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MINAMATA COP 1

BRIEF ON MERCURY AND ARTISANAL AND SMALL-SCALE GOLD MINING (ASGM)

Over the last 40 years, mercury has been used in artisanal and small-scale gold mining (ASGM) practices in more than 50 countries. Decentralisation, economic turmoil and a 10-fold gold price increase within the period of 1996 to 2002 triggered the modern gold rush. Many seasonal miners and prospectors in developing countries try their luck in some ASGM hotspot areas due to the promise of these high returns.

In ASGM activities mercury may be mixed with ore containing traces of gold through the panning process, whole ore amalgamation in sluice boxes, and using ball-mills, trommels or little rotating drums. The mercury/gold amalgam resulting from the process is roasted using a blow torch in the burning unit on site, at the gold kiosk and / or in the backyard of the houses.

As the amalgam is heated, the mercury vaporises into gaseous form, leaving behind a small amount of gold. The mercury vapours are highly toxic if inhaled and can lead to devastating health impacts. Most mercury vapour from this type of gold processing enters the atmosphere, contributing to widespread global pollution via atmospheric deposition.

The remaining processed water from ore concentration, in conjunction with mercury, usually will be discharged to the river, on the ground, in ponds or fish ponds, and in rice fields, contributing to the re-emission of mercury globally.

UNEP (2013) identified ASGM as the major anthropogenic source of mercury, accounting for 37% of the total anthropogenic mercury emissions to the global atmosphere. Besides the use of mercury, the ASGM sector is also closely linked to deforestation, land degradation and increased social, economic and health problems. Kocman et.al (2017) assumed that 50% of total ASGM releases to terrestrial systems are released directly to water.

It is well known that the exposure to mercury through inhalation or ingestion may pose a range

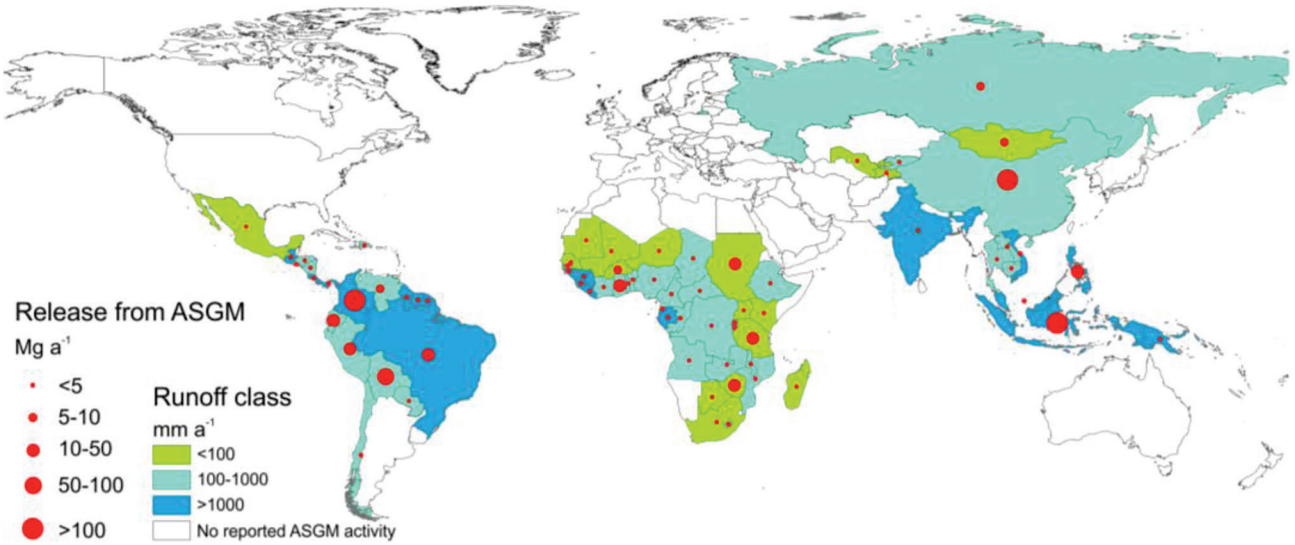

Figure 1. Estimated releases of Hg from artisanal and small-scale gold mining (ASGM) to terrestrial systems (land and water) and surface runoff class for countries with known ASGM activities.
Source: Kocman, et al. 2013.

of serious health impacts, including brain and neurological damages, memory loss, skin rashes, emotional changes, tremors, kidney, heart, vision and respiratory problems, deformation of the foetus and even death. Many studies have also shown that mercury pollution from ASGM activities accumulates in the food chain, especially through fish and even through some types of rice.

ASGM HOTSPOTS AREAS IN MORE THAN 70 COUNTRIES SHOULD BE RECOGNISED AND IDENTIFIED AS ACTIVE AND FUTURE MERCURY CONTAMINATED SITES.

Artisanal and small-scale gold mining is carried out in over 70 countries by approximately 10-15 million miners, including approximately 4-5 million women and children (Telmer and Veiga, 2009). More than 20 million people depend on this sector for their livelihood. Between 25% and 33% of ASGM miners globally suffer from moderate chronic mercury metallic vapour intoxication (CMMVI) (Steckling, et.al. 2016).

Further, more than 100 million people living nearby or downstream of the ASGM sites are considered as

Figure 2. Baby and children with birth defects in ASGM hotspots of Indonesia. *Source: a) Larry C. Price/Pulitzer Centre on Crisis Reporting, b) BaliFokus*

populations at risk. Women of child-bearing age and young children are vulnerable populations that are impacted most.

Several studies have already shown that many people around ASGM sites have elevated levels of mercury in their blood, hair, urine and breast milk, as mercury has contaminated the food chain, including rice (Böse-O'Reilly et.al., 2008; Gibb and O'Leary 2014; Böse-O'Reilly et.al., 2016).

A recent study conducted by IPEN and BRI in several countries showed elevated levels of mercury in women of child-bearing age in ASGM countries up to 6 times above the safe level recommended by the World Health Organization.

In Indonesia, several severe cases of mercury intoxication suspects and birth defects in ASGM hotspots areas have been found (BaliFokus, 2012). According to Trasande et.al (2016) Indonesia is losing approx. US $961,000 – US $1,630,000 in earning potential in ASGM communities every year due to mercury contamination.

The National Action Plan to eliminate mercury in the ASGM sector should include local stakeholders and miners' associations, review the governance of the ASGM sector, and identify alternative livelihoods. The action plan should also include health interventions and monitoring. Rapid elimination of mercury is possible as physical and mechanical gold extraction processes - such as concentrators, electro winning and gravity processes - are available at an affordable price.

MERCURY USE AND TRADE IN ASGM SHOULD BE PROHIBITED IMMEDIATELY TO PROTECT MINERS AND COMMUNITIES. ALTERNATIVE TECHNOLOGY SHOULD BE INTRODUCED WITHIN THE FRAMEWORK OF FORMALISATION AND THE IMPROVED GOVERNANCE OF ASGM SECTOR.

The Mercury Treaty contains provisions under Article 7 and Annex C requiring Parties who have an ASGM sector to send a notification to the Secretariat stating that the ASGM situation in their respective countries is "more than insignificant" and to develop a National Action Plan (NAP) to address and reduce the use of mercury in ASGM.

The NAP requires strategies to prevent foreign and domestic supplies of mercury being diverted into ASGM, thereby providing a mechanism to restrict mercury supplies that are not controlled under pri-

Figure 3. Many women who are involved in gold processing using mercury in ASGM sites bring their babies to the processing facilities.
Photo: CEJAD, Kenya

mary mining or chlor-alkali closure provisions of the Treaty.

A NAP can also help mobilise resources to provide better services and training to small-scale miners and their communities and to promote the adoption of less polluting and more sustainable practices. Moreover, the NAP should also consider a review of the governance of small-scale mining practices through several regulations at the national and local level. Additionally, opportunities and activities to increase the added value of gold to become jewellery, handicrafts or other products produced by local artisans should be considered.

The eventual phase out of the use of elemental mercury in mining practices should be determined and, where possible, set out as a short-term goal to be achieved by 2020. The achievement of this goal, however, must be linked to successes in other poverty-reduction programs and, in some cases, displaced miners, their families and the impacted communities may need access to supplemental livelihood opportunities.

Specifically, the Treaty states at Article 7:

- *The objective is to "take steps to reduce, and where feasible eliminate, the use of mercury and mercury compounds in, and the releases to the environment of mercury from, such mining and processing."*
- *According to the trade provisions (Article 3), mercury from primary mercury mines and chlor-alkali facilities cannot be used for ASGM after the Treaty enters into force. Monitoring measures and public participation can help insure that this provision is enforced.*
- *Each Party shall notify the Secretariat if at any time the Party determines that artisanal and small-scale gold mining and processing in its territory is* ***more than insignificant****. If it so determines the Party shall:*
  - *(a) Develop and implement a national action plan in accordance with Annex C;*
  - *(b) Submit its national action plan to the Secretariat no later than three years after entry into force of the Convention for it or three years after the notification to the Secretariat, whichever is later; and*
  - *(c) Thereafter, provide a review every three years of the progress made in meeting its obligations under this Article and include such reviews in its reports submitted pursuant to Article 21.*
- *Plan requirements include a national objective and reduction target, and actions to eliminate the following worst practices: whole ore amalgamation; open burning of amalgam or processed amalgam; amalgam burning in residential areas; and cyanide leaching in sediment, ore, or tailings to which mercury had been added without first removing the mercury. Countries should work to establish* ***a sunset date or reduction target in their national objectives****.*

Key issues on ASGM to consider at COP 1 include:

- The urgent need to prohibit the use and trade of mercury in ASGM effectively and immediately;
- Safer mercury alternatives of gold extraction methods should not create new toxic exposures;
- The introduction and adoption of non-mercury gold extraction methods should be done within the formalisation framework and ASGM governance reform;
- Abandoned and contaminated ASGM sites as well as residential areas must be identified, characterised and included in the contaminated sites inventory;
- Capacity building for miners, community leaders and local health workers should be incorporated in the NAP and elaborated by the relevant local agencies;

- The capacity building should also include needs assessments to provide miners with the opportunity to participate/provide views on some of the workable interventions, including their knowledge on what would be required to have safer mercury-free alternatives; i.e. factoring social factors is important;
- Added value of gold (e.g. jewellery) should be introduced to provide the trickle-down effect to the ASGM miners and communities;
- An exit strategy and mechanism to alternative livelihoods or new sectors should be considered in the NAP;
- Long-term bio-monitoring plans need to be developed at the local level;
- Improvement of the capacity of local laboratories and develop knowledge sharing platforms or stakeholders' forums; and
- Health interventions for the impacted miners and communities should be provided immediately.

REFERENCES

Buxton, A. 2013. *Responding to the challenge of artisanal and small-scale mining. How can knowledge networks help?* IIED, London. ISBN: 978-1-84369-911-8.

Böse-O'Reilly S, Lettmeier B, Matteucci Gothe R, Beinhoff C, Siebert U & Drasch G (2008). *Mercury as a serious health hazard for children in gold mining areas.* Environmental Research. 107(1): 89-97.

Gibb H and O'Leary KG. (2014). *Mercury exposure and health impacts among individuals in the artisanal and small-scale gold mining community: a comprehensive review.* Environ Health Perspect. 122(7): 667-672.

David Kocman, Simon J. Wilson, Helen M. Amos, Kevin H. Telmer, Frits Steenhuisen, Elsie M. Sunderland, Robert P. Mason, Peter Outridge, and Milena Horvat (2017). *Toward an Assessment of the Global Inventory of Present-Day Mercury Releases to Freshwater Environments.* Int. J. Environ. Res. Public Health 2017, 14(2), 138; doi:10.3390/ijerph14020138

Telmer, Kevin H. and Veiga, Marcello M. (2009). *World emissions of mercury from artisanal and small scale gold mining.* Chapter Mercury Fate and Transport in the Global Atmosphere pp 131-172. 03 March 2009 in N. Pirrone and R. Mason (eds.), Mercury Fate and Transport in the Global Atmosphere, 131. DOI: 10.1007/978-0-387-93958-2_6, © Springer Science + Business Media, LLC 2009.

Trasande L, DiGangi J, Evers D, Petrlik J, Buck D, Samanek J, Beeler B, Turnquist MA, Regan K (2016). *Economic implications of mercury exposure in the context of the global mercury treaty: hair mercury levels and estimated lost economic productivity in selected developing countries,* Journal of Environmental Management 183:229 - 235, doi: 10.1016/j.jenvman.2016.08.058

UNEP (2013). *Global Mercury Assessment 2013: Sources, Emissions, Releases and Environmental Transport.* UNEP Chemicals Branch, Geneva, Switzerland. 42pps

WHO (2016). *Technical Paper #1: Environmental and Occupational Health Hazards Associated with Artisanal and Small-Scale Gold Mining.*

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