

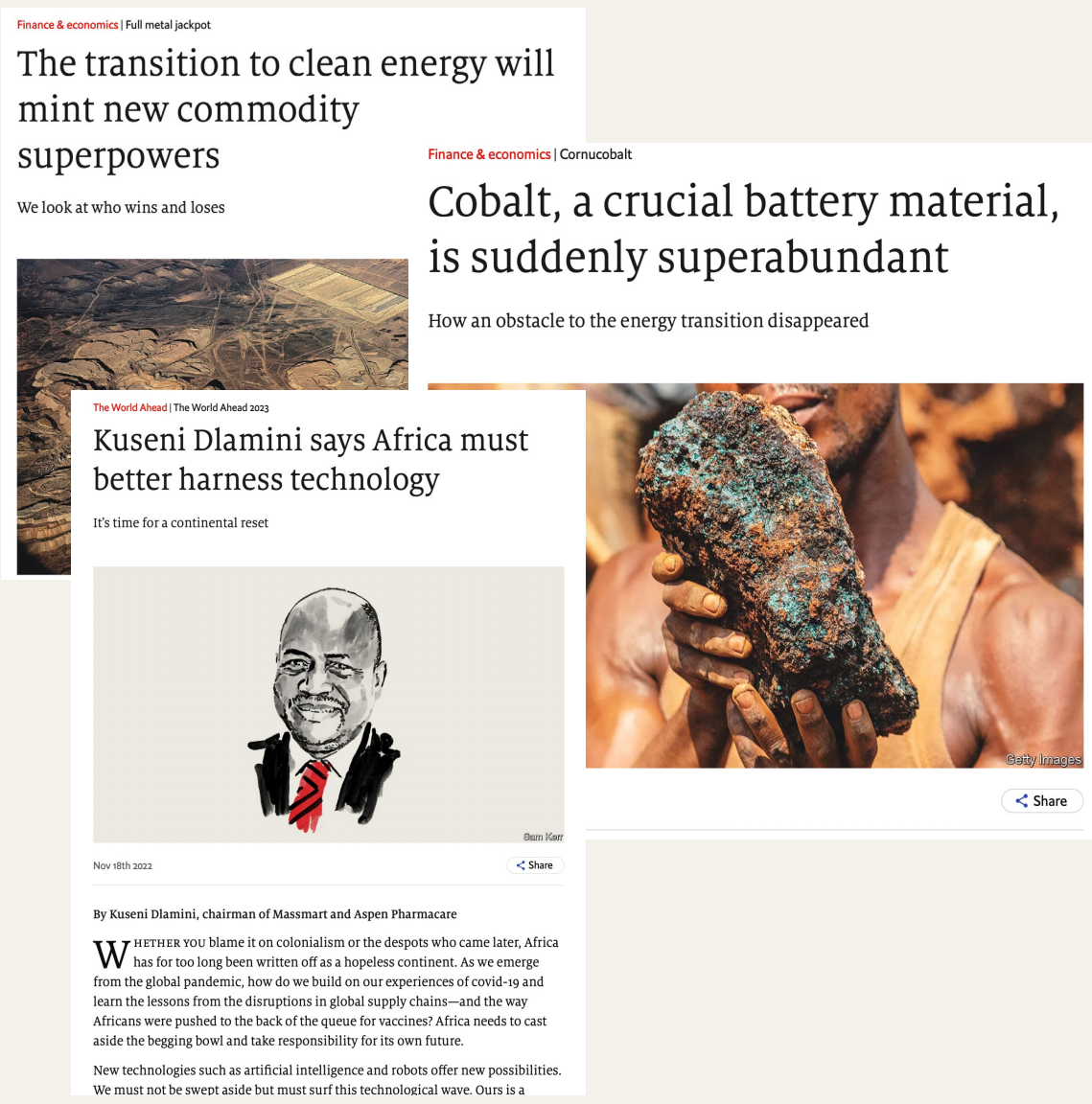
Overcoming the 'Dark Side of Innovation' for Healthy Ecosystems and Equitable Development in Namibia

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Introduction

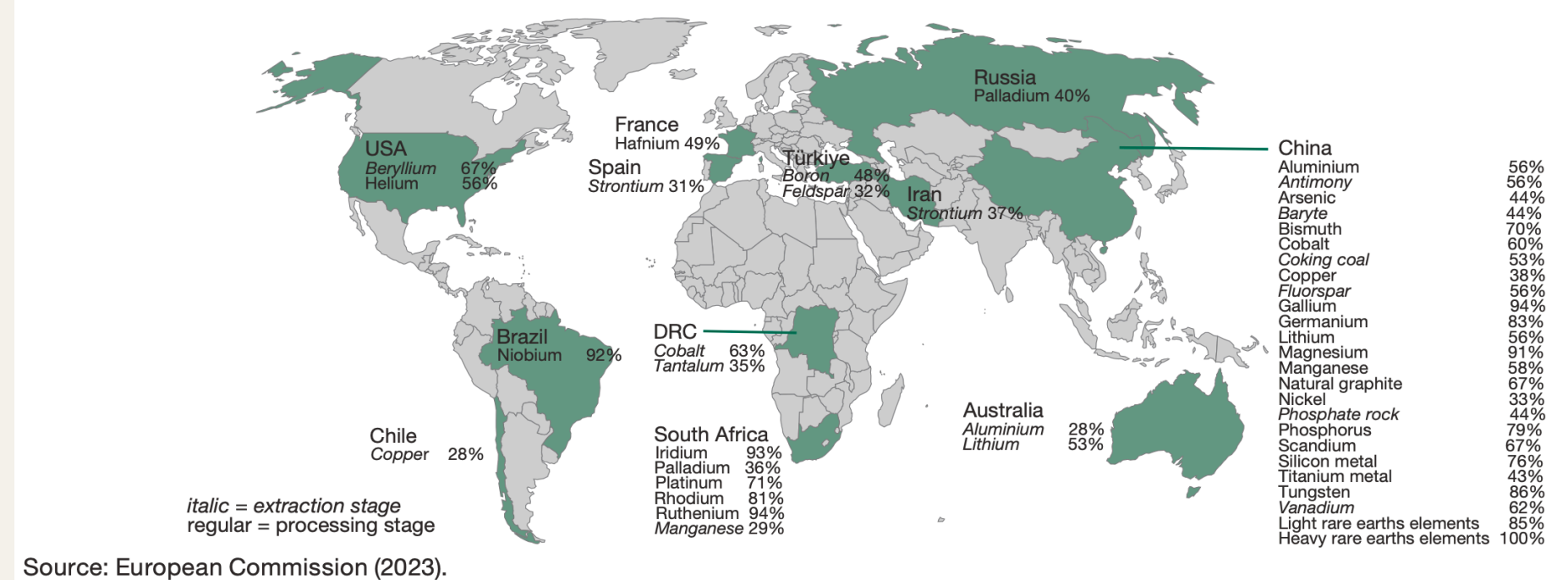
In the global transition to sustainable cities and communities, implementation of renewable energy and low-carbon technologies is vital (e.g., Sait et al., 2019). However, the material basis of this technological shift lies in the growing demand for specific natural resources referred to as critical raw materials (CRMs) or critical minerals. African countries have been found to be disproportionately dependent on their natural resource wealth for employment generation and economic development, and the potential rise of new 'commodity superpowers' creates both development risks and opportunities (Adu and Dramini, 2018). The hidden costs of new technological innovation in terms of the 'dark side of innovation' is a paradox in which mineral rich economies are unable to harness benefits of resource wealth, with the significant collateral damage to the environment and society (Iammarino and Sait, 2022). However, a key gap exists in terms of understanding how to balance rising demand for CRMs with protections for fragile economies and ecosystems, without bargaining power or policy frameworks to address the implications of dependency on predatory mining companies and extractive industries



What are 'Critical Raw Materials (CRMs)?'

"Critical Raw Materials (CRMs) are those raw materials that are economically and strategically important for the European economy but have a high-risk associated with their supply. Used in environmental technologies, consumer electronics, health, steel-making, defence, space exploration, and aviation, these materials are not only 'critical' for key industry sectors and future applications, but also for the sustainable functioning of the European economy." (Ferro and Bonollo, 2019).

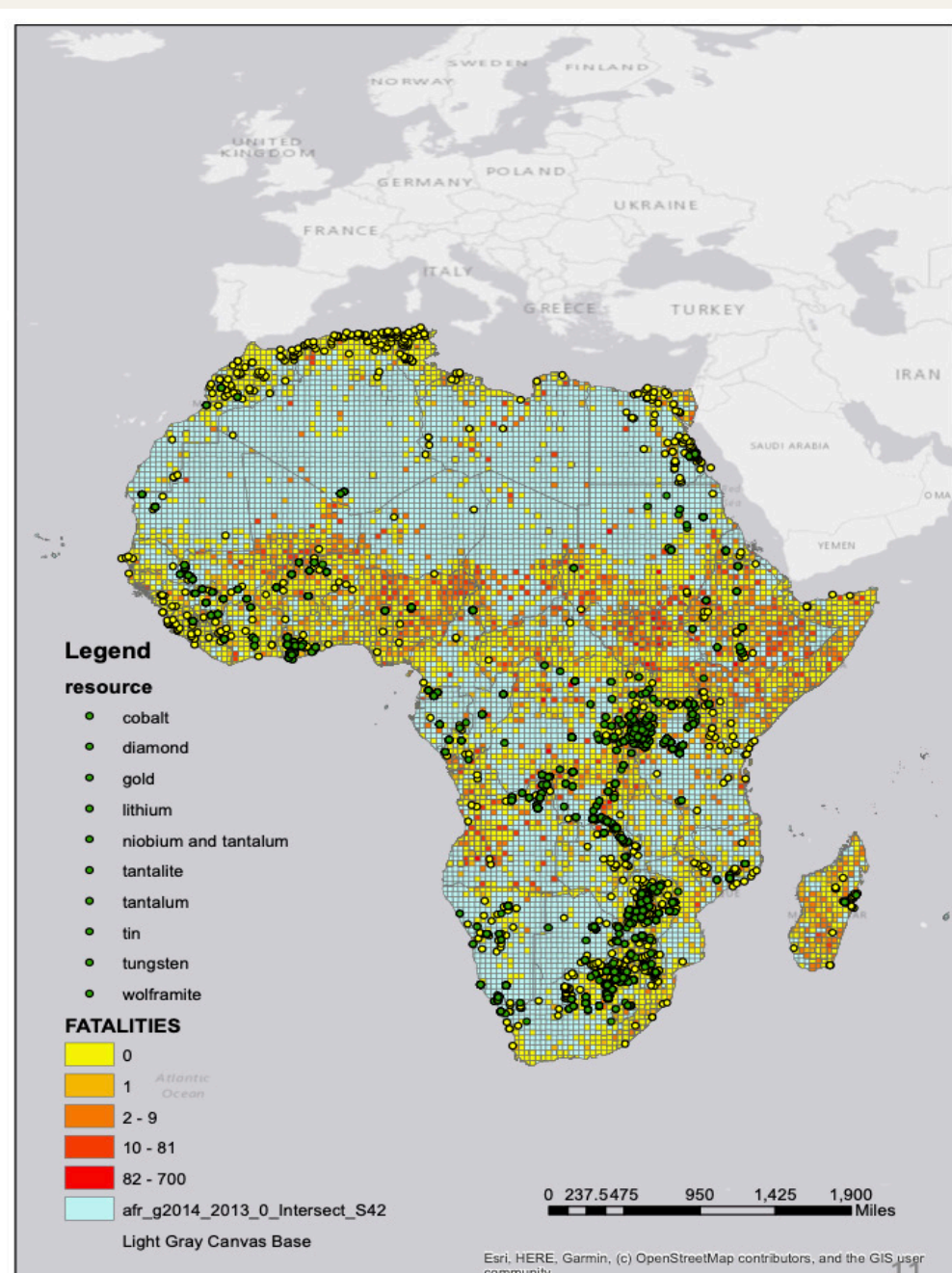
Global distribution of critical raw materials supply



CRMs refer to a large group of natural resources defined by their supply constraints including the geographic concentration of mining deposits, production capacity and refining capabilities, alongside non-substitutability, low recycling rates, and few commercially viable alternatives (Reuter et al., 2013; Petavratzi et al., 2019). Although there is no universal list of CRMs they are commonly thought to include commodities such as tin, tungsten, tantalum, gold, cobalt, lithium, bauxite, nickel, graphite, manganese, rare earths and others. There is growing interest in CRMs in African countries (Heffron, 2020; Pedro, 2021; Usman et al., 2021; Baranzelli et al., 2022; Iammarino and Sait, 2022), emphasising the need to focus on the contributions of the mining sector to African development, especially as the continent increasingly plays an important role in the global CRM trade.

Exploring the Dark Side of Innovation

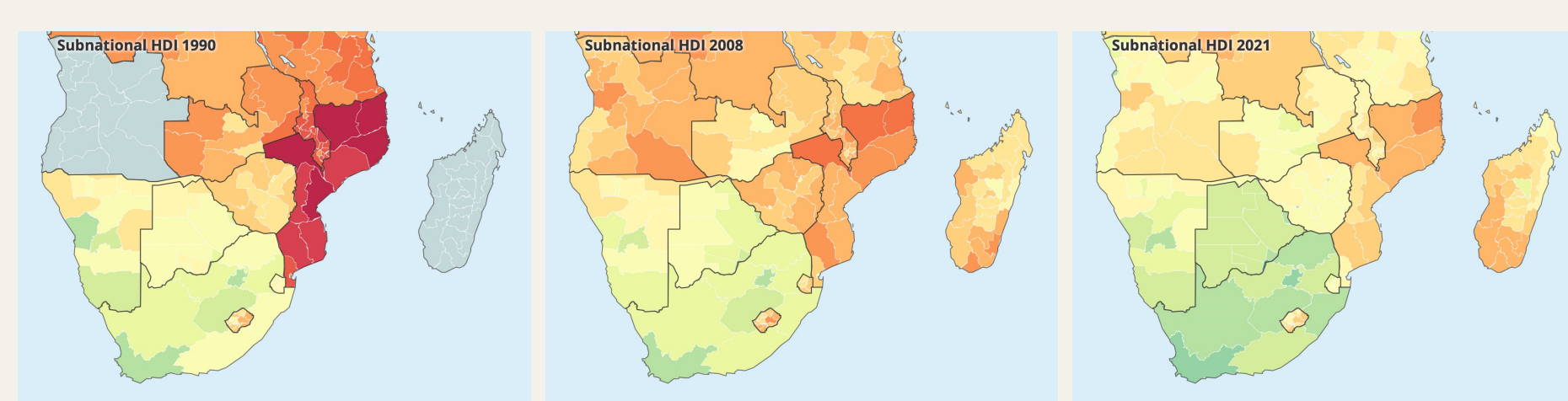
Dark side of innovation perspectives emphasise the direct or indirect, inherent or unintended, immediate or long-term implications of innovation, and also highlight a need to focus on the consequences of technological change (Coenen and Morgan, 2020; Biggi and Giuliani, 2021). In the case of CRMs this relates to the geographically uneven development consequences created, sustained, or mitigated by technological progress, so far under-explored in the literature (Phelps et al., 2018; Iammarino and Sait, 2022). A key element has been the relationship between mining and conflict, where African sources of CRMs have been connected with the so-called 'conflict minerals' i.e., tin, tungsten, tantalum and gold (Church and Crawford, 2018, 2020). Beyond conflict, mining also has been found to have negative environmental, social, economic and political consequences (Kramarz et al., 2021)



Healthy Ecosystems & Equitable Development

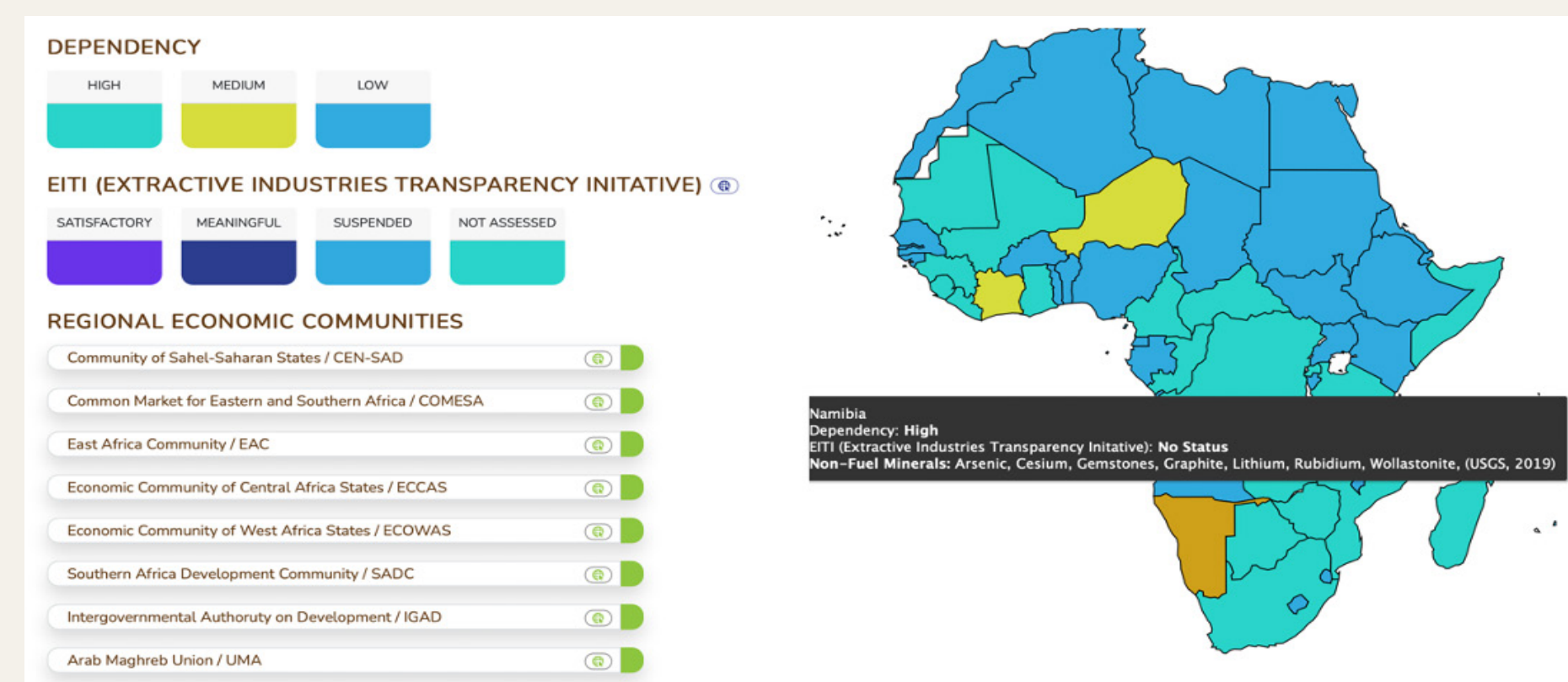
Enhancing sustainability and corporate social responsibility in a thinly regulated industry requires a better understanding of how mining policy frameworks can be used to explain and address the interplay between government, industry, research, and civil society towards embedded protections as well as enhancing the community benefit of extractive mining practices. In addition to large scale mining – mainly undertaken by multinational enterprises (MNEs) – the unintended consequences of artisanal and small-scale mining on the economy, ecosystems and society needs reappraisal. This study uses evidence from the case of Namibia, in South-West Africa, which is one of the largest suppliers of several CRMs such as uranium, and is an emerging source of cobalt, lithium and other minerals. Namibia remains highly dependent on the mining sector for its economic development with a recent EU-Namibia deal signed in November 2022.

Land and natural resource rights in Namibia



Namibia has a complex relationship with land and natural resources. As a USAID (2010: p.3) report, notes: "In 1990, Namibia emerged from a century of colonial rule with [...] unequal distribution of land that had deprived indigenous Namibians of rights to land and resources. At Independence, roughly 4000 white commercial farmers owned Namibia's 5000 commercial farms, each averaging 7200 hectares and primarily dedicated to raising livestock. The remainder of Namibia's population of 1.5 million people (mostly black) was crowded onto Namibia's communal land, existing on a mix of subsistence farming, livestock rearing, hunting and gathering, and remittances from abroad." The far reaching consequences of which are still felt today in terms of high levels of inequality, poverty, and relative economic under-development (World Bank, 2023).

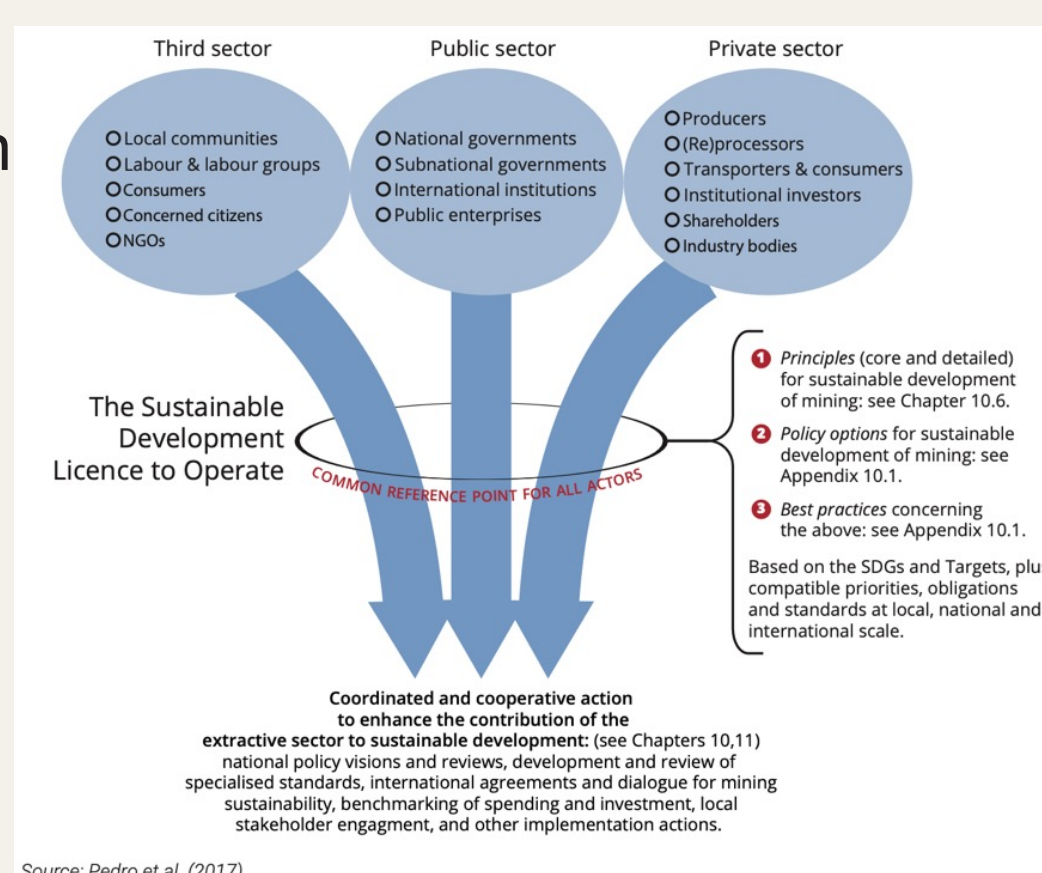
Namibia's mining sector policies



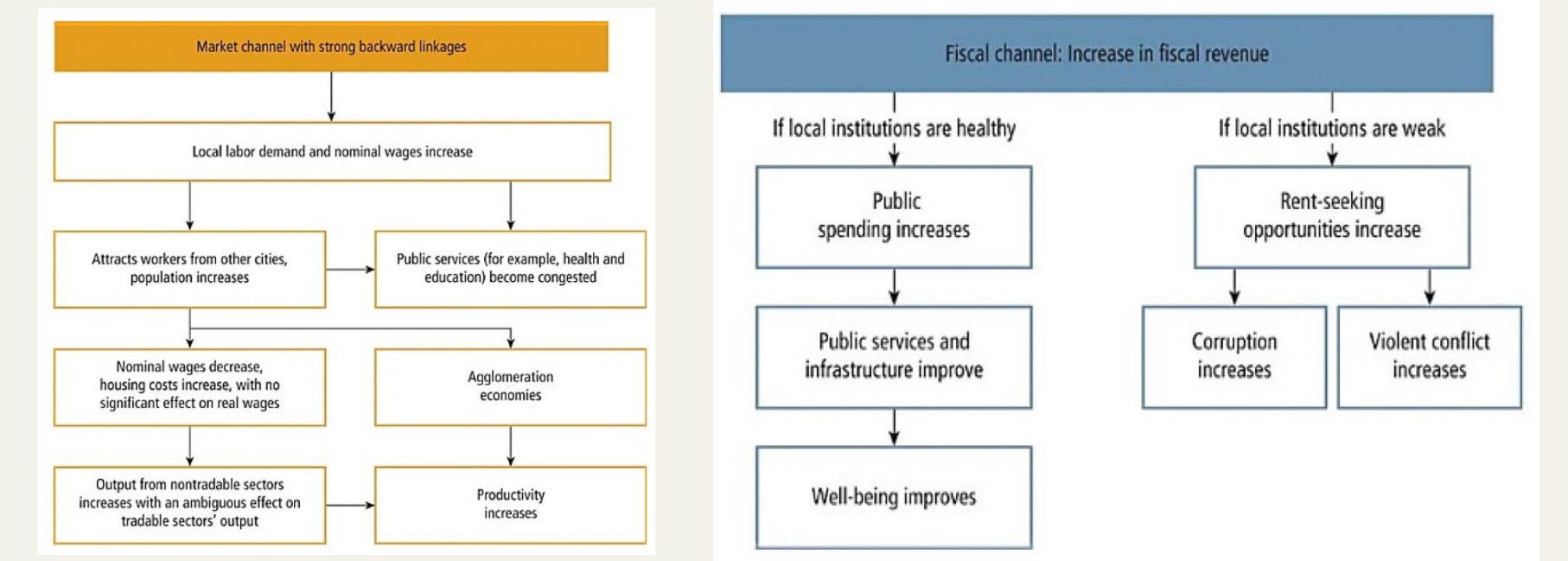
Namibia arguably has one of the most developed mining sector policy frameworks in the continent. As Ali et al. (2019) write:

"Realising the importance of mining to its economy, the Namibian government has promoted mineral exploration and mining investment through sound legislation governing exploration and mining licenses, environment clearance, labor issues, and financial transactions; a stable and competitive taxation framework; the acceptance of international practices for capital markets and foreign trade. However, government policy is not static, and in 2016 the Namibian government announced that it intends to reserve a stake of at least 20 percent for black Namibians. The state allows sufficient time to explore and develop and permits mineral rights to be used as collateral, with freedom to trade the mineral produced. Furthermore, Namibia has an excellent road and telecommunications infrastructure and is currently upgrading its harbors. Namibia also offers a good standard of living for employees in the exploration and mining sector." (p.81)

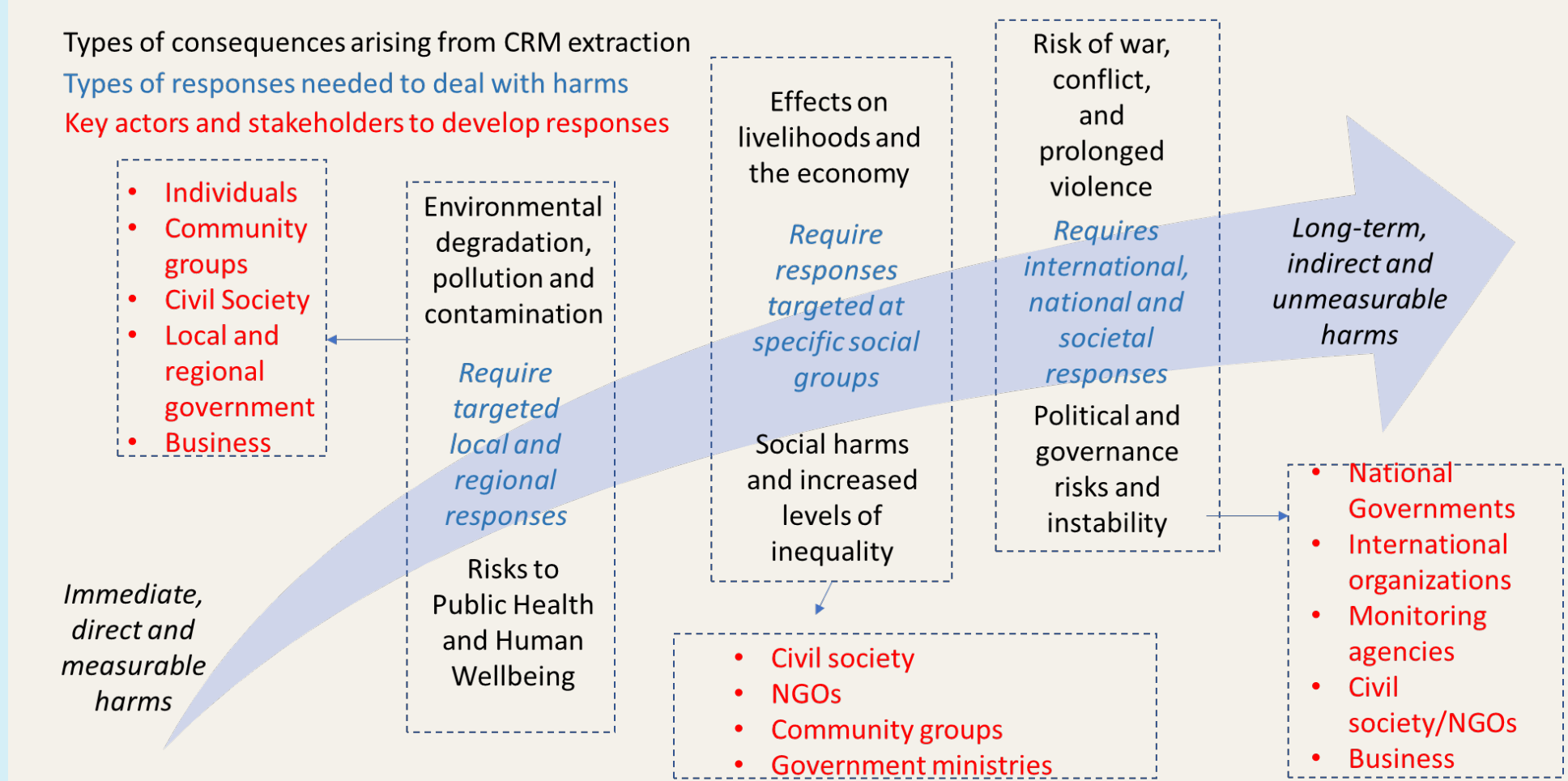
However, there have been concerns that the mining sector is not Namibian. As Abraham Noabeb, the Black Business Leadership Network of Namibia says, "It [the mining sector] is in Namibia but it is not Namibian. The mines that are in Namibia are owned by foreigners, foreign nationals and foreign multinational companies and corporations.". Leveraging the ability of the sector to contribute to sustainable development requires alignment of public, private and third sector interests through mining sector policies (Pedro et al., 2017; Ayuk et al., 2019), while ensuring that there is consistent and full implementation of Namibia's 2018 minerals policy. Without this alignment and setting a land governance framed agenda there is unlikely to be success in creating sustainable development outcomes.



Pathways to sustainable development?

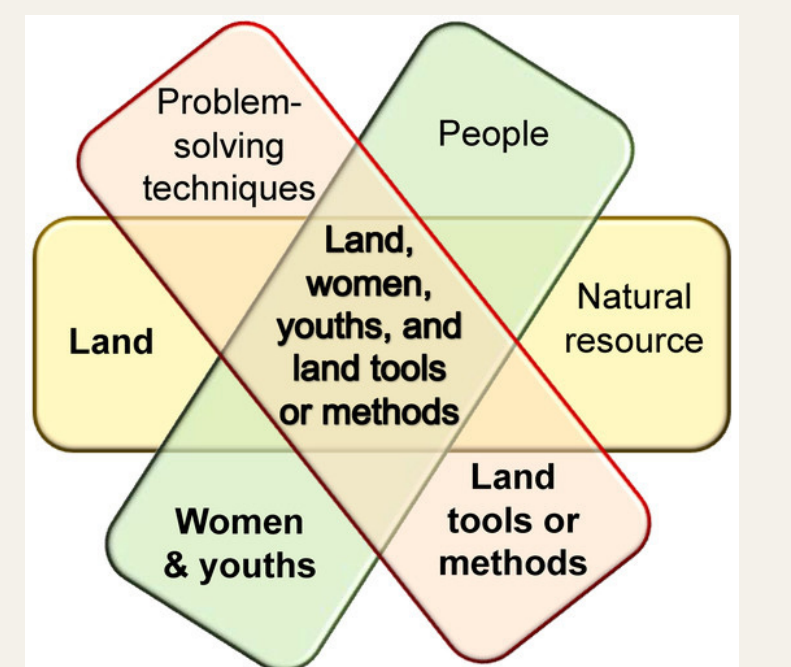


The main pathway to sustainable development in relation to mining arguably comes through two channels: first, a market channel through which investment can increase wages, local employment, and lead to 'urban growth' or 'agglomeration economies'; second, is fiscal channel through which revenues can be invested by governments in improving local standards of living and wellbeing (Chuhan-Pole et al., 2017). However, this requires overcoming the various negative consequences of mining (Iammarino and Sait, 2022).



Conclusions

As Chigbu's (2020) article on *Land, Women, Youths, and Land Tools or Methods: Emerging Lessons for Governance and Policy* emphasises, natural resources and land issues cannot be seen as being separate from either land tools or the need for people-centred interventions. Arguably, essential to overcoming the 'dark side of innovation' in relation to mining and development is prioritising local development needs and ensuring that communities are at the heart of natural resource management policy. In the



case of Namibia, inequitable land ownership and privileging of foreign direct investment may lead to perverse outcomes relative to mineral policy objectives. To overcome this, requires a 'land governance' framing that helps redress barriers in terms of access to land and natural resources. Thus, seeing CRMs as not simply 'valuable commodities' but 'development resources' can help change attitudes and perspectives towards balancing growing demand with local needs and priorities.

Land Governance and Gender

The Tenure-Gender Nexus in Land Management and Land Policy

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