

Minutes
UNEP Global Mercury Partnership Workshop on Approaches to Reduce the Use
of Mercury in Artisanal and Small Scale Gold Mining
October 15, 2010
World Bank Mirambo Conference Room, Dar Es Salaam Tanzania

09:00 Welcome, sign-in and round-table introductions

Participants in Attendance:

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09:00 Welcome, Introduction of Susan Keane from Christopher Sheldon

09:30 Background on Artisanal and Small Scale Gold Mining (ASGM) and the global mercury treaty
Discussion leader: Susan Keane, Natural Resources Defense Council (NRDC), Co-lead UNEP Global Mercury Partnership ASGM Partnership Area

Brief introduction to Mercury as a Global Pollutant and purpose of the meeting, by Susan Keane

- Stressed the importance of ASGM as the largest consumer of mercury globally and the largest contributor to global emissions after coal burning (global annual ASGM release approximately 1500 tonnes).
- Trade of mercury currently flows from developed to developing nations but this will be restricted under existing commitments to ban mercury exports (EU, 2011 and US, 2013); further trade restrictions are likely under the upcoming mercury treaty.
- UNEP Global Mercury Partnership works on a voluntary basis to:
 - Help governments with strategic planning for the ASGM sector
 - Reducing risk
 - Promoting cleaner technologies
 - Exploring market based approaches
- Introduction to the UNEP mercury treaty to be signed in 2013
 - Reduced supply
 - Reduced demand
 - Reduction targets
 - Financial mechanism for ASM assistance

Around the table individual personal introductions.

10:00 Baseline ASGM situation in Tanzania

Discussion leaders:

John Nayopa, *Sustainable Management of Mineral Resources Project (SMMRP)*

SMMRP: a five year technical assistance project funded by IDA (50 million USD) and Gov of Tanzania (5 million USD)

- SMMRP coordinated by Ministry of Energy and Minerals (MEM)
- Objectives are to strengthen government capacity to manage the sector, improve socio-economic impacts of large and small scale mining, enhance private local and foreign investment in the mining sector
- Components: A - improving benefits of the mineral sector (includes ASM); B - strengthening governance and transparency; C – stimulating mineral sector investment; D – project coordination, management, monitoring and evaluation. Work of SMMRP was based on a review of past ASGM initiatives
- Current work : baseline study on ASM (main areas of focus)
- Focus is on current trends, behavioral changes, legacies of past interventions
- Extension services will strengthen ZMOs, RMOs, ASM trainers – using transportable demonstration units
- Grants programs will address financing barriers to new technologies
- Awareness of environmental issues including tailings management, better practices
- Promotion of collaboration between LSM and ASM is also seen as a priority

Questions and Discussion:

Comment: Environment is not explicitly stated as a main objective in the SMMRP: response is that the environment is implicit in the social and economic considerations.

Alex Magayane, Ministry of Energy and Mines, Assistant Commissioner, Small Scale Mining Development; ASM Overview in Tanzania

- Provided an overview of ASM in Tanzania
- Numbers from survey in 1996: 550,000–1,000,000 ASM miners; ratio of gems:gold:other was 11:8:1; gender ratio – women account for at least 23% but less than 6% are owners of PMLs. Therefore using 1996 numbers, 40% were ASM Gold = 220,000 to 400,000.
- MEM has a permanent body to address development of ASM in Tanzania
- MEM has been training on new technologies, including borax; the indication from the miners is that they need safer alternatives

Wilson Mutagwaba, MTL Consulting Company Ltd., Alliance for Responsible Mining, consultant to the SMMRP, Baseline Survey

- Current figures are still dated from 1996 survey
- MTL to work with two other partners to produce reliable quantitative information, covering 21 regions centered around eight current mining zones: Dar es-Salaam, Arusha, Mwanza, Singida, Mpanda, Mbeya, Mtwara, Shinyanga
- In depth studies to focus on Makanya, Mererani, Rwamagaza
- Teams are being trained to enumerate for survey
- Three main survey tools: baseline data surveys; data from zonal mines offices and district officials; household surveys in three selected areas.
- Also will focus on key informant interviews, focus group discussions, observations, and other participatory methods
- Stakeholder and institutional analysis will also be part of the survey
- Development of MIS based database based on the existing Mining Cadastral Information Management Systems (MCIMS)

Questions and Discussion:

Comment about the survey data base: Barrick has also been collecting data on small scale miners; it may be possible to share data with the baseline survey

Question: Please explain small grants program.

Answer: A credit system will be put in place available to miners, in a competitive manner. There is a plan to develop a manual which explains eligibility and details. The program will include training component; will likely send a call for project submissions. Will be administered via credit lines through local banks; will work with zonal districts and Alex Magayane's commission on Small Scale Mine Development. The financial package will be 2 million USD; another 2 million to follow if successful. Projects ideas will be open to miners and communities. 10,000USD upper limit to individuals; 50,000 USD for community projects

Comment: importance of transparency of the granting and project reviewing process

Comment: importance of having a formalized gold purchasing chain in order for success; current gold buying system is not fostering use of legal channels

Comment: regional PML licensing offices need more localized power in order to be successful –ASGM licensing policy should not require miners to make trips to Dar es Salaam.

Clarification: in fact the credit programs will be “Grants”; although there will be some requirements for collaborative funding and returns.

Comment: gold trading is a critical component of ASM gold sector; Kevin Telmer explained importance of having legal gold trade within ASM sector; provided examples from other countries where

government competes effectively to prevent black market from developing. Examples cited include Ghana and the Philippines, where the government do not require ASM sector to pay royalties; instead gold is bought at market prices in order to compete directly with the black market. John Tychsen gave the example of Ethiopia where the government pays above the local market price to discourage the black market.

10:45 Coffee break

11:00 Current mercury use practices – recent observations from the field

Discussion leader: Dr. Kevin Telmer, Artisanal Gold Council

- Introduction of Artisanal Gold Council
 - Development strategy: transition towards formalization and away from mercury use; more organization and better practices and more profits; need of facilitation by government policy and services
- Explanation of current practices in Tanzania using photography from Geita region
- Suggestions for immediate improvements: 1. improve exploration in ASM; 2. Improvements in mining practices: lifting ores and people using foot winches, legal cooperatives, better sluicing to produce better concentrates so that less mercury can be used, mercury reactivation, direct smelting may work depending on ores and access, using carpets instead of burlap sacks, better crushing and milling technologies are possible (Ghanaian direct smelting “kit” given as example), better tailings valuation and processing is possible, waste management is another area where improvements are immediately possible. Also in area of sales and trade and in telecommunications (cell phone messages and services).
- Longer term improvements typically involve adding sophistication to existing systems – better milling, better cyanide leaching, etc.
- Role of development programs: technology, training, microfinance, higher profits. There are many opportunities for simple innovations which can improve livelihoods and reduce mercury now
- Current estimate of mercury use in Tanzania ASGM from www.mercurywatch.org is 45 tonnes – open for collaboration and discussion. Triangulated estimate of number of ASGM miners is 300,000.

Questions and Discussion:

Comment: Communication of the appropriate use of technology is a critical part of equipment supply for development programs; it is not enough simply to provide equipment without training.

Comment: Nice to see how improvement in efficiency is the way towards reductions in mercury use.

Comment: The Zain Telecom Network does already provide some gold information but information provided is not clear.

Notice: Global Forum on ASGM will be held in Philippines in December 2010 – Tanzania has been invited and hopefully will attend with representatives from government and ministry who are familiar with ASGM

Notice: Also, a meeting will happen in Mwanza next month regarding legal vs illegal trade in gold in Tanzania; Ghana representatives will be present at this meeting and can explain the Ghanaian approach;

Comment regarding exploration: There can be a good role for the Geological Survey to provide information on the mineral sector in Tanzania. This was stressed as an area needing stronger collaboration in upcoming programs.

Comment: Large scale miners should consider ceding unused (and unlikely to be used) parts of their concession areas to development by legal small scale miners; these concession areas typically have good information about geology.

Comment: Should projects adopt zero mercury strategies or are mercury reduction strategies more appropriately being advocated?

Response: Often it is a two step process: step 1 is reduction, step 2 is elimination by alternative process. Step 1 is an important relationship building exercise. Zero mercury processes cannot always be implemented immediately due to field and socio-economic conditions including legality of operations. Mercury is used for a large number of reasons. Many of the reasons - such as 'mercury acts as a tool for the division of wealth in ASGM sites' are socially and economically important, but poorly recognized.

11:30 Reducing mercury exposures and transitioning miners away from mercury use

Discussion leaders:

Haji Rehani, AGENDA Project on Implementing Mercury Alternatives

- Key Study Findings: Borax direct smelting technologies were promoted by Agenda NGO. A few of the barriers identified to uptake of the method are identified here. The cost of fuel was an immediate issue for miners to process their gold. Amount of concentrate also an obstacle to borax method – currently when using mercury amalgamation process miners process 10 to 30 kg of sluice concentrate, but in case of direct smelting method, they must reduce the amount of concentrate down to 50 to 100g in order to directly smelt. It is very difficult for miners to reduce to this small amount of concentrate without losing gold in the process. During burning of the concentrate smoke is created and was causing respiratory problems for the miners; so the miners felt the process was hazardous. If sulfides present in concentrates it is possible that sulfuric acid was being released during smelting. Also potential for metals such as lead to be volatilized. Thus, it is important that ventilation concerns are included as an essential component of further interventions and trainings on the direct smelting with borax process.
- In a previous study, retorts were promoted but it was found that retorts are not being used in the field – due to the amount of heat required, the fact that miners are not able to see the gold during the process, and amalgam amounts are too small to use retorts effectively.
- Recommendations: additional awareness raising is needed. Evaluation of the potential toxic effects of all methods is needed. The use of local technologies, such as a bike wheel driven

heating systems currently used by metal workers, should be employed to address the heating issues.

- How to reduce mercury use in ASM:
 - need for ministry to facilitate cooperatives to formalize and develop medium scale technologies including cyanide
 - reduce illegal mining by re-licensing the underused LSM concessions to ASGM miners – especially state owned concessions, of which there are many
 - use of fumehoods in gold shops - the water trap condenser is a useful technology that can be installed at gold shops (brokers) and will be economically attractive immediately, because the brokers can resell the mercury that they capture. This is an effective mercury emission reduction tool and was successful in Kalimantan, Indonesia.

Questions and Discussion:

Comment: Clarification about the limitations of direct smelting: it is often difficult to attain necessary temperature. Miners were burning in open air, and were feeling sick from exposure to fumes (could be due to burning sulphides associated with the ore, which may contain other toxic metals such as lead, for example).

Comment: When promoting alternatives, note that environmental impact assessments will be required for medium scale projects. This is why it is important for MEM to work with the Environment Ministry.

Question: What temperature is required for borax method?

Response: Borax does not change melting temperature of gold, in fact it facilitates the melting of the “mix”. No temperature was given.

Comment: Promotion of cooperative model is a critical one for financing of technology such as the direct smelting kit – as developed in Ghana.

Comment: An important role of Zonal ministry officers is facilitating spread and continual use of new technologies.

Comment: It is important to demonstrate the financial benefits to the miners of the alternatives.

Comment: Considering local geology is important in choosing an appropriate method.

Comment: important to realize that barriers to more efficient technologies are often in place because they sustain profits for a few stakeholders in gold chain. This has to be considered when promoting alternatives.

Aloyce Tesha, Ministry of Energy and Mines Review of Global Mercury Project in Tanzania

- The Global Mercury Project, a joint effort of GEF/UNIDO/UNDP/ Gov of Tanzania , was implemented from 2002-2007.
- The objective was the removal of barriers to introduction of new technologies in ASGM
- Health and environmental assessments in Rwamagasa revealed acute and severe mercury related contamination, in human health and in crops
- Recommendations from the GMP have had a bearing on the current Mining Act of 2010, being released shortly
- Microcredit organizations were interested in facilitating loans in the sector and were looking for guidance in this regard
- Training of trainers and transportable demonstration units formed a model for dissemination of better practices in ASGM
- Important challenges:
 - Determining success of interventions via surveys and follow-up;
 - Budget concerns – need for sustained extension services to be provided by district ministry offices

Questions and Discussion:

Comment: What about the sustainability of the interventions? What have the miners continued to practice?

Answer: Information needs to be collected to determine which interventions continue to be practiced. However, it is clear that it is important to promote the capacity of local populations and local leadership in understanding regional contamination from mercury. Training of trainers is a very useful model for distribution of knowledge.

Comment regarding implementation: TDUs weren't used due to financial problems. Government commitment to projects is needed even when project funding was limited. Lack of follow up affected the continued use of TDUs.

Comment: The incentive to continue working to develop better practices must come locally, and local leadership needs to be involved, with recognition of relevance of the work for local populations.

12:30 *Gareth Taylor* Addressing existing contamination at ASGM sites

- Example of Esther, an ASGM miner who processes tailings
- Value chain problems: owners and dealers take lion's share of wealth from the gold; people most affected get the least value
- Tanzania has a need for organized and legalized ASGM to help a wider range of people
- Tanzania total estimated Gold Resource is 90 million ounces
- ASGM estimates: 500 ounces per month currently; but niche exists for 10,000 ounces per month
- Removal of existing mercury from tailings necessary before processing for gold
- Geita area tailings samples for mercury approximately 2.3ppm (grams per tonne)
- ASGM milling recoveries are low – around 30-40% : grinding is a significant opportunity for intervention – grinding is key to better processing
- Cyanidation provides closer to 90% if appropriate grinding is done
- Commercialized ASGM ventures that capture this additional value are more useful than aid – commercial viability is key to a successful approach
- Key principles: no child labor, no hard labor for women, safety, education, standards, legalization, access to capital, share of benefits
- Effects on social fabric are more positive in commercialized ASGM enterprises than in LSM
- Current project is focusing around Lake Victoria goldfields; currently doing feasibility study
- Challenges include legality of artisanal miners; logistics (how to direct smelt using Borax, for example); convincing local partners and investors to embark on collaborative enterprise
- Risk is still too great to companies like Barrick- mainly due to issue of safety; if deaths were to occur in a collaborative enterprise and Barrick had supported it, the company would somehow shoulder blame.

Questions and Discussion:

Comment: Risk to LSM stakeholders is a difficult issue for moving forward with development of this model. Not clear how to get past this issue.

Comment: There are “sharks” in the system - individuals who benefit by exploiting the miners; for example by encouraging inefficient initial processes and keeping the tailings that contain a significant amount of gold. What to do about this?

Comment: No investor will be interested unless revenues can increase significantly, and thus efficiency of the process for the ASGM miners is crucial. The sharks need to be included and cannot be cut-out. Working from the community level up is how sharks can be involved or avoided (in theory).

1:00 Break for lunch

1:30 Working lunch/ discussion

Facilitated discussion on collaborative approaches to reducing mercury ASGM in Tanzania:

Opportunities for collaboration on:

- *Technical approaches and training*
- *Policy development*
- *Financial approaches*

Collaboration with UNEP Global Mercury Partnership

Relationship to other environmental concerns, especially Lake Victoria environmental issues

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Rafik Hijri, World Bank senior water specialist, connected from World Bank office in Washington DC by telecom.

Mr. Philbert Rweyemamu from Barrick described a cooperative project between Barrick and ASGM miners in Tanzania:

- The project commenced in 2006 or 2007; implementation has not started yet.
- Artisanal Miners will never go away; they preceded the LSM sector in Tanzania and have not gone away; it is critical to find a method for co-existence. This is in the interest of both parties.
- Barrick approach in the context of this project: accommodation of ASM miners by encouraging and facilitating their productivity.
- Safety is an important first point of contact in community engagement
- The next step is to establish a common purpose and vision through engagement. Engagement meetings started small but grew. Executive committee started to develop follow up activities. Committees of Artisanal and Small Scale Mining groups were formed, including many groups from local society.
- Education was a key tool for developing interest in having community meetings
- Cooperatives have been a successful approach in certain areas, and it was decided to try this approach for the ASGM miners.
- Barrick's approach was to start with legal operations – those with PMLs and their workers.
- It took the time to build trust. During this time sampling and safety analysis was conducted involved mapping, establishment of database on local miners and workings (mineral database)
- Next mineral recovery assessments were made with the cooperatives – gold recovery being the main consideration

- This has produced a feasibility study regarding expectations; this had all been done in a transparent manner with the community
- Legal hurdle: 40 cooperatives needed to form a union in Tanzania. The project had only 4 cooperatives but went to ministry anyways; the Ministry conceded an exception for unionizing those four cooperatives; this represents about 1300 people (of which 570 were women and children)
- One problem is that the artisanal miners are only interested in quartz veins –which only represents 20-30% of the ore body (the other ore is of a lower grade and would be much less economical to process using small-scale approaches)
- But this is compounded by the fact that processing by ASGM miners is not efficient. In effect, they get only 6% of the total ore body
- Worked with African Precious Metals to ensure viable marketing chains
- In North Mara areas, kids and women working in the mining communities is commonplace
- Current planned investment is 3 million USD in the project, to be paid back in 6 months. Gold treatment plant cost is 1.5 million USD. The activity will start with gravity as the main technology but may advance to other processes later.
- Must address the issue of acceptance and trust. It comes with time.
- Also formed multipurpose cooperatives, with women – including cooks and cleaners etc.
- DVD available but only in Swahili, with English subtitles

Representatives from the Ministry of Water and Irrigation made comments about water quality and chemicals management:

- Water Resources Project: (Water Quality Management Survey) water ministry has commissioned a study on water quality, assessment and management control
- Also a localized water sector development project in North Mara
- There is a lack of research on how mercury is affecting water resources and people; research on this is urgently needed
- There is an important concern regarding the growing use of cyanide – it can be a more acute source of toxicity than mercury; more assistance is needed on handling these materials. Strengthening of authorities of ministries to deal with cyanide use in ASM sector is needed.
- Need for hospitals and schools in these communities
- Difficult to implement water management education with nomadic artisanal miners – especially because in gold rushes - i.e. with many migrant workers.

Other points made during Open Discussion:

- Regulations are coming on how mercury is to be used in Tanzania (from Bureau of Standards); includes trade and importation; this is a draft standard which is still within the ministry
- **Suggestion:** Other Tanzanian ministries should be collaborating on this effort
- Rafik raised the following points:
 - A key issue is that the mining sector has been expanding very quickly; increasingly cyanide and mercury are being used; experience in these areas is not well established; also uranium mining on the horizon. Concerns are widespread throughout the country; noted that mining is the second fastest growing sector. Considering this, there is urgent need for action on the country's water issues.
 - A central challenge is understanding the scale and severity of the problem, including regarding health and environment, fisheries
 - Since the potential threat is serious, a multi-sector approach to the issue is warranted
 - A recommendation was made for the preparation of a policy note about this issue.
- **Question:** Is water ministry part of the inter-ministerial committee working on World Bank ASGM project?
- **Answer:** No. However, Chris Sheldon explained that information from World Bank ASGM baseline survey will be shared with the Ministry of Water; a commitment was made to be inclusive of a wider group of stakeholders
- **Comment:** Building capacity between ministries and stakeholders is an important need that has been identified. For example, further coordination is needed with the work of National Environmental Management Council (NEMC) and with the Water Quality Management Strategy.
- WWF is forming an Extractive Industries Tri-sectoral forum (government, private sector, civil society) that could serve as a platform for discussing these issues among stakeholders.
- Rafik noted that most recommendations from the Global Mercury Project wrt to water resources and mercury have not been followed up.
- **Suggestion:** Although inter-ministerial steering committee exists for the SMMRP, broader communication and representation is needed. This is identified as an area in Tanzania which urgently requires nurturing.
- **Comment:** UNEP treaty process can act as a binding force for ministries and disparate groups, especially as it relates to mercury science and monitoring in environment, fish, human populations etc.
- **Comment:** Water is perhaps the most difficult media to monitor and drinking water is rarely a significant pathway for human toxicity. Fish, air, and human tissues may be a more appropriate initial target for monitoring. Fish monitoring in particular is likely to be the focus of global monitoring efforts under the mercury treaty.

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2:45 List of Action Items postulated by Susan Keane

1. **Data Sharing:** the ASM baseline survey is a key instrument that can create a platform to collaborate and share information with other sources of data, for example, water quality data, health data, Barrick survey data

2. **Study of Policy and Solutions Enacted by other Countries:** Tanzania could benefit from examining work on the sector in other countries such as Ghana, Zimbabwe, Philippines, and Ethiopia.

3. **LSM Involvement:** Efforts should be made to find concrete ways for LSM to become more involved. One example is Barrick's project of helping local miners to create a cooperative. Also, the establishment and sharing of geological information between LSM and ASM can be helpful, as is concession sharing and sale to increase productivity of ASGM miners

4. **Expanding Stakeholder Dialogue:** The discussion about ASGM needs to involved a wider range of stakeholders, for sharing data and information on projects, including Energy and Minerals, Water, Health, Livestock and Fisheries, and Environment Ministries . the Bureau of Standards; Regional Small scale Miner Associations; Chemicals Management Bureau; and the Tanzanian delegation to UNEP treaty negotiations.

5. **Engagement in Global Treaty Process:** Tanzania has important stories and experience to share on the international stage; in turn it responsibility of the all stakeholders in Tanzania to be familiar with these important international developments that will affect the ASGM sector; there is a need to identify who serves on the Tanzanian delegation to the treaty process.

6. **Policy Note Preparation:** A suggestion was made to prepare a policy note, whose purpose is to share information among sectors and to elevate the discourse to a high political level within Tanzania.

7. **Development of an Informal Working Group on ASGM and Mercury:** As attendees noted, the best way is learn about developments in the sector is to stay in close touch with others working in the field. The work on ASGM in Tanzania can be facilitated by the formation of an informal mechanism to stay in touch The possibility was raised that the Tri-sectoral Forum being convened by WWF could possible support this aim.

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3:00 Conclusion