Imagining Impact in Global Supply Chains

Data-Driven Sustainability and the Production of Surveillable Space

Archer, Matthew

Document Version
Final published version

Published in:
Surveillance and Society

DOI:
10.24908/ss.v19i3.14256

Publication date:
2021

License
CC BY-NC-ND

Citation for published version (APA):
Archer, M. (2021). Imagining Impact in Global Supply Chains: Data-Driven Sustainability and the Production of Surveillable Space. *Surveillance and Society*, *19*(3), 282-298. https://doi.org/10.24908/ss.v19i3.14256

Surveillance & Society

Article

Imagining Impact in Global Supply Chains: Data-Driven Sustainability and the Production of Surveillable Space

Matthew Archer

Copenhagen Business School, Denmark
mbarcher@protonmail.com

Abstract

In the context of global agrocommodity supply chains, the sociotechnical imaginary of neoliberal sustainability is characterized by a belief that the impactfulness of market-based solutions like fair trade standards and voluntary certification schemes relies on the transparency and traceability of those supply chains. Achieving transparency and traceability, however, relies on the collection, analysis, and dissemination of data about numerous social, environmental, and economic factors, data that are generated through increasingly intensive regimes of high-tech monitoring and surveillance. For my interlocutors, who work to design and promote these standards, surveillance comes to be seen as not only justified but also expected and necessary, leading to the tacit categorization of certain spaces (and the human and non-human actors who populate them) as surveillable. In the case of sustainability standards specifically, which are imposed almost exclusively on producers in the Global South, the notion of surveillable space raises important questions about race and gender.

Introduction

Over lunch one Friday in the office cafeteria, I introduced myself to Emily, Michael, and Bruno, three employees of a standards development organization where I spent a week conducting participant observation and ethnographic interviews in the spring of 2020.[1] I told them about my research on the role sustainability standards play in the governance of the Kenyan tea supply chain (part of a collaborative, multi-sited ethnographic research project on the topic) and asked them about their work. Michael chuckled, telling me he was "just an accountant" and that most of his days were spent processing reimbursement claims from colleagues who had recently traveled for work. He then quickly excused himself and went back to his desk, wishing me good luck with my research. Bruno and I turned to Emily as she told me that she was a data analyst, using GIS (geographic information system) technology to map the adoption and impactfulness of her organization's sustainability standards, and that she spends most of her time working on new ways to promote traceability in global agrocommodity supply chains. Bruno interrupted her by leaning over and squeezing her shoulder: "Emily's our drone and satellite girl." She rolled her eyes as he continued, "So you better not make her mad, or she'll send one to your house!" Emily laughed, jokingly threatening Bruno, "You better watch out! I know where you live."

[1] All personal names in this essay are pseudonyms to protect the anonymity of my interlocutors. I have also chosen not to identify the name of their employers for the same reason, although when referring to publicly available documents, I do refer to specific organizations.

Archer, Matthew. 2021. Imagining Impact in Global Supply Chains: Data-Driven Sustainability and the Production of Surveillable Space. *Surveillance & Society* 19(3): 282-298.
https://ojs.library.queensu.ca/index.php/surveillance-and-society/index | ISSN: 1477-7487

We spent the next ten or fifteen minutes talking about the kinds of data Emily analyzes and why. GIS tools allow her to correlate spatial data derived through GPS (global positioning system) coordinates and satellite imaging with social, environmental, and economic data collected through audits, surveys, disclosure requirements, academic research, and other methods of data collection. She raised concerns about transparency and traceability that are familiar to anyone involved in the development and management of global supply chains, arguing that these qualities were necessary to facilitate sustainability in the global agro-food industry, and that new technologies like the drones and satellites Bruno had joked about moments earlier, when deployed in tandem with blockchains and artificial intelligence, were the best way to promote them. She gave a number of examples of issues she thought these kinds of technologies could help solve, from the pervasiveness of child labor on Ivorian cacao farms to the rapid encroachment of soy plantations into the Amazon rainforest.

When I asked for specifics, she was happy to elaborate, even if she was speaking mostly hypothetically. A traceability system for cocoa, she argued, would make it easier for buyers to notice discrepancies between how much cocoa a farm claimed to produce, how much buyers paid for that cocoa, and how many workers farm and factory managers claimed to employ. High production values but low employment figures might indicate that some workers are being paid under the table, that there are cases of unfree labor, or that children are working on the farm. Storing these data on a blockchain would ensure that they were tamper-proof and could be securely shared between different stakeholders, thus improving transparency as well as traceability, a kind of techno-optimism that is increasingly common in the global food industry (Wang 2020). In the case of deforestation, Emily claimed that it should be fairly straightforward to use GPS coordinates to plot the boundaries of rainforest-adjacent farms and then use satellite imaging to check whether they were expanding into neighboring rainforests from year to year. I asked her if she was working on any of these tools for tea specifically, and although she was focusing mostly on cocoa, soy, and palm oil, she assured me that, once these solutions were developed for certain commodities, they would be easily "scalable," able to be exported to different contexts and applied on a scale larger than the individual farms where these solutions are currently being developed and tested.

Emily's unmitigated optimism about the role of technology left an impression on me, not because I hadn't heard it expressed in numerous interviews with her colleagues and with people working in different standards organizations and multinational corporations but because of how ordinary it all seemed to her. In Emily's worldview, these technologies of monitoring and surveillance, which in another context might be a better fit in a dystopian sci-fi novel, were so mundane that they had become fodder for lunchtime banter with colleagues over a plate of pasta salad and falafel, something that she could talk about as casually as she would recommend tourist sites and restaurants I should visit later in the week. Beneath her casual treatment of the promise of these technologies, however, is a relatively unquestioned assumption about the kinds of spaces where these technologies are deployed to collect data, namely, that they are spaces that can be more or less indiscriminately monitored and surveilled, that there are certain kinds of spaces—in this case, farms and the forests that surround them—that are intrinsically *surveillable*. The goal of this essay is to better understand that assumption and its implications, focusing in particular on the way Emily and other interlocutors, through their work trying to generate technologically mediated, data-driven sustainability impacts, contribute to the production of what I call *surveillable space*.

My fieldwork in the organization where Emily worked was just a small part of a larger effort to understand the way sustainability standards are produced and the role these standards play in the governance of global supply chains. Although many of my interlocutors work on standards that can be used to certify a number of different commodities produced in numerous countries across the Global South, I conducted this research in the context of a larger project that focused explicitly on the Kenyan tea supply chain and includes sites in Mombasa (the tea auction and brokerage firms), Kenya's Rift Valley (tea estates, smallholder farms, and processing factories), Nairobi (certification bodies), and Dubai (trading firms). In addition to the week of fieldwork described above, I have conducted around seventy interviews with people working in standards development organizations, industry groups, trading firms, certification bodies, multinational corporations that own well-known tea brands, and local tea shops in both the US (Washington, DC) and Europe

(Denmark, Germany, the Netherlands, and the UK). I have also assembled an archive of current and previous versions of various sustainability standards, impact evaluation reports, corporate sustainability reports from companies that produce and sell tea, industry white papers, and other documents that relate to the sustainable development of the Kenyan tea industry. Thus, while much of the analysis below draws on tea-specific examples and conversations, the results should be seen as more general, since none of my interlocutors focus exclusively on tea (with the exception, perhaps, of the local tea shop owners I interviewed). Even people who currently work as tea traders or those who work on tea-specific sustainability standards invariably have previous work experience with other commodities, from spices to coffee to timber.

With that in mind, this essay explores the relationship between surveillance, space, and sustainability, focusing on the way this relationship manifests in the sociotechnical imaginary of voluntary sustainability standards and the way that this imaginary is structured around entangled accounts of transparency, traceability, and impact. I argue that the increasingly "data-driven" approach to sustainability in global supply chain management not only justifies but requires the intense and invasive monitoring and surveillance of agrocommodity production sites (and the human and non-human actors who inhabit them), since the data required for data-driven sustainability is generated through monitoring and surveillance, producing what I refer to as *surveillable space*, spaces where there is an expectation of surveillance, even if they are not (yet) surveilled. In theorizing this, I bring together classic accounts of space and surveillance (e.g., Thrift and French 2002) with more contemporary critical theories of technology, data, and surveillance, especially Benjamin's (2019) notion of the "technological benevolence" and the metaphors Chun (2011) relies on in developing her theory of "programmed visions." Armed with the advanced technologies of monitoring and surveillance that allow them to enact their sociotechnical imaginary of sustainability and its impacts, standardizers emerge as self-styled saviors of a world on the brink of collapse (see Reinert 2019 on "salvific violence").

Sustainability, Surveillance, and Space

Much like post-9/11 supply chain security efforts "unleashed a variety of highly racialized programs that introduce new forms of biometric surveillance" (Cowen 2010: 604), growing concerns about transparency and traceability in global supply chains have precipitated increasingly intense and invasive surveillance regimes in agrocommodity production sites in the Global South, justifying and ultimately necessitating the surveillance of these sites in the name of sustainability. Regarding transparency, Stephen Gill (2008) has shown how international organizations like the International Monetary Fund (IMF) work to establish an expectation of transparency in countries in the Global South as a way to justify and institutionalize increased surveillance. Regarding traceability, Nanna Bonde Thylstrup (2019: 1, 3, 7) argues that we "live in a new culture of traceability" in which "datafication has also accelerated and distributed the means of traceability exponentially, thereby amplifying and modulating processes of inscription and tracking" and leading to a "form of value extraction… where individuals become by-products of the data capitalist mode of knowledge production."

Sustainability standards like the Rainforest Alliance's sustainable agriculture standard, Fairtrade International's various commodity- and labor-specific standards, the Forest Stewardship Council and Marine Stewardship Council's labeling schemes, and the increasingly popular Roundtable on Sustainable Palm Oil are all examples of what Cashore (2002) refers to as non-state market-driven governance systems. Guthman (2007) identifies sustainability standards in particular as a key technology of neoliberal governance (see also Mutersbaugh 2005; Ponte, Gibbon, and Vestergaard 2010). In an analysis of attempts to impose so-called quality standards on the Alaskan salmon industry, Hébert (2010) traces not only the limits of these standards via-à-vis both local cultural histories and political ecologies but also a general outline of the paradoxes of commodifying sustainability through the production of sustainable products: many of the things required by standards directly contradict the ostensible goals of standardization. One of the most interesting examples of this in Hébert's (2010) work is her observation that the material qualities of salmon that sustainability advocates promote in the Alaskan salmon industry as a way of distinguishing Alaska's wild-caught salmon from farmed salmon originating in places like Norway—i.e., supple, unbruised

pink flesh—are qualities developed and promoted by the salmon farming industry itself. The same dynamic emerges in the use of sustainability standards as a technology of governance in other agrocommodity supply chains. As I show below, especially as sustainability standards become increasingly, in the words of my interlocutors, "data-driven" and "evidence-based," the enhanced stringency of these standards and their associated certification processes end up diminishing the longer-term viability of the tea industry, from prohibiting subsistence agriculture on the edge of smallholder farms to making it riskier to pass farm knowledge on to children to the sustainable (but, according to the standard, illicit) exploitation of local forest resources (see also Sodikoff 2009; Dove 1998). Increased monitoring and surveillance of farms, farmers, and their surroundings are fundamental to this.

Surveillance studies scholars have been interested in the spatial dynamics of monitoring and surveillance for some time (Thrift and French 2002; Graham and Wood 2003; Crampton and Elden 2007), an interest that has been enhanced by the emergence of new surveillance technologies like drones and satellites on one hand (Millner 2020), and the proliferation of "smart city" discourses on the other (Alvarez León and Rosen 2020). These increasingly digitalized forms of surveillance are not only quantitatively different from earlier forms of "analog" surveillance, but qualitatively different as well, especially to the extent that they facilitate the development of more automated regimes of surveillance (Graham and Wood 2003). This article contributes to this literature by theorizing the categorization of particular kinds of spaces as surveillable, even if those spaces are not actually surveilled (or not *yet* surveilled).

Surveillance studies scholars have written extensively about "sites of surveillance" and "spaces of surveillance," such as airports and sporting events (Klauser 2016), schools (Hope 2010), and border crossings (Aas 2011). Farms, too, have become a topic of interest in surveillance studies, and this article responds directly to Francisco Klauser's (2018: 372) call to "study the performative role of techno-infused 'sustainability talk'" and to critically explore the way concepts like vulnerability, sustainability, and impact "are understood and addressed in particular smart-farming projects." The monitoring and surveillance of farms is increasingly automated, mediated by technologies like drones, satellites, and blockchain-enabled platforms that store, analyze, and disseminate data that gets reframed, under the sign of sustainability, as social and environmental impacts. But, as Monahan and Mokos (2010: 25) argue in their study of environmental quality sensors in urban areas, "when technical systems for sensing environmental danger are deployed without simultaneous attention to correcting underlying conditions of environmental pollution or social inequality, the systems may do more harm than good: the systems may normalize, and perhaps exacerbate, root problems of contamination and unequal exposure." This resonates with critical analyses of surveillance, data/datafication, and space in the context of public health interventions. Reflecting on "everyday practices of enumeration and statistical representation," Sangaramoorthy and Benton (2012: 288–289) observe that "the interpretation of seroprevalence surveys, routine disease surveillance, and census data relies on predetermined categories of space, as they also reproduce distance between the places where the data are collected and where they are 'cleaned,' analyzed, and disseminated." The datafication, and presumably the digitization, of medical surveillance also "reflect[s] and perpetuate[s] distance between those who serve as objects of analysis and those who perform the analysis."

Building on these interdisciplinary insights, the notion of surveillable space developed in this article seeks to shift attention from particular (in the sense of both specific and seemingly disconnected) sites of surveillance to the work that goes into legitimizing the surveillance of those sites, thereby emphasizing the spatiality of what Haggerty and Ericson (2000) have theorized as the "surveillant assemblage" and extending Thrift and French's (2002: 331) theory of the "automatic production of space," which deals with the way software-as-a-technology-of-ordering has "[become] one of the chief ways of animating space." Examining these dynamics in the context of global agrocommodity supply chains originating in the Global South enriches critical theories of surveillance and space, which tend to be empirically grounded in Europe and

North America, with a particular focus on smart cities (e.g., Galdon-Clavell 2013) and policing (e.g., Sewell, Jefferson, and Lee 2016; Benjamin 2016; Minocher and Randall 2020).[2]

Datafied Impacts in the Sociotechnical Imaginary of Sustainability Standards

Standardizers are people and organizations who are involved in the development, promotion, adoption, and enforcement of standards, which are "rules about what those who adopt them should do, even if this only involves saying something or designating something in a particular way" (Brunsson and Jacobsson 2000: 2–4). This includes organizations like the Rainforest Alliance (RA), Fairtrade International (FLO), the World Fair Trade Organization (WFTO), the International Organization for Standardization (ISO), national standards organizations like Danske Standard, etc. It also includes the many actors who are involved in negotiating and enforcing those standards, including certification bodies (such as NEPCon and Africert), large multinational corporations (such as Unilever, Starbucks, and Tata Global Beverages), representatives from powerful industry groups (such as the Kenya Tea Development Authority), and others who are consulted during the development and revision of standards. The standards that standardizers develop and promote are a key technology of neoliberal governance (Guthman 2007; Ponte, Gibbon, and Vestergaard 2010; Loconto and Busch 2010; Smith 2014). As Smith and Lyons (2012: 199) argue, "ethical, fair and organic standards reproduce market-based inequalities through audit technologies that advance global neoliberalism." Within this discourse, the collection of data about workers and the environment through invasive technologies of monitoring and surveillance is positioned as something that is necessary to be transparent about sustainability's social and environmental impacts, which in turn is necessary for those impacts to manifest (Gale, Ascui, and Lovell 2017; Ascui, Haward, and Lovell 2018).

When I started this research in the summer of 2018, both RA and FLO were in the process of revising their standards. Sustainability standards are usually revised every few years (depending on the standards development organization), a process that has become standardized itself through, for example, the ISEAL Alliance's codes for standards development and revision. FLO was revising its tea standard specifically, while RA was revising its general standard following its merger with UTZ (formerly Utz Kapeh), a competing standards development organization that is popular in Europe and most commonly associated with coffee and chocolate. As two of the most well-known standards, other actors in the industry were aware of the revision and many of the people I talked to in companies and other organizations, from competing standards organizations to non-governmental organizations (NGOs), had participated in the revision process by responding to FLO and RA's respective calls for public consultation.

The revised versions of both of these important standards emphasize the growing role of the collection, analysis, and disclosure of production and exchange data, including data about both inputs (e.g., fertilizer usage to employment statistics) and outputs (e.g., production quantity and price). For example, according to a 2019 draft version of RA's new standard:

> Through the new certification system, Rainforest Alliance will facilitate data on sustainability practices and outcomes to producers, companies and other supply chain actors…. This indicator data would be used to assess compliance, support farm and group management self-learning, and potentially report to other supply chain actors in a secure certificate holder "member profile"…. Depending on the topic, data can be collected through internal sources such as the farm or group's internal management system or a trader or buyer monitoring and evaluation system, or through external sources such as the certification assurance process, external data sources such as satellite imagery, or by other credible and mutually agreed upon 3rd parties. Data used for

[2] Benya's (2016; see chapter six in particular) analysis of the surveillance of women mine workers in South Africa is a notable exception to the overwhelming empirical focus on Western urban policing among scholars of surveillance, race, and gender.

> compliance and external reporting may also be verified and analyzed through the assurance process. (RA 2018: 6–7)

Similarly, in a document describing the main changes in FLO's "small-scale producer organizations" standard, the role of enhanced data collection was clear (FLO 2019). The new standard includes a "best practice suggestion to point out farm assessments could be used as a tool to identify risks of compliance of members against the Standard with the aim to promote simple, good and robust data collection" (FLO 2019: 5). The process of "monitoring and assessing performance of members" changed from a development requirement (something a certified organization has to show progress on) to a core requirement (principles that certified organizations must comply with), which was done in order to "strengthen organizational and business capacity of organizations, following the stepwise approach towards a management system, recognizing and building on existing practices" (FLO 2019: 5). During the consultation process where various stakeholders were able to comment on the proposed revisions, one of the main points was a lack of indicators about various challenges producers face. For many of these challenges, from the difficulty of combatting slavery in global supply chains to insufficient and unsafe housing for farmworkers, the solution was to introduce new indicators or refine existing sets of indicators and to make the collection and disclosure of data about these indicators a core requirement (instead of a development requirement). What is clear from these changes is that the best-known purveyors of voluntary sustainability standards are increasingly committed to the datafication of certification regimes, and that they see datafication as increasingly central to their mission of generating sustainability impacts. Impactfulness, as it were, is perhaps the key dimension when it comes to measuring and evaluating the success of a sustainability initiative like private certifications schemes. Data about uptake and coverage, as well as data generated through audits and economic analyses of the effects of standards, all come to be seen as evidence of a standard's impactfulness (or in some cases, lack thereof).

This preoccupation with data is not limited to large, private sector-adjacent organizations. Many of the people I talked to in organizations that are critical of RA and FLO also believed that more accurate data about social and environmental impacts would show that companies like Unilever, which committed to sourcing its Lipton tea exclusively from Rainforest Alliance-certified sources and more recently committed to sourcing all of its tea from "sustainable" sources, and Tata Global Beverages, which has made similar commitments, were less concerned with sustainability than their "bottom lines." Even in their critiques, my interlocutors' approach to sustainability turned fundamentally on an understanding of transparency and traceability as the collection and dissemination of more and more data. It also relied on the assumption that more data would somehow lead to more sustainability, usually paired with the claim that the more people who had access to that data (from consumers to producers to regulators) the easier it would be to hold companies and other organizations accountable for their unsustainable practices and to distribute the costs and benefits of sustainability equitably throughout the supply chain.

This is a good example of what Jasanoff and Kim (2009: 120) refer to as a sociotechnical imaginary: "'collectively imagined forms of social life and social order reflected in the design and fulfillment of nation-specific scientific and/or technological projects.' Imaginaries, in this sense, at once describe attainable futures and prescribe futures that states believe ought to be attained." Sociotechnical imaginaries do not have to be analyzed at the level of the nation-state (Jasanoff 2015), however, and the concept has been adopted to analyze topics such as corporate social responsibility and biotechnology (Smith 2015) and corporate narratives about smart cities (Sadowski and Bendor 2019). Indeed, standardizers' intense focus on the quantitative, data-driven measurement and evaluation of their standards' social, environmental, and economic impacts, especially the way the intensity of this focus has increased in the recent revisions of these standards, can be understood precisely as a description of "attainable futures" and a prescription of the kind of futures they "believe ought to be attained."

In a prescient essay, Goodman and Goodman (2001: 115) describe standards-based certification and labeling initiatives as "technocentric and ecocentric approaches" to sustainable food consumption, where a "truncated green imaginary fosters niche production for those consumers who can afford to pay premium

organic prices and are knowledgable about the health risks of conventionally produced foods." The embrace of new technologies as a way to imagine, engender, and enforce sustainability in global supply chains reflects "a mindset that enables people to think with technology, to transform what is known into what is possible. This imagination is performative: it improvises within constraints to create something new. It is through the exercise of their technological imaginations that people engage the materiality of the world, creating the conditions for future world-making" (Balsamo 2011: 6). By translating their sociotechnical imaginaries of transparency, traceability, and impact into what they describe as "data-driven" and "evidence-based" sustainability schemes, standardizers contribute to the qualification of the spaces where those impacts are supposed to occur and the communities they are supposed to affect as surveillable since it is precisely those spaces and communities that generate the data and evidence that motivates their techno-efficient vision of sustainability.

Unilever's description of the "sustainable sourcing" pillar of its highly regarded Sustainable Living Plan (USLP) demonstrates the inextricable relationship between impact, transparency, traceability, surveillance, and data within this imaginary (Unilever 2020). A section of Unilever's website on "creating positive impacts" starts by describing the kinds of impacts they want to achieve and introducing readers to their Procurement Framework, their Code for Responsible Extraction (CORE) policy, and their Responsible Sourcing Policy, to which all suppliers must adhere. They then reiterate their commitments to traceability and transparency, to smallholder livelihoods, and to the cultivation of a circular (rather than linear) economy before concluding that they "are leveraging digital and technological solutions to better understand the realities on the ground and help inform the development and implementation of our impact programmes." A section on "transparency and traceability" immediately follows the section on "creating positive impacts." It starts by elaborating Unilever's techno-optimism: "Unilever is actively developing and deploying technologies that have the potential to disrupt and transform supply chain transparency. We're investing in satellite data, geolocation, blockchain and AI, working with major tech firms and innovative start-ups to build new approaches to monitoring and traceability, extending from downstream operations to plantations or crop source."

Returning to RA, the same data-driven approach to transparency, traceability, and impacts emerges as a central component of their imagined future. In a June 2020 Q&A with RA's outgoing Chief Sustainable Supply Chain Officer Britta Wyss Bisang, which was posted on the RA blog, Bisang described what the organizations means when it claims to be "reimagining certification" (RA 2020). In order for certification to be "more impactful," it must "become more data-driven, more improvement-oriented and better tailored to the needs of producers.… Based on data-driven insights into what the sustainability needs are, companies need to co-invest in improvements that contribute more to sustainability." Whereas auditing traditionally relied exclusively on a "boots-on-the-ground" approach, "digitized data" has recently emerged as a "fourth pillar" alongside the more traditional pillars of "visual inspection, document checks, and interviews." According to Bisang, "the role of technology [in RA's efforts to 'reimagine certification'] is huge," and she emphasized the role of satellite imagery and GPS data in "sensing deforestation" and as "the basis of the 'first mile' of production, from smallholder farmers to the certificate holder." Reflecting on the COVID-19 pandemic, which Bisang saw as "an opportunity to move toward a more sustainable economy" where "supply chain transparency and traceability" are "even more important than it is today," she argued that the pandemic "will speed up the techniques to do digital trainings, remote audits, and use of data for assessments even more—which is a good thing."

Embracing Technology

In summer 2019, I met Shannon in a busy café in London for an interview about her work as a sustainability manager at a large tea trader. As we discussed competition in the global tea supply chain, I asked her who she considered to be her company's biggest competitor, suggesting another British trading firm where I had an interview planned for a few days later. She replied with a quick "yeah" before back-peddling a little, telling me that "to be honest, it's hard to say." She described how different estates all neighbor each other in Kenya, and how they buy from and sell to each other, and are in general "very close." As an example of

this, she described working together with other companies in the tea industry on a number of "big stakeholder projects" around the Mau Forest in Kenya, organized by the IDH (Initiatief voor Duurzame Handel [Sustainable Trade Initiative]):

> We've got big landscapes projects in Kenya where we're trying to protect and regenerate the Mau Forest, which is a big rainforest [that] borders about five tea estates, including [our own and four others]. And it's all about working with a community like the Government Forest Protection Service. [The project] is quite famous. It's been led [and] funded by IDH.… It's been a really, really good project. We also give sort of pro bono to it. So we do, like, surveillance flights. And we pay for fencing. We give money to it as well, like we put in money for the project. Everyone does. It's just been really successful.

During the interview, I didn't follow up with her about these "surveillance flights." As I was transcribing our conversation, however, I was struck by how casually she had mentioned them, as if the different activities she'd listed—building fences, donating money, conducting surveillance flights—were all tokens of the same type of mundane initiatives that characterize contemporary corporate social responsibility. For her, of course, they *were* mundane, a normal part of her work that only seems strange to a researcher skeptical about the benefits of increased surveillance under the guise of sustainability.

Nevertheless, Shannon's nonchalant attitude toward these surveillance flights seemed, to me, fundamentally related to the way Emily and Bruno had joked about deploying weaponized drones to settle minor workplace disputes. I started to notice this kind of casualness in other interview transcripts and field notes as well, an optimistic but otherwise relatively un-reflexive embrace of monitoring and surveillance technologies like drones and satellites, phone tracking, automated audits, blockchain-enabled transparency initiatives, enhanced reporting requirements, and so on. From searching for new data sources and compiling huge data-sets to training farmers how to keep accurate records about inputs and outputs to meeting with researchers and doing other outreach activities to extol the values of technologically mediated sustainability projects, the mundane work of my interlocutors is a prime example of what Martin French (2014) calls "informatics practice," the labor of materializing the information that underlies these kinds of data-driven processes.

Sean, an impact evaluation specialist at one of the standards organizations I visited, bragged about the "dashboards" he and his colleagues were working to develop, which he saw as a key part of their efforts to make their standard more transparent and thus more impactful. The dashboards would allow interested stakeholders to access information about the different products they certified, helping them to avoid buying from or sourcing to companies that were, for example, underpaying their workers, failing to provide safe or sanitary housing, refusing to enforce bans on certain pesticides, or encroaching on protected forests. He embraced the possibility of increased transparency that the use of drone and satellite monitoring of farms could facilitate when paired with blockchain-enabled modes of disclosure and access, which he imagined, like many blockchain advocates mistakenly do (see Calvão 2019), as relatively secure, immutable, and transparent.

Sean's optimism about these technologies, however, obscures two things: First, in order for blockchain-enabled transparency and traceability schemes to work as planned, they require massive amounts of data, which producers themselves are increasingly tasked with collecting and disclosing, a task that is often complicated by local sociocultural and ecological dynamics (see, e.g., Osterhoudt 2012; Seshia Galvin 2018). Second, the growing reliance on these technologically mediated modes of sustainable supply chain management not only hides the political biases of the people involved in designing and implementing these projects but also shuts out those who lack access to the requisite technical expertise, internet connectivity, etc. (Graham and Wood 2003; Calvão and Archer 2021).

A few months later, I interviewed Sean's colleague James, who works in a different office but performs a similar role within their organization. He reiterated Sean's points about the role of technology in promoting

transparency, and thus sustainability, in global supply chains before moving on to a description of his day-to-day work, which revolves around collecting and analyzing data to demonstrate the social and environmental impacts that are associated with compliance with his organization's standards. He and his colleagues take regular fieldtrips to see the impacts of their standards firsthand, which helps them stay passionate about the work they do. But these trips serve other functions as well. In particular, they give the measurement and evaluation experts working in these organizations' North American and European headquarters a chance to check in on their colleagues who work in offices located in producer countries. Thus, when James visits banana plantations in Costa Rica or coffee farms in Peru, collecting data for his organization's impact reports is only one of his goals. Equally, if not more important, these trips give him the opportunity to establish, enforce, and normalize protocols for collecting data through monitoring, surveillance, and reporting.

During one of these trips, for instance, James concluded that the auditing reports produced in order for farms to get certified were not detailed enough, focusing too much on compliance and not enough on progress. "Yes/no answers," he told me, do not help organizations establish useful baselines or track improvements resulting from their sustainability initiatives. After meeting with auditors, farmers, and other local stakeholders, he went back to his organization's headquarters and pushed for more detailed auditing requirements. This reveals an important shift in the purpose of audits, away from the mere verification of data to the active, targeted generation of data. At the same time, James thought that the data from these reports should be disclosed to other stakeholders, hence the work he and his colleagues have put into developing online "dashboards," interfaces where each actor along the supply chain can see what other actors are doing, ideally in the form of "big data" whose objectivity and security is ensured by "the blockchain." The purported utility of these dashboards rests on James and his colleagues' implicit assumptions about the relationship between data, monitoring and surveillance technologies, and sustainability—that is, their sociotechnical imaginary of standards and their impactfulness—and serves to reinforce this imaginary, justifying the collection, analysis, and dissemination of more and more data in the name of transparency, traceability, and sustainability.

The mobilization of monitoring and surveillance technologies to ensure the impactfulness of private sustainability standards is an example of what Ruha Benjamin (2019: 140–143) refers to as "technological benevolence," which justifies the "[n]umerous efforts... to develop technologies that ameliorate social cleavages," even as these ostensible "fixes" often exacerbate the problems they attempt to solve by reinforcing the structures that enabled those problems to emerge in the first place. Recall the RA executive's unqualified claim about dataficiation being "a good thing." Similar to the technologies Benjamin studies, the drones and satellites, mobile uploads, and data-hungry AI interfaces that play such a central role in the sociotechnical imaginary of neoliberal sustainability reflect and reproduce many of the existing inequities of colonialism and capitalism while idealistically promoting these technologies not only as more progressive than colonialism but also as more sustainable than other forms of capitalism.[3]

Systems Thinking and Thinking Systems

The sociotechnical imaginary of data-driven sustainability impacts was on full display during a webinar hosted by the International Finance Corporation (IFC) to launch its new environmental, social, and governance (ESG) analysis tool, MALENA: "Developed in partnership with the World Bank Innovation & Technology Lab and IFC, MALENA – MAchine Learning ENvironmental (Social & Governance) Analyst – aims to inform IFC's ESG due diligence, enabling us to learn what does and does not work in terms of helping clients manage their ESG risks" (IFC 2019). The hosts, who had backgrounds ranging from communications to IT, introduced the webinar with a discussion of ESG integration in financial decision-making and the now ubiquitous Sustainable Development Goals (SDGs). When it came to questions about social and environmental due diligence, it seemed clear to the event's organizers that "the answer... lies in

[3] Consider that many of the key texts in corporate sustainability are explicitly framed as responses to growing discontent with capitalism.

data." What was less clear was whether or not humans had the capacity to process and analyze these data sufficiently. This is where MALENA comes in: new technologies like AI, machine learning, and natural language processing will enable MALENA to sift through the vast amounts of data that users "feed her," analyze it, and respond to prompts such as "Show me the risks for Ghana!" from people interested in investing in Ghanaian companies.

Using AI and machine learning to figure out how to increase an investment's non-financial impacts might seem far removed from standards developers' promotion of new technologies to facilitate more efficient certification systems, but it reflects a more general "algorithmic imaginary" that is increasingly pervasive in the context of neoliberal sustainability, including sustainability standards. The algorithmic imaginary, according to Bucher (2017: 31), is "the way in which people imagine, perceive and experience algorithms and what these imaginations make possible." Algorithms, she argues, citing Cheney-Lippold (2011), "create a 'cybernetic relationship to identification' by constructing 'categories of identity,'" although these categories do not always match the way people categorize themselves and their environments. Although Bucher's (2017) study focuses on the way people actively engage with algorithms that determine their experience of social media (such as "liking" something not because you actually like it but because you want to communicate to "the algorithm" that you want more similar content to appear on your feed), many of her insights ring true in the case of standardizers who seem to be increasingly imagining certification as a kind of automated or algorithmic if-then form of supply chain governance. Within this algorithmic imaginary (or maybe more accurately, a sort of pre-algorithmic imaginary), certain actions take on a different meaning: the daily collection and reporting of data about pesticide use and salary payments on tea farms comes to be seen as necessary for an AI-enabled monitoring system to identify potential instances of non-compliance rather than as a reflection of any immediate interest in those data per se.

In my interlocutors' ideal world, decisions about compliance would be automatic, leading to a form of algorithmic governance that reflects "a growing willingness to outsource decision-making authority to algorithm-based decision-making systems" (Danaher et al. 2017: 2). When Emily, the "drone and satellite girl" I introduced at the beginning of the article, was telling me about her work as a data analyst, she told me the reason they are so invested in devising methods to analyze spatial data in particular is so they can more easily determine whether or not farmers are complying with the parts of their standard that deal with deforestation. Since I had already told her my project focused on Kenyan tea production, she picked a relevant example, the same one Sharon had identified during our interview a few months earlier. According to Emily, the Mau Forest was an important source of water for surrounding tea farms, but tea farms also need wood to burn the stoves that power the factories where tea is produced. This increases the risk of illegal logging to provide firewood for local tea factories, which has the long-term effect of destroying the industry's water source (the Mau Forest Complex is known locally as one of Kenya's five "water towers"). By collecting and analyzing GPS and satellite data, it would be possible for a program to track deforestation, automatically notifying certification bodies and standards development organizations of non-compliance and thereby essentially automating the (de-)certification process.

Samuel is an analyst in a different standards development organization who is convinced that these kinds of technologically mediated compliance decisions are "the future of certification." The system he imagined, however, was different from Emily's, one where certificate holders were tasked with constantly ("at least daily") collecting and reporting compliance data on topics ranging from pesticide use to salary payments to production volumes. In order to verify the accuracy of these data, he imagined that drones might be used to conduct random checks of the farm, beaming the resulting video surveillance back to offices in Europe and the US for trained experts to check. While these drone checks would not replace traditional audits, which involve numerous human auditors conducting interviews and site visits with farm and factory managers and workers to make sure the different requirements of a standard are being met, they would introduce an element of surprise. Like many of my interlocutors, Samuel was suspicious of the motivations of local actors, and he worried that the announcement of audits before auditors arrived gave producers too much time to hide things that they didn't want the auditors to find.

These kinds of suspicions are ubiquitous among standards developers, although they recognize that there are often good reasons why "local actors" might feel compelled to call ahead or "cut corners." Another interlocutor, Rebecca, described how local auditors are more likely to "overlook" certain instances of non-compliance, especially when it comes to issues of cultivating food for household use in areas around the margins of cash-crop plots. According to Rebecca, people working for more "local" certification bodies like Africert, which has offices in Kenya, Ghana, and Côte d'Ivoire, will typically refuse to issue a verdict of non-compliance if, for example, a small-holder farmer has planted arrow root (*Colocasia esculenta*, also known as taro) between the edge of a tea farm and an adjacent river, even if such practices are "technically" not allowed. Auditors at a Western-based certification body like NEPCon, which is headquartered in Copenhagen, are typically a bit stricter, even if the auditors themselves are also "locals." Although my interlocutors agreed that it was a bit ridiculous that farmers weren't allowed to plant subsistence crops on the periphery of their own farms without the risk of losing their sustainability certification(s), they tended to shrug it off as "rules-are-rules."

These rules and their enforcement are rooted in a colonial legacy of Western actors wielding their purported expertise and rationality to govern people and nature in the Global South, and my interlocutors recognized that it was patronizing and paternalistic. Lucas, who played a key role in the development of a new sustainable cocoa standard, told me that "the colonial times are not over" and that producers in the Global South "don't think we respect them." In meetings with representatives from producer countries, he "felt… that we had to be very careful that what we were doing should not be the second step of colonialism, that we would just make requirements for them [to follow]." To get around these, he imagined a world where everyone is looking for ways to cheat the system or, at the very least, willing to look the other way. According to Lucas:

> Certification is based on going to a farm [to] look around and so on, ask[ing] people [about social and environmental conditions on the farm], and I think we have to go more to new technologies, where it's monitoring, so farmers have to report data into a system, such as, "How many children do I have? Do they go to school? Do I employ women?" and so on, whatever. And then they can report that and the system is [overseeing] what is going on, and says, "Oh, this cannot be right," and then we go and have a look. Because it's a very expensive system that people are going around auditing in [a particular] place, so we have to find another system that is much cheaper and I think more efficient.… Certification might be the best thing we have today, but I think in ten years' time it shouldn't be the best thing. It should be changed into something that is inexpensive, assisting the farmers more than we are doing now, where a lot of people are earning a lot of money going on certification audits. It would be better [if that] money [were] not spent on that, but on a reporting system. You know, when you have a credit card, sometimes the credit card company will say, "Are you in America now?" It can see some strange things. They [have] a monitoring system, but they don't come to ask you once a year at your place, what have you been doing. [In my opinion], it's stupid, so we have to totally change the system.

Like other standardizers, Lucas clearly sees sustainability certifications as a kind of system, but what makes the quote above so illuminating is that Lucas lays out an explicit distinction between what the "system" does and what "we" do. The former oversees and notifies, while the latter "goes and has a look."

What emerges is an imagined future where sustainable supply chains are algorithmically governed, where a "system" is able to autonomously identify possible instances of non-compliance that human auditors can then go and investigate. The success of these systems is evaluated in terms of their ability to generate impacts that can be objectively measured, valued, and valorized so that the power of markets might be harnessed to yield efficient and optimal outcomes for all the stakeholders involved, from consumers and shareholders to factory workers and smallholder farmers. Standardizers' positive outlook about the role this kind of automated decision-making might play in the future of sustainability certification schemes lies at the

intersection of a pervasive techno-optimism and what Danaher et al. (2017: 2), citing Domingos (2015), describe as a "dream of creating 'master algorithms' that will be able to learn and adapt to any decision-making situation without the need for human input or control." Underlying this is the belief that more data about the social and environmental impacts of economic activities will lead to the most optimal and efficient outcomes across numerous dimensions, which, for my interlocutors, is synonymous with sustainability. Within the sociotechnical imaginary of sustainability standards and their impactfulness, one that is shared equally by non-profit organizations and multinational corporations, social and environmental impacts are technologically mediated and data-driven. Impactfulness relies on transparent supply chains and traceable transactions, both of which rely, in turn, on the production of surveillable space, on increasingly intense and increasingly invasive monitoring and surveillance regimes that facilitate the collection, storage, analysis, and proliferation of increasingly granular data about producers and the socioecologies they inhabit. The future, according to my interlocutors, depends on it, "which is a good thing."

This salvific specter of a more technologically advanced, more automated, more transparent, more sustainable world recalls Wendy Chun's (2011) speculations on the supernatural qualities of automation more generally. In *Programmed Visions,* Chun (2011: 87) argues that the promise of governance based on a "transparent technologically mediated contact" offers "a vision of permanence and flexibility," the "spectrality" of which "makes our media daemonic; inhabited by invisible, orphaned processes that… help us in our times of need. They make executables magic." Whether or not the proliferation of automated programming relies on the dispersal of "a reluctant 'priesthood' of machine coders" or represents instead an opportunity for programmers to free themselves "from both drudgery and knowledge," the world of programming is magical, full of "sourcery," demons, and "undead information" (Chun 2011: 43). These automated programs (e.g., *if* taro has been planted by the river, *then* the smallholder loses her certification) rely on a source code, "an abstraction than is haunted, a source that is a re-source, a source that renders the machinic… ghostly," (Chun 2011: 54) or godlike. Indeed, in the imaginary of standardizers, non-compliance becomes a kind of sin, something an omniscient, automated auditing system, not dissimilar from the Christian god (or Santa Claus), should always be looking out for. What Freidberg (2014) calls the "technopolitical work" of sustainability standards comes to be seen, in this light, more as the work of a magician than an engineer, reliant on a sort of mystical causality not dissimilar from the kind famously described by Evans-Pritchard (1937) in his account of Azande witchcraft. Buttressed by this "priesthood" (Chun 2011: 46) of programmers, data analysts, and other techno-optimists, my interlocutors' faith in the power of drones and satellites and blockchains starts to make much more sense, as does the role they tacitly imagine for themselves vis-à-vis disempowered producers in the Global South, where they act as both the arbiters of what counts as good (sustainable) and as the saviors tasked with its realization.

Surveillable Space

Within standardizers' sociotechnical imaginary of the impactfulness of their standards, monitoring and surveillance technologies are seen as necessary for transparency, which enables the accountability necessary for sustainability. At the same time, these technologies ground standardizers' ambitions of an automated future in contemporary schemes to collect as much data as possible, even if they remain unsure how to use it, what Fourcade and Healy (2017) have called the "data imperative." My interlocutors' faith in the ability of these technologies to engender the kind of inevitably sustainable futures they imagine is rivalled only by their conviction that a world of datafication and automation will be better than the world today.

One of the effects of this sociotechnical imaginary, which combines a clear embrace of monitoring and surveillance technologies with an almost mystical confidence in their efficacy, is its production of what I call surveillable space, which brings us to this essay's main concern. Standardizers' insistence that certain spaces like farms and factories in the Global South—where "cheap natures" (Moore 2015) are transformed into cheap commodities for "conscious consumers" in Europe and the US (Sylla 2014)—need to be constantly monitored and surveilled in the name of transparency and sustainability contributes to the production of surveillable space. Surveillable spaces are not just spaces that are surveilled but spaces where there is an expectation of surveillance, where non-surveillance (a failure or a refusal to surveil or submit to

being surveilled) is seen as irresponsible and unsustainable. Non-surveillance comes to be seen as the exact opposite of what should be done to promote transparency and traceability, something to be rectified. A lack of monitoring corresponds to a lack of knowledge about impacts, both positive and negative, which in turn engenders a lack of accountability. In other words, if a particular space and its human and non-human inhabitants are not surveilled, then there is a lack of transparency and traceability; and if there is a lack of transparency and traceability, then those spaces and their inhabitants might not benefit from the positive social, environmental, and economic impacts of sustainability.

According to Ascui, Haward, and Lovell (2018: 908–909), "the technologies that are enabling environmental Big Data and the [Internet of Things] fundamentally change what we 'see' in the natural world: they foreground new actors and problems and de-prioritise others, which can in turn suggest new governance solutions which change both our relationship with the natural world, and inter-human relations or politics." But technologies like drones and satellites do more than change what we "see" in the world (LaFlamme 2018); they also change how we imagine it, not only as it is but also how it can be, exemplifying the "programmed visions" Chun (2011) theorizes. As I have argued above, understanding the role of data-driven monitoring and surveillance technologies in the sociotechnical imaginaries that inform standardizers' approach to impact is necessary to understand the way these imaginaries affect (and to some extent effect) the relationship between society and space. In the case of sustainability standards that are designed for agricultural supply chains, optimistic claims about the potential of these technologies to foster transparency and sustainability belie the massive amounts of data that have to be generated for these "data-driven" projects to work. By focusing on these intersecting imaginaries, we are better able to "trace the coming-into-being" of the surveillability of particular spaces and the human and non-human actors who populate them, places like farms and factories in the Global South where many of the commodities people in the West consume on a daily basis—things like coffee, tea, and chocolate, but also clothing, electronics, and other objects—are produced. The role standardizers play in the establishment, proliferation, and (re-)enforcement of these imaginaries is a fundamental but often neglected part of the story of how standards emerge as technologies of neoliberal governance, even if it certainly isn't the only important role.

The multiple actors involved in designing, negotiating, enforcing, and resisting standards raises important questions about race, gender, and class, which this essay has not addressed given that many of those actors remain in the background or even behind-the-scenes in the narratives relayed by my interlocutors (see Benya 2016 for a seminal account of these dynamics in the South African mining industry). This resonates with the epilogue of *Programmed Visions,* where Chun (2011: 179–180) teases out a thread that was "largely invisible yet central," the idea that software must be understood as both *in medias res* and *in medias race*:

> Like software, race was, and still is, a privileged way of understanding the relationship between the visible and invisible: it links visual cues to unseen forces.… Race and software therefore mark the contours of visual knowledge as "programmed visions." As human vision is increasingly devalued through technological mediation in the sciences and through ideals of "color-blindness," images, graphics, and simulations proliferate.

Issues of race and gender were also largely invisible yet fundamental to my analysis of surveillable space, especially given the racialized and gendered dynamics of surveillance. The kinds of standards my interlocutors design and promote can only be applied in the Global South, a technology of governance designed exclusively for small farms and large plantations where the majority of workers are women of color. Even on farms in Western countries like Italy and the United States, huge numbers of farm workers are immigrants, many of whom are undocumented and, therefore, even more precariously employed. My interlocutors, however, are far removed from those sites, even if they play an important role in governing them and rendering them surveillable. On one hand, the notion of surveillable space clearly needs to be explored from the perspective of those who inhabit those spaces, suggesting that future research on smart farming and other technologically mediated modes of agricultural production might productively engage with surveillability. On the other hand, the topographies of racial capitalism that underlie these surveillable spaces are already visible, even when viewed through the rose-tinted glasses of my optimistic interlocutors.

Indeed, through the "images, graphics, and simulations that proliferate" within the sociotechnical imaginary of data-driven sustainability, it becomes clear who the imagined beneficiaries of sustainability are: women of color in the Global South, smiling as they pluck tea and dry coffee beans for Western consumers (Archer 2020). Race is also visible in the anxiety of my interlocutors as they tiptoe around the uncomfortable colonial vestiges of contemporary sustainability, which exhibits both a familiar reliance on the technopolitics of measurement (not dissimilar from classic analyses by, e.g., James Scott [1998] and Timothy Mitchell [2002]) and a paternalistic attitude toward the ostensible beneficiaries of various sustainability projects.

Surveillable spaces are unforgiving, where the crudeness and cruelness of algorithmic governance is exacerbated by the fact that these surveilled spaces are populated by already marginalized communities who are already disproportionately affected not only by climate change and other socioecological crises but also by the inbuilt biases of many algorithms (Noble 2018). Simone Browne (2015) theorizes surveillance as the extension of a white, male gaze, which makes its effects on non-white, non-male, and other marginalized communities even more severe. This is true not only in the sense that these communities are more intensely surveilled in the first place but also in the sense that surveillance per se has different effects on their physical and emotional wellbeing (Sewell, Jefferson, and Lee 2016; Browne 2015).

Conclusion

The efficacy of standards and other governance technologies within the sociotechnical imaginary of neoliberal sustainability—that is, the extent to which market-oriented sustainability initiatives like certification schemes are able to generate positive social, environmental, and economic impacts—depends on the transparency of global supply chains and the traceability of the different things whose movements they facilitate, qualities which, in turn, depend on the collection and analysis of increasingly vast amounts of data. Standardizers extract these data from sites of production and the people who inhabit them, typically in the Global South, using new technologies of monitoring, surveillance, and data analysis like drones, satellites, and blockchains. A failure to surveil or a refusal to be surveilled comes to be seen as a suspicious denial of the traceability and transparency that my interlocutors see as fundamental to sustainability more generally. Within this imaginary, in other words, the surveillance of particular people and places is not merely justified but expected.

I propose the notion of surveillable space as a way to try and make sense of this expectation, highlighting the relationship between the sociotechnical imaginary of sustainability standards and their "data-driven" impactfulness, and the surveillability of the spaces where those impacts are supposed to manifest. Although my research focuses specifically on people who design and promote sustainability standards from their offices in unremarkable buildings in the business districts of European and North American cities, surveillability raises questions that extend far beyond both these interlocutors and these institutions. In addition to exploring the experiences of surveillability from the perspective of producers, future work might examine the production of surveillable space in more general imaginaries of sustainable development, which also increasingly revolve around the collection, analysis, and dissemination of data about impacts, exploring how efforts to "render technical" (Li 2007) are accompanied by efforts to render surveillable. Sustainable investing, too, which centers on the extraction of so-called "ESG" (environmental, social, and governance) data from companies, offers an interesting case study of surveillability, both to the extent that companies hesitate (or refuse) to disclose these kinds of data and to the extent that they are able to manipulate the data they do provide in order to appear more sustainable.

Acknowledgements

This essay benefited tremendously from comments and questions I received at a seminar and a paper development workshop hosted by the Technologies in Practice (TiP) group at the IT University of Copenhagen. Thanks, in particular, to Rachel Douglas-Jones, Carsten Østerlund, James Maguire, Irina Papazu, and Pedro Ferreira. Outside these meetings, many others have also offered valuable comments and critiques, including Sarah Besky, Nanna Bonde Thylstrup, Dan Souleles, Porter Wells, Frederik Schade, Filipe Calvão, Sayd Randle, Maha Rafi Atal, and Jan De

Haes. I am grateful to the three anonymous reviewers for providing engaged and constructive feedback on the essay and to Alana Saulnier for expert editorial guidance. My fieldwork was funded by the Danish Independent Research Fund (DFF) through a Sapere Aude grant (#7023-00115AB) and was conducted as part of the SUSTEIN research project alongside Martin Skrydstrup (PI) and Hannah Elliott, who also provided helpful comments on earlier drafts of this essay.

References

Aas, Katja Franko. 2011. "Crimmigrant" Bodies and Bona Fide Travelers: Surveillance, Citizenship and Global Governance." *Theoretical Criminology* 15 (3): 331–346.

Alvarez León, Luis F., and Jovanna Rosen. 2020. Technology as Ideology in Urban Governance. *Annals of the American Association of Geographers* 110 (2): 497–506.

Archer, Matthew. 2020. Stakes and Stakeholders in the Climate Casino. *GeoHumanities* 6 (1): 171–187.

Ascui, Franciso, Marcus Haward, and Heather Lovell. 2018. Salmon, Sensors, and Translation: The Agency of Big Data in Environmental Governance. *Environment and Planning D: Society and Space* 36 (5): 905–925.

Balsamo, Anne. 2011. *Designing Culture: The Technological Imagination at Work*. Durham, NC: Duke University Press.

Benjamin, Ruha. 2016. Catching Our Breath: Critical Race STS and the Carceral Imagination. *Engaging Science, Technology, and Society* 2: 145–156.

———. 2019. *Race after Technology: Abolitionist Tools for the New Jim Code.* Cambridge, UK: Polity.

Benya, Asanda. 2016. *Women in Mining: Occupational Culture and Gendered Identities in Mining.* PhD diss., University of Witwatersrand.

Browne, Simone, 2015. *Dark Matters: On the Surveillance of Blackness*. Durham, NC: Duke University Press.

Brunsson, Nils, and Bengt Jacobsson. 2000. The Contemporary Expansion of Standardization. In *A World of Standards*, edited by Nils Brunsson and Bengt Jacobsson, 1–17. Oxford, UK: Oxford University Press.

Bucher, Taini. 2017. The Algorithmic Imaginary: Exploring the Ordinary Affects of Facebook Algorithms. *Information, Communication & Society* 20 (1): 30–44.

Calvão, Filipe. 2019. Crypto-Miners: Digital Labor and the Power of Blockchain Technology. *Economic Anthropology* 6 (1): 123–134.

Calvão, Filipe, and Matthew Archer. 2021. Digital Extraction: Blockchain Certification and Mineral Supply Chains. *Political Geography* 87: 1–11.

Cashore, Benjamin. 2002. Legitimacy and the Privatization of Environmental Governance: How Non–State Market–Driven (NSMD) Governance Systems Gain Rule–Making Authority. *Governance* 15 (4): 503–529.

Cheney-Lippold, John. 2011. A New Algorithmic Identity: Soft Biopolitics and the Modulation of Control. *Theory, Culture & Society* 28 (6): 164–181.

Chun, Wendy Hui Kyong. 2011. *Programmed Visions: Software and Memory*. Cambridge, MA: MIT Press.

Cowen, Deborah. 2010. A Geography of Logistics: Market Authority and the Security of Supply Chains. *Annals of the Association of American Geographers* 100 (3): 600–620.

Crampton, Jeremy W., and Stuart Elden, eds. 2007. *Space, Knowledge and Power: Foucault and Geography*. Farnham, UK: Ashgate Publishing.

Danaher, John, Micahel J. Hogan, Chris Noone, Rónán Kennedy, Anthony Behan, Aisling De Paor, Heike Felzmann, et al. 2017. Algorithmic Governance: Developing a Research Agenda through the Power of Collective Intelligence. *Big Data & Society* 4 (2): 1–21.

Domingos, Pedros. 2015. *The Master Algorithm: How the Quest for the Ultimate Learning Machine Will Remake Our World*. New York: Basic Books.

Dove, Michael R. 1998. Living Rubber, Dead Land, and Persisting Systems in Borneo: Indigenous Representations of Sustainability. *Bijdragen tot de taal-, land-en volkenkunde / Journal of the Humanities and Social Sciences of Southeast Asia* 154 (1): 20–54.

Evans-Pritchard, Edward E. 1937 *Witchcraft, Oracles and Magic among the Azande*. Oxford: Clarendon Press.

Fourcade, Marion, and Kieran Healy. 2017. Seeing Like a Market. *Socio-Economic Review* 15 (1): 9–29.

Fairtrade International (FLO). 2019. Fairtrade Standard for Small-scale Producer Organizations Main Changes. April. https://files.fairtrade.net/standards/2019_04_03_Main_Changes_SPO_EN.pdf.

Freidberg, Susanne. 2014. Footprint Technopolitics. *Geoforum* 55: 178–189.

French, Martin. 2014. Gaps in the Gaze: Informatic Practice and the Work of Public Health Surveillance. *Surveillance & Society* 12 (2): 226–242.

Galdon-Clavell, Gemma. 2013. (Not so) Smart Cities?: The Drivers, Impact and Risks of Surveillance-Enabled Smart Environments. *Science and Public Policy* 40 (6): 717–723.

Gale, Fred, Francisco Ascui, and Heather Lovell. 2017. Sensing Reality? New Monitoring Technologies for Global Sustainability Standards. *Global Environmental Politics* 17 (2): 65–83.

Gill, Stephen. 2008. *Power and Resistance in the New World Order*. New York: Springer.

Goodman, David, and Michael Goodman. 2001. Sustaining Foods: Organic Consumption and the Socio-Ecological Imaginary. In *Exploring Sustainable Consumption*, edited by Maurie J. Cohen and Joseph Murphy, 97–119. Oxford, UK: Pergamon.

Graham, Stephen, and David Wood. 2003. Digitizing Surveillance: Categorization, Space, Inequality. *Critical Social Policy* 23 (2): 227–248.

Guthman, Julie. 2007. The Polanyian Way? Voluntary Food Labels as Neoliberal Governance. *Antipode* 39 (3): 456–478.
Haggerty, Kevin D., and Richard V. Ericson. 2000. The Surveillant Assemblage. *The British Journal of Sociology* 51 (4): 605–622.
Hébert, Karen. 2010. In Pursuit of Singular Salmon: Paradoxes of Sustainability and the Quality Commodity. *Science as Culture* 19 (4): 553–581.
Hope, Andrew. 2010. Seductions of Risk, Social Control, and Resistance to School Surveillance. In *Schools Under surveillance: Cultures of Control in Public Education*, edited by Torin Monahan and Rodolfo D. Torres, 230–245. New Brunswick, NJ: Rutgers University Press.
International Finance Corporation (IFC). 2019. Meet MALENA: Using Artificial Intelligence to Strengthen Environmental & Social Risk Management. IFC Sustainability Webinar Series, September. https://www.ifc.org/wps/wcm/connect/topics_ext_content/ifc_external_corporate_site/sustainability-at-ifc/company-resources/ifc_sustainability_webinars#MALENA_2019-09-26 [accessed August 15, 2021].
Jasanoff, Sheila. 2015. Future Imperfect: Science, Technology, and the iImaginations of Modernity. In *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, edited by Sheila Jasanoff and Sang-Hyun Kim, 1–33. Chicago, IL: University of Chicago Press.
Jasanoff, Sheila, and Sang-Hyun Kim. 2009. Containing the Atom: Sociotechnical Imaginaries and Nuclear Power in the United States and South Korea. *Minerva* 47 (2): 119–146.
Klauser, Francisco. 2016. *Surveillance and Space.* London: Sage.
———. 2018. Surveillance Farm: Towards a Research Agenda on Big Data Agriculture. *Surveillance & Society* 16 (3): 370–378.
LaFlamme, Marcel. 2018. A Sky Full of Signal: Aviation Media in the Age of the Drone. *Media, Culture & Society* 40 (5): 689–706.
Li, Tania Murray. 2007. *The Will to Improve: Governmentality, Development, and the Practice of Politics*. Durham, NC: Duke University Press.
Loconto, Allison, and Lawrence and Busch. 2010. Standards, Techno-Economic Networks, and Playing Fields: Performing the Global Market Economy. *Review of International Political Economy* 17 (3): 507–536.
Millner, Naomi. 2020. As the Drone Flies: Configuring a Vertical Politics of Contestation within Forest Conservation. *Political Geography* 80: 102–163.
Minocher, Xerxes, and Caelyn Randall. 2020. Predictable Policing: New Technology, Old Bias, and Future Resistance in Big Data Surveillance. *Convergence* 26 (5–6): 1108–1124.
Mitchell, Timothy. 2002. *Rule of Experts: Egypt, Techno-Politics, Modernity*. Berkeley, CA: University of California Press.
Monahan, Torin, and Jennifer T. Mokos. 2010. Sensing Environmental Danger in the City. *The International Review of Information Ethics* 12: 20–26.
Moore, Jason W. 2015. *Capitalism in the Web of Life: Ecology and the Accumulation of Capital*. New York: Verso Books.
Mutersbaugh, Tad. 2005. Fighting Standards with Standards: Harmonization, Rents, and Social Accountability in Certified Agrofood Networks. *Environment and Planning A* 37 (11): 2033–2051.
Noble, Safiya. 2018. *Algorithms of Oppression: How Search Engines Reinforce Racism*. New York: New York University Press.
Osterhoudt, Sarah. 2012. Sense and Sensibilities: Negotiating Meanings within Agriculture in Northeastern Madagascar. *Ethnology: An International Journal of Cultural and Social Anthropology* 49 (4): 283–301.
Ponte, Stefano, Peter Gibbon, and Jakob Vestergaard. 2010. *Governing through Standards: Origins, Drivers and Limitations*. London: Palgrave Macmillan.
Rainforest Alliance (RA). 2018. Rainforest Alliance Sustainable Agriculture Standard Applicable for Smallholder Farms. November. https://www.rainforest-alliance.org/wp-content/uploads/2019/02/rainforest-alliance-sustainable-agriculture-standard-smallholders-v1.0.pdf [accessed August 24, 2021].
———. 2020. Why Sustainability Certification Is Evolving, and How. Organizational Updates, June 24. https://web.archive.org/web/20201220155731/https://www.rainforest-alliance.org/business/reimagining-certification/why-sustainability-certification-is-evolving-and-how/ [accessed December 20, 2020].
Reinert, Hugo. 2019. Requiem for a Junk-Bird: Violence, Purity and the Wild. *Cultural Studies Review* 25 (1): 29–40.
Sadowski, Jathan, and Roy Bendor. 2019. Selling Smartness: Corporate Narratives and the Smart City as a Sociotechnical Imaginary. *Science, Technology, & Human Values* 44 (3): 540–563.
Sangaramoorthy, Thurka, and Adia Benton. 2012. Enumeration, Identity, and Health. *Med Anthropol* 31 (4): 287-291.
Scott, James. 1998. *Seeing Like a State: How Certain Schemes to Improve the Human Condition Have Failed*. New Haven, CT: Yale University Press.
Seshia Galvin, Shaila. 2018. The Farming of Trust: Organic Certification and the Limits of Transparency in Uttarakhand, India. *American Ethnologist* 45 (4): 495–507.
Sewell, Abigail A., Keven A. Jefferson, and Hedwig Lee. 2016. Living under Surveillance: Gender, Psychological Distress, and Stop-Question-and-Frisk Policing in New York City. *Social Science & Medicine* 159: 1–13.
Smith, Elta. 2015. Corporate Imaginaries of Biotechnology and Global Governance: Syngenta, Golden Rice, and Corporate Social Responsibility. In *Dreamscapes of Modernity: Sociotechnical Imaginaries and the Fabrication of Power*, edited by Sheila Jasanoff and Sang-Hyun Kim, 254–276. Chicago, IL: University of Chicago Press.
Smith, Kiah. 2014. *Ethical Trade, Gender and Sustainable Livelihoods: Women Smallholders and Ethicality in Kenya*. London: Routledge.
Smith, Kiah, and Kristen Lyons. 2012. Negotiating Organic, Fair and Ethical Trade: Lessons from Smallholders in Uganda and Kenya. In *Food Systems Failure: The Global Food Crisis and the Future of Agriculture*, edited by Christopher Rosin, Paul Stock, and Hugh Campbell, 182–202. London: Earthscan.
Sodikoff, Genese. 2009. The Low-Wage Conservationist: Biodiversity and Perversities of Value in Madagascar. *American Anthropologist* 111 (4): 443–455.

Sylla, Ndongo Samba. 2014. *The Fair Trade Scandal: Marketing Poverty to Benefit the Rich*. Athens, OH: Ohio University Press.
Thrift, Nigel, and Shaun French. 2002. The Automatic Production of Space. *Transactions of the Institute of British Geographers* 27 (3): 309–335.
Thylstrup, Nanna Bonde. 2019. Data out of Place: Toxic Traces and the Politics of Recycling. *Big Data & Society* 6 (2): 1–9.
Unilever. 2020. Sustainable Sourcing. Sustainable Living. https://web.archive.org/web/20201215070624/https://www.unilever.com/sustainable-living/reducing-environmental-impact/sustainable-sourcing/ [accessed December 15, 2020].
Wang, Xiaowei. 2020. *Blockchain Chicken Farm: And Other Stories of Tech in China's Countryside*. New York: FSG Originals.