Institute for Advanced Study

Responsibly Mining ET Minerals in Africa: The Role of Digital Technology

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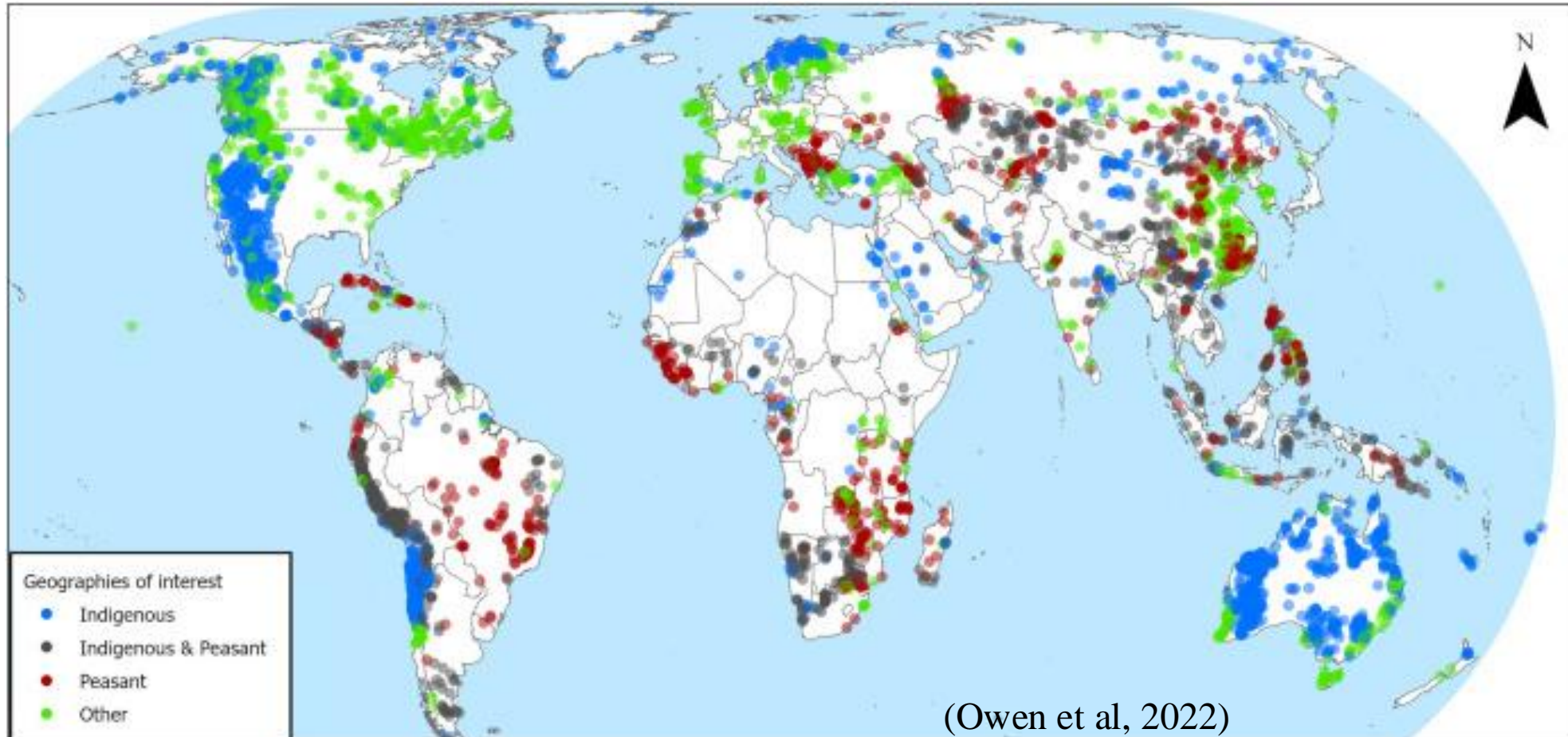
How can technology promote responsible energy transition mineral extraction in Africa?
An exploration of digital technology to monitor supply chains.

Cobalt, lithium, nickel, copper, graphite, manganese, rare earths--these energy transition minerals (ETMs) are needed for the green transition to wind & solar energy, batteries and fuel cells. Experts say there will be a 500% increase in demand for ETMs by 2050 (Hund et al., 2020).
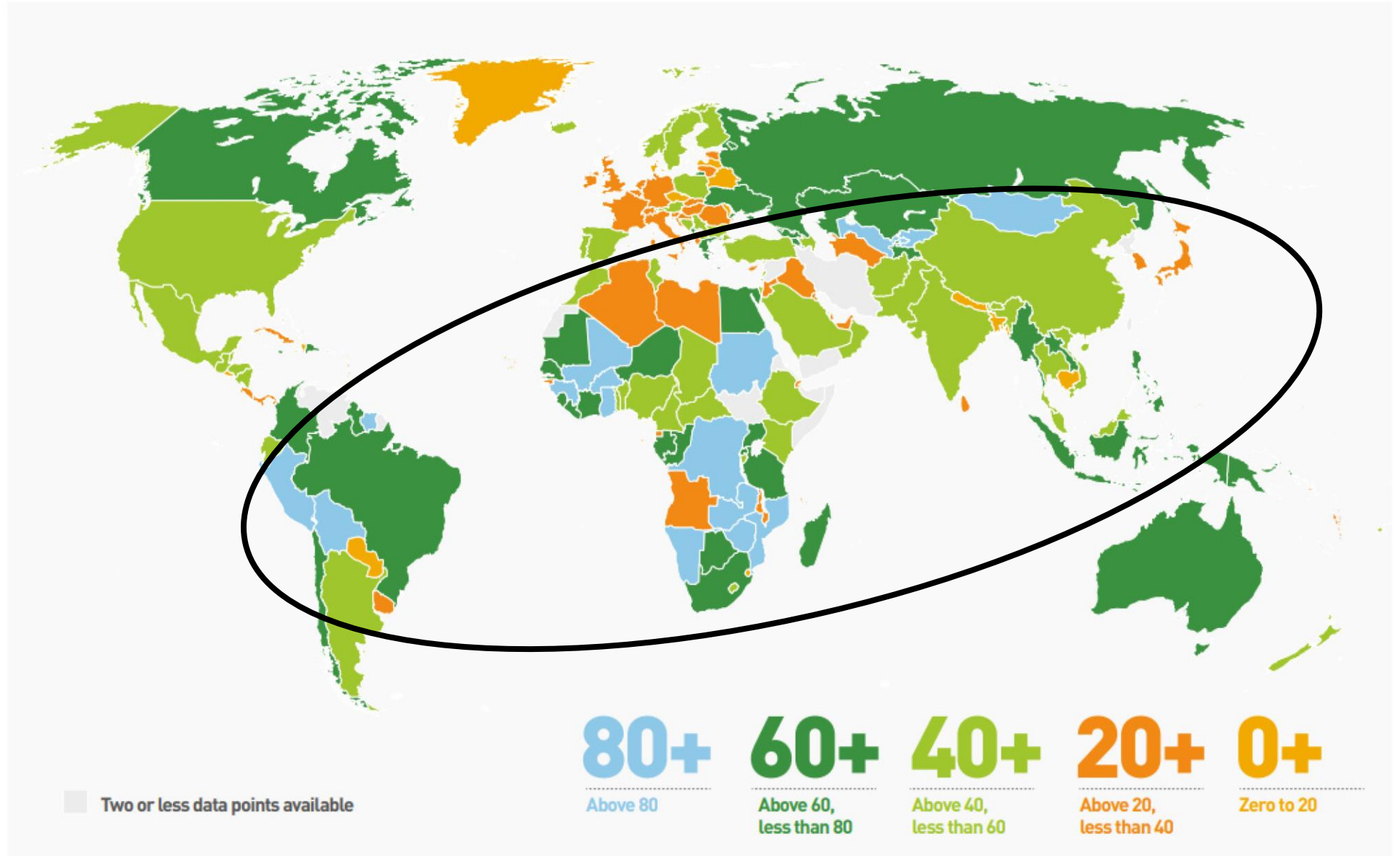
Energy transition minerals (ETMs) are largely located on lands of indigenous or poor peoples.

Geographies of interest
- Indigenous
- Indigenous & Peasant
- Peasant
- Other

(Owen et al, 2022)

Mineral Contribution Index

80+ Above 80

60+ Above 60, less than 80

40+ Above 40, less than 60

20+ Above 20, less than 40

0+ Zero to 20

Two or less data points available

2023 Global Rights Index

10 worst countries in the world for working people

The 2023 ITUC Global Rights Index depicts the world's worst countries for workers by rating 149 countries on a scale of 1-5+ based on the degree of respect for workers' rights, with 1 being the best rating and 5+ being the worst.

Violations are recorded each year from April to March. Each country is analysed against a list of 97 indicators derived from ILO conventions and jurisprudence. The index represents violations of workers' rights in both law and practice.

2.56 EUROPE

3.52 AMERICAS

4.18 ASIA-PACIFIC

3.84 AFRICA

4.53 MIDDLE EAST AND NORTH AFRICA
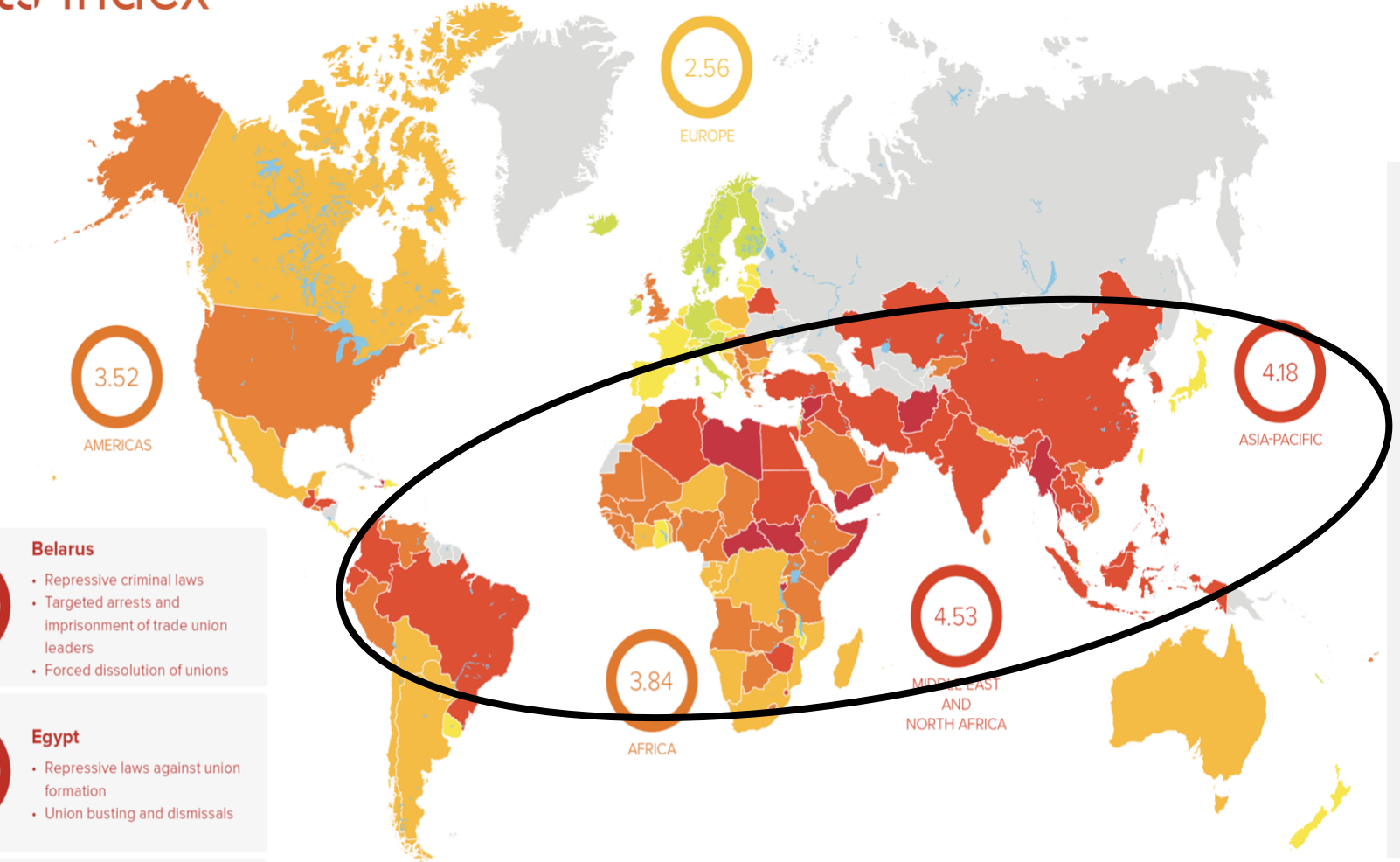
Bangladesh
- Regressive laws
- Obstacles to union formation
- Police violence

Belarus
- Repressive criminal laws
- Targeted arrests and imprisonment of trade union leaders
- Forced dissolution of unions

NEW – Ecuador
- Regressive laws
- Police violence against strikers

Egypt
- Repressive laws against union formation
- Union busting and dismissals

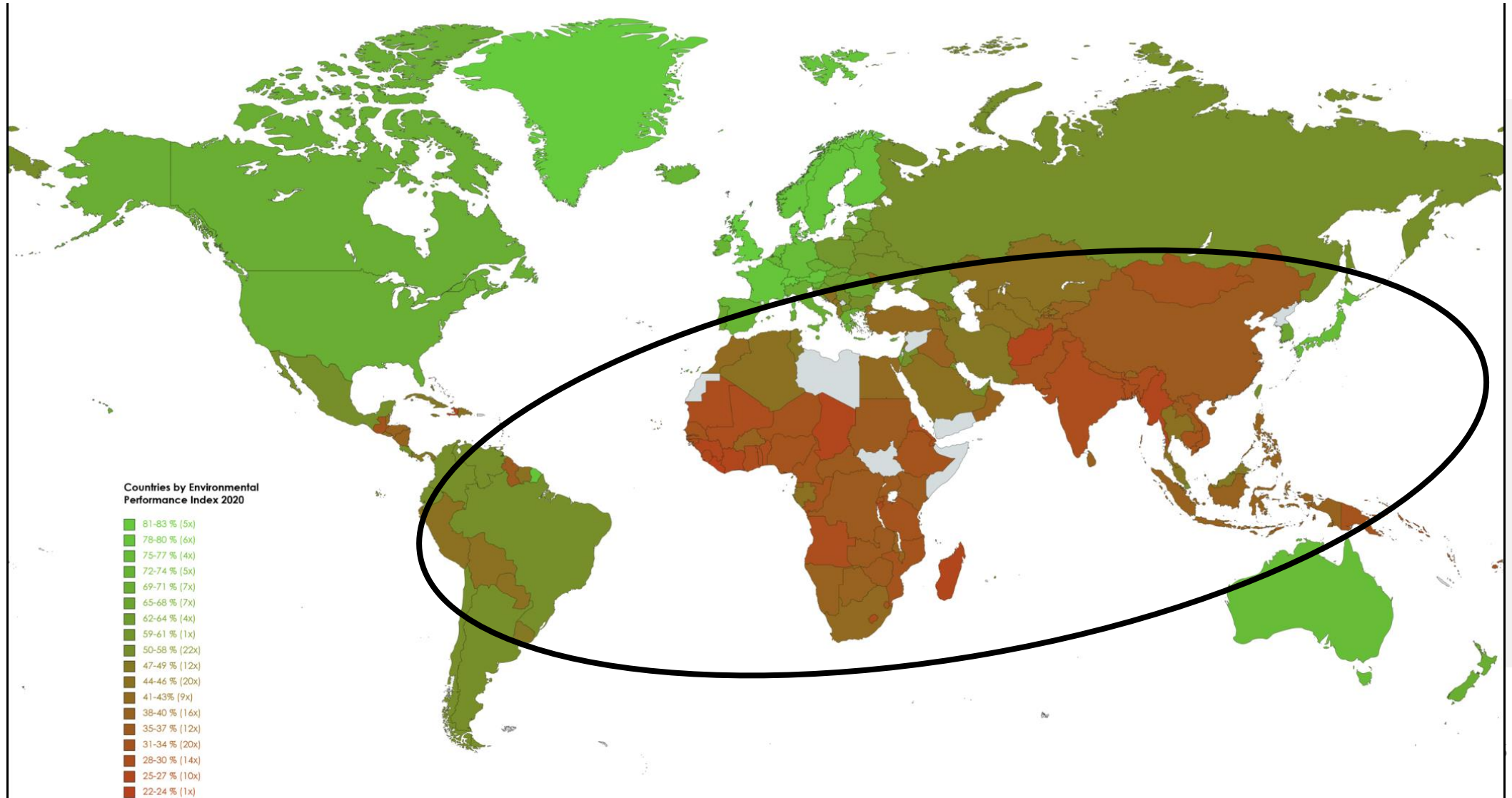**Eswatini**
- Murder
- Police violence during strikes

Guatemala
- Violence against trade unionists
- Climate of fear and impunity

https://www.globalrightsindex.org/en/2023

Yale Environmental Performance Index

UNIVERSITY OF AMSTERDAM
Amsterdam Business School

Countries by Environmental
Performance Index 2020

- 81-83 % (5x)
- 78-80 % (6x)
- 75-77 % (4x)
- 72-74 % (5x)
- 69-71 % (7x)
- 65-68 % (7x)
- 62-64 % (4x)
- 59-61 % (1x)
- 50-58 % (22x)
- 47-49 % (12x)
- 44-46 % (20x)
- 41-43% (9x)
- 38-40 % (16x)
- 35-37 % (12x)
- 31-34 % (20x)
- 28-30 % (14x)
- 25-27 % (10x)
- 22-24 % (1x)

https://epi.yale.edu/

African Climate Foundation 2023 Report

"While critical minerals developments have not delivered transformation yet in Africa, **the dark side of the energy transition** has become visible with
- the pollution of soils, air, water contamination, toxic residuals,
- intensive consumption of water and power,
- workplace and environmental risks,
- child labour, sexual abuse,
- corruption and armed conflict in the mining areas."
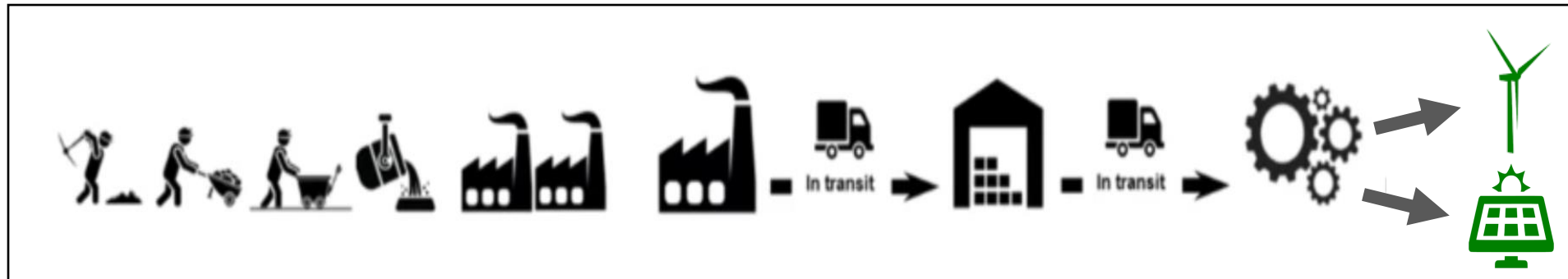
Just transition

Research problem

- Most companies cannot fully determine where their supplies come from, and many firms consider supply chain tracking too costly to undertake with all suppliers.

  - After the Dodd-Frank Act (2010), 80% could not determine the origin of materials, with only 1% certain they were conflict-free (Kim & Davis, 2016).

- This has caused companies to seek technological solutions to track origins of supplies, and understand the social and environmental conditions of production.

- Organisations have introduced technology that help satisfy the companies need for oversight and reporting.

- We research this technology adoption in global value networks, and seek to understand how stakeholders are impacted.

Digital technologies for supply chain tracking and monitoring

How can digital monitoring and supply chain tracking technology ensure the extraction and use of ETMs contribute to a 'just' transition?
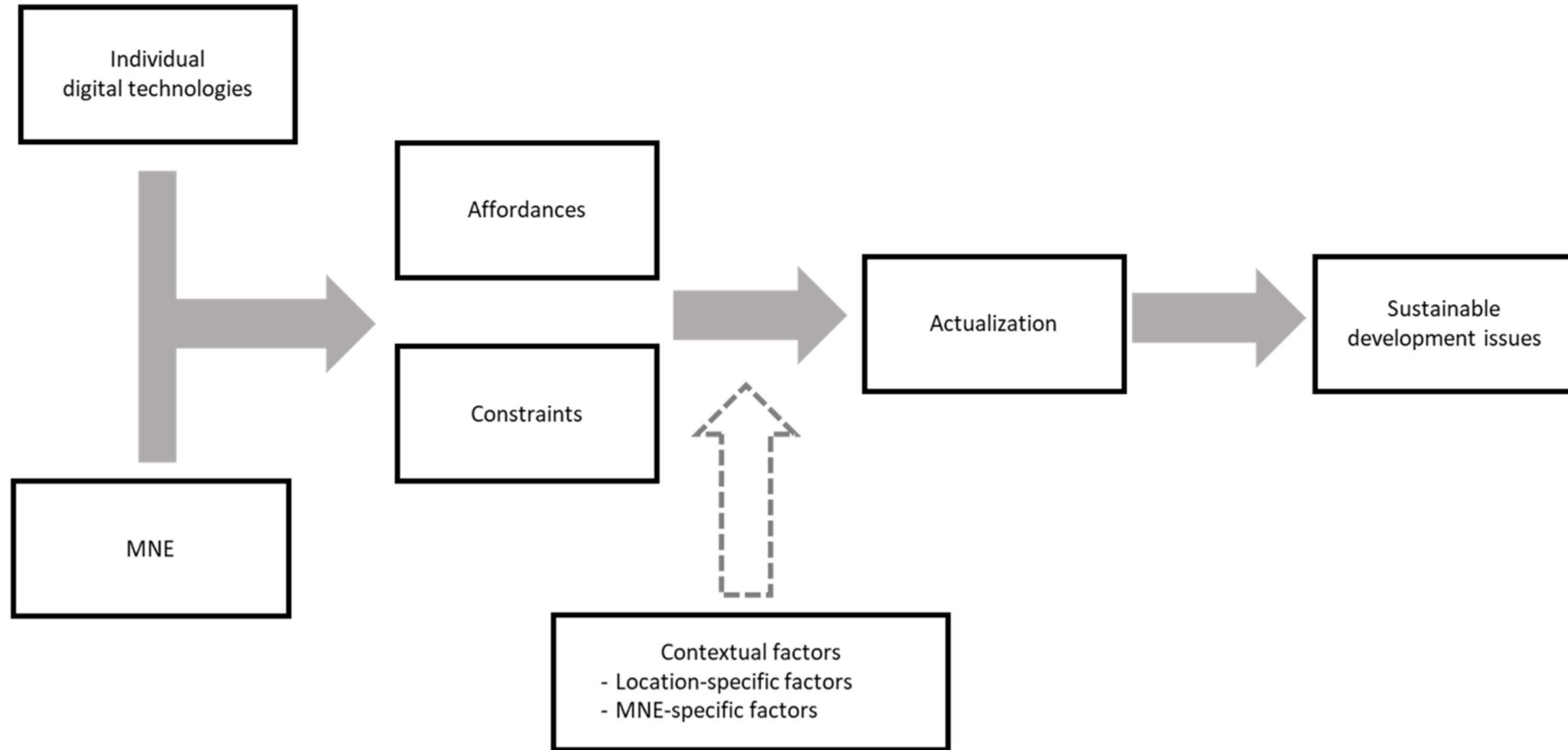
25+ Digital Technologies

Active in the African Great Lakes Region (Burundi, the Democratic Republic of the Congo, Ethiopia, Kenya, Malawi, Mozambique, Rwanda, Zambia, Tanzania, and Uganda) plus South Africa.

Great Rift Valley

Affordances (Cuilli & Kolk, 2023)

Field research in Kenya and Tanzania

- Oct. 20-30, 2024 Traveled with Robert Bwana through Kenya and Tanzania.

- Observed 6 mine sites (mostly ASM).

- Met with people connected to 4 different digital technologies, including:
  - A blockchain platform for supply chain tracking,
  - An app for reporting health & safety issues about mines,
  - An app for reporting on ESG performance, and
  - An app to report human rights incidents.

- Interviewed 34 individuals who were stakeholders connected to one of the different digital technologies, including miners, minesite managers/owners, NGO workers, community change agents, local and national government representatives, mineral dealers, and other participants in the supply chain.
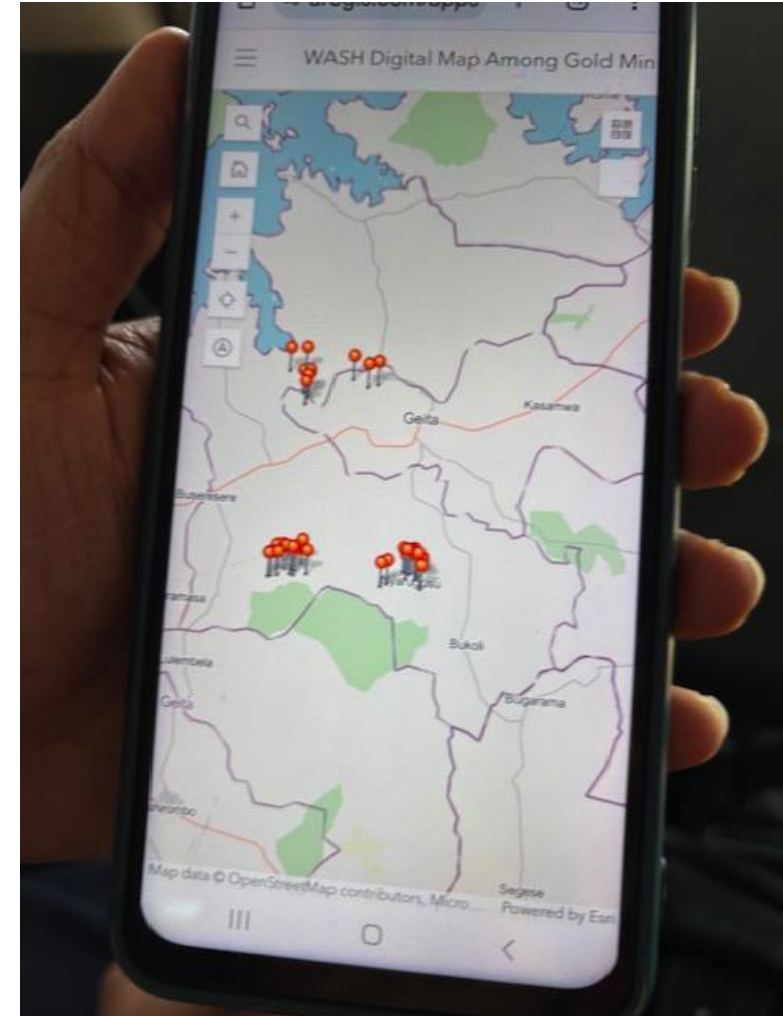
Preliminary impressions from field reseach

- **Who enters the data in the technology?**
  - Not generally open to the public—skepticism about crowdsourcing approaches

  - Specific people were recruited as "change agents"

  - Despite digital gender gap in Africa, many female change agents

  - Much training seemed to be required, but this may increase user confidence in data accuracy

Preliminary impressions from field reseach

- **What affordances does the technology allow?**
  - Immediate distribution
  - Data visualization & long-term record
  - Evidence gathering using smart-phone capabilities
    - Compass
    - Geolocation
    - Timestamps

Preliminary impressions from field reseach

- **Who receives and acts upon the data in the technology?**
  It depends . . .
  - End users/retailers (Blockchain)
  - Advocacy NGOs (Incident reporting)
  - Local Government (Health & Safety)
  - NGOs + Change Agents (Continuous improvement)

Preliminary impressions from field reseach

- **Who owns the data?**
- Willingness to use technology tied to who controls the data
- Resistance to Government control of data in Kenya

Actualization of Technology

Affordance for whom?

Each stakeholder will be afforded differently

Not all stakeholders experience similar constraints, which constraints are overcome?

Any Questions?

Thank you for your attention!