Eliminating Worst Practices and Reducing Exposures to Mercury from ASGM

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Convention Connections – Article 7

Paragraph 3.

(a) Develop and Implement a national action plan in accordance with Annex C;

(c) Provide a review every three years of the progress made in meeting its obligations... pursuant to article 21

Paragraph 4.

Parties may cooperate with each other and with relevant intergovernmental organizations and other entities, as appropriate, to achieve the objectives of this article... (a), (b), (c), (d), (e), (f)
NAP Obligations – Annex C

(b) Actions to eliminate: **(Worst Practices)**

(i) Whole ore amalgamation;
(ii) Open burning of amalgam or processed amalgam;
(iii) burning of Amalgam in residential areas; and
(iv) Cyanide leaching in sediment, ore or tailings to which mercury has been added without first removing the mercury;

(e) Strategies for promoting the reduction of emissions and releases of, and exposure to, mercury in artisanal and small-scale gold mining and processing, including mercury-free methods;
Summary and Sources

• Video, pictures and graphics to explain technical interventions to eliminate worst practices and reduce mercury exposures

• Sources – all publically available
  • Artisanal Gold Council videos
  • Materials available at www.artisanalgold.org; youtube: Artisanal Gold Council channel; UNEP: www.unep.org
Highly Graphical Manuals and Guides

Health Issues in Artisanal and Small-Scale Gold Mining
Training for Health Professionals
Version 1.0

Using Retorts to Reduce Mercury Use, Emissions, and Exposures in Artisanal and Small-Scale Gold Mining
A PRACTICAL GUIDE
Version 1.0
A PRACTICAL GUIDE

REDUCING MERCURY USE IN ARTISANAL AND SMALL-SCALE GOLD MINING

Helping artisanal and small-scale gold miners to derive the greatest benefit from this development opportunity, while minimizing the environmental and social consequences is absolutely possible. All that is needed is understanding, innovation and will.
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<th>Mining and Concentration</th>
<th>Processing</th>
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<td>Unsafe excavation</td>
<td>Whole ore amalgamation</td>
<td>Lack of fume hoods</td>
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<td>Poor crushing and grinding</td>
<td>Chemical leaching after mercury</td>
<td>Poor chemical management</td>
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<td>Poor manual sluicing</td>
<td>Open-air amalgam burning</td>
<td>Poor purity assaying</td>
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<td>Poor &amp; untargeted power sluicing</td>
<td>No process control</td>
<td></td>
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<tr>
<td>Poor planning</td>
<td>Little or no waste management</td>
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| Excavation planning      | No whole ore amalgamation | Use of fume hood |
| Safe ore extraction      | Closed basin amalgamation | Proper chemical management |
| Efficient crushing and grinding | Use of retorts / fume hoods | Educated purity assaying |
| Improved and targeted sluicing | Mercury reactivation |          |
| Improved panning         | Basic process control |          |
| Established operational protocols | Basic waste management |          |

| Excavation planning      | Zero mercury methods | Use of fume hoods |
| Safe ore extraction      | Washing and sorting concentrates | Best chemical management |
| Advanced crushing and grinding | Direct smelting | Formal purity assaying |
| Efficient sluicing       | Chemical leaching |          |
| Enhanced concentration   | Advanced process control |          |
| Standardize operational protocols | Advanced waste management |          |
Instant mercury reduction

- Collect the coarse gold before amalgamation – reduces at least 10-20% of mercury use
How is Mercury Used and Lost?

Gold + Sand

Add mercury to dissolve gold

Tailings

Form Amalgam

60% Au, 40% Hg

Apply Heat

Sponge Gold

Hg into water

Hg into air

Hg into air

Hg into air
Mercury Losses Vary With Style of Operation

- Much more mercury lost when *whole ore* is amalgamated
- Even worse when CN is used after mercury – a growing trend
Whole Ore Amalgamation - Nicaragua
What is ASM in Latin America and in the world

History of ASM; role in creating the modern mineral sector; current status

Contribution of ASM to local socio-economic development

Mechanisms to formalize and legalize ASM

Role of the state and other actors including ASM miners

General recommendations: do's and don'ts
Peru
High intensity whole ore amalgamation
Whole Ore Amalgamation
Copper Plates - Brazil
Copper Plates
Mercury then Cyanide!
Open Burning - Ignorance
Bolivia
Bolivia
Limitado Espacio • Limitado espacio – limita al espacio en el valle aluvial de los dos ríos: Río Calera y Río Amarillo Río Equador
La mezcla de mercurio en residuos contaminados hace que la gestión de los materiales altamente complejo, caro e imposible, en efecto, porque no hay manera eficaz de gestionar las emisiones a la atmósfera y la gestión de la hidrosfera de Hg y el mercurio, el cianuro de los desechos de los complejos. Esto es reconocido internacionalmente como una de las peores prácticas.
Burkina Faso
Senegal
DR Congo
Modern Artisanal and Small-Scale Gold Mining

• An important development opportunity which can contribute directly to poverty alleviation and regional development.
• Although social and environmental problems are common in this sector, there is also great opportunity to transform mineral wealth into lasting local development.

Nigeria
Indonesia
High intensity whole ore amalgamation
Brasil
Alluvial
Solutions

• Technology Transfer
• Financial Mechanisms
• Enabling Policy
Approach to Solutions

• Profit is an important incentive for creating sustainable change in any ASGM operation.

• Stability and Dignity and Health count but to lesser degree

• Asking miners to change their behaviour in a way that induces a pay cut has been universally unsuccessful

• Interventions where better practices have come along with increased profits have thrived

• **Field work is the source of innovation and progress**
  • All progress to date has come from field work
Technical Solutions

• Alternative processing:
  • Lower mercury (step 1) - **Mercury Recycling**
    • emissions control (fume hoods, retorts)
    • mercury re-activation
  • Zero mercury (step 2)
    • Gravity separation + chemical leaching

• Widespread education needed about these methods
• Local innovation often critical to adapt methods
ARTISANAL GOLD COUNCIL
Making Artisanal Gold Work for Development

Logos of various organizations
Tech Doc Solutions
Thank You