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RESEARCH

Gold's Price

Meeting demand for gold comes at a high cost to the environment.

BY MARY MAGNUSON

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View of an illegal dredger used for extracting gold dust in the Amazon rainforest of southeastern Peru.

If you're wearing gold jewelry right now, there's a good chance it came from an illegal mining operation in the tropics and surfaced only after some rainforest was sacrificed, according to a team of University of Wisconsin–Madison researchers and alumni who studied regulatory efforts to curb some of these environmentally damaging activities in the Amazon.

The researchers, including Mary Herman Rubinstein Professor of Geography Lisa Naughton, investigated mining-related deforestation in a biodiverse and ecologically sensitive area of the Peruvian Amazon to see whether formalizing and legalizing these mining operations might curb some of their negative effects.

Their study, published June 2 in the journal *Environmental Research Letters,* was co-authored by a group including UW–Madison alumnae Nora Álvarez-Berríos (PhD, Geography), now studying land use and climate impacts at the International Institute of Tropical Forestry, and Jessica L'Roe (PhD, Geography), now a geography professor at Middlebury College.

The team focused on an area around the Tambopata National Reserve in Peru from 2001 to 2014. During this period, Naughton says, demand for gold rose, roads penetrated the region and mining surged. In turn, mining-related deforestation rose by almost 100,000 acres over their study period.

"Because the gold is in the sediment scattered under the forest floor, to extract the gold, you have to remove the forest and dig," Álvarez-Berríos says. "You have to excavate sensitive waterways."

While these mining operations are often called "artisanal" or "small-scale," in aggregate they are very destructive. In many countries, they operate outside the law, and millions of people are involved across the tropics. Álvarez-Berríos says the typical first step to reducing the environmental impact of "artisanal" mining is to bring it under governmental oversight, formalizing the activity. That way, local agencies can manage the impacts and protect both ecologically sensitive areas and the economic well-being of poor mine workers.

"Peruvian authorities, like authorities in other gold-rush sites, have given up on trying to stop gold mining. They're trying to confine it and contain it," L'Roe says. "Most of the studies about formalization are mainly about trying to help the poor or make it more fair for the poor. Seldom, almost never, as far as we can tell, have these formalization projects been assessed for their environmental impact. So that's what we were looking at."

During their study period, local agencies issued provisional titles to miners to conduct their operations safely. After receiving a provisional title, miners would, in theory, undergo a series of environmental impact and compliance assessments.

But, as L'Roe says they found, many miners simply took their provisional title as a green light to start mining and never went through with the environmental impact assessments. Over their study period, no mining operations made it through the full compliance process.

Naughton says that while formalizing mining has the potential to decrease environmental damage, it needs enforcement and regulations that match the local context. Formalization without environmental impact assessment or enforcement could just encourage more damaging and dangerous mining, or the expansion of these operations under the pretense that what they're doing is legal.

"To sort out in a fair way who owns what land, with what rights, that is a slow process," Naughton says. "This gold rush is explosive. By the time you have well-regulated and transparent public land and property rights, the forest will be gone."

The team plans to go back to Tambopata to present its results to local stakeholders. Many members of the community are already aware of the problems. The three co-authors hope their study will set a precedent for monitoring formalization interventions in Tambopata and other tropical sites losing forest to mining. ■

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