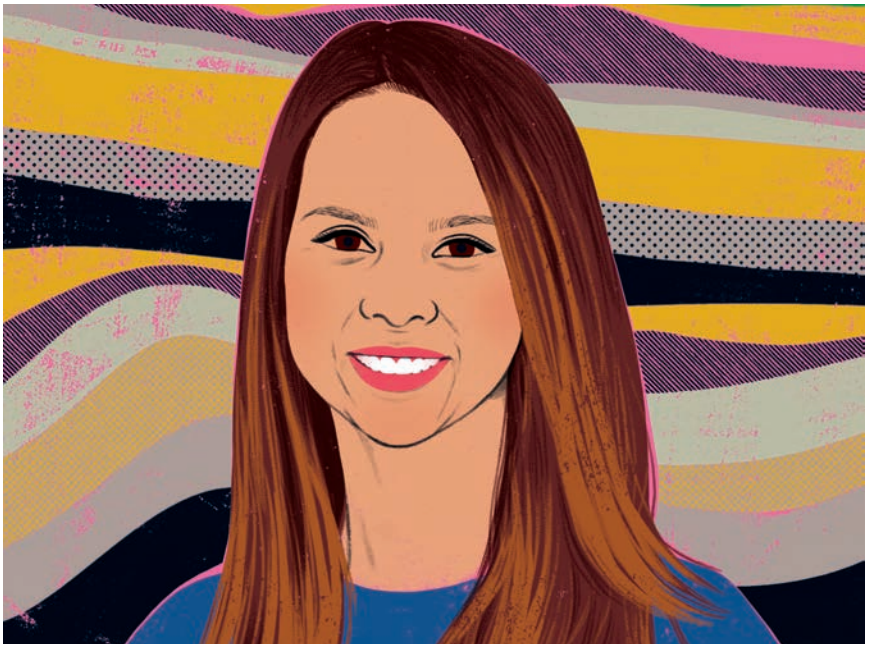
Café Economics

Mine the Gap



Minerals expert and self-proclaimed mining geek **Gracelin Baskaran** tells us why the race for critical minerals is leaving some countries in the dust

If platinum is the Rolls-Royce of minerals, South Africa should be driving in style. When a younger Gracelin Baskaran moved to Rustenburg on a Fulbright scholarship, the South African mining town produced 70 percent of the world's platinum, feeding what seemed an insatiable demand for this key ingredient in catalytic converters. But platinum demand collapsed in the late 2010s as the world started transitioning to electric vehicles. Baskaran, a Michigan native, says her time in South Africa's platinum belt cemented her interest in the boom-and-bust cycles of minerals. "I did a PhD thinking about platinum, and now I think about minerals across the periodic table every day."

Baskaran is the founding director of the Critical Minerals Security Program at the Center for Strategic and International Studies. She is a mining economist, and her PhD is from the University of Cambridge. Although Baskaran travels the world devising strategies for critical mineral engagement, she tells F&D's Bruce Edwards that she also spends much of her free time examining minerals—those still buried in the Earth's crust.

Rare earths are not actually all that rare, unlike the capacity to process them, which will remain concentrated in a single country for years, Baskaran explains.

F&D: Why the interest in mining?
GB: I love going to mines because there is so much you learn by being at the rock face. What other minerals are there? What are the challenges with extraction? Why do some projects succeed and others fail? Mining is a whole ecosystem. There's an amazing rare earths project out in California. They have a closed-loop water system, and you don't understand how important that is in a desert until you go there. I've spent time at mines all over the world—uranium, copper, cobalt, platinum, rare earths—and it's great.

F&D: You really are a mining geek.
GB: Through and through.

F&D: How critical are these minerals?
GB: Minerals go into everything. They're in your phones, your computers, your defense technologies, your semiconductors, your cars. So they're mission critical to every part of our economic, national, and energy security. Now, we tend to take things for granted, right? And for a long time, we didn't view minerals as being an important policy priority. But about three years ago, China started imposing export restrictions on germanium and gallium, which you need for semiconductors and chips. Then it became graphite, which is needed for electric vehicles. And then it was rare earths.

When those rare earth export restric-

Illustration by Sonia Pulido

tions went into effect, Ford had to stop manufacturing in Chicago. Japan had to stop manufacturing the Suzuki. Vehicle manufacturing in Europe was disrupted. All of a sudden, we realized it wasn't about US versus China, but that anytime supply chains concentrate in one country's hands, you create a significant economic risk that affects factory floors and households worldwide.

F&D: Hence the race to secure these minerals. How would you compare this with, say, the oil rush in the late 19th century?

GB: The difference with critical minerals—and there are 60 on America's list—is that they're everywhere. Oil is one commodity that's generally concentrated in a handful of countries. That's why OPEC became the force that it is. It's much harder to form a minerals cartel. The geological distribution of minerals has meant that we are engaging with a set of countries we've never really engaged with commercially, particularly in Africa and Latin America. So the race for minerals, although as important as the oil rush, is far more complex. It requires engagement with a far wider set of countries.

F&D: You've written about industrial policy in relation to a US initiative called Project Vault. What's it about?

GB: Industrial policy was an icky word for a long time, right? It's the antithesis of a free market. And a lot of us are free market people in our bones. The thing we forget is that, historically, a lot of countries have used industrial policy. Japan subsidized Honda for a long time before it became profitable. Finland subsidized Nokia for a long time before it was commercially viable. So when we look at minerals and the supply chain outside of China, it's still nascent. And when you have a nascent industry, it often requires support to become economically competitive, which is exactly what industrial policy does.

Support can take various forms, such as subsidies, grants to build processing facilities, or equity investments. But hopefully the industry will only need this support until it can compete on its own. One of the things we've realized is that mining is not an overnight industry. Here in the US, for example, it takes 29 years for a mine to start producing after a deposit is first identified.

> "Mineral security is not just a national security imperative, it's an economic security imperative."

Project Vault, one of the US's flagship initiatives, is an economic security stockpile. Historically, a lot of our industrial policy for minerals was for defense-related needs during wartime. We have stockpiled for defense since 1939. But what we've not had before is an economic security stockpile for civilian technologies so that auto manufacturers, semiconductor companies, and energy manufacturers can continue making critical products even if a country cuts off access or there's a Strait of Hormuz disruption. Project Vault shows that mineral security is not just a national security imperative, it's an economic security imperative.

F&D: The world has been mining for a long time, but how much do we know about extracting rare earth minerals?

GB: Mining rare earths is not the hard part. The hard part is processing. Rare earths are not actually rare. That's a bit of a misnomer. The difficulty is finding them in concentrations that are dense enough and then separating them in a process of more than 50 steps to get them to the necessary purity. And that technological know-how has been concentrated in China. So when those rare earth export restrictions went into effect, China was processing 99.5 percent of heavy rare earths. And like I said, it's not an overnight industry. So processing will remain concentrated in the hands of a single country for some time.

F&D: Africa has huge mineral wealth, but Africans generally have not gained much from it. What are the chances that the continent will benefit this time around?

GB: The mineral scramble of the last few years has seen the world take a very different approach to Africa. Africa has historically been an aid recipient. All of a sudden, the world is looking at the continent through a commercial diplomacy lens, and that could be a game changer.

Everybody wants Africa's resources. And when there's competition, countries get to decide the best value proposition for their resources. It creates a real opportunity. In recent years countries such as Ghana, Namibia, and Zimbabwe have introduced restrictions on mineral exports to capture more in-country value addition, saying, "If you're not processing here, minerals aren't leaving the country."

But at the same time this opportunity is dependent on stable investment environments, including consistent policies, particularly around taxation, and a commitment to reinvest resource revenues in physical infrastructure, human capital, and sustainable resource management. That's how you develop an investible market where the benefits are shared. But reaching that level of stability remains a struggle.

F&D: So if world powers manage to parse out all the concessions and realize the full potential for critical mineral mining, could it actually wean us off fossil fuels?

GB: The biggest drivers of mineral demand are clean-energy technologies. The average internal combustion engine uses 32 kilograms of critical minerals. The average electric vehicle uses 210 kilograms—a sixfold increase. Clean energy presents significant opportunities for access to low-cost energy, but it also requires a substantial expansion of mining and processing capacity beyond current levels. F&D

This interview has been edited for length and clarity. Visit www.imf.org/podcasts to hear the full interview.