



# INTERNATIONAL WATERS RESULTS NOTES

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## Removal of Barriers to the Introduction of Cleaner Artisanal Mining and Extraction Technologies

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Project Status: Completed



### Key results:

1. Elevated international awareness about mercury pollution from artisanal gold mining, resulting in a growing global imperative to act.
2. Development and demonstration of cleaner artisanal gold extraction techniques.
3. Government commitments in all six pilot countries to implement new policies addressing the problems of artisanal gold mining, including mercury laws, mining labor laws, and microfinance policies.

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## PROJECT OBJECTIVE

Mercury is one of the most toxic substances in the world, causing significant damage to the environment and to the health of the people who handle it. Mercury is used by millions of poor artisanal miners to extract gold through a process called amalgamation, wherein on average, two grams of mercury are released into the environment for every gram of gold recovered – often resulting in impairment, death, and a permanently ruined environment. Artisanal and small-scale (ASM) mining emits 1,000 tonnes of mercury annually, and is the second biggest source of global mercury pollution after coal-fired power plants. A steep rise in the market value of gold since 2001 resulted in a surge of artisanal gold mining, with at least 15 million miners, often some of the world's poorest people, operating in more than 50 countries.

The long-term objective of this project, known as the Global Mercury Project (GMP), was to assist a pilot suite of developing countries located in several key transboundary river/lake basins in:

- assessing the extent of pollution from current activities,
- introducing cleaner artisanal gold mining technologies which minimize or eliminate mercury releases,
- developing capacity and regulatory mechanisms enabling the sector to minimize negative environmental impacts

The six countries involved in the project were: Brazil, Indonesia, the Lao Peoples Democratic Republic, Sudan, Tanzania, and Zimbabwe, and study areas were identified in each. In these areas artisanal gold mining directly involved nearly 2 million people in total, who were supporting more than 10 million dependents.

## RESULTS: PROCESS

INDICATOR #1: Improved national and regional capacities for effective environmental management of artisanal mining and extraction activities. [*Target: Conduct miners' training needs assessment through consultations with miners, miners' associations, local governments, NGOs and relevant institutions and identify target groups for training; develop a databank of artisanal mining and extraction technological requirements.*]

A list of the main needs of miners and their communities in terms of technology, sanitation, education, health, etc. was developed. A database of 350 articles on artisanal mining and mercury was assembled. Participation of main stakeholders in country meetings was obtained and leaders were identified to be used as multipliers of the concepts and techniques taught.

INDICATOR #2: Awareness of miners, government and general public raised. [*Target: Conduct awareness campaign; develop training material and train trainers.*]

A 144-page Manual for Training Artisanal Gold Miners was developed and published, as were a series of brochures for miners. About 20 trainers were selected and trained in each of the six pilot countries. A course on awareness of mercury dangers reached at least 30,000 people in all six project countries. 120 government employees were trained. More than 30 radio and newspaper interviews appeared in all pilot countries and in Canada; and more than 60 technical papers were published in technical journals and conference proceedings.

INDICATOR #3: Development of country-specific policies and legislation for governing the small-scale gold mining sector. [*Target: Evaluate existing legislation on small-scale mining and mercury; prepare and give recommendations on new and revised policies, regulatory standards, and legislation. Promote government capacity mechanisms.*]

National experts produced comprehensive documents reporting barriers and possibilities to change the legislations to make artisanal mining more formalized in the six pilot countries. Suggested legislation was to be incorporated in countries' Mining Codes, including the banning of amalgamation of whole ore and the banning of the joint use of mercury and cyanide. In all six pilot countries, governments have made commitments to adopt GMP recommendations and implement new policy measures including new mercury laws, mining labor laws, microfinance policies, laws to legalize indigenous miners and provide assistance programs. New UN guidelines for the regulated and controlled use of mercury in mining were developed.

INDICATOR #4: Dissemination of project results. [*Target: Published print and web materials with project information and results.*]

The GMP published 60 papers in journals, conference proceedings and book chapters on GMP related activities. A website complete with database was developed:  
<http://archive.iwlearn.net/www.globalmercuryproject.org/>

### **RESULTS: STRESS REDUCTION**

INDICATOR #1: Application of affordable and locally-made clean technology to improve gold recovery and avoid environmental degradation. [*Target: Identify miners' technical needs and the local capacity to build equipment. Build prototypes of equipment to increase gold recovery and reduce mercury pollution. Develop micro-financing programs.*]

Technical capacity to build equipment was identified at each project site, and "Transportable Demonstration Units" (TDUs) were built. TDUs are training facilities in a pilot size that demonstrate methods to improve gold recovery and reduce mercury use as well as address other health problems related to artisanal mining communities such as malaria, sanitation, HIV/AIDS, TB, etc. Prototypes of affordable and simple pieces of equipment were built and tested in Canada and a new inexpensive gold centrifuge ("Artie") was developed. The GMP identified and trained local manufactures who are now producing ASM equipment in Tanzania, Indonesia and Sudan. Six experts in micro-financing were hired to study the possibility of introducing micro-credit for artisanal miners to purchase suggested pieces of equipment.

### **RESULTS: ENVIRONMENTAL AND SOCIOECONOMIC STATUS**

INDICATOR #1: Determination of the extent of environmental pollution and health effects. [*Target: Environmental and health assessments conducted in the pilot sites in all project countries with results returned to stakeholders. Establishment of strategies to assess and reduce mercury mobility from hotspots. Upgrading of local labs for monitoring mercury pollution.*]

Environmental and Health Assessments were concluded and published, with results of health assessments of miners and community members discussed with each individual. The project published an Environmental and Health Assessment protocol which is now the benchmark for all assessment worldwide (e.g. UNEP, WHO projects). Satellite imagery was used to evaluate the flow of mercury with suspended sediments in Indonesia and Brazil. Technicians in all six pilot countries received a portable flameless atomic absorption spectrometer (LUMEX) and were trained to analyze air, soil, water and biological samples. National laboratories were equipped with capacity to measure mercury in the human being and the environment.

## KEY LESSONS LEARNED

- 1) Data collection improves with: longer stays in the communities; formal and informal communication with community leaders and other members; consultation with small-scale miners about appropriate questions and indicators; the participation of local research partners and assistants; and return visits.
- 2) The process of introducing new technologies would ideally be a medium to long term project where time spent with beneficiaries is significantly prolonged. Government structures such as the use of field extensionists (similar to the one used in the agriculture sector) may be the best vehicle for this.
- 3) To manage (overly) high expectations of the project from different stakeholders, establish forums at the community level where community representatives would interact with project staff and learn about the project objectives and the plans, outcomes and challenges.
- 4) From the perspective of policymaking, it can be assumed that wherever there is significant mercury use during the processing of gold, and wherever gold-mercury amalgam is being burned, environmental and health damage is serious enough to justify intervention.

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