

# 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)*

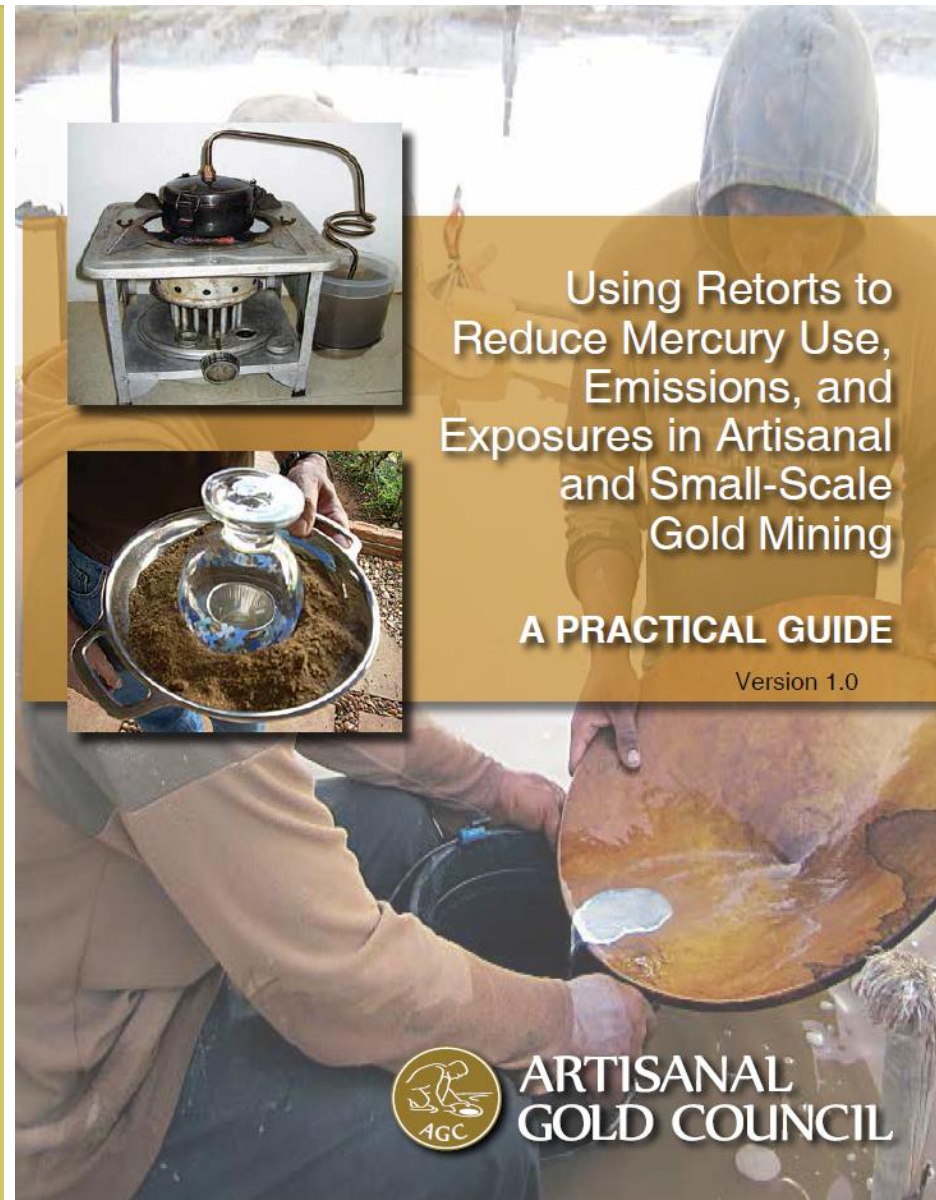
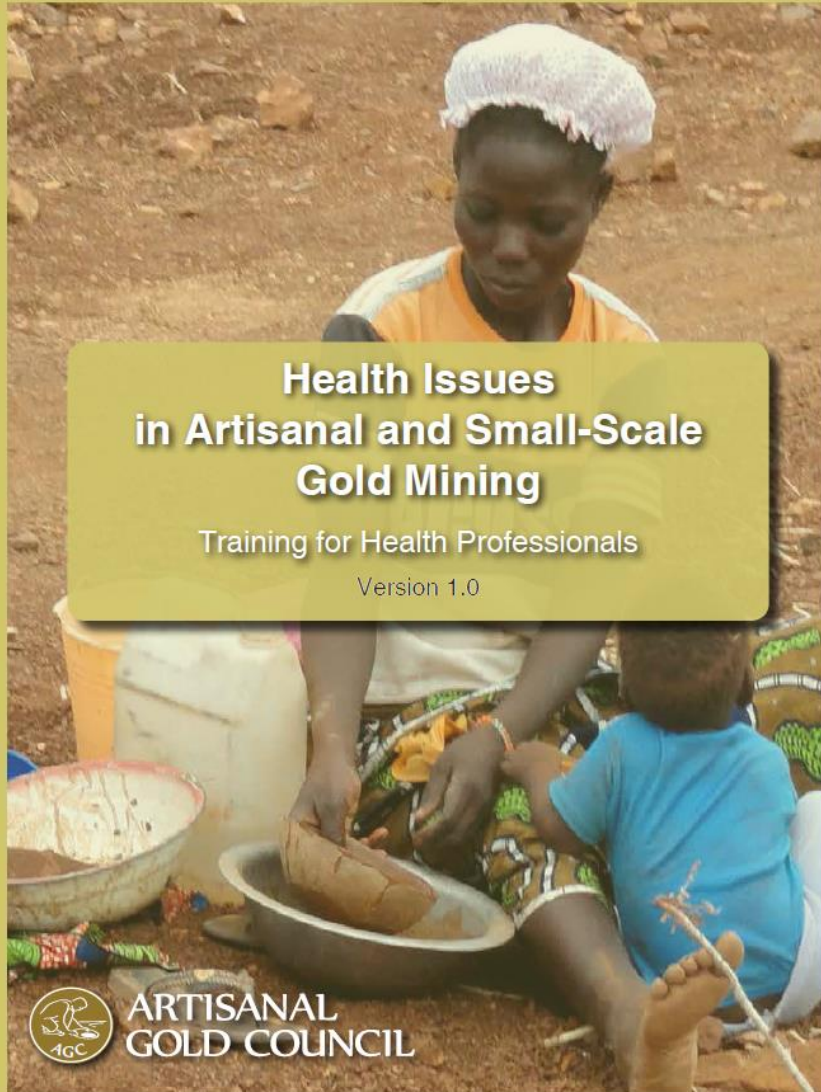
- (i) Whole ore amalgamation;
- (ii) Open burning of amalgam or processed amalgam;
- (iii) burning of Amalgam in residential areas; and
- (iv) Cyanide leaching in sediment, ore or tailings to which mercury has been added without first removing the mercury;

(e) Strategies for promoting the reduction of emissions and releases of 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
  - Telmer K. and Stapper D. (2012) **Reducing Mercury Use in Artisanal and Small-scale Gold Mining: A Practical Guide** - A UNEP Global Mercury Partnership document produced in conjunction with Artisanal Gold Council; ISBN 978-92-807-3282-5
  - Richard M., Moher P., and Telmer K. (2014) **Health Issues in Artisanal and Small-Scale Gold Mining: Training for health professionals**, (Version 1.0), Artisanal Gold Council. Victoria, BC. ISBN: 978-0-9939459-0-8
  - Richard M., Moher P., Rossin R., and Telmer K. (2014) **Using Retorts to Reduce Mercury Use, Emissions and Exposures in Artisanal and Small Scale Gold Mining: A Practical Guide**, (Version 1.0), Artisanal Gold Council. Victoria, BC. ISBN 978-0-9939459-2-2
  - Artisanal Gold Council videos
  - Materials available at [www.artisanalgold.org](http://www.artisanalgold.org); youtube: Artisanal Gold Council channel; UNEP: [www.unep.org](http://www.unep.org)

# Highly Graphical Manuals and Guides



# The “Tech Doc”

## A PRACTICAL GUIDE

### REDUCING MERCURY USE IN ARTISANAL AND SMALL-SCALE GOLD MINING



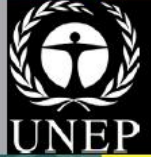
[www.unep.org](http://www.unep.org)

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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.

For more information, contact:  
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## Mining and Concentration



## Processing



## Refining

Unsafe excavation

Poor crushing and grinding

Poor manual sluicing

Poor & untargeted power sluicing

Poor planning

Whole ore amalgamation

Chemical leaching after mercury

Open-air amalgam burning

No process control

Little or no waste management

Lack of fume hoods

Poor chemical management

Poor purity assaying

**POOR PRACTICE**

Excavation planning

Safe ore extraction

Efficient crushing and grinding

Improved and targeted sluicing

Improved panning

Established operational protocols

No whole ore amalgamation

Closed basin amalgamation

Use of retorts / fume hoods

Mercury reactivation

Basic process control

Basic waste management

Use of fume hood

Proper chemical management

Educated purity assaying

**BETTER**

Excavation planning

Safe ore extraction

Advanced crushing and grinding

Efficient sluicing

Enhanced concentration

Standardize operational protocols

Zero mercury methods

Washing and sorting concentrates

Direct smelting

Chemical leaching

Advanced process control

Advanced waste management

Use of fume hoods

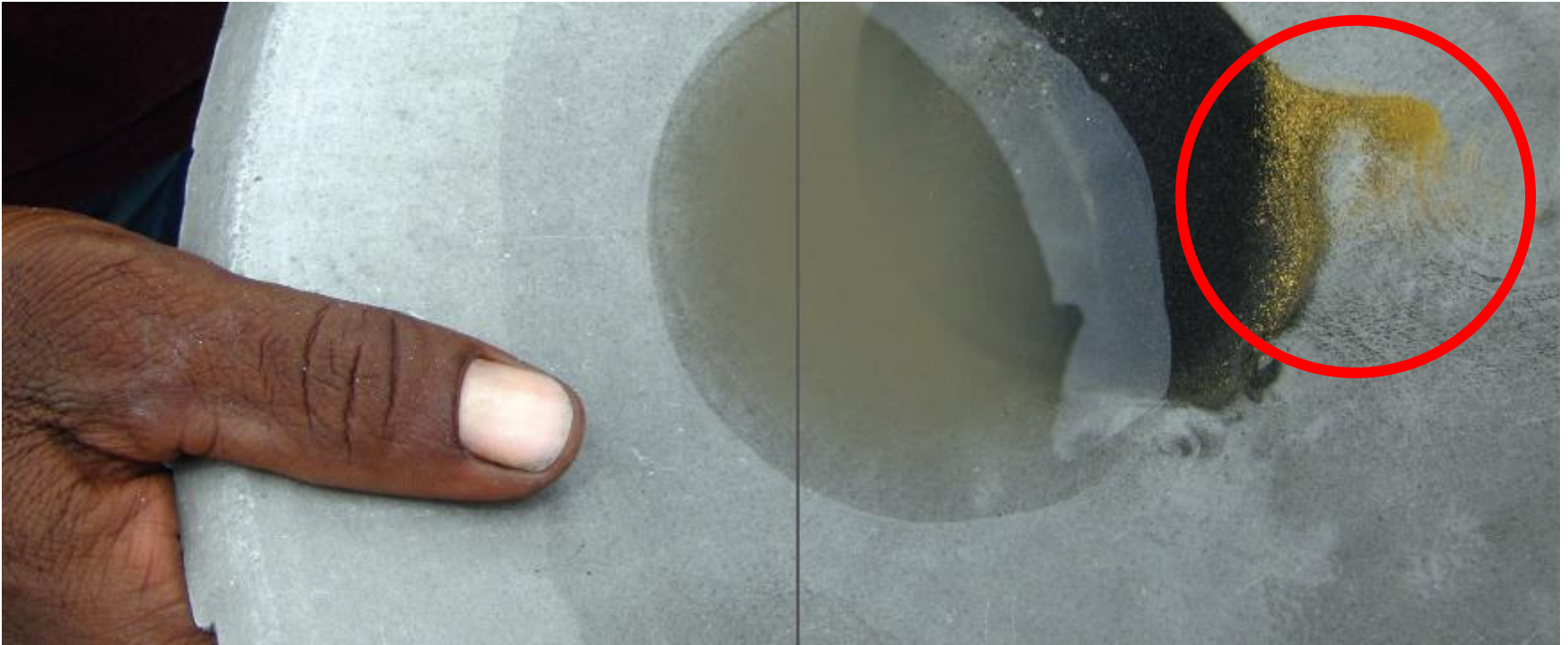
Best chemical management

Formal purity assaying

**BEST**

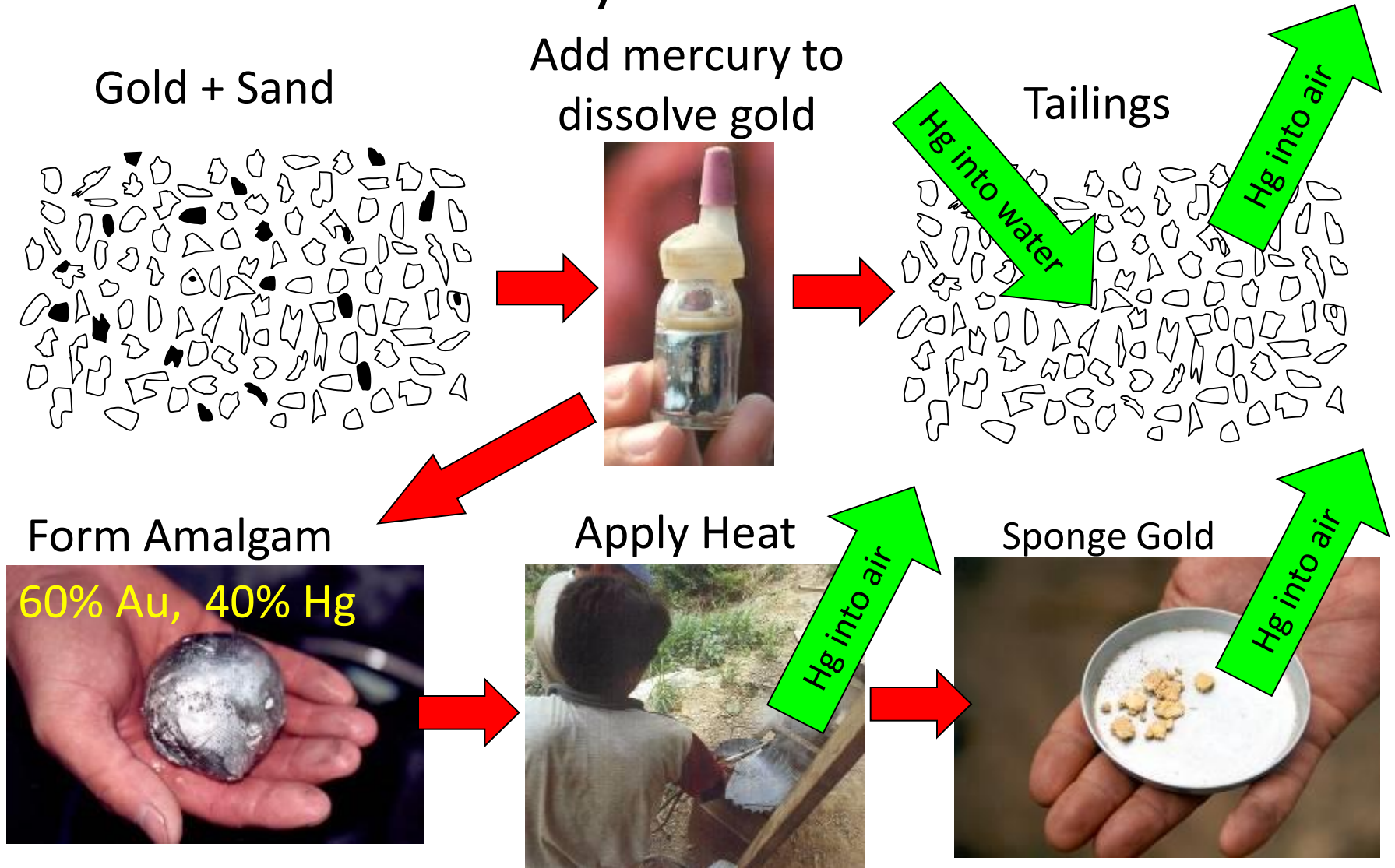
# Instant mercury reduction

- Collect the coarse gold before amalgamation – reduces at least 10-20% of mercury use



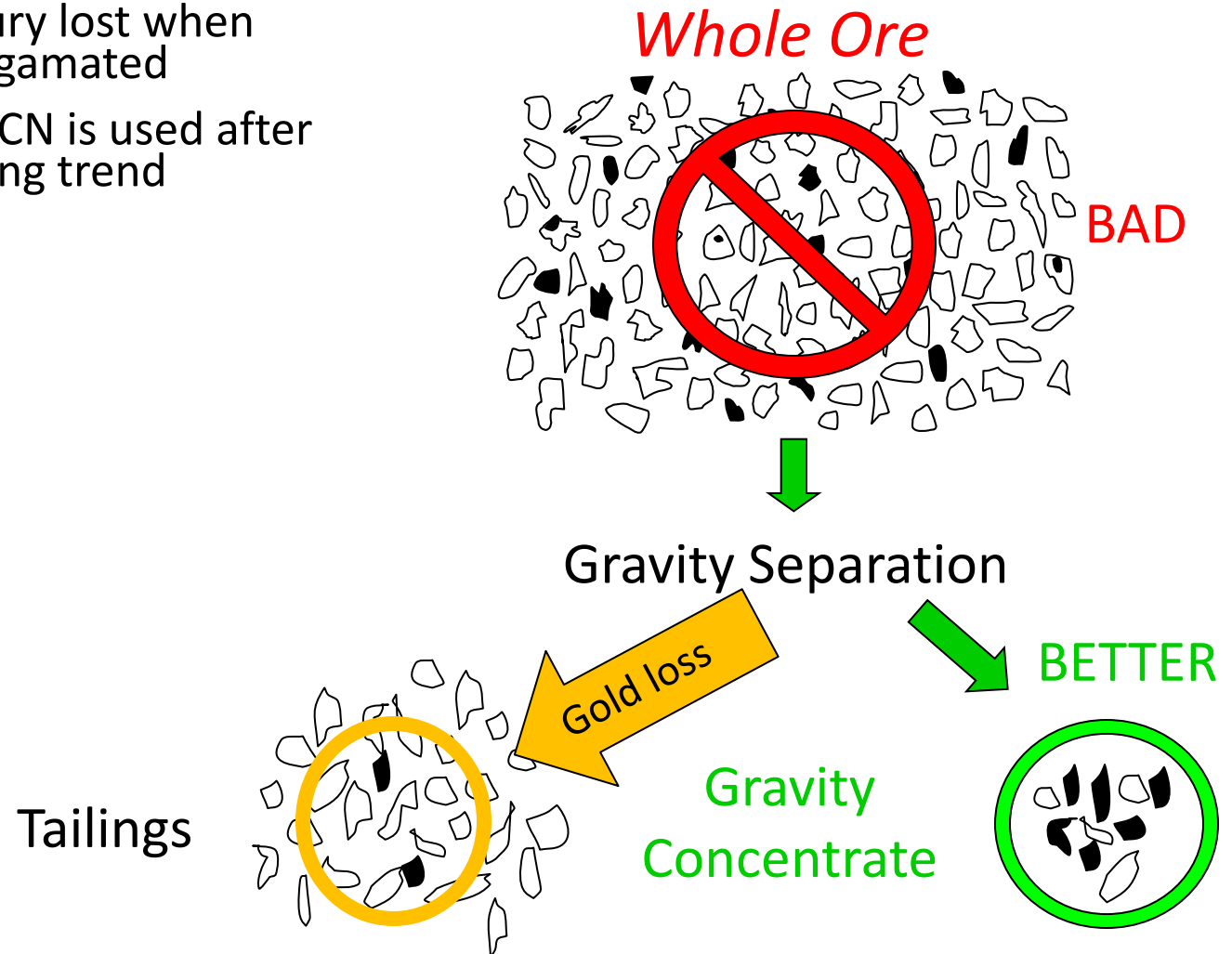


# How is Mercury Used and Lost?



# 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



# Whole Ore Amalgamation Peru



A man wearing a white long-sleeved shirt, black pants, and a black hat with a white patterned band is standing in a rustic, stone-walled building. He is looking down at a large, cylindrical stone mill. The mill is made of rough-hewn stone and is partially submerged in a shallow pool of water. A wooden beam is leaning against the mill. In the foreground, there is a red plastic bucket and a large, smooth, grey stone. The background shows a weathered stone wall and a wooden door.

Peru

# High intensity whole ore amalgamation



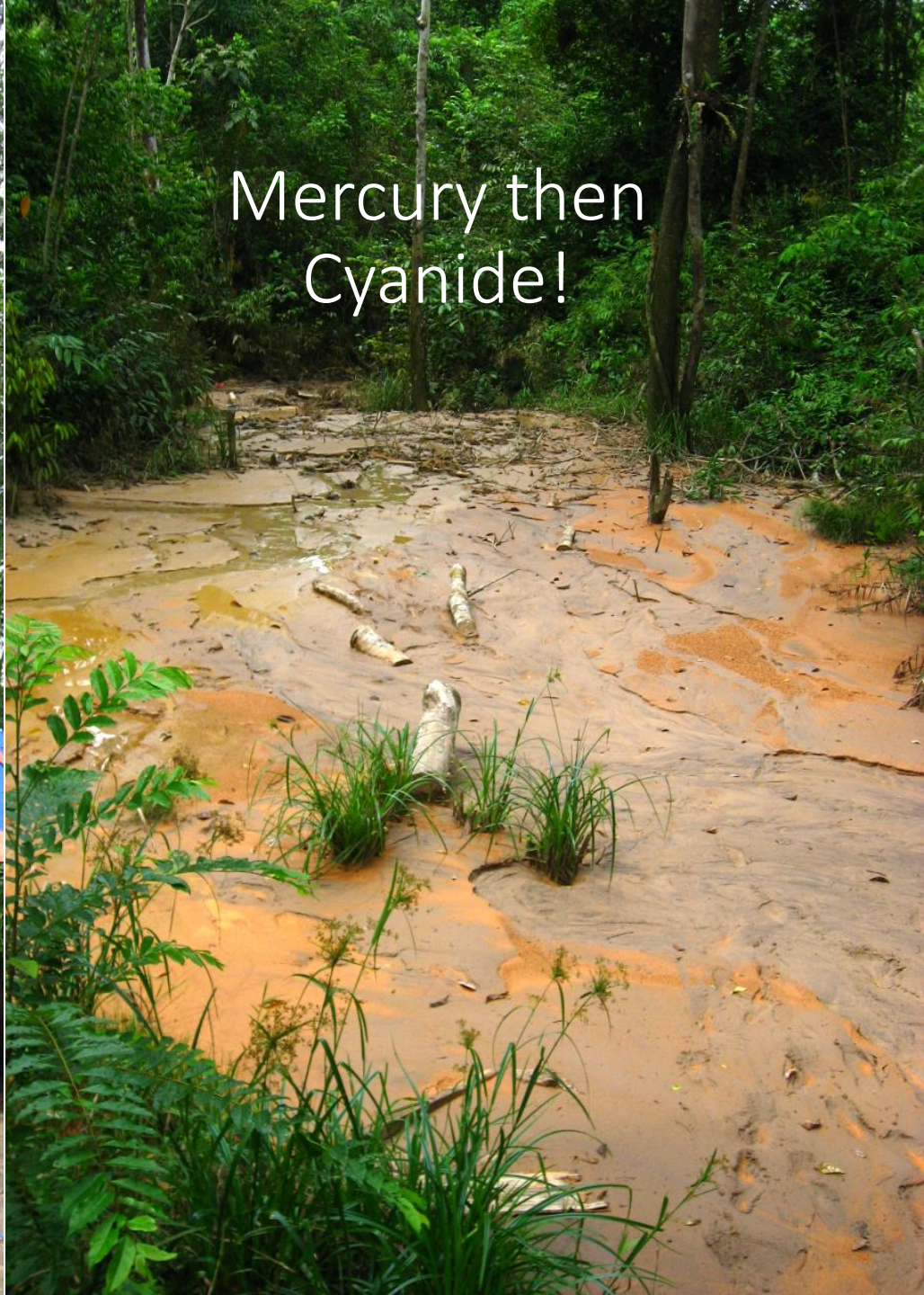
# Whole Ore Amalgamation Copper Plates - Brazil



# Copper Plates







Mercury then  
Cyanide!

# Open Burning - Ignorance





a.



b.

Bolivia



c.



d.



e.



f.

# Bolivia



g.



h.

© Artisanal Gold Council, 2012



Bolivia





c.



d.

Bolivia



e.



f.

An aerial photograph of a mining operation in Ecuador. The scene features several large, irregularly shaped ponds filled with a milky, greenish-grey liquid, likely a leaching solution. These ponds are situated on a cleared, sandy or silty area. To the right and in the foreground, there is a cluster of industrial buildings, some with blue roofs and others with grey or white roofs. A dirt road winds through the site. The background consists of steep, brownish hills with sparse green vegetation. A blue rectangular box with the word "Ecuador" in white text is overlaid on the center of the image.

Ecuador



a



b



c



d



e



f



g

Equador



h



i



j





Nicaragua





Mozambique





Tanzania



Ghana





Burkina Faso





Mali





Senegal





DR Congo





Nigeria





Nigeria





Indonesia

Indonesia



High intensity whole ore amalgamation





Brasil

# LANDSAT Band 3,4,5

Brasil



An aerial photograph of a river delta, showing a complex network of channels and distributaries. The land is a mix of light-colored, sandy or silty soil and darker, vegetated areas. A prominent blue rectangular box is overlaid on the center of the image, containing the word "Alluvial" in white text. The word "Alluvial" is positioned horizontally and is the central focus of the image's text content.

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



# Tech Doc Solutions

# Thank You



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GOLD COUNCIL**

