



The health of water sources in the municipality of Andes depends on responsible mining.
Photo | Ana Milena Posada Piedrahita.

Towards Mining

without

Mercury

Mercury, the only liquid metal at room temperature, is widely used in gold mining with serious consequences for the environment and human health. Metallurgical research with a social component has succeeded in getting miners to remove this material from their traditions.

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It is known that mercury has a high density and the rare property of being liquid at room temperature. It is also known that it is very reactive to other metals, with which it forms alloys called amalgams. For this reason, it is used in processes such as gold mining and the making of dental amalgams in dentistry. However, since it is highly toxic for humans and other organisms, its use has been forbidden or restricted in almost every country with legislation that protects the environment.

Research has shown that the bad use of mercury damages the environment, the health of people who work with this metal and the health of the communities directly or indirectly exposed to it.

In Colombia, Statute 1658 forbade the use of mercury in mining in July 2018. The harmful effects of the bad use of mercury on the health of people who work with this metal and the health of communities directly or indirectly exposed to it are fully identified: feebleness of mind, deficiencies and irreparable damage in the nervous system, joint problems, physical deformities in children of contaminated parents, genetic problems and eye damage that results in poorer visual acuity. Nonetheless, it is not easy to avoid the use of mercury. Small- and medium-scale mining is a very important economic activity for about fifty developing countries located in

Africa, Asia and South America. Colombia has a mining industry and great gold reserves that are mainly exploited through artisanal or small-scale mining. Highly toxic compounds, including mercury, are used in the processing and beneficiation of gold. Antioquia, in particular, has plenty of mineral resources and is the country's largest gold and silver producer. This characteristic can be either a great social opportunity or a great threat, depending on the viewpoint. Envi-

ronmentally responsible and friendly mining in our communities is a priority of Universidad de Antioquia's Precious Materials Research Group (MAPRE). For this reason, it has carried out applied research projects with technical and medical interventions in almost every gold-bearing municipality in the province of Antioquia, especially in the municipality of Andes. Through a five-year intervention funded by Universidad de Antioquia, the Health Secretariat of Andes and the Mining Secretariat of Antioquia, miners in this municipality have been persuaded to stop using mercury in processes to recover gold and silver.

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Below are some of the main results of the MAPRE group's applied research projects:

We raised awareness in the gold-extracting communities about the existence of special areas where there can be no mining, such as paramos, reserved areas, natural parks, Ramsar sites —wetlands of crucial ecological importance— springs or near bodies of water.

We managed to convince miners of the need to characterize or know the minerals to perfection before processing them. In other words, minerals must not be processed unless they are known in depth. University laboratories are the main support in this activity.

More research, training, support and technical advice from university research groups are necessary since some gold-extracting communities still use mercury even though it has been forbidden since July 2018.

Gold-extracting communities in general, and particularly those in the municipality of Andes, are very receptive to the interventions carried out by Universidad de Antioquia's MAPRE group. This shows credibility and confidence in our alma mater. Such factors contributed to the positive impact generated by the support, monitoring and constant and customized advice provided by the research team. This impact can be witnessed in the implementation of good practices in the processing of gold, use of mercury-free clean technologies, production efficiency, decrease in mercury emissions and dumping, much better environmental management and occupational health.

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Knowing and studying metals alongside communities allows us to reach ambitious goals, which, in turn, lead us to imagine a near future in which mining without serious consequences to people's health or the environment is possible. ✕