CREATING A SUSTAINABLE ARTISANAL AND SMALL-SCALE GOLD MINING SECTOR

Case Study: Brazil

Tapajós River Basin, Itaituba

A comprehensive training program produces measurable results in critical areas of health and environmental protection

Existing Process

Amalgamation of whole ore, as opposed to just the concentrate, using copper plates led to the largest losses of mercury in the mines. Contaminated tailings with 50 to 200 ppm mercury that leave the copper plates go into water streams and are oxidized and methylated. Some miners used contaminated tailings to remove part of the residual gold by cyanidation, forming toxic mercury cyanide.

Intervention

Global Mercury Project: a three-prong initiative to reduce mercury emissions by introducing simple technologies, education campaigns, and environmental awareness. The plan involved capacity building and preparation of a team of trainers. Sixty people were trained and 13 trainers were selected for the first replication phase. Training was then extended to 4,200 miners in 141 mining locations, focusing on how to increase gold recovery, how to recycle mercury, how to use retorts, and how to reduce health impacts of mercury. In addition, a pilot plant was developed to reprocess tailings for gold extraction.

Outcomes

- Miners incorporated 7 of 20 best practices including recycling and confinement of mercury, refilling old pits
- Marked increases in critical areas of health awareness and practices: health and quality of life, use of mercury, and protection of local environment
- Gold recovery showed modest increases, while mercury recycling and confinement showed much greater absolute improvement scores
- High participation in workshops and meetings by local miners and government authorities at all levels
- Miners responded better to training and education better than to strict legislation only

Favorable Ground Conditions

- Miners, relatively new to ASGM, were receptive to change in processing methods.
- Piura is accessible from Lima, and from Portovelo, Ecuador, where a demonstration plant could be used.
- A manageable number of miners (10,000) who are organized increased the likelihood of communication among them and of replication.

The use of copper plates for whole ore amalgamation in the Tapajós River Basin. Photo: Global Mercury Project

Reasons for Success

- *Close multi-stakeholder collaboration among international organizations* (GEP/UNDP/UNIDO), governments at all levels, training experts, and local miners facilitated development of trainings and technical interventions. The influx of support provided resources for a comprehensive plan as well as an easily-scalable model for replication, with dozens of trainers in over a hundred locations.
- *Clear metrics for success:* Organizers created a training program with specific indicators to demonstrate how miners retained and applied trainings. Knowing which interventions succeeded and failed helped to improve the programs and build on successes. Organizers were therefore able to evaluate their plan and target resources to where the impact is greatest.
- *Comprehensive approach to the ASGM problem* included not just technical aspects but also educational and cultural components that helped miners incorporate best practices into their daily lives. Trainees were better able to retain and continue applying the practices even after trainers left.

For Further Information

Sousa et al. (2007). Implementing Programs to Improve Gold Recovery and Reduce Environmental Impacts by Artisanal Gold Mining in Brazil. Global Mercury Project Report (http://circle/ubc.ca/handle/2429/8466)

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