Q&A: Making the case for artisanal and small-scale mining

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Artisanal and small-scale miners load bags of copper and cobalt ore near Kolwezi, DRC. Each bag can weigh up to 75 kilograms. Credit: Espérant Mwishamali

Artisanal and small-scale mining plays a critical role in supplying the world with minerals vital for decarbonization, but this kind of mining

typically lacks regulation and can be socially and environmentally harmful.

Despite ASM's significant challenges, University of Michigan researchers argue that artisanal and small-scale mining, or ASM, should be embraced.

Minerals such as cobalt, copper, lithium and nickel are necessary components of electric vehicle batteries, wind turbines, photovoltaic systems and battery storage units. Artisanal and small-scale mining, or ASM, provides as much as 20% of the global supply of these minerals.

"There is no decarbonization without mining these and other minerals. To move away from coal, oil and gas, the global energy system must mine critical minerals," said Brandon Marc Finn, a researcher at the U-M School for Environment and Sustainability. "At the same time, we argue that ASM should be recognized as an essential social and environmental justice issue of our time."

ASM plays a central role in local economies as well, Finn says. About 40.5 million people around the world participate in ASM in 80 different countries, and up to 270 million people depend on it.

However, ASM is linked to environmental degradation, can be detrimental to health outcomes, and is frequently associated with human rights abuses, including child labor. ASM workers generally operate with limited capital, for minimal pay, and without social safety nets.

"ASM workers choose artisanal mining because they often do not have comparable alternative livelihood options and this work supports them and their families. They adopt informal, often unregulated working practices because these typically have lower barriers to entry into the market," said Finn, also a core faculty member at the U-M Center for

Sustainable Systems.

To better understand ASM, Finn conducted three fieldwork trips with mining communities in the Democratic Republic of the Congo to trace the start of the cobalt and copper supply chains.

He discusses the challenges and future of artisanal and small-scale mining in a study published in the journal *Energy Research & Social Science*. His co-authors are Adam Simon, professor of Earth and environmental sciences, and Joshua Newell, professor of environment and sustainability.

What is artisanal and small scale mining?

Artisanal and small-scale mining is typically mining that is very labor intensive. Miners use mostly rudimentary tools such as picks, axes and shovels. It generally does not use overly mechanized processes such as large-scale diggers or dump trucks.

These mines are usually composed of hand-dug tunnels extending tens of meters deep, open pit mines, or the mining minerals from old waste (tailings) from industrial mines. It is typically above ground and therefore more easily accessible.

ASM miners may lack transparency around pricing, the weighing of their ore and the grade of ore they have mined. The argument we're making regarding ASM is to act in good faith and not pretend these problems don't exist. We document many of the challenges in the paper. While many regard the problems as symptomatic of ASM mining, we argue that ASM itself is symptomatic of long-term marginalization.

Many large tech companies seek to exclude ASM from their supply chains. This threatens to worsen the living conditions and livelihoods of

millions of people. Hundreds of millions of dollars have been spent trying to "formalize" ASM mining practices and have largely failed. This is, in part, because they misunderstand the problem.

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Rather than look away from the problem and try to exclude ASM miners from global mineral supply chains, we should turn towards them, and to the social, economic and geopolitical reasons that make ASM necessary in the first place.

This is all the more essential given soaring demand for critical minerals, such as cobalt and lithium. With hundreds of billions of dollars invested into low-carbon technologies, some of this money should support the most vulnerable parts of the workforce that mine the metals that enable our lives and will sustain the global energy transition.

What are some of the challenges associated with artisanal and small-scale mining?

The dangers or risks emerge because there's often very little regulation and enforcement of occupational standards. If you overregulate, then you potentially cut people out from participating in ASM. But if you don't regulate at all, you also face issues such as tunnels that are structurally unsound, or the complete lack of assessment of breathing conditions when you're 30 or 40 meters underground.

There are significant issues in terms of health for miners, such as dust

inhalation, silicosis and exposure to mercury. Mercury also goes into water bodies, with impacts extending beyond the individual mining site. There are issues of dust pollution and severe environmental pollution, deforestation and others, all of which are not exclusive to ASM. They occur at and beyond industrial mines too.

To me, these issues are relatively straightforward to regulate and improve upon if you have governance structures in place. The honest, transparent and pragmatic position is that these conditions exist and we should mitigate as much harm as possible, and distribute the wealth generated from industrial mining more fairly.

Another very challenging issue with ASM is that of child labor. Recent pathbreaking scholarship from Andrew Gulley estimates around 2% of cobalt comes from child labor specifically, which sounds pretty low, but when you realize that industrial mining employs a small fraction of the workforce that ASM mining employs, you realize it takes many more hands to produce one percent of ASM-mined ore than it does for industrially produced ore.

I do have an abolitionist view on child labor: I don't want children working in mines or with dangerous equipment, but I think the reason they do is because the alternatives that families have are nearly nonexistent. A way to deal with that is to take a more realistic perspective in terms of regulating ASM in designated ASM areas with enforceable standards and fair pay to workers.

What are some solutions to these issues?

I think the first kind of solution is for us to be able to understand how artisanal and small-scale mining happens and why it happens. Because of the socioeconomic realities that people face, people make rational decisions to get into ASM mining because they need to provide for

themselves and for their families.

I think when we understand why it happens, we have to take a more holistic approach on how we deal with ASM. And it's not just on the mining side: it's the politics and the economic structures that inform the conditions that create ASM.

It's also the royalties and taxation received by national governments from industrial mines, which do not sufficiently benefit ordinary people on the ground. Industrial mining companies owe more to impacted communities than they pay. This is especially because they are sometimes implicated in housing displacement and widespread environmental pollution, but also because they extract so much value from the ground.

Industrial mining companies have a fundamental duty and a moral obligation to the people whose land they're on and resources they are extracting from. This includes supporting ASM workers. Bringing industrial mining into the artisanal mining debate is important because I want to try to hold them more accountable and show how they are related.

On the other hand, I think development organizations like The World Bank need to adopt more heterodox thinking to ASM mining and development. The World Bank has spent hundreds of millions to try to formalize artisanal and small-scale mining, but I think that's often not a conducive approach.

You can't start by trying to instill the outcome you want if that very outcome threatens peoples' ability to earn a livelihood. You need to find some middle ground between doing nothing and overextending your reach to formalize an industry, and thereby risk threatening livelihoods.

There do need to be minimum standards for ASM. For example, ASM mining zones need to be designated to miners, and these zones must have decent and abundant ore grades. Once you have a reasonable designated zone, you're able to enforce the occupational, environmental and social standards.

However, this is only part of the problem. Minimal standards need to apply to the point of sale, too. ASM miners should be compensated fairly and transparently for the material they produce. This point of sale should be regulated as much as the mining itself.

These areas should have the requirement of not using child labor. But regulating bodies should offer alternatives which put families in better positions without child labor than they would have been in with their child being on the mining site in the first place. This also entails paying miners market rates for the ore they produce.

We also need to ask miners themselves what they want, rather than assuming solutions without their input and expertise. Artisanal miners know why they mine, and have excellent ideas on what could improve their working and living conditions. We should ask them questions and listen to their answers.

What's the future you'd like to see of artisanal and small-scale mining?

The future I'd like to see is that we understand mining, both artisanal and industrial mining, in its full complexity. I think we need to know the role ASM plays in providing the backbone of survival for miners and their families.

I think we, as consumers, as tech companies, whoever has to rely on

these minerals, need to be able to understand that a different kind of mining may be possible for ASM and for industrial mining. We need to acknowledge and appreciate the work that ASM miners do to enable our daily lives, and to enable decarbonization in the future. We need to bring ASM into discussions on social and environmental justice—not turn away in outrage or feign plausible deniability.

We need to try to understand the notion of justice beyond just the U.S. It's not just the U.S. decarbonizing as an inherent moral good. We have to know that these supply chains are not only necessary for modern technology and the modern world, but they link us morally to one another.

It's easy to forget this, because it's happening somewhere far away in a place we haven't heard of and to populations of people that have been absolutely marginalized for hundreds of years.

I don't think the solution lies in us shaming each other as individuals: I think part of the solution probably also lies in holding political elites and major corporate actors' feet to the fire.

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