

# BEYOND THE ‘TYRANNY OF METRICS’? INDICATOR LITERACY IN SUSTAINABLE FINANCE

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## ABSTRACT

Sustainable finance ‘thought leaders’ call for metrics as the key to aligning investment with sustainability objectives and harnessing the market for ‘good’. In this article, we consider how measurement is used in sustainable finance through three case studies of financial instruments described as bonds (green, forest, and impact) and develop Sally Engle Merry’s concept of ‘indicator literacy’ as a contribution to critical geographies of sustainable finance. Through ethnography, we explore how labelling financial products as sustainable (and therefore moral) increasingly relies on claims to achieve measurable outcomes and how attention to spatial and scalar dynamics illuminates what this leaves out.

**Key words:** sustainable finance; ethnography; green bonds; impact investing; ESG; impact bonds

Averting environmental apocalypse and thwarting extreme poverty have become enormous global businesses that require trillions of dollars (Mawdsley 2018; *The Economist* 2022). The United Nations, political leaders, and corporate elites identify financial innovation as a ‘powerful problem-solving machine’ and non-state investment as the only viable source of funds in a new era of fiscal austerity (Palmer 2015). Financial actors seeking to act on such claims for their contribution to sustainability face two major and related challenges: one of classification of assets (which securities are to be considered sustainable?) and one of accountability (how are the social and environmental outcomes of an investment demonstrated?). These challenges impose limits on what matters about diverse relations between people (and the planet). The use of metrics, indicators and measures within an infrastructure of evaluation recalls the application of business management techniques

to non-business settings within ‘New Public Management’ across Europe and the USA from the late twentieth century to the present day. Geographers, historians, and anthropologists have interrogated quantification herein as a means of governance through the production of ostensibly objective forms of knowledge (Morse 2019; Strathern 2000; Porter 2020). Jerry Muller (2018) goes so far as to describe a ‘tyranny of metrics’ that distorts understanding of health, welfare, and charity because it eclipses other ways of knowing these phenomena through attention to spatial and relational dimensions. Is the same true of sustainable finance? Does this enable the profusion of ‘greenwash’, misleading or questionable claims about environmental, social, and governance commitments, by financial and business actors (Jones 2019; Montgomery *et al.* 2023)? How might a better understanding of techniques used in classifying and accounting for sustainability help expand analytical horizons and

contribute to holistic critical geographies of sustainable finance?

This paper explores how, instead of being 'given', the production of metrics in sustainable finance relies on processes of translation that frame (Callon 1998) what counts and what does not. Such framing is geographical in that it relies upon spatially diffuse networks, represents human–nonhuman relations as linear and/or transactional, and conceptualises scale by occluding attention to power and inequality. Analysis, therefore, must address the geography of sustainable finance's dependence on measurement. We propose that ethnographic approaches could help to cultivate 'indicator literacy' as an analytic goal and even the basis of applicable insight about what numbers do and do not say. 'Literacy' is used somewhat metaphorically to connote competence or capacity to read nuance and complexity in metrical depictions that otherwise tend to 'flatten'. Following Sally Engle Merry (2016, p. 26), we define indicator literacy as a form of knowledge employed in understanding structural and ideological biases, regimes of power, and interpretative work that produce quantitative knowledge (Merry 2016, p. 26). It affords 'a more sceptical view about indicators and provide[s] criteria for assessing their relative merits' (Merry 2016, p. 26). Furthermore, this paper articulates the spatial dimensions of indicator literacy and therefore makes a contribution to the critical understanding of sustainable finance by exploring the interdisciplinary dialogue between human geography and anthropology. It first clarifies the scope of the term 'sustainable finance' and works by geographers alongside other critical social scientists on the role of metrics in it. It introduces anthropological theory and methods to empirically engage with claims made for and with measurement in sustainable finance. We draw on three case studies conducted by members of Hau of finance, a research project that uses ethnographic methods to understand the processes and effects of sustainable finance, who are among the authors of this paper. Although it necessarily sacrifices ethnographic detail, particularly regarding putative 'beneficiaries' of sustainable finance who are anthropology's stereotypical

subjects, this approach enables a comparison that brings deterritorialising processes that enable sustainable finance into view.

## SUSTAINABLE FINANCE

Sustainable finance itself encompasses a broad range of activities, and there is no agreement among its chief exponents over a definition. For heuristic purposes, sustainable finance within this paper connotes investment with the deliberate aim of achieving positive social and/or environmental change. Relevant concepts and practices include environmental, social, and governance (ESG) investing; socially responsible investment (SRI); sustainable investing; and impact investing, among others. There is growing consensus on significant differences between these categories, but they are sometimes used interchangeably, including by self-defined experts. Advocates often suggest that they fit on a 'spectrum' of capital, flanked by 'conventional' finance at one end and philanthropy at the other. The blurred connotation of a spectrum fits the comparative impulse of this paper. We also recognise that sustainable finance encapsulates geographical and cultural diversity, for example, spanning Islamic finance (Jaafar & Brightman 2022) and Chinese retail investment in green assets (Dal Maso 2023). Our attention focusses primarily on large institutional investors (such as pension funds, insurance companies, and foundations and their asset managers) whose employees and offices are mainly based in Europe and North America but who invest in a wide range of organisations that are ultimately dependent on the activities of others across the globe.

Scholars have been sceptical of the assertion that sustainable finance is a dramatic new alternative to unsustainable capitalism (Langley 2020). However, several critical accounts accept a distinction made by impact investing practitioners between their activities and those of others working in sustainable finance, such as SRI and ESG (Langley 2020). For example, '[i]mpact investing goes further than ESG investing and SRI in two ways: firstly, it aims not just to avoid a negative impact but to create a positive one; secondly,

it insists on measuring the impact it creates' (O'Donohoe *et al.* 2010, p. 5; Cohen 2021). However, moving 'beyond intentions' by measuring (and benchmarking) achievement of non-financial goals does not definitively distinguish impact investing from all ESG. As Sarah Bracking (2012, p. 271) shows, the 'thin, partial, and pseudo-mathematical methods' that provide an 'incomplete and partial valorisation' of investing based on measurement of non-financial return are not limited to what is now known as 'impact investing'.

The establishment of devices for assessing qualities through a system of ratings, metrics, and indicators that render them quantitative has been a primary focus for scholars. To be distinguished from other forms of investment, 'impact investing' requires judgement devices to coordinate parties through agreement about the more-than-financial returns on capital through their measurement (Chiapello & Godefroy 2017). For Emily Barman (2015), this contributes to a 'valuation infrastructure' that incorporates consideration of values (not mere value) through metrics that enable calculation of impact and therefore negotiations about its value. Economic sociologists have long explored financial analysis as a mode of translation that offers grounded theory to analyse such processes (Beunza & Garud 2007). But as Stefan Leins (2020) shows, attention to broader perceptions not reducible to calculative agencies builds understanding of how different stakeholders in sustainable finance perceive what it does and how it works.

The production of financial products that offer a positive non-financial return alongside profit has been equated with a 'moral turn' (Maso *et al.* 2022), although moral claims have long been central to finance (Fourcade & Healy 2007). The 'turn' consists of a move away from an orthodoxy in which producing economic value is a basis for moral claim-making (Kish & Fairbairn 2018, p. 571), and towards one in which scientific models, refracted through policy instruments such as the Paris Agreements, represent authoritative consensus about societal goals, justifying measures for the 'disciplining' of finance towards their achievement (Maresca 2023). On this

basis, securing human and more-than-human life rests upon investors' frameworks and decisions rather than legislators (Muniesa 2017, p. 451). The metaphor of a 'triple bottom line', for example, takes what is central to long-standing ethical claims made for business (that it makes profit, or rather avoids loss) and suggests adding 'social' and 'environmental' bottom lines too. John Elkington (2018), credited with inventing the concept, has voiced concern that it has been reduced to a mere accounting tool that has done little to transform capitalism in line with his original proposal. In doing so, he questions the idea that rendering financial, social, and environmental data commensurable, even if possible, is enough to generate reform. Others continue to make momentous claims about the significance of contemporary measurement techniques. Impact investing pioneer Ronald Cohen asserts that:

If Adam Smith had realized in the 18th Century that in the 21st Century we'd be able to measure impact, the improvements that the theory of Moral Sentiments was writing about, he'd probably have thought of impact as the invisible heart of markets to guide the invisible hand. I really do believe that is the next frontier for society and for capitalism. (Cohen quoted in Campisano 2023)

It remains unclear what such techniques and technologies *do*, especially when viewed through an analytical lens that acknowledges the complexity of human and environmental relations.

The process of creating representations of social or environmental change that can be compared to financial reporting is not straightforward, but it has foundations in several trends in academia, policy, and practice. The formalisation of finance as an academic discipline since the 1970s has helped it gain scientific authority and has followed economics in cultivating credibility and policy relevance through theoretical models (Appadurai 2016; Porter 2020). Alongside finance, the evolution of management studies, taught in business schools, is based on disembedded knowledge made possible through numerical representation as a prerequisite and means of enacting deliberate change. Metrics as management

tools appeal because of the clarity they present. They can be improved or disputed, but the validity of metrics as a form of evidence is rarely, if ever disputed, reflecting the etymological root of the word 'data', connoting what is 'given' (Gregg 2015, p. 42). Such an approach often seems to ignore or conceal the local realities and spatial networks represented within data and to obfuscate the multiscalar ambitions and effects of measurement technologies. Metrics can facilitate the introduction of market-based forms of management, such as payments for ecosystem services or REDD+, but the translation of place-based objects, processes or sets of relations into 'immutable mobiles' for this purpose can set in motion diverse, often unwanted local social, political and material effects (Brightman 2012).

### ETHNOGRAPHY AND INDICATORS

Questions about the quantitative representation of environmental and social change evoke longstanding critiques of international development. Development finance institutions like the World Bank and bilateral agencies such as USAID render complex social and political problems as 'technical' to justify their own approaches and existence (Li 2007; Papanastasiou 2020). They seem to exemplify Muller's (2018) concern with a tyrannous 'metric fixation' characterised by the aspiration to replace judgement based on experience with standardised measurement. This often involves accepting poor proxies for what is intended to be measured and narrow definitions of accountability. But does such an approach afford engagement with what different people are trying to do with metrics or what they (unevenly) achieve through them? Thomas Yarrow and Soumya Venkatesan (2012) suggest that starting out with a certain critique as an aim is problematic for an ethnographic approach. Alternatively, social scientists gain a critical resource when they take challenging introspective questions asked by some research participants seriously (Eyre 2022) and when they aim to speak to their interlocutors as well as about them (Latour 2005). Metrics seem ripe for such treatment.

Scholars from across the humanities and social sciences are increasingly alert to the limitations of the 'hermeneutics of suspicion' (Felski 2015), which do not define a distinctive critical contribution. For example, anthropologist Sally Engle Merry (2016, p. 5) explores how indicators create, rather than merely revealing, truth. Merry eschews writing in a 'denunciatory mode' to explore the complexity and diversity of indicator development, preferring an approach that is open to more genuinely dialogic insights but no less critical for them. One of her key claims, which we follow, is that some indicators do provide a more accurate and complex understanding of social phenomena (Merry 2016, p. 25). Not all indicators are the same. This makes it key to promote and develop indicator literacy to orient nuanced critical analysis.

Merry and co-authors trace five phases of indicator development: conceptualisation; production; use; effects and impact; and contestation to orient a more targeted critique (Merry *et al.* 2015). Three aspects of her analysis are particularly pertinent to our own. Firstly, she identifies the risk of 'expertise inertia', whereby the knowledge of outsiders with quantitative tools but without first-hand experience eclipses that of the human subjects whom the metrics represent. In the cases below, we explore the importance of spatial networks and scalar relations to this process, noting that deterritorialisation helps constitute moral claims for and through measurement in sustainable finance. Secondly, Merry shows that indicators may or may not be rendered numerically (Merry *et al.* 2015, p. 4), problematising a straightforward binary between qualitative and quantitative knowledge as the basis of critique. Thirdly, Merry notes discussion, debate, and unease about the limits of numerical indicators among interlocutors who nevertheless remain in favour of them (Merry 2016, p. 41), revealing a resource for critical analysis.

### METHODS

This article draws on three case studies (the Ferrogrão Railway, the Forests Bond, and the Asháninka – Peru Development Impact Bond)

conducted by the authors as part of a larger research project about sustainable finance. The research methods adopted are primarily ethnographic and resemble Merry's (2016, pp. 8–9) study of indicators. They included 46 interviews with 'key stakeholders' across case studies as well as wider experts, one month of fieldwork in Kenya, and over one year of participant observation in three working groups (largely conducted remotely) and at three conferences focussed on sustainable finance. This paper also relies on an informed and systematic review of documents and frameworks, both provided by interlocutors and publicly available. Importantly, it also draws on contextual insights from earlier research involving prolonged fieldwork over several years among economic elites in the UK and Europe, indigenous people in the Amazon, and smallholder farmers in rural East Africa (Brightman 2012; Bonilla 2013, 2016; Eyre 2021, 2022, 2023).

Comparison between cases is aided by their common focus on bonds and bond-like structures. Bonds are financial instruments sold on market exchanges or via bespoke trades orchestrated by bankers. They are debts raised by companies and governments to fund their activities. Bonds normally pay back a fixed return over a set period and contain more protection for investors than equity investments. For this reason, they also offer smaller average returns. The use of bonds in sustainable finance is varied, and this paper explores three, summarised in Table 1. It includes 'green bonds', a pioneering 'forests bond' specifically designed to benefit a conservation company, and 'impact bonds' offering a variable return based upon the achievement of pre-set indicators that relate to social goals. By treating several types of bonds as ethnographic objects that can be followed, our multi-sited methodology enables us to ethnographically trace various stages of indicator development: conceptualisation; production; use; effects and impact; and contestation that leads to and from the US, UK, Brazil, Kenya, and Peru. This encompasses multiple different 'stakeholders' as interlocutors in our research, calling for attention to their diverse perspectives.

Long-term engagement exposure to the critical faculties of (some of) our interlocutors

as they engage with the compromise and complexity of creating positive change makes it possible (even incumbent on us) to 'take them seriously', including when we do not agree with them. Furthermore, doing so is a critical resource because of the potential to contrast and compare across and within case studies. In fact, some of our interlocutors are among the most strident critics of others. Their self-reflective analysis of the part they play in 'financialising' people and the planet through their activities energises our critique. However, other interlocutors do not demonstrate the same self-reflective impulse. These differences are material to our analysis of sustainable finance through different bonds and reflect the diversity of financial instruments and actors we describe, and of sustainable finance more broadly.

## GREEN BONDS

Green bonds are perceived as a success story of sustainable finance because they have secured huge amounts of investment: they have 'achieved scale'. Total issuance worldwide has topped \$2 trillion (CBI 2022). They are tradeable debts raised by governments or companies (with the mediation of investment banks) that fund a wide range of climate change adaptation, mitigation, or resilience aims (and claims) across the globe. However, they are not defined by how sustainable the companies (or countries) they finance are perceived or measured to be. Oil companies can issue green bonds, which are defined by the use of loan proceeds to fund projects certified by experts based on envisaged and estimated environmental impacts.

Consider efforts to conceive a bond to fund the Ferrogrão Railway in Brazil, a case study conducted by Author 2. The idea for Ferrogrão followed a 2012 technical feasibility study for a railway that would allow the soybean production from the centre of the country to flow through the ports of Arco Norte, for export. This was commissioned by major Brazilian and multinational agribusinesses that wanted to lower costs and avoid problems generated by road transport. In 2016, the railroad was included in the Brazilian government's Investment Partnership

Table 1. Comparative overview of different bonds.

Bond	Type	Target	Focus	Stakeholder organisations	Status	Market	Impact measurement	Impact indicator
Ferrogrão Railway	Green	Amazon biome in the states of Mato Grosso and Pará, Brazil	Sustainable commodity trade logistics	Brazilian Ministry of Infrastructure Climate Bond Initiative Agribusinesses	Project	Exchange-traded	Implied impact <sup>a</sup>	Size and volume of trades <sup>a</sup> Certification <sup>a</sup>
Forests Bond	Unlabeled	Kasigau Corridor, Kenya	Forest conservation	Wildlife Works BHP Billiton International Finance Corporation (IFC) Investors	Completed	Exchange-traded (London Stock Exchange)	Outcome <sup>a</sup>	Carbon credits sold/carbon emissions offset <sup>a</sup>
Asháninka – Peru Development Impact Bond (DIB)	Development impact	Asháninka indigenous communities from the Ene River Valley, Peru	Sustainable cacao and coffee production and marketing	CARE (Central Asháninka Río Ene) Kemitto Ene (Indigenous Cooperative) Common Fund for Commodities (CFC) Schmidt Family Foundation Rainforest Foundation UK (RFUK) Royal Tropical Institute (KIT)	Completed	Bilateral	Output	Cooperative's increase of supply from members by 20 per cent Members' yield increase >600kg/ha cacao Cooperative's sales increase >35t cacao Members' use on >0.5 ha of leaf rust resistant coffee varieties

<sup>a</sup>Impact measurement and indicators were not explicitly stated by the initiators.

Program (PPI) becoming part of a set of infrastructure works to be carried out in partnership with the private sector.

The intention was that the railroad would transport up to 42.3 million tons of maize and soybeans annually. It would also facilitate the importation of fertilisers and petroleum derivatives as inputs for farming businesses. The proposed extension of 933 km ran parallel to an existing highway (BR-163) but promised increased efficiency, productivity, and profitability for large agribusiness groups. A socio-economic evaluation followed Brazil's transport ministry (DNIT 2016) and European Commission guidelines and used benefit–cost ratio and cost recovery time as the feasibility indicators. Costs of construction and operation were compared with direct benefits (comprising reduction in transport costs, emission of pollutants, and accident costs) and indirect benefits (tax collection and job creation). Other indirect benefits such as 'socio-economic development' were not calculated. One presentation calculated a total of BRL 6.1 billion (US\$1.2 billion) of negative externalities avoided, in terms of accidents and CO<sub>2</sub> emissions. This was described as approximately 50 per cent of the total external costs of the BR-163 Highway. In 2019, the Brazilian Ministry for Infrastructure (Minfra) signed an agreement with the Climate Bonds Initiative (CBI) to progress to certification as a green infrastructure project. The certification of green bonds under the CBI depends on alignment with the Climate Bonds Taxonomy. The purpose of this certification is to provide credible assurance to investors that such investments are 'consistent with a rapid transition to a low-carbon economy', following the latest scientific and political consensus, such as the COP 21 Paris Agreement. The taxonomy identifies eight sectors, 103 asset types, and 198 specific project types needed to deliver a low-carbon economy. These are based on input from hundreds of technical experts, including climate scientists, financiers, and other academics (including through CBI's own sector-specific working groups). It uses a traffic light system to show compatibility with the 1.5°C decarbonisation trajectory agreed at COP 21. Green is automatically compliant, red is

non-compliant, and orange requires additional screening. This is possible through a single, clear screening indicator question provided within the tool. Figure 1 gives an example of the taxonomy for the transport sector. The last column shows whether the specific project type in question is certifiable, indicating specific eligibility criteria have been developed or are still under development.

The taxonomy enables green bond issuers to frame evaluations of their own climate impact and structures the independent verification process undertaken under the authority of the CBI. It also enables the framing of green bonds as an asset class. Aneil Tripathy has analysed this process, citing the charismatic head of the CBI exhorting other climate finance professions: 'The more that we can commoditize and standardize what we do the more deals will flow' (Tripathy 2021). This requires ensuring the validity of claims for environmental sustainability while simultaneously making them as generic as possible. Standardised indicators enable this deliberate ambiguity, but they have not stopped debates about 'greenwashing'. Instead, by using problematic frameworks and definitions, green finance professionals regard themselves as making a series of pragmatic compromises (Tripathy 2021) that are required for their work to influence regulators and investors for the sake of real change on the path to 'meaningful' and 'scientifically validated' progress, such as the 1.5°C decarbonisation trajectory. Acknowledging and exploring such compromises affords indicator literacy.

During our interviews, CBI seemed to accept the government's main argument that Ferrogrão would avoid the need to duplicate the BR-163 highway, already congested with trucks carrying maize and soybeans to the port of Miritituba in Pará. The claim that the railway 'may' help inhibit deforestation by blocking the opening of smaller trunk roads off the highway also seemed to be accepted at face value. When challenged, the CBI specifically referenced three positive aspects that qualified the plans as green infrastructure and eligible for financing through a certified green bond. The first was that rail travel produces lower carbon emissions than road transport. The second was that no station would be built between Sinop in Mato Grosso and


Passenger, freight & supporting infrastructure					
	Asset type	Asset specifics	Paris Agreement compliant	Screening indicator	Certifiable
<b>PUBLIC PASSENGER TRANSPORT</b>	Infrastructure	Public walking and cycling infrastructure and cycling schemes	●		●
		Bus rapid transit systems	●		●
<b>ROAD FREIGHT</b>	Lorries and trucks	Vehicles with no direct emissions (electric or hydrogen)	●		●
		All other types of lorries or trucks (e.g. biofuel-powered or hybrid trucks)	●		
<b>FREIGHT RAIL</b> 	Trains	Rolling stock for electrified freight rail	●	Fossil fuel freight must not be more than 25% of the freight transported (in tonne/km)	●
		Rolling stock for non-electrified freight rail	●	(i) Fossil fuel freight must not be more than 25% of the freight transported (in tonne/km)  (ii) Transport meets universal gCO <sub>2</sub> /t-km (tonne-kilometre) threshold	●
	Infrastructure	All infrastructure for electrified freight rail	●		●
		All infrastructure for non-electrified freight rail	●	Eligible if the associated rail is eligible	●

Figure 1. Climate bonds initiative taxonomy in the transport sector (CBI 2021).

the port nearly 1,000 km away. This suggested that the potential for environmental degradation around the route was limited. They ignored the proposal for a charging station in Matupá, at the intersection of two indigenous lands and connecting BR-163 to a minor road (MT-322) that crosses the Kayapó indigenous land (Terra Indígena Kapoto-Jarina) at its boundary with the Parque Indígena do Xingu. Indigenous groups argued that this would lead to increased traffic on the minor road, and therefore on both indigenous territories. This problematised CBI's third assertion is that the railway did not cross indigenous lands. Indigenous groups and NGOs argued that the railroad will nevertheless impact at least 14 indigenous and environmentally protected lands. However, neither the taxonomy nor the detailed criteria for 'Low Carbon Transport' (CBI 2022) contain any reference to understanding such spatial nuance, or the legal right to 'free prior and informed consent' that indigenous people in Brazil have asserted in opposition to the railroad. The

taxonomy affords little room for this form of political contestation because it is occluded within the political process of developing a sustainable financial product.

It is important to acknowledge that the green bond has not been issued and may never be issued, at least as a certified green bond, but also that soybean production is inextricably linked to deforestation in the Amazon (Vasconcelos *et al.* 2020). It occurs within contexts of demand for cattle fodder in European livestock-producing countries and for meat and other animal products worldwide. Indicator literacy calls for acknowledgment of the social structures and geographical configurations in which indicators and financial technologies based upon them are constructed.

Where does this leave claims about the measurement of positive environmental impact or the balance between commodifying nature and creating a real and radical alternative to environmental degradation? One of the key things that certification does is to



render the 'green' aspects of green bonds ultimately qualitative, yes or no, rather than quantitative. Detailed measurement, complex indicators, and calculative practices are material to CBI certification. But rather than measuring the results of the investments the bonds fund, these only generate forecasts that are sufficient to generate the label. Instead, it is the size and traded volume of the bonds themselves that stand as measurable indicators of impact, indexing a growing market for green-labelled financial products (but not positive environmental outcomes).

Arguments made by the CBI, whose role is to certify the 'green credentials' that make a green bond, offer pause for thought. This is especially because it is the 'closest thing to a gatekeeper for the industry' (Chappatta 2018). Tellingly, CBI told Author 2: 'we always look for alternative scenarios to the proposed project. If the project is not certified, they will do it anyway'. Despite many policy reversals in Brazil following the victory of Luiz Inácio Lula da Silva over Bolsonaro in October 2022, it seems likely that the Ferrogrão railway will still be a priority for the new government.

## FORESTS BOND

The success of green bonds made them an inspiration for different actors aiming to harness the power of capital markets for environmental and social good. Our second case study is a 'Forests Bond', developed to support the market for voluntary carbon credits. Beginning in 2014, the International Finance Corporation (IFC), itself a major issuer of green bonds, saw a possibility to build a template for 'institutional investors' to finance efforts to combat deforestation by supporting carbon offsetting. This necessarily involved making it easy to 'understand' for these investors. Understanding here does not connote intellectual capacity but rather the resonance between different goals and ways of framing them. As one investment banker put it: 'Unlike corporates, which could buy offsets for their own sustainability efforts, asset managers are indexed to some index that does not include carbon credits'. This made it challenging to evaluate performance, which

is 'indexed' or 'benchmarked' against similar investors and investments. Further challenges included limited access to information about carbon markets and prices and low levels of liquidity that could make these assets difficult to sell. This was problematic, even for 'activist investors', meaning investment firms, funds, and individual managers who made prominent commitments to sustainable investing more broadly.

To link forestry-based emission reduction projects to capital markets, the IFC drew on the idea of a financial mechanism called a stripped bond. A stripped bond is one in which the principal (money raised through the issue of a bond) is separated from the coupon, or interest component (the financial return paid to the investor), into two separate securities that can be sold separately. One of the IFC's teams explained to Author 1 that:

It could be issued in another currency, maybe it could be carbon, and not a cash coupon. We were also thinking about some kind of impact-based product. .... Depending on the size of the bond that would give you a couple of million. So, the idea was that investors would not get a cash coupon instead we would use the foregone coupon to invest in a project that could create carbon reductions.

Although this seemed attractive and the IFC had positive conversations with potential investors in a product linked to the voluntary carbon credit market, gaining commitment proved challenging for several reasons. One was a lack of institutional expertise: potential investors did not have experience with carbon markets (and the IFC team found the subject often fell between different teams). A second problem was the extreme challenge of forecasting the value of carbon credits, even with longstanding expertise in carbon finance. Both problems were addressed by the mining multinational BHP Billiton. At the time of the development of the bond, the company had been prominently criticised as the world's 20th largest carbon emitter. Against this background, several interlocutors suggested the company had 'serious commitment to doing something' about its emissions through combatting deforestation.

BHP's upfront commitment to purchase \$12 million in carbon credits from IFC to offset against its own emissions was essential to the design of a product that was able to mediate between the requirements of different stakeholders in a bond. After more than two years in development, the Forests Bond was listed on the London Stock Exchange in 2016. It paid an annual coupon of 1.546 per cent to investors until it matured five years later. How did this work? The proceeds of the issuance could be used by the IFC to finance any projects that met its normal lending criteria. They did not buy VCUs or support deforestation projects. What made the bond a 'forests bond' was how investors were paid. They could choose to receive the coupon in cash or in carbon credits. The carbon credits would be bought from a REDD+ project in Kenya, the Wildlife Works Kasigau Corridor Project. These were verified under the Verified Carbon Standard (VCS), administered by the subsequently controversial non-profit Verra, and as Climate Adaptation and Biodiversity Gold Level by the Climate, Community and Biodiversity Alliance (CCBA). The IFC agreed to guarantee the purchase of up to \$12 m worth of carbon credits over five years. Essential to the mechanism (and its label as a forest bond) was that BHP provided upfront funding to IFC sufficient to buy any and all carbon credits that investors did not want at a fixed price. This was referred to as a 'price support' mechanism in the prospectus that was the basis of the legal contract. So, for example, if investors chose to be paid in cash (which all did), then the return would still be linked to the preservation of forests through carbon credits bought from Wildlife Works by BHP at the fixed price of \$5.

Critics have suggested the Forests Bond was 'greenwash' because it did not engage with questions about the additionality of and externalities relating to claimed 'direct impact' such as cutting carbon dioxide emissions from deforested land. Conversely, measurement and verification of direct impacts by respected and independent non-profit organisations were repeatedly emphasised by different stakeholders in interviews and written documentation as a counterargument to accusations of greenwashing. As in the case

of green bonds, this was sufficient as a qualitative stamp of approval. The opportunity to interrogate what such numbers meant was limited because the overarching 'sustainability' goals of the bond's creators and investors focussed on the longer term aim of promoting market-based mechanisms. This often meant not asking who they work for or testing what they do. As one proponent put it:

The proposition of a voluntary carbon credit-linked bond must be simple enough that a mainstream investor does not need to understand how to choose one international standard over another, whether or how to assess the environmental and social integrity of the underlying projects, or how to determine the inherent quality of the carbon credit (Rosembuj 2022)

Inherent, and almost explicit, in this goal is the obfuscation of the worldwide environmental cost of BHP's CO<sub>2</sub> emissions alongside its numerous corporate controversies. The complicity of consumers and investors in North America and Europe with the Australian-headquartered company's mining and metal extraction operations is also obscured in the name of creating an 'investable proposition'.

At the World Bank's Innovate4Climate conference in 2022, reflecting on lessons learned after the five-year bond matured in November 2021, representatives from all the key actors who were present referred to it as a major success. They also acknowledged that no investors bought carbon credits and that none of them would be prepared to accept a return in carbon credits today. What did 'success' mean then? Such depictions were not because different actors were blind to its limitations but because of how they defined (and measured) success. For Wildlife Works, the sale of carbon credits through the bond enabled the project to survive at a time when low carbon prices threatened its existence. BHP was able to use funds to offset their carbon emissions to make additional claims to catalyse funding to combat deforestation, although it was noticeable they did not take an active role in the conference. One portfolio manager at the asset manager, who was the lead investor, described the bond as 'tremendously successful. Creating the right template for future bonds in the space around carbon

credits .... Direct use of proceeds, which is so important to us, and measurable outcomes'. During interviews with Author 1, other investors were more equivocal about the importance of KPIs to their decision to invest. One family office with clear organisational KPIs said the investment was not made with these in mind but because the bond combined extremely low financial risk with an innovative product to stimulate more sustainable finance: 'it was a no-brainer for us'.

Our questions about the logic of carbon offsetting, or unintended consequences for people in the area of the project supported by the Forest Bond, were uncomfortable challenges to the good intentions of some of its instigators. But unexpectedly, one of the key investors in the bond acknowledged the value of such an orientation when he told Author 1: 'As a fixed income investor, my job is to work out what could go wrong. You're telling me something that could go wrong that I haven't considered before'.

## IMPACT BONDS

The financial success of green bonds and attempts to emulate them through the forest bond can be compared with a near-contemporary financial innovation envisaged as a new asset class that would maximise non-financial value and is the subject of our third case study. 'Impact bonds' are not typical products that provide a fixed income but contractual debt arrangements for the provision of welfare, development, or other services in which repayment is contingent on achieving targeted outcomes. An investor covers the upfront capital required by a provider to deliver a service that an outcome payer will pay for. This outcome payer (also known as the commissioner) specifies a set of measurable outcomes and agrees them with the investor (and in some cases, the service provider) before signing the contract. The investor is only repaid if these outcomes are achieved. An independent verifier decides on the achievement of these outcomes. Advocates for this 'results-based finance' have claimed it can transform the operations and efficiency of governments, aid agencies, and NGOs. Critics

point out the attendant costs, limitations, and re-production of injustices, including profit generated from vulnerable and/or marginalised people (Kish & Leroy 2015).

The Asháninka – Peru Development Impact Bond was launched in 2015 by the Common Fund for Commodities (CFC), a financial institution established within the framework of the United Nations, as an outcome payer. The Schmidt Family Foundation, the personal philanthropic vehicle of long-time Google Chairman Eric Schmidt, was the investor. The NGO Rainforest Foundation UK (RFUK), alongside its partners in Peru, was the delivery organisation. The fourth key stakeholder was the Royal Tropical Institute (KIT) as an independent verifier of the outcomes of the project. The DIB aimed to support sustainable cocoa and coffee production and sale to benefit the Asháninka people of Amazonian Peru.

As a pilot, the DIB was small (\$110,000) and designed to be tested over a brief period (10 months). It focused on providing training on collection and storage methods for cocoa (and, to a lesser extent, coffee), investment and support in the capacity of Kemito Ene as the organisation capable of marketing Asháninka produce, and providing training and support for controlling diseases and promoting sustainable farming techniques. The DIB's 'headline' goals were twofold. Firstly, to increase the productivity of indigenous Asháninka members of the Kemito Ene Producers Association (KEA), a coalition of farmers supported by RFUK and a local political organisation called CARE (Central Asháninka Río Ene). A second and underlying aim was the strengthening of the production (and sales) process itself, with lasting benefit for KEA members, their families, and the broader community. Of course, different actors had different aims. RFUK had a particular interest in capacity-building Kemito Ene as an organisation and promoting sustainable agro-forestry techniques. The CFCs were focused on yield. These different goals had to be distilled into 'key metrics' that were at the heart of the DIB contract and upon which payment depended. Negotiations over developing metrics for diverse and complex aims took considerable time. As one interlocutor put it: 'I don't think any of us realised how

difficult it would be to agree on the indicators at the start of the process'. The institutional biases they expected were not always present; for example, the implementer argued for more challenging targets, including one that was not achieved, that were not in its narrow financial interests.

Ultimately, four key indicators were agreed. They were necessarily output-focussed, with a primary focus on yield, sales volume, and inputs. Two also specified a minimum proportion of the membership of Kemito Ene (60%) who had to meet the target, addressing a longstanding tendency for purely output-focussed agricultural initiatives to benefit only the wealthiest members of target communities. During multiple interviews, different stakeholders were explicit about the limitations of the metrics used and the complexities hidden by them, but it was clear that they made compromises they felt were required. In part, like the Forests Bond, the success of the DIB was indexed by its existence because it brought together such a diverse group with near-incompatible aims.

A potential second DIB negotiation, begun in 2018 by RFUK and CFC (now acting as investors) with the private Good Energies Foundation as outcome payer, enabled Author 2 and Author 1 to better understand key interlocutors' deliberations. Led by RFUK, the stakeholders decided against the use of the DIB structure and in favour of a conventional grant, although they also committed to reflecting on their deliberations. There seemed to be several mismatches between different partners: in terms of outcomes versus outputs focus, concerns about who would bear the risk, and what kind of flexibility they wanted from the DIB. Here, we can reflect on only one aspect.

During a group discussion we facilitated with different interlocutors following separate interviews with multiple parties, one area for discussion was the extent to which metrics convey the aims of the intended beneficiaries of the bond and even the way that they conceptualised their lives. Although Authors 1 and 2 were not able to conduct fieldwork in indigenous communities due to the COVID pandemic and its aftermath, Author 2's longstanding experience of conducting research among indigenous Amazonian communities led her to ask how different interlocutors

felt that the bond was able to accommodate the way Asháninka people relate to their environment. While staff at RFUK immediately expressed interest and a sense of frustration that the indicators left no room for such understanding, another stakeholder told us, 'I hadn't realised this and I don't really know how we could even create a metric for this'. Importantly, for our purposes, however, and returning to our interest in indicator literacy, they were interested in exploring if and how this might be possible, rather than suggesting it was unimportant because it could not easily be measured. They explained the problem in terms of their professional roles. To make such conceptions matter to decision-makers within their own organisation, they needed the right representation through numbers. It is not our purpose to suggest what that would involve in this article, but to reflect on an important realisation for our interlocutors: what was not represented by their indicators. This allows us to return to the question of the relationship between morality and metrics (and what indicator literacy adds to it).

## METRICS AND INDICATOR LITERACY

Sustainable finance pioneers such as Ronald Cohen's invoke measurement techniques and technologies as constitutive of a new 'moral' counterpart to Adam Smith's 'invisible hand'. Discussing metrics with interlocutors who piloted but then turned away from a DIB to support sustainable agriculture for indigenous people in Peru helps us critically reflect on such claims. The 'outcome-based' payment structure on offer from impact bonds must be distinguished from the input-focussed abstraction of labelling 'green' bonds. However, at an analytic level, there is something common to them, that the popular evocation of Smith's invisible hand speaks to (Muehlebach 2012, pp. 27–28). It is an emblem of the belief that market-based relations are inherently 'democratic' because they enable informed choice by different parties about what they 'need', or desire (Marouby 2007, p. 99). This is often expressed through the metaphor of the invisible hand that coordinates those pursuing

their own interests through the exchange of information and perspectives afforded by market-based transactions. This equates the right course of action with the (economically) rational course of action: supply and demand are negotiated through price as a metric of value based on scarcity that enables deliberation about costs and consequences (Brown 2003). Advocates such as Cohen seem to regard the production of metrics about non-financial goals as the basis of an equivalent system for non-financial goals, where participants are not pursuing their own (narrow) interests but can coordinate through the right metrics that show 'impact'. However, as we have shown, our interlocutors struggle to straddle the gulf between what is claimed and what is measured. As our most thoughtful and self-critical interlocutors themselves noted during discussions, these instruments do not often attempt to account for the worldviews of one group (referred to as beneficiaries) because impact is primarily defined by another (the outcome payer) in combination with the other 'key stakeholders'. This prevents considerations of Amazon cosmologies (Bonilla 2016), but also more generally limits broader relationally- and spatially-informed analysis of investments. For advocates, investment is an efficient means to achieve positive outcomes through the allocation of capital using appropriate metrics. Such framing obscures the organisational effects of ideologies that predominate in the City of London, California's Silicon Valley, New York's Wall Street, and Washington, D.C. As an ethnographic contribution to critical geographies of sustainable finance, indicator literacy can draw attention to the limits of what financial actors are willing to acknowledge and measure. It might also help inform interlocutors who are willing to work beyond the limitations of existing and reductive metrics.

Within this paper, empirical material from three case studies (the Ferrogrão Railway, the Forests Bond, and the Asháninka – Peru Development Impact Bond) has allowed us to explore three facets of indicator literacy that afford a contextually-informed perspective with which to critically analyse metrics used to describe complex social, spatial, and scalar phenomena. Firstly, we have pointed

to 'expertise inertia' that characterises the production and use of metrics in sustainable finance bonds. Spatial networks that constitute these bonds (at different scales) obfuscate the voices of indigenous people who fear their lives will be negatively affected by the Ferrogrão Railway, cosmologies of human–nonhuman relations for Asháninka cocoa growers, and debates about whether carbon markets combat deforestation. National laws and corporate cultures in the USA and Europe regarding 'fiduciary duty', necessarily making financial return the priority for professional investors, set boundaries for what is possible in Brazil, Kenya, and Peru. Secondly, we have problematised straightforward opposition of qualitative and quantitative knowledge as the basis of critique. Evaluation of all three bonds is often qualitative, whether through their existence itself or the labels they generate of 'green' or 'social' value. Conversely, their success can be indexed by the volume of money invested in them rather than the non-financial value measured.

A third facet of indicator literacy incorporates the perspectives, debates, and doubts of our interlocutors as a resource for critical thinking. This has informed an original critique that is generalisable across green, forests, and impact bonds. It also points to differences between them. Our case studies suggest that changes sought by impact bond implementers (such as building the capacity of indigenous cooperatives) are more difficult to express faithfully in terms of quantitative indicators than the aims of green bond issuers (such as the construction of 'green' infrastructure). Paradoxically, there is a greater onus on these smaller actors to demonstrate success using quantitative measures. Acknowledgement of this greater burden of measurement (because of greater emphasis on impact itself as a criteria for success) draws attention towards incentives to use inappropriate measures of success. Rather than making normative claims in favour of impact investing over green or forest bonds, indicator literacy helps to orient critical evaluation of a broad range of claims made for sustainable finance with reference to space, scale, and perspectives that are often ignored. As such, it moves beyond

straightforward critiques of metrics as acts of greenwashing or financialisation in themselves in order to understand the processes and ethical standpoints that are influenced by and reproduced in sustainable finance. This neither obfuscates the enduring power of metrics nor merely denounces it as tyrannical but attends to what it does, for whom, and with what consequences. Pursuing this comparatively, diversifying the perspectives that count when thinking about sustainable finance, is a contribution that ethnographers are well positioned to make within critical geographies of sustainable finance.

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