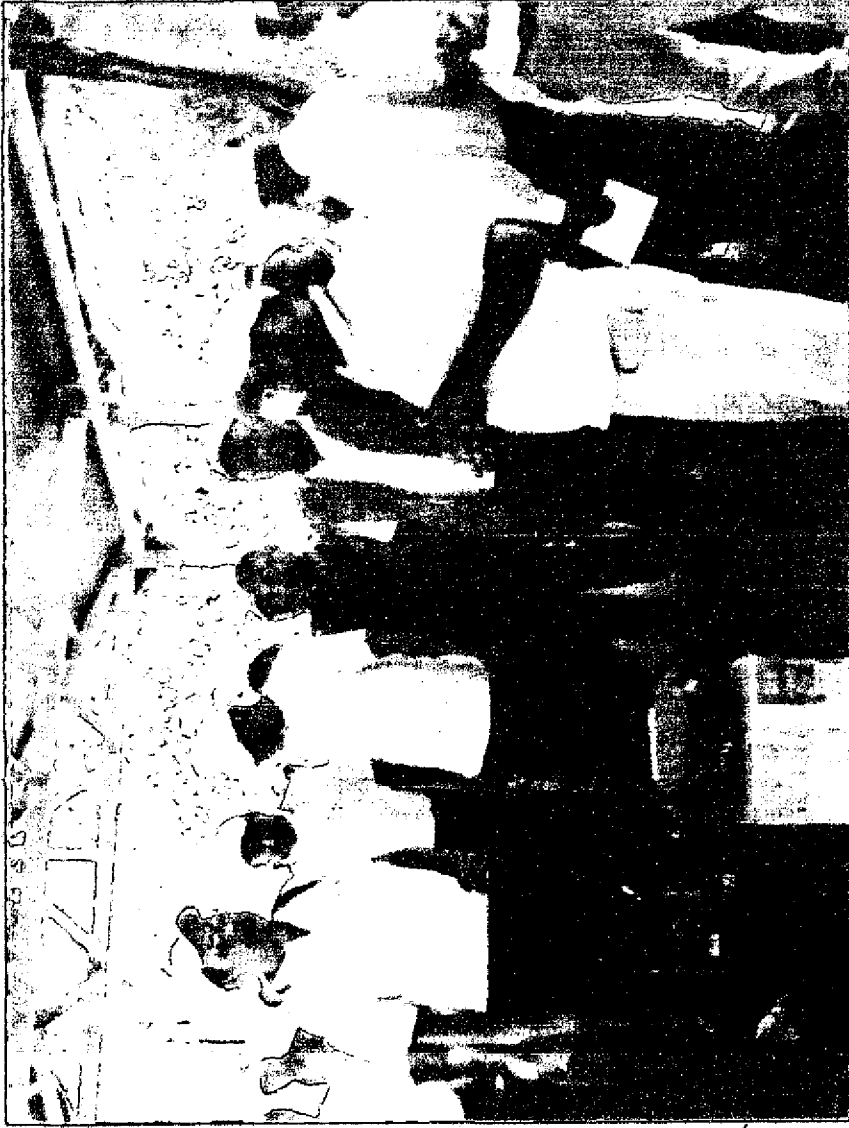
SUNDAY OBSERVER

APRIL 1, 2007

NEWS IN PICTURES



ema Ibrahimu after pre-Administrative Secretary.



The UNIDO representative Patricia Scott (second left) inspects equipment after launching the Global Mercury Project at Rwaniga in Geita District, Mwanza Region recently.

Campaign to check environmental pollution in mining sector in Geita

By Nasser Kigwangallah

THE government has recognised the great potential which small-scale miners hold in contributing towards national economic growth and development.

On this score, the Energy and Minerals Ministry has formulated the Mineral Sector Policy to act as a guideline and aimed at mineral development and exploitation in the country.

The policy stresses that the private sector should be encouraged to indulge in the research and exploitation of minerals.

"There is a need to attract modern technology and the necessary investment capital for large-scale as well as small-scale mining," reads the policy paper in part.

According to the policy, strategies for rationalizing artisanal and small-scale mining into organized and efficient operations in order to ensure gainful employment and poverty alleviation among the youths have been set.

Under that policy, the role of the government would be to stimulate and guide private mining investment by administering, regulating and facilitating the growth of the sector through a well organized and efficient institutional framework.

That is why, the United Nations Industrial Development Organisation (UNIDO), the Ministry of Energy and Minerals in collaboration with Tan-Discovery launched a Technology Demonstration Awareness Campaign at Blue Reef Mine, Rwangasa Village, Geita district in Mwanza region recently.

"The campaign, one of its kinds to be launched in the country this year, was aimed at improving the quality of life in the poor communities, creating employment and increasing incomes in order to overcome poverty," says Patricia Scott, the UNIDO Representative in the country while launching the campaign.

The campaign encourages small-scale miners to use technologies that would make them more competitive and preserve the environment.

It also encourages the use of technologies

that will not harm the environment and encourages small-scale miners to use alternative energy sources such as solar, wind, biomass and water.

UNIDO has long recognized the mineral potential and the significant contribution being made by the artisanal mining sub-sector to the Tanzania economy.

However, despite the significance and positive contribution to the wealth of the country, artisanal mining suffers from poor organization structures, inefficient and processing techniques as well as working tools; all of which lead to low productivity, negative environmental impacts and poor health and safety standards.

In the mining sector, UNIDO assists communities in increasing their productivity through improved, affordable and clean technologies and engaging in alternative economic activities, with particular focus on the disadvantaged groups including women and children.

In this context, therefore, back in 2002, UNIDO initiated a project known as "Global Mercury Project" to assist communities along key rivers and lakes in assessing pollution from various activities in their vicinities; introduction of cleaner gold mining and extraction technologies to minimize or eliminate mercury releases, to develop capacity and regulatory mechanisms that would enable the sector to minimize negative environmental aspects.

According to Patricia Scott, the campaign at Rwangasa is directed at assisting in implementation of education and awareness in Geita district mining villages, beginning with Rwangasa. Other villages to be included in the campaign are Nyarugusu and Nyakagwe.

"It is our hope that the processing technologies displayed in the Transportable Demonstration Unit as well as the educational materials and information provided by the officers and miners, trained by UNIDO, will ultimately raise the commitment of the Geita mining communities towards environment and make them aware of the hazards related to the use of mercury for gold extraction, which represent serious risks to their health and safety," notes Patricia in her statement.

UNIDO for environment-friendly te

By Nassor Kigwangallah, Geta

THE United Nations Industrial Organisation has promised developing countries assistance to enhance productivity and access to local and international markets.

This would be done by

helping the nations to improve their knowledge capacity, especially in the use of modern technologies that are friendly to the environment.

"UNIDO works with member states to improve the quality of life of the poor communities by creating employment, particularly in the rural areas," Country Representative Patricia Scott said on Wednesday.

She made the remarks at

the launch of a technology demonstration awareness campaign at Blue Reef Mine in Rwigyasa Village, near here yesterday.

"We encourage the use of technologies that will be environmental friendly by the constant use of alternative energy sources such as solar, wind, biomass and water to generate electricity," she said.

She added that the UN agency has long recognised

the significant contributions made by the artisanal mining sub-sector in Tanzania.

Scott explained that despite their significance and positive contribution to the wealth of the country, inefficient environmentally polluting mining and processing techniques and inadequate or poor equipment were leading to low productivity, negative

environmental impact and poor health and safety standards.

Outlining the part UNIDO was playing, she said communities are assisted in increasing their productivity through improved, more affordable and cleaner technologies.

"In this context, UNIDO initiated a Global Mercury Project to assist communities

along key rivers and lakes in assessing the pollution from current activities," she pointed out.

She said the programme aims at introducing cleaner gold mining and extraction technologies to minimise or eliminate mercury releases.

She revealed that they also intend to develop the capacity and regulatory mechanisms to enable the sector to become a

Wachimbaji madini Geita wafundishwa mbinu za kukwepa zebaki



Mwakilishi wa UNIDO hapa nchini, Patricia Scott.

Na David Azaria

SERIKALI ya awamu ya tne iko katika mchakato mzito wa kuendesha mafurzo maalumu kwa wachimbaji wadogo wa dhahabu nchini.

Lengo la mafurzo hayo ni kukwepa vijana na athari za zebaki ambayo imetambua katika kushajha na kurasia dhahabu katika maeneo mbalimbali ya uchimbaji wa madini hayo hapa nchini.

Kwa mujibu wa wataalamu wa afya, sumu ya zebaki juwa na madhara makubwa kwa afya ya binadamu ikiwa ni pamoja na kukosa usingizi, macho kuwa mekundu, viungo kukosa nguvu na kupooza au kuchanganyikiwa paki.

Jabadi hizi za serikali zilianza

mwaka 2002 kupitia Kiungo cha Global Mercury ambacho kwa sasa lipo katika mikakati maalumu kabisa ya kuhakikisha kwamba wachimbaji wadogo wanaondokana na uchimbaji wa kizamari wa kupata dhahabu kwa kutumia zebaki na kuingia katika uchimbaji wa kisasa zaidi.

Mrudi uharizi katika kijiji cha Lwamgasa wilayani Geita mkoani mwanza ambapo tathmini ya mazingira na afya za wananchi wa kijiji hicho zidanyika.

Wananchi wote wa kijiji hicho waliipinwa na wengi wao waligundulika kuathirika na zebaki, hasa watoto. Shirika la Umoja wa Mataifa la Maendeleo ya Viwanda na Biashara (UNIDO) lwa kushirikiana na Serikali imetua mtaalamu wa kupendelea maw: ghibi ya dhahabu, kuyasaga



Kwa mujibu wa mtaalamu utafiti uliofanywa katika kijiji cha Lwamgasa, umeonyesha kwamba zaidi ya watu 50 kati ya 250 waliopinwa hivi karibuni wamepata umaambukizo ya sumu ya zebaki.

na kisha kuyasaga na hatimaye kurasia dhahabu bila kutumia zebaki, kama ambavyo wachimbaji wadogo walikuwa wanafanya.

Mmoja wa wataalamu hao kutoka katika kiungo cha Global Mercury, Aloyce Tesha, anasema wachimbaji wadogowadogo wanaotumia zebaki katika shughuli zao za ukamataji wa dhahabu wamepata maambukizi ya sumu ya zebaki katika miili yao.

Anasema pamoja na wachimbaji hao kupata fursa ya kujifunza namna ya kutumia mitambo huo pia watafundishwa namna ya kuongezea hapa hapa nchini.

Kwa mujibu wa mtaalamu hayo, utabii uliofanywa katika kijiji cha Lwamgasa umeonyesha kwamba zaidi ya watu 50 kati ya 250 waliopinwa hivi karibuni wamepata maambukizo ya sumu ya zebaki. Asilimia 75 ya wakazi wa kijiji hicho ni wachimbaji wadogo wa dhahabu.

"Hii ni ruzizi nzuri kwa wachimbaji wetu wadogo kwa sababu pamoja na kujifunza kutumia mitambo huu, pia watapata fursa ya kujifunza namna ya kuongezea hapa nchini badala ya kutumia fedha nyang'onyanga kutoka nye ya nchi," anasema.

Tesha anaeleza fursa hiyo itawawezesha kuongezea mitambo mingine na kujazua wenyewe kwa wenyewe badala ya kuagiza kutoka nye kwa gharama kubwa.

Meneje mrudi huo wa Global Mercury anasema kwamba mafurzo hayo kwa wachimbaji wadogo wa madini ni utekelezaji wa sera ya madini ya mwaka 1997 inayohimiza kutobomba uchimbaji mdogo na kotelelela wenywe mpanigilio bora na wa

Mchimbaji mdogo wa madini ya dhahabu akipembua madini hayo kwa kutumia zebaki

kisasa zaidi na unaonza mazingira. Anasema pamoja na hii, pia sera inahimiza upatikanaji wa zana na vitaa bora vya uchimbaji na uchenyeaji wa madini vyanje bei nafuu na kuhimiza utengenezaji wa vitaa hivyo hapa nchini.

Akizunguza katika mafurzo hayo, Mwakilishi wa UNIDO hapa nchini, Patricia Scott, anasema shirika lake litandelea kuwa bega kwa bega na serikali ya Tanzania kuhakikisha kurwa wananchi wote wanaondokana na athari zinazosababishwa na zebaki.

"Shirika lengu imetiona hili baada ya kufanya utabii kwa muda mrefu hapa Tanzania, lakini napenda kuwaeleza Watawazari na hata wachimbaji wadogo wadogo kwamba zebaki dawa imepatikana kwa sababu mstembao huu huhusiana sana kila kote ndani yake," alifafanua.

Mafurzo hayo yanatendelea katika maeneo mawili tofauti ya Lwamgasa, Nyarugusu na Nyikagwe wilayati Geita na kila eneo litachukua muda wa miaka mitatu kukamilisha mafurzo hayo.

Jumla ya wachimbaji wadogo 80,000 wanatarajiwa kumfikia na mafurzo hayo ambayo kwa wilaya ya Geita yanatarajiwa kuhitimishwa Oktoba mwaka zuru, kabla ya kuhamia mkoa mwingine yenye wachimbaji wadogo wanaotumia zebaki.

Rugumyamheto awaasa watumishi wa umma

Alisema pamoja na ukweli kwamba mishahara inayotolewa na serikali ni midogo, hiyo isiwe sababu kwa watumishi wa serikali kutowajali wananchi katika utumishi wao.

Na Lucas Raphael, Tabora

WATUMISHI wa Serikali wameaswa kuhitua uwezo wao wote katika kutekeleza dhambi za serikali na kuondokana na tanzam ambazo bado hizi huwafanya wabigirizi katika vitendo vya ruzi wa na kutwamsha maendeleo. Kauli hiyo ilitolewa injini hapo na aliyekuwira Katibu Mkuu katika Ofisi ya Rais Mwanajumbe wa Utumishi wa Umma, Joseph Rugumyamheto, aliyokwinda kwenye majira katika wakazi wa Uenyekeni wa Chuo cha Utumishi wa Umma jiji.

Alisema pamoja na ukweli kwamba mishahara inayotolewa na serikali ni midogo, hiyo isiwe sababu kwa watumishi wa serikali kutowajali wananchi katika utumishi wao na kujituisisha na rushwa. Serikali inekwama ikifanya juhudi za kuwafanya watumishi wake wazi maisha bora na salama, lakini kazi hiyo ni ngumu na katiyana na ukweli kwamba suala la maishani ya

watu ni suala gumba na nyeti kutishughulika, vileseni. Pia aliwaasa watumishi wa umma nchini kutofanya kazi kwa kuangalia mishahara, bali waangabe hali halisi na mazingira wanayotumwa kama wakombozi wa jamii katika utaji wa huduma mbalimbali. Aliwataka vijara wanaopata utumishi wa serikali na wote wanaofanya kazi katika sekta mbalimbali kuifanya kazi hiao kwa kujitama, tena kwa moyo wa upendo kutwamsha jamii katika maishani mbalimbali yanayokabili.

Awali, Katibu Mkuu Ofisi ya Rais, Mwanajumbe wa Utumishi wa Umma, Ruth Mwalali alisema kwa Rugumyamheto ni kiongozi wa kutwamsha kutokana na utumishi wake uliotokua na uliokuwa na marudat mengi kwa umma.

Chuo cha Utumishi wa Umma kilimzawadhi mwenyekiti wake huyo wa ikwama, zaidi mbali mbali ikwama kompyuta ndogo ambayo walisema jamaidika katika kuruka kumbukumbu mbalimbali.



Waziri wa Nchi, Mwanajumbe wa Umma, Hawa Ghasia

Wengi waathirika na sumu ya zebaki



Meneja Mrazi wa Global Mercury, Aloyce Tesha akitesa mafunzo kwa wachimbaji wadogo kuhusu uchimbaji bora wa dhahabu bila kuathirika na sumu ya zebaki. (Picha na David Azaria)

Na David Azaria, Geita

MAELFI wa wakazi wa Wilaya ya Geita, mkoani Mwanza na hasa walioko katika maeneo ya machimbo ya dhahabu, wako hatiani kupoteza maisha kutokana na aya zao kuathirwa vibaya na sumu hatari zina ya zebaki. Hayo yalibainishwa na Meneja Mrazi wa Global Mercury, Aloyce Tesha alipozungumza katika mahuzo ya siku 90 kuhusiana na matumizi bora ya zebaki kwa wachimbaji wadogo wa dhahabu wilayani hapo. Tesha alisema kwa mujibu wa utunguzi uliofanywa na mrazi huo katika wilaya ya Geita na hasa kwa wakazi wanaozunguka maeneo ya machimbo ya dhahabu, watoto wadogo na akina mama ndiyo waliowathirika kwa kiasi kikubwa na sumu hiyo ya zebaki.

"Kwa mfano tu hapu Lwanga na hapu baada ya ku-

lanya utafiti wetu na kuwapima wata 250 taulabari wata 25 waliokuwa wameathirika kutokana na sumu hiyo ya zebaki. Ikadi ambayo kitalaati ni kutwa na kihaya zaidi ni kwamba waathirika walo wengi ni alina maana na watoto wadogo," alisema. Alisio mfano wa kiasi meroji mwanafunzi wa darsa la rone katika Stride ya Misingi ya Mwenge kijiji hapo ambaye baada ya kupimwa alikuwa akiwa amethirika na sumu ya zebaki. Pia katika utafiti huo alikuwa namo meroji hizi hapo maziwa yake aliyokuwa alimnyemesha miko yakawa yameja zebaki, hali iliyasababisha wamruke kumanyemesha marini huyi maziwa. Alisema kutokana na hali hiyo serikali imeona umuhimu wa kuwapa wachimbaji wadogo mtambo ambao pamoja na mtambo mwingine utawacholeza namna ya uchimbaji mzuri wa dhahabu bila kupata madhara ya sumu ya zebaki.

Usalama waongezeka Kibondo

Na Oscar Mbusa

HALI ya usalama katika mpori ya Wilaya ya Kibondo mkoani Kigoma inakuwa nzuri baada ya serikali kuzifunga kambi tatu za wakimbizi wilayani hapo hivi karibuni. Mkuu wa Wilaya ya Kibondo, Lutemba Kanali John Mzurikwa alitambua Habari Leo uwishoni mwa wiki kuwa kuhungwa kwa kambi hizo kumefanya uhalali kuisha trelaoni na awali. Mzurikwa alitaja kambi zilizo-

fungwa kuwa ni Mwendeki, Muziwa na Nduta na kwamba serikali inatengalia uweteshano wa kuhunga kambi iliyopata ya Kanembo. "Kwa upanda hali ya ulenzi na usalama sisi inekuwa nzuri kwani vitendo vyote vya uhalali vimekomeshwa," alisema Mzurikwa. Alisema hadi sasa wakimbizi 160,000 asilimia 95 wakiwa ni kutoka Burundi wamerejeshwa kwao au walioadhi ni wakimbizi 48,000. Katika hatua nyingine, Mzurikwa alisema wita hiyo ipo kabla mlikatibi kutamba ya kufanya upinduzi ya ki-

imo kuhakikisha kazi zinawasa mara ya kutisha. Alisema katika mpango huo wilaya hiyo imeweka programu maalumi ya kuhitawia talabuni za kibi kaya kuanzia Aprili hadi Julai kuwa kazi hizo zinadima nini kwa kuwaga kipi na kwa imada gani ili Serikali iweze kujua namna ya kuhitawia. Teroji kuhakikisha kuwa msimu wa kilimo unakopanza tumawasambanza pembejezi, mbugu na mbolea wakutima ili kaya zote 53,000 za Wilaya ya Kibondo ziwende kuhitawia kilimo chao," alisema.