

The Global Mercury Project



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Employment in ASM (*ILO, 1999*)

- **Worldwide: 13 million artisanal miners in 55 countries**
- **Gold is the main substance extracted: about 6 million miners extracting between 300 and 500 tonnes Au/year**

| <u>Continent</u> | <u>Number of Miners (million)</u> |
|---------------------|-----------------------------------|
| Asia/Pacific | 6.7 - 7.2 |
| Africa | 3.0 - 3.7 |
| Latin America | 1.4 - 1.6 |
| Developed countries | 0.4 - 0.7 |
| <u>Total</u> | <u>11.5 - 13.2</u> |

Source: International Labour Organization (1999)

Gold ASM

- **ILO numbers are currently underestimated**
- **Number of miners have increased in Asia and Africa and reduced a bit in Latin America**
- **ASM in Africa and South-eastern Asia is out of control**
- **In China: 3 to 15 million miners ...depending on how ASM is defined (*Gunson & Veiga, 2002*)**
- **Best guess: 20 to 30 Million ASM (50% involved in gold)**
- **Approximately 30% of the world's artisanal miners are women**
- **Thousands of abandoned mine sites are "Hg time bombs"**

Why Mercury is a Problem?

- **Gold price increasing = More people involved**
- **Mercury use is increasing in Gold ASM**
- **Hg is easy to be used & cheap: 1g Au buys 1kg of Hg**
- **UNEP (2002): as much as 800 tonnes/a Hg being released by ASM (almost 50% of the anthropogenic Hg global emission)**
- **Neurological problems found in miners, surrounding communities (inhalation of vapors) and fish-eating people (methylmercury ingestion)**

Why Mercury is a Problem?

- **Mercury (CH₃Hg) in fish is not visible**
- **Not everybody sees the environmental and health effects of mercury**
- **There are so many other diseases generated by poverty that Hg poisoning is overlooked**
- **Just an “elite” is “knowledgeable” about Hg**
- **Lots of people are “happy” with mercury pollution...a COVENIENT VILLAIN**

Mercury a Convenient Villain

“Water is extremely contaminated with mercury.”
(a mineral water supplier)

“Fish are so heavily polluted with mercury that they swim at the bottom of the river.” (a butcher)

“You environmentalist should go to the school...this mercury we use is inoffensive.”
(an ASM leader in Brazil, when he was drinking a glass of metallic Hg in front of the TV cameras)

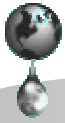


Global Mercury Project

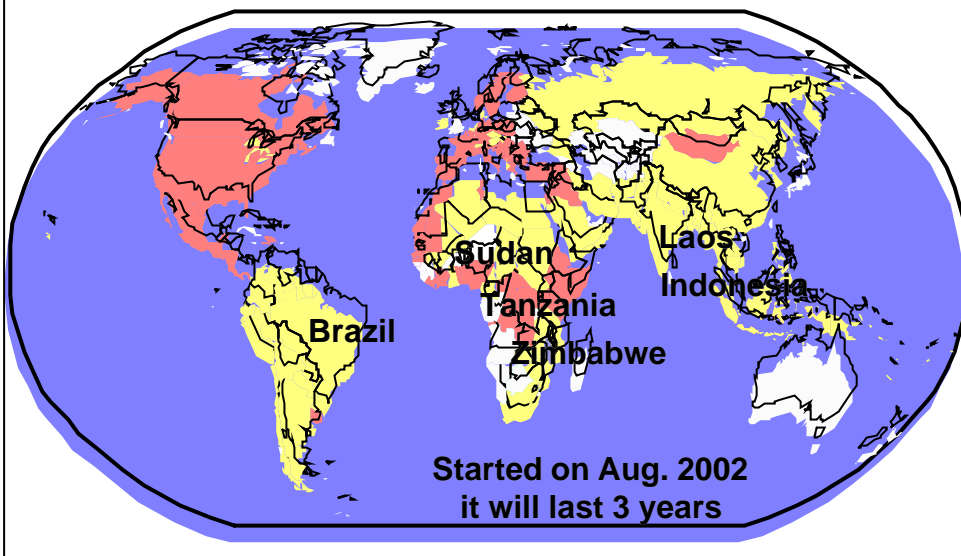


we are here

- ✓ environmental and health assessment;
- ✓ build capacity in local laboratories to assess impact of mercury pollution;
- ✓ reduce mercury pollution caused by artisanal miners on international waters;
- ✓ introduce cleaner technologies for gold extraction and train miners (demonstration sites);
- ✓ develop capacity and regulatory mechanisms within Government that will enable the sector to minimize mercury pollution.



Global Mercury Project



Brazil

- In the 80s and 90s:
1 million gold ASM
- Currently: 200,000 gold miners
- 20 tonnes Au/a
- 20 to 30 tonnes/a Hg released



2000 Artisanal Gold Mining Sites in the Brazilian Amazon

Project site in the Tapajós region where 1000 tonnes Hg were emitted since 80s



Artisanal Gold Mining Areas
186,000 km²
3.7% of the Legal Amazon
(5 million km²)



Tapajós region:
2.9 million ha
(29,000 km²)

Brazil

- **Project sites:**
- **São Chico : 2 tonnes Au produced, 5 tonnes Hg released since end 90s.**
- **Creporizinho: 3 tonnes Au produced, 10-15 tonnes Hg released**
- **Cyanidation of Hg-contaminated tailings**

Brazil (São Chico)



- **Cyanidation: heap leaching**
- **Spread CN and Hg to the rivers**

Indonesia

- Amalgamation of the whole ore followed by cyanidation
- High risk of methylation
- Mercury emitted: 100 times the amount of gold produced
- About 110,000 – 350,000 miners (seasonal)
- >100 tonnes Hg emitted annually



Indonesia



Indonesia

Homemade retorts help reduce Hg exposure



Laos (Lao PDR)

- **Project site: 3000 people in alluvial mining in Mekong River: 10 to 40 g Au/a/person**
- **Agricultural communities: Au is a 2nd source of income**
- **Annual income: US\$ 317 to 533**
- **Mining is mainly conducted by women and children**
- **$Au_{\text{produced}} \cdot Hg_{\text{lost}} = 2$**



Sudan

- **120,000 miners**
- **~10 tonnes Hg (1987–2002) dumped into the Nile River**
- **25% women and children**



Tanzania

- **300,000 to 600,000 ASM**
- **25% are women**
- **Project site: Lake Victoria: 100,000 miners**
- **3-4 tonnes Hg/a released**

Zimbabwe

- **350,000 ASM**
- **majority are panners**
- **10-20 tonnes Hg/a**
- **Milling centers: good solution?**
- **In Kadoma region: 70 milling centers employing 2000 people**

Zimbabwe

- **Milling centers: miners take the ore to be processed by mill owners**



Zimbabwe

- **Milling centers: 30% Au extracted with amalgamation and 70% with cyanidation...good deal for the millers**



Zimbabwe

More homemade retorts distributed



Where This Mercury is Coming from?

In 2000: Hg produced by recycling:

- **USA = 280 t**
- **Europe = 480 t (it cost US\$ 14-20/kg to dispose Hg in Europe)**
- **Rest of the world = 150 t**

Total recycled = 910 t

Total produced by Hg mines = 1849 t

TOTAL sold in the world = 2759 t

Maxson, 2003, report to the EU

Conclusion

- **Main pathway of Hg to humans in the study areas is likely by inhalation**
- **Lots of miners are still unaware of Hg harmful effects**
- **True information should reach the affected people**
- **Cyanidation of Hg-contaminated tailings: DANGEROUS (it increases Hg solubility)**
- **Projects should focus on training (miners and Govts.)**
- **Projects should be integrated with other actions to reduce poverty: rural development strategy**

Think Globally but Act Locally