

Canadian Institute of Mining Annual Meeting

HUMAN RESOURCES MEETING SOCIETY'S NEEDS

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Social and Economic Aspects of Reducing Mercury Pollution in Artisanal Gold Mining

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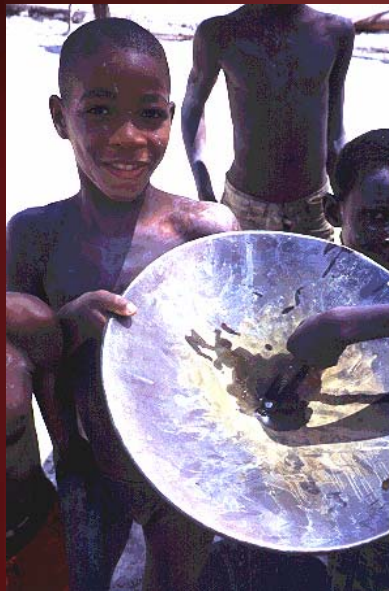
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Artisanal Mining



Lao PDR, 2000



Suriname, 1996



Venezuela, 1995

Artisanal & Small-Scale Mining

- **Artisanal mining**
 - **Application of human energy (e.g. pick & shovel) directly to produce minerals**
 - majority no technical skills and lack adequate working tools
- **Small-scale mining**
 - **Application of modern technology for limited scale mineral production**

Significance of Artisanal Mining

- **15 million people in artisanal and small scale gold mining**
- **55 developing countries**
- **Use of mercury damages health of 100 million people**

Artisanal & Small Scale Mining Potential

...the equipment and methods currently used...are for the most part neither modern nor efficient... There is no doubt that not only can the methods and equipment be greatly upgraded and improved over a fairly short period but that the benefits to be obtained there-from are expected greatly to outweigh the cost.

Source: Small-Scale Mining in the Developing Countries, United Nations, 1972

Small Scale Mining



Typical Mining Conditions



Environmental Impact of Inefficient Processing



Un-reclaimed Mine Area

Image of Mining Industry

- Artisanal and small-scale mining is the poor, highly visible image of the mining industry that the public sees
- Need for major mining companies to address the challenges and engage positively to improve conditions

Artisanal and Small-Scale Mining

- Offers people a potential to get out of poverty
- High gold price lures peasant farm workers
- Health, safety and environmental costs

Artisanal Mining & National Incomes

	Mining Community	Mining Community	Mining Community	National ¹
Region or community	Monthly Income (Local Currency)	Monthly Income (US\$)	Annual Income US\$	Annual Income US\$
Brazil - São Chico	374.4 R	125	1,500	2,850
- Crepurizinho	538 R	179	2,148	
Indonesia ³ - Talawaan	350,000 Rp	41	492	710
- Galangan	750,000 Rp	88	1,056	
Lao PDR, villages ⁴	310,000 Kip	38	456	320
Ingessana District, Sudan	< 300,000 SP	< 80	< 960	350
Rwamagasa, Tanzania	50,000 TSh	44	532	280
Kadoma-Chakari Region, Zimbabwe	40,000 Z\$	49	588	480 ²

Source: Summary Report: Technical and Socio-Economic Profiles of Global Mercury Project Sites, Hinton & Veiga, 2004

Notes:

¹ Gross national incomes (per capita), World Development Indicators 2002 (<http://econ.worldbank.org/wdr>)

² Zimbabwe Per Capita Incomes shown for 2001.

³ Indonesia rates based on miners' incomes

⁴ Lao PDR per household income

Small Scale Mining



**Stamp Mill
1-t ore piles
await processing**



**Miners collect coarse
gold after processing**



Tailings reprocessed by miller

Current Conditions



**Indonesian miner amalgamating gold in a pool behind his house;
the water is also used for domestic purposes.**

Current Conditions



Venezuelan miner burning amalgam in a shovel and inhaling mercury vapor

Current Conditions



**Demonstration of burning off mercury
from mercury/gold amalgam ball**

Zimbabwe 2006

Current Conditions



*Mining area close to town - school nearby;
rock overhanging the pit*



Recent rock collapse on left & rock overhang

Zimbabwe 2006

Conflict

Indigenous Peoples/Illegal mining

26 Prospectors Bodies Found in Indian Reservation Area

"The corpses were in an illegal prospecting area in Rondônia; Now there are 29 people killed by the 'cintas-largas' indians."

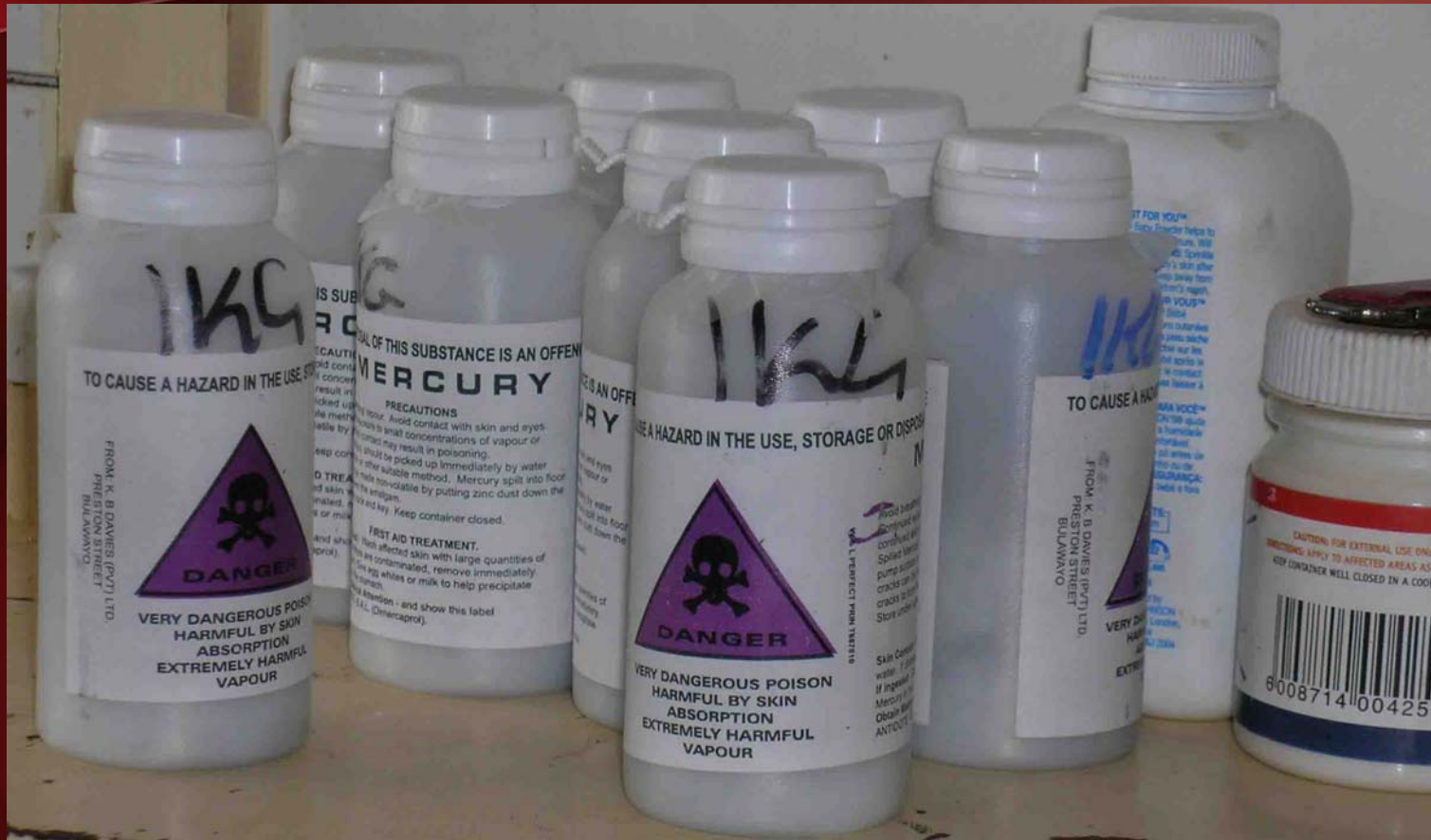
- **Intrusion onto Yanomani lands: '000s killed**
- **Yanomani Indians killed by *garimpeiros***
- **Violence, intimidation & corruption prevented effective legal action by Macuxi Indians in 1998**



Mercury Health Hazard

- Health risk
 - Mercury-contaminated fish
 - Spilled mercury
 - Permanent damage to brain/kidneys
- Organic compounds
 - Powerful neurotoxin
 - Neurological damage & death

Mercury Trade



Mercury for sale in containers with hazard warning labels

Trade

- Mercury trade decreased from 6,066 tonnes in 1990 to 1,849 tonnes in 2000; availability of recycled mercury from chlor-alkali plants etc increased from 440 tonnes in 1990 to 910 tonnes in 2000.
- The free trade of mercury from developed countries makes it readily available.
- Developing countries obtain mercury through legal channels for legitimate uses (e.g. dental fillings), but is diverted to ASM operations.
- Poor recoveries
- Partial value
- Formal and Informal channels

Global Mercury Project

- Mercury-Hazard Awareness
 - Best practices to limit contamination
 - Retort from inexpensive materials
 - Mercury emission and exposure controls
 - Recycle/reuse mercury
 - Reduce mercury in tailings
 - Prevent combined uses of mercury & cyanide
- Limit where mercury is used
 - Protect village/residential areas & water sources
 - Safe storage, disposal, clean-up & rehabilitation
 - Guidelines to manage mercury in gold shops
- Environmental and health assessments

Mercury Hazard-Awareness Drama



Zimbabwe 2006

Use of Retort



Kitchen-bowl retort in operation in Zimbabwe; mercury vapor is condensed on the glass bowl and drops on the sand to be recycled.

Training Program



GMP team teaching miners in Mozambique

Artisanal & Small Scale Mining

Small-Scale Mining in the Developing Countries, United Nations, 1972:

...the equipment and methods currently used...are for the most part neither modern nor efficient... There is no doubt that not only can the methods and equipment be greatly upgraded and improved over a fairly short period but that the benefits to be obtained therefrom are expected greatly to outweigh the cost.

**It is now time to address the challenges:
engage positively to improve conditions**

Thank you

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www.globalmercuryproject.org

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