The term *artisanal & small-scale miners (ASM)* encompasses all small, medium, informal, legal and illegal miners who use *rudimentary* processes to extract gold and other minerals from secondary and primary ores.
About 30 million artisanal and small-scale miners (ASM) extracting more than 30 minerals from secondary and primary ores in virtually all developing countries.
In the world as many as 9 million women and 2 million children directly employed in mining (50% involved in gold mining)
This is the biggest gold rush the world has ever seen

• 15 million artisanal miners producing 300-400 tonnes Au/a in 70 countries

• About 50 million people directly and indirectly involved in artisanal gold mining
Causes of poor practices

- Disorganisation & Transience
- No technical assistance
- Lack of education
- Inadequate Regulations
- Financial Barriers
- Lack of Support from Mainstreams of Society
- **POVERTY**
Environmental Problems Caused by Artisanal Gold Mining

- Water siltation
- Landscape degradation
- Destruction of habitats
- Loss of organic soil
- Deforestation
- Mercury pollution
Why Mercury in ASM is a Problem?

- Worldwide >1,000 t/a Hg is used and lost by artisanal miners or 1/3 of the global Hg consumption for all uses (total Hg use for chlorine, batteries, catalyst, dental, lightning, etc. = 3,290 tonnes/a)

- Miners who use mercury and community members suffer severe neurological problems
Miners Are Not Aware of the Dangers of Hg

- Water is also used for fish farming, drinking, bathing.
- Mercury is freely available, used in the miners’ backyard.

Galangan, Kalimantan, Indonesia

Zimbabwe, 2005
Solutions Being Introduced

Reduction of Hg Use and Emissions

- Avoid bad practices and Hg exposure

Replacement for Amalgamation

- Use other process (e.g. Cyanidation)

Short-term

Long-term
Ore Processing

Bad practices

• Whole ore amalgamation
Ore Processing
Bad practices

- Copper plate amalgamation
Ore Processing
More efficient and better practices

• Concentration of the ore
Ore Processing
More efficient and better practices

- Controlled amalgamation
Amalgam burning

Bad practices

• Open air retorting
Amalgam burning
Good practices

• Locally made retorts (1)

Gold comes yellow as amalgam has contact with enameled dish

Lao PDR, 2003
Amalgam burning
Good practices

- Locally made retorts (2)

Lao PDR, 2005
Problems faced

Education/Training is not Trivial

- Miners cannot afford to stop their activities to "be educated"
- Miners learn by example
- Miners must decide what is good or not for themselves...not us
- Miners move from one site to another
- **We need to spend more time with the miners**
Solutions

Reaching out to the miners is essential.

What is a TDU?

- container, truck or trailer
- mineral processing and amalgamation equipment
- educational theater
- technical trainer
- personal protective equipment
- brochures
- classroom
- Hg Lab with LUMEX
- audio-visual
- health trainer/nurse
- hands-on training

SOLUTIONS
Training the Trainers

Indonesia, 2005

Brazil, 2005

Sudan, 2006

Lao PDR, 2005
Awareness Campaign Focused on Groups at Risk
Conclusions

• Important to introduce immediate **MEASURES** to reduce mercury exposure and emissions

• Actions must be bottom-up and top-down

_Brazil, 2007_
_U.S. EPA fume hood for gold shops_