

Rare earth, critical minerals, and bio-molecules: Centering African IPLCs in the new resource economy

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Dr. Metolo Foyet, Conservation Equity & Safeguards Specialist at The Nature Conservancy, highlights the intersections of critical minerals, biodiversity, and Indigenous rights in the global green transition

In this discussion, I highlight the intersections between critical minerals, biodiversity, and Indigenous rights within the context of the global green transition. I also highlight the urgent need to integrate local voices into global environmental governance (GEG) frameworks.

The future of planetary health and sustainable development depends on centering Indigenous Peoples and Local Communities (IPLCs) as co-creators of solutions. This includes leveraging digital storytelling as a tool for empowerment and advocacy, as well as forging integrative policies that bridge biodiversity, technology, and human rights.

The global race for rare earth elements, critical minerals, and bio-based, readily biodegradable, sustainably sourced mineral-derived ingredients has become both a geopolitical flashpoint and an economic opportunity. Africa sits at the center of these strategic resources, from cobalt and tantalum in the DRC to lithium in Zimbabwe, uranium in Niger, graphite in Madagascar, Mozambique, and Tanzania, and bioactive molecules in the Congo Basin.

While these materials underpin the energy transition (EV batteries, solar panels, wind turbines, hydrogen fuel cells), digital economies (semiconductors, data centers, AI hardware), mobility industries (catalytic converters, lightweight alloys), medical innovations (cancer treatments, diagnostic tools, imaging equipment, implant materials), and defense and aerospace systems worldwide (radar systems, jet engines, satellites, precision-guided weapons), the continent faces a triple challenge: leveraging its geological wealth for sustainable growth; managing rising global demand amid a fragile supply chain concentrated in China; and safeguarding democracy and ecological integrity. Yet, as governments, corporations, and international bodies pivot to secure these minerals, the voices of the communities most intimately tied to the land – the IPLCs – are often marginalized or overlooked.

This is not merely a question of extraction or economics. It is fundamentally about governance, political participation, and human rights. African IPLCs have long managed landscapes through knowledge systems that predate colonial extraction regimes. These communities understand the ecological cycles, resource interdependencies, and social networks that sustain both livelihoods and biodiversity. Their stewardship is not merely environmental; it is deeply cultural, spiritual, and socio-economic. However, the contemporary demand for critical minerals often ignores these realities, framing Africa as a “resource frontier” rather than a constellation of living, organized societies with rights, traditions, and agency.

Digital storytelling: Catalyzing inclusive resource governance and sustainable futures

Digital storytelling offers a transformative avenue to shift this narrative. For IPLCs living in mineral-rich and biodiverse landscapes, resource politics are personal: mines and concessions often overlap with ancestral lands, sacred ecosystems, and community livelihoods. They are not bystanders but knowledge holders and political actors in resource governance. True sustainability requires moving beyond seeing landscapes as commodity frontiers and recognizing that amplifying IPLC voices adds both legitimacy and credibility to bio-based initiatives.

Through social media, virtual campaigns, and netnographic methods, mineral resources and raw materials stakeholders committed to ethical sourcing and corporate social responsibility, in collaboration with IPLCs, can co-create new models of engagement that move beyond extractivism. By documenting and broadcasting their win-win perspectives or sustainable strategies, they can reframe global narratives around critical minerals and biomolecules, building advocacy pathways that promote transparency, equity, and sustainability while reaching both local policymakers and international audiences.

Digital storytelling transcends language and geography, making visible local knowledge on biodiversity, land use, cultural heritage, and the social impacts of mineral projects. Approaches such as visuals, interactive maps, and platforms (to facilitate transparency and multi-stakeholder engagement in mineral supply chains), as well as open-access research repositories, are particularly effective in democratising data and elevating alternative perspectives in policy and business forums at both national and international levels. When designed strategically and collaboratively with local technologists, grassroots leaders, policymakers, and journalists, these tools connect resource debates with human rights, climate justice, and citizen empowerment, ensuring content is created by communities, not merely about them.

Research innovation and integrative policy

At the intersection of political science, eco-diplomacy, digital advocacy, and resource governance lies an urgent research and policy agenda. Scholars and practitioners must explore how IPLC knowledge and participatory mapping can inform mineral governance frameworks, and how international policy can integrate environmental stewardship and human rights through Indigenous data sovereignty (IDS), and access and benefit-sharing (ABS) compliance. This requires cross-disciplinary partnerships, blending geography, anthropology, law, and media studies to produce evidence-driven recommendations that elevate local voices and translate local realities into policy influence while addressing the global demand for critical resources.

Any continent's rare earth and critical mineral endowment is both a strategic asset and a responsibility. Recognizing IPLCs as active partners – rather than passive rightsholders – in the resource economy is essential. Digital advocacy, when guided by ethical and culturally

informed practices, can serve as a bridge: linking local knowledge with global policy and amplifying community priorities. IPLCs' digital voices remind us that the green transition must not replicate the injustices of the fossil fuel era.

Without inclusive, transparent, and equitable frameworks, Africa and its partners risk repeating patterns of historical dispossession rather than development. By centering Indigenous voices, leveraging digital technologies, addressing the digital divide, fostering youth leadership, and pursuing cross-sector partnerships, we can envision a mineral governance paradigm that is not merely extractive but regenerative: one in which primary communities are not just custodians of resources, but architects of their own futures in the digital and ecological landscapes of tomorrow.

A biodiverse lens: Expanding the resource frontier

Increasing demand for rare earth elements (REEs) raises questions about environmental sustainability and supply security. Africa's unique biological heritage, coupled with its mineral abundance, opens pathways for innovation via biomimicry and biotechnology (using nature-inspired systems to replace environmentally harmful compounds with renewable alternatives); ingredient discovery (characterizing natural resources for cosmetic, nutraceutical, agrochemical, pharma, textile, bioplastic, food, gastronomy and other industries); feedstock mapping (evaluating availability, quality, and sustainability potential of raw materials across geographies); and ABS compliance (ensuring ethical bioprospecting with fair benefit-sharing for IPLCs; while upholding ABS commitments under the Nagoya Protocol).

Identifying and characterising these novel bio-mineral ingredients requires interdisciplinary research that bridges geology, biology, and technology, conducted with ethical attention to IPLC knowledge and benefit-sharing.

Investing in that direction, and linking biodiversity with biotechnology, would position Africa as a global leader in sustainable ingredient innovation, creating new value chains that address local consumer needs while contributing to global sustainability goals.

For Africa to benefit from this transformation, governance must be at the core. This means:

1. Embedding human rights in resource policy: Guarantee IPLC participation in decisions on critical minerals and bio-resources.
2. Developing strategic research agendas: Align African scientific priorities with global sustainability commitments, while tailoring solutions to African consumers and industries.
3. Strengthening cross-sector partnerships among governments, academia, the private sector, biotech firms, and IPLCs to create inclusive innovation ecosystems.
4. Investing in digital capacity-building for communities to leverage storytelling and data tools that influence policy and market mechanisms.
5. Supporting open-access platforms for sharing research, mapping, and monitoring data on rare earth and bio-mineral innovations to foster transparency and multi-stakeholder engagement in mineral supply chains.

Such fusion of tradition and technology would enhance democratic participation, promoting accountability in the management of Africa's critical mineral and biodiversity assets.

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