

CREATING A SUSTAINABLE ARTISANAL AND SMALL-SCALE GOLD MINING SECTOR

CASE STUDY: PORTOVELO, ECUADOR

A mineral processing plant is constructed to educate and train artisanal miners in cleaner techniques for gold extraction.



(Above) The demonstration plant in Portovelo, Ecuador for education and training of artisanal miners. (Right) A grinding mill with rotating cement wheels common in Portovelo.



Photos: Marcello Veiga.

Existing Process

Artisanal miners use relatively primitive and inefficient techniques to extract gold that include improper milling, poor concentration techniques and/or whole ore amalgamation with cyanide leaching of contaminated tailings. Gold recovery is greatly reduced while excessive amounts of mercury are released into the environment.

Intervention

A coalition of government officials, processing center owners, engineering experts and foreign investors collaborated in the development of a demonstration plant in Portovelo, Ecuador. The demonstration plant was built and used to train miners on methods to reduce and/or eliminate the use of mercury while increasing gold recovery. Miners from Peru, Colombia and Ecuador have learned techniques that include gravity concentration, flotation, and cyanidation.

Outcomes

- Hg levels in the region were reduced by approximately 50%;
- Higher and more efficient gold extraction rates via gravity-flotation-cyanidation plants;
- Change in overall perception of artisanal miners that cleaner extraction processes can lead to more profitability and health benefits;
- A pre-feasibility study of a small processing plant operating with gravity concentration, flotation, and cyanidation revealed that with gold grade equal to or above 10 g/t, even by achieving a gold recovery rate of only 50% (US \$1,300/oz of Au), a 10 t/day plant is still profitable.

Favorable Conditions on the Ground

- Active participation of miners in the decision-making process;
- Increased presence of and support from the local government;
- Movement towards formalization of the small-scale mining sector.

Reasons for Success

- *Close collaboration* among local technical and engineering experts, outside investors, government officials, and owners of processing centers provided all the elements for development and adoption of Hg-free mining techniques. In particular, strong private sector investment provided needed financing for these developments;
- *International training and cooperation efforts*: the government invested in organizing trainings and formalizing miners as a way to improve working conditions and create a favorable investment environment;
- *Technical support* from local experts, engineers, and international mining experts from the Dept. of Mining Engineering at the University of British Columbia (Canada) help to turn the adoption of Hg-free techniques from rhetoric to reality.

For More Information

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