



# **(Un)Worlding the Plantationocene: Extraction, Extinction, Emergence**

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## **Abstract**

This article explores how tropical plantation lifeworlds are made and unmade through more-than-human forms of extraction, extinction, and emergence. Taking the palm oil sector as my primary focus of inquiry, I trace the extractions of substance, land, and labour undergirding the historical transformation of oil palm from West African subsistence plant to pan-tropical cash crop and controversial global commodity. I then examine how the presents, futures, and relations of multispecies communities are pushed to the edge of extinction under the plantation logic of ecological simplification, reorganization, and instrumentalization. Finally, I explore oil palm landscapes as zones of ecological emergence, where diverse plants, animals, and fungi are learning to co-exist with oil palm in new forms of symbiosis. Thinking-with processes of more-than-human extraction, extinction, and emergence foregrounds the sequential and synchronous ways in which plantations are worlded, unworlded, and reworlded across time, space, and species. Such an approach points to the importance of reconciling theoretical conceptualizations of plantations as ideology with ethnographically grounded examinations of plantations as patches. It also invites difficult but important ethical, political, and methodological questions on how to story the lively facets of plantation lifeworlds without doing (further) violence to the human and other-than-human beings who experience plantations as lethal undoings and endings.

**Keywords:** Southeast Asia, plantations, oil palm, extraction, extinction, emergence, Plantationocene, patchiness

## (Un/re)worlding the Plantationocene

The world today, in the words of the late anthropologist Deborah Bird Rose, is one of great unmaking (2013, p. 9). Climate change, extractive capitalism, and environmental degradation – the hallmarks of the Sixth Mass Extinction – are wreaking havoc on the lives, relations, and futures of the planet’s diverse, other-than-human dwellers. The sheer scale of planetary “omnicide” – the killing of everything, in philosopher and political theorist Danielle Celermajer’s (2020) terms – is difficult to grapple with, materially and conceptually. A suite of neologisms – ninety, at the latest count – have proliferated in scholarly attempts to grasp the spatiotemporal scope and significance of this great unmaking (see Chwałczyk, 2020). Some have established a strong foothold in social sciences and humanities discourses – Anthropocene, Technocene, and Pyrocene, for instance. Others retain a niche status and remain cryptic at best – Molysmocène, Neganthropocene, Prometheocene, and the tongue-in-cheek Neologismcene.

One concept that has gained traction within this diverse and growing taxonomy is the Plantationocene. The Plantationocene, writes Science and Technology Studies scholar Donna Haraway, refers to “the devastating transformation of diverse kinds of human-tended farms, pastures, and forests into extractive and enclosed plantations, relying on slave labour and other forms of exploited, alienated, and usually spatially transported labour.” It entails “the rapid displacement and reformulation of germ plasm, genomes, cuttings, and all other names and forms of part organisms and of deracinated plants, animals, and people.” And it “continues with ever-greater ferocity in globalized factory meat production, monocrop agribusiness, and immense substitutions of crops like oil palm for multispecies forests and their products that sustain human and nonhuman critters alike” (Haraway, 2015, fn. 5; see also Hennessy, 2019; Latour et al., 2018; Mitman, 2019).

As geographer Janae Davis et. al. (2019) remind us, the plantation, as colonial spatiotemporal formation and racializing assemblage, was extensively theorized by scholars in the fields of critical race and literary studies long prior to the formulation of the “Plantationocene” per se (see, for instance, Hartman, 2016; McKittrick, 2013; Wynter, 1971). In conversation with interdisciplinary debates that have flourished since the term’s articulation, this article examines how multispecies worlds in the Plantationocene are made, unmade, and remade through entangled processes of more-than-human extraction, extinction, and emergence.<sup>1</sup> In analysing these three

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<sup>1</sup> See, for instance, Carney (2020); Chao (2021b); Dillon (2019); Ishikawa (2020); Jegathesan (2021); Murphy and Schroering (2019); Paredes (2021); Saraiva (2018); Tsing et al. (2019); Whitaker (2020); Wolford (2021); the *Edge Effects* Plantationocene Series <https://edgeeffects.net/tag/plantationocene/>; and the proceedings of the Cornell Symposium, “A Conversation on the Plantationocene” at <https://einaudi.cornell.edu/research/global-research-priorities/conversation-plantationocene>. For in-progress edited collections and special issues problematizing the

intertwined processes, I take as my primary object of inquiry one of the tropics' most rapidly growing and controversial agribusiness industries – the palm oil sector. Covering over nineteen million hectares and second only to soy in scale, the palm oil sector is an important source of food and biofuel for the world's growing population, but its expansion is also a major driver of tropical deforestation, biodiversity loss, precarious livelihoods, and Indigenous dispossession (Colchester & Chao, 2011, 2013; Cramb & Curry, 2012; Obidzinski et al., 2012; Wakker, 2005; Zuckerman, 2021). These impacts are particularly marked in Southeast Asia (the primary ethnographic focus of this paper), home to the two top palm oil-producing countries in the world – Malaysia and Indonesia – and source of over 84% of global palm oil supplies (Ritchie & Roser, n.d.).

Synthesizing findings derived from investigative and ethnographic fieldwork in the Southeast Asian plantation sector with interdisciplinary insights from fields including the environmental humanities, environmental history, and multispecies studies, I begin by tracing the extractions of substance, land, and labour undergirding the historical transformation of oil palm from West African subsistence plant to pan-tropical cash crop and controversial global commodity.<sup>2</sup> I then examine how the presents, futures, and relations of multispecies communities are pushed to the edge of extinction under the plantation logic of ecological simplification, reorganization, and instrumentalization. Finally, I explore oil palm landscapes as zones of ecological emergence, where diverse plants, animals, and fungi are learning to co-exist with oil palm in new forms of symbiosis.

The Plantationocene, as material formation and conceptual analytic, helps me disentangle the distributed agencies of plants and people within oil palm plantations as capitalist natures (Escobar, 1999). On the one hand, the concept draws attention to vegetal beings – in this case, oil palm – as a particular form of capital, whose material and biotic vitality matters to the production and productivity of agro-industrial landscapes (cf. Hartigan, 2017; Head et al., 2012; Myers, 2015). On the other hand, the Plantationocene draws attention to the perduring (il)logic of human mastery, discipline, and control in and through which particular plants and particular people are rendered productive, exploitable, or disposable under plantation regimes – to what end, to whose benefit, and at what cost (cf. Allewaert, 2013; Li, 2014; McKittrick, 2013).

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concept of the Plantationocene from anthropological and interdisciplinary perspectives, see Macedo et al. (forthcoming) *Plantations and their Afterlives: Materialities, Durabilities, Struggles*; and Chao and Paredes, (forthcoming) "Introduction: Plantations as Affective Infrastructures: Between Ecological Form and Enduring Logic".  
<sup>2</sup> I conducted ethnographic fieldwork in Indonesia and Malaysia in the capacity of Project Officer for the international human rights organization Forest Peoples Programme between 2011 and 2015, and in the capacity of doctoral and postdoctoral researcher between 2015 and 2019. This research investigated the social and environmental impacts of deforestation and monocrop oil palm expansion among Indigenous communities. It also entailed a significant advocacy component, including co-researched complaints submitted to United Nations bodies, government agencies, and sustainable palm oil certification standards, as well as participatory mapping and human rights trainings organized jointly with NGOs and communities in the field.

As a “material-semiotic assemblage” (Law, 2019) or “dispersed ontology” (Chao, 2018a), the Plantationocene is embedded within and generative of, multiple, intersecting, and overlapping worlds – individual and collective, human and other-than-human, local and global, and First to Fourth. It comes into being through the doings and undos of diversely situated entities – some intentional, concerted, and complementary, others partial, contingent, and conflictual (Clarke & Star, 2008; Tsing, 2000). Differentially articulated across space and time, the Plantationocene is, in Marisol de la Cadena and Mario Blaser’s (2018) terms, a world of many worlds. Within this world of many worlds, different plantation regimes partially produce their own natures through the situated intra-action of plants, people, pathogens, soils, and chemicals (cf. Beilin & Suryanarayanan, 2017; Soluri, 2000; Tomich, 2011).

In the process, plantations reveal themselves to be products of enduring, hegemonic logics of discipline and domination (Li, 2017a; Rusert, 2019; Thomas, 2019), at the same time as they are always embedded within, and generated by, specific temporal, spatial, multispecies, and material contexts – in a word, plantations are “patchy.” Developed by anthropologist Anna Tsing et al. in their transdisciplinary examination of the form and concept of the Anthropocene, the notion of patchiness eschews the flattening violence of theoretical abstraction and centres instead on the granular textures and terrains animating the “uneven conditions of more-than-human livability in landscapes increasingly dominated by industrial forms” (2019, p. S186). Patchiness, Tsing et al. write, invites attention to the modular simplifications and feral proliferations at play within capitalist landscapes, the importance of noticing and attuning to more-than-human sites and stories, the need to think with different scales and structures in theorizing material formations, the challenge and necessity of reckoning with crisis while also attending to emergence and possibility, and the imperative to rethink intersectional injustices within and beyond the human realm.

Thinking-with the concepts of the Plantationocene and patches in conjunction with one another offers a powerful lens through which to reflect on and reimagine relations of living and dying across species lines, alongside the epistemic regimes of liveability and killability that undergird plantation necrobiopolitics.<sup>3</sup> Processes of extinction, extraction, and emergence in the patchy Plantationocene operate both sequentially and synchronously. Examining these dynamics through their *relationship* to one another, rather than as distinctive or hierarchically positioned objects of inquiry, helps

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<sup>3</sup> Biopolitics, as articulated by Michel Foucault (1990), refers to the ways in which institutions position life at the explicit center of political calculation. Necropolitics, as articulated by Achille Mbembe (2003), refers to the systematic subjection of particular peoples to the power of death and to precarious conditions of life. Whereas biopolitics emphasizes the governance of life through the power to “make live,” necropolitics emphasizes its counterpart – the power to “make die.” In conjoining these two interrelated yet often separately treated concepts, “necrobiopolitics” offers a way of thinking about plantations as régimes of killability without eliding or effacing how plantation formations may also enable or sustain particular human and other-than-human lives and futures (Chao, 2021c, p. 481).

reveal how the continuation of one process alternately sustains or undermines that of the other within the chains of multispecies interdependencies that animate plantation landscapes. In these ostensibly homogeneous and impoverished natures, the vitality of some organisms is put to work at the detriment of others. Meanwhile, modest yet resilient communities of critters have found ways to survive and thrive with oil palm, in forms of multispecies emergence that transcend – indeed challenge – prevalent narratives of the Plantationocene as zones of extinction and extraction *only*.

Multiple questions animate this experimental foray into the lifeworld of oil palm as plant, part, and product – or “lively capital,” in anthropologist Kaushik Sunder Rajan’s (2012) terms. What multispecies worlds are enabled or subverted by the proliferation of monocrops? What indexicalities, oppositionalities, and incommensurabilities are at play in the entanglements of human and other-than-human beings within plantationscapes? What ethical concerns arise in storying plantations as sites of multispecies flourishing? And how do emergent ecologies of “cenes” help or hinder scholarly attempts to address the tension between messy, sticky, situated multispecies worlds on the one hand, and the necessary reduction, abstraction, and simplification of always already patchy realities when repackaged as concepts and theories?

In addressing these questions through a patch-and-Plantationocene framework, I deploy what feminist philosopher Rosi Braidotti (2006) describes as a “nomadic ethics,” or a way of apprehending the world that eschews the fiction of unitary, bounded subjects or the possibility of totalizing accounts, and that instead tracks the multiple and interconnected movements, meanings, and mutations of diverse subjects across spatial, temporal, and epistemic domains (2006, pp. 4, 11). This approach draws on and distinguishes itself from my extant, ethnographically grounded scholarship on plantations in rural West Papua, and my engagements with decolonial research methodologies (see, for instance, Chao, 2022a; Chao & Enari, 2021). Traveling in a transversal mode across multiple domains by way of multi-sited, scale-hopping ethnographic vignettes, this article seeks to bring into the picture an array of different places and actors – from colonial institutions and plantation workers, to displaced Indigenous peoples, foreign tourists, laboratory scientists, parasitic and mutualistic species, and of course, oil palm itself. Attending to the uneven relations of extraction, extinction, and emergence at play between these diverse sites and subjects brings to light perspectives that may be submerged or flattened by narratives that approach plantation logic and its ethnographic granularities through any one of these angles alone (see Gómez-Barris, 2017; Sousanis, 2015). It helps foreground the sequential, synchronous, and situated ways in which plantations are worlded, unworlded, and reworlded. It points to the importance of reconciling theoretical conceptualizations of plantations as enduring ideology with ethnographically grounded examinations of plantations as ecological patches. And it invites difficult but important ethical, political, and methodological questions on how to story the lively facets of

monocrop lifeworlds without doing (further) violence to the human and other-than-human beings who experience plantations as lethal undoings and endings.

### **Extraction: Or, putting plants and people to work**

Typically deployed in the context of subterranean resources, the English word “extraction” derives from the Latin *extrahere*, meaning “to draw out.” The term denotes the removal or displacement of something or someone from their original home and roots, often by force, and to the ends of rendering this something or someone productive or useful in one form or another (Oxford English Dictionary n.d.; [Etymonline n.d.](#)). Plantations are not commonly referred to as extractive industries. As many an anonymous reviewer and conference organizer reminds me, plantations “don’t count” as extraction. The term, I am informed, is reserved primarily for mining, drilling, pumping, and quarrying activities. Here, the objects of extraction exist prior to their drawing out – coal, gas, and oil, for instance. In the Plantationocene, by contrast, plants and people are actively uprooted from one place, transplanted to another, and put to work together, the labour extracted from the one sustaining the vitality of the other. Displacement and emplacement conjoined, I argue back, are what make plantation extractions possible and productive. Extraction is thus a central operative of the Plantationocene. But what kinds of extraction are at play here, exactly? Let us think with *Elaeis guineensis*, the African oil palm.

The scientific name of the species itself – coined by the French botanist Nicholas Jacquin in 1763 – conjures extractions of both substance and source. *Elaeis*, from the Greek *elaia* meaning “olive,” refers to the bunches of oleaginous, ovoid-oblong drupes from whose nut and flesh kernel and crude palm oil respectively are crushed out. *Guineensis*, or “of Guinea,” refers to the west coast of Africa, from where native oil palm seeds and fruit were traded, transported, and transplanted across the tropical belt from the early nineteenth century onwards. But oil palm’s imbrication with extraction long predates its entry into Western scientific taxonomies and colonial-capitalist world systems.

Casks of palm oil unearthed in Egyptian tombs in Abydos by European archaeologists in the 1800s suggest that oil palm arboriculture in West Africa – from where the palm oil was traded – dates back to over five thousand years (Banks & Hilditch, 1933; Gunstone, 2001, p. 131). This hypothesis is further supported by palynological evidence of a substantial rise in oil palm pollen across West Africa during the Late Holocene (D’Andrea et al., 2006). Together with pearl millet and sorghum, oil palm was central to the prehistoric transition of West African societies from nomadism to sedentism between 2500 and 1400 BC (Casey, 2000). The plant was rarely intentionally cultivated, but rather spread by humans, birds, and other animals through seed dispersal. Germinating in forest clearings originally made for yams, taro, and

other staple crops, oil palm survived when horticultural sites were abandoned and until the next cycle of shifting cultivation, when it eventually overtopped the forest canopy and continued to produce harvestable fruit in extensive semi-wild groves (Sauer, 1993). Today, palm oil obtained from wild, semi-wild, and small-scale cultivated oil palm groves remains a primary ingredient in traditional West African cuisine, the male inflorescences tapped for toddy or palm wine, and the female inflorescences crushed to obtain cooking oil (see von Hellermann 2021).

Palm oil made its first forays down the trajectories of colonial trade in the sixteenth century, alongside pepper, shells, panther skins, and cotton that travelled down the broader Niger delta and adjacent Bights of Benin and Biafra via an intricate network of riverine channels coined the “Oil Rivers” by the British.<sup>4</sup> With the beginnings of the European slave trade in 1562 and the concomitant expansion of sugarcane plantations off the equatorial African coast and West Indies, the product entangled with the destinies of captive bodies aboard cargo ships, its oil used in the preparation of food for humans themselves violently extracted from their lands and homes to serve the agendas of racialized capitalist imperialism. Following the abolition of the slave trade in 1807, palm oil and palm kernels became the principal cargo of former slave ships, their value heightened by the Industrial Revolution and a growing demand for the ingredient in the making of margarine, candles, glycerine, machine lubricants, soaps, and tin plating (Henderson & Osborne, 2000; Jones, 1989; Miers & Roberts, 1988; J. E. Robins, 2021).

By the early twentieth century, oil palm populations had expanded into Central and South America, taking root in Colombia, Costa Rica, Ecuador, and Honduras. But it is in Southeast Asia, rather than oil palm’s native West Africa, that the mass production and extraction of palm oil first took hold. Early agronomic experimentation was carried out in North Sumatra by the Belgian agronomist Adrien Hallet, who had seen native exploitation of the species in the Congo and who developed the *deli* palm variety of higher oil percentage and yield. The creation of *deli* in turn paved the way for extraction made bigger and better. The first oil palm monocrops – the Deli estates – were established in 1911. These monocrops became the template for the near-nineteen million hectares of oil palm plantations spread out (and spreading) across and beyond the Indonesian archipelago – including back in oil palm’s native West Africa, where the plant’s traditional smallholder cultivation is now increasingly being substituted with large-scale, industrial, and often foreign-owned mega-plantations (Carrere, 2013; Meijaard et al., 2018).

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<sup>4</sup> The “Oil Rivers” comprised a vast area encompassing Bonny and Kalabari, Brass, Old Calabar, the Cameroons, and Lagos.

**Figure 1. Extraction: Aerial view of land being developed for oil palm cultivation.**



*Ulu Baram, Sarawak province, Malaysian Borneo. (Photo: Sze Ning, 2012).*

New and nefarious breeds of regimented extraction animate the techno-industrial world of oil palm (see Chao, 2018b). Oil palm agronomists and plantation managers whom I interviewed and participant-observed during fieldwork in monocrop concessions in Jambi (Indonesia), and Sarawak (Malaysia) explained that extraction in the plantation begins in the third year of oil palm's life, when the plant starts to bear mature fruit. From then on, fresh fruit bunches are harvested every ten to twenty-one days, quadrant by quadrant and for the next twenty years, their weight increasing from five to over fifty kilograms. At the twenty-five-year mark, unproductive oil palm stands are mechanically felled, chipped, and replaced with new seedlings from the nursery, and the cycle begins all over again.

Once fruit are harvested or naturally fall from the tree, their free fatty acid content rises exponentially. The fruit must be processed within twenty-four hours lest they begin to ferment. Time is of the essence. In the mills and refineries that I visited during my fieldwork, harvested fruit bunches were day and night sterilized, threshed, steamed, stripped, crushed, churned, pressed, digested, clarified, vibrated, and dried under extreme temperatures and pressure, to the deafening roar of engines and the pungent smell of oil and acidic fumes. Continuous heating and stirring in the press digester loosen the fruit's mesocarp and breaks open the oil cells. Extraction is accompanied by purification, as high-heat refining removes remaining fragments of rancidity-

inducing elements. Representatives of oil palm conglomerates listed these elements to me over the course of my visits to their mills and refineries in Jakarta and Kuala Lumpur: phosphatides, sludge, fibre, sand, gum, fatty acid, water, dirt, and trace minerals. Degumming, bleaching, sterilization, deodorization, and hydrogenation, my interlocutors explained, transform the once carotene-rich red oil into its more aesthetically pleasing (and therefore sellable) transparent varieties, samples of which were displayed on corporate premises, enclosed in shiny glass cases: solid palm stearin, liquid palm olein, palm fatty acid distil, and palm mid-fraction. Left over from this convoluted procedure, and often left unmentioned during the tours I was given, is a viscous, indelible black gunk that reeks of tar, burnt caramel, formaldehyde, and bitumen. Expensive to dispose of safely, and often hidden away in staff-restricted areas of the mills and refineries, this toxic by-product ends up seeping into the soils and rivers of the plantation and beyond, no longer useful yet ongoingly harmful. The conjoined processes of depletion and destruction that accompany industrial production and extraction echo powerfully through the substance's name: spent earth.

Meanwhile, scientists in urban biotechnology laboratories and agronomic research centres far removed from the plantation work away at the project of making extraction bigger and better. Experiments I observed in these settings involved delicately handled oil palm gametes and ramets housed and germinated in test tubes, pipettes, petri dishes, and humidity domes. Together with functional-structural genetic plant modelling and 3D architectural mock-ups of cross-bred palm progenies, these experiments are driven, as one Malaysian expert genomist explained, by the pursuit of an oil palm "ideotype" that is "more" in every sense. More oil percentage. More yield. More rapid maturation rates. More fruit bunches. More photosynthetic efficiency. More optimal nutrient uptake. More dense planting potential. More high-quality oil. More regular germination. More climate resilience. More resistance to pests, pathogens, drought, and water stress. All to say, more profit.

The unnatural history of oil palm, then, has long been one of extraction-cum-transformation – one in which the plant's biotic vitality (its genes, growth, germination, and more) are worked upon and put to work as a form of vegetal labour (Barua, 2018; see also Beldo, 2017; Blanchette, 2017). The logic of extraction that produces oil palm as capitalism's Cheap Nature or unpaid workforce (Moore, 2015) in turn relies on extractive relations between plantation owners and plantation workers. Prefigured in the spectacular violence of nineteenth-century sugar and tobacco plantations of the Caribbean and American South and the atrocities of the Trans-Atlantic Slave Trade, extractive labour regimes and practices abound in the palm oil sector today.<sup>5</sup> Hired as casual or seasonal labourers, plantation harvesters, pesticide-sprayers, and loose fruit

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<sup>5</sup> The afterlives of plantation slavery perdure in the structural, racial, and everyday violence suffered by African-American people to this day, all of which continue to render normative the production of premature Black death (Sharpe 2016). See also Hartman (2007); Hatch et al. (2019); McKittrick (2011); Rusert (2019); Wynter (2003).

collectors in the Southeast Asian oil palm sector often work under highly precarious conditions, their unprotected bodies exposed daily to an array of toxic chemicals. Below-minimum wage payments, the suppression of independent unions, together with forced, child, and trafficked labour, remain rife (Koczberski & Curry, 2004; Li, 2017b; Pye et al., 2012; SawitWatch, 2006). In rural Sarawak (Malaysia), plantation workers whom I encountered during my fieldwork were often migrants from neighbouring regions of Indonesia in search of better opportunities, or from poor rural villages surrounding the concessions. Many described having been transported by labour brokers to remote plantations, living severed from their families, without access to clean water, lighting, and other basic facilities, and feeling further isolated by a lack of social support, cultural barriers, and ethnic discrimination. Subject to the abusive conditions of debt bondage, none knew for certain whether they would ever make enough money to return home.

In the Plantationocene, then, labour is extracted from vulnerable persons and bodies themselves extracted from native place and kin in order to further the extraction of palm oil and the production of profit. Extraction, in other words, multiplies across species lines. These mutually entangled chains of exploitation in turn produce a version of what Science and Technology Studies scholar Michelle Murphy (2017) calls “surplus life,” of lives that are deemed disposable, whose future continuance is inconsequential, and that are therefore sacrificeable and ungrievable in the name of nation and economy (see also Agard-Jones, 2013; Butler, 2010; Chao, 2021a, n.d. a). In the palm oil nexus, surplus life also encompasses the many Indigenous communities who are systematically dispossessed without consultation or consent of their customary territories to make way for industrial monocrops and attendant infrastructures – mills, refineries, irrigation channels, and roads – yet who remain by and large excluded from the sites and circuits of palm oil production (Chao, 2019a, 2022a; Colchester et al., 2011, 2014; Colchester & Chao, 2011, 2013). Across tropical Southeast Asia, but also in Latin America and West Africa, Indigenous peoples are forcibly displaced or resettled from their kindred soils, waters, and forests, uprooted from their ancestral lands, and left to fend for themselves in makeshift huts and tents erected at the outskirts of the plantation, or by the side of dusty roads. Sheltered under plastic sheets and corrugated aluminium roofing, they watch the overloaded palm oil fruit trucks rumble by. The bulldozers slashing away at the forest. The spent earth bleeding into the waterways. They watch extraction in action.

### **Extinction: Or, flattening multispecies worlds**

The African oil palm thrives best in lowland humid environments, and particularly in or near riverine forests and freshwater swamps. Shade-intolerant and highly hydrophilic, the plant requires high levels of soil moisture, temperatures ranging from 24 to 32 degrees Celsius, and at least 1,780 to 2,280 millimetres of rain per year. Vast and

open areas are ideal, as oil palm struggles to compete with faster-growing tree species. Suitable soils vary from sandy to lateritic red and yellow podzols, young volcanic soils, alluvial clays, and peat soils – so long as they are neither too acidic nor alkaline. Water tables may undergo significant fluctuation, but continuous flooding and large bodies of above-ground stagnant water are disfavoured. It is these factors combined that make the planet's tropical belt the ideal environment for oil palm cultivation. But it is also in these very same tropical zones that the highest levels of biodiversity today are found, and where the most rapid rates of species extinction are occurring. Extinction, then, constitutes our second point of entry into the lifeworld of oil palm.

Today, palm oil is one of just four commodities driving the majority of tropical deforestation (up to half, according to some reports) and oil palm plantations represent the second largest driver of global warming after beef production (Union of Concerned Scientists, 2016).<sup>6</sup> Between 2000 and 2010 alone, oil palm monocrops were responsible for two to nine percent of worldwide emissions from tropical land use (Carlson & Curran, 2013). The establishment of plantations on carbon-rich peatlands plays a major role in this story. Peatlands may release up to twenty-eight times as much carbon as the forests above them when drained for agricultural purposes, requiring more than six hundred years for the carbon balance to be re-established (Danielsen et al., 2009). Easily ignited following drainage and difficult to extinguish, predict, and control, peat fires can last for weeks or even months, smouldering subterraneously over vast areas and sometimes re-emerging miles away from their original source (Page & Hooijer, 2016). Highly concentrated planting in oil palm monocrops also reduces freshwater and soil quality and undermines critical ecosystem services once sustained by forests, such as the regulation of hydrological cycles. This in turn enhances the risk of abiotic effects including intensified winds, soil desiccation, and wildfires. Gradually, soil erosion and nutrient and mineral depletion undermine the very grounds of the plantation. We find ourselves once again in the realm and ruins of spent earth.

For those organisms who survive the felling and the flames, the ecologically and structurally simplified ecology of oil palm plantations prove a largely inhospitable environment – one characterized by a uniform tree and tree age structure, low canopies, sparse understory vegetation and woody debris, low-stability microclimates, the almost-complete absence of leaf litter, a twenty-five to thirty-year clearing cycle, and run-off chemical fertilizers and pesticides (Danielsen et al., 2009; Obidzinski et al., 2012; Petrenko et al., 2016; Savilaakso et al., 2014). Habitat fragmentation, the shift to simpler community compositions, the absence of ecological corridors, and the impervious barriers posed by plantations to species migration undermine both species

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<sup>6</sup> The four commodities are beef, soy, palm oil, and wood products.

richness and abundance, allowing only about fifteen percent of native animal species to survive the transition from primary forest to plantation, and fewer than half of vertebrate communities (Fitzherbert et al., 2008). According to the IUCN Red List of Threatened Species, palm oil production is affecting at least 193 threatened species globally, including 54% of all threatened mammals and 64% of all threatened birds (Meijaard et al., 2018).<sup>7</sup> Among the most vulnerable to forest-monocrop landscape transitions, and associated heightened poaching activities and human-wildlife conflicts, are the critically endangered Bornean and Sumatran orangutans, the Sumatran tiger, the Sumatran rhinoceros, and the Sumatran and Bornean pygmy elephants, as well as forest specialist species such as the *Muscicapa* flycatcher, arboreal fruit-eating gibbon, and peat swamp frog.

**Figure 2. Extinction: Cassowaries are one of many native species whose habitats are threatened by monocrop oil palm expansion.**



*Merauke, Indonesian West Papua. (Photo: Vembri Waluyas, 2020).*

More often than not, oil palm expansion intensifies – rather than creates – the threat of extinction faced by tropical flora and fauna because it tends to take place within a broader mosaic – or patchwork – of extractive industries both past and present. These extractive landscapes include agribusiness operations, but also mining, logging, pulp and paper, and urban infrastructural developments, that have already radically undermined the ecosystems that endangered species depend upon. Forest fragments

<sup>7</sup> A search with the key words “palm oil,” “palm plantation,” or “oil palm” within the “Threats” text boxes for species assessments in the IUCN Red List categories reveals that oil palm threatens 405 species worldwide, of which 193 are listed as Critically Endangered, Endangered, or Vulnerable (Meijaard et al., 2018).

left standing between developed zones tend to be small, few in number, and susceptible to adverse and cumulative edge effects. The lack of biotic corridors connecting these fragile ecological patches in particular undermines their ecosystemic viability, including species migration and dispersal, nutrient recycling, and pollination through biotic vectors. Over time, patches become home to simpler, species-poor communities dominated by a few generalist types of low conservation significance.

When it comes to an agribusiness sector that is of critical importance to global food and (renewable) fuel security, notably less land-intensive than any other oil crop, and increasingly central to the economic development of Global South nations, balancing extraction and conservation is a Catch-22. The establishment of High Conservation Value (HCV) zones under oil palm certification schemes like the Roundtable on Sustainable Palm Oil, for instance, seek to preserve select patches of forest to sustain populations of endangered species, as a trade-off for the tens of thousands of hectares cleared for oil palm. In the process, conservation initiatives – both corporate and state-promoted – end up creating “sacrifice zones” where deforestation proceeds at an unrelenting pace, and across ever larger swaths of land (Chao, 2021d; *cf.* Oliveira & Hecht, 2016). Meanwhile, agronomic experts and conservation scientists whom I interviewed during the Annual Conferences of the Roundtable of Sustainable Palm Oil (RSPO) spoke of being torn between adhering to the logic of land use expansion or intensification (otherwise known as the “land sharing or sparing” debate) (RSPO 2012, 2013, 2014). The former approach, they explained, allows biodiversity to be better maintained within the agricultural landscape, but at the cost of less dense planting (and therefore lower palm oil yields) and greater areas of land. The latter approach, meanwhile, leaves greater areas of natural habitat untouched, but radically depletes those areas that *are* planted, often rendering them useless in the long-term for the purposes of both humans and ecosystems. Wicked problems abound in the plantationscape.

In the material space of the monocrop, however, it is not scientific reports or conservation statistics that conjure the flattening, deadening force of Plantationocenic singularity and sameness, but rather its ghostly and strange sounds and sights. In the plantation, as many of my Indigenous Marind interlocutors in rural West Papua described, an uncanny silence presides, interrupted occasionally by the metallic drone of bulldozers, the rattling of electric chainsaws, the rumbling of oil palm fruit trucks, and the torrential gush of toxic effluents spewing from the refinery and mill (Chao, n.d. b, 2017, 2022b). In this realm of sensory alienation and disorientation, there are no bird cries or animal sounds. Row after row of identical oil palms, planted equidistant one from the other, extend as far as the eye can see. From time to time, a breeze animates the canopy. A frond collapses. A fruit bunch hits the ground. Other than this, there is no movement detectable in the plantation, no matter how far or how long one

walks. There is only silence and singularity. There is only the being and time of oil palm – growing, fruiting, senescing.

Alongside extraction, plantation regimes operate through the conjoined (il)logic of ecological simplification, reorganization, and homogenization. As Haraway puts it, the Plantationocene “radically simplifies the number of players and sets up situations for the vast proliferation of some and the removal of others. It’s an epidemic friendly way of rearranging species life in the world” (cited in Mitman, 2019, p. 5; see also Scott, 1998, pp. 262–306; Shiva, 1993, pp. 6–12; Tsing, 2011, p.19). Singularity and sameness may not be viable ecologically (more on this later) – but they are ideal economically. For instance, mono-landscapes lend themselves well to agronomic management and control. Here, the effects of variables including fertilizer, rainfall, and weeding can be easily monitored and evaluated. The product harvested from monocrops tends to be uniform in size, dimensions, and yield, thus matching market demand and limiting the risk of revenue fluctuation. But singularity and sameness, both imposed and envisioned, also flatten multispecies lifeworlds. They create non-human forms of surplus life – those lives deemed sacrificeable, unvaluable, and therefore better not born. They foreground the uneven necrobiopolitical dynamics undergirding capitalist natures, wherein the proliferation of some comes at the cost of many multiple others.

But not everyone reads deadly singularity in the plantationscape as a multispecies contact-less zone. Sitting beside me on a flight into Kuala Lumpur, a family of British tourists peer excitedly down at the endless stretch of oil palm greeting us on our descent. It is their first trip to Malaysia, the mother tells me. They have come to visit the country’s famous rainforests and national parks. They hope to encounter an orangutan. They are amazed to see the rainforest below – so green, so dense, so big, and so close to the city. Also, so very orderly and organized – it’s wonderfully neat, the father comments. They are shocked when I tell them this is not a forest, but an oil palm monocrop. They gaze again at the deceptively lush canopy and its regimented sea of fronds from the airplane window. They seem disconcerted – almost displeased by the inconvenient revelation. Well, it’s still forest, the mother concludes. I mean – there are trees after all, and lots of them at that. I look down at the neo-nature below as it inches ever closer. She’s not wrong. There is a strange aesthetic to singularity and sameness – albeit a deadly one. Are plantations, I wonder, the forests of the future?

### **Emergence: Or, unearthing more-than-human futures**

In an oil palm concession lying two thousand three hundred kilometres southeast of Kuala Lumpur, in the Indonesian province of Jambi on the island of Sumatra, a young worker is making his way to the aviary. It is feeding time for the plantation’s twenty

resident barn owls. Intentionally introduced from Java some years earlier, the owls are part of the company's Integrated Pest Management Program and serve as natural predators to rat populations, a major pest in oil palm plantations. Some among the owlets are wild-caught and others captive-bred. Those that have resided in the aviary for six months will soon be ready for soft release into the plantation. Here, they will make new homes in wooden nest boxes built high atop metal poles and equipped with hiding rooms and partitions to enhance occupancy, nesting, and breeding. From these nest boxes, the owls will travel a radius of up to one thousand metres once night has fallen, gliding silently across the undergrowth in search of rats, frogs, lizards, snakes, fish, mice, and smaller birds. Every so often a shrill shriek echoes through the canopy, signalling the presence of these otherwise largely invisible raptors. They will reproduce once a year. They will always return to the same nest box. Plantation workers call them the guardians of the oil palm.

Biological pest management strategies are increasingly required of corporations seeking to achieve sustainability certification for their product. In the process, species like the Javanese barn owl (*Tyto alba javanica*) have become key players in oil palm plantations. As I discovered during my research in oil palm monocrops in rural West Papua (Chao, 2021c), the biotic affordances of these species are often harnessed within Integrated Pest Management programs to control the high rates of pest infestation and feral proliferations that monocrops invariably suffer from as a result of ecological simplification and homogenization (cf. Scott, 1998; Tsing et al., 2019). Fellow biological allies animating Plantationocenic environments that I encountered during this research included leopard cats, Asian palm civets, snakes, and diurnal birds such as the yellow-bellied prinia, lesser coucal, ashy tailorbird, great tit, and oriental magpie-robin, all of which prey on rodents and other small vertebrates. Parasitoids such as the yellow assassin bug, tachinid flies, and chalcidoid wasps prey on the eggs and larvae of the damaging rhinoceros beetle. Other species, meanwhile, support oil palm's reproduction through pollination, such as the pollinating weevil (*Elaeodobius kamerunicus*) that was introduced from Africa to Asian plantations in the early 1980s (J. Robins, 2021).

Certain plants, too, play an important role in sustaining oil palm ecologies. For instance, fast-growing and abundantly leaf-shedding plants including *Cassia cobenensis*, *Cassia tora*, and *Euphorbia heterophylla* are often intentionally planted in concessions as they aid in soil nitrogen fixation and moisture retention, prevent soil erosion and weed growth, and provide nourishing humus to support oil palm's maturation. Leguminous ground cover plants prevent the chippings of felled palms from becoming breeding grounds for the rapacious rhinoceros beetle. An array of bacterial communities are also harnessed by plantation operators as biofungicides and biofertilizers that inhibit the growth of pathogenic fungi on oil palm trees. These include bacteria from the genera *Trichoderma*, *Aspergillus*, *Fusarium*, and *Burkholderia*.

Alongside other “multispecies entrepreneurs” (Kirksey, 2015), oil palm mutualists support the plant’s healthy growth while furthering their own proliferation.<sup>8</sup>

**Figure 3. *Emergence: Domesticated barn owl enlisted in a plantation Integrated Pest Management Program.***



Jambi, Indonesia. (Photo: Sophie Chao, 2019).

Some feral proliferations, however, remain stubbornly resistant to biological and chemical control. Most prominent among these are the devastating epidemics provoked by *Ganoderma*, a fungus that spreads through the root systems of host and neighbouring oil palms, concealing itself for several years before proliferating suddenly and uncontrollably. Red-orange fructifications begin to appear along the oil palm trunk, the root cortex slowly rots, the base of the palm stem blackens and exudes a viscous gum, and eventually, the crown of the tree falls off and the trunk collapses. *Ganoderma*

<sup>8</sup> On the indexical or antagonistic relations at play between plantation parasites, mutualists, and human labourers, see inter alia Beilin and Suryanaryanan (2017); Chao (2021c); and Paredes (n.d.).

can be treated with *Trychoderma* fungi, but only for a limited period of time due to *Trychoderma*'s short lifespan. When an infection is detected, all still-healthy palms within four square meters must be pre-emptively felled and burned, and the soil entirely replaced to the same level of depth.

Where parasites cannot be fully eradicated, compromises and trade-offs must be sought to maintain an equilibrium between pests and their predators, in which population thresholds are balanced out against economic thresholds. Rat populations, for instance, are tolerated so long as they limit their destructive effects to less than five percent per hectare of plantation. Some soft grasses, ferns, and flowering plants are also allowed to grow so long as they do not impede on harvesting and loose fruit collection. And yet even then, human strategies of biological control can backfire. For instance, species such as the ground cover plant *Mucuna bracteate*, that are intentionally introduced in light of their beneficial ecological services, can transform from biological ally to problematic weed when they proliferate in unplanned ways and with unintended consequences, robbing oil palms of their nutrients and water and thereby undermining the cash crop's growth and yield.

The more-than-human ecologies birthed by industrial oil palm assemblages thus complicate the prevailing characterization of monocrop plantations as realms of totalizing singularity – as dead spaces of “out-and-out exterminism,” in Haraway's (2019) terms. Rather, forest unworldings go hand in hand with new and different plantation worldings – some of them beneficial to oil palm, and others lethal. Within these emergent ecologies, an array of critters are finding new fodder and futures in the company of oil palm. Often of simpler composition, low conservation value, and dominated by a few generalist types, plantation eco-communities contrast starkly with the biodiverse rainforest and peat forest ecosystems that they replace. They are also often largely invisible and inaudible to human eyes and ears. Indeed, plantation dwellers are generally only detectable through the traces and marks they leave upon the landscape, rather than through fleshly, face-to-face encounters.

Perceiving these traces and marks, and the beings that generate them, demands a cultivation of attentiveness from the patchiness of the ground up – a “looking around” (Tsing, 2014) and also *beyond* the singularity and sameness of the monoculture. Looking around uncovers a Plantationocene animated by myriad secretive lives, stories, and socialities – some nested away deep in the undergrowth, others flourishing at the core of palms, and yet others making worlds high up in the canopy. Looking around unearths what cultural theorist Macarena Gómez-Barris calls “submerged perspectives,” or perspectives that centre processes of emergence within extractive zones, as they manifest in new forms of multispecies vitalities (2017, pp. 3–4). Looking around reveals that even in industrial monocrops, nothing comes without its world (Puig de la Bellacasa, 2012).

As anthropologist Anna Tsing writes, storying more-than-human worlds demands that we differentiate between “forms of disturbance that are inimical to all life and those that offer multispecies opportunities” (2014, p. 108). Storying in this mode brings us face to face with radical incommensurabilities in the relative value attributed to non-human life, alongside non-human hierarchies and relationalities. It invites us to consider the ethical and political responsibilities that arise in storying plantation life and deathworlds as “lively ethographies,” grounded in forms of knowing and engaging that acknowledge the consequential lives of other-than-human actors (Chao, 2020; van Dooren & Rose, 2016, p. 77). It also problematizes how (or whether) to resist normative or prescriptive scholarship in navigating the line between stories of hopeful emergence on the one hand, that unearth in ferality an unexpected politics of the possible, and stories of irremediable finality that find in extinction an urgent prompt for a radical rethinking of our relations to the environment (Chao, 2021e; Chao et al., 2022; Chao & Enari, 2021; Tsing et al. 2021). Together, these questions invite us to consider: what are stories of multispecies emergence for, who gets to tell them, and whom do these stories serve?

Back in the Indonesian province of Jambi, night has fallen over the plantation. The young worker has fixed two wooden nest boxes and is on his way home. A fierce shriek cuts through the night. The plantation worker recognizes the distinctive call of the guardian of the oil palm, and smiles. He tells me that the barn owl is not a guardian to everyone. Many Indigenous groups in the area, including displaced members of the many Orang Rimba tribes who have lost their forests to oil palm, find the bird terrifying and consider it dangerous. They describe it as an intruder and a ghoul – always lurking and watching in the shadows. They call it the “ghost owl,” the “demon owl,” or the “death owl.” With time, the worker explains, Orang Rimba will learn to live with barn owls, just like they will learn to live with oil palm, because whether it’s good or bad, oil palm, at the end of the day, is here to stay. The raptor’s shrill cry echoes once again, somewhere in the distance. The plantation quivers. Plantation worldings and unworldings continue into ever darker nights.

## **Reimagining Plantationscapes**

This paper has examined plantation lifeworlds through the tripartite lens of extraction, extinction, and emergence, as they animate the lifeworld of industrial oil palm in sequential, synchronous, and situated ways. Following these multiple lines of flight highlights how the engineered hegemony of Plantationocenic formations is belied by the patchy stories, ecologies, and substances that shape them – some of which are characterized by complementarity and others by friction. Plantations, as such, are not worldless spaces, devoid of meaning, matter, or morality. Rather, plantations are *of* and *for* some worlds, and not others. And plantations are also never *entirely* inimical

to life (Tsing, 2014, p. 108) – even as they remain primary drivers of ecological disturbance and disruption.

In methodological terms, grappling with the uneven necrobiopolitical relations of the plantation form demands an interdisciplinary practice of epistemic nomadism that engages with “patchiness” as an object of inquiry and as a mode of research and representation, at the same time as it converses with and contributes to, interdisciplinary theorizations of the Plantationocene as enduring logic. Reconciling ethnographic specificity and conceptual transposability is no easy task. It produces erasures and silences that demand to be reckoned with and acknowledged. Absent from this account, for instance, are the voices of rural smallholders, global consumers, multi-national conglomerates, financial institutions, social and environment non-governmental organizations, and last but not least, the spirits and souls that also participate in the (un)making of more-than-human worlds (Bubandt, 2018; Chao, 2019b; Hermanns, 2020). In the image of these unevenly shared worlds, plantation narratives, too, must be understood as partial and patchy.

Far from prescriptive or exhaustive, the approach deployed in this article thus invites other complementary ways of grappling with the dispersed ontology of the plantation form. One might follow cash crops through their material, biotic, and ecosystemic connections across space and time as crop, food, animal feed, biofuel, and myriad industrial outputs (e.g. Head et al., 2012; von Hellermann n.d.). One might explore the discursive force of plantation logic within human-generated rhetorics of development and realities of dispossession that so often accompany plantation proliferation (e.g. Hetherington, 2020; Leguizamón, 2020). One might grapple with plantations as zones of violent and phantasmagorical (un)becoming, distributed within and across species lines (e.g. Allewaert 2013; Taussig 2018). One might also attend to the phenomenologies and imaginaries of Indigenous and other marginalized communities who experience and theorize multispecies landscapes through their own relational, beyond-human, multi-sensory, emplaced, reflexive, and decolonial philosophies, practices, and protocols (e.g. Chao, 2022a; Chao & Enari, 2021).

At the same time, the multi-sited story of oil palm explored in this piece invites attention to the metaphorical and metonymic values of the “plantation” *beyond* its agro-industrial manifestations (Chao, 2022b). When conceived more broadly as an extractive site and system of power in which marginalized (and often racialized) human and other-than-human subjects labour for the benefit of others, the plantation comes to encompass myriad other institutions. These include prisons, the criminal justice system, and industrial livestock factories, but also white-dominated institutions like universities and their constitutive members and disciplines, whose sources of funding sometimes originate from philanthropic branches of long-standing oil palm and agribusiness corporations (for instance, the Leverhulme Trust’s darker origins lie with the soap and

cleaning product conglomerate and major oil palm retailer Unilever) (Clukey & Wells, 2016; McKittrick, 2013; Shange, 2019). In this and many other ways, plantation regimes invite us to consider how the (il)logic of simplification, exploitation, and homogenization transcends the agro-industrial space of monocrops as “shadow places of capitalism” (Plumwood, 2008) and impinges upon an array of other, uncomfortably familiar, paradigms, practices, and institutions.

More provocatively, perhaps, the situatedness of plantation assemblages and their attendant forms of violence opens space to rethink the ways more-than-human worlds are theorized in an age of great unmaking, and their methodological, political, and ethical implications. It invites us to consider the (im)possibility of comparing the unspeakable violence committed against Black slaves in United States and Caribbean plantations to the exploitation of plants, land, and smallholders in present-day monocrops. It demands attention to the terms and implications of analogizing human and other-than-human lives and deaths when they are entangled and indexical, yet also radically different and potentially incommensurable. It reveals the difficult balancing act involved in resisting or opposing ongoing processes of extinction and extraction while also refraining from backgrounding or devaluing the emergences that extinction and extraction paradoxically enable. It also problematizes the elaboration of transposable conceptual frameworks that may eschew the exigencies and nuances of ethnographic specificity in storying multispecies worlds. It further foregrounds how theory asserts intellectual mastery over the messiness of everyday, lived lives that must be reduced and simplified for the purposes of generalizable validity, and in doing so, becomes itself uncannily plantation-like.

Theories and concepts such as the Plantationocene, then, can help us understand the enduring logics and ideologies that shape plantations and their afterlives. Debates that have flourished surrounding this term may themselves be understood as a vital form of political, intellectual, and ethical emergence. But theories can also elide the situated, fleshly specificity of plantations as patchy zones of more-than-human entanglement *and* as violent sites of racialization and dehumanization, in ways that obscure the realities and reasonings that precede and ground them (Haraway, 2008; Weheliye, 2014). As material formation and conceptual analytic, the plantation thus calls for modes of theorizing that push against assumptions of mastery in and of worlds theorized. Thinking-with the figure of “spent earth” – the lethal by-product of agribusiness extraction encountered earlier in this essay – invites reflection also on the “we’s” and the “worlds” generated by plantationocenic proliferation: whether these are the worlds we want to inhabit, what is lost in doing so, who counts or does not count within the more-than-human “we,” and what new or different communities of “we” might be enabled or pre-empted by Plantationocenic landscapes and logics.

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