The green economy as plantation ecology: when dehumanization and ecological simplification go 'green'

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Abstract

The green economy is proposed as a solution to address growing and potentially irreversible ecological crises. But what happens when environmental solutions are premised on the same logics of brutal simplification and dehumanization that sustain and reinforce systems of oppression and ecological breakdown? In this article, we describe the transformation of the biophysical landscape of the planet into replicable blueprints of the plantation plot. The plantation as a colonial-era organizational template is an ongoing ecological process premised on disciplining bodies and landscapes into efficient, predictable, calculable, and controllable plots to optimize commodity production and is dependent on racialized and gendered processes of dehumanization. The visible cultural, physical, aesthetic, and political singularity of the plot, under the guise of objectivity and neutrality, permits a tangible depiction of the way ecological breakdown takes place. We interrogate the notion of "greening" as a strategy to combat the unintended impacts of colonial plantation ecology, arguing that such tactics further reinforce the template of plantation ecology rather than dismantle it. We first conceptualize the historical plantation and its biophysical, cognitive, and corporeal organizational principles. We then offer examples of "greening" as new, more inclusive (but equally detrimental) forms of plantation logics, and crucially identify how these extensions of plantation logic get co-opted by resistance agents, from social movements to disease and pestilence. We consider sustainability certifications of palm oil through the Roundtable on Sustainable Palm Oil (RSPO) in Colombia and compensatory afforestation programs designed

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to offset forest destruction through monoculture plantations in India. We conclude by highlighting how abolition ecologies can serve as an antidote to plantation logic and highlight necessary relationships of self-reflexivity, repair and collective solidarity required to disinvest in plantation ecology.

Keywords: political ecology, capitalism, green economy, racism, Capitalocene

Résumé

L'économie verte est proposée en tant que solution pour faire face aux crises écologiques incessantes et potentiellement irréversibles. Pourtant, les solutions environnementales dominantes reposent sur les mêmes logiques de simplification brutale et de déshumanisation qui soutiennent et renforcent les systèmes d'oppressions sociaux actuels et l'effondrement écologique en cours. Nous décrivons la transformation du paysage biophysique de la planète sous forme des monocultures de plantation, un modèle transposable sans égards pour les réalités locales. La plantation, en tant que cadre d'aménagement territorial de l'ère colonial, est un processus écologique en elle-même, fondée sur la discipline des corps et des paysages en parcelles efficaces, prévisibles, calculables et contrôlables pour favoriser la production de marchandises par le biais d'une optique de déshumanisation racisée et genrée. La singularité culturelle, physique, esthétique et politique visible de la parcelle de plantation, laquelle se veut objective et neutre, offre une représentation tangible de la manière dont la dégradation écologique se produit. Nous nous interrogeons sur la notion de « verdissement » en tant que stratégie de lutte contre les impacts imprévus de l'écologie des plantations coloniales en soulignant que de telles tactiques renforcent la logique de la plantation plutôt qu'elles ne le démantèlent. Nous commençons par conceptualiser la plantation historique et ses principes d'organisation biophysiques, cognitifs et corporels. Nous proposons ensuite des exemples de « verdissement » en tant que nouvelles formes plus inclusives (mais tout aussi nuisibles) de logiques de plantation, et identifions comment ces extensions de la logique de la plantation peuvent être détournées par des agents de résistance, qu'il s'agisse de mouvements sociaux ou de maladies et d'épidémies. Nous nous basons sur les certifications de la production de l'huile de palme dans le cadre de la Table ronde sur l'huile de palme durable en Colombie, ainsi que sur des programmes de reboisement compensatoire conçus pour compenser la destruction des forêts en Inde. Nous terminons en soulignant comment les écologies d'abolition peuvent servir de contrepoids à la logique des plantations en mettant en lumière les relations primordiales d'autoréflexivité, de réparation et de solidarité collective requises pour se désinvestir de l'écologie des plantations.

Mots-clés: écologie politique, capitalisme, économie verte, racisme, Capitalocène

Resumen

La economía verde se presenta como una solución para enfrentar el creciente y potencialmente irreversible colapso ecológico. Sin embargo, ¿qué sucede cuando las soluciones ambientales se fundamentan en las mismas lógicas de brutal simplificación y deshumanización que mantienen y refuerzan los sistemas de opresión social y degradación ecológica? En este artículo, describimos la transformación del paisaje biofísico del planeta en patrones replicables de la parcela de la plantación. La plantación, como un modelo organizativo arraigado en la época colonial, representa un proceso ecológico continuo que se fundamenta en la reconfiguración de cuerpos y paisajes en parcelas eficientes, predecibles, calculables y controlables con el fin de optimizar la producción de mercancías, basada en la deshumanización racializada y de género. La evidente singularidad cultural, física, estética y política de la parcela, a pesar de su aparente objetividad y neutralidad, ofrece una representación tangible de cómo se manifiesta la degradación ecológica. En este artículo, cuestionamos la noción de "reverdecimiento" como estrategia para contrarrestar los efectos indeseados de la ecología de las plantaciones, argumentando que dichas tácticas refuerzan el modelo de plantaciones en lugar de desmantelarlo. En primer lugar, conceptualizamos la plantación histórica y sus principios organizativos, tanto biofísicos como cognitivos y corporales. Posteriormente, presentamos ejemplos de "reverdecimiento" como nuevas formas aparentemente más inclusivas pero igualmente perjudiciales de la lógica de la plantación. Finalmente, identificamos cómo estos aspectos de la lógica de la plantación son apropiados por actores de resistencia, desde movimientos sociales hasta enfermedades y epidemias. Consideramos como ilustraciones las certificaciones de sostenibilidad del aceite de palma a través de la Mesa Redonda sobre Aceite de Palma Sostenible (RSPO) en Colombia y los programas de reforestación compensatoria diseñados para contrarrestar la destrucción de los bosques mediante la expansión de plantaciones de monocultivos en India. Concluimos resaltando cómo las ecologías de abolición pueden servir como un antídoto contra la lógica de las plantaciones y destacamos las relaciones necesarias de autorreflexión, reparación y solidaridad colectiva requeridas para alterar la lógica de la ecología de las plantaciones.

Palabras Clave: ecología política, capitalismo, economía verde, racismo, Capitaloceno

1. Introduction

In response to climate crisis and ecological breakdown, green transitions are being increasingly demanded by multilateral environmental organizations, scientists, policymakers, global lending agencies, and corporations alike. Proposals such as 'green growth' and a 'green economy' build on a popularized sustainable development discourse by claiming that growth can and must continue but be 'smarter' at internalizing unintended environmental side-effects – or externalities – into the economy. Renewable energy, certified niche products, and financialized Environmental, Social and Governance (ESG) portfolios are examples of how green products are leveraged to generate and capture new value and profit. Yet, the production of goods and services ("green" or otherwise) has its own ecological consequences. The desire to grow greener has meant the active manipulation of landscapes and labor relations to generate measurable (and lucrative) productive commodities in the name of sustainability (Neimark *et al*., 2021; Voskoboynik & Andreucci, 2022; Bigger & Webber, 2021). The "greening" agenda has not considered its own ecological effects beyond marginal efficiency improvements; this is because the underlying logic that drives intensive production systems erases and normalizes the global historical and colonial foundations of ecological breakdown (Sultana, 2022). This has been eloquently articulated by political ecologists and critical geographers in past decades (e.g. Sullivan, 2018; Andreucci *et al*., 2017; Pulido, 2017; Dempsey & Suarez, 2016; Büscher *et al*., 2014; Fairhead *et al*., 2012; Bakker, 2010; Smith, 2010).

In this article, we analyze an organizational template that has shaped and continues to shape landscapes and labor relations over the past five centuries: the plantation. Plantations – historical and contemporary – are situated in particular geographies and linked to expansive supply chains and markets. The uniform monoculture of plantation ecology attempts to scrub away any historical register of place by treating land as *terra nullius,* devoid of cultural significance, use or value other than for the extraction of specific commodities (Lindqvist, 2014). Consequently, people and non-human nature are violently detached from their communities and relations, extending monoculture beyond a production model. Here monoculture also refers to the imposition of singular ways of understanding the world and patterns of thought; universal, linear, and fixed conceptions of time and space (e.g. Shiva, 1993; Castree, 2009; Escobar, 2018); the imposition of a 'settler' distancing from nature ('something for the taking') (Burow *et al*. 2018); and structured and hierarchized categories of classifying people along racial, caste, ethnic, and gendered lines to optimize the instrumentalization of their labor (Ferdinand, 2019). However, this is not a complete or smooth process, and is rife with struggles for autonomy and subversion from people and polycultures alike (Tsing, 2015).

We explore these contested landscapes through the lens of *plantation ecology*. Plantation ecology stands in stark opposition with ecologies that generate the conditions for abundant life to thrive, or a world where many worlds can co-exist (Escobar, 2018). Plantation ecology refers to the historically and geographically situated plot, defining how and where capital production intervenes in the web of life, while attempting to enroll emergent life into new plantations. Rather than amorphously reproducing the wheel as 'Plantationocene', plantation ecology should rather be understood as the set of dehumanizing ecological relationships that define capital accumulation in the web of life, or 'Capitalocene' (e.g. Moore, 2015). Since plantations signify a spatialized geography or physical plot of capital production, the term 'Capitalocene' more appropriately characterizes the underlying processes qualitatively (and irreversibly) transforming the web of life. These include the degradation of dehumanized bodies as cheap racialized labor, the violent homogenization of whole landscapes, and "just in time" production of new commodities to power global markets (Wolford, 2021; Davis *et al*., 2019; Sapp-Moore *et al*., 2019; Moore, 2015; Haraway, 2015; Haraway *et al*., 2016; McKittrick, 2013). Plantations are like templates shaping how commodity production is physically mapped onto the landscape, seascape, and even (increasingly) the spacescape. While maintaining the homogeneity of monoculture, they widen and deepen the commodity frontier – the process of accumulating value into and through new goods and services – and tap into emergent values and superficial representations of virtue and aesthetic judgements of beauty and taste.

Plantation ecology has its roots in the colonial enslavement of African people as dehumanized, laboring bodies to produce raw goods in colonized landscapes for manufacturing hubs in urban centers in North America and Europe (McKittrick, 2013). Colonial expansion gave credence to wealthy capitalists in Europe to justify colonial subjects as darker-skinned sub-humans that were indolent, ignorant, dangerous, immoral and hence

equivalent in stature to manipulable objects of nature (Koshy *et al*., 2022). European elites also leveraged racialized exploitation in overseas colonies to sustain class-based exploitation of working-class laborers within Europe. The abject dehumanization of millions of people through chattel slavery ensured a reliable and *gratis* labor force to funnel trillions of dollars in accumulated value from supply chains to the European capitals and their colonial outposts (Nally, 2011; Craemer *et al*., 2020). The profits and power relations generated by this system continue to shape the world today. Between 1990 and 2015, wealthy nations appropriated 12 billion tons of raw materials, 822 million hectares of land, 3.4 billion barrels of oil, and 188 million person-year equivalents of labor from former colonies and other nations distinguished along the racial color line (Hickel *et al*., 2022). Devaluation – or making inputs to production of *less worth* – is a functional property defining the ecological simplification and decimation of non-commodifiable life on the plantation. While quantification of resource and labor appropriation is beyond the scope of this article, we illustrate how "greening" solutions continue to embed devaluation, or the 'cheapening' of nature, life, and labor, as an organizing principle, further sustaining and reinforcing plantation ecology as the outcome of organizing land and labor for the elite capture of value (Moore, 2015).

In the next section we further expound on plantation ecology as an organizing principle causing ecological breakdown, irrespective of whether commodity production is "green" or otherwise. Borrowing from Ritzer (2018), we frame our reflections around four plantation design principles of *efficiency*, *predictability*, *calculability*, and *control* of both resources and labor for optimal commodity production. By optimizing the production of commodified goods and services (eco-friendly, socially disruptive, or otherwise), we argue that these principles characterize an ecology in their own right and attempt to further cement monocultural social and natural environments. Building from the four design principles of the plantation, we then illustrate in Section 3 how "greening" aids the expansion of plantation ecology by geographically widening and deepening the commodity frontier. In Section 4 we draw upon examples from afforestation in India and sustainability certification in Colombia and Indonesia. These examples illustrate how resistance emerges amidst the continual failures of monocultural uniformity repackaged as "green." We conclude in Section 5 by inviting space for relationships of self-reflection, repair, and solidarity needed to build the *abolition ecologies* that obstruct the will towards singularity and sameness and the violent oppressions these entail.

We invite researchers, activists, and civil society – inside and outside academia[2] – interested in interrogating "green" solutions to consider how plantation ecology is a common denominator exacerbating climate and ecological breakdown. Resisting and dismantling plantation ecology can form a conceptual basis for building place-based solidarity against systems of oppression and for regenerating abolition ecologies. Abolition translates as restorative justice and the freedom to live away from environmental harm, racial discrimination, unjust gendered forms of labor, and class subjugation and constant threats of incarceration (Heynen and Ybarra, 2021; Gilmore, 2007; Pellow, 2019). Recognizing what Ferdinand (2019) claims is the tendency of environmental thought and anti-colonial thought to speak past each other, we hope these dialogues nurture transformative and collaborative thought and action.

2. Plantation ecology

The logic of the plantation operates as an organizational template historically shaping societal and ecological relations through the discipline of commodity production and pervasive dehumanization. Plantations are grounded in specific territories but are multiscale and linked globally across supply chains as well as the exploitation of racialized and gendered bodies as dehumanized labor, whose living relational connections to territory and knowledge systems are repackaged and made deadened as resources for commodity production (Yusoff, 2018). The plantation should be understood through the manifestation of a temporally and spatially specified plot, making and shaping monocultural environments with the express purpose of capital

[2] Our framing encourages academics to include themselves as workers of the neoliberal academy plantation, with its own ecological throughput and patterns of dehumanization proceeding once again along lines of gender, racial, ethnicity, class, human and non-humans. Attention to the workers of the plantation brings class politics into political ecology (e.g. Arsel, 2022), with the aims of building solidarity and action "for collaborative struggle with, for, and alongside communities" outside the academe (Reese & Johnson, 2022, p. 28).

accumulation (Yusoff, 2018; Wynter, 1971). In turn, capitalism does not merely generate ecological consequences or "externalities," but is itself an ecological process generating and profiting off its own internal contradictions. This latter point is what has been termed capitalist world ecology – the dual interaction of human activity and environmental change as the production of capital in the web of life (Moore, 2015).

The outcome of this globalized world ecology has resulted in the vast terraforming of the earth's surface. These extend to monocultures of industrial agriculture and timber, processing and manufacturing factories, and mine sites. Less often perceived as extractive but operating under the same principles of enclosure include tourist resorts and nature parks, gated communities, and whirring and energy-intensive "cloud" servers. Seascapes are also integrated through transnational shipping networks, timed to brutal same-day delivery schedules (Ajl, 2021). Commodified outputs from the plantation emerge across a series of productive processes including the direct production of goods and services across multiscalar supply chains, their financial derivatives (e.g. futures trading, crop insurance markets, green bonds, climate-smart adaptation funds, speculative climate finance), the disposal of wastes (e.g. the e-waste, circular economy, and recycling industries), the securitization and militarization of plantation borders (e.g. industrial prisons and detention centres), and secondary appropriation of surplus value through activities such as rent seeking (e.g. carbon offsets, recreational tourism, eco-gentrification in urban areas).

As Wolford (2021: 7) states: "class, gender, and racial divisions were not invented for the plantation but in many ways, they were perfected there – strict hierarchies were laid down, justified and often internalized." It is important to emphasize that the "plantation" is not a synonym for "capitalism" but has been a kind of laboratory to position class relations, including racialized and gendered forms of dehumanization, as central to ordering people and nature alike for optimal commodity production. The establishment of racialized hierarchies of labor is but one (extremely brutal) process of class differentiation in optimizing the production and accumulation of capital (Koshy *et al*., 2022). Gendered divisions of labor underpin class differentiation through the exploitation of social reproduction and form the kernel of modernity's patriarchal origin (Mies, 2014, von Werlhof, 2013). Racialized and gendered subjugation to *less-than-human* status acts to proximate workers as equally manipulable as that of presumed non-human natures, perceived as passive resources (McKittrick, 2015, Yusoff, 2018). To the extent that green strategies abolish class and patriarchal relations is to realistically assess how these initiatives *ecologize* anew in particular places and settings, or conversely further pattern plantation ecology in more deceptively inclusive ways.

In what follows, we first conceptualize four organizational principles of plantation ecology that characterise its precision and replicability. Then we analyse how these principles widen and deepen commodity frontiers, and the role that "greening" plays in expanding plantation ecology. We demonstrate that "greening" not only fails to disrupt global and multiscalar links of plantation discipline, but actively aims to reinforce and expand them in the name of minimizing risks to disruption (i.e. *sustainability* as sustaining the status quo).

The organization of plantation ecology

Sociologist George Ritzer (2018) noted how every aspect of society was rapidly following a blueprint resembling the experience of being served in a fast-food McDonalds restaurant. He identified four intertwined organizational principles, which Desmond (2019) traces through to the cotton fields of slave-owning plantations of the U.S. South and contemporary capitalist work culture. These four dimensions, which we now turn to, are *efficiency*, *calculability*, *predictability*, and *control* (Ritzer, 2018).

Efficiency refers to obtaining the maximum amount of product or objective in the shortest time or cost possible. In theory, maximizing benefit and minimizing cost is a desirable objective, especially when considering the rapid social and ecological hemorrhaging occurring. When efficiency is applied in the context of plantation ecology, it refers to maximizing commodity production by reducing or further depriving the natures that make up the plantation's workforce (human and non) or by maintaining output through reductions in labor and resource costs (Shove, 2018). There is never a genuine attempt to become more efficient at a systemic level when unlimited growth and capital expansion is the aim, but only attempts to make material and energy extraction for commodity production quicker and more optimized. In this way, efficiency gains are

immediately translated into new investable resources to expand production. This is a contradiction that English economist William Stanley Jevons had already identified in 1865 (Dale *et al*, 2017).

Efficiency in achieving desired objectives, with either minimal cost, maximal potential to extract profit or both, is a predominant feature of economic justifications associated with "internalizing" environmental externalities. For the green economy, efficiency is invoked through the argument that the world's life support systems can and must be protected if (and only if) their expected returns are higher than any alternative use. For instance, Waldron *et al*. (2020) highlight how "nature protection" as a green financial market could increase total global economic output by upwards of US$454 billion per year by 2050 and possibly up to US$ 1 trillion annually if remaining areas of the earth not currently under industrial production could be framed as a "single underexploited type of asset" (p. 11). The authors employ this efficiency-oriented argumentation to underpin the adopted Global Biodiversity Framework at the most recent Conference of the Parties to the Convention on Biological Diversity in Montreal (COP15 in 2022).

The second dimension is ***calculability***. On the historical plantation, enslaved people's laboring potential was meticulously documented by plantation owners according to age, gender, and health status. In the shaping of plantation ecology, calculability is the capacity to quantify every aspect of the process of "product" delivery in terms of measurable indicators and targets, including increasingly creative ways to represent relational and subjective experience through quantified parcels of data. Desmond (2019) argues that the "cold calculation" in the control and precision of the laboring body has not altered since the days of exacting maximal labor per slave on historical plantations, but only that technology has become more sophisticated. These practices include surveillance of workers' emotional state to optimize productivity (e.g. Kaklauskas *et al*., 2011), upwards accountability and hierarchical reporting, achievement of ever-precise indicators and targets, and the overall precise quantification of output per unit of salary paid. Mbembe (2019: 14) refers to such measurement as a process in which all life itself becomes a "computational object" to be inserted into an algorithm to minimize costs and maximize labor potential.

For the green economy, calculability is the capacity to quantify every aspect of the process of "product" delivery in terms of measurable indicators and targets, including relational and subjective experiences. Calculability lies at the heart of the logic underpinning carbon emissions trading schemes, which invent "measurable 'equivalences' between emissions of different types in different places" irrespective of context (Lohmann, 2009: p. 81). To illustrate this absurdity, a carbon molecule emitted by a hospital treating desperate war-torn patients in Aleppo becomes both qualitatively and quantitatively equivalent to a carbon molecule from a billionaire's yacht cruising the South Pacific. Or, in India's compensatory afforestation programme, the loss of 166 sq km of tropical rainforest on Great Nicobar Island is planned to be compensated with an equivalent amount of monoculture tree plantation 2,400 km away (e.g. Narain, 2023). Climate loss and damage compensation, forest or wetland loss, or even discussions on historic loss and damage, similarly tend to quantify otherwise incommensurable physical loss, cultural genocide and ecocide through monetary compensation or arbitrary equivalencies— excusing systemic changes and leaving power relations unchanged.

The third dimension, ***predictability***, ensures that product delivery or public policy is homogenized for consistency and buy-in. Without collapsing difference, the deviation of laboring bodies from a standardized formula of expected future production gains aligned to a mechanical clock time characterizes both the abject violence against laboring bodies on the historical plantation (e.g. Smith, 1997) as well as present-day industrial production discipline (e.g. Nanni, 2017). The insidious case of 133 enslaved Africans thrown overboard the Zong slave ship in 1783 to collect on insurance claims illustrates how important predictable delivery of private financialized human bodies was for plantation ecology (Sharpe, 2016). Similar to how milk gets dumped, or pigs get slaughtered during bottleneck delays in the supply chain (such as during the COVID-19 pandemic), rough seas, mutinies, and weather delays threaten(ed) the predictability of fully productive, dehumanized labourers to meet expected production of plantation crops.

Producing predictable outcomes out of increasingly unpredictable climates continues today in the green economy. Paprocki (2018), for instance, illustrates how "climate adaptation" projects have been strategically targeted to depopulate coastal areas of Bangladesh to both dispossess small-scale fishers of their territories and cultural sovereignty, sucking them into precarious wage-labor relations in peri-urban slums, while

simultaneously awarding contracts for lucrative sea wall construction projects financed by foreign investors. Like the rough waters of the Atlantic during the slave trade, climate change adaptation has become an opportunity to turn unpredictable risk into new value streams and new spinoffs of the plantation. Predictability is also crucial to justify returns on eco-investment associated with strategies like climate finance and carbon futures markets. For instance, commodity finance analysts have assessed the predictability of returns in carbon and ESG-related investment portfolios vis-à-vis other capital markets (Cornell, 2021; Cappucci, 2018). Verifiable offsets that avoid double-counting and ensure additionality – e.g. carbon sequestration that would not have happened without the offset, are major conundrums for climate financiers. Speculative finance in climate-smart real-estate and infrastructure depends on predictable returns of investment, irrespective of context, culture, history, climate, or underlying socio-political tensions and dynamics (Scoones and Stirling, 2020).

The fourth dimension refers to ***control*** in maintaining the conditions of plantation (re)production and aligns with Mbembe's (2003) necropolitics to understand how hegemony on the historic plantation is sustained, as well as how rights to thrive are distributed to a few at the expense of the (slow) death by exploitation of countless others. Although control is presented here as a dimension parallel to the others in sustaining plantation precision and replicability, it might also be conceived as a form of biopower deployed across physical (e.g. military-industrial and surveillance technology) and cognitive landscapes to internalize or normalize the other three dimensions. Control operates through adherence to established path dependencies, including along lines of racial purity, patriarchy, and prioritizing settler futures (Mitchell and Chaudhury, 2020; Duncan, 2019). These can range from coercive social norms, formal laws and regulations by the state, scientific expertise, and nation-building discourses defining what is considered appropriate courses of action within the cognitive, cultural, and physical boundaries of hegemonic plantation logics. As political ecologists have long argued, the apparatus of science is weaponized to both build further on and improve the technics of governance that ultimately maintain or strengthen control over society (Scoones *et al*., 2015; Robertson, 2012; Jasanoff, 2004; Mumford, 1964). In this sense, the dimension of control is a clear exercise of power that makes it appear as though the contradictions of the plantation can always be 'rendered technical' (Li, 2007) but necessarily managed within the confines of the plantation itself.

In these contexts of discursive, political and economic hegemony, ecology is easily weaponized towards ecofascist agendas (Moore and Roberts, 2022). "Invasives" on the plantation, for instance, reflect non-human natures like pathogens, pests, and parasites that threaten expected yields and ultimately commodity futures markets. They may also include perceived threats from Indigenous and other subaltern groups whose inclusion in the club of "Humanity" (capital H) stands in the way of more efficiently exploiting their labor. The convergence of xenophobic nationalism and neoliberal capitalism (e.g. Arsel *et al*., 2021) is a holdover to a supposed 'golden era' of the historical plantation where all resistance could be violently suppressed. "Greening" interventions cannot be viewed in isolation from the expulsion of migrants, construction of border walls, for-profit anti-black carceral plantations continuously churning out cheap labor, control of women's reproductive rights, and everyday intimidation by police and paramilitary forces. These work in concert to reinforce plantation discipline, even in more eco-friendly and net-zero forms, and the ongoing colonial and patriarchal project that they underwrite (Arboleda, 2020; Federici and Linebaugh, 2018; Ferguson and McNally, 2015; Gilmore, 2007).

Expanding the commodity frontiers of the plantation through the green economy

While the four principles of plantation discipline described above help us to understand the culture and technique shaping plantation ecology, the frames of *commodity widening,* and *commodity deepening* illustrate how plantation discipline operates geographically and historically. The process of enrolling biophysical materials and laboring bodies into production takes place at the commodity frontier (Swyngedouw, 2006).[3]

[3] As Smith (2010) describes, non-human natures get transformed rather than "destroyed" through the production of surplus value. Ecological relations, on the other hand, are severely and irreversibly altered through these transformations (Georgesçu-Roegen, 1970). For instance, when nature conservation is premised upon its lucrative profit-making potential, the non-human natures being "conserved" are transformed into exclusive sites of extraction where emergent (tourism-

This frontier refers to an "underutilized" "outside", where relational values between people and non-people are violently subjugated to that of property and commodities for exchange value (Moore, 2010). The advancement of this frontier is manifested as resource imperialism, proceeding through militarized expansion across territorial space and dispossessing people of their sovereignty and relational entanglements to life (Harvey, 2005). The expansion of this to new places is what Moore (2015) refers to as "commodity widening." Commodity widening usurps land and its inhabitants and attempts to fold them into the efficient, calculable, predictable, and controllable social relations required for capital accumulation. Meanwhile, "commodity deepening" refers to hyper-intensified processes of producing commodities that are more refined, adaptive, and resilient to crises, without necessarily expanding production geographically. In the two sections below, we connect each of these frames with our discussion on plantation ecology and the green economy through the examples of climate debt and climate-smart agriculture respectively.

Commodity widening

The relation of commodity widening processes to historical plantations explains their geographic spread, particularly through the settler colonial occupations of the Americas, resulting in Indigenous genocide and an orchestrated global slave trade that set the wheels of white supremacy into motion. As Zuberi and Bonilla-Silva (2008) argue, once Africans were emancipated from slavery in the West in the 19th century, resource imperialism and colonial subjugation continued and accelerated across commodity frontiers in Africa and Asia during the 20th century and beyond. Commodity widening usurps land and its inhabitants and attempts to fold them into the efficient, calculable, predictable, and controllable social relations of the industrial plantation as described above.

Banoub *et al*. (2020) identify how commodity widening takes place through a process of discovery, selection, and exclusion in the acquisition of vast new terrain for commodity production. The authors emphasize the spatial and temporal malleability of material natures as a function of their physical qualities as well as the labor to optimize the production of surplus value. Goods and services produced under the green economy, such as lithium batteries for electric vehicles or carbon offsets from tree plantations, follow in the practice of commodity widening, beginning with enclosure or resource capture of lithium or sequestered carbon stocks from common or customary land relations to private property regimes. Consequently, commodity widening is prone to what has been termed "green grabbing" (Fairhead *et al*., 2012).

Commodity widening is tightly linked to low-interest bank loans and expanding relations of debt. Bank loans by colonial creditors and resulting debt bondage financed vast slave-owning plantations for commodity crops in the US South, the Caribbean, South Asia, North Africa, the Malaya peninsula and elsewhere (Upadhyaya, 2004; Harvey, 2019). In turn, debt-fueled commodity production to pay back creditors has pushed the frontiers of commodity expansion into new territories, disrupting already existing human-nature relationships, generating further ecological degradation and new speculative opportunities for investment in green financing like climate-smart agriculture to address the continuous environmental contradictions of production. These new speculative opportunities and the low-interest loans they encourage further the debt-commodity expansion of the agricultural commodity frontier, kicking the can of environmental problems further down the road, and the debt repayment-commodity frontier expansion continues *ad nauseum*.

Since the 1990s, national debt relief through conservation agencies working with creditors in Europe and North America has been a popular approach for nature protection. These 'debt for nature' swaps involve writing-off sovereign debt by a creditor country, or conservation NGO working on their behalf, in exchange for conservation projects, thus offering economic "wiggle room" for countries to invest in ecological transitions (Svartzman & Althouse, 2022). Countries must achieve conservation outcomes, like the expansion of protected areas, by specific deadlines in these swaps and therefore must raise sufficient conservation finance to do so, often through the form of government loans or bonds devoted to terrestrial (e.g. "green") or marine (e.g. "blue") conservation agendas. These have grown in the wake of the COVID-19 pandemic (Akhtar *et al*., 2020), with new deals being arranged with Belize, Zambia, Ecuador, and Barbados.

based) industries, adept at exploiting the value generated by conservation imagery, qualitatively transform the previous ensemble of situated ecological relations to put the terms and conditions of capital accumulation first.

The outcome of these swaps results in exchanging one type of debt for another, allowing holders of green or blue bonds to profit from lucrative nature conservation strategies – including through real-estate speculation from conservation-based tourism. While provisions can be made to foreclose social harm to marginalized populations, there is no requirement that this takes place. Similar strategies of debt-driven "greening" have come in the name of so-called "nature-based solutions" that disguise large-scale infrastructure projects under the banner of environmental consciousness (Chausson *et al*., 2023).

Commodity widening also takes shape from the value grabbing of untapped rent value from nature (e.g. Andreucci *et al*., 2017; Fairhead *et al*., 2012), fueling ecologically and socially damaging economic spillovers like real-estate speculation (e.g. Gillespie, 2020). Rent refers to the instituting of property rights not used exclusively for new commodity production, but to extract value benefiting from aesthetic qualities, including the nebulous notion of being "nature positive", prime locations, cultural characteristics, carbon sequestration potential, or other positive externalities (Andreucci *et al*., 2017). These may result in exchanging carbon credits or certifying products or landscapes as "eco-friendly." Commodity widening through value grabbing from rent caters to morals, ethics and even calls for justice. Capitalizing on rent value requires reserve armies of low-skilled and precarious workforce to manage landscapes for nature-based solutions and palatably labelling them as green jobs (e.g. Neimark *et al*., 2021). The efficiency, calculability, predictability, and control dimensions of plantation ecology become best suited in locations where labor costs are low and the consumptive values of treating nature as an asset class are most optimal.

Commodity deepening

Commodity deepening occurs when spatial extensification of new territories is no longer possible. The commodity frontier advances through intensification that ramps up and hastens production. This involves technological innovation to further capitalize on otherwise difficult to obtain cheap natures and labor potential, identify and exploit surplus value and to further centralize control (Arboleda, 2020). In the case of agriculture, this commodity deepening process takes place through mergers or agreements between retailers, fertilizer and pesticide suppliers, shipping and seed companies, big tech digital agriculture platforms, multilateral banks, and "sustainable" development finance (Banoub *et al*., 2020).

Some examples of commodity deepening include: artificial intelligence technology to identify and extract difficult-to-reach mineral ores and oil sands, genetic breeding of climate and pest-resilient crops, optimized exploitation of (now depopulated) commercial fish through aquaculture, shortening poultry production schedules through injections of ever-specialized hormones, or the use of drones and field sensors that provide data on soil conditions, fertilizer requirements, and monitor pests and many more (GRAIN, 2021). In terms of labor, commodity deepening has meant greater surveillance of individual productivity, stronger captivity of workers to dependency on high-interest credit lines and mounting debts, greater fragmentation of laboring classes through outsourcing across global supply chains and the disruption of meaningful union organizing of workers across these disparate chains. In short, plantation ecology is further deepened and reinforced through greater control over productivity to enhance the pace, direction, and consistency of surplus value generation (Banoub *et al*., 2020).

One example of commodity deepening of plantation ecology emblematic to the green economy is the deployment of climate-smart agriculture. Touted discursively and institutionally by both governments, agribusiness, and among multilateral development and aid agencies, climate-smart agriculture leverages upon the branding of climate solutionism to further intensify industrial crop production through bioengineered crops. It wields already existing practices like herbicide usage for pest resistance and rebrands them as "climate-smart", reducing the need to till soils and release stored carbon (GRAIN, 2021). Yet enrolling these rebranding techniques and engineered technologies into plantation production systems directly and indirectly exacerbate the ecological breakdown they are meant to address. For instance, applying formulated herbicides to target particular pathogens has, in some cases, permitted these very pathogens to evolve and mutate in ways that adapt to the genetic selection of whole crops or livestock engineered to thrive with continued applications of these herbicide or antibiotics (Wallace, 2020). As the recent Covid pandemic painfully demonstrated, these risks (e.g. pathogen outbreaks and climate change) are ultimately offloaded onto workers of the plantation.

Consequently, production relations of the plantation not only do not change but are further securitized and entrenched.

Commodity deepening thus exerts a discursive, institutional, and material power to obscure existential risks that might alter the discipline of plantation ecology (Newell and Taylor, 2018). It rather redeploys concepts like regeneration and climate resilience in service of justifying new or existing commodities produced under already existing modes of plantation discipline, monocropping, financialized speculation and debt. Above all, commodity deepening does little to nothing to alter uneven patterns of value accumulation that accrue to end users of supply chains rather than returned to workers of the plantation (both human and non). While marginal material and energy efficiencies may result, the overall outcome is the expansion of yields and more efficient "just-in-time" delivery to retailers and consumers, especially when the same digital technologies are tied to algorithms for consumption preferences before consumers even know they desire something (GRAIN, 2021). Ultimately, such green branding for material and energy efficiencies is overwhelmed by faster economic throughput or rebound effect, making it *even more* difficult to transform production relations of plantation ecology that cause social and ecological harm (Nasser *et al*., 2020). Commodity deepening is metaphorically the act of digging a deeper hole to pull oneself out of it.

Regardless of the extensive or intensive nature of surplus value generation (e.g. commodity widening or deepening), the subjugation of human and non-human bodies as devalued natures is crucial to the process of how plantation ecology becomes inscribed as the Capitalocene in the web of life (Moore, 2015). Figure 1 illustrates the characteristics of plantation ecology as thus far described. Both commodity widening and deepening involve financial speculation on expected future profits in light of uncertainties and risks. In doing so, both processes *attempt* to hold the future hostage by already foreclosing the agency of unborn non-human natures and other lifeworlds (Mitchell and Chaudhury, 2020; Whyte, 2017). The key here lies in the *attempt*. While this does not deny the variable of success in erasing and subduing lifeworlds as novel, disruptive, or innovative assets produced in plantations, it also reveals the systemic failures that are working to undo plantation ecology itself.

3. From "greening" ecology to subjecting "green" to ecology

For all its seeming pervasiveness, plantation ecologies are contradictions. By constantly generating social and ecological harm, they also generate the conditions to undo themselves. Yet, the crises it produces also become new opportunities to continuously subject people and nature as cheapened and discardable workers, raw materials, or wastelands to make way for new "eco-friendly" and inclusive plantation products – everything from climate change crop insurance for those willing to pay the premiums to LGBTQ+ friendly and accredited real estate companies that contribute to urban gentrification and a growing housing crisis. The issue is not in the intention towards inclusivity, it is rather in the lack of attention to the political economy within which such inclusivity resides. The way that plantation ecology reduces diversity to monoculture – even as it depends on such diversity as the substrate to reproduce, sustain, and expand the deadening and dehumanizing logics of monoculture – is what Katherine McKittrick (2013: 5) calls an "oppression/resistance schema," giving the plantation an inbuilt capacity to maintain itself by feeding off its own contradictions. Yet, subjecting novel branding strategies to the replication of plantation ecology removes the "green" clothes from the metaphorical emperor and opens up possibilities for more fundamental ecological transformations.

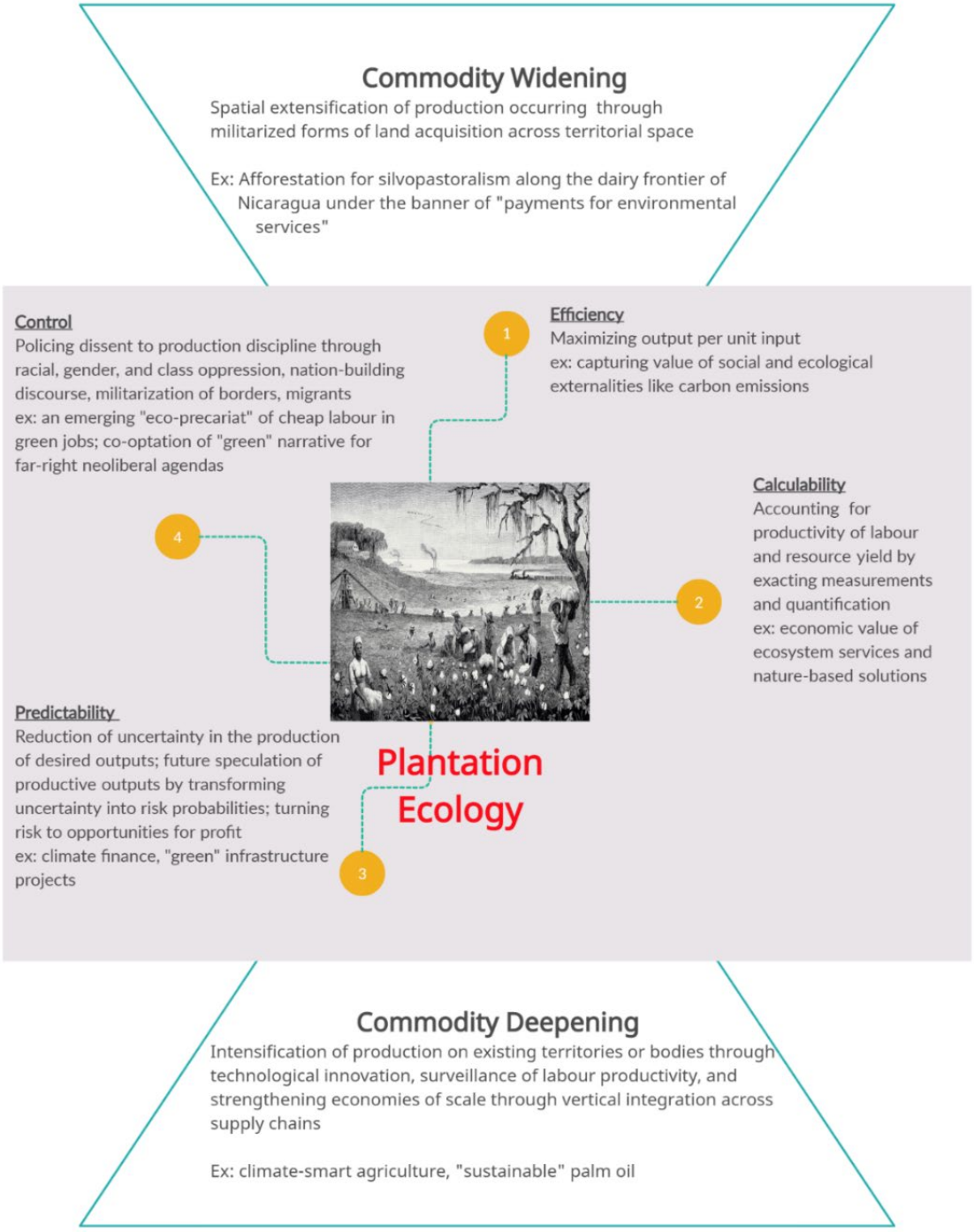

Figure 1: Characteristics of plantation ecology. For more details on payments for environmental services (PES) as expanding the commodity frontier, see Van Hecken *et al*. (2021).

One way to appreciate the relational character of plantations is to better understand how and by whom they are unmade. This requires understanding how situated sites of liberation and freedom are established, even if ephemeral (Gilmore, 2017). In their review of Johnhenry Gonzales' (2019) *Maroon Nation*, Heath (2022) describes Gonzales' account of how autonomous peasant economies of formerly enslaved workers on sugar plantations in Haiti transformed the production relations of plantation ecology. This was the result of political struggle to reassert specific definitions of freedom as tied to place and the formation of class consciousness and solidarity that emerged out of the struggle and culminated in the Haitian Revolution. Such consciousness continued to foster resistance against efforts of post-Independence elites to reassert plantation discipline, including in the discursive use of so-called "free" labor. Heath describes how autonomy and self-sufficiency by maroon communities facilitated escape and re-capture into the plantation economy through the liminal reappropriation of the plantation itself, for a moment in time and space, reasserting West African cultural traditions with the territory.

Elsewhere, Glover and Stone (2018) describe how terraced landscapes of wet rice cultivation by the Ifugao in the Cordillera mountains of northern Luzon in the Philippines were the outcome of social, cultural, and spiritual resistance to colonial (Spanish) and imperial (American) attempts to reassert plantation ecology in the 19th and 20th centuries. A morphologically distinct landrace of rice (called *tinawon*) sustained and gave cultural meaning and purpose for the Ifugao in reclaiming their freedom from oppression. In these contexts, the notion of a plantation can no longer be totalized through uniformity, precision and replicability, dehumanization or value accumulation, but rather become sites of life generation premised on liberation from oppression and control. *Tinawon* rice is typically grown in only one harvest, combining deep spiritual connection and cultural meaning for the Ifugao, defining their political structure and economic relations, and the unique climatic, altitude, and ecological conditions of the Cordillera mountains (*Ibid.*).

The close relation (or indeed complicity) between both human and non-human resistance to plantation ecology that these historic examples provide opens new avenues of reflection in the face of ecological breakdown and so called "green" solutions. As we have thus far described, "greening" strategies have tended to entrench plantation ecology through the generation of new forms of value capture, including through novel forms of resource and labor devaluation to produce "green" goods and services. But how do affected workers on the plantation (both human and non) engage in marooning practices by taking advantage of increasing social and ecological dislocations that continuously emerge from these so-called solutions? How might abolition from the ruins of the plantation be fostered by weaving new kinds of relationality, class consciousness, and solidarity to build political power (Stoetzer, 2018)? How might the "green" plantation be resisted by fostering alternative ecologies of liberation and abolition? We now turn to two examples of "greening" interventions that reproduce plantation ecology, y*et al*so involve actions of resistance and defiance. These examples are summarized in Table 1. In these examples, we refer to our own empirical research (both published and unpublished), drawn from interviews conducted between 2017-2019 (for compensatory afforestation in India) and 2021-2022 (for the RSPO). We subsequently conclude with some lessons that point towards abolition ecologies.

Plantation ecology characteristic ⇩ / **'Greening' intervention** ⇨	**Predictability**	**Efficiency**	**Calculability**	**Control**	**Commodity widening**	**Commodity deepening**
1. Roundtable on Sustainable Palm Oil (RSPO)	a) Rendering visible (qualitatively and quantitatively) the value of "sustainable" global palm oil production within commodity chains a) Implementation of methodologies that distinguish areas with high carbon stock potential for protection from degraded lands with low carbon and biodiversity values that may be developed.	a) Maintaining the production of palm oil commodity on a global scale a) According to a global RSPO representative, RSPO certified grower members produce 5.7 tons of Certified Sustainable Palm Oil (CSPO) per hectare and are thus 50% more productive than global average yields of 3.8 tons of CSPO per hectare. ----------	a) Quantified assessment of 8 sustainability principles that are being monitored and audited in the context of third-party certification a) Indicators of sustainability based on tons of Certified Sustainable Palm Oil per hectare.	a) RSPO member Poligrow SAS (Colombia) has been accused[4] of using dubious practices of illegal land acquisition in collusion with government actors to hold control of dispossessed lands. Despite accusations, the company continues to be praised for its sustainable standards and practices.	a) Ensures increased supply of certified "sustainable" palm oil as a novel commodity a) Promotion of strategic productive alliances between large corporations and smallholders (Scheme Smallholder certifications) that further the geographical expansion of plantations.	a) Securitizes surplus value for market access for palm oil regardless of the land history or social and environmental impacts a) Sustainability is defined by practices that add surplus value to palm oil production, such as selecting the best seeds and planting materials, technical fertilization based on soil surveys, adequate use of agrochemicals, and good water treatment.

[4] RSPO Complaints Panel (2019); RSPO Complaints Panel (2017); RSPO (2015)

	---------- b) Unpredictability of social and violent conflicts over access to and control of natural resources as a consequence of incommensurable valuations of ecosystems	b) The capacity to maintain efficient production is undermined by persistent labour shortages in many oil palm plantations such as Malaysia, which relies on foreign labour. Chronic labour shortages coupled with unfavourable immigration laws and COVID-19 have caused millions of tons of oil palm fresh fruits bunches to spoil (Crowley 2020).	---------- b) Climate change and global environmental change, especially erratic rainfall and new pests pose threats to oil palm production (Murphy et al. 2021). This affects both predictability and calculability of indicators.	---------- b) Widespread mobilizations of workers and through ongoing labour strikes; demonstrations to denounce harmful practices in the oil palm industry, notably in Indonesia (De Vos & Delabre 2018).	---------- b) Oil palm smallholders, who form the backbone of oil palm growers can hardly obtain sustainability certification due to prohibitive costs and limited knowledge of certification benefits (Abazue et al. 2019).	---------- b) Increasing public awareness of the greenwashing of ecological and social impacts from sustainability-certified palm-oil-based biofuels, casting suspicion over public manipulation.
2. Compensatory Afforestation (India)	a) Equivalencies of afforestation targets depending on category of degraded land and irrespective of context ----------	a) Standardized tree planting (e.g. monoculture) requirements of 1000 saplings per hectare ---------- b) Poor survivability of	a) Monetary compensation of deforestation based on net present value of forgone ecosystem services ----------	a) Intended eradication of *Podu* cultivation and associated lifeworlds practiced by Adivasis; hiring labour from nearby villages to foment distrust and subvert resistance	a) Extensification of mining projects, justified through forest compensation; expansion of new commodities from compensation forests, including carbon credits and ecotourism	a) Securitizing existing commodity markets through climate mitigation and improving public relations to justify extraction by expanding no-go plantations controlled by the State Forestry departments.

	b) Expected "land banks" as repositories for compensation forest monocultures becoming sites of resistance and conflict, especially in jurisdictions far from site of development projects	tree monocultures, due to disease, climate, poor soils, and illegitimate knowledge claims around forest ecological values	b) Arbitrary and undemocratic metrics to capture lost social and ecological values (measured in money) is accumulating and goes largely unused. These funds can be used to finance people-centered ecological restoration	---------- b) Advocacy to defend land rights for forest-dwelling communities; potential to mobilize across jurisdictions; acts of sabotage, cutting down plantations, restoring *podu* cultivation	---------- b) Public backlash against growing ecological crises across India, through solutions that essentially subsidize ecological breakdown, worsening climate change	---------- b) Activists increasingly revealing the existence of "ghost" plantations as Forest Conservation Act (2023) aims to expedite permitting of compensation forest to hasten development projects. These "ghost" plantations exist only digitally, but not on the ground (Kukreti, 2022)

Table 1: Features of two "greening" interventions that: a) embed or reinforce plantation ecology through their theory and implementation within the so-called "green" economy and b) generate contradictions that resist and redirect plantation ecology.

Green certification schemes: The Roundtable on 'Sustainable' Palm Oil (RSPO) and its undoing

The rapid expansion of palm oil monocultures by transnational and local firms in Southeast Asia, Central and West Africa, and more recently, Latin America has caused the erasure of social-ecological histories along with mass-scale incorporation or displacement of local communities in forest biomes among the richest in terms of biodiversity (Pye, 2019; McCarthy and Cramb, 2009). Dehumanized, laboring bodies brought into plantation logics of the oil palm plantation have been widely devalued, and differentiated according to gender, nationality, ethnicity, class status and subjected to sustained forms of exploitation (Bissonnette, 2013; Li, 2011). In Colombia, in a context of civil war, oil palm plantations have provided the justification and financial means for military and paramilitary forces to enclose and secure large tracts of land, dispossessing thousands from their territorial and cultural autonomy to further the accumulation of lands for commodity production (Hurtado *et al*., 2017; Maher, 2015; Palacios, 2012; Potter, 2020). In response to growing scrutiny from the more visible aspects of ecological destruction across palm plantation regions (e.g. orangutan deaths, forest and peat soil fires and haze, massive contribution to climate disruption) as well as labor practices, "sustainable" palm oil through certification has become a salient public relations 'fix' for the industry (Pye, 2019).

The Roundtable on Sustainable Palm Oil (RSPO) is an initiative launched in 2004 by the WWF, the Malaysian Palm Oil Association (MPOA), Unilever, Migros (a retailing and refining chain), and AAK (a vegetable oil producer) with the goal of promoting the use and production of harm-free palm oil. The RSPO provides a platform for oil palm companies to engage in a supposedly third-party certification process that measures compliance with rules and standards approved by the consensus of its members, such as zero burning, herbicide use reduction and respect of labor regulations (Bain & Hatanaka, 2010). Its definition of sustainability relies on applying the right techniques and best practices such as selecting the best seeds and planting materials, technical fertilization based on soil surveys and nutritional assessments, adequate use of agrochemicals, and attention to drainage and water systems to increase the productivity, efficiency and profitability of RSPO members.[5]

Without changing the production system but using "green" as a license to both widen and deepen commodity frontiers, the RSPO offers a novel survival strategy for the dehumanizing logic of the plantation. Using the sustainability narrative, the RSPO has become the most prominent initiative to secure market shares for oil palm and assert large companies' social and environmental corporate responsibility and ESG portfolios. It effectively contributes to creating a "green" rent value within the broader political economy of intensive oil palm production and secures access to markets in places (like Western Europe) where consumers have higher purchasing power and environmental awareness, what has been termed 'ethical consumerism' (Pye, 2019: 220). The RSPO further legitimizes the idea that plantation agriculture can be regulated voluntarily by companies, if consumers are willing to pay more for an eco-certified product produced by the same plantation discipline that in fact never gets called into question. Opposition to plantation logics is thus effectively diffused through novel and flexible strategies that co-opt socio-environmental concerns and ultimately serve to extend the plantation.

The RSPO's principles and criteria of sustainability do not address the structural problems of the industry, including land conflicts and dispossessions, labor exploitation, human rights violations, and environmental degradation caused by the continuous expansion of the industry (Pichler, 2013). RSPO certifications and membership can also be used by palm oil companies to legitimize and consolidate illegal land dispossessions and accumulation, and greenwash histories of violence, discrimination and conflict as is illustrated in the case of specific palm oil companies in Colombia associated with paramilitary violence, forced land dispossessions, and death threats to land claimants and indigenous populations nearby plantations (Comisión Interesclesial de Justicia y Paz, 2015; EIA, 2015; Somo & Indepaz, 2015). The combined apparatus of government, private sector, organized crime, paramilitary groups, and scientific institutions at the helm of the green economy falsely equate savagely simplified plantation discipline to the kinds of ecological plurality they claim to be regenerating.

[5] In an interview conducted by co-author D. L .A., the RSPO representative suggested that one of the major incentives for getting certified by the RSPO for Latin American producers was to get access to the growing EU's market for sustainable palm oil.

Oil palm production, however, exists outside the logic of the plantation. Despite profound disruptions brought by Western colonialism to the complex ecological relations developed by communities throughout history, small family farmers have remained the backbone of oil palm production in most parts of the world (RSPO, 2020). Even in Malaysia and Indonesia, where oil palm was initially introduced in the late 19th century as a plantation crop grown in centrally managed large-scale systems, it was rapidly taken up by hundreds of thousands of small family farmers and grown in diverse ecological systems (Bissonnette & De Koninck, 2017). In Northeast Brazil under Portuguese colonialism, African slaves brought with them oil palm seeds, which eventually enabled the emergence of a distinct Afro-Brazilian landscape. It produced the agroecological region now referred to as the Palm Oil Coast, *Costa do Dênde,* a clear marker of agency, cultural and territorial reappropriation (Watkins, 2015). Despite the horrifying logic of the plantation, the crop itself and the human relations formed around it can never be fully reduced to a predefined outcome premised on a factory model logic of production.

Where the "green" plantation logic manifested through RSPO shows limits is precisely in the certification of small family producers or smallholders. The diversity and complexity of tenure arrangements, cultivation practices and access to information (Jelsma *et al*., 2017) renders small scale production less visible to the uniformity of "greening" practices. This is not to say that small-scale oil palm farmers fall outside power relations of plantation logics, which they indeed may aspire to in the hopes of generating profit as property owners. However, because they are highly heterogeneous and remain embedded within more embodied relations to land and labor, they actively shape ecological processes that fundamentally differ from that of monoculture.

"Greening" development in India through compensatory afforestation

The reproduction of plantation logics within India's green economy is a growing concern. Stories of resistance from plantation landscapes in the state of Odisha point, however, to insight in why and how these logics fail or get undone. In India, compensatory afforestation (CA) requires public and private agencies that deforest for roadbuilding, mining, or other development projects to plant an 'equivalent' forest elsewhere. While ostensibly a tree-planting project, CA is at its core a tree-cutting project, since every forest being cut is behind each (largely monoculture) plantation that exists through this program.

In Keonjhar District, Odisha, monoculture tree plantations have been imposed on community lands for decades, often under the guise of "*podu* prevention" (Panda, 1999). *Podu* refers to a system of agroforestry that is often known as rotational agriculture, shifting cultivation, or swidden cultivation. Practitioners move from site to site, leaving fallows to regenerate and clearing a new patch for cultivation. Like many previous afforestation programs, CA site plans reveal that forest officers intentionally select *podu* sites for plantation, describing them as "*podu*-ravaged", "subjected to *podu* cultivation" or "conspicuously cultivated" (DFO, 2014). Aware that this will drive conflict and resistance from villagers, who cultivate or forage about half of their food basket in the forest (Valencia, 2019), site plans often include strategies to ensure "good humor" among villagers including celebrations that will inspire them to "protect the plantation" (DFO, 2014). Yet because communities are acutely aware that the spatial and ecological imposition of plantations on *podu* lands reflects a broader political project—threatening their livelihoods—they reject the counterintuitive assumptions of CA, including that Adivasi (i.e. Indigenous) customary rights, livelihoods, and cultures are obsolete; that monoculture plantations are equivalent to forests; and that plantation protection leads to "benefits."

The state's pursuit of "efficiency" is reflected in its strong preference for teak (Tectona grandis). Teak is a favored species for plantation forestry given its quick growth, durability and economic value. But for communities in these areas, teak plantations are "utterly useless" (Valencia, 2019) in comparison to forests and regenerating fallows which offer fuelwood, fruits, roots, tubers, leafy greens, seeds, fodder, and other forest products. Resistance to teak has an important historical legacy in central India. The *Jangal Katai Andolan* (Forest-Cutting Movement) in the 1970s organized Indigenous communities to burn plantations, destroy saplings, and demolish forest department infrastructure (Sen, 2018, p. 195). In Keonjhar, Indigenous organizing against plantations initially focussed largely on species selection, with demands not to end plantations but to

recognize communities' decision-making role in picking species that benefit them. Today, forest agencies claim to be undertaking a more "holistic" approach to plantations, including attention to polyculture. However, ground-level evaluations of CA plantations shows that, where plantations are indeed undertaken at all (e.g. Kukreti, 2021), teak remains the mainstay.

The narrative that plantations depict efficiency is belied by the fact that plantations rarely survive (Rana *et al*., 2022). In Keonjhar, the plantation legacy is mired with failures spanning from the era of social forestry (e.g. Panda, 1999) to their new linkages with the green economy (Valencia, 2019). Ground truthing of CA plantation data has revealed that CA saplings may be planted, and a plantation may exist in principle, but within a few years sites are often reverted to shifting cultivation and replanted with traditional crops (Valencia, 2021). In 2013, the Comptroller and Auditor General of India released a report including evidence of unacceptable plantation survival rates, unmet offset objectives, and rampant financial mismanagement (MoEFCC, 2013). Hardline conservationists and retired forest officers challenged the program on similar lines, leading to a new law – the Compensatory Afforestation Fund Act, 2016.[6] Taken together, the veneer of efficiency crumbles.

The dimensions of calculability and predictability particularly enrich an analysis of how CA connects with the broader green economy. As per India's Forest Conservation Act, to achieve "equivalence" between forests and plantations, deforesters must fund plantations that average 1,000 trees per hectare and must pay into a fund that approximates the net present economic value of foregone ecosystem services (e.g. biodiversity protection, carbon, water recharge) associated with deforestation spread across a 50-year period, to account for lost regeneration costs (Kohli *et al*., 2011). However, advocacy to push state forest agencies away from highly dense "block plantations" and towards "assisted natural regeneration" has created a perverse outcome. For instance, site maps for upcoming plantations in Thuamul Rampur, Odisha reveal that rather than simply targeting shifting cultivation fallows for block plantations at 1,600 trees per hectare, every square centimeter of village commons will be enrolled in plantation projects at a lower density (Valencia, 2019). Given that neighboring villages are often affected, this plan will convert interconnected, Indigenous shifting cultivation landscapes into archipelagos of homesteads within seas of fenced-off "green" state property.

Compensatory afforestation plantations are unique within India's massive restoration portfolio as they have the power to delay forest clearances for expensive extractive projects. Predictability of plantation site availability, suitability, and execution is therefore key. One evidence of this is that in Odisha, the state land bank identifies lands for CA as lands for investment, thus increasing the risk of land dispossession. The political economy of land demands within which CA is embedded also creates a predictable procedural space. A site plan can simultaneously employ specific turns of phrase, including the assertion that desired lands for CA are "conspicuously cultivated" or "free of encroachment and encumbrance" (DFO, 2014). These phrases sanitize the lived experiences of people dispossessed by the plantation projects and conceal failures in due process with no consequence. Predictability is a core component of compensatory afforestation and restoration logics more broadly because of the calculated commitments around tree planting that India has made to which plantations must fulfill. India's global commitment to afforestation – at 26 million hectares – is second only to China. India has long committed to increase from present forest cover of 21% to 33% (for more on these rather arbitrary numbers and definitions, see Davis & Robbins, 2019).

The resulting power struggle between communities and the State invokes the fourth dimension of control. Reflecting on the planned proliferation of plantations across *podu* patches in her village, one senior woman asserted: "We will not allow them. If they do plantation everywhere, what land will be left? How will we survive?" (Valencia, 2019). While plantation policies and plans occur at the higher levels of the forest bureaucracy, exertion of control is often up to the lower-level rangers, guards, and watchmen. Strategies such as hiring labor from outside villages (or dominant communities within the villages), negotiating 'deals', and manufacturing consent through illegitimate local institutions are employed to ensure that saplings are planted, as a bare minimum commitment, and to justify calculated plantation quotas and statistics on forest coverage (Choudhury & Aga, 2019; Fleischman, 2014; Gerber, 2011) Communities may take these in stride, with an

[6] The Fund referenced here manages offset payments—currently accumulated at more than US$ 7 billion —whereas this case study focuses on the linked but separate offset plantations.

ultimate plan of reclaiming the land from the scrawny saplings to plant millets (Cenchrus americanus and others) or niger seed (Guizotia abyssinica) instead. But what binds the plantation ecology of CA to the green economy is the equivalence that each monoculture planted justifies for deforestation elsewhere. Here, a unique contradiction emerges. CA plantations are telecoupled to deforestation. They exist to mitigate harm, while extending harm and control by placing forests in the hands of many into the hands of the State forest agencies. While attempts continue to gobble up grassland areas and seeming "wasteland", from the eyes of the government, for their conversion to forested monoculture plantations, efforts to reclaim land back in the hands of land users continues to follow suit. Meanwhile, plantations are spreading to distant locations, increasing the State's grip on territories in other jurisdictions.

The social impacts of CA reflect the scale at which people most vulnerable to the impacts of climate change and ecological breakdown will also be most threatened by the green economy solutions supposedly aimed at addressing impacts. It also reveals the fragility of the plantation: for all the efforts to make plantations efficient, calculable, predictable and controlled, communities assert that it doesn't take much to pull up a weak teak sapling and plant millets or niger seed instead (Valencia, 2019). Modifications to the Forest Conservation Act in 2023 will make it easier to divert forests to expedite developments in the name of being in "national interest and concerning national security," thus exonerating the need for forest compensation at all in some cases. These security-related infrastructures include, among others, projects for planned commercial wildlife safaris, ecotourism projects, public works in so-called "left wing extremism" areas and in any location within 100 km of an international border with India (Sharma, 2023). It is also expected that forest plantations can be designed to maximize carbon sequestration for tradeable carbon credits and to render development projects carbon neutral (*Ibid.*).

4. Never quite a conclusion, towards abolition ecologies

Describing plantation ecology is not meant to showcase how "green" is being done wrong and how it can be done right. That would be too precise, too replicable, too rational, even if it was indeed possible. Moreover, the "greening" of plantation ecology is not limited to specific interventions like compensatory schemes or sustainability certifications but may also apply to sweeping economic transition programs like the Green New Deals[7] of wealthy, industrialized nations (Ajl, 2021) that do not pay attention to the logics we have described here. Ecological solutions cannot come from plantation ecology – the same discipline and design that has only sharpened the knife blade of ecological breakdown and inequality, precipitating the loss of socio-cultural imaginaries and capacities to intervene and generate alternatives. Liberation from the plantation requires dismantling the plantation rationalizer in our collective minds. This means *policy un-friendly recommendations* amidst an ever-tightening State/corporate nexus that regenerate a praxis of worlds (plural) in common, crucially grounded in desires for freedom from oppression and dehumanization. To us, the demands for social and environmental justice that defy the imposition of plantation discipline by twinned state and private sector interests are *ecologizing* practices, meaning that they reanimate thought and being in ways that stimulate conditions for the proliferation of alternative socio-ecological relations. These spaces reflect relationships to the land that have historically regenerated conditions for living out of both desire and survival (McKittrick, 2013).

A plethora of questions emerges as to how these forms of existence terraform landscapes of hope against hope, of people and non-people alike, temporally through situated encounters and geographically across territories. Such ecologies are not predictable, efficient, calculable, controllable nor are they replicable, but rather reflect the unlikely kinships of place-making that emerge amidst the ruins of the plantation (Stoetzer, 2018). They do not deepen or widen plantation commodity frontiers; yet could just as easily be essentialized as new desired endpoints and themselves driven into new production systems that placate any attempt to reroute

[7] Compromises to labor that underpin welfare-based social democracies in wealthy industrialized countries of the North depend fundamentally on the pillaging of dehumanized labour and cheap (renewable) energy and material extraction in the Third World (Ajl, 2021). The proposed Green New Deals of Ed Markey/Alexandra Ocasio-Cortez in the US and the European Green Deal risk being strategically imbricated within the logics of plantation ecology as described.

the template of plantation ecology. Put differently, they could all too easily be romanticized into new equitable, politically-correct, diverse, and inclusive plantations – that fail to address uneven dimensions of value and knowledge accumulation.

Only profound solidarity across the social fragmentations embedded in plantations can overcome the tendency to reproduce plantation logic. This requires internationalist and intersectional solidarity movements that encompass agrarian and fisherfolk demands for autonomy over food production systems, Indigenous struggles for territorial sovereignty, and demands for decent working conditions that reflect lived experiences across gender, race, and immigration status. It is therefore imperative that so-called "greening" solutions be scrutinized for the tyrannical interests of the 1% that they ultimately serve. As we have argued in this piece, dehumanization and ecological simplification are not merely technical issues of mal-distribution or improper recognition within plantation discipline, but are fundamental conditions of its existence and expansion (Ajl, 2021; Coulthard, 2014). Reclaiming autonomy from the plantation has inspired decolonial and abolitionist thinkers from the Black radical tradition (e.g. Angela Davis, bell hooks, Kimberly Crenshaw, Saidiya Hartman, Clyde Woods, and Ruth Wilson Gilmore); Indigenous ecologists like Potawatomi scholar Kyle Powys Whyte, Yellowknives Dene scholar Glen Coulthard, Michi Saagiig Nishnaabeg scholar Leanne Betasamosake Simpson, and Unangax scholar Eve Tuck; anti-imperialist and non-Eurocentric decolonial scholars like Liberian activist and academic Robtel Neajai Pailey, Cameroonian historian Achille Mbembe, Peruvian sociologist Aníbal Quijano, and Bolivian sociologist and historian Silvia Rivera Cusicanqui, as well as anti-caste philosophers and contemporary thinkers like Jyotirao Phule, Babasaheb Ambedkar, E.V. Ramaswamy Periyar, Suraj Yengde, and Kancha Ilaiah among many others.

The process and material outcomes of attaining freedom from the plantation is what Heynen and Ybarra (2021) refer to as abolition ecologies, characterized as embodied relationships between people and territory imbricated within a struggle for liberation from state-sanctioned violence, criminalization, and dispossession. The movement to "Defend the Atlanta Forest", which aims to halt a planned police training facility whose construction threatens the safety and environment of neighboring Black communities and is an act of ecocide in an era of ecological breakdown and on the sacred stolen territory of the Muscogee Creek people, is an abolition ecology in the making (Bernes, 2023). It intertwines the efforts of prison abolitionists, dreamers of Black liberation from the carceral state and legacies of plantation oppression, Indigenous activists and environmentalists alike through a 'movement of movements.' Together, these actors root themselves with the plants and animals of the forest through a myriad set of human and non-human relations premised on social and ecological justice.

Abolition ecologies are the biophysical and socio-spatial relations that shape and are shaped by legacies of resistance from (neo)colonial oppression rooted in situated categorizations of dehumanization (e.g. anti-black, anti-Dalit) and ecocide (Sultana, 2022). An abolition ecology means dismantling the infrastructure of plantation ecology and putting an end to the possibility that plantation "irrationalities", conceived as economic externalities, could ever be enrolled back into a more diverse and inclusive plantation. An avenue of necessary inquiry resides in how such dismantling ought to take place, without falling prey to co-optation. Does care for social and environmental justice ultimately require *blowing up pipelines,* referring to the title of Andreas Malm's 2021 book? It may be, as Grubačić and O'Hearn (2016) argue, that abolition ecologies are deeply liminal as the example of maroon ecologies in Haiti illustrate. This means that they may not "exist" as such, but are immanent in resistance to being named, mapped, or fully analyzed (Harney & Moten, 2013). This immanence of resistance is itself the relationality reflecting what ecological complexity means and to which *care-ful* attention is needed in doing away with plantation discipline, yet often with little guarantees.

The "Gesturing Towards Decolonial Futures" collective have recently reflected on ways to ensure that efforts made towards decolonization are not re-routed into the same desires and entitlements that lead to colonial practice, rendering decolonization a weaponized buzzword that serves colonial interests (Stein *et al*., 2021, Tuck and Yang, 2021). Part of this responsibility lies in affective affirmation of "staying with the trouble" (e.g. Haraway, 2015) without being content with residing in a space of mere intellectual critique of coloniality. This does not exonerate the "reproduction of modern/colonial desires and habits of being" (p.10). The collective

identifies "circularities" or pitfalls that ensnare engagement with decolonization back into colonial practice, highlighting how they positions themselves aspirationally within what they call "the house modernity built" to better contextualize the pathways that engagement with decolonization may take. In each case, they proceed by walking readers through the mistake-ridden journey of trying better, with attention to humility, curiosity, attention to difference, self-complicity and long-haul discomfort with the trouble we find ourselves in. By keeping an eye to the ways resistance and response strategies to plantation logics fold back into what they seek to escape from, it becomes possible to hold out a "horizon of possibility" without cynically writing off the recurring inevitability of the plantation. Part of this practice involves disinvesting in the unethical and deadening trajectory of the plantation but without arrogance as to the "correct ways" of fashioning alternatives. This involves taking the lead of abolitionist and anti-colonial struggles as well as through individual and societal commitment to "hospicing" the harmful everyday practices and habits of being that consciously and unconsciously reproduce plantations (Stein *et al*., 2021).

Undoing the "green" plantation is an undertaking in taking ecology seriously, and by that we mean opening the deeply political horizon of how harmful habits of thinking and being are reproduced in society and in ourselves.

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