# CREATING A SUSTAINABLE ARTISANAL AND SMALL-SCALE GOLD MINING SECTOR

## Case Study: Piura, Peru

**Artisanal miners near the border with Peru and Ecuador learn mining theory and practice**

### Existing Process

Grinding ore with mercury in "quimbaletes" or "chanchas" led to losses of mercury from 5 to 10 times the amount of gold produced. Because of the high sulfide content of the ore, miners were extracting only 20 to 30% of the gold. Lack of water and energy in Piura make establishing processing plants there difficult.

### Intervention

A total of 46 miners from Piura, Peru were trained at a demonstration plant in Portovelo, Ecuador. They were introduced to concentration equipment such as the Icon centrifuge and column flotation. Regional government officials were also engaged and remain interested in installing a plant more locally.

### Outcomes

- Miners in Piura reduced their use of mercury by 50% because as a result of their training, they understand how the high levels of sulfide in their ore is causing poor gold recovery (20-30%) when they use mercury amalgamation.
- Miners realize they receive a better deal if they sell their ore to ore dealers who then transport the ore to cyanidation plants. Or, alternatively, they can bring their ore to processing plants in Ecuador.

### Favorable Ground Conditions

- Miners were relatively new to ASGM and receptive to change in processing methods.
- Piura is accessible—only a half day trip from Lima and a two- to four-hour drive 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.

Above: Miners learn about improvements that can be made during milling. Right: Miners observe a flotation system for mineral concentration. Photo credit: Marcello Veiga.

### Reasons for Success

- *Effective use of local talent:* Training was done through a local mining engineer who was very well qualified and related well to the miners. Miners were also able to bring their own ore so they could see for themselves the effectiveness of the processing techniques they were learning.
- *Ability to make use of efforts from previous ASGM projects:* The University of British Columbia was able to capitalize on earlier work by using an already established demonstration plant for training the Piura miners.
- *Engagement with local organizations:* UBC developed good relationships with the association of processors in Portovelo and also with the loose organization of miners in Piura. This enhanced security promoted wider access for the miners to see various process set ups.

### For Further Information

Viega et al. (2015) Reducing mercury pollution by training Peruvian artisanal gold miners. Journal of Cleaner Production. DOI: 10.1016/j.clepro.2015.01.087.

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